



**UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY**



MZUMBE UNIVERSITY

**ENVIRONMENTAL AND SOCIAL IMPACT STATEMENT FOR THE PROPOSED
ESTABLISHMENT OF ACADEMIC BLOCK, TWO (2) STUDENTS HOSTELS,
CAFETERIA, DISPENSARY, FOUR (4) STAFF HOUSES AND RESERVOIR TANK AT
PLOT NO. 1, BLOCK 'A', MZUMBE-TANGA CAMPUS, PANGARAWA AREA,
GOMBERO VILLAGE, GOMBERO WARD, MKINGA DISTRICT IN TANGA REGION**

PROPONENT

MZUMBE UNIVERSITY

P.O.BOX 1

MZUMBE, MOROGORO

MARCH, 2024

EXECUTIVE SUMMARY

1. Introduction

Mzumbe University (MU), through the Government of the United Republic of Tanzania (URT) has received financing from the World Bank to implement Higher Education for Economic Transformation (HEET) Project. Under HEET Project, MU intends to establish an academic block, two (2) students' hostels, cafeteria, dispensary, four (4) staff houses, and reservoir tank in Gombero Village, Gombero ward, Mkinga District, Tanga Region. However, the construction and operation of the proposed project are expected to have environmental, social, and economic impacts, which need to be identified and mitigation measures put in place for ensuring sustainability of the project.

The World Bank Environmental and Social Frameworks (ESF) and Standards (ESSs) as well as the Environmental Management Act of 2004 of Tanzania require project developers to carry out an Environmental and Social Impact assessment (ESIA) prior to new project implementation. Through a rigorous ESIA, potential environmental and social impacts will be thoroughly evaluated, and necessary measures will be recommended to ensure the continued harmony between academic growth, infrastructure development, and environmental preservation. Therefore, this ESIA study was done in line with Environmental Management Act, Cap 191, the Environmental Impact Assessment and Audit (Amendment) Regulations, 2018, and the World Bank Environment and Social Framework (ESF) as well as the project's Environmental and Social Management Framework (ESMF). In addition, this ESIA has been guided by the Project Appraisal Document (PAD) and Project Operational Manual (POM) both of 2021.

2. Projects Description

The proposed project initiative was driven by the need to accommodate the increasing demand on existing infrastructure, hence establish a new Campus in Mkinga District, Tanga Region. The new establishment will consist of an Academic Block, two (2) Students' Hostels, Cafeteria, Dispensary, four (4) Staff Houses and Reservoir Tank. Currently, MU has three campuses; Main Campus in Morogoro, Dar es Salaam Campus College and Mbeya Campus College with an estimate of 15,000 students. Therefore, the proposed project will absorb the growing number of graduates from basic education who are both inspired and capable of pursuing higher education in Tanzania.

3. Relevant Policies and Legislation

The National laws, policies, plans, strategies, and legislation relevant to this project have been discussed in this report. Furthermore, this ESIA study has also complied with the World Bank's new Environmental and Social Framework (ESF) and applicable World Bank Environmental and Social Standards (ESSs) to HEET project.

4. Stakeholders Engagement

Stakeholder identification and involvement adhered to guidelines specified in the Environmental Impact Assessment (EIA) and Audit Regulations (2005, as amended in 2018), World Bank Environmental and Social Standards (ESS10), and the Stakeholders Engagement Plan (SEP).

Public consultations entailed the sharing of project details, comprehension of stakeholder concerns, and cultivation of community relationships. Key stakeholders were pinpointed based on their roles, significance, influence, and potential impact on the project. The Stakeholders Engagement Plan (SEP) encompassed both national and sub-national levels, with a particular emphasis on sub-national stakeholders. It delineated the specifics of engagement pertaining to project activities, encompassing stakeholders at regional, district, and village tiers. The project aspired to inclusivity by involving women, vulnerable populations, and individuals with special needs. Consultations occurred throughout the project's duration, and mechanisms were instituted to address issues such as Gender-based Violence (GBV), Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH).

5. Impact Assessment and Proposed Mitigation and Enhancement Measures

The project implementation will have environmental and social consequences at various stages throughout its lifecycle. The construction, operation, and closure phases of the proposed project will generate impacts. One of the most significant and noticeable impacts will be the pollution of the surrounding environment, affecting water, land, air, and vegetation. Despite the project being enclosed within a fence, there is still a possibility of direct or indirect impacts on these elements due to the project implementation.

5.1 Significant environmental impact

Negative environmental impacts

- Contamination and /impaired quality of receiving body – land and water.
- Increased Air pollution and climate change
- Increased generation of solid and hazardous waste
- Generations of Solid and Hazardous Wastes
- Generations of Liquid Wastes
- Storm water generation and overflow
- Increased vibration
- Air pollution due to dust and gases emission.
- Increased Noise level
- Loss of vegetation
- Impact on natural resource (Energy and water)
- Erosion of Exposed Surfaces
- Increase storm water generation and overflow.
- Loss of Visual Aesthetics

Positive environmental impacts

- Improved visual aesthetics of built environment.
- Management of storm water and reduction of environmental pollution
- Proper management of secondary vegetation e.g. trees

5.2 Significant Social Impacts

Positive social impacts

- Job creation and employment opportunities
- Increase in market for local construction materials.
- Increase skills and impart knowledge to local communities.
- Reduce noise level; this may happen due to the removal of heavy machinery at the project site this will reduce the amount of noise from project area.
- Increase of commercial and social activities around project locations
- Growth of trade and increase investment.
- Production of skilled labour force for implementing various development policies, plans, and goals for sustainable social and economic growth of the Nation.
- The growth of Banking activities within the project area.
- Occupational Safety and Health impacts
- Community Health, Safety and Security
- Gender discrimination

Negative social impacts

- Child labor
- Food Insecurity
- Increase level of crimes
- Loss of employment and revenues
- Loss of revenue to institutions and the government
- Loss of business opportunity

6. Mitigation and Enhancement Measures

The ESIA report recommends a set of mitigation and enhancement measures to minimize any adverse effects identified during the assessment. These measures include proper waste management practices, regular monitoring, and community engagement to ensure that the project aligns with sustainable practices.

The developed Environmental and Social Management Plan (ESMP) outlined in this report outlines the schedule for implementing the proposed strategies to mitigate these impacts, as well as plans for ongoing monitoring. It clearly defines the roles and responsibilities of various parties involved in mitigating and monitoring the adverse environmental and social effects. Mitigation and enhancement measures for the ESIA of the proposed establishment of new buildings at MU-Main Campus should be carefully planned and implemented throughout the project's lifecycle. Here are measures for each phase:

a. Potential mitigation and enhancement measures associated with Construction phase

Mitigation measures

- Implement measures to prevent loss of significant secondary vegetation.
- Monitor construction activities to minimize noise and dust pollution.

- Schedule construction activities to minimize disruption to the campus and nearby communities.
- Monitor construction activities to minimize noise and dust pollution.
- Implement effective dust suppression techniques, such as using water sprays or dust suppressants on construction sites to minimize the release of fugitive dust.
- Provide waste handling facilities such as waste bins and skips for temporarily holding domestic waste generated at the site.
- Explore and implement advanced construction techniques that minimize vibrations.
- Ensure the proper selection of appropriate transportation route in consultations with stakeholders, avoiding large agglomerations as well as good Site Practices such as signage and signal personnel where appropriate and vehicle lighting (front and back).

Enhancement Measures

- Employ local labor and contractors to stimulate the local economy.
 - Provide training to workers on environmental and safety practices.
 - Establish a complaints mechanism for addressing construction-related issues promptly.
- b. Potential Mitigation and Enhancement Measures associated with Demobilization phase.**

Mitigation measures

- Remove all construction equipment and materials from the site.
- Conduct a final site inspection to ensure compliance with environmental standards.

Enhancement Measures

- Restore any temporarily impacted areas to their original state or as agreed upon with relevant stakeholders.
- Hold a community engagement session to inform residents of the completion of construction activities.

c. Potential mitigation measures associated with Operation and Maintenance phase.

Mitigation Measures

- Develop a comprehensive reforestation plan to replace cleared vegetation.
- Implement the use of renewable and cleaner energy sources for construction equipment to minimize the emission of greenhouse gases.

Enhancement Measures

- Develop a community outreach program focused on environmental education, and climate change mitigation.
- Engage with local schools and institutions for educational programs on environmental conservation.
- Promote environmental conservation and sustainable practices within the university community.

d. Potential mitigation measures associated with Decommissioning phase.**Mitigation Measures**

- Develop a decommissioning plan in accordance with regulatory requirements.
- Safely remove and dispose of any hazardous materials or equipment.
- Remediate the site to its original or agreed-upon condition.

Enhancement Measures

- Engage with stakeholders to determine the future use of the site and its assets.
- Explore opportunities for repurposing infrastructure for community benefit, if feasible.

7. Environmental and Social Management Plan (ESMP)

This report proposes strategies to reduce or avoid the negative social and environmental impacts that have been identified. These strategies, along with a monitoring plan, are outlined in the ESMP (Environmental and Social Management Plan). Most of these measures align with well-established engineering and social practices. The ESMP also defines the roles and responsibilities of various stakeholders involved in the plan. During the construction phase, the primary actors responsible for implementation are the contractor and MU. However, once the operation phase begins, MU will take on the key role in implementing the mitigation measures.

8. Environmental and Social Monitoring Plan (ESMoP)

There are four types of monitoring activities: baseline monitoring, impact monitoring, compliance monitoring, and mitigation monitoring. The Contractor's safeguard team, consisting of environmental, social, and safety experts, will conduct the monitoring of environmental and social parameters during the construction phase, supervised by the Consultant's safeguard team. Once the operation phase begins, the responsibility for mitigation and monitoring will shift to the MU. To assess the progress and address any emerging environmental issues, OSHA and/or NEMC will conduct annual EHS reviews, examining environmental concerns alongside the project's implementation status and sensitivity.

9. Cost Benefit Analysis

The Environmental Impact Statement (EIS) evaluates the project by considering its negative impacts in relation to the socioeconomic benefits that would be missed if the project were not carried out. The analysis of the environmental cost-benefit assesses the ratio between the negative and positive impacts. The project offers significant potential financial and social benefits, while the environmental impacts can be adequately mitigated. The financial resources required for mitigating the negative impacts are relatively small compared to the overall investment needed.

10. Decommissioning Plan

The project is anticipated to last for 100 years, and this document outlines an initial decommissioning plan. The plan aims to establish practical decommissioning approaches that can

be executed safely, without endangering the public's health and safety, decommissioning personnel, or causing harm to the environment. It adheres to the guidelines and regulations set by relevant regulatory agencies. The purpose of this preliminary decommissioning plan is to ensure that the decommissioning and final disposition of the project though it's not expected to happen are taken into account during the project's initial design phase.

11. Conclusion

The ESIA report concludes that the proposed establishment of the Academic Block, two (2) Students' Hostels, Cafeteria, Dispensary, four (4) Staff Houses, and Reservoir Tank is environmentally and socially viable. The potential negative impacts identified can be effectively mitigated through the recommended measures, ensuring sustainable project execution. By involving relevant stakeholders in the decision-making process, the project can be implemented with broad support from the community and university stakeholders. The findings and recommendations of this ESIA report provide a solid foundation for responsible project development and environmental stewardship, safeguarding the ecosystem and the well-being of those who will benefit from this vital infrastructure.

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LIST OF ABBREVIATION

| | |
|-------------|---|
| AIDS | Acquired Immune Deficiency Syndrome |
| CBA | Cost Benefit Analysis |
| CESMP | Contractor Environmental and Social Management Plan |
| CSO | Civil Society Organisation |
| DED | District Executive Director |
| EIA | Environmental Impact Assessment |
| ESIA | Environmental and Social Impact Assessment |
| EIS | Environmental Impact Statement |
| EMA | Environmental Management Act |
| ESMP | Environmental and Social Management Plan |
| ESMoP | Environmental and Social Monitoring Plan |
| ESF | Environmental and Social Framework |
| ESMF | Environmental and Social Management Framework |
| GA | Government Authority |
| GBV | Gender Based Violence |
| GHO | Grievance Handling Officer |
| GRIC | Grievance Redress Integrity Committee |
| GRM | Grievance Redress Mechanism |
| HEET | Higher Education for Economic Transformation |
| HIV | Human Immunodeficiency Virus |
| HSE | Health, Safety and Environment |
| ILO | International Labour Organisation |
| LGA | Local Government Authority |
| MoEST | Ministry of Education, Science and Technology |
| TANGA UWASA | Tanga Urban Water Supply and Sanitation Authority |
| MU | Mzumbe University |
| NEMC | National Environment Management Council |
| NGOs | Non – Government Organisation |
| OSHA | Occupational Safety and Health Authority |
| PAD | Project Appraisal Document |
| PIU | Project Implementation Unit |
| PAPs | Project Affected Person |
| POM | Project Operational Manual |
| RUWASA | Rural Water Supply |
| SEA | Sexual Exploitation and Abuse |
| SEP | Stakeholders Engagement Plan |
| TANESCO | Tanzania Electricity Supply Company |
| TZS | Tanzanian Shillings |
| ToR | Terms of Reference |
| UPIU | University Project Implementation Unit |

| | |
|-----|-------------------------------|
| URT | United Republic of Tanzania |
| VEO | Village Executive Officer |
| WB | World Bank |
| WEO | Ward Executive Officer |
| WSP | Wastewater Stabilization Pond |

CHAPTER 1: INTRODUCTION

1.1 Background Information

Mzumbe University (MU) is a Public University which operates under the Ministry of Education, Science and Technology (MoEST). The University was established by the Mzumbe University Charter 2007 made under section 25 of the Universities Act. No. 7 of 2005 which repealed the Mzumbe University Act No. 21 of 2001. Mzumbe University's predecessor, the Institute of Development Management (IDM), established in 1972 focused on training skilled human resource in public administration and management, business administration, accountancy, economic planning and hospital administration and related areas for middle cadre officers in the public service and private sector. Currently, the University has three campuses: Main Campus at Mzumbe, Morogoro; Dar es Salaam Campus College and Mbeya Campus College.

MU has received financial support from the World Bank (WB) for Higher Education for Economic Transformation (HEET; P166415). The HEET project is supported by the Government of the United Republic of Tanzania (GoT) through the World Bank. The main Project Development Objective (PDO) is to strengthen the learning environments and labour market orientation of programmes in priority disciplines and the management of the higher education system. Generally, it is done under seven (7) strategic focus areas namely:

- i. Increasing enrolment capacity in degree programmes in priority disciplines
- ii. Upgrading learning resources and equipment
- iii. Promoting applied research and innovation capacity
- iv. Building functional linkages with private sector/industry
- v. Strengthening use of digital technology
- vi. Promote self-generated income.
- vii. Building capacity of academic staff and university leadership

In strengthening the learning environments and labour market orientation of programmes in priority disciplines the University plans to focus on seven strategic focus areas under HEET project. However, two strategic focus areas (Increasing enrolment capacity in degree programmes in priority disciplines and developing options for self-generating income) will involve construction and rehabilitation projects.

In order to increase enrolment capacity in degree programmes in priority disciplines and to develop options for self-generating income, MU is planning to use part of the funds to establish a new Campus in Gombero ward, Mkinga District, Tanga Region. The proposed development consists of an Academic Block with Staff Offices and a Mini Library; Two Student Hostels, a Cafeteria, a Dispensary, Four Staff Houses, and a Reservoir Tank with a capacity of 400,000L. These buildings will be constructed within MU land at Pangarawe, Gombero, Mkinga. It should be noted further that according to the World Bank Environmental and Social Framework with Environmental and Social Standards (ESS), and Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations 2018, before undertaking these activities project developers are required to carry out an Environmental and Social Impact Assessment (ESIA) prior to project implementation.

The World Bank Environmental and Social Frameworks (ESF) and Standards (ESSs) as well as the Environmental Management Act of 2004 of Tanzania require project developers to carry out an Environmental and Social Impact assessment (ESIA) prior to project implementation. Through a rigorous ESIA, potential environmental and social impacts will be thoroughly evaluated, and necessary measures will be recommended to ensure the continued harmony between academic growth, infrastructure development, and environmental preservation. Therefore, this study was done in line with Environmental Management Act, Cap 191, the Environmental Impact Assessment and Audit (Amendment) Regulations, 2018, and the World Bank Environment and Social Framework (ESF) as well as the project's Environmental and Social Management Framework (ESMF). In addition, this ESIA has been guided by the Project Appraisal Document (PAD) and Project Operational Manual (POM) both of 2021.

1.2 Rationale and Objective of the HEET Project

1.2.1 Objective of the MU HEET Project

The primary objective of the project is to enhance MU learning environments and align its programs with the labor market through the implementation of the Higher Education for Economic Transformation (HEET) initiative, funded by the World Bank. Specifically, the MU HEET project aims to achieve the following strategic focus areas;

- a. To establish six facilities (Academic Block with Staff Offices and a Mini Library; Two Student Hostels, a Cafeteria, a Dispensary, Four Staff Houses, and a Reservoir Tank with a capacity of 400,000L)
- b. Expand MU capacity to admit more students in priority disciplines, addressing the growing demand for higher education in these fields.
- c. Enhance the quality of education by investing in state-of-the-art learning resources and equipment, ensuring a modern and effective learning environment.
- d. Foster a culture of applied research and innovation, aligning academic activities with practical applications to contribute to economic transformation.
- e. Strengthen collaboration between MU and the private sector/industry, promoting mutual benefits and relevance of academic programs to real-world needs.
- f. Integrate advanced digital technologies into academic processes to modernize teaching methods, research, and overall university management.
- g. Develop sustainable options for self-generated income to reduce dependence on external funding sources and enhance financial stability.
- h. Invest in the professional development of academic staff and university leadership to ensure high-quality education and effective management.

1.2.2 Rationale of the project

In recent years, Tanzania has achieved notable progress in basic education. One notable example is the significant rise in primary level enrollment, which increased by 24.5% from 8,116,488 pupils in 2015 to 10,111,671 pupils in 2018 (10,601,616 in 2019). The positive trend in secondary education enrollment during the 2013/2014 academic year also indicated an increase in students

transitioning to post-primary education. While the country has witnessed expansion in basic education, policymakers widely recognize that the successful performance at this level leads to a heightened demand for subsequent education levels, particularly higher education.

Despite the advancements, a major challenge lies in the education system's incapacity to absorb the growing number of graduates from basic education who are both inspired and capable of pursuing higher education. The pressing need is to enhance investment in infrastructure, facilities, and quality assurance systems, particularly in fields such as Engineering (Railway, Hydropower, Aeronautic, etc.), Medical Science and Technology, Agriculture and Allied Sciences, Energy and Minerals, Forestry, and Natural Resource Management. To address these challenges, the Higher Education for Economic Transformation (HEET) project aims to provide funding for the development of infrastructure, faculties, and quality assurance systems in higher education. The goal is to facilitate swift economic transformation in the country. Through the HEET project, the Government of the United Republic of Tanzania aims to strengthen the operational capacities of public universities, empowering them to become reliable drivers of economic transformation. This involves building upon their respective institutional visions, missions, objectives, and core values.

1.3 Objectives of ESIA Study

The objective of the ESIA study is to ensure that environmental concerns are integrated in all the project activities in order to contribute to sustainable development. The specific objectives of conducting the Environment and Social Impact Assessment study with respect to the project was:

- a. To carry out environmental screening and scoping study to identify social and environmental risks and impacts in the project site and nearby environment.
- b. To identify, analyse and assess environmental and social risks and impacts of the proposed establishment.
- c. To describe the pertinent regulations and standards governing, environmental quality, health and safety, protection of sensitive areas, protections of endangered species and land use control at international, national regional and local levels.
- d. To ensure that the project comply with key relevant policy, legal and institutional frameworks, and compliance of Environmental and Social Standards
- e. To recommend cost-effective measures for minimizing or eliminating adverse impacts of the proposed design, construction, operation and maintenance of the project.
- f. To prepare Environmental and Social Management Plan (ESMP), including Health and Safety Management for design, construction, operation, and maintenance phases of the Project.
- g. To identify key stakeholders, the roles and responsibilities of the project implementation entity, implementing agencies and other stakeholders, legislative and regulatory requirements for the implementation of the ESMP.
- h. To inform statutory and public stakeholders about the potential impacts as well as risks and opportunities of the project and about the proposed mitigation measures.

1.4 Methodology and ESIA Team

The ESIA study applied different participatory methods to involve all the concerned stakeholders. The methodology used in this study is commensurate with the Environmental Management Act, Cap 191 and the Environment Impact Assessment and Audit (Amendment) Regulations, 2018). A multi-disciplinary team of experienced scientists and environmental professionals was assembled to carry out the required resource assessment, generation of baseline data, determination of potential impacts and recommendation of mitigation measures. These include; EIA Expert (Team Leader), Environmental Engineer, Civil Engineer, Sociologist & GBV Specialist, Biodiversity expert, Occupational Health and Safety Specialist and GIS experts, Municipal and Civil services engineer who worked in close collaboration with the relevant stakeholders in Mkinga district council, and Gombero ward officials. An interactive approach was adopted among the environmental team members and other project professionals. The team utilized the checklist for data gathering, analysis, and presentation. The team members conducted the reconnaissance investigations to determine the critical elements for analysis and the issues highlighted for the design and planning process. Team meetings were held to discuss the progress of investigations and analyses and facilitate data integration toward an understanding of the systems at work in both the natural and built environment. Baseline data for the study area were collected using a combination of:

- i) Site Reconnaissance
- ii) Analysis of Maps and Plans
- iii) Review of Reports and background documents
- iv) Checklists
- v) Field Studies
- vi) Public Consultations

1.4.1 Desk Study

The ESIA study applied different participatory methods to involve all the concerned stakeholders. The methodology used in this study is commensurate with the Environmental Management Act, Cap 191 and the Environment Impact Assessment and Audit (Amendment) Regulations, 2018. The study was undertaken based on checklists complimented by the Consultants' experience and through discussion with local government officials and communities in the vicinity of the project area. The scoping study was done both as a desktop study and fieldwork. It involved the review of literature/documents on HEET Environmental and Social Management Framework (ESMF) as well as Project Appraisal Document (PAD) and Project Operational Manual (POM) all of 2021. ESMF (2021). and the World Bank Environmental and Social Standards on Assessment and Management of Environmental and Social Risks and Impacts (ESS1) were fully incorporated in this ESIA. According to ESS1, ESIA is an instrument to identify and assess the potential environmental impacts of a proposed project, evaluate alternative.

Stakeholders' engagement involved development of a systematic approach to develop good relationships and gather their views on issues that could affect them. It also intended to provide stakeholders with a mechanism through which to raise grievances. Other issues involved review

of Mvomero socio-economic profile, district development plans and field studies at the project site. This aimed at gathering information and data on various aspects of the project.

1.4.2 Site visits

This involved undertaking systematic assessments within and around the proposed establishment. All observations were analyzed and documented. Furthermore, experts' observations and technical methods related to the issues in question were explored as detailed in this report. To get wide scope of the existing situation on the site, appraisal was made on physical and environmental conditions of the proposed establishment and areas that may be impacted by the project, including land use and drainage system as well as assessment of other relevant socio-economic parameters.

1.4.3 Stakeholder Engagement

Identification of stakeholders

The stakeholders were identified based on their roles, relevance, and potential to be impacted or to impact the project. Most of the stakeholders that might be impacted by the project, e.g., nearby developments, local government authorities, Government Departments, Parastatal Organisation and MU, were pre-determined. discussion, were conducted. The consulted stakeholders include:

- Gombero, Vunde Manyinyi, Dima, Jihirini and Kichangani Village
- Gombero Ward
- Mkinga District Council
- Occupational Safety and Health Authority (OSHA)
- Fire and Rescue Force
- Tanzania National Electric Supply company (TANESCO)
- Tanga Urban Water Supply Authority (TANGA UWASA)
- Rural Water Supply Agency (RUWASA)
- Ministry of Education Science and Technology (MoEST)
- Tanzania Commission for Universities (TCU)

In contrast, others were identified by different stakeholders, including the Proponent. Some of the stakeholders unfolded as consultations went along, e.g., groups and individuals on and in the vicinity of the project area.

Involvement of stakeholders

The study team, in collaboration with the project proponent representative visited the proposed project area and neighboring community. Physical observations and stakeholder interviews were conducted to collect baseline data and issues of concern. The study applied different participatory methods to involve all relevant stakeholders. The interview with individuals is based on a list of available contents or questions and discussions. Focused group discussions were also used to gather information. In establishing the public's views concerning the proposed project, the consultants were provided with an introduction letter addressed to each stakeholder, briefing the project, and asking them to raise their concerns to consultant freely.

Documentation of stakeholders' concerns

The stakeholders pointed out several issues and concerns. An individual or a group of people who raised an issue was cross-checked by discussing it with other groups. Key issues raised by each stakeholder group were summarized and further analysed in this report. For details of stakeholders consulted, the record of main issues raised (comments) and responses, see Chapter 5.

1.4.4 Baseline Data and Information

1.4.4.1 Environment

Information was gathered on the existing physical environment, particularly as related to topography, soils, drainage and hydrology in general.

Climate, soils, and topography

Information on the climate, geology, topography, soils, was obtained by compiling data from existing reports, and source agencies. Maps were also examined to obtain some of the data such as topography of the general area. Field work was carried out to augment and verify existing information relating to topography and soils and to obtain first-hand knowledge of the other physical aspects.

Hydrology and drainage

Surface and ground water characteristics were assessed using field investigation as well as maps and data from previous reports.

Air quality

Spot measurements were done on site to determine the current ambient air quality in terms of particulate matter and pollutant gases at the project site. Particulate matters were measured at site in terms of TSP, PM₁₀, PM_{2.5} by using Dust Monitor, that measures dust particles of different dimensions (microns of 10, 5.0, 2.5, <1.0, 0.3 and >10). The equipment complies with the EMC Directives. Ambient pollutant gas concentrations (i.e. CO, NO_x, NO₂, SO₂, H₂S, and VOC) were measured using gas analyzer. 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.

Noise and Vibration

Spot measurements were done on site to determine the current noise levels and vibration at the project site. Sound level meter device was used to record noise at the four corners of the project site (north, south, east, and west) as prescribed in ISO 19961:2003 and ISO 3095:2001. 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.

Ground vibrations were measured using a vibrometer data logger, which is designed to measure ground vibrations according to European standard EN 14253:2003. The meter has an accuracy of $\pm 5\%$, acceleration of 200 m/S^2 , a wide frequency range of 10 Hz to 1 kHz for capturing almost all possible ground vibrations. On taking measurements, the accelerometer transducer was mounted on the ground to record both ambient and peak vibrations. To produce accurate results, the transducer was secured in direct contact with the ground. The same point used for noise measurements were also used for vibration.

1.4.4.2 Biological Environment

The status of the flora and fauna of the study area was determined by a review of literature relevant to the area and field investigations. The vegetative communities were identified and classified into community types. Identification was carried out of dominant tree species. The vegetation was identified and described for their property. Information on fauna was gathered from existing literature on reported species as well as observations in the field. Observations were made particularly to assess the presence of birds in the general area. Information also was obtained from locals in the area about the presence of any significant species.

1.4.4.3 Socio-economic Environment

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 approved terms of reference provided:

- i) Population and settlement characteristics
- ii) Land uses and livelihoods.
- iii) Community structure, employment, and income
- iv) Developments underway
- v) Infrastructure in place
- vi) Water supply and other utilities
- vii) Waste management practices.
- viii) Recreational activities
- ix) Energy supply
- x) Public health and safety
- xi) Access to and delivery of health, education, and social services

1.5 Review of project documents and literature

This involved reviewing available information on the project to gain a basic understanding of the components and their operation. The documents consulted are presented in the list of references and bibliography of this report.

1.6 Policy, Legal and Institutional Arrangement

Policy, legal and institutional arrangement were compiled from review of documents: policies, legislation, guidelines, and standards. Information and data on local by-laws, institutional structures and mandates/authority were obtained from Mkinga District Council.

1.7 Report Structure

The report is presented in accordance with the format given in Section 18 (1 and 2) 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. List of Acronyms
1. Introduction
2. Project description;
3. Policy, Legal and Institutional Framework
4. Baseline Environmental and Social condition
5. Stakeholder Engagement Plan and Grievances Redress Mechanism
6. Impacts Assessment, Mitigation Measures and Project Alternative
7. Environmental and Social Management Plan
8. Environmental and Social Monitoring Plan
9. Cost Benefit Analysis
10. Decommissioning Plan
11. Conclusions

CHAPTER 2: PROJECT DESCRIPTION

2.1 Location and Accessibility

2.1.1 Location

The project area for proposed establishment of MU-Tanga Campus is located in the Pangarawe area, Gombero ward, Mkinga District in Tanga Region. Gombero ward lies at the border between Tanga city and Mkinga district council. It is bordered by Mzizima and Mabokweni wards in Tanga city on the Eastern side, Mapatano and Mnyenzani wards on the Eastern side, Bwiti ward in the northern, and Zigi River which separate it with Kiomoni ward which is in Tanga city to the southern side. Gombero ward is subdivided into six (5) Sub-wards (Villages); namely Gombero, Kichangani, Jihirini, Vunde Manyinyi, and Dima. Despite being in Mkinga district, Gombero sub-ward is located close to Tanga city than its district headquarters at Mkinga. This causes the majority of products and services to be accessed by residents from Tanga city.

Table 0:1 : GPS Coordinate of the project area

| S/N | Point | Latitude (S) | Longitude (E) |
|-----|------------------|--------------|---------------|
| 1 | Academic Block | -4.99753 | 38.95179 |
| 2 | Students Hostels | -4.99241 | 38.95572 |
| 3 | Cafeteria block | -4.99229 | 38.95431 |
| 4 | Dispensary block | -4.99893 | 38.95895 |
| 5 | Staff Houses | -4.99542 | 38.94947 |
| 6 | Reservoir tanks | -4.99184 | 38.95054 |

2.1.2 Accessibility

The MU-Tanga Campus can be accessed via three routes: Rubawa Primary School, Pangarawe Centre, or Gombero Centre. These routes are connected by an unpaved dirt road that originates as a junction at Mabokweni along the Tanga-Horohoro main road and continues to Maramba. The distance from the junction to the Campus site is approximately twelve kilometers (12km) on an unpaved dirt road, which is accessible year-round. Additionally, the distance from the Mabokweni junction to Tanga city is approximately eight kilometers (8km) on the tarmac of the Tanga-Horohoro main road. Consequently, the MU-Tanga site is situated approximately twenty kilometers (20km) from the city centre of Tanga.

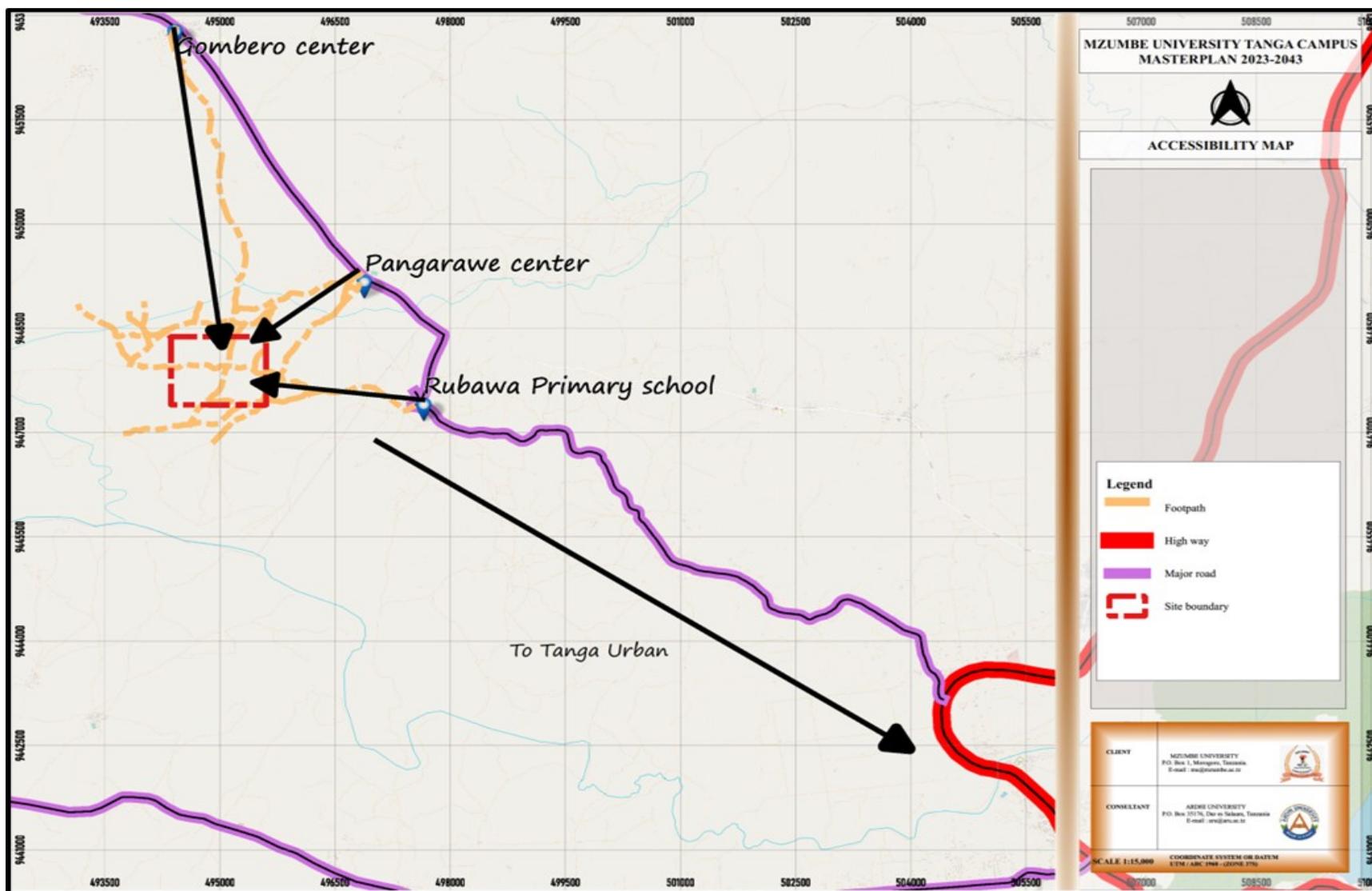


Figure 0:1:Map show location and accessibility to MU-Tanga Campus (Source: MU-Tanga Campus Masterplan, 2023-2043)

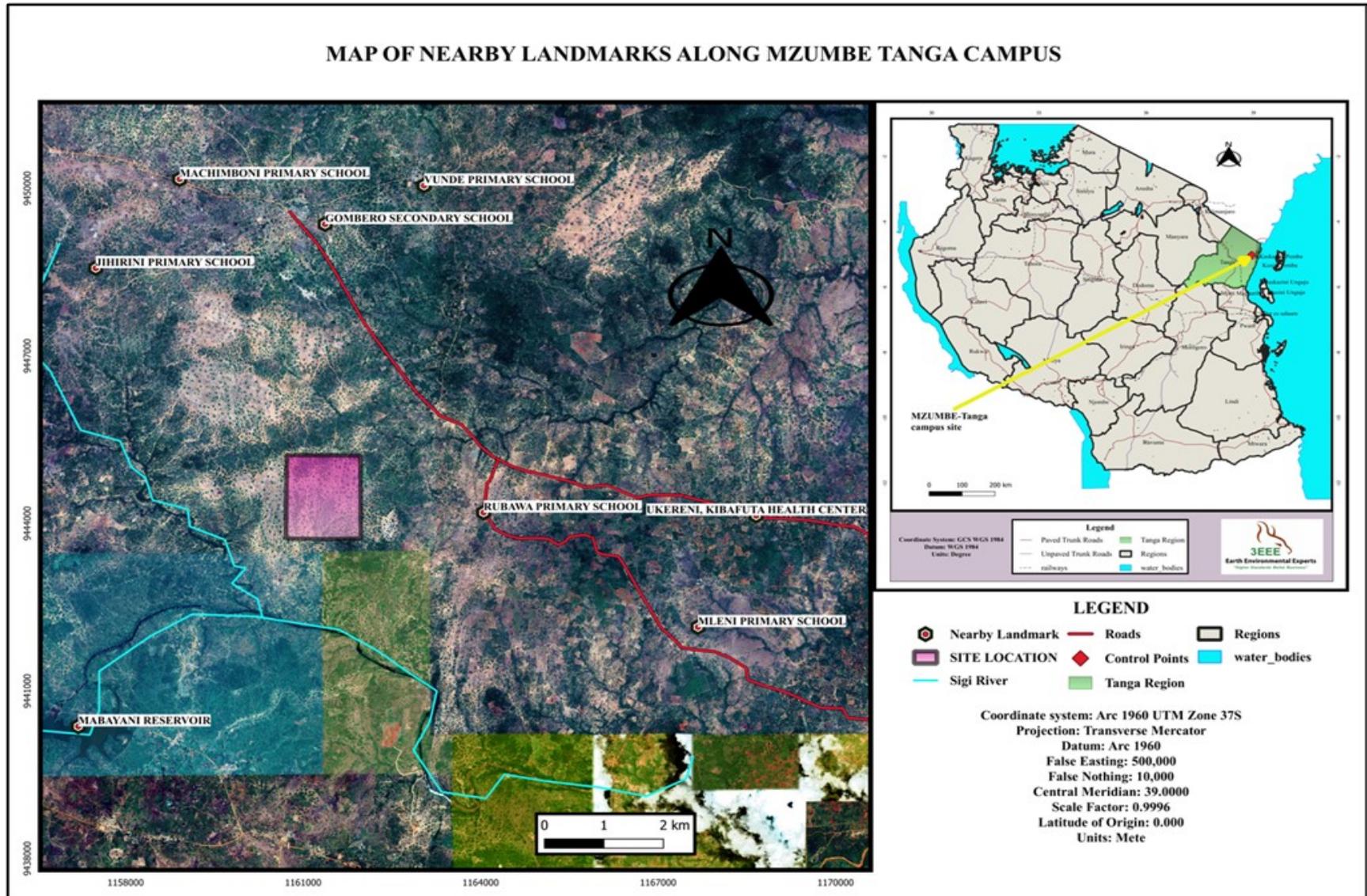


Figure 0:2: Map show facilities close to MU-Tanga Campus (Source: 3Es September 2023)

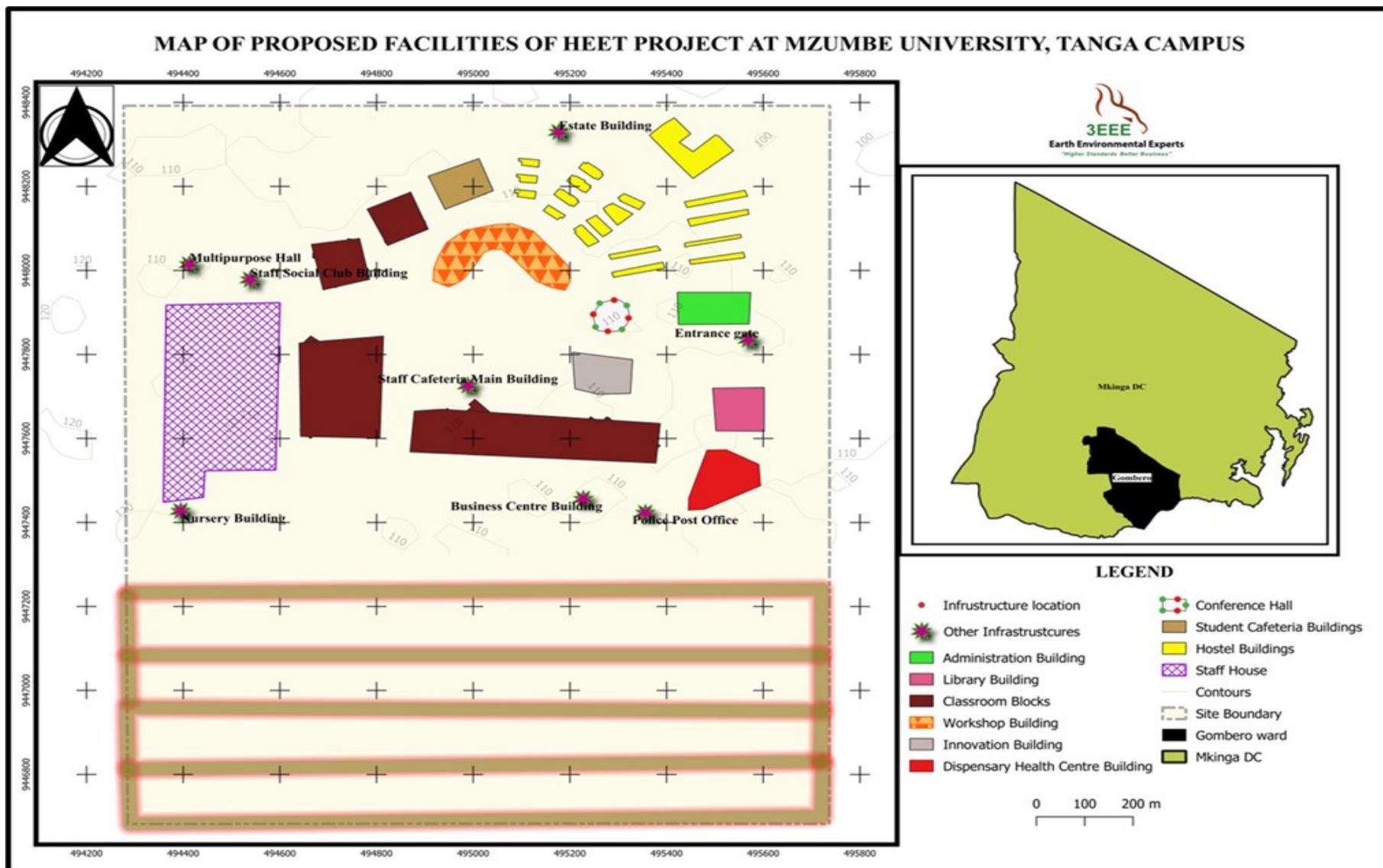


Figure 0:3: Map show proposed facilities to be established within MU-Tanga Campus (Source: 3Es, September 2023)

2.1.3 Land ownership

The project site is within the area characterized by sandy clay loams and sandy clay soils, different vegetation i.e. (short and long grasses), natural tree species, and secondary tree species cover the surface land. No sensitive ecological sites are found near the proposed sites. The general area is characterized by flat alluvial plains with homogenous sedimentation pattern and the specific area has a largely flat topography. The site is on a surveyed and planned area for educational purposes and other purposes ancillary thereto. Based on title deed the land and the existing buildings erected thereon shall be maintained and same shall be used for Education Purpose only. Hence, the proposed construction under HEET project will be done at the least developed area.

2.1.4 Major Adjacent developments

At the site there are no major developments occurring in the area. The site is surrounded by indigenous trees which are short trees, shrubs with thorns, lawn & few cactuses.

2.2 Project Scope and Activities

MU will establish different infrastructures for MU-Tanga Campus namely; Academic Block with Staff offices and Mini library, two (2) Students' Hostels, Cafeteria, Dispensary, four (4) Staff Houses and Reservoir Tank.

2.2.1 Description of site for Proposed establishment

Site 1: Academic Block

The block will be of 2-Storeys and the estimated net floor area is 3,556 m². The sites allocated for academic use will consist of staff offices for 65 staff, mini library for 80 students, six (6) classrooms for 360 students, One (1) training lab for 80 students, One (1) lecture theatre for 300 students, departmental areas, workshops & laboratories, and a centre for innovation and technological transfer. Within the site there is indigenous trees which are short trees, shrubs with thorns, lawn & few cactuses were observed.

Site 2: Students Hostels

At this site only two buildings of 3-Storeys (Ground plus two floor) for student's hostels will be constructed with capacity to accommodate 360 students and with a maximum built up area of 1,531m². The design and development of the hostel buildings should also pay attention to sustainability and self-sufficient aspects. The proposed site is undeveloped one which is covered by indigenous trees which are short trees, shrubs with thorns, lawn & few cactuses.

Site 3: Cafeteria block

The building for cafeteria will be a single storey with a seating capacity of 450 persons and the estimated net floor area is 980m². The cafeteria shall include all functional spaces that makes it operable, including four kitchen zones namely; hot cooking, butchery, baking and salads ('kadmanjee') in a well-organized manner. Other supporting spaces such as food storage (both hot and cold stores), utensils store, preparation area, serving area shall well be organized. The proposed site is undeveloped one which is covered by indigenous trees which are short trees, shrubs with thorns, lawn & few cactuses.

Site 4: Dispensary/Health center block

This dispensary block will be a single storey and the estimated net floor area is 487 m². This dispensary will be established in order to ensure healthy life for people who will be living on the Campus and the neighbouring community. This will consist of all necessary treatment facilities mainly for outpatient services including weighing & triage, doctor's consultation rooms, laboratory, nurse station, janitor's room, pharmacy, pantry, ablution area and observation rooms for male and female. Moreover, there will be three (3) wards, one for male patients, one for female patients and the other for children. Each ward to be furnished with two (2) beds. The project area is undeveloped one which is covered by indigenous trees which are short trees, shrubs with thorns, lawn & few cactuses. The health center is expected to have at least 15 staff, 20 beds for inpatients, and 25 outpatients.

Site 5: Staff House

At this site only four (4) buildings of single -Storeys will be established with a maximum built up area of 190m². The house types are two-bedroom single storey detached houses, each consisting of lounge, dinning space, kitchen area, store, two bedrooms one self and a common toilet. The houses are intended to accommodate particularly supporting staff who need to stay closely to the Campus to make sure everything goes well. Staff from the estate department, health department, security department, ICT department are given more priority.

Site 6: Reservoir tanks

This will involve establishment of reservoir tank with a capacity of 400,000litres. From storage tank there will be two service lines, the first will service staff housing, student hostels, health center, estate and CITT while the second will service the remaining areas. Water from this tank will be distributed by gravity to all other service areas.

2.2.2 Project Considerations

The overall design of the buildings will promote use of construction materials, which are environmentally friendly, durable, and vandal-proof and those, which require minimal periodic maintenance. The buildings friendly to gender equality including considerations to persons with special needs (e.g., physical, learning impairment, emotional and behavioral). The general design considerations will incorporate aspects of modern architecture, the current local government building policy guidelines and the latest standards developed by (Contractor Registration Board) CRB and the Tanzania Commission of Universities (TCU) Architectural Metric Handbook which will include;

- **Sanitary appliance:** The number of toilets and wash hand basins will be selected according to the number of students, workers and disabled who will be using these facilities. The total number of toilets at the proposed establishment will be stated after project design.
- **Waste water management:** Wastewater will be connected to the existing sewer system (Wastewater stabilisation pond) at MU with capacity of 7,740m³/day and the proposed one with the same capacity which will be established in order to accommodate and manage all wastewater generated at MU.
- **Functionality and Space planning:** Contractor should collaborate with stakeholders to understand the specific needs and requirements of each building. Also, the design should cater for natural ventilation with features that encourage natural air circulation (including use of permanent air vents above all doors and windows). In addition to that, the design

caters for various types of energy efficient luminaries including fluorescent lamps and natural lighting through glass windows and doors as appropriate for both security and lighting.

- **Sustainable resource use:** The design of the buildings will incorporate landscaped gardens which will be planted with suitable species of trees / shrubs and grass to prevent ecological deterioration and improve aesthetic value of the site. Part of the excavated soil will be used for landscaping therefore reducing the amount of soil to be transported away from the site. Also, contractor should select materials with low environmental impact, such as recycled content, low VOC (Volatile Organic Compounds), and sustainably sourced wood.
- **Solid waste management:** Contractor will be responsible for the management of generated solid waste. However, during operation phase MU will manage their solid waste especially biodegradable waste through the proposed compositing facility and will ensure proper waste segregation and composting processes.
- **Security and Safety issues:** Contractor should comply with local building codes and regulations to ensure the structural integrity of the building, conduct thorough risk assessments to identify potential hazards and vulnerabilities, incorporate earthquake-resistant designs and materials to withstand seismic activity in susceptible regions, implement fire-resistant materials and systems to enhance building safety. Additionally, evacuation plans and emergency exits must be well-planned to facilitate safe and swift evacuation during emergencies. Also, implementing robust security systems, including access control and surveillance.
- **Durable and Vandal-Proof Materials:** Contractor should consider using materials like concrete, brick, or metal cladding for durability and resistance to vandalism in external parts. And in Flooring should opt for materials like terrazzo, polished concrete, or durable commercial-grade carpeting. Also, in windows and doors contractor should use impact-resistant glass and robust door hardware. Wall finishes: Consider using graffiti-resistant coatings or easily cleanable surfaces. Furniture and fixtures: Choose sturdy and tamper-resistant furniture and fixtures for common areas.
- **Disaster issues:** Contractor should develop buildings with disaster-resilient features, such as earthquake-resistant foundations and reinforced structures to withstand potential natural disasters. Also, establish emergency evacuation plans, implement clear and accessible evacuation plans, ensuring all occupants can safely exit the building in case of emergencies.
- **Climate Change Adaptation:** The building design should prioritize energy efficiency and sustainable materials to minimize its carbon footprint. Adequate insulation and natural ventilation systems can help regulate indoor temperatures, reducing reliance on energy-intensive cooling or heating. Rainwater harvesting systems can also be implemented to mitigate water scarcity during dry periods.
- **Inclusivity and Accessibility:** The building should be designed to cater to the needs of all users, including people with disabilities and elderly individuals. Adopting universal design principles ensures that the building is accessible, user-friendly, and promotes equal opportunities for everyone. This includes barrier-free entrances, accessible restrooms, and consideration of diverse mobility needs.
- Replacement of planting trees that would be knocked down during construction.

2.3 Project Activities

Activities for the project shall be implemented in four phases namely planning, construction, demobilisation, and operation and maintenance phases. Details of each of the phases are provided in the sections that follow;

2.3.1 Mobilisation /Preconstruction/Planning Phase

Planning phase for the project commenced in August 2023 and will be concluded in January 2024. Activities during mobilisation phase will include;

a. Topographical Survey

A comprehensive topographic survey involves intricately mapping the natural and artificial elements of a given area. It furnishes precise elevation information, often depicted through contour lines, revealing the terrain's configuration and incline. This data holds significant importance in construction ventures, ensuring accurate planning for drainage, grading, overall site viability, and environmental factors.

Surveyors carried out the topographical survey for planned projects, delineating property boundaries and ground levels. This process is essential for maintaining compliance with property limits and identifying and addressing potential environmental and social impacts outlined in the ESIA report.

b. Geotechnical investigations

The geotechnical assessment for the proposed structures including the academic block, student's hostels, cafeteria block, dispensary block, staff house and reservoir tanks at MU-Tanga Campus involved the use of excavation trial pits and in-situ testing for each building. This examination plays a crucial role in evaluating the below-ground conditions in the project area and ensuring the structural strength, stability, and safety of the intended construction. By analyzing properties of soil and rock, groundwater conditions, and potential geohazards, the geotechnical assessment offers valuable insights for designing foundations capable of withstanding the specific geological challenges at the location. The collected data helps optimize construction methods, mitigate risks, and ensure the durability and resilience of the proposed structures. Essentially, a comprehensive geotechnical assessment is an essential step in the pre-construction phase, significantly contributing to the overall success and sustainability of the planned facilities.

c. Architectural and Services Designs

The effectiveness and efficiency of facilities rely on the planning and design of both architectural and structural, ensuring that each building serves its intended purpose. Carefully crafted architectural blueprints foster an environment conducive to academic block, student's hostels, cafeteria block, dispensary block, staff house and reservoir tanks at MU-Tanga Campus.

Moreover, the structural designs are crucial in guaranteeing the safety and durability of the constructions. Adequate engineering and structural assessments are imperative to withstand environmental challenges, natural disasters, and the passage of time. This aspect becomes particularly critical in a physics laboratory where a stable and secure infrastructure is essential for conducting sensitive experiments.

d. Acquisition of various permits/ certificates

The acquisition of various permits and certificates for proposed project based on ESIA study at and it involves acquisition of ESIA certificate, building permit, a land use permit, a water use permit, a waste management permit, occupational health and safety certificates, and Fire certificate.

2.3.2 Construction Phase

The proponent intends to engage a contractor for the establishment of academic block, student's hostels, cafeteria block, dispensary block, staff house and reservoir tanks at MU-Tanga Campus. The contractor will handle tasks such as procuring raw materials, recruiting labor, and executing the construction work. It is expected that this phase will last for 18 months from the signing of the contract with the selected contractor. The following sections will explore different aspects connected to this timeframe;

2.3.2.1 Construction Activities

During the construction phase, activities will encompass site preparation, establishment of a workers' camp, erection of buildings, deployment of construction equipment, and acquisition of construction materials;

a) Site preparation

Activities under site preparation will include land clearing, grading and excavation, construction of auxiliary structures such as access roads, etc. leveling, and earth marking.

b) Construction of worker's camp

The awarded contractor will construct a workers' camp within the project area at Pangarawe area. This facility will serve as housing for 100-200 workers and also function as storage space for various construction materials and equipment, as well as a workshop for servicing construction machinery. However, it's important to note that all workers engaged in the project will be accommodated in this camp. The majority of workers, including unskilled and semiskilled laborers, will be recruited from Pangarawe area, Gombero, Vunde-Manyinyi, Jirihini, Kichangani and Dima villages, both of which are in close proximity to the proposed project area, however, there is no accommodation services close to the project area.

The factors shall include the topography of the site, proximity to the project site, availability of water, and other considerations.

c) Construction of Buildings

Some of the activities to be undertaken will include excavation of foundation footing, laying down a brick base, pouring a concrete slab, installation of framework, installation of plumbing workers, putting a wall frame, roofing, and finishing.

d) Construction Equipment

Different machinery will be used to construct the project facilities. These will include:

- Bull Dozers for clearing the site, removal of topsoil and vegetation materials, and pushing out stumps;
- Graders for grading and levelling land for buildings and access road formation;
- Tippers/lorries for transporting construction materials and workers;
- Light machinery like pedestrian rollers for access road compaction;
- Front end loader for loading materials onto tippers and lorries;
- Several light equipment like wheel burrows, shovels, picks;
- Concrete mixers;
- Compactor;
- Wheelbarrow; and
- Hammers and bolt and nut fasteners, hand saw, electric and gas welders, electric saws and grinders, load roller, trucks, hand drills and drill bits, wire cutters, concrete mixer trucks, wheel loader, forklift, excavator etc.

e) Construction Materials

Different raw materials will be required during construction phase. Materials such as sand, gravel and quarry stone will be outsourced from different places. The building materials such as quarry stone, gravel and sand will be collected from approved sites.

Use of concrete blocks for construction of different infrastructures will be more environmentally friendly than use of burnt bricks, which contribute to deforestation. Other materials such as cement, concrete block, paints, timber, roofing materials, windows, doors and other joinery, tilt and roller doors, wallboard and plasterboard, light fittings, fuel and oil, electricity, water, ceramic tiles, steel, pipes, adhesives, copper wires, gas (acetylene and oxygen), cardboard will also be outsourced for the project.

NB: A contractor who will be awarded the construction bid will have to adhere to Health, safety, and Environmental (HSE) standards as per construction regulations. MU will have the key personnel who will be checking the Standard operation procedures (SOP) to comply with the legal requirement.

o *Sourcing of materials*

Based on the location of the project site, most of construction materials shall be sourced from Tanga and outside Tanga Region. Greater emphasis will be laid on procurement of building materials from within the local area as highlighted in the table 2.2 below, which will make both economic and environmental sense as it will reduce negative impacts of transportation of the materials to the project site through reduced distance of travel by the materials transport vehicles.

Table 0:2: List of material requirement

| Requirement | Type | Source | Quantity (Estimated) | Mode of Transport |
|---------------------|-------------------------|---|----------------------|-----------------------------|
| Building materials | Gravel | | | Trucks |
| | Sand | | | Trucks |
| | Cement | | | Trucks |
| | Concrete brocks | | | Trucks |
| | Water | TANGA UWASA | | Trucks |
| | Timber | To be sourced from authorized local dealers in Tanga City | | Trucks |
| Energy | Electricity | TANESCO (National Grid) proximity to the site | | |
| | | Generator will be used in case of power outage | | |
| Equipment/ Machines | Bull Dozers | Contractor | 1 | Trucks |
| | Graders | | 1 | Trucks |
| | Trucks /Tippers/lorries | | 1 | |
| | Concrete mixers | | 1 | Trucks |
| | Compactor | | 1 | Trucks |
| | Excavator | | 1 | Trucks |
| | Front end loader | | 1 | Trucks |
| Manpower | Skilled | Contractor | 30 | Communal buses/Company cars |
| | Unskilled | Local people near project site | 120 | Communal buses |

NB: Quantity of raw materials and exact source of raw material will be estimated and determined after BOQ.

- **Transportation of materials**

The contractor will be responsible for the transportation of all construction materials and equipment from point of sourcing to the site mainly by using Tanga-Horohoro main road and untarmacked road.

2.3.3 Demobilisation Phase

The main activities to be undertaken during the demobilisation phase shall include the demolition of the storage facility/camp site. Rubble from construction activities, demolished storage facilities, and other waste from construction activities will be used as fillers during foundations. Any leftover solid materials are likely to be composed of bricks, and crumbles of cement will be disposed by levelling off other degraded areas within the project area and within the surrounding communities. Demobilization will further involve laying off construction workers, removal of construction equipment and leftover materials, dismantling of workers' camp and levelling the site, landscaping, and filling of borrow pits. Demobilisation phase will last for a period of two 2-3 months.

2.3.4 Operation and maintenance phase

Activities during operation and maintenance phase will include commissioning the use and regular maintenance of these new premises. During this phase different wastes both solid and liquid waste will be generated within the same period, which will need proper management. The activities that are expected to be done during the operation phase will include;

- Daily teaching and training operations
- Utilization of cafeteria for food services
- Management, maintenance and operation of wastewater treatment plant Management, maintenance and operation of solid waste dump site.
- Maintenance of water supply facilities

2.3.5 Decommissioning Phase

Decommissioning occurs when a project reaches its conclusion. It is expected that the life span of the proposed project will last for several years basing on the technology to be used, also when the project reaches its end, all the facility and related infrastructure will be dismantled. This process will include the removal and demolition of buildings and equipment used, or even the complete demolition of the entire area, followed by the clearance of the site and transportation of all waste and debris to a disposal site. Subsequently, site restoration efforts will be undertaken to ensure that the area reverts to its original condition as it existed prior to the construction of the proposed buildings.

2.4 Manpower and Utility Requirements

2.4.1 Manpower Requirements

The proposed project will temporarily employ about 100-150 people during the construction phase. Employment during the construction phase will be under contractor and will be in the form of skilled as well as unskilled labourers considering all gender types. For the semiskilled and unskilled labourers, the contractor will employ people from the Pangarawe, Gombero, Vunde-

Manyinyi, Jirihini, Kichangani and Dima villages as a way of making sure that the project becomes beneficial and brings a sense of community ownership.

The Contractor must comply with the stipulations outlined in the Employment and Labor Relation Act No. 6 of 2004. Moreover, they are obligated to create a recruitment and termination strategy focused on acquiring local skills for the project and ensuring equal opportunities. It is mandatory to follow the Labor Institution Wage Order (2013) and make payments in accordance with prevailing labor laws to avoid conflicts during the construction phase. The Contractor and the client are jointly responsible for drafting contracts, which require approval from both the World Bank and the Labor Officer. Additionally, to prevent the use of child labor, the contractor has been furnished with pertinent laws detailed in POM 2021.

2.4.2 Power Supply

The MU-Tanga Campus will be connected to the national grid on the line from Tanga City-Horohoro, at Pangarawe road junction. Along Pangarawe road, the medium transmission line is planned to the proposed Campus, thus making it easy for connection after stepping down/up the transformer. Based on the power use, the average electricity demand for the campus is 4125KVA per month, equivalent to a consumption of 137.5KVA per day.

Therefore, to meet this demand, three (3) transformers with capacity of 500KVA have metered power(T2), and one transformer of 200KVA is for individual connection (T3) will be installed to serve the entire campus. Also, two (2) backup power (generators) of the capacity 500 KVA each will be installed to supply energy during any emergence. One generator will serve the administration building, and another generator to serve the academic zones (MU-Tanga Campus Master Plan 2023-2043).

2.4.3 Water Supply

The water supply plan for the proposed MU-Tanga Campus will rely on three potential sources. The primary and most dependable source will be Tanga UWASA, utilizing connections from the existing transmission line along Tanga-Horohoro road, which is situated approximately 12 kilometers from the Campus location. Also, two proposed tanks (each 4500m³) will be installed and connected to Tanga UWASA water transmission mains. From each storage tank there will be two service lines, the first will service staff housing, student hostels, health center, estate and CITT while the second will service the remaining areas. Water from these tanks will be distributed by gravity to all other service areas. The distribution network will use a combination of loops and a few dead-end systems (MU-Tanga Campus Master Plan 2023-2043).

The second potential source is ground water which will be accessed through boreholes. Preliminary hydrogeological survey indicates that the aquifers can be reached about 80-120m from the earth's surfaces. Roof top rainwater harvesting is highly recommended to be considered not only as supplementary water supply source but also a means to manage stormwater runoff around the campus. Buildings with suitable roof surfaces and strategic locations will be fitted with a centralized rainwater harvesting system connected to underground storage tanks. Based on roof surfaces available, the storage tanks will be designed to provide sufficient storage capacity to accommodate rainwater for the entire rain season (MU-Tanga Campus Master Plan 2023-2043).

2.5 Construction products, by-products and wastes

It is anticipated that the project will generate a variety of products, by-products and wastes during its construction and operational phases. The characteristics of the products, by-products and wastes are discussed in this section.

2.5.1 Products

The final product will be 885 student's capacity.

2.5.2 By-Products

The by-products will be disposed-off as follows:

- **Soil;** the soil generated during excavation will be reused elsewhere in the project. Unusable soil will be transported for disposal at designated dumping sites.
- **Pieces of timber/wood;** large pieces of timber/wood generated during the construction phase will be transported back to the contractor 's yard for reuse in future while the small pieces of timber/wood will be disposed-off for use as fuel for cooking and heating.

2.5.3 Solid Waste

2.5.3.1 Construction phase

Major wastes generation associated with the project construction and their treatment/ disposal methods are described in table 2.3.

Table 0:3: Waste generation and treatment during construction Phase

| Activity | Waste type | Amount | Treatment/ Disposal Method(s) |
|---------------------------|--------------|-----------------|--|
| Clearing of topsoil | Spoil Soil | Significant | This soil shall be stock piled along the foundation trenches for all structures and backfilled for pipes laying. The soils shall be used to reinstatement site at the end of the project, the spoiled materials shall be disposed to Mpirani landfill which is about 11.5Km from MU-Tanga campus site. |
| Biodegradable solid waste | Food remains | Not Significant | Collected and stored temporary through a dustbin or temporary collection point then disposed at Mpirani landfill. These solid wastes are organic in nature and thus proper management is required in time to avoid bad odor if they are not disposed in time |
| Actual Construction | Rubbles | Not Significant | Will be stockpiled and used to fill cut sections |
| | Scrap metals | Not Significant | Sell to recyclers |
| | Timber | Not Significant | Provided to locals for re-use |
| | Cement bags | Not Significant | Sell to recyclers |

2.5.3.1 Operational phase

At the proposed location for the MU- Tanga Campus development in Tanga, there are currently no strategies in place for handling both solid and liquid waste by the Mkinga district council. the proposed establishment of MU-Tanga Campus, various facilities such as offices, a health center, cafeteria, administrative buildings, and service structures (e.g., the main library and photocopying center), along with staff quarters, are expected to produce municipal solid waste such as vegetation, food remains, cardboards and papers. However, during construction period other waste will be generated this include scrap metals, drums, tins, glasses and plastics. Additionally, during both the construction and operational phases of the campus, yard waste and sewage sludge from wastewater treatment facilities are expected to be significant sources of solid waste.

The total amount of solid waste generated is expected to be 0.266tons/day based on generation rates of 0.3kg/day/person and population projection about 885 person. Given that there is currently no waste collection in the vicinity of the proposed MU-Tanga campus, it is strongly advisable to implement waste minimization strategies. Hence, solid waste will undergo sorting and temporary storage in waste bins and skip buckets. Once the recovery of valuables is no longer feasible, the remaining waste will be transported to the ultimate disposal site at Mpirani landfill about 11.5km from MU-Tanga Campus. Also, MU will establish composting facility for management of biodegradable waste and biogas production. In addition to that, incinerator shall be established at Health centre and student hostel to treat all hazardous waste generated at MU-Tanga campus.

2.5.4 Liquid waste

The proposed establishment of sewerage network will gather wastewater from each building, and in each building will feature its own pre-treatment system to reduce the volume of wastewater that reaches the tertiary treatment facility then will be managed into the proposed wastewater stabilization ponds (WSP). This proposed WSP is designed with the intention of reusing the treated effluents before they are discharged into the environment.

Therefore, to facilitate reuse, the aim is to gather and oversee most of the wastewater at the WSP situated in the northwestern section of the campus.

2.5.4.1 Construction phase

Assuming that;

- There will be 100 people (Worst case scenario)
- Water consumption = 40L/Capital/Day
- 80% of water consumed become wastewater.
- 100% of the workers shall use University toilets.
- Wastewater generation per day = $100 \times 40 \times 0.8$

Therefore, about 3.2 m³ per day of liquid waste will be produced from the site during construction period. The wastewater will be collected and treated through temporary onsite wastewater treatment system at the camp site.

2.5.4.2 Operation phase

Assuming that;

- There will be 885 people (Worst case scenario)
- Water consumption = 40L/Capital/Day
- 80% of water consumed become wastewater.
- 100% of the students and workers shall use University toilets.
- Wastewater generation per day = $885 \times 40 \times 0.8$

Therefore, about 28.32 m³ per day of liquid waste will be produced from the site during Operation period. The wastewater will be collected and treated through the proposed WSP, and the design will accommodate entire operation period.

2.5.5 Hazardous waste

The main hazardous wastes that will be generated at the site are electrical equipment, concrete additives, tins, scrap metal etc. This waste will be collected within the designated dustbin then taken to the storage area and finally disposed by an authorised contractor.

Hazardous waste will also be generated during operation phase. This includes medical waste from dispensary, oils and greases, chemicals, scrap metal, tins, and glass. Medical waste will be treated through incinerator that will be established at the health centre.

Other hazardous waste will be managed properly by MU and disposed by authorized contractor responsible for waste management. Also, E-wastes like computers, printers, and tonners will be disposed based on the Environmental Management (Control and Management of Electrical and Electronic Equipment Waste) Regulations of 2021.

2.6 Stormwater management

Stormwater management refers to the control of both quality and quantity of rainwater in an area of influence. The positioning of buildings, roads, and systems for managing wastewater at the proposed establishment of MU-Tanga campus is significantly determined by the runoff drainage patterns. This is due to the fact that the campus's development is expected to alter the way rainwater flows within the area, leading to an uptick in stormwater runoff.

The strategy for managing stormwater is transformed to prioritize recycling, storing, slowing down, filtering, gathering, and safely transporting it to the downstream environment. By adopting this method, stormwater management contributes to the efforts to preserve environment within the campus.

Also, managing stormwater is vital for the security and safety of the roads on the campus. The road drainage system plays a crucial role in evacuating water from both the road's surface and subsurface, as well as from the surrounding areas that contribute to water accumulation. This drainage system is essential for preserving the stability and longevity of the roads by minimizing moisture content.

2.7 Occupational Health and Safety (OHS)

2.7.1 OHS During the Construction Phase

MU will work hand in hand with the lead consultant to ensure regular trainings on occupational health and safety are provided to both permanent and casual staff. Further, relevant information on various outbreak and pandemic will be shared including Cholera, COVID-19 and HI/AIDS. During the construction phase, the contractor will provide with adequate protective gears such as helmets, heavy duty gloves, jackets and boots. And also, ensure the right infrastructure is in place e.g., sign boards, first-aid station and also, when necessary, transport in case of emergency evacuation.

The awarded contractor will provide relevant trainings to students which are close to the proposed establishment in order to ensure smooth navigation of their daily to day transportation. The speed limit will be set not exceeding 50km/h but within the designated area shall not exceed 10km/h. The contractors shall ensure all their drivers are aware of the set speed limits to ensure safety within the project area and also, both the entrance and exit areas will be identified and labeled.

Also, it explains the mitigation measures for hazards and risks associated with health and safety which include the following;

2.7.1.1 Slips and falls

- Maintain a clean and organized workplace by promptly cleaning up spills, debris, and clutter.
- Regularly sweep, mop, and vacuum floors to remove dust, dirt, and liquids that can create slip hazards.
- Repair or replace damaged flooring promptly to eliminate tripping hazards.

- Choose flooring materials with appropriate slip resistance for different areas. For example, use non-slip flooring in areas where liquids are commonly present.
- Clearly mark wet floors or areas under maintenance with warning signs and cones to alert workers and visitors.
- Use high-visibility tape or paint to mark steps, ramps, and changes in floor level.
- Ensure adequate lighting in all work areas, including stairwells and hallways, to improve visibility and reduce tripping hazards.
- Provide regular training to employees about slip and fall hazards and the importance of following safety procedures.
- Encourage workers to report hazards promptly so that they can be addressed.
- Maintain walking surfaces, including outdoor walkways and parking lots, to prevent uneven surfaces and tripping hazards.
- Conduct regular workplace inspections to identify and address potential slip and fall hazards promptly.
- Use scaffolds, ladders, and elevated platforms with proper guardrails and fall protection equipment.
- Establish clear evacuation routes and procedures in case of an emergency to prevent panic and rushing that could lead to slips and falls.

2.7.1.2 Working at height.

- Erect and dismantle scaffolds according to manufacturer guidelines and industry standards.
- Regularly inspect scaffolding for stability and structural integrity.
- Install safety nets where feasible to catch falling workers or objects.
- Regularly inspect equipment, scaffolding, and other structures for damage, wear, or defects.
- Select the right ladder for the job and ensure it's in good condition.
- Place ladders on stable, level surfaces and secure them to prevent slipping.
- Provide workers with appropriate personal protective equipment (PPE) such as helmets, gloves, and footwear designed for working at heights.
- Train workers on the proper use of fall protection equipment, safe work practices, and emergency procedures.
- Assign a competent supervisor to oversee work at heights and ensure safety procedures are followed.
- Establish effective communication methods between workers at different heights and ground level.

2.7.1.3 Moving machinery.

- Install appropriate guards, barriers, and shields on machinery to prevent workers from coming into contact with moving parts.
- Ensure that guards are properly designed, secured, and in place before starting any machine.
- Provide comprehensive training to operators and maintenance personnel on safe machine operation, maintenance procedures, and hazard recognition.
- Conduct regular inspections of machinery to identify worn-out parts, malfunctioning components, or potential hazards.
- Follow manufacturer recommendations for routine maintenance and ensure that machinery is serviced by qualified technicians.

- Conduct thorough risk assessments before implementing new machinery or making changes to existing processes to identify potential hazards.
- Establish a reporting system for near misses, incidents, and safety concerns related to machinery. Investigate these reports and take corrective actions as needed.
- Provide appropriate PPE such as gloves, goggles, helmets, and hearing protection based on the machinery's hazards.

2.7.1.4 Diseases prevention

- Encourage frequent handwashing with soap and water for at least 20 seconds. Provide hand sanitizers in common areas.
- Promote proper respiratory etiquette by covering coughs and sneezes with a tissue or the inside of the elbow.
- Regularly clean and disinfect frequently touched surfaces, such as doorknobs, light switches, shared equipment, and restrooms.
- Maintain good indoor air quality by ensuring proper ventilation and air circulation within the workplace.
- Conduct health screenings, including temperature checks and symptom assessments, for employees and visitors before they enter the workplace.
- Implement safety measures in cafeteria, such as limiting the number of occupants and maintaining physical distancing and good housekeeping.
- Provide education and training to employees about disease prevention, proper hygiene practices, and the importance of adhering to safety protocols.
- Create a comprehensive COVID-19 safety plan tailored to your project, including policies, procedures, and protocols.
- Conduct a thorough risk assessment specific to the construction site.
- Assign a responsible person or team to oversee and enforce COVID-19 safety measures.
- Require all workers to wear appropriate personal protective equipment (PPE), including masks, gloves, and eye protection.
- Set up handwashing stations or hand sanitizing stations at key locations on-site.
- Encourage frequent handwashing and provide hand sanitizer.
- Increase the frequency and thoroughness of cleaning and disinfecting common areas, tools, and equipment.
- Improve ventilation in enclosed spaces to increase air circulation.
- Implement daily health screenings for all workers, subcontractors, and visitors. This may include temperature checks and symptom questionnaires.
- Encourage workers to report symptoms or exposure to COVID-19 immediately.
- Maintain open lines of communication with workers, subcontractors, and stakeholders about COVID-19 developments and safety measures.
- Use signage and digital communication methods to remind everyone of safety protocols.

2.7.1.5 Being struck by objects

- Regularly inspect the environment to identify potential hazards related to falling objects.
- Assess the risk associated with each hazard, taking into account factors such as object weight, height, and frequency of exposure.
- Use warning signs, cones, and barricades to alert individuals to the presence of falling object hazards.
- Clearly mark exclusion zones in areas where there's a risk of objects falling.

- Use toe boards on scaffolding and elevated platforms to prevent tools and materials from slipping off.
- Conduct regular inspections of equipment, storage areas, and structures to identify and address potential hazards.
- Ensure that any damaged or deteriorating structures are repaired promptly.
- Keep work areas clean and organized to minimize the risk of tripping over objects or inadvertently causing objects to fall.
- Ensure that objects are stored securely when not in use.
- Use appropriate personal protective equipment (PPE) such as hard hats, safety goggles, and steel-toed boots in areas with falling object hazards.
- Ensure that PPE is in good condition and worn consistently.

2.7.1.6 Over-exertion

- Conduct ergonomic assessments of workstations and tasks to identify potential over-exertion risks.
- Modify workstations and equipment to minimize physical strain and discomfort.
- Contractor should train employees on proper lifting techniques, including bending at the knees, keeping the load close to the body, and using leg muscles instead of back muscles.
- Reduce the weight of materials, tools, or equipment when possible.
- Provide mechanical aids such as lifting devices, conveyor belts, or adjustable height workstations to reduce manual lifting and carrying.
- Design workstations and workflows to minimize the need for repetitive or forceful movements.
- Contractor should make a job rotation or task alternation to reduce the repetitive nature of physically demanding tasks and provide rest periods.
- Employees should ensure to maintain good posture while working, which includes sitting or standing with a straight back and avoiding excessive twisting or bending.

2.7.1.7 Ergonomics injuries and illness

- Ensure that workstations are designed with ergonomics in mind, taking into account the user's body size, shape, and tasks.
- Provide adjustable chairs, desks, and computer monitors to accommodate various users and allow for proper positioning.
- Implement stretching and exercise programs tailored to the specific needs of employees to improve flexibility and reduce muscle tension.
- Implement job rotation or task variation to reduce repetitive motions that can lead to overuse injuries.
- Encourage short, frequent breaks to allow employees to rest, stretch, and change positions during the workday.
- Provide ergonomic tools and accessories such as ergonomic keyboards, chairs, and footrests to reduce strain on wrists and hands.
- Develop and enforce safe lifting and material handling procedures, including the use of appropriate lifting equipment like dollies or forklifts for heavy objects.
- Conduct regular health screenings and assessments to identify and address ergonomic-related health issues early.
- Offer access to healthcare professionals who can provide guidance on managing and treating ergonomic injuries and illnesses.

2.7.2 OHS During the Operation Phase

All the safety issues will be taken into consideration including the allocation of emergency assemble point; Emergency plans and procedure will be developed to prevent and mitigate the likely consequences of accidents associated with the project (construction). There will be a document that outlines in detail the potential accidents/emergencies and how to respond; this document will also explain how to mitigate environmental hazards. The document will also respond to Occupational Health and Safety hazards related to daily operation e.g., risks of fire explosion. Thus, fire extinguishers of powder foam type and fire horse reel will be placed in several strategic points and occasionally serviced.

2.10 Disaster Risk Management

The disaster risk management plan is intending to provide efficient and effective operational procedures that will allow the university to save lives, minimize injuries, protect property, environment and preserve functioning campus in times of natural and man-made/technological hazards. In addition, it can be used to control hazards so as reduce the vulnerability, to reduce the risk and the overall management of disaster risk to the MU community. The plan provides the basic information on the action to be taken during the pre-disaster, the disaster phase (during the event) and post disaster phase. The plan describes the emergency and assigns the responsibilities for various emergency tasks, specifically to WHO does, WHAT, WHEN AND HOW.

2.8 Gender Analysis and Mainstreaming

The constitution of Tanzania, Act No. 15 of 1984 clearly stipulates equal rights for both men and women and prohibits any form of discrimination based on gender, colour, tribe, religion, or station in life. Tanzania has signed and ratified both international and Regional Instruments, such as the Elimination of All Forms of Discrimination against Women in 1987; and the African Charter on Human and Peoples' Rights on the Rights of Women in Africa in 2005. Currently, Tanzania has achieved gender parity in primary school enrolment rates, this can be attributed to the free education policy introduced through the Circular 5 of 2015, which implements the Education and Training Policy of 2014. This circular was responding to strategies for eliminating discrimination based on gender.

In the same context, MU has a deliberate policy to encourage equal employment opportunity for both men and women. The contractor of the project will also align with the policies to ensure equal employment opportunities for gender.

2.9 General repairs and maintenance

Regular maintenance and repairs will be conducted on the buildings and related facilities throughout the project operational phase. These activities encompass fixing building walls and floors, maintaining electrical devices and equipment, repairing refrigeration systems, addressing leaks in water pipes, painting, and replacing worn-out materials, among other activities.

2.10 Project Boundaries

Identification of boundaries within which the ESIA study is undertaken is an important component of the environmental and social assessment study. There are three types of boundaries which are institutional, temporal, and spatial boundaries.

2.10.1 Institutional boundaries

Institutional boundaries refer to those institutions and sectorial boundaries in which the project lies or rests. These will be determined from political boundaries, Acts, regulations and institutional mandates and administrative structures. The proposed development is about establishment of Academic Block with Staff offices and Mini library, two (2) Students' Hostels, Cafeteria, Dispensary, four (4) Staff Houses and Reservoir Tank at MU-Tanga campus. The key institutions that will oversee the implementation of the project activities will include;

- Ministry of Education Science and Technology
- Mkinga District Council
- Tanzania Commission of Universities (TCU)
- Fire and Rescue Force.
- Occupational Safety and Health Authority (OSHA)
- Tanga UWASA
- RUWASA
- TANESCO
- Pangarawe, Gombero, Vunde manyinyi, Jirihini, Kichangani and Dima community

These institutions will be consulted in this ESIA process, as the key stakeholders with interest in the development at MU for environment and economic prosperity of the local people and Tanzanians in general.

2.10.2 Temporal boundaries

Temporal boundaries refer to the lifespan and reversibility of impacts. For example, the impact of construction work for the affordable housing project may be short-lived, but the presence of these buildings in the selected site may have implications that stretch far into the future until when decommissioning is undertaken. In addition, consideration needs to be given to what happens when the project ends, where there is a need for site restoration and decommissioning of the proposed facilities. Therefore, some of the impacts that may occur during construction, e.g., noise caused by bulldozers will disappear as soon as the construction phase is completed. The construction period will last while the operational phase will be designed for several years unless an unforeseen event occurs.

2.10.3 Spatial boundary

The spatial dimension encompasses the geographical spread of the impacts regardless of whether they are short-term or long-term. The spatial scale considers the receptor environmental component and can be local or broader. Two zones of impact namely core impact zone and influence impact zone are considered.

- Starting with the core impact area (where the project is located). In this case, the core impact area for the project will be Pangarawe area (where project will be located) and its nearby areas (Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima Villages) as where the impact will be felt.
- The second area is the immediate impact area. This is the area surrounding the core area and bears relatively some of the impacts. In case of the proposed project, the immediate impact area will be the neighboring area within Gombero ward in Mkinga District Council in general which will benefit from revenues paid by the investor and from different social economic activities.

- The other area is area known as the area of influence. In terms of spatial dimension, this is the outer most area that consists of centers of decision making that can influence the development of proposed project.

2.11 Project cost and Duration

MU has received financial support from the World Bank (WB) through the Government of the United Republic of Tanzania (GoT) under the project named Higher Education for Economic Transformation (HEET) which is about **10,000,000,000.00 TZS**. The project implementation is estimated to take **18 months** after commencement Specifically, under this project MU intends to establish six infrastructures, which are Academic Building, two (2) Students' Hostels, Cafeteria, Dispensary building, four (4) Staff Houses, and Reservoir tank with capacity of 400,000L. The total budget for the proposed establishment is summarized as follow (Table 2.4);

CHAPTER 3: POLICIES, LEGAL AND INSTITUTIONAL FRAMEWORK

3.1 Introduction

Tanzania has a number of policies and laws and has an administrative framework for the management of environmental and social issues enshrined in the National Constitution. Tanzania has various Acts, Regulations and guidelines on environmental and social issues relevant to the projects under the HEET project. Tanzania is also a signatory to and has ratified various international conventions on environmental and social sustainability. Some of the policies, laws, regulations and guidelines that are relevant to the environmental and social management of the proposed HEET project are briefly described in the succeeding subsections.

3.2 Policies Relevant to the Project

The following are relevant Sectoral and cross–Sectoral policies that provide directives on how the project should operate in relation to the concerned environmental and socioeconomic settings. The proponent shall continue to consult these policies in the course of implementing the project activities.

Table 0:1: Policy Compliance

| S/N | POLICY | REQUIREMENT | COMPLIANCE STATUS |
|-----|---|---|---|
| 1 | The National Environmental Policy, 2021 | The policy provides the framework for the formulation of plans, programmes and guidelines for the achievement of sustainable development. Instruments for implementation include the use of Environmental Audit (EA), development of national standards and indicators, and the preparation of appropriate legislation. NEP encourages good land and water resources management to reduce undesirable environmental impacts such as soil salinity, water pollution and spread of water borne diseases. | MU has observed one of the requirements of the national environmental policy by putting measures to control and minimizing pollution that will happen during constructions and operations period. |
| 2 | The National Land Policy (1997) | The National land Policy is relevant to this project because the project will be required to ensure protection of existing cultural heritage and conservation of ecological and socially sensitive areas. In addition, to promote sound land information management and to protect land resources from degradation for sustainable development. | MU comply with this policy because the proposed building project is located within the area planned for institutions and as such it is compatible with the land use in the project area as required by the National Land Policy. |
| 3 | The Construction Industry Policy (2003) | Among the major objectives of the policy, which supports a sustainable block development sector, include the promotion and application of cost effective and innovative technologies and practices to support socio-economic development activities such as blocks, road-works, water supply, sanitation, shelter delivery and income generating activities and to ensure application of practices, technologies and products which are not harmful to either the environment or human health. This project is in-line with this policy as ultra-modern technology shall be used during construction and its operation. | This project is in-line with this policy as ultra-modern technology shall be used during construction and its operation. Implementation of the proposed establishment will as much as possible make use of cost effective and environmentally friendly technologies to minimize wastage of resources especially building materials, water and energy. |
| 4 | The National Employment Policy (2008) | The major aim of this policy is to promote employment mainly of Tanzania Nationals. Relevant sections of this policy are (i) 10, which lays down strategies for promoting employment and section 10.1 is particularly focusing on industry and trade sectors (ii) 10.6 which deals with employment of special groups i.e., women, youth, persons with disabilities and (iii) 10.8 that deals with tendencies of private industries to employ expatriate seven where there are equally competent nationals. | MU shall abide by this policy by employing Tanzanians who have the required qualifications as well as unskilled |
| 5 | 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 puts emphasis on gender quality and equal opportunity of 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 levels of project planning to implementation. |

| S/N | POLICY | REQUIREMENT | COMPLIANCE STATUS |
|-----|---------------------------------------|--|---|
| 6 | National Policy on HIV/AIDS (2001) | The policy recognizes that HIV infection shall not be grounds for discrimination in relation to education, employment, health and any other social services. Pre-employment HIV screening shall not be required. For persons already employed, HIV/AIDS screening, whether direct or indirect, shall not be required. HIV infection alone does not limit fitness to work or provide grounds for termination. HIV/AIDS patients shall be entitled to the social welfare benefits like other patients among the employees. HIV/AIDS information and education targeting the behavior and attitudes of employees and employers alike shall be part of HIV/AIDS intervention in the workplace. | The proponent will adhere to the policy by availing HIV/AIDS information and voluntary screening services to its workers as well as observing other provisions of the policy. |
| 7 | The Energy Policy (1992) | The policy advocates the adoption of renewable energy options. This project intends to integrate renewable energy (solar power) as part of the energy source. | MU will adhere to the policy by planning to integrate solar panel as alternative energy source in they proposed establishment. |
| 8 | The National Water Policy (URT, 2002) | The policy aims to establish a comprehensive framework for sustainable water resource management in Tanzania. It acknowledges growing challenges like scarcity, misuse, and wastage of water, uncontrolled water abstraction, and inadequate monitoring due to resource and capacity constraints. It emphasizes the importance of water for socio-economic activities and recognizes conflicts arising from competing water uses during droughts. Despite lacking prioritization criteria, the policy prioritizes domestic water supply and ecosystem maintenance. It highlights the need for better coordination between water and land development, especially amidst ongoing liberalization, to alleviate pressures on water resources and ensure smooth linkage. | The proposed establishment shall be designed in such a way that water use is kept to the minimum by, for example, installation plumbing fixtures such as faucets and flushing cisterns, which minimizes use of water. It will also ensure that pollution of water sources is avoided or minimized during the construction and operation phases. |
| 9 | The National Health Policy (URT 2003) | The main objectives of this policy is to ensure that health services are available and accessible to all people wherever they are in the country, whether in urban and rural areas. The policy encourages safe basic hygienic practices in workplaces, promote sound use of water, promotes construction of latrines and their use, encourage maintenance of clean environment; working environment which are conducive to satisfactory work performance. | The Proponent/Contractor shall observe this policy by providing good hygienic condition to the workers and shall continue to be provided with appropriate PPE's based on their working sections. |
| 10 | Education Training Policy (2014) | The policy stressed that for improvement of the quality of education in Tanzania there should be a shift from using many text books into using single text book for each subject. The policy also emphasizes 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 with the service offered by the school. | MU through HEET will increase teaching and learning infrastructure which at the end will to increase enrolment of the students. And, also, the school fees will be affordable to all people. |
| 11 | National Mineral Policy (2009) | The National Mineral Policy also addresses that the mining activities should be undertaken in a sustainable manner. Reclamation of lands after mining activities is recommended. As far as this project is concerned, mining activities is directed to quarrying activities for obtaining stones and aggregates. | No mining activities will be undertaken by proponent within the project area as raw materials (Fine and coarse aggregates) for the proposed establishment shall be bought from authorized vendors. |

3.3 Relevant Legal Framework

This section addresses the legal conditions that are relevant to the proposed project. This ESIA has been prepared in general compliance with the following legislations.

Table 0:2: Legislation Compliance

| S/N | LEGISLATION | REQUIREMENT | COMPLIANCE STATUS |
|-----|---|--|---|
| 1 | Environmental Management Act, Cap 191, 2004 | The Environmental Management Act, Cap 191 establishes a legal framework for sustainable environmental management aligned with the National Environmental Policy. It ensures the continuity of the National Environmental Management Council (NEMC), empowering it for enforcement, compliance, and monitoring of environmental impact assessments. Proponents must also heed Environment Management Act Cap 72 concerning land use responsibilities and sustainability. | All section shall continue to be observed by Proponent in order to protect the environment against any sort of pollution (refer to the Environmental Management Plan of this report). |
| 2 | Occupational Health and Safety Act (2003) | This Act deals with the protection of human health from occupational hazards. It specifically requires the employer to ensure the safety of workers by providing safety gears at the work place. | The Proponent/Contractor will acquire a certificate of registration of a workplace from OSHA to abide to the law. |
| 3 | The Land Act, 1999, CAP 113 R.E. 2019 | The Act seeks to control the land use and clarify issues pertaining to ownership of land and land-based resources, transactions on land and land administration. The law provides for technical procedures for preparing land use plans, detailed schemes and urban development conditions in conformity with land use plan and schemes. | The land is owned by the project proponent and title deed (certificate of occupancy) for the proposed establishment land is attached in appendix 2. |
| 4 | The Urban Planning Act (2007) | The law provides for the orderly and sustainable development of land in urban areas, to preserve and improve amenities; to provide for the grant of consent to develop land and powers of control over the use of land and to provide for other related matters. | The project will seek planning consent and building permits from relevant authorities. |
| 5 | Employment and Labour Relations Act, R.E 2019 | The Act ensures fundamental labor rights and sets employment standards, offering extensive protection against discrimination. It mandates equal opportunity, prohibiting discrimination based on various factors including gender, pregnancy, marital status, disability, and age. Employers must take affirmative action to ensure a safe and healthy workplace for all genders. | The Proponent commits to enforcing labor laws, ensuring workplace equality, fostering economic justice, and upholding labor rights |
| 6 | The Engineers Registration Act and its Amendments 1997 and 2007 | The Act provides restriction that no person other than a registered engineer shall engage in professional engineering work or services which includes professional service consultation, planning, designing or responsible supervision of construction or operation in connection with any public or privately owned public utilities, buildings, machines, equipment, processes, works or projects where public interest and welfare, or the safeguarding of life, public health or property is concerned or involved, and that requires application of engineering principles and data. | MU shall engage registered engineers to observe the provisions of the Act when executing its activities. |

| S/N | LEGISLATION | REQUIREMENT | COMPLIANCE STATUS |
|-----|---|--|---|
| 7 | The Contractors Registration Act, 1997 | This Act establishes the Contractors Registration Board (CRB). CRB has a mandate to register contractors, regulate the conduct of the contractors and for related matters. Among other things CRB is required to take legal action against unregistered contractors who undertake construction, installation, erection or alteration works; ensure that all construction sites are hoarded; and labour laws, occupational health and safety regulations in the construction industry are adhered to. On executing its construction activities. | The proponent shall therefore appoint a registered contractor and make sure that the provisions of the Act are adhered to. |
| 8 | The Architects and Quantity Surveyors, Act 2010 | This Act was enacted by the parliament to provide for establishment of a board to regulate the conduct of Architects and Quantity surveyors and architectural and quantity surveying consulting firms in Tanzania. The board is vested with powers to inspect premises or construction sites to verify whether the rules and regulations of carrying out construction projects are adhered by consulting firms. This is aimed at ensuring that appropriate professionals who are registered by the board are involved in undertaking works as required by the law. | Therefore, the proponent shall abide by this Act by carrying out construction by adhered consulting firm. |
| 9 | Public Health Act, 2009 | The Act 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. | The Proponent will observe this Act by promoting and preserve the public health. |
| 10 | Fire and Rescue Force Act, 2007 | The act empowers the commissioner general of the force or his agent to enter premises to ascertain any contravention of provisions of the Act and obtain information required for firefighting purposes. A court may issue an order for a closure or prohibit the use of any premises for human habitation or storage in case there is failure to comply with fire prevention regulations. The Act also obliges the owners and managers of the structures to set aside places with free means of escape, and install fire alarm and detection systems, or such other escape and rescue modalities in the event of fire | The Proponent abide to this Act by making sure that the awarded Contractor and their employees undergo fire and rescue training and must have a certificate for compliance. Also, should make sure all the design structure and the site layout plan shall be submitted to Fire and Rescue Force for approve. |
| 11 | Water Resources Management Act, 2009 | The Act provides for the protection of the water resources and the user so that there is a balance between different uses. The provisions of the Act will be adhered to during implementation by ensuring that surface and ground water sources are protected. Furthermore, water to be sourced from a borehole which will be drilled within the project area shall be used wisely at the project site and from the river shall have water use permit. And if the project area has wastewater treatment plant, the proponent shall have discharge permit from responsible authority | The proponent shall adhere with the act by ensuring the protection of surface and ground water resources, and they will use water from Tanga UWASA |
| 12 | Energy and Water Utilities Regulatory Authority Act, No 11, of 2011 | Section 28 of the Water Supply and Sanitation Act confers EWURA among others powers to exercise licensing and regulatory functions in respect of water supply and sanitation services; establishment of guidelines on tariffs chargeable for provision of water and sanitation services; monitoring water quality and standards of performance for provision of water supply and sanitation services. | Proponent will comply with the act by increasing efficiency in the use energy and water utilization. |

| S/N | LEGISLATION | REQUIREMENT | COMPLIANCE STATUS |
|-----|---|--|--|
| 13 | The Workers Compensation Act, 2015 | An Act to provide for the compensation to employees for disablement of death caused by or resulting from injuries or diseases sustained or contracted in the course of employment, to establish the Funds for administration and regulation of worker's compensation and to provide for related matter. It applies to both workers in the private and public sectors. | The Proponent shall comply with this act by ensuring that all workers from Contractor shall be compensated accordingly in this manner and registered to WCF. |
| 14 | Prevention and Control of HIV/AIDS Act, 2008 | The Act primarily addresses prevention, treatment, and support for HIV/AIDS, promoting public awareness, reducing transmission, and providing community-based services. Section 4(1) emphasizes awareness and protection rights, while Section 19(2) focuses on community-based services, potentially impacting local HIV transmission dynamics. | The Proponent shall operate within the requirements of this legislation in addition to those of the HIV policy. |
| 15 | The Law of the Child Act, 2019 | This act reforms and consolidates laws regarding children's rights, welfare, and protection. It addresses adoption, custody, employment regulations, and prohibits child labor exploitation by individuals or companies. | Contractor and MU vow to prevent child labor by enforcing rules during project, safeguarding those under fourteen. |
| 16 | The Roads and Fuel Toll Act, [Cap.220 R.E.2019] | The Roads Act covers financing, development, maintenance, and management. Key clauses include constructing access roads, notifying affected landholders, and regulating weight, speed, and dimensions. It also addresses offenses, penalties, and recovery procedures. | The project proponent shall observe relevant section of the Act by ensuring that his project don't affect the roads which is near the project site. |
| 17 | The Road Act, 2007 | Part IX of the Act provides for offences and penalties against the contravention of the provisions of the Act. Furthermore, the Act stipulates that the Road authority shall be compensated in respect of the expenses incurred while repairing the road damaged by any person. | The project proponent shall observe relevant section of the Act by ensuring that his project will be located outside the road reserve. |
| 18 | Standard Act of 2009 | The Standards Act establishes the National Environmental Standards Compendium (NESC) with compulsory standards (TBS), covering various industries' environmental impacts. Test methods for compliance are specified. The MU project will adhere to these requirements. | MU must adhere to Act, regulatory requirements, implement proposed mitigation measures for air pollution abatement, and follow environmental best practices. |
| 19 | Universities Act No. 7 of 2005 | Universities Act No. 7 of 2005 provides for establishment of the Tanzania Commission for Universities (TCU) to provide the procedure for accreditation of institutions of higher learning and other related matters. The proposed project at MU will be regulated by the Tanzania Commission for Universities (TCU) for ensuring that quality education is offered, which meets the needs of all the stakeholders in line with this Act. | MU should ensure Tanzania commission for universities (TCU) provides procedures to higher education accreditation in the institution of the project, which will bring to the people related to on the project. The project complies with all the procedures of the universities act to be consulted for the project development. |
| 20 | The Education (Amendment) Act, 1995 | This Act 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 | MU under HEET project will be monitored by Accreditation Council. |

| S/N | LEGISLATION | REQUIREMENT | COMPLIANCE STATUS |
|-----|-------------|--|-------------------|
| | | 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. | |

3.4 Relevant Regulations

Table 0:3: Regulation Compliance

| S/N | REGULATIONS | REQUIREMENT | COMPLIANCE STATUS |
|-----|--|---|--|
| 1 | The Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations, 2018 | The Environmental Management (Environmental Impact Assessment and Audit) Amendment Regulations, 2018, are part of Tanzania Environmental Management Framework, building on the EIA and Audit regulations from 2005 under the Environmental Management Act No. 20 of 2004. These regulations establish procedures for conducting Environmental Impact Assessments (EIA) and Audits for development projects with significant environmental impacts. They outline steps like project registration with NEMC, screening, scoping, and producing an ESIA report, which must consider environmental, social, cultural, economic, and legal factors. The regulations are relevant to the MU project, requiring its registration and EIA study to comply with specified guidelines | Proponent has carried out this ESIA, hence, the requirements of these regulations are observed. |
| 2 | The Environmental Management (Fees and Charges) Regulations, 2021 | The National Environment Management Council (NEMC), established under the Environmental Management Act Cap 191, oversees enforcement, compliance, and monitoring of environmental impact assessments, research, and awareness. Mandated by relevant regulations, it monitors industries for environmental effects, charging fees for compliance monitoring and audits, which are non-refundable as per the Environmental Management (Fees and Charges) Regulations, 2021. | MU complies with regulation by paying review fees as required by the NEMC Council. |
| 3 | Environmental Management (Air Quality Standards) Regulations, 2007 | This standard aims to establish baseline air quality parameters, enforcing NEMC-prescribed standards for industries, promoting eco-friendly technologies to safeguard human health and the environment from pollution sources. Compliance with 2007 regulations is crucial. | MU will ensure that all emissions will be within recommended standard level. |
| 4 | Environmental Management (Soil Quality Standards) Regulations, 2007 | This standard sets limits for soil contaminants in agriculture and habitat, ensuring adherence to minimum soil quality standards to sustain, restore, and enhance soil productivity. It also regulates expansion projects to prevent environmental contamination | MU complies by maintaining trucks and excavators to prevent oil spills and directing wastewater from washrooms to treatment facilities |
| 5 | Environmental Management (Water Quality Standards) Regulations, 2007 | This standard aims to uphold water quality set by NEMC, considering the capacity of receiving waters to handle pollutants without harm, safeguarding human health and the environment through adherence to regulations. | MU complies with regulation, will treating all liquid waste from project through WSP to protect environment |

| S/N | REGULATIONS | REQUIREMENT | COMPLIANCE STATUS |
|-----|---|--|--|
| 6 | The Environmental Management (Standards for Control of Noise and Vibration Pollution) Regulations, 2015 | The regulation prohibits a person to make any loud, unreasonable, and unnecessary on unusual noise that annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and of the environment describes the permissible noise levels from different facilities. The provisions of these regulations will guide in ensuring that noise and vibration levels do not exceed the maximum thresholds specified. | MU ensures that these regulations are adhered by ensuring noise and vibrations produced during construction period are within acceptable limit. |
| 7 | The Urban Planning (Use Groups and Use Classes) Regulations, 2018 | These regulations have been made under section 77(1)(i) of the Urban Planning Act (Act No. 8 of 2007). This regulation is made for the purposes of planning and the control of development, all uses of land and buildings are categorized in the use groups and use classes in the First Schedule. For proposed establishment at MU regarding MU title deeds it follows under Use Group K – Educational Buildings and Use Class: (d) Schools/Faculties, institutes, colleges, university colleges and universities. | MU abide to the requirement of the regulations because the lands shall be used solely for Educational purposes and for the other purposes ancillary thereto. |
| 8 | The Urban Planning (Application for Planning Consent) Regulations, 2018 | These regulations, pursuant to section 77(1)(o) of the Urban Planning Act (Cap. 355), mandate that all development within the Planning Area must obtain planning consent from the Planning Authority. Additionally, they require specific documentation including block plans, elevation plans, floor plans, and site plans for proposed developments. | MU will abide to the requirement of the regulations. |
| 9 | The Urban Planning (Planning Space Standards) Regulations, 2018 | The Urban Planning Space Standards offer guidelines for efficient space use, aiming for sustainable development. Applied to the HEET project at MU, these standards informed building design and site selection. They dictate building heights, setbacks, plot coverage, and provision for transport systems, including roads, parking, and pedestrian walkways. | MU HEET project integrates urban planning space standards into building design, ensuring efficient project area utilization throughout implementation. |
| 10 | The Urban Planning (Zoning of Land Uses) Regulations, 2018 | The regulations, based on section 77(1)(d) of the Urban Planning Act (Cap. 355), detail permissible land uses in different zones. Residential, commercial, industrial, institutional, public utilities, beach, open spaces, recreational, transportation, communication, agricultural, water bodies, conservation, and economic development uses are specified. Institutional zones allow central and local government offices, educational institutions, cultural and religious centers, medical facilities, recreational areas, utilities, and essential staff quarters, among other uses, subject to specific criteria. | MU will abide to the requirement of the regulations during design and construction period. |
| 11 | The Industries and Consumer Chemicals [Management and Control] Regulations, 2020 | The Industrial and Consumer Chemicals Act in Mainland Tanzania mandates registration for those dealing with industrial chemicals. Managed by the Industrial and Consumer Chemicals Management and Control Board, it lists chemicals requiring registration. Compliance with the law is crucial during importation, storage, use, and disposal of chemicals to meet legal requirements. | MU will use registered chemicals in Tanzanian labs, avoiding imports by sourcing from local importers for their projects. |
| 12 | The Environmental Management [Control of Ozone Depleting Substances] Regulations, 2007 | Regulations identify products with ozone-depleting potentials, including automobile and truck conditioning units, refrigeration, and air conditioning equipment containing controlled substances. This encompasses refrigerators, freezers, dehumidifiers, water coolers, ice machines, and air conditioning units. Dust emissions may occur during material handling, especially during construction at MU. | MU should adhere to this regulation so as not to participate in ozone depleting and pay pollution cost when needed. |

| S/N | REGULATIONS | REQUIREMENT | COMPLIANCE STATUS |
|-----|--|---|--|
| 13 | The Environmental Management (Solid Waste Management) Regulation, 2009 as amended in 2016 | The regulation has been made under section 114, 115, 116,117, 118, 119, 120,121, 122 and 230 of Environmental Management Act, 2004. These regulations apply to all matter pertaining to solid waste management. They aimed among other things at setting standard for permit to operate solid waste disposal sites, permit to transport solid waste, permit to dispose solid waste and license to own or operate solid waste disposal site. | MU will ensures proper handling of construction and operational waste to prevent pollution and comply with regulations |
| 14 | Environmental Management Act (Hazardous Waste Control) Regulations, 2021 | This regulations under the Environmental Management Act, 2004, mandate Tanzanian residents to protect the environment from hazardous waste. They must report any hazardous waste activities to authorities. These rules cover hazardous waste handling, including generation, storage, and disposal, within mainland Tanzania. Principles of environmental sustainability like precautionary, polluter pays, and producer extended responsibility guide waste management. | MU will abide to the requirement of the regulations. |
| 15 | The Environmental Management (Control and Management of Electrical and Electronic Equipment Waste) Regulations, 2021 | The Regulations apply to all categories of electrical and electronic equipment wastes with respect to generation, collection, storage, transportation, importation, exportation, distribution, selling, purchasing, recycling, refurbishing, assembling, dismantling and disposal of electrical and electronic equipment waste or components, and their movement into or outside Mainland Tanzania. The amount of waste electrical and electronic equipment (widely known as WEEE or e-waste) generated every year in Tanzania is increasing rapidly. Waste from electrical and electronic equipment includes a large range of devices such as computers, printers, fridges and mobile phones at the end of their life. This type of waste contains a complex mixture of materials, some of which are hazardous. These can cause major environmental and health problems if the discarded devices are not managed properly. These regulations require the separate collection and proper treatment of WEEE and sets targets for their collection as well as for their recovery and recycling. | Thus, MU shall ensure compliance with all these requirements during the implementation of the project. |

3.5 Relevant National Plans/Strategies

In order to guide national development more effectively and systematically, Tanzania has prepared a number of strategies aiming at operationalizing the various policies in key sectors. Some of the strategies that have a bearing on the proposed project are:

3.5.1 The Tanzania Development Vision 2025

The Composite Development Goal for the Tanzania Development Vision 2025 foresees the alleviation of poverty through improved socio-economic opportunities, good governance, transparency, and improved public sector performance. These objectives not only deal with economic issues, but also include social challenges such as education, health, the environment and increasing involvement of the people in working for their own development. The thrust of these objectives is to attain a sustainable development of the people. The Vision 2025 seeks to mobilize the people, the private sector, and resources of the nation towards achievement of shared goals and achieving a sustainable middle market economy by 2025. The vision outlines Tanzania plans and strategic goals covering all sectors of the economy and outlines institutional changes that must take place to enable Tanzania to make the progress suggested in the vision. The proposed project will stimulate local economic growth and will contribute towards realisation of the Vision 's objectives.

***Compliance:** MU project will contribute to the attainment of the 2025 Vision through provision of adequate skilled labor force for implementing various development plans.*

3.5.2 The National Five-Year Development Plan (FYDP III) 2021/22-2025/26

In implementing the Third Five Year National Development Plan the Government will focus on stimulating an inclusive and competitive economy, strengthening industrial production capabilities and service delivery, promoting investment and trade, bringing development to our citizens and building human resource capacity.

To facilitate its implementation, this plan has been developed in line with the implementation Strategy which is divided into three implementation plans. First, is the Action Plan which outlines all activities and objectives intended for whole period of implementation. The second is the Financing Strategy (FS) that shows how to avail funding for development projects as well as other strategic steps outlined in the Plan. The latter has prepared a Monitoring and Evaluation Strategy (MES) for monitoring the implementation of projects to know whether the intended results are being met and prompt corrective measures whenever needed to ensure delivery of the intended results. Through the slogan of the Sixth Phase Government of *Kazi Iendelee*, each of us has a responsibility to fulfill assigned responsibilities effectively in order to achieve effective implementation of this Plan.

3.5.3 Project Operational Manual (POM)

This Project Operational Manual (POM) sets forth all the operational and procedural steps which will guide the implementation of the Higher Education for Economic Transformation Project (HEET) at Mzumbe University, Tanga. The Operational Manual offers a brief description of the components, details the results expected to be achieved through HEET and outlines the operational and financial reporting arrangements, procurement and disbursement processes, standard formats for biannual and annual reporting and amendment procedures. It is supported and -complimented by a series of technical documents which will provide further guidance on key project components. It should be used in conjunction with the recent versions of the Project Appraisal Document (PAD), Legal Agreement, and Environmental and Social Management Framework (ESMF).

The primary users of the POM will be the technical, financial, operational, and administrative staff from Mzumbe University and its associated parties tasked with implementing and monitoring any part of HEET-Mzumbe, including consultants, contractors and the surrounding communities. It may also be of use by technical and development partners involved in the education sector to ensure greater coherence in development of education project designs. This POM will be updated as needed to reflect any changes made during project implementation. Any changes to the POM will require clearance by MoEST, as recommended by the National Project Steering Committee (NPSC). All revised versions of the POM will be submitted to the World Bank for non-objection. In the event of a conflict between the provisions laid out in the POM and the Project's Financing Agreement, the Financing Agreement shall govern.

3.5.4 Project Appraisal Document (PAD)

This document provides the project formulation underpinning. It describes the strategic context, project description including its project development objectives, components, beneficiaries and rationale for the World Bank involvement and role of partners. Further, the document outlines the implementation arrangements. Grievance redress services as well as the key risks and results framework and monitoring have also been presented in PAD. The projects under MU will be implemented in line with the requirements by PAD.

3.6 Relevant International Agreements, Conventions and Treaties

International agreements, convention and treaties which are relevant to this project include:

- United Nations Framework Convention on Climate Change (1992)
- Paris Agreement (2015)
- The Convention on Biological Diversity (1992)
- Stockholm Convention (2001)
- United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification (UNCCD-1994)
- International Labour Convention

3.6.1 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.

Since Tanzania is a Party to the Convention, she 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.

Compliance: *MU project will abide with the requirements on control and prevention of greenhouse gases by emphasizing use of soft copies as opposed to hard copies in teaching and learning.*

3.6.2 Paris Agreement (2015)

The Paris Agreement aims to hold global temperatures 'well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C' (Art. 2.1.(a)) Since Tanzania is among the parties to the agreement, she will make profound changes to its economy to achieve this goal.

Compliance: *MU project will abide with the requirements to reduce greenhouse gas emissions, at least to a point where there is a balance between emissions and sequestration by discouraging the use of solid biomass fuels and encourage utilization of clean, sustainable energy fuels including Liquefied Petroleum Gas (LPG), electricity and sustainable biomass.*

3.6.4 United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification (UNCCD-1994)

The objective of the Convention, provided in article 2, is "to combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification, particularly in Africa, through effective action at all levels, supported by international cooperation and partnership arrangements." Tanzania ratified the UNCCD in 1997 with the obliged to implement the provisions of the Conventions within her respective capacity in support of sustainable development.

Compliance: *MU project will abide with the requirements to combat desertification and mitigate the effects of drought by undertaking different measures to control floods, minimize deforestation, manage water resources and induce water harvesting technologies.*

3.6.5 International Labour Conventions

International Labor Organisation (ILO) Conventions ratified by Tanzania include: C138 Minimum Age Convention of 1973, which prohibits child labor, and C182 Worst Forms of Child Labor Convention of 1999. As the conventions have been adopted by the Tanzania Government, MU project will abide by them and ensure that no child labor is practiced throughout the project. Other relevant agreements include ILO Convention C148 Working Environment (Air Pollution, Noise and Vibration) Convention of 1977, which protects workers against occupational hazards in the working environment due to air pollution, noise and vibration. The proposed project will ensure workers work in safe environment.

3.7 Institutional Framework for the Management of Environment

Tanzania is among countries in East Africa with an Act for environmental management legislation. The legislation, Environmental Management Act (EMA) (2004), provides a legal and institution framework that guides the implementation of the environmental management activities. The framework provides a pre-requisite for effective implementation of Environment Policy at all levels (National, Region, Council, and Village/Mtaa/Hamlet). According to the Environmental Management Act (EMA) (2004), there is the Environmental Management Committee established at the Hamlet/Village/Mtaa, Ward, and Council and at National level with the responsibility for the proper management of the environment in respect of the area in which they are established. The functions and responsibility of these committees are well explained in the Act. The proposed project will include all governance levels in the management of environment during HEET execution as shown in Table 3.4.

Table 0:4: Legal and Institution framework

| Level | Institution | Role and responsibility |
|-------------------|--|---|
| National Level | Vice Presidents Office (Division of Environment) | <ul style="list-style-type: none"> ○ Coordinate the implementation of the National Environmental Policy. ○ Coordinate various environment management activities in Tanzania. ○ Advise the Government on legislative and other measures for the management of the environment. ○ Advise the Government on international environmental agreements. ○ Monitor and assess activities, being carried out by relevant agencies in order to ensure that the environment is not degraded. ○ Prepare and issue a report on the state of the environment in Tanzania. |
| | Vice Presidents Office (NEMC) | <ul style="list-style-type: none"> ○ Coordinate Environmental Management Policy, Act and EIA guidelines. ○ Approval of ToR, Review of ESIA. ○ Issuing an Environmental Certificate. ○ Review and recommend for approval of environment impact statements. ○ Enforce and ensure compliance of the national environmental quality standards. ○ Initiate and evolve procedures and safeguards for the prevention of accidents which may cause environmental degradation and evolve remedial measures where accidents occur. ○ Undertake in co-operation with relevant key stakeholders' environmental education and public awareness; |
| | Ministry of lands, housing and human settlements development | <ul style="list-style-type: none"> ○ Authority over the national land including the project area. ○ Enforce law and regulations in the area of influence of the project. |
| | Ministry of Education, Science and Technology (MoEST) | <ul style="list-style-type: none"> ○ To develop and implement Policies on Education, Research, Library Services, Science, Technology, Innovation, Skills, Training Development and their implementation; ○ To improve Basic Education Development through Teachers Training Accreditation and Professional Development; ○ Teachers Professional Standards Development; ○ Schools Accreditation and Quality Assurance; ○ Development of Local Experts in Science, Technology and Innovation; ○ Coordinates roles of Departments, Parastatal Organizations, Agencies, Programmes and Projects under the Ministry. |
| | Occupational Safety and Health Authority (OSHA) | <ul style="list-style-type: none"> ○ Issuing certificates of compliance. ○ Designated Authority for occupational safety issues. ○ Registration of workplace. |
| Project Proponent | Mzumbe University (MU) | <ul style="list-style-type: none"> ○ Project investment and project cycle implementation, monitoring and auditing; Conducting ESIA study and follow-up on ESIA certificate. ○ Land acquisition and payment of compensations. ○ Paying of applicable taxes and charges. ○ Project operation and decommissioning |
| Project Financier | World Bank | <ul style="list-style-type: none"> ○ Project financing |

| Level | Institution | Role and responsibility |
|--|---|--|
| Regional Level | Tanga Region | <ul style="list-style-type: none"> ○ Oversee and advice on implementation of national policies at regional level. ○ Oversee enforcement of laws and regulations. ○ Advice on implementation of development projects and activities at the regional level. |
| Local Government Authorities and Communities | Mkinga District Council | <ul style="list-style-type: none"> ○ Oversee and advise on the implementation of national policies at the district level. ○ Oversee enforcement of laws and regulations. ○ Advice on implementation of development projects and activities at the district-level |
| | Ward Office and Village Office at MU-Tanga campus | <ul style="list-style-type: none"> ○ Project monitoring (as watchdogs for the environment, ensuring the well-being of residents) and participate in project activities. ○ To extend administrative assistance and advice on the implementation of the project. ○ Managing the community's relations |
| | Local communities, NGOs, CSOs, and FBOs | <ul style="list-style-type: none"> ○ Project monitoring (as watchdogs). ○ Provides assistance and advice on the implementation of the project. ○ Part of the project beneficiaries through employment opportunities, income generation, and CSR projects. |

3.7.1 Principal Participants in the Implementation of the Proposed Project

In order to guarantee the robust advancement and successful execution of the envisioned project, it is imperative to delineate and specify the roles and authority of key project implementors. The involvement of the following entities will play a crucial role in this process;

- Funding Institutions
- Mzumbe University (MU) - UPIU
- National Environmental Management Council (NEMC)
- Consultant
- Contractor

3.7.1.1 Funding Institutions (GoT and World Bank)

The primary responsibility of HEET project funders will be to ensure the meticulous execution of the project in adherence to the highest environmental standards, in strict accordance with the Environmental and Social Framework (ESF), Environmental and Social Standards (ESSs), and Environmental Impact Statement (EIS).

Table 0:5: Principal Participants in the Implementation of the Proposed Project

| S/N | Institutions/ Position | Roles and responsibilities in HEET Project |
|-----|---|--|
| 1 | GoT and World Bank | <ul style="list-style-type: none"> ○ Review sub-project screening including risk level categorization; ○ Review the ESIA, ESMPs and site specific ESMPs; ○ Review quarterly reports by the implementing agencies; ○ Monitor compliance with the ESMF; and ○ Undertake implementation support missions. |
| 2 | UPIU-MU | <ul style="list-style-type: none"> ○ 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 respective project implementing institutions 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 (C-ESMP). ○ Ensure implementation of the ESMP and mitigation measures aligns with pertinent national policies, legislations, and the World Bank Environmental and Social Standard (ESS1). MU oversees the Project Implementation Unit (PIU), tasked with supervising and monitoring the implementation of project construction activities. ○ Ensure that contractors have an Environmental Health and Safety Officer (EHS), who are familiar with the compliance requirements, including WB EHS guidelines. ○ Review progress reports by the supervision engineer/consultant during civil works and conduct inspection of the sites. ○ During project operation, overall management falls under the UPIU, collaborating with other departments and units as per the activity's nature. Generally, the UPIU operates under the day-to-day management of MU. ○ The UPIU is overseen by management meetings chaired by the Deputy Vice Chancellor, providing support, guidance, and oversight. Additionally, the UPIU designates Environmental and Social Safeguard Specialists for the supervision and monitoring of project implementation. |
| 3 | NEMC | <ul style="list-style-type: none"> ○ Receive ESIA/ESMP reports, review and provide recommendations for improvement and further guidance ○ Provide environmental permit where necessary upon receiving of ESIA / ESMP reports prepared by consultants on behalf of clients ○ Invited to deliver presentations in some of the trainings conducted by the project on environmental and social issues in the country. They can be invited as participants sometimes to allow them share experience. ○ Conduct monitoring of environmental and social issues during project implementation and provide guidance on the way forward. |
| 4 | Supervision Engineer/ Consultant | <p>a. Environmental specialist(s)</p> <ul style="list-style-type: none"> ○ They shall guarantee that contractors employ an Environmental Health and Safety Officer (EHS) who is well-versed in compliance requirements, including World Bank Environmental Health and Safety (WB EHS) guidelines ○ Assist the PIU to ensure that the necessary environmental, health and safety authorizations and permits have been obtained; ○ Maintain open and direct lines of communication between the PIU and contractor(s) with regard to environmental matters; |

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| | | <ul style="list-style-type: none"> ○ Review and approve the contractor’s site-specific construction ESMPs (CESMP), Waste Management Plans together with the PIU; ○ Conduct regular site inspections of all work areas to ensure compliance with CESMPs and E&S specifications for contractors Assist the contractor in finding environmentally responsible solutions to problems; ○ Instruct the contractor(s) to stop activities which generate adverse impacts, and/or when the contractor(s) fails to implement the ESMP requirements / remedial actions; ○ Monitor the contractor’s environmental awareness training program for all personnel working onsite; ○ Prepare written reports for the PIU such as weekly report of non-compliance issues; summary monthly report covering key issues and findings from supervision activities; and consolidated summary report from contractor’s monthly report. <p>b. Social specialist(s)</p> <ul style="list-style-type: none"> ○ Facilitating dialogue between project stakeholders, including local communities, to address concerns and ensure their perspectives are considered. ○ Ensuring project activities adhere to Tanzanian regulations, policies, and World Bank standards related to social safeguards and community well-being. ○ Providing training and support to project staff and community members on social issues, grievance mechanisms, and community development initiatives. ○ Regularly monitoring project activities to assess their social impacts, effectiveness of mitigation measures, and compliance with agreed-upon standards and regulations. ○ Compiling and submitting regular reports on social performance, community engagement activities, and compliance with regulatory requirements to relevant stakeholders, including the UPIU and World Bank. ○ Identifying and mitigating social risks associated with the project, such as conflicts with local communities, land acquisition issues, and cultural heritage preservation. ○ Working closely with other project stakeholders, including government agencies, NGOs, and local authorities, to coordinate social interventions and maximize positive project impacts while minimizing negative ones. <p>c. Health and Safety Officer (EHS)</p> <ul style="list-style-type: none"> ○ Ensure that all construction activities adhere to World Bank Standards, Tanzanian regulations, and relevant policies and legislations concerning health and safety. ○ Regularly inspect construction sites to monitor compliance with safety standards and identify any deficiencies that need addressing. ○ Provide training to the contractor on the EHS requirements to be followed; ○ Review and approve the contractor’s site-specific construction ESMPs (CESMP), Health and Safety Mangement Plan, Waste Management Plan, Labour Management Plans and Traffic Management Plans together with the PIU; ○ Monitor protocols for handling accidents or emergencies on construction sites from contractor, including immediate response procedures and post-incident investigations. ○ Monitor the contractor’s environmental awareness training program for all personnel working onsite; ○ In case of any accidents or incidents, immediately notify the PIU and support the process of documenting and reporting the case to the WB; |
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| | | <ul style="list-style-type: none"> ○ Conduct thorough risk assessments of construction sites to identify potential hazards and develop mitigation strategies to prevent accidents and injuries. ○ Prepare written reports for the PIU such as weekly report of non-compliance issues; summary monthly report covering key issues and findings from supervision activities; and consolidated summary report from contractor's monthly report. ○ Maintain comprehensive records of safety inspections, incident reports, and compliance documentation, and submit required reports to UPIU and project stakeholders. ○ Collaborate with UPIU, contractors, and workers to promote a culture of safety and ensure that safety considerations are integrated into all aspects of project planning and execution. |
| 5 | Design Consultant | <ul style="list-style-type: none"> ○ Understand the sub-project setting and site-specific requirements with discussions with the PIU; ○ Incorporate the issues identified in the ESIA, ESMPS into the project design. ○ Provide cost estimates for implementing the design requirements. |
| 6 | Contractor | <p>a. Environmental Specialist (s)</p> <ul style="list-style-type: none"> ○ Compliance with relevant environmental and social legislative requirements (project-specific, district- and national level), including allocating adequate budget for implementation of these requirements; ○ Prepare CESMPs based on the ESMP in the bidding documents and contracts; ○ Work within the scope of contractual requirements and other tender conditions; ○ In case of non-compliances/discrepancies, carry out investigation and submit proposals on mitigation measures, and implement remedial measures to reduce environmental impact; ○ Propose and carry out corrective actions in order to minimize the environmental impacts; ○ Provide training to project personnel on environmental best practices and build capacity for effective environmental management. ○ Develop contingency plans and response protocols to address environmental emergencies or incidents that may arise during construction ○ Implement monitoring programs to track environmental parameters during construction activities; ○ Maintain accurate documentation of environmental compliance activities and ensure that all necessary permits and approvals are obtained. ○ Identify opportunities for improving environmental performance and implement measures to minimize negative impacts and enhance sustainability. ○ Send weekly reports of non-compliance to the Supervision Engineer/consultant; and ○ Send monthly progress reports to the Supervision Engineer/consultant. <p>b. Social specialist(s)</p> <ul style="list-style-type: none"> ○ Ensure adherence to World Bank Standards and Tanzanian regulations, policies, and legislation concerning social aspects of construction projects. ○ Developing mitigation strategies to address social risks and impacts. ○ Facilitate meaningful engagement with local communities, government agencies, NGOs, and other stakeholders affected by the project throughout the project lifecycle. ○ Monitoring project activities to ensure compliance with social safeguards. ○ Providing capacity building and training to project stakeholders on social issues. |

| | | |
|--|--|---|
| | | <ul style="list-style-type: none"> ○ Collaborating with relevant government agencies to ensure alignment with national policies and legislations. ○ Reporting on social performance and addressing grievances from affected communities. ○ Ensuring transparency and accountability in project implementation, promoting sustainable development goals. ○ Continuously review and improve social management strategies and practices to enhance project outcomes and minimize negative impacts on communities. <p>c. Health and Safety Officer (EHS)</p> <ul style="list-style-type: none"> ○ Prepare and implement the contractor’s site-specific construction ESMPs (CESMP), Health and Safety Management Plan, Labour Management Plans and Traffic Management Plans. ○ Organize and facilitate regular safety training sessions about EHS (including relevant WBG EHS Guidelines) for all personnel involved in the project to enhance awareness and ensure adherence to safety protocols. ○ Perform frequent site inspections with the PIU and Environmental Supervision Engineer/consultant to monitor compliance with safety regulations, identify any unsafe practices or conditions, and take corrective actions as necessary ○ Develop and implement emergency response plans to effectively manage accidents, injuries, or other emergencies that may arise during construction activities. ○ Carry out any corrective actions instructed by the Supervision Engineer/consultant; ○ Provide training to the labourers on the EHS requirements to be followed; ○ Monitoring and reporting covers details of fatalities, injuries, crash types, and locations. ○ Maintain comprehensive records of safety inspections, incidents, and corrective actions taken, and ensure timely reporting to relevant authorities as per regulatory requirements. ○ Foster a culture of safety among all project stakeholders, encouraging active participation and accountability for maintaining a safe work environment. ○ Liaise with relevant government agencies, regulatory bodies, and other stakeholders to ensure alignment with health and safety standards and facilitate inspections or audits as needed. ○ Continuously monitor and evaluate safety performance, identify areas for improvement, and implement measures to enhance safety standards throughout the project lifecycle. |
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3.8 Environmental and Social Management Framework (ESMF)

The World Bank Environmental and Social Policy for Investment Project Financing sets out the requirements that the Bank must follow regarding projects it supports through Investment Project Financing. The Environmental and Social Standards set out the requirements for Borrowers relating to the identification and assessment of environmental and social risks and impacts and mitigation measures associated with projects supported by the Bank through Investment Project Financing. In that context, the World Bank has set out the E&S standards that must be complied with in the implementation of any project. These standards among others aim to support borrowers in achieving good international practice relating to environmental and social sustainability, assist borrowers in fulfilling their national and international environmental and social obligations, enhance non-discrimination, transparency, participation, accountability and governance; and (d) enhance the sustainable development outcomes of projects through ongoing stakeholder engagement.

This section (Table 3.6) shows how the 10 E&S standards of the World Bank are taken on board on ensuring that all HEET projects to be implemented at MU are environmentally and socially sensitive.

3.8.1 Objective of the Environmental and Social Framework

The proposed project will be developed and implemented according to the requirements of the World Bank Environmental and Social Framework (ESF). The ESF sets out the World Bank's commitment to sustainable development. The ESF protects people and the environment from potential adverse impacts that could arise from Bank-financed projects and promotes sustainable development. The ESF enables the World Bank and Borrowers to better manage environmental and social risks of projects and to improve development outcomes. The ESF also places more emphasis on building Borrower governments' own capacity to deal with environmental and social issues. The ESF offers broad and systematic coverage of environmental and social risks. It makes important advances in areas such as climate change; labour standards; transparency; nondiscrimination; social inclusion; public participation; and accountability - including expanded roles of grievance redress mechanisms. The ESF codifies best practice in development policies. It brings the World Bank's environmental and social protections into closer harmony with those of other development institutions; and encourages Client countries to use, and improve, their own national environment and social policies, when these policies are materially consistent with the ESF and supported by adequate implementation capacity. The ESF provides an incentive for countries to develop and build their own environmental and social policies and capacity.

Table 0:6: World Bank Environmental and Social Standards

| Environmental and Social Standards (ESS) | Applicability | Requirements |
|---|---------------|---|
| ESS1: Assessment and Management of Environmental and Social Risks and Impacts | YES | The standard focuses in helping project beneficiaries to manage and reduce both environmental and social risks and enhance project positive impacts. The proposed project for MU at Tanga campus will use this requirement to strengthen the environmental and social framework for the assessment, development, and implementation of World Bank-financed projects where appropriate. |
| ESS2: Labour and Working Conditions | YES | The standard focuses on the adoption of standard labour practices that consider the acceptable working conditions for the people to be employed in the execution of the project activities. It requires the Borrower to prepare and adopt labour management procedures. Among others the standard call for provisions on the treatment of direct, contracted, community, primary supply workers, and government civil servants. It further calls for fair terms and conditions of work, non-discrimination and equal opportunity and workers organizations. Provisions on child labour and forced labour. Requirements on occupational health and safety, in keeping with the World Bank Group's Environmental, Health, and Safety Guidelines (EHSG). |
| ESS3: Resource Efficiency and Pollution Prevention and Management | YES | The standard aims at enhancing effective use of resources and control of pollution. It further requires an estimate of gross greenhouse gas emissions resulting from project (unless minor), where technically and financially feasible. Requirements on management of wastes, chemical and hazardous materials, and contains provisions to address historical pollution. ESS3 refers to national law and Good International Industry Practice, in the first instance the World Bank Groups' EHSGs. |
| ESS4: Community Health and Safety | YES | The standard aims at protecting local communities against any health risks and ensures their safety against project activities. It requires infrastructure to consider taking safety and climate change, and applying the concept of universal access which are technically and financially feasible. It requires further on traffic and road safety, including road safety assessments and monitoring. It calls for addressing risks arising from impacts on provisioning and regulating ecosystem service. Measures to avoid or minimize the risk of water-related, communicable, and non- communicable diseases. Requirements to assess risks associated with security personnel, and review and report unlawful and abusive acts to relevant authorities. |
| ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement | NO | This standard is not applicable in this proposed project because land is legally owned by MU (Appendix 2). Based on title deed (Appendix 2) state that the land and the existing building erected thereon shall be maintained and same shall be used for Education Building Purpose Only. Use Group K classes (d) as defined in Urban planning Act (Use Groups and Use Classes) Regulation, 2018. The land is legally owned by MU. |

| Environmental and Social Standards (ESS) | Applicability | Requirements |
|---|---------------|--|
| ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources | NO | The area of the proposed establishment of MU facilities is located in area where there is no any sensitive habitat/ species |
| ESS7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities | NO | This standard is not applicable in this project because there is no any requirement related to ESS7. |
| ESS8: Cultural Heritage | YES | Applicable for the proposed project due to chance finds of physical cultural resources during excavation activities for new construction. |
| ESS9: Financial Intermediaries (FIs) | NO | This standard is not applicable in this project because there is no any requirement related to ESS9. |
| ESS10: Stakeholders' Engagement and Information Disclosure | YES | The standard aims at making stakeholders part of the project through continuous sharing of information and updates. The standard call for stakeholder engagement throughout the project life cycle, and preparation and implementation of a Stakeholder Engagement Plan (SEP). It requires early identification of stakeholders, both project-affected parties and other interested parties, and clarification on how effective engagement takes place. Stakeholder engagement to be conducted in a manner proportionate to the nature, scale, risks and impacts of the project, and appropriate to stakeholders' interests. |

3.8.2 Assessment and Management of Environmental and Social Risks and Impacts (ESS1)

The proposed establishment of MU facilities within the Main campus will involve clearance of some natural vegetation which are currently environmental conversation agent MU. The natural vegetation to be cleared are grasses and few indigenous trees. This Environmental and Social Standard is applicable to this project due to potentially adverse environmental risks and impacts on the site and in the areas of influence. These include impacts on environment such as air, water, land, human, health and safety. Thus, MU shall analyze project activities and associated environmental and social risks and impacts the during construction phase.

The project has prepared an Environmental and Social Impact Assessment (ESIA) and/or Environmental and Social Management Plans (ESMPs). Therefore, the project components have been screened to determine potential adverse impacts and mitigation measures for their planned activities.

According to the social relation between MU and the nearby community, social services like, FGBP church, mosques, Rubawa primary school, Gombero dispensary, Gombero secondary school nearby the project area for the proposed establishment of MU-Tanga Campus can be pressurized due to the increase of student's enrolment and affected by construction activities during construction period.

3.8.3 Labor and Working Conditions (ESS2)

The standard recognizes the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. ESS2 is applicable to the project given that the project will employ/engage both skilled and non-skilled workers, through contractors/subcontractors, and primary suppliers, to undertake various activities. In order to comply with the provisions of ESS2, MU will take worker safety seriously by laying out internal controls and procedures that will protect workers employed or engaged in relation to the project from occupational hazards during all relevant project phases.

All works will be done in compliance with relevant environmental and health and safety standards to minimize impact on workers as well as the local area and citizens. The ESIA contains robust procedures for worker safety, requiring plans for accident prevention as well for health and safety of workers and communities, which are also part of contracts for civil works.

MU will ensure that the project contractors and sub-contractors operate under policy-led objectives that promote gender equality, non-discrimination and fair treatment in recruitment and employment, respect for national labor laws, including prohibiting child and forced labor, and combatting gender-based violence, in particular sexual harassment.

Contractors/subcontractors, primary suppliers and sub-contractors shall ensure equal employment opportunity and not discriminate anyone on the basis of color, nationality, tribe, social origin, political opinion, religion, gender, pregnancy, marital status/family responsibility, disability, HIV/AIDS, age or station of life, sexual orientation, or union membership.

MU will ensure that workplace sexual harassment of any nature by workers directly hired, or project workers engaged through contracts/subcontracts companies shall be prohibited, and those determined to be guilty will be subject to disciplinary action, including summary dismissal.

3.8.4 Resource Efficiency and Pollution Prevention and Management (ESS3)

This ESS3 sets out the requirements to address resource efficiency and pollution prevention and management throughout the project lifecycle. In order to ensure the efficient use of resources, MU projects will source construction materials from government authorized sources and water from

Tanga UWASA will be used throughout the project implementation. The area for proposed establishment of MU-Tanga campus has a total area of 121.70 HA. This implies that the project area for MU-Tanga campus is covered by green spaces and number of tons of CO₂ generated per year from main sources like cafeterias, vehicles will be sequestered by the available green spaces. Moreover, the project will utilize the pollution prevention and emergency response plan drafted as part of the ESIA to mitigate any potential source of pollution from the planned activities. The risks identified for strengthening the system for complying with ESS1 are applicable to ESS3.

3.8.5 Community Health and Safety (ESS4)

The ESS requires beneficiary to avoid or minimize safety and health risks and impacts of the project, with particular attention to people who, because of their particular circumstances, may be vulnerable. During project execution the risks of Gender-Based Violence or Sexual Exploitation and Abuse of children, or communicable diseases, may arise from the interaction of project workers with local communities from Pangarawe area, Gombero, Vunde-Manyinyi, Jirihini, Kichangani and Dima villages. The project will ensure compliance with national law requirements regarding the COVID-19 situation. MU shall work closely with villages leaders to communicate to local communities related health and safety risks and preventive measures for accidents associated transportation of materials and other human health issues including covering mitigation measures to GBV risks and prevention of HIV and AIDS during construction.

All works will be done in compliance with relevant environmental and health and safety standards to minimize impact on workers and the local area. During the project's operational phase, waste will be disposed of to dumpsite. Also, the proposed establishment of new buildings for M-Tanga campus should reflect the risk of adverse consequences posed by the nature and use of the structural elements, and the natural conditions of the area. Hence, takes into account the relevant engineering safety considerations, such as geotechnical, structural, electrical, and mechanical specification.

In order to ensure safety during project implementation, MU will ensure that contractors and sub-contractors enclose all project sites in fencing for safety and security reasons. Where required, adequate safety clearance zones can be established on sites where neighboring activities may affect project operation. Appropriate safety signage shall be put in place to warn potential dangers associated with trespassing or accessing the enclosure with no supervision. The ESIA process shall contain robust procedures for accident prevention as well for health and safety of project affected communities.

3.8.6 Cultural Heritage (ESS8)

This recognizes that cultural heritage provides continuity in tangible and intangible forms between the past, present and future. People identify with cultural heritage as a reflection and expression of their constantly evolving values, beliefs, knowledge and traditions. In that regard, it echoes out the need to protect cultural heritage from the adverse impacts of project activities and support its preservation. Hence, the project will ensure measures defined in the ESMF and contracts are followed by contractors during excavations and road clearing (if any) to avoid impacts to cultural heritage and also ensure that chance find procedures will be enforced. HEET project will consult Division of Antiquities in the Ministry of Natural Resources and Tourism on application of the ESS8. ESS8 is applicable for the proposed project due to chance finds of physical cultural resources during excavation activities for new construction. Additionally, during stakeholder

consultation the community member from Pangarawe area, Gombero, Vunde-Manyinyi, Jirihini, Kichangani and Dima Villages raised concern about the existence of big tunnels/Kichuguu within the project area. Also, the ESIA team confirmed this during site visit, hence the proponent (MU) will preserve and conserve this by creating garden nearby the tunnel to make it more attractive.

3.8.6 Stakeholder Engagement and Information Disclosure (ESS10)

Effective stakeholder engagement improves the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation. The proposed project has engaged stakeholders as per SEP developed for HEET project. The engagement will cover all phases of the project. Implementing agencies will provide stakeholders with timely, relevant, understandable and accessible information, and consult with them in a culturally appropriate manner, which is free of manipulation, interference, coercion, discrimination and intimidation. *See chapter five for comprehensive Stakeholders Engagement Plan for this project.*

3.9 Environmental, Health and Safety General Guidelines

The World Bank Groups Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice (GIIP). EHS Guidelines are applied as required by their respective policies and standards. These industry sector EHS guidelines are designed to be used together with the General EHS Guidelines document, which provides guidance to users on common EHS issues potentially applicable to all industry sectors. The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. Application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets, with an appropriate timetable for achieving them. The applicability of the EHS Guidelines should be tailored to the hazards and risks established for the project in accordance to the proposed project activities. The circumstances that skilled and experienced professionals may find when evaluating the range of pollution prevention and control techniques available to a project may include, but are not limited to, varying levels of environmental degradation and environmental assimilative capacity as well as varying levels of technical feasibility. The applicability of specific technical recommendations should be based on the professional opinion of qualified and experienced persons. Other World Bank instruments applicable to this Project are the following:

- Community Health and Safety:
<http://documents.worldbank.org/curated/en/290471530216994899/ESF-Guidance-Note-4-Community-Health-and-Safety-English.pdf>
- Gender based violence:
<http://documents.worldbank.org/curated/en/399881538336159607/Environment-and-Social-Framework-ESF-Good-Practice-Note-on-Gender-based-Violence-English.pdf>

CHAPTER 4: BASELINE ENVIRONMENTAL AND SOCIAL CONDITION

4.1 Introduction

This chapter describes the existing environmental setting of the proposed project and its immediate surroundings. This includes the physical environmental condition comprising air, water and land components, the biological environment and social – economic environment. Attributes of the physical environment like water, soil and noise quality in the surrounding area that were assessed primarily through analysis of sample collected from the field. Surveys were carried out to understanding, record the biological environment prevailing in the area, and were verified against published information and literatures reviews. The social-economic environment has been studied through consultations with various stakeholders in the area within the project site.

4.2 Components and Parameters for Baseline Environment Study

The various components studied as a part of the baseline study are discussed in the following sections components;

- Physical Environment (Air, Noise, Vibration and Water Environment)
- Biological Environment
- Socio-Economic Environment

This chapter describes the existing environmental setting of the proposed project and its immediate surroundings. This includes the physical environmental condition comprising air, water and land components, the biological environment and social – economic environment. Attributes of the physical environment like water, soil and noise quality in the surrounding area that were assessed primarily through analysis of sample collected from the field. Surveys were carried out to understanding, record the biological environment prevailing in the area, and were verified against published information and literatures reviews. The social-economic environment has been studied through consultations with various stakeholders in the area within the project site.

4.2 Components and Parameters for Baseline Environment Study

The various components studied as a part of the baseline study are discussed in the following sections components;

- Physical Environment (Air, Noise, Vibration and Water Environment)
- Biological Environment
- Socio-Economic Environment

4.3 Physical Environment

4.2.2 Climate

The site settles in Tanga a coastal region that has warm humid climate. In Tanga, the wet season is hot and mostly cloudy; the dry season is warm, windy, and mostly clear; and it is oppressive year-round. Over the course of the year, the temperature typically varies from 21°C to 32°C and is rarely below 20°C or above 33°C.

The construction and operation of academic block, two student hostels, a cafeteria, dispensary, four staff houses, and a reservoir tank at MU-Tanga Campus in Pangarawe Area, Gombero Village, Gombero Ward may lead to changes in the local climate due to increased urbanization, altered land use patterns, and potential deforestation or habitat disruption. The reservoir tank, in particular, may affect local water systems and contribute to changes in hydrological patterns. Additionally, increased human activity and infrastructure development may result in higher energy consumption, waste generation, and air pollution. The social impact on the community should also be considered, as the project could bring both positive and negative consequences, such as changes in local demographics, employment opportunities, and community dynamics.

4.2.2.1 Temperature

Pangarawe site experience the high and low temperature similar to the macro climate of Tanga. The hot season lasts for 3.0 months, from December 26 to March 27, with an average daily high temperature above 31°C. The hottest month of the year in Tanga is March, with an average high of 37°C and low of 25°C. The cool season lasts for 3.2 months, from June 4 to September 9, with an average daily high temperature below 28°C. The coldest month of the year in Tanga is August, with an average low of 21°C and high of 27°C (Source: Weather-and-climate.com, 2023).

The local temperature patterns will influence the design and construction of the buildings, especially considering the region climate conditions. Extreme temperatures, whether hot or cold, may affect the energy efficiency of the structures, requiring appropriate insulation and ventilation systems. Additionally, temperature can impact the well-being of occupants, influencing considerations such as the need for air conditioning or heating systems in the buildings. Moreover, the reservoir tank's functionality and water storage capacity may be influenced by temperature fluctuations, affecting the overall sustainability and resilience of the project in the face of environmental conditions. A thorough assessment of temperature-related factors is crucial for ensuring the long-term success and adaptability of the proposed infrastructure in the specified location.

4.2.2.2 Rainfall

Pangarawe as it is in Tanga experiences extreme seasonal variation in monthly rainfall. Rain falls throughout the year. The month with the most rain is April, with an average rainfall of 6.2 inches. The month with the least rain is August, with an average rainfall of 0.5 inches. Precipitation patterns in Pangarawe follow a wet season from November to May, accounting for 6.4 months, and a drier season from May to November, spanning 5.6 months. April is the wettest month, while September is the driest. Sunlight remains relatively consistent throughout the year, with minor variations in the length of the day. The microclimatic conditions, including sea breezes and winds, contribute to a cooler environment during morning and evening hours. Despite small cliffs nearby, the area elevated position allows unobstructed airflow, influencing building orientation for natural

ventilation and energy efficiency. The campus site falls within a dry zone, defined by contours between 1139.50m and 149.00m, with surface runoff collected by the Zigi seasonal stream that eventually flows into the ocean, shaping the site's hydrology (Source: Weather-and-climate.com, 2023).

Rainfall can influence various aspects of the project, including construction activities, water management, and the overall ecosystem. Excessive rainfall may pose challenges during the construction phase, leading to delays, soil erosion, and potential damage to infrastructure. Additionally, the reservoir tank's efficiency and capacity need to be evaluated in relation to the expected rainfall patterns in the region to ensure sustainable water supply. Furthermore, the ESIA address potential impacts on the local environment and community, such as changes in water flow patterns, soil erosion, and the overall resilience of the proposed structures to weather-related challenges. Mitigation measures and adaptation strategies should be integrated into the project planning to minimize any adverse effects of rainfall on the successful implementation and long-term sustainability of the development.

4.2.2.3 Humidity

We base the humidity comfort level on the dew point, as it determines whether perspiration will evaporate from the skin, thereby cooling the body. Lower dew points feel drier and higher dew points feel more humid. Unlike temperature, which typically varies significantly between night and day, dew point tends to change more slowly, so while the temperature may drop at night, a muggy day is typically followed by a muggy night. The perceived humidity level in Tanga, as measured by the percentage of time in which the humidity comfort level is muggy, oppressive, or miserable, does not vary significantly over the course of the year, staying within 3% of 97% throughout (Source: Weather-and-climate.com, 2023).

Humidity plays a crucial role in the environmental and social impact assessment for the proposed development in MU-Tanga Campus. High humidity levels, typical in the region, may pose challenges in the construction and maintenance of the structures, particularly the reservoir tank. Elevated humidity levels can accelerate the deterioration of building materials, leading to potential structural issues over time. Additionally, high humidity might impact the indoor air quality and comfort of the proposed facilities, including the academic block, student hostels, cafeteria, and staff houses. The increased moisture content in the air could influence the design and selection of materials for the buildings and necessitate the implementation of effective ventilation systems to mitigate potential adverse effects on occupants' well-being. Moreover, considerations for landscaping and sustainable design to address humidity-related issues are vital for ensuring the long-term resilience and success of the project in the specific climatic conditions of the MU-Tanga Campus area.

4.2.2.4 Wind

This section discusses the wide-area hourly average wind vector (speed and direction) at 10 meters above the ground. The wind experienced at any given location is highly dependent on local topography and other factors, and instantaneous wind speed and direction vary more widely than hourly averages. The average hourly wind speed in Tanga experiences significant seasonal variation over the course of the year. The windier part of the year lasts for 5.2 months, from April 26 to October 1, with average wind speeds of more than 10.6 miles per hour. The windiest month

of the year in Tanga is July, with an average hourly wind speed of 13.2 miles per hour. The calmer time of year lasts for 6.8 months, from October 1 to April 26. The calmest month of the year in Tanga is March, with an average hourly wind speed of 8.1 miles per hour (Source: Weather-and-climate.com, 2023).

The wind will play a crucial role in influencing the environmental and social impact of the proposed project at MU-Tanga Campus in Pangarawe Area, Gombero Village, Gombero Ward, Mkinga District, Tanga Region. The potential effects of wind on the project involve considerations such as wind load on structures, wind-driven dispersion of pollutants, and the impact on local ecosystems. The design and construction of the academic block, student hostels, cafeteria, dispensary, staff houses, and reservoir tank must account for local wind patterns to ensure structural integrity and safety. Additionally, the wind may influence the dispersion of airborne pollutants from the facilities, affecting air quality and potentially impacting nearby communities. Moreover, the project's landscape planning should consider wind erosion control measures to mitigate potential environmental degradation.

4.2.3 Soil

Pangarawe area has soil of different strata, the top layer being a mixture of sand and loam soil while clay soil is found within three meter deep. This is an indicative that there is no limitation of foundation types for the buildings. The site has secondary vegetation dominated by shrubs with thorns, few cactuses as well as short trees. This implies that landscape design should respect vegetation and enhance the use of plants related to the context (Mzumbe University Tanga Campus Masterplan 2023-2043).

The soil composition and quality at the proposed area for the establishment of academic facilities, hostels, cafeteria, dispensary, staff houses, and a reservoir tank in Pangarawe Area, will play a crucial role in determining the environmental and social impact of the project. The soil ability to support the construction and infrastructure development, as well as its drainage characteristics, will influence the overall stability and longevity of the structures. Additionally, understanding the soil's fertility and composition is vital for landscaping, planting, and ensuring sustainable land use. A comprehensive analysis of the soil will be essential for mitigating potential environmental risks, such as erosion, contamination, or disruptions to local ecosystems, and for incorporating responsible and eco-friendly construction practices into the project.

4.2.4 Topography

The terrain morphology of MU-Tanga campus is characterised by flat land with some few moderate anthill and fewer rainfall ditches. Based on topographical data capturing, the area is gently elevated towards the northern side with little slope on the North-western side.

The natural features and elevation of the land will influence the design, construction, and overall feasibility of the infrastructure. Slopes, hills, and valleys may affect the layout and accessibility of the buildings, requiring careful planning to ensure structural stability and adherence to safety standards. Additionally, consideration must be given to potential drainage issues, erosion control measures, and the preservation of the existing landscape to minimize environmental impact. The topography will also influence the project's environmental and social aspects, shaping how the development integrates with the surrounding terrain and community, and potentially affecting factors such as water supply and transportation logistics.

4.2.6 Catchment and Hydrology

The Campus site, as it is for the whole Mkinga District, is located within the inland areas from the coastal reefs. The Zigi seasonal stream collects surface runoff from the site to the ocean. The primary runoff flow during the rainy season moves from Southeast to North West of the site. The site is within a dry zone, the campus site is between contours 1139.50m and 149.00m.

The catchment characteristics, such as land topography and soil composition, will influence water runoff, drainage patterns, and potential erosion risks. Understanding the hydrological features, including rainfall patterns, water sources, and aquifer characteristics, is crucial for sustainable water management and ensuring an adequate water supply for the proposed facilities. Additionally, a reservoir tank implies water storage, requiring a thorough assessment of water availability and the potential impact on local water resources. Proper consideration of catchment and hydrological factors is essential to mitigate potential adverse effects on the local ecosystem, water sources, and the surrounding community, ensuring the project's overall sustainability and adherence to environmental regulations.

4.2.7 Existing Land Uses in the Project Area

The current land-use of the MU-Tanga campus is shrub land that has no built structures, and agricultural activities. The site does not have defined pathways for accessibility. According to the title deed, the planned area has a total area of 121.70 HA out of which about 10,000m² will be used by the project.

4.3 The Biological Environmental

The ESS6 addresses all habitats, categorized as 'modified habitat', 'natural habitat', and 'critical habitat', along with 'legally protected and internationally and regionally recognized areas of biodiversity value' which may encompass habitat in any or all of these categories. Terrestrial and aquatic habitat in the project area for the proposed establishment of MU-Tanga campus at Pangarawe area will be categorized as Modified habitat in accordance with the methodology and requirement of IFC NP6/ ESS6 defined as follows:

Modified habitat; are areas that may contain a large proportion of alien animal and/or plant species and/or where human activity has significantly altered the primary ecological functions and species composition.

4.3.1 Flora and Fauna

The proposed area for project implementation has a variety of plants species including indigenous trees which are short trees, shrubs with thorns, lawn & few cactuses were observed. Other trees within the project area it includes but not limited to the following; *Vachellia seyal* (Shittimwood), *Ehretia amoena* (Sandpaper bush), *Euphorbia murielii* (Candelabra tree), *Carissa spinarum* (Egyptian carissa), *Aloe secundiflora* (African Aloe), *Ochna serrulate* (Small-leaved plane), *Hyphaene coriacea* (Doum palm), *Grewia kakothamnos*, *Chamaerops humilis* (European fan palm).

Also, during general searches it was observed that there is no species of the amphibians and reptiles that are included in the IUCN Red list of threatened species. The construction and development activities associated with the project may not lead to habitat disruption and fragmentation, potentially displacing or disrupting the environment of various plant species. The increased human

presence and infrastructure may result in changes to the local ecosystem, affecting environmental and potentially leading to environmental degradation.

4.3.2 Unique and Endangered species

There are neither unique no endangered species of concern that were observed during site assessment.

4.4 Baseline Measurement

This includes measuring recommended parameters to be used as a baseline for monitoring practices during project construction and operation phases. For our proposed project, baseline measurement will consider air quality measurement for particulate matter and gaseous emission, noise level measurement and water quality analysis.

4.4.1 Baseline Data on Ambient Air Quality, Noise and Vibrations

The ambient air quality was monitored in the impact area as per air quality monitoring guidelines. Sampling location was selected regarding the persons living within the project area and the surrounded community in order to assess the impact associated with the proposed establishment. The study area represents per urban environment. The prime objective of the baseline air quality study was to assess the ambient air quality of the project area.

4.4.1.1 Ambient pollutant gases

Levels of ambient pollutant gases were measured using Portable Multi Gas Detector, following the manufacturer's procedure and ISO 11042-1: 1996(E) protocol that meets the European standards (say EN 61779, EN 50104 and EN 45544). The measured parameters include: Carbon monoxide (CO) [mg/nm^3], nitrogen dioxide (NO₂) [mg/nm^3], Hydrogen sulphide (H₂S) [mg/nm^3], and sulphur dioxide (SO₂) [mg/nm^3]. The three reading were recorded at each point and the mean value used to represent the gaseous concentration at that point. The measured parameters were then compared with TBS-NES limits and World Health Organization (WHO) guidelines to check their level of compliance.

The results show that all measured parameters were within permissible limits corresponding to limits prescribed by Local Standard (TBS limits) and international limits (WHO/IFC limit) for ambient air quality (See appendix 2).

4.4.1.2 Dust as Particulate matter in terms of PM₁₀ and PM_{2.5}

Dust levels were measured using Particulate Matter/Dust Monitor that complies with the EMC Directive 89/336/EEC of the European Union in accordance to manufacturer procedure and applicable local standards and/or international environmental guidelines. On taking measurements, the device was placed at breath height of about 1.5 meter from the ground to monitor dust concentrations at each identified station. This position is assumed to be a relatively the breathing zone of the people at their respective locality or working environment. The recorded data were compared with prescribed available limit to check their compliance with both TBS-NES standards and WHO/IFC guidelines. However, all the recorded baseline data for PM₁₀ and PM_{2.5} were within the prescribed by TBS and IFC/WB Group limits at each location (Appendix 3).

4.4.1.3 Noise levels

Noise baseline data were recorded in accordance to ISO 1996-1:2003 using a Digital Sound Level Meter, with measurement range of 30 to 130dB (A). During the measurement, the device was set

to the “A” weighed measurement scale, which enables the meter to respond in the same manner as the human ear. The “A” scale is applicable for workplace compliance testing, environmental measurement, and workplace design. On taking measurements, the device was held approximately 1.5 m above the floor and at least 0.5 m away from hard reflecting surfaces such as walls. A number of readings were periodically to grasp the mean diurnal noise values for each station. Average values were then calculated and compared with local and international standards. Based on findings, the average noise level indicate that the existing status of the project area and the nearby community are within the acceptable noise levels prescribed by WB/IFC limit and TBS limit.

4.4.2.2 Ground Vibration

Data logger vibrometer was utilized to quantify the ground vibration at sampling location according to European standard EN 14253:2003. On taking measurements, the accelerometer transducer was mounted on the ground to record both ambient and peak 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 ongoing quarry activities. Based on the measured findings, all the location/stations were within the human detection, permissible TBS and WHO limits (Appendix 5).

4.5 Socio-Economic Environment

The Socio-economic aspects that were studied in the project area included.

4.5.1 Population

During the 2022 national census, Mkinga District had a total population of 146,802 with 73,048 males and 73,754 females. The 2022 National Population Census reveals that Gombero ward had a population of 6,292, consisting of 3,146 males and 3,146 females, with a population growth rate of 2.1 percent (Source: NBS, 2022). However, the construction and operation of these facilities may lead to an influx of students and staff, potentially affecting the demographic composition of the area. The increased human activity may also put pressure on local resources and infrastructure, impacting the community's daily life. Additionally, the environmental changes associated with construction and development may influence the livelihoods of the nearby residents, especially if the project alters the landscape, water sources, or local ecosystems.

4.5.2 Cultural Heritage, Aspirations, Traditions and Religion

In Mkinga District, the predominant ethnic groups are the Zigua, Segeju, Sambia, Bondei, Digo, and Sambia. Additionally, Swahili is the official language of Tanzania and is commonly used in Mkinga District. Other languages spoken in the district include Zigua, Sambia, and Bondei. In terms of religion, the majority of the population adheres to Islam, with a notable Christian minority. The construction of academic blocks, student hostels, staff houses, cafeteria, dispensary, and a reservoir tank may alter the physical landscape and disrupt the cultural fabric of Pangarawe area, Gombero, Vunde-Manyinyi, Jirihini, Kichangani and Dima villages. The project might lead to changes in the local traditions and daily life, affecting the aspirations of the community members. Additionally, the influx of students and staff from diverse backgrounds may introduce new cultural influences, potentially impacting the existing religious practices.

4.5.3 Health Services

Mkinga district has three types of healthcare facilities: one (1) newly constructed district hospital located in Parungu Kasera (the district capital of the Mkinga District), three (3) health centres, and forty-two (42) dispensaries. Gombero ward hosts one of these dispensaries, with plans for additional construction. Given the distance between MU-Tanga campus and Parungu Kasera, relying on the district hospital facility may be challenging because it is costly and timely to get to the hospital as it is located an estimated 18km away. In addition, the Gombero ward dispensary is small and has limited medical facilities and personnel therefore, it is crucial for MU-Tanga Campus to establish healthcare facilities that will ensure access to healthcare services for both MU students, staff and the local from Pangarawe area and its nearby areas like Gombero, Vunde-Manyinyi, Jirihini, Kichangani and Dima villages.

Also, the addition of a dispensary within the campus suggests a positive impact on healthcare accessibility for both students and the local community. The dispensary is expected to provide essential medical services, contributing to improved health outcomes and prompt medical attention. Additionally, the construction of staff houses, and student hostels may lead to an increase in the local population, necessitating adjustments in the provision of health services to accommodate the growing demand. The overall effect on health services will depend on how well the project integrates healthcare facilities and addresses the potential health-related needs of the expanding community and student population.

4.5.4 Education

As of 2022, Mkinga District had a total of 94 schools, with 79 being primary schools and 15 being secondary schools and 1 vocational training centre (VETA). The primary education department includes 76 primary schools with a combined student population of 28,254, comprising 14,258 boys and 13,996 girls in grades I through VII. The district's enrolment status for Standard I meets the national requirement, ensuring that all school-age children are enrolled.

Across the district's 21 wards, there are a total of 15 secondary schools. One of these fifteen secondary schools is located in Gombero ward, and all educational facilities are government-owned, with no private institutions currently in operation. The presence of just one vocational training centre indicates an imbalance in secondary education, limiting the opportunities for secondary graduates to pursue college education. The secondary school in Gombero ward serves several surrounding villages, including Pangarawe, Gombero, Vunde-Manyinyi, Jirihini, Kichangani and Dima villages.

The Mkinga district and the Gombero ward educational system currently face numerous challenges in delivering quality education. The primary reason for the lack of quality education is the insufficient school infrastructure, including classrooms, teachers' housing, laboratories, libraries, and student dormitories. In many cases, there is a severe shortage of teachers' houses, and in some schools, they are entirely absent. Consequently, teachers are compelled to reside in rented houses, often far from the school premises. This forces teachers to endure long commutes, which consumes a significant amount of their time and hinders their ability to fulfill their responsibilities in schools. The shortage of school infrastructure presents a major challenge as it is essential for providing quality education that equips students with knowledge and skills.

Another issue is the considerable distance between schools and students' residences, particularly because many secondary schools are located in ward headquarters. As a result, students from villages within the ward must walk long distances to attend school, with some covering up to 7 kilometers daily. This lengthy commute discourages regular attendance, especially during adverse weather conditions such as heavy rain. Consequently, students may not achieve their educational goals over the intended four-year study period.

Several factors contribute to this long-distance problem:

- Insufficient subsidies for school construction from the council.
- Inability to build dormitories at every school by both the central government and the community, which would allow students living far from school to reside on campus.
- Limited community involvement in development activities due to their economic constraints.
- The absence of a school feeding programme, resulting in many students attending day schools without adequate nutrition, despite coming from financially challenged families.
- This situation hampers the students' learning experience and overall academic progress.

4.5.5 Employment

a. Agriculture

The agriculture sector employs over 80% of the population in Mkinga District, while approximately 20% are engaged in minor activities such as livestock farming, fishing, and small-scale agribusiness. 85% (250,580 hectares) of Mkinga district's land area is suitable for crop cultivation and livestock rearing. Food crops like maize, cassava, beans, legumes, and bananas are grown, along with cash crops such as cashew nuts, coconuts, groundnuts, oranges, mangoes, spices, and sisal in larger plantations. However, out of the 250,580 hectares of arable land, only 75,574 hectares, or 30%, are currently cultivated for both cash and food crops. Also, livestock keeping is common in Gombero ward, including cattle, goats, and sheep.

However, the living standards of the people are not satisfactory. This is primarily due to the fact that 95% of livestock keepers have low incomes, which result from limited livestock production and product yields. It is expected that much of the unskilled labour force for the construction activities will be sourced from Pangarawe area and villages of Gombero ward including, Gombero, Vunde-Manyinyi, Jirihini, Kichangani and Dima villages. This is because most of the people from these areas are from low socio-economic status.

Also, the construction and operation of the new infrastructure may lead to land use changes, potential soil erosion, and water resource alterations, impacting local farming activities. The increased human presence and activities may result in changes to the socio-economic dynamics of the community, potentially affecting traditional farming practices and livelihoods. Additionally, the reservoir tank construction may influence water availability and distribution, impacting irrigation practices and overall agricultural productivity.

b. Fisheries

The Mkinga district's proximity to the ocean on the east provides employment opportunities and alternative livelihoods for its estimated 21 fishing communities in economic generating activities such as salt mining, seaweed cultivation, both industrial and subsistence fishing, aquaculture, and the collection of ornamental and medicinal fisheries products. However, the fishermen's livelihoods face challenges as their fishing activities are restricted to the territorial waters within

20 kilometers from the coastline. This limitation is due to the use of inadequate fishing equipment and small vessels, resulting in minimal and subsistence-level incomes.

The construction and development activities at Panngarawe area in Gombero ward may lead to habitat disruption, sedimentation, and changes in water quality, affecting the aquatic ecosystem. Increased human activity and infrastructure may contribute to the degradation of nearby water bodies, potentially impacting fish habitats and breeding grounds. The reservoir tank construction, in particular, may alter water flow dynamics, further influencing local fisheries. Additionally, the influx of people associated with the expanded campus could lead to increased fishing pressure and resource exploitation, exacerbating the strain on the local fisheries.

c. Mineral Resources

Abundant mineral resources like iron ore, titanium, and precious gemstones like rubies and sapphires are found in Mkinga District. The district is already engaged in mining activities, with potential for further exploration and resource development.

4.5.6 Water supply

Mkinga District enjoys numerous sources of water, including permanent rivers like Umba, Msambiazi, and Zigi, as well as permanent water sources like Kinyatu. There are also areas suitable for constructing dams. The district experiences two annual rainy seasons, allowing for rainwater harvesting and use during the dry season. Properly harnessing these opportunities can significantly alleviate water shortages in the district.

The water sector in Mkinga District faces significant challenges related to the shortage of clean and safe water in various parts of the district. These issues arise due to several factors, including the aging water infrastructure in places like Maramba, Bwiti-Mavovo, Daluni Kisiwani, Mkinga, Moa, and Duga Maforoni, resulting from inadequate maintenance caused by financial constraints. The scarcity of safe water is also linked to the high cost of constructing water facilities, limited citizen participation in funding water projects, and insufficient government contributions.

Additionally, human activities like farming, deforestation near water sources, and animal grazing contribute to water shortages, as there are no stringent measures in place to address the negative impacts. Furthermore, a lack of expertise in environmental conservation and the absence of Water Users Associations in some areas have led to improper water source management. In some coastal plain regions like Manza, Doda, Mkinga, and Kwale, the presence of calcium and magnesium in the earth's crust results in hard water, which doesn't meet the necessary quality standards for human consumption. The proposed site is situated in a semi-arid climate with flat terrain and scattered vegetation. The nearby surface water source is the Zigi River, located approximately 3.5 kilometers from the proposed establishment of MU-Tanga campus at Pangarawe area. The Rural Water Supply and Sanitation Authority (RUWASA) representative suggests several options for the main water supply to the proposed MU-Tanga campus area, including rivers (specifically the Zigi River), groundwater, and rainwater harvesting.

Efforts to establish a reliable water supply service for the proposed campus site are actively being pursued by authorities at both the regional and district levels. Currently, preliminary surveys and hydraulic assessments are in progress to determine the cost of bringing water to the proposed site from the Mabokweni water reservoir (dam). This reservoir also serves Tanga city and Horohoro

urban center, and RUWASA confirms that it has ample water to meet the demands of the proposed campus. The plan involves pumping water from the Mabokweni water reservoir (located 13.5 kilometers away) to an overhead tank, situated either within or close to the campus site. From there, gravity will carry the water to its intended destinations.

4.5.7 Economic Infrastructure

a) Road network

The road infrastructure in Mkinga district consists of a network covering a total distance of 406 kilometers, encompassing regional roads managed by TANROADS, district roads, and feeder roads. The district is crossed by a Tanga-Horohoro Road thus enabling motorcars to pass over throughout the year. This road has played a big part in attracting investors to the district.

MU-Tanga campus is accessible by the main road from Tanga town to Maramba which is under the TANROADS. The road is paved from Tanga to Mikocheni. The road from Mikocheni to Maramba is unpaved and lacks traffic separation for motorized and non-motorized traffic. According to TARURA traffic counting, the annual average daily traffic number (AADTn) across Tanga-Mkinga Road is 46 per hour.

b) Walkways

Walkways are designed to provide access to all buildings and public spaces in the campus. All walkways are proposed to be dressed in permeable paving to allow infiltration and their widths are proposed to range from 2 to 4 metres. Walkways are also designed to ensure safety, security and convenient walking, and thus most of them are separated from access roads. Furthermore, Walkways have been designed to ease connectivity of the main land use activities, such as hostels, classrooms, lecture theatres, lecture halls, lecture rooms, offices and cafeteria.

Additionally, roadside walkways have been proposed along the access roads and collector roads. These walkways have been designed with shade trees on both sides of the road and they are connected to all gates through pedestrian gateways. Shade trees have been proposed to improve aeration and the walking environment along the roadside walkways.

c) Energy and Power Supply

Electricity supplied in the district is through National Grid. The proposed site is situated more than five (5) kilometers away from the closest settlement, and it currently lacks access to a nearby power source. Nevertheless, efforts are in progress to introduce electrical power infrastructure to the location. As per official information, the nearby power transmission lines are located in Pangarawe village, approximately 3.8 kilometers from the proposed site. Currently, TANESCO is in the process of assessing the investment requirements and estimating the necessary resources to provide power to the proposed MU-Tanga campus.

The construction and operation of these facilities will likely increase the demand for electricity to power lighting, heating, and various equipment within the academic block, hostels, and other structures. Additionally, the need for a reservoir tank may require a reliable power source for pumping and water distribution. Therefore, should address the potential strain on the local power infrastructure, considering both short-term construction needs and long-term operational requirements. Sustainable energy solutions and efficient power management strategies should be explored to mitigate adverse effects on the existing energy and power supply systems in the region.

d) Communications

The district has a good mobile phone connection through Airtel, Vodacom, Tigo, Halotel and Zantel services. Coverage of communication services is progressively extending to cover the whole District. The postal services used at the district are those available in Tanga city which is approximately 41Km from the district headquarters.

The proposed establishment of MU-Tanga campus will significantly impact communications in various ways. Firstly, there will be an increased need for effective communication among project stakeholders, including university officials, local authorities, construction teams, and the community members. Clear and transparent communication channels will be essential to convey project updates, timelines, and any potential disruptions to the local community. Additionally, the environmental and social impact statement will require extensive communication efforts to inform and engage the public, addressing concerns and obtaining feedback. Collaboration between different departments within the university and external partners will be crucial to ensure seamless coordination and successful implementation of the project, emphasizing the importance of efficient communication strategies throughout the planning, construction, and operational.

e) Financial Institutions

Financial services in Mkinga district are insufficient to cope with the growing demand for financial services and economic activities. NMB is the only Banks that provide financial services to the whole population. However, in terms of banking services, there is no any kind of Banks that provide their services in Gombero ward. The proposed project, involving the establishment of an academic block, student hostels, cafeteria, dispensary, staff houses, and a reservoir tank at Mzumbe-Tanga Campus in Pangarawe Area, Gombero Village, Gombero ward, Mkinga District, Tanga Region, is likely to impact financial institutions in several ways. Firstly, the need for substantial funding to execute such a comprehensive development plan may prompt financial institutions to engage in project financing, leading to increased loan portfolios for the institutions involved. Additionally, the successful completion of this project could boost local economic activities, attracting investments and potentially influencing the demand for financial services. On the other hand, financial institutions may need to assess the environmental and social implications of their involvement in funding the project, ensuring compliance with ethical and sustainability standards. Moreover, the establishment of academic facilities may enhance the area's educational profile, potentially attracting more students and contributing to the local economy, which could indirectly affect financial institutions through increased demand for educational loans or banking services in the region.

CHAPTER 5: STAKEHOLDERS ENGAGEMENT PLAN AND GRIEVANCES REDRESS MECHANISM

5.1 Introduction

This chapter gives an overview of the stakeholder engagement efforts conducted thus far including the process of identifying stakeholders. It highlights the stakeholders who have been identified and consulted, the methods used for consultation, and the concerns and issues raised by stakeholders regarding the construction activities of various facilities at MU and conclude with a review of how these issues have been addressed. The primary objective of stakeholder engagement is to outline how MU will involve stakeholders throughout the development of the proposed project.

Recognizing the importance of public participation in project development, the proposed Mzumbe-Tanga Campus project adheres to the World Bank's Environmental and Social Framework (ESF), specifically Environmental and Social Standard (ESS) 10 on Stakeholder Engagement and Information Disclosure. This standard emphasizes open and transparent communication as crucial for enhancing project sustainability, acceptance, and success.

Aligned with ESS10 and Tanzanian regulations, including the Environmental Management Act (Cap 191) and the Environmental Management (EIA and Audit) (Amendment) Regulations (2018), a comprehensive public involvement plan was implemented early in the project design. Local communities, leaders, and key stakeholders were informed about the project objectives, technologies, and potential impacts through various channels, including:

- Consultative meetings: Facilitating direct dialogue and feedback exchange.
- Key informant interviews: Gathering in-depth insights from relevant individuals.
- Email communication: Providing readily accessible information updates.
- Public meetings: Offering broader information dissemination and discussion opportunities.
- Telephone calls: Addressing individual concerns and ensuring accessibility.

During these engagements, stakeholders were briefed on the project details, potential impacts, and grievance redressal mechanisms, including the University's dedicated grievance desk. They were encouraged to ask questions and clarify any misunderstandings. This comprehensive approach ensured inclusive participation and informed decision-making throughout the project development process. Furthermore, the engagement activities enable the relevant authorities to ensure that concerns and comments from various stakeholders are taken into account while developing Environmental and Social Management Plan (ESMP) and an Environmental Monitoring Plan for the project. Stakeholder consultation will continue during the disclosure of the ESIA report and throughout the implementation of the proposed project.

5.2 Stakeholders Identification and Analysis

Stakeholders include all individuals, groups or organisations that might be affected or might affect the proposed project (positively or negatively) in one way or the other. A Public consultation process has been conducted during the scoping report preparation for the proposed project to be located at Gombero ward, Gombero village in Pangarawe area. This process allowed the creation of a channel of communication for consultation from the local and national level. National and local authorities including leaders in the area of influence of the project have been involved in the process. Also, stakeholder identification and involvement adhered to guidelines specified in the Environmental Impact Assessment (EIA) and Audit Regulations (2005, as amended in 2018), World Bank Environmental and Social Standards (ESS10), and the Stakeholders Engagement Plan (SEP). Public consultations entailed the sharing of project details, comprehension of stakeholder

concerns, and cultivation of community relationships. Key stakeholders were pinpointed based on their roles, significance, influence, and potential impact on the project. The Stakeholders Engagement Plan (SEP) encompassed both national and sub-national levels, with a particular emphasis on sub-national stakeholders. It delineated the specifics of engagement pertaining to project activities, encompassing stakeholders at regional, district, and village tiers. The project aspired to inclusivity by involving women, vulnerable populations, and individuals with special needs. Consultations occurred throughout the project's duration, and mechanisms were instituted to address issues such as Gender-based Violence (GBV), Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH).

The consulted stakeholders are found at Regional, District and local levels. At district levels consultant meet with District Environment Management Officer, Town planning officer and community development officer. At the ward level, Gombero Ward Executive Officer (WEO), Gombero, Vunde-Manyinyi, Jirihini, Kichangani and Dima Village officials were consulted. In addition to that, interview was held with the health and safety inspectors at Occupation Health and Safety Authority (OSHA), Fire and Rescue Force office, Rural Water Supply and Sanitation Agency (RUWASA), Tanga UWASA, TANESCO, NGOs and CBOs.

5.3 Requirement of Stakeholder Engagement

According to the Environmental Management Act Cap 191, the Environmental Management (Environment Impact Assessment and Audit) (Amendment) Regulations of 2018, and the World Bank ESS10 (Stakeholder Engagement and Information Disclosure), its necessary to include Stakeholder Engagement and Information Disclosure as integral parts of project planning and implementation in order to develop good relationships and gather their views on issues that could affect the project throughout the project life.

The Environmental Management (Environment Impact Assessment and Audit) (Amendment) Regulations of 2018 along with the ESIA emphasize the importance of stakeholder engagement and provide the guidelines on when and how the public should be notified during key stages of the ESIA process. Specifically, stakeholder engagement is required during the ESIA Scoping stage and after the completion of impact analyse. The project proponent is also obligated to inform the public at the commencement of scoping activities and upon submission of the Draft ESIA to NEMC (National Environmental Management Council).

5.4 Objectives of Stakeholder Engagement

The general objective of the Stakeholder Engagement Plan (SEP) is to guarantee a consistent, thorough, coordinated and culturally suitable approach to engaging stakeholders and disclosing project information. The objective is to showcase the commitment of the MU to following internationally recognized best practice in engagement. Following the standards of current international best practices, the stakeholder engagement for this project seeks to ensure that the engagement process is conducted without manipulation and interference. MU is fully dedicated to adhering to Tanzania national environmental policy and legislation, and World Bank Environmental and Social Policy.

This Stakeholder Engagement plan identifies the key stakeholder and establishes effective mechanisms for obtaining stakeholder feedback and demonstrates how it will be integrated into

the broader ESIA process. The plans ensures that concerns raised by key stakeholders are addressed both in the ESIA and during project decision making and design phase. It also serves as a documentation of the engagement process and outlines the responsibilities of the project proponent in accordance with Tanzania legislative requirements and international best practices. Considering this context, the specific objectives of this stakeholder engagement plan are as follows;

- Provide relevant, timely, accessible and appropriate information regarding hydroelectric power plant related developments, in an appropriate manner and understandable format to all stakeholders. Information will be disclosed as early and as comprehensively as possible.
- Consult stakeholders on their opinions, concerns, preferences and perceived gains and risks with respect to the project planning and implementation, including the design and proposed management and mitigation measures to reduce potential impacts and to enhance possible benefits.
- Provide all stakeholders with the means to address concerns and grievances with the project, in a structured, reliable and responsive manner.

5.5 Stakeholders Engagement and Disclosure Methodologies

Various communication techniques are employed during stakeholder engagement. Essentially, community meetings serve as the primary methods for involving the public, other method are focus group discussion and interview. These methods are utilized to generate initial awareness, encourage participation, and facilitate long-term information sharing. However, the selection of specific methods depends on the level and purpose of engagement, as well as the specific stakeholder group being targeted. In the ESIA process, the ESIA Consultants employed the following methods to engage the public.

5.5.1 Community Meetings

This method facilitates sustained information exchange between the proponent and the relevant public, including women and vulnerable groups. Community meetings were organized to disseminate information to individuals who could potentially be impacted by the project, as well as to gather their comments and address any queries they may have. These meetings involved a presentation followed by a session for questions and answers. The main goals were to clarify the project details and seek opinions regarding both positive and negative impacts of the project.

5.5.2 Formal Meetings

Formal meetings with elected officials and government functionaries were held to provide information about the project to agency representatives, and to solicit their comments and questions. The meetings consisted of a short formal presentation followed by a question-and-answer period.

5.5.3 Focus Group Discussions

MU employed FGD 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 was employed to explore issues that were 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 was centered upon establishing similarities and differences among people of the same or different groups.

5.5.4 One on one interviews

The interviews aimed to give a chance to individuals to air concerns on the project and involved Project Affected Persons (PAP) and Other Interested Parties (OIPs) depending on the issues to be addressed.

5.5.5 Site visits

These visits focused on identifying and discussing stakeholder concerns and to disclose project information within communities.

5.5.6 Disclosure

- MU will make accessibility of ESIA report, along with other pertinent project documents to the public.
- The complete set of documents will be physically accessible in local offices and project offices. Electronically copies will be available on the MU website.
- Summary information will also be provided at Ward and Village offices situated in the project area.

5.6 Stakeholders Concerns

Generally, all government all consulted stakeholders consulted had no objections regarding the proposed project and appeared to be content with its objectives leading to its initiation. They all urged the proponent to abide by the relevant rules and regulations guiding her project operations. All raised issues from consulted stakeholders are pointed and noted as explained on Table 5.1.

Table 0:1: Details of Stakeholders concerns (Source; Consultation with stakeholders on August 2023)

| Level | Institution/ Group | Views and Concerns of Stakeholders | Response to concerns |
|-----------------------|--|--|--|
| National level | Tanzania Commission of Universities (TCU) | <ul style="list-style-type: none"> ○ Building should be well designed to reduce and avoid environmental pollution like noise, air and vibration pollution. ○ The contractor should deploy dust suppression and mitigation measures such as regular sprinkling of water and scaffolding the site to minimize on dust pollution. ○ Building construction and their design should consider access for disabled people and their necessary facilities. ○ The proponent should take into account issues of waste management for both solid, liquid and hazardous waste. | <ul style="list-style-type: none"> ○ The design group should incorporate and revise all the addressing concerns in the drawings in order to enhance their functionality. ○ MU management shall cooperate with contractor to develop a plan that ensures that dust generated during construction activities are well managed. ○ MU shall establish WSP for management of wastewater for the proposed campus at Tanga and should ensure that all problems associated with wastewater generation are treated and well managed. Also, the solid waste during operation phase should manage into proposed composting facility however for all non-biodegradable waste will be managed into Mpirani landfill which is about 11.5Km from MU-Tanga campus site. ○ The soil suitability for the specific buildings must be assessed through a soil analysis as detailed in the Geotechnical report. |
| Regional Level | OSHA | <ul style="list-style-type: none"> ○ The proponent and contractor should make sure the project is registered under the Workplace Information Management System (WIMS) before pre- construction and construction phases. ○ The proponent should make sure that the awarded Contractor should have registered HSE representatives and First Aiders at all project phases, as well as First Aid Kits with all necessary facilities. ○ Medical examination should be done to all workers before and after construction and operation phases as well as during operation phase. ○ The proponent and contractor should conduct Risk Assessment before construction and prepare a Risk Assessment report. ○ The contractor should have accident book for the workers in order to keep accident records for those workers who had accidents during construction | <ul style="list-style-type: none"> ○ MU and Contractor shall register the proposed establishment of new buildings at OSHA. ○ MU and Contractor shall ensure that HSE representatives and trained first aiders are in place for the proposed development. ○ Medical check-ups (Pre and Post medical) for the new employee and laboures will be done and workers shall be tested their health as per OSHA regulations. ○ Contractor shall conduct risk assessment and shall have accident book. ○ MU and contractor shall have health and safety management plan to ensure safety of workers within the project area. And the first aid kits shall be provided in an area where it will be easily visible and accessible. ○ Personal Protective Equipment (PPE) must be supplied to all workers due to the inherent nature of |

| Level | Institution/ Group | Views and Concerns of Stakeholders | Response to concerns |
|-------|------------------------------------|---|---|
| | | <p>period.</p> <ul style="list-style-type: none"> ○ The proponent and contractor should prepare the Occupational Health and Safety Policy both in English and Swahili languages, and it should be displayed in an accessible place within a work place. ○ The contractor should provide sufficient Personal protective equipment's (PPE) to all workers at the site and enforce them to use it all the time at the project site. ○ Contractor should provide Induction training to workers on health and safety and the appreciation of safety gear will be done. ○ The proponent should ensure temporally, or portable toilet are in place within the project site if the existing toilet facilities are distant from the proposed project site. ○ The proponent should ensure temporally, or portable toilet are in place within the project site. | <p>construction tasks and the associated hazards.</p> <ul style="list-style-type: none"> ○ MU and contractor should explain the nature of the project to the surrounded community and people living within the project area. ○ Contractor shall construct and design area for workers to change the clothes and other stuff during project implementation. ○ Contractor shall establish temporally toilets at the proposed site during construction period ○ Contractor shall construct and design area for workers to change the clothes and other stuff during project implementation. ○ MU and contractor shall have health and safety management plan to ensure safety of workers within the project area. |
| | Tanga Fire and Rescue Force | <ul style="list-style-type: none"> ○ Architecture drawings should be submitted to fire office for approval before the commencement of the construction. ○ Contractor who responsible for drawing should be aware with building regulation. ○ Proponent must install the exit signs throughout the project site and a fire assembly point. ○ Fire detections system must be provided. Its components such as smoke detectors, heat detectors, beam detectors, sounders, beacons, manual call points, control panel, alarms and others must be in acceptable standards. Installation should be done by recognized and qualified institution. ○ Adequate Portable Fire Extinguishers must be provided, installed properly and maintained in accordance with acceptable standards by authorised personnel during all phases of the proposed project. ○ The Proponent should make sure workers are provided with firefighting trainings. | <ul style="list-style-type: none"> ○ The Contractor shall submit drawings to Fire and rescue force and shall adhere to details regulation of the architect designs. ○ MU should adhere this in order to ensure compliance and avoid unnecessary incident or accident. ○ MU shall award contractor with registered electrical engineers. ○ The design group will need to incorporate and revise all the addressing concerns in the drawings in order to enhance their functionality. ○ The design group shall incorporate and revise all the addressing concerns in the drawings in order to enhance their functionality. |

| Level | Institution/ Group | Views and Concerns of Stakeholders | Response to concerns |
|--------------------|---|--|--|
| | TANESCO | <ul style="list-style-type: none"> ○ The office is positive with the implementation of the proposed establishment ○ The contractor should consult TANESCO at the earliest stage possible in order to assess the proposed site if it's possible to install 3 transformers as proposed in MU-Tanga campus master plan, two with capacity of 500 KVA and one with 200 KVA ○ The proponent should install solar Pannel as source of alternative energy if its within their budget due to cost, but if it fails to do that it's better to use backup generator as alternative energy. | <ul style="list-style-type: none"> ○ The contractor shall construct TANESCO at earliest stage of project implementation. ○ MU shall consider solar energy and backup energy as alternative energy |
| | TANGA UWASA | <p>The consultant had a little discussion with the panel, and they had the following comments.</p> <ul style="list-style-type: none"> ○ The office is positive with the project implementation and will be responsible for water supply to MU-Tanga campus and the surrounded community to minimize water problems at Gombero ward. | <ul style="list-style-type: none"> ○ Tanga UWASA shall provide and distribute water to MU-Tanga Campus and the surrounded community |
| Local Level | Mkinga District Council (DED, Environmental Management Officer, Land Planning Officer, Community Development Officer) | <ul style="list-style-type: none"> ○ Clearance should be done only on the proposed establishment areas in order to minimize cutting of trees and other vegetation. ○ Contractor and Proponent should ensure proper management of waste in all phases of project implementation. ○ Insist on health and safety of workers during and after the construction period so as to prohibit the complaints from the community after project implementation. ○ Wastewater from the proposed developments should be well planned and designed to prevent the outbreak of diseases. ○ Employment priority should be given to the local community surrounding the project for both skilled and unskilled labour. ○ It is a good project that will help to provide modern education for students from Tanga region and worldwide. ○ Also, they talked about the gender issue that during | <ul style="list-style-type: none"> ○ Clearance shall be done for the proposed development area and the remained part were conserved. ○ MU and contractor shall ensure proper management of solid, liquid and hazardous waste. ○ MU and Contractor shall ensure health and safety during and after construction period. ○ MU will manage wastewater from proposed development through the WSP which will be established. ○ The proponent and contractor shall provide employment for local residents for both skilled and unskilled labourers. ○ MU-Tanga Campus shall provide modern and quality education for people from different area. ○ The contractor shall consider gender balance in provision of employment during construction phase. ○ The proponent shall build good relationship with the surrounded community. |

| Level | Institution/ Group | Views and Concerns of Stakeholders | Response to concerns |
|-------|---|--|---|
| | | <p>the construction period women should participate in all aspects as long they accept what they assigned by a contractor.</p> <ul style="list-style-type: none"> ○ The proponent should build a good relationship with the surrounding community. ○ During construction period safety issue must be enhanced and health education e.g., AIDS and malaria. ○ The proponent and contractor should rise awareness on transmission diseases like HIV/AIDS, COVID19 during project implementation. ○ During project implementation the proponent and contractor should enhance culture and custom of people from Pangarawe area in Gombero ward. ○ Sensitization and trainings on finance management should be given to laborers. | <ul style="list-style-type: none"> ○ The contractor shall provide and enhance health education e.g. HIV&AIDS and COVID19. ○ Contractor and proponent shall enhance culture and custom of people from Gombero area. ○ Child labour shall be avoided. ○ Contractor shall provide trainings on finance management to labourers during demobilization and decommissioning of the project. |
| | DMO-Mkinga | <ul style="list-style-type: none"> ○ The proponent and contractor should associate with DMO-Mkinga in order to raise awareness on transmission diseases like HIV/AIDS, COVID19 during project implementation. ○ MU and Contractor should conduct orientation to their workers on common GBV issues like sexual harassment and homosexuality. ○ MU and Contractor should enhance transparency with their workers within the project area. | <ul style="list-style-type: none"> ○ The contractor shall associate with DMO-Mkinga to provide and enhance health education e.g. HIV&AIDS and COVID19. ○ MU and Contractor shall conduct orientation in every day. ○ MU and Contractor shall enhance transparency with their workers within the project area. |
| | RUWASA | <ul style="list-style-type: none"> ○ The proponent should select water source as the main water supply for the proposed campus area includes rivers (Zigi river), ground water and rainwater harvesting. | <ul style="list-style-type: none"> ○ MU shall use water from Zigi river through Tanga UWASA. However, ground water and rainwater harvesting as alternative water source. |
| | Ward Office-Gombero ward and Village office (ward Executive Officer, Village Executive Officers, chairmen, and | <ul style="list-style-type: none"> ○ The project is worth being undertaken and accepted. ○ Water should be supplied to proposed MU-Tanga campus and the surrounded community to minimize water problems and sustains lives of people from Gombero ward. | <ul style="list-style-type: none"> ○ Tanga UWASA shall provide and supply water to MU-Tanga Campus and the surrounded community. ○ The land for proposed established is owned by MU based on title deed attached on appendix 3. ○ MU shall give temporary areas for food vendors from Gombero to run their services in simple way. |

| Level | Institution/ Group | Views and Concerns of Stakeholders | Response to concerns |
|-------|--|---|---|
| | community members) | <ul style="list-style-type: none"> ○ MU should give area to food vendor (Mama lishe and Baba lishe) to conduct their services during project implementation. ○ MU will be required to establish and construct road during project implementation to avoid accident and facilitate easy transportation of raw materials. ○ Contractor should put road sign and consider speed limit for all roads that will be used for transportation of raw materials to prevent accidents because the proposed area for proposed campus is close to primary school. ○ Employment priority should be given to the local community surrounding the project for both skilled and unskilled labour. ○ Also, the proponent should establish Dispensary or health center within the project due to absence of health services within the Pangarawe area. ○ The community requested a temporary dispensary to be established to provide first aids for those who will get injured within the project area during the construction period. ○ The proponent and contractor should ensure proper management of any kind type of waste generated during project implementation in all phases. | <ul style="list-style-type: none"> ○ MU and contractor shall construct and establish road during project execution. ○ Contractor shall put road sign and will be aware with speed limit for all drivers during project implementation. ○ The proponent and contractor shall provide employment for local residents for both skilled and unskilled labourers. ○ MU shall establish Dispensary within the proposed campus to ensure health of the students and the surrounded community. ○ The proponent and contractor shall ensure proper management of waste during project implementation. |
| | Non-Government Organisations (NGO's) and Service providers | <ul style="list-style-type: none"> ○ Priority in students' enrollment should be given to all gender and disabled people. | <ul style="list-style-type: none"> ○ TCU shall be responsible with this and will accept you are requirement. |

5.7. Stakeholders Engagement Plan (SEP)

Effective stakeholder engagement improves the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation. The proposed project has engaged stakeholders as per SEP developed for HEET project. The engagement plan will be reviewed and updated throughout the project implementation (Table 5.2). 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.

Table 0:1: Stakeholders Engagement Plan

| Stakeholder Name | Stakeholder Type | Engagement Objective | Engagement Method | Frequency/Timing | Expected Outcome |
|--|------------------|---|---|-------------------------------------|---|
| MU (Administrative & Academic staff) | Internal | Ensure project aligns with university goals and objectives. | Meetings Regular progress update | Throughout project duration | <ul style="list-style-type: none"> ○ Clear communication channels, support for project objectives |
| MU Students | Internal | Provide a safe and conducive learning environment | Information sessions & surveys | Mobilization phase | <ul style="list-style-type: none"> ○ Awareness of potential disruption |
| Local government (Mkinga District Council, Gombero Ward, Gombero, Vunde-Manyinyi, Jirihini, Kichangani and Dima Village) | External | Minimize construction related inconvenience | Community meeting | Mobilization and Construction phase | <ul style="list-style-type: none"> ○ Mitigation measure for dust, noise and traffic. ○ Responsiveness to concerns |
| Construction Contractor | External | Efficient and timely project delivery | Regular progress meeting. Site visits | Throughout construction phase | <ul style="list-style-type: none"> ○ Clear project requirement. ○ Adherence to construction schedule |
| Government Authorities (TCU, TANESCO, OSHA, FIRE, RUWASA, TANGA UWASA, Mkinga District Council) | External | Comply with regulations and obtain necessary permits. | Project registration. Permit application process. Regular updates | Mobilization phase | <ul style="list-style-type: none"> ○ Timely approval of permits, adherence to regulations |
| Environmental Agencies (Division of Environment, and NEMC) | External | Minimize Environmental and Social Impact | Environmental and Social Impact Assessment, consultation sessions | Mobilization phase | <ul style="list-style-type: none"> ○ Mitigation measure for Environmental concerns. ○ Compliance with regulation |
| Donors/Funding Agencies (World Bank) | External | Accountability and transparency in fund utilization | Reporting mechanisms. Project presentations | Throughout project duration | <ul style="list-style-type: none"> ○ Clear financial reporting, alignment with World Bank requirement. |

5.8 Grievance Redress Mechanism

Grievances are any complaints or suggestions about the way a project is being implemented, and they may take the form of specific complaints for damages/injury, concerns around resettlement and compensation, concerns about routine project activities, or perceived incidents or impacts. Stakeholder engagement operates as a bi-directional procedure. Thus, it is crucial to establish a feedback mechanism system that allows stakeholders who are impacted by or have an interest in the proposed project to express their input (like opinions, requests, suggestions, and grievances) for review and, if necessary, seek resolution. It is important to acknowledge that not all grievances may be considered valid or applicable to the proposed project context. Nonetheless, the feedback mechanism should operate in a non-judgmental manner and document all received feedback.

A Grievance Redress Mechanism (GRM) is a formal system established to address and resolve complaints or grievances raised by stakeholders or affected groups. This is designed to provide an avenue for stakeholders or affected groups to engage with the project on issues of concern or unaddressed impacts. In order to make this aim a reality, MU will develop a grievance handling mechanisms and procedures to address grievances associated with the construction of university facility and rehabilitation of existing water supply system including grievances related to PAP and contractor's grievances.

The implementation of a Grievance Mechanism Procedure guarantees that complaints are properly documented and treated well with fairness and appropriateness. MU strives for ongoing enhancements to this procedure. The Grievance Mechanism was communicated to the relevant parties during the public consultation sessions. The Grievance Handling Officer (GHO) appointed by MU has the responsibility for handling all types of grievances arising from implementation of all projects and sub-projects under the HEET project including work related grievances and managing the Grievance Register. Complaints can be submitted in written or verbal form either directly by the complaint or through MU employees, Contractor, Consultant and Mkinga District Council.

5.8.1 Purpose

A Grievance Redress Mechanism (GRM) is necessary for addressing the legitimate concerns of the project affected persons. Grievance handling mechanisms provide a formal avenue for affected groups or stakeholders to engage with the project on issues of concern or unaddressed impacts.

The aim of a Grievance Mechanism document is to effectively handle complaints and grievances raised by communities and local stakeholders in equitable, fair, timely and transparent manner. Also, it fosters mutual confidence and trust by providing a platform to address stakeholder concerns, gather information about their issues, and serve as an early warning system to tackle problems before they potentially becoming more challenging and costly to resolve. It is crucial to address these grievances in a timely manner to ensure the smooth execution of the project.

The stakeholder engagement process will ensure that the PAPs are adequately informed of the procedure. The GRM is designed with the objective of solving disputes at the earliest possible time, which will be in the interest of all parties concerned and therefore, it implicitly discourages referring such matters to a tribunal/court for resolution.

5.8.2 Scope

The grievance mechanism will be utilized to address complaints and grievances from stakeholders whether they perceived or actual, that are connected to the actions of MU and its contractors in regard to the planned construction of the Academic building and other infrastructure in MU, Gombero ward, Mkinga District Council. A complaint or grievance refers to any matter, concern or problem (Whether they perceived or actual) that an individual stakeholder or community group has regarding the operations and activities of MU and its contractors.

5.8.3 Features of Grievance Redress Mechanism

The features of a grievance redress mechanism should include;

- a. **Accessibility;** the mechanism should be easily accessible to affected group or stakeholders, ensuring that they can submit their grievances conveniently.
- b. **Clear Procedures;** there should be well defined procedures for submitting, reviewing, and resolving grievances. This includes the steps involved, required documentation and timelines for resolution.
- c. **Impartiality and Fairness;** the mechanism should be impartial and treat all grievances with fairness, without bias or favoritism towards any party involved.
- d. **Confidentiality;** Confidentiality should be maintained to protect the privacy and identity of individuals involved, especially when dealing with sensitive matters. For example, in case of complaints related to Gender Based Violence (GBV), grievances will be treated with due confidentiality. Specific provisions will be included for complaints related to Sexual Exploitation and Abuse (SEA) that could be derived from the project to ensure the survivor's confidentiality and rights.
- e. **Timely Response;** the mechanism should aim to provide timely responses to grievances, ensuring that individuals are kept informed about the progress of their complaints.
- f. **Resolution and Remedies;** the mechanism should have provisions for resolving grievances effectively and providing appropriate remedies to the aggrieved parties. This includes corrective actions, compensation, policy changes or other forms of resolution.
- g. **Feedback and Monitoring;** Regular feedback and monitoring of the grievance redress mechanism are essential to identify areas for improvement and ensure its effectiveness over time.

5.8.4 Grievance Mechanism Process or Procedures

The responsibility of managing the grievance mechanism at MU will rest with Project Coordinator, who will allocate resources to the Grievance Handling Officer for handling correspondence, facilitating internal resolutions, maintaining a record of grievances, and providing reports both internally and externally. The Grievance Handling Officer will collaborate, assist, and cooperate with other work groups to develop appropriate solutions and responses. It is crucial to follow the approval process for external communication and reporting to ensure consistency with MU policies and approved key messages. The following are procedures that should be followed throughout the entire process to ensure complete resolutions of a grievance;

5.8.4.1 Receive and Register/Logging Grievance

Every grievance will be registered using the Grievance Receipt and Resolution Form for HEET Project Affected Person (PAPs). PAPs shall file the grievance through a special e-mail established for receiving grievances, suggestion boxes, meetings or directly to the GHO who will record

grievances/complaints receipt and resolution form and MoEST GHO. The GHO is responsible for reading and explaining the recorded information to the complaint to ensure accurate representation of the complaint or grievance. If a grievance is reported to someone other than the GHO, all forms must be promptly transferred to the GHO within 24 hours of receipt or as soon as practically possible. In situations where the grievance is of an urgent nature and demands immediate action, it is important to guide the complaint to the GHO and promptly inform the Project Coordinator. Such urgent matters may include environmental concerns, safety issues, or complaints regarding human rights violations related to security. Each grievance will be assigned a unique case number, and all communication and consultations related to the grievance will be documented and securely stored. Regular monitoring of the database will enable the identification of recurring grievances, facilitating the development of suitable measures for addressing them effectively.

5.8.4.2 Acknowledging Receipt of a Grievance

The GHO will promptly acknowledge receipt of any complaint or grievance, ensuring that is done within a maximum of 5 day from the submission date. The complaint will be informed of the expected timeframe for receiving a response. The Grievance Acknowledge the resolution form should contain a unique reference number and contact information, such as a phone number or alternative method for reaching the MU. Additionally, the project commits to providing a response within a specified period which is about 2 weeks after the grievance is logged. The acknowledgement will include a summary of the grievance, details of how the MU intends to address it, and an estimated timeframe for delivering the final response. Also, the response will either accept or refute responsibility for the grievance and next step will be the investigation and resolution or immediate actions to be taken.

5.8.4.2.1 Screen

Upon receiving a grievance, it will undergo a screening process ranging from level 1 to 3, as defined in table 5.3 below, to ascertain the suitable course of action. The GHO will be in charge of assigning a grievance owner who will be responsible for engaging with the external stakeholder and finding a resolution. The screening of grievances will depend on their level of severity, determining the appropriate grievance owner and approach for addressing the grievance. Therefore, The University has no Grievance redress mechanism that is connected with the building projects. The grievance redress mechanisms at MU will involve three levels which are described in table:

Table 0:3: Grievance Screening

| Level | Issue Description | Management Approach |
|--------------|--|--|
| Level 1 | A grievance that is limited in scope, occurring as a single occurrence and primarily affecting a specific location and involving one person filing the complaint. Please not those certain isolated grievances, despite being singular in nature, may be deemed substantial enough to be classified as level 1 grievances, such as instances where a violation of national or international law has taken place. | Grievance Handling Officer will notify the management of MU and subsequently employ authorized solutions to address and manage the response. |
| Level 2 | A grievance that arises repeatedly within the local community or region and is deemed to have the potential to disrupt MU operations or generate | Develop a plan for addressing grievances and create a response to be reviewed and approved by MU and other relevant management. |

| Level | Issue Description | Management Approach |
|---------|--|--|
| | unfavourable attention from local information or other stakeholders. | |
| Level 3 | A grievance that is extensive and recurring, causing long-lasting harm and/or receiving unfavourable attention from local media, or is perceived to have the possibility of generating negative media on MU operations and comments from local stakeholders. | Give priority to issues management, legislative and regulatory advocacy process, and establish a suitable management strategy. |

5.8.4.3 Assess and Investigating a Grievance

The Grievance Handling Officer will conduct a thorough investigation of all submitted grievances, engaging other departments, contractor and MU management as necessary to fully comprehend the circumstances that give rise to the grievance. The GHOs aims at completing investigation within two (2) weeks of the grievance first being logged and will involve the aggrieved person or people in this investigation to ensure their views are incorporated. Also, the GHO is responsible for keeping the complainant informed about the progress the progress of the review. If additional time is required to examine the grievance, the complainant will be notified in writing, along with an indication of when a resolution will be provided.

5.8.4.6 Grievance Resolution

Based on the findings from the investigation, the GHO attempts to resolve the grievance through dialogue, negotiation or other appropriate means. The objective is to find a satisfactory solution that addresses the concerns raised. However, if complainant is satisfied, the GHO should seek their sign off and determine if any follow up is needed to monitor resolution implementation. Once the measures have been implemented the grievance should be closed. Also, if the grievance still stands then the GHO will initiate further investigation and determine the steps for future action. And If the PAP is not satisfied with decision of GHOs, the grievance is referred to the Grievance Redress Integrity Committee (GRIC) respond within 2 weeks' time from the submission.

5.8.4.5 Third party appeal

If the complainant is dissatisfied with the solution proposed by the Grievance Redress Integrity Committee (GRIC) and requires broader consultation, grievances will be referred to an impartial third party for review and final decision. The Chairman of the GRIC, in consultation with the project coordinator, will forward the issue to the next level (third party). This third party should be neutral, respected, and agreed upon by both MU and the affected parties. Potential third-party reviewers may include public defenders, District Commissioners, Regional Commissioners, Legal Advisors, local or international NGOs, or technical experts. The third party will assess the case and determine if further reasonable actions can be taken. If all reasonable and justifiable corrective actions have been exhausted, a written notice will be provided to the complainant, formally closing their grievance. The notice may include supporting documents such as paid invoices, written agreements, photographs, emails, etc., as evidence of the resolution actions taken and adherence to the Grievance Mechanism Procedure. In cases where the complainant's address is unavailable, they may be notified by telephone or in person.

5.8.4.6 Follow up and Close Out

Once resolutions have been approved and agreed upon by the complainant, it is the responsibility of the GHOs to promptly initiate the administrative process to redress the grievance. The details of the resolution, including the action plan, and the target timeframe for closure must be updated

in the Complaint/Grievance Register. The case is considered "resolved" only when the agreed resolution has been implemented, and it then transitions to a "closed" status. To acknowledge the receipt of the resolution, the GHOs must request the complainant to sign the form in three designated places. The complainant's signature signifies their acknowledgment of the receipt, satisfaction with the outcome (or notification of alternative escalation mechanisms if unsatisfied, with a maximum activation timeframe of 30 days), and confirmation that they have been respectfully informed about the outcome of the reviews without objections.

In situations where complainants are hesitant to sign any forms or when no forms are used, the GHOs verbally seeks feedback on the satisfaction with the process and outcome. For example, they may ask if there are any suggestions for process improvement or if the complainant is content with how the process was handled. With the consent of all parties present, this interaction can be recorded on a voice recorder.

5.8.4.7 Monitoring and Reporting

It is important to consistently monitor and evaluate the performance of the grievance mechanism throughout the duration of the project. This monitoring aims to enhance both the system itself and the overall project. All reported grievances should be promptly recorded in the designated system, along with the corresponding target resolution dates. The management of MU will routinely monitor grievances as part of their broader project management responsibilities, maintaining comprehensive records of raised complaints throughout the project's lifecycle. Upon receiving grievances, electronic notifications must be distributed to the management team. Grievance records should be accessible to management at all times. The GHOs will compile monthly internal reports, which will be shared with the management team. These reports will include the following information:

- The number of grievances logged in the previous period, categorized by level and type.
- The number of stakeholders who have expressed dissatisfaction with the resolution after 30 days.
- The number of grievances that remain unresolved after 60 days, categorized by level and type.
- The number of grievances resolved directly between the GHOs and the complainant, without the involvement of legal or third-party mediators, categorized by level and type.
- The number of grievances concerning the same or similar issues.
- The Grievance Officer's responses to the concerns raised by various stakeholders.
- The actions taken to incorporate these responses into the project's design and implementation.

These reports, along with other relevant records, will be available for external review if necessary. A suitable grievance report should be included in MU annual reporting, which will be accessible to the public. A hard copy of the report will be kept at the MU offices, and an electronic version will be made available online.

5.8.4.8 Storing of Grievance

MU will securely file all records, such as grievance forms, investigation notes, interview records, and meeting minutes, to uphold the privacy and confidentiality of all parties involved.

CHAPTER 6: ASSESSMENT OF IMPACTS AND IDENTIFICATION OF PROJECT ALTERNATIVE

6.1 Introduction

Assessment of environmental, social and economic impacts in this report are conducted to help determine the acceptability of the project, and to make sure that adverse impacts are properly addressed and mitigated accordingly. The assessment process during mobilisation, construction, demobilisation, operation and decommissioning phase involves looking at:

- The environmental baseline features.
- Uniqueness of the project and project design features.
- Potential vulnerabilities and the nature.
- Location of the project, and
- Duration of activities.

Chapter seven details the suggested steps for mitigation, which MoEST, through MU, is dedicated to implementing. The objective is to avoid or minimize the adverse effects identified. This study aims to ensure that the investments funded by this project adhere to both the World Bank Environmental Standards (ESS) and the Government of Tanzania (GoT) legislations in an environmentally and socially responsible way.

- The assessment of environmental risks and impacts encompassed several aspects: (i) adhering to the Environmental Health and Safety Guidelines (EHSGs) outlined by the WB; (ii) evaluating risks concerning community safety; (iii) addressing issues linked to climate change; (iv) considering any potential threats to the preservation, conservation, maintenance, and restoration of natural habitats and biodiversity; and (v) examining the impacts on ecosystem services and the utilization of living natural resources.
- The assessment of social risks and impacts involved: (i) identifying potential threats to human security, such as crime or violence; (ii) analyzing risks that could disproportionately affect specific individuals or groups due to their unique circumstances, making them more disadvantaged or vulnerable; and (iii) evaluating negative economic and social consequences related to the involuntary acquisition of land or restrictions on land use.

The following aspects were considered when determining the significance of identified impacts:

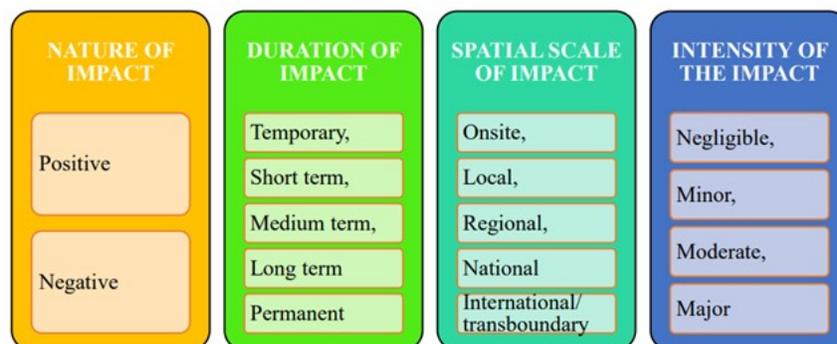


Figure 0:1: Impacts Identification (Source: 3Es Consultant, 2023)

6.1.1 Nature of Impact

There are two basic natures of impacts; impacts that tends to be beneficial or useful to the environment or social-economic aspects are termed as Positive Impacts and those which tends to affect the environment or social-economic aspects in a negative way are termed as Negative Impacts.

6.1.2 Duration of Impact

The duration of impacts defines the timeframe by which the impact will be felt or the time by which the positive or negative impacts related to the project will continue to occur. In other writings, they are termed as temporal scale. This duration can either be short term, medium term, long Term or permanent.

6.2 Environmental Impact Rating Scale

In order to guarantee a fair and accurate comparison among different studies conducted by ESIA teams, a uniform assessment approach was employed to evaluate the significance of the identified impacts. The assessment of impact significance, which refers to the importance of the impact within the larger context of the affected system, was based on specific criteria.

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

The impact assessment involves analyzing of the overall effect within the surrounding environment to determine the significant of the impact. This assessment considers various factors such as social, cultural, historical, economic, political and ecological aspects. As a result, the severity or benefit of an impact is initially assessed within a specific field of expertise before evaluating its significance on a larger scale. This requires two separate rating scales, one to determine the severity or benefit and another to determine the environmental significance.

6.2.1 Severity/Benefit

The severity of impacts is determined by experts who use their professional judgement to assess the degree of change that negative impact would have on the existing conditions, or the level of benefits that positive impacts would bring to a specific affected system or specific affected group (Table 6.1).

Table 0:1: Severity rating scale

| Negative Impacts | Positive Impacts |
|--|--|
| <p>Very severe An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated. For example, change in topography.</p> | <p>Very Beneficial A permanent and very substantial benefit to the affected system(s) or party (ies), with no alternative to achieve this benefit. For example, the creation of a large number of long-term jobs.</p> |
| <p>Severe</p> | <p>Beneficial</p> |

| Negative Impacts | Positive Impacts |
|---|---|
| Long-term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming or some combination of these. | A long-term impact and substantial benefit to the affected system(s) or party(ies). Alternative ways of achieving this benefit would be difficult, expensive or time consuming, or some combination of these. For example, an increase in the local economy. |
| Moderately severe Medium- to long-term impact on the affected system(s) or party(ies), that could be mitigated. For example, constructing a narrow road with an area with low conservation value. | Moderately beneficial A medium- to long-term impact of real benefit to the affected system(s) or party(ies). Other ways of optimizing are equally difficult, expensive and time consuming (or a combination of these), as achieving them in this way. |
| Slight Medium- to short term impacts on the affected system(s) or party(ies). Mitigation is very easy, cheap, less time consuming or not necessary. | Slightly beneficial A short- to medium-term impact and negligible benefit to the affected system(s) or party(ies). Other ways of optimizing the beneficial effects are easier, cheaper and quicker, or some combination of these. |
| No effect The system(s) or party(ies) is not affected by the proposed development. | Don't know/Can't know In certain cases, it may not be possible to determine the severity of the impact. |

The extent of the impacts can be assessed both with and without measures to minimize them in order to illustrate the gravity of the impact if no action is taken. The term mitigation encompasses more than just compensation and encompasses concepts of control and remedy. When it comes to positive effects, optimization refers to any approach that can enhance those benefit. Both mitigation and optimization should be realistic, technically feasible and economically viable.

6.2.2 Spatial scale

The Spatial scale defines the extent or area over which the impact will take place. Environmental Impacts due to the proposed underground transmission cables can affect the environment or social-economic aspects at Household level, Localized, at a study area, District, Regional, National or International Level. See Table 6.2.

Table 0:2: Spatial scale

| Individual | Individuals in the area that could be affected |
|------------|--|
| Households | Households in the area could be affected |
| Localized | A few hectares in extent (from the site). The specific area to which this scale refers is defined for the impact to which it refers. |
| Study Area | Includes the entire project area. |
| District | Includes areas around the project includes Gombero ward within Mkinga District Council. |

| | |
|---------------|--|
| Regional | The impacts will be of such a nature that it may affect the Tanga City. |
| National | The impacts will be of such a nature that it may affect the entire Tanzania. |
| International | The impact would affect resources and processes outside the borders of Tanzania. |

6.2.3 Temporal scale

The temporal scale defines the times over which the impacts would continue to occur (Table 6.3).

Table 0:3: Temporal scale

| Temporal scale | Explanation |
|----------------|---|
| Short term | Less than 5 years. |
| Medium term | Between 5 and 20 years |
| Long term | Between 20 and 40 years, and from a human perspective essentially permanent |
| Permanent | More than 40 years, and resulting in a permanent and lasting change. |

6.2.4 Criteria and Significance Rating

The significance of the impact, considering all the assessment criteria mentioned earlier, serve as an indication of its overall importance. The assessment of significance was conducted within the appropriate context, recognizing that an impact can be relevant to the ecological environment, the social-economic environment. This can be achieved by ensuring that all ESIA team followed the mentioned objective criteria, subjectivity was minimized to the greatest extent possible. Nevertheless, it is important to acknowledge that there will always be an element of judgement involved that cannot be entirely eliminated from the assessment of significance.

The importance of an impact does not always correlate directly with its severity, even though one would anticipate a direct relationship, meaning that a severe impact would typically be considered highly significant. However, this is not always true. For instance, alterations to the geology could be significant in terms of their severity, but their significance is perceived as low because society does not consider the environmental changes to be important (Table 6.4).

Table 0:4: Significance of an Impacts

| Significance | Explanation |
|--------------|--|
| High | These impacts will usually result in long-term effects on the environment that will only be mitigated over very long periods of time. At times, this is not possible, and it is up to the government to decide if this is acceptable when considering the benefits of the Project. |
| Moderate | These impacts will usually result in medium to long term effects on the natural and/or cultural environment. These impacts do exist but not substantial, and usually result in moderately severe effects or moderately beneficial effects. The emphasis for moderate impact is on signifying that the impact has been reduced to a level that is as low and reasonably practicable |
| Minor | These impacts will usually result in medium to short term effects on the natural and/or cultural environment. The environmental and/or |

| | |
|------------|---|
| | social conditions will be affected, but the impact is small enough that it is unlikely to be a concern to the government, communities and organisations. |
| Negligible | There are no primary or secondary effects at all that are significant to scientists or the public. Also, this means that the existing environmental and social conditions will not be affected or the effect is not detectable. A negligible impact is likely to be of no concern to the government, communities and organisations. |

The impacts were further rated on a scale of “-3” to “+3” through “0” in the following manner:

- +3: High positive impacts
- +2: Moderate positive impacts
- +1: Minor positive impact
- 0: Negligible/ No impacts
- -1: Minor negative impact
- -2: Moderate negative impacts
- -3: High negative impacts

The team focused on significant positive and negative impacts that were rated -2, -3 and proposed mitigation measures (Table 6.5).

Table 0:5: Summary of Potential Environmental and Socio-economic Impacts

| S/ N | Identified Impacts | Description of Impacts | Mobilization phase | Construction Phase | Demobilization Phase | Operation Phase | Decommissioning Phase |
|-------------------------------|--|--|-----------------------|-----------------------|-------------------------|--------------------|--------------------------|
| Socio-Economic Impacts | | | | | | | |
| 1 | Job Creation and employment opportunities | The impact is direct, indirectly, inductive, cumulative and reversible | +2 | +2 | 0 | +3 | 0 |
| 2 | Increased Business/trade opportunities | The impact is direct, indirectly, inductive, cumulative and reversible | +2 | +2 | 0 | +3 | 0 |
| 3 | Increased Government Revenues | The impact is direct, indirectly, inductive, cumulative and reversible | +2 | +2 | 0 | +3 | 0 |
| 4 | Food Insecurity and inflation of prices on other social services | The impact is indirectly, cumulative and inductive | 0 | -2 | 0 | -1 | 0 |
| 5 | Disruption of Economic and Social Activities | The impact is direct, indirectly, inductive, cumulative and reversible | -2 | -2 | 0 | -2 | 0 |
| 6 | Increased level of crimes | The impact is direct, indirectly, inductive, cumulative and reversible | -2 | -2 | 0 | -2 | -1 |
| 7 | Safety and Health risks | The impact is direct, indirectly, inductive, cumulative and partially reversible | -1 | -2 | | | |
| 8 | Prevalence of Communicable diseases | The impact is direct, indirectly, inductive, cumulative and partially reversible | -1 | -2 | 0 | +2 | 0 |
| 9 | Increased Traffic and road accidents | The impact is direct, reversible, cumulative and inductive | -1 | -2 | 0 | -2 | -1 |
| 10 | Income to local suppliers and service providers | The impact is direct, indirectly, and inductive | +1 | +2 | 0 | +3 | 0 |
| 11 | Increased skills and impart knowledge to local communities | The impact is direct, indirectly, and inductive | 0 | +2 | 0 | +3 | 0 |
| 12 | Occupational Safety and Health impacts | The impact is direct, indirectly, and inductive | 0 | -3 | -1 | -2 | -2 |

| S/ N | Identified Impacts | Description of Impacts | Mobilization phase | Construction Phase | Demobilization Phase | Operation Phase | Decommissioning Phase |
|---------|---|---|-----------------------|-----------------------|-------------------------|--------------------|--------------------------|
| 13 | Community Health, Safety and Security impacts | The impact is direct, indirectly, and inducive | 0 | -3 | -1 | -2 | 0 |
| 14 | Conflicts and grievances | The impact is direct, indirectly, and inducive | 0 | -2 | 0 | -2 | 0 |
| 15 | Impact on gender during employment | The impact is direct, indirectly, partially reversible, cumulative and inducive | -1 | -3 | 0 | -2 | 0 |
| 16 | Population/Labour influx | The impact is direct, indirectly, and inducive | 0 | -3 | 0 | -1 | 0 |
| 17 | Insecurity and theft | The impact is direct, indirectly, and inducive | 0 | -2 | 0 | -1 | 0 |
| 18 | Child labor | The impact is direct, indirectly, and inducive | 0 | -1 | 0 | 0 | 0 |
| 19 | Increase of Admission of Students to MU | The impact is direct, indirectly, and inducive | 0 | 0 | 0 | +3 | 0 |
| 20 | Growth of Trade and Increased Investment | The impact is direct, indirectly, and inducive | 0 | -1 | 0 | +3 | 0 |
| 21 | Production of skilled labor force for implementing various development policies, plans and goals for sustainable social and economic growth of the Nation | The impact is direct, indirectly, and inducive | 0 | -1 | 0 | +3 | 0 |
| 22 | The growth of Banking activities in the project area | The impact is direct, indirectly, and inducive | 0 | -1 | 0 | +2 | 0 |
| 23 | Increased incidences of diseases and ill health | The impact is direct, indirectly, and inducive | 0 | -2 | 0 | -2 | 0 |
| 24 | Increased pressure on social services and utilities | The impact is direct, indirectly, and inducive | 0 | -3 | 0 | -2 | 0 |
| 25 | Health and safety risks due to fire hazards | The impact is direct, indirectly, inducive, and reversible | -2 | -2 | 0 | -2 | -1 |
| 26 | Increased water demand | The impact is indirect, reversible and inducive | 0 | -1 | 0 | -2 | 0 |
| 27 | Increased energy demand | The impact is direct, reversible and inducive | 0 | -1 | 0 | -2 | 0 |

| S/ N | Identified Impacts | Description of Impacts | Mobilization phase | Construction Phase | Demobilization Phase | Operation Phase | Decommissioning Phase |
|------------------------------|--|--|--------------------|--------------------|----------------------|-----------------|-----------------------|
| 28 | Loss of employment and business opportunities | The impact is direct, indirectly, inductive, and reversible | 0 | 0 | 0 | 0 | -3 |
| 29 | Loss of revenue to institutions and the government | The impact is direct, indirectly, inductive, and reversible | 0 | 0 | -3 | 0 | -3 |
| Environmental Impacts | | | | | | | |
| 30 | Loss of vegetation and other natural resources (Energy and water) | The impact is direct, indirectly, inductive and irreversible | -2 | -1 | 0 | 0 | 0 |
| 31 | Impairment of air quality due to dust and gases emission | The impact is direct, indirectly, inductive, and reversible | 0 | -2 | -2 | 0 | -2 |
| 32 | Contamination and /impaired quality of receiving body (land and water) | The impact is direct, indirectly, inductive, and reversible | 0 | -2 | 0 | 0 | -1 |
| 33 | Contribution to Climate Changes | The impact is direct, indirectly, inductive, and reversible | 0 | -1 | 0 | 0 | -1 |
| 34 | Increased Noise level | The impact is direct, indirectly, inductive, and reversible | 0 | -2 | 0 | 0 | -1 |
| 35 | Increased vibration | The impact is direct, indirectly, inductive, and reversible | 0 | -2 | 0 | 0 | -1 |
| 36 | Generation of solid and hazardous wastes | The impact is direct, indirectly, inductive, and reversible | 0 | -3 | 0 | -3 | -1 |
| 37 | Generation of liquid waste | The impact is direct, indirectly, inductive, and reversible | 0 | -3 | 0 | -1 | -1 |
| 38 | Erosion of Exposed Surfaces | The impact is direct, indirectly, inductive, and reversible | -1 | -2 | 0 | 0 | -1 |
| 39 | Loss of visual Aesthetics | The impact is direct, indirectly, inductive, and reversible | 0 | -2 | 0 | 0 | -2 |

| S/ N | Identified Impacts | Description of Impacts | Mobilization phase | Construction Phase | Demobilization Phase | Operation Phase | Decommissioning Phase |
|---------|---|---|-----------------------|-----------------------|-------------------------|--------------------|--------------------------|
| 40 | Increased water pollution | The impact is direct, indirectly, inductive, and reversible | 0 | 0 | 0 | -2 | 0 |
| 41 | Increased Storm Water Generation and Overflow | The impact is direct, indirectly, inductive, and reversible | 0 | 0 | -1 | -1 | 0 |
| 42 | Impact from poor hygienic condition | The impact is direct, indirectly, inductive, and reversible | 0 | -1 | -1 | -2 | 0 |
| 43 | Loss of aesthetic value due to haphazard disposal of demolished waste | The impact is direct, indirectly, inductive, and reversible | 0 | 0 | 0 | 0 | -2 |

KEY

| | | | |
|----|---------------------------|----|---------------------------|
| +1 | Minor positive impact | -1 | Minor negative impact |
| +2 | Moderate positive impacts | -2 | Moderate negative impacts |
| +3 | High positive impacts | -3 | High negative impacts |
| 0 | Negligible | | |

6.3 Possible Potential Impacts during Mobilisation Phase

A. POSITIVE SOCIAL IMPACT

6.3.1 Job Creation and employment opportunities

During this phase people will be employed by the contractor to do mobilisation works such as quarrying, material extraction and transportation activities etc. This will increase the income to all those who have the opportunity to be employed by the contractor. The project intends to recruit a qualified contractor who will employ about 130 unskilled and semiskilled laborers from the project region and about 20 skilled laborers from outside the project area. This illustrates an indirect impact when unskilled and semiskilled labor are obtained locally, whereas skilled labor may come from a regional or even international pool. The project offers temporary employment possibilities that run the course of the mobilisation phase.

Moreover, as the project workforce's need for a variety of goods and services rises, the possibility of self-employment options is highlighted. Local food sellers, operators, security guards, engineers, OHS officers, accountants, procurers, and casual laborers may become more in demand as a result.

In addition to that, this development project will generate employment across various sectors, including construction, hospitality, healthcare, and administration, thereby contributing to the economic growth of the region. The villages of Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima will experience direct and indirect effects from this project. The construction phase will create job opportunities for local residents, providing income and improving their standard of living. Additionally, the completed facilities will require staff for maintenance, administration, and support services, further enhancing employment prospects. The local economy is likely to benefit from increased business activities, such as services catering to students and staff. These effects are immediate, localized, temporary, and reversible because they depend on the number of workers needed for the project during the mobilisation stage.

6.3.2 Increased Business/trade opportunities

Local entrepreneurs engaged in small-scale enterprises, such as food vendors, accommodation providers, and shop owners, stand to benefit significantly. The influx of workers, including those from the contracting company and laborers from Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages, and other neighboring communities, creates a ready market for goods and services. This development is likely to stimulate economic growth, creating a positive impact on the local economy.

The persons from Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages will experience both direct and indirect effects due to this project. The influx of students, staff, and visitors is likely to boost the local economy through increased demand for goods and services, such as accommodation, food, and transportation. Local businesses may witness growth as they cater to the needs of the campus community.

This impact is direct, localized, and short-term in nature, as it directly influences local businesses within the immediate vicinity of the project area. The heightened demand for food, accommodation, and various goods from these enterprises is expected to stimulate economic growth for small businesses, particularly in Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages, contributing to the local economy during the initial phases of project

implementation. The impact is reversible as it corresponds to the mobilization phase and may diminish once the project concludes.

6.3.3 Increased Revenues to local authorities

During the mobilization phase, the proposed establishment of academic facilities and infrastructure at MU-Tanga Campus is expected to result in increased revenues to local authorities. This financial impact is likely to be immediate and beneficial for the local government.

In the social aspect, residents of Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima Villages will experience both direct and indirect effects. Direct impacts include potential employment opportunities arising from the construction and subsequent operation of the academic block, hostels, cafeteria, dispensary, staff houses, and reservoir tank. This could lead to improved livelihoods and economic well-being for individuals in these communities. However, indirect impacts may include changes in social dynamics, cultural practices, and community relationships due to the influx of new infrastructure and activities.

The impact is localized to the immediate vicinity of the proposed project site, with both short-term effects during construction and medium to long-term effects during the operational phase. While some impacts may be reversible, such as temporary disruptions during construction, others may be irreversible, especially those related to social and cultural changes. The overall significance of the impact is likely to be moderate, considering the localized nature of the project and its potential positive and negative effects on the communities. Cumulatively, these changes may contribute to the broader regional development but are not expected to have a significant national impact.

B. NEGATIVE SOCIAL IMPACT

6.3.4 Food Insecurity and inflation of prices on other social services

The project is likely to exacerbate existing issues of food insecurity and contribute to inflation of prices on other social services. The influx of construction activities and the mobilization of resources may lead to increased demand for local goods and services, potentially driving up prices and impacting the affordability of essential items. This, in turn, could intensify food insecurity among vulnerable communities and create economic challenges for accessing basic social services. Specifically, the students from Rubawa Primary School, as well as residents of Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages, will likely experience social impacts. The construction activities may disrupt local routines, affecting the daily lives of these communities. Increased prices may strain household budgets, especially for families with limited financial resources, potentially leading to a decline in the overall well-being of the affected populations.

The impact is indirect, localized, and short to medium-term. While the project may indirectly contribute to food insecurity and inflation in the affected areas, the effects are localized to the communities in proximity to the construction site. However, if not properly managed, the cumulative effects of such disruptions could become significant over time, necessitating careful consideration of mitigation measures to minimize adverse consequences on the affected communities.

6.3.5 Disruption of Social-Economic Activities and Services

The project is likely to cause a brief disruption of social-economic activities and services in the affected region. The construction and development activities may temporarily impact local businesses, transportation, and daily routines. Specifically, residents of Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages will experience direct and localized social effects. The construction phase may lead to the displacement of some community members, changes in social dynamics, and potential strain on local resources. The impact is expected to be moderate, short-term, and reversible, with the potential for long-term positive outcomes once the infrastructure is established. However, the overall impact is significant in the short term, careful planning and mitigation measures can minimize long-term negative effects on the social fabric of the affected villages.

6.3.6 Increased level of crimes

The influx of workers, construction activities, and the overall transformation of the area may lead to a rise in criminal activities such as theft, vandalism, and other related incidents. This impact is likely to be indirect and localized, affecting the communities of Rubawa Primary School, Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages.

In a social aspect, the students of Rubawa Primary School and residents of the aforementioned villages may face challenges related to security and safety. The increased crime rates could create a sense of insecurity, impacting the well-being and daily lives of the local population. It is crucial for project planners and authorities to implement measures that address these social concerns, such as enhancing local law enforcement, community policing, and public awareness programs.

Also, the significance of this impact is likely to be moderate, as it may be mitigated with appropriate security measures. Nevertheless, it is essential for project stakeholders to monitor and manage the situation to prevent any long-term or cumulative negative effects on the affected communities.

6.3.7 Safety and Health risks

During the mobilization phase of the proposed establishment at MU-Tanga Campus in Pangarawe area, Gombero Village, the Safety and Health risks are significant considerations. Construction activities often involve heavy machinery, excavation, and potential exposure to hazardous materials, leading to increased risks for accidents and occupational health issues. The mobilization phase, characterized by intense construction and groundwork, may pose direct and localized impacts on the safety and health of workers, as well as indirect effects on the surrounding communities.

The students of Rubawa Primary School and residents from Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages will likely experience social disruptions during the mobilization phase. Noise, dust, and increased traffic could disrupt daily activities, impacting the quality of life and well-being of the local population. The nature of construction work may also require temporary relocations or adjustments to daily routines, affecting community dynamics.

In terms of the environmental and social impact assessment, the safety and health risks during mobilization are considered direct, localized, and short-term. While these impacts are significant for the workers and immediate surroundings, they are generally reversible once the construction phase concludes. However, the social impacts on the communities, such as disruptions to daily life

and potential temporary relocations, may have lingering effects, categorizing them as medium-term social impacts. Hence, it's crucial for the project planners to implement robust safety measures to mitigate risks during construction and to engage with the affected communities to address their concerns. Monitoring and managing these impacts will be essential to ensure the overall success and sustainability of the proposed development.

6.3.8 Increased Traffic and road accidents

This surge in traffic can be attributed to the influx of construction vehicles, machinery, and workers commuting to and from the site. With the heightened activity, roads in the vicinity may experience congestion, particularly during peak hours, leading to potential delays for commuters and local residents. Moreover, the presence of heavy machinery and construction vehicles navigating through local roads poses an increased risk of accidents, not only to construction personnel but also to pedestrians and other road users.

This impact will have direct repercussions on the daily lives of individuals residing in Rubawa Primary School and the villages of Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima. Measures to mitigate these impacts, such as implementing traffic management plans, enforcing speed limits, and enhancing road signage, are crucial to ensuring the safety of both workers and the surrounding community during the construction phase of this development project.

In terms of the nature and scope of the impact, it is both direct, localized, short-term, reversible, occurring during the mobilization phase of the project. However, the potential for road accidents may have medium-term consequences if not effectively managed.

C. NEGATIVE ENVIRONMENTAL IMPACT

6.3.9 Loss of vegetations due to exploitation of borrow pits, quarries, and other natural resources

The exploitation of borrow pits, quarries, and other natural resources for construction purposes may lead to a loss of indigenous trees, disrupting the delicate ecological balance in the region. The direct impact on the environment is significant, as it involves the extraction of resources and alteration of the landscape. In a social context, students from Rubawa Primary School and residents of Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages are likely to experience indirect and localized effects. The noise, dust, and potential displacement caused by construction activities could disrupt the daily lives of these communities, affecting their well-being and traditional activities.

The impact is medium-term and reversible, as the construction phase will eventually conclude, but the social disruptions may persist for a considerable duration.

Moreover, the cumulative effect of such projects in the region, when combined with other development initiatives, could lead to long-term changes in the local social fabric and environment. It is crucial for stakeholders to consider mitigation measures, sustainable resource management, and community engagement to minimize adverse effects and ensure the long-term resilience of both the environment and the affected communities.

6.3.10 Contamination and /impaired quality of receiving body: land and water

The construction and subsequent operation of the academic block, student hostels, cafeteria, dispensary, staff houses, and reservoir tank at MU-Tanga Campus may lead to soil and water pollution due to the use of construction materials, waste disposal, and potential discharge of effluents. This contamination can affect the surrounding ecosystems, posing risks to environmental and the overall ecological balance.

In a social aspect, the project's impact on students from Rubawa Primary School and residents of Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages is substantial. The potential contamination of water sources could jeopardize the communities' access to clean water, leading to health concerns and reduced quality of life. The construction activities may also disrupt the daily lives of local residents, impacting their social dynamics and cultural practices.

The environmental impact is both direct and indirect, localized to the Pangarawe area and neighboring villages. The contamination and impaired quality of land and water are likely to be moderate but have the potential for long-term consequences if not adequately addressed. The impact is reversible to some extent through proper mitigation measures, but certain irreversible changes to the ecosystem may occur. In terms of significance, the impact is considered significant given its potential to affect the well-being of the local communities and the environment. The cumulative effect of construction and operational activities adds to the overall impact, making it crucial to implement effective environmental and social management strategies to minimize adverse effects.

6.3.11 Generation of noise and dust

The noise and dust will likely result from the operation of heavy machinery, construction equipment, and vehicle traffic in the area. This impact is direct, high, and significant, as it directly affects the surrounding environment and the nearby communities from Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima Villages.

The noise pollution can disturb environment and disrupt the daily activities of residents, while the dust can cause respiratory problems and soil degradation. Although these effects may be mitigated during the construction period, they could persist in the medium to long term if not properly managed. However, with appropriate measures, such as using dust control methods and scheduling noisy activities during less sensitive times, the impact can be minimized, making it reversible to some extent.

6.3.12 Increased Air pollution and climate change

The construction and development activities in Rubawa Primary School and surrounding villages like Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima may result in increased air pollution, mainly due to emissions from construction machinery and transportation. This could worsen climate change by releasing pollutants like particulate matter and greenhouse gases. The social and environmental impacts are multifaceted, including noise pollution, disruption of local ecosystems, and potential displacement of indigenous trees. Residents, particularly vulnerable groups like children and the elderly, may suffer from respiratory issues and other health concerns due to increased air pollution.

However, the immediate impact is localized, long-term consequences are possible, especially regarding air quality and climate patterns. Although some environmental impacts may be reversible with proper mitigation measures, the long-term effects of climate change could be

irreversible. It's crucial to consider both the immediate and long-term consequences on the environment, climate, and community well-being, as well as the cumulative effects of proposed developments within the broader regional and national environmental framework.

6.4 Possible Potential Impacts during Construction Phase

A. POSITIVE SOCIAL IMPACTS

6.4.1 Job Creation and creation of opportunities

The influx of construction activities will generate employment opportunities, directly benefiting local communities. However, the students of Rubawa Primary School, as well as residents from Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages, will experience a mix of social and environmental effects. Socially, the project may bring about positive changes through increased access to educational facilities, healthcare services, and potential economic opportunities. On the environmental front, there could be localized and potentially moderate impacts due to construction activities, such as noise, dust, and alterations to local ecosystems.

The impacts are likely to be direct and short-term during the construction phase. However, the long-term impact on the social fabric of the communities and the environment may vary. The reversibility of the environmental impact depends on the mitigation measures employed, while the social impact is likely to be more enduring. The cumulative effect, considering the overall growth and development, could be significant in the regional context, contributing to the transformation of the Mkinga District in the Tanga Region.

6.4.2 Income to Local Suppliers and Service Providers

During the construction phase of the proposed establishment at MU-Tanga Campus in Pangarawe area, Gombero Village, the income generated for local suppliers and service providers will have a profound impact on the socio-economic landscape. Local businesses providing construction materials, equipment rental services, and labor will experience increased demand, leading to a boost in their revenue. This, in turn, will positively affect the livelihoods of individuals and families associated with these businesses. However, the impact is localized and direct, as it primarily benefits the immediate vicinity of the construction site.

In terms of the social and environmental aspects, students from Rubawa Primary School and residents of Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages will be affected. Socially, the influx of students and staff may lead to increased interaction and cultural exchange, fostering community integration. However, it may also bring challenges such as increased traffic and noise levels, potentially impacting the daily lives of the local residents. Environmentally, the construction may result in short-term disruptions to local ecosystems, noise pollution, and waste generation. The long-term environmental impact depends on the sustainability measures adopted during and after construction.

Overall, the project's impact is direct, localized, and predominantly short-term during the construction phase. The social effects are mixed, with potential positive and negative outcomes. The environmental impact is moderate but reversible with appropriate mitigation measures. The significance of these effects depends on the extent of community engagement, environmental management practices, and the implementation of sustainable measures. The cumulative impact of this project, when considering its construction and operational phases, could be significant, emphasizing the need for careful planning and management to minimize adverse effects.

6.4.3 Increased skills and impart knowledge to local communities

The engagement of the community, particularly students from Rubawa primary school, and residents from Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages, will result in a direct and localized positive impact. The construction project is expected to provide employment opportunities, skill development, and knowledge transfer to individuals in these communities. The direct engagement of local residents will foster a sense of ownership and pride, leading to improved social cohesion. Additionally, the project is likely to generate environmental awareness, with a focus on sustainable construction practices and resource management.

From an environmental standpoint, the impact is predominantly indirect and localized. However, these effects are expected to be reversible once the construction is complete. The project's focus on sustainable development and environmental best practices will minimize any long-term or irreversible environmental impact. The cumulative effect of increased skills and knowledge in the community, coupled with environmentally conscious practices, is expected to contribute significantly to the overall well-being of the region. In the medium to long term, the community is likely to experience enhanced social and economic development, with the project serving as a catalyst for positive change.

6.4.4 Improved quality of life and living standard.

The proposed establishment in Pangarawe area, aimed at establishing an academic block, two students' hostels, cafeteria, dispensary, four staff houses, and a reservoir tank at the MU-Tanga Campus is expected to bring about a significant improvement in the quality of life and living standards during the construction phase. This positive impact will be manifested through job creation, skill development, and economic opportunities for the local community. As the project progresses, students from Rubawa Primary School, along with residents from Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages, will experience social and environmental changes. The social impact will be direct and localized, as these communities will witness increased accessibility to education and healthcare facilities, fostering community development. On the environmental front, the impact is likely to be indirect and moderate, with potential changes in local ecosystems due to construction activities. However, the long-term benefits, such as an educated workforce and improved healthcare, will contribute to sustainable development. The impacts are reversible with proper planning and mitigation measures in place. Overall, the project is expected to have a significant and positive cumulative effect on the well-being of the local population and the environment.

B. NEGATIVE SOCIAL IMPACTS

6.4.5 Prevalence of Communicable diseases

The construction projects can create conditions favorable for disease spread due to heightened construction activity and population influx, affecting Rubawa Primary School students and residents of Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages. This influx strains healthcare facilities, alters water sources, and increases human density, elevating disease transmission risks. The impact is indirect, localized, moderate, and short to medium-term, resulting from construction-related changes rather than activities themselves.

However, some effects may reverse post-project completion, others like disease prevalence changes could persist. The significance of the impact is moderate, posing risks to public health and social well-being, though not severe or irreversible. However, the cumulative impact, when

combined with subsequent project phases, may lead to substantial and lasting consequences, emphasizing the need for comprehensive mitigation measures.

6.4.6 Occupational Safety and Health Impacts

The construction activities may expose workers to potential hazards such as falls, exposure to hazardous substances, noise pollution, and heavy machinery accidents. Adequate safety measures, including personal protective equipment, training programs, and regular inspections, should be implemented to mitigate these risks and ensure the well-being of the construction workforce.

In terms of social and environmental impacts on the local communities, students from Rubawa Primary School and residents of Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages will likely experience both direct and indirect effects. Direct impacts may include changes in noise levels, increased traffic, and altered landscape aesthetics due to construction activities. Indirect impacts may manifest in improved educational opportunities for local students, enhanced healthcare services through the construction of a dispensary, and potential economic benefits from increased employment opportunities during and after construction.

The social impact on the communities is expected to be more regional and may extend beyond the construction phase. The establishment of educational facilities, staff houses, and other amenities could contribute to the long-term development of the region by providing improved access to education and healthcare. The cumulative effects of the project, when viewed in conjunction with other regional developments, may be significant in promoting overall socio-economic growth.

6.4.7 Community Health, Safety and Security Impacts

The construction activities proposed in the area have the potential to significantly impact the nearby communities, including Rubawa Primary School students and residents of several villages such as Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima. These impacts include increased dust, noise, and vehicular traffic, which could pose health and safety risks. From a social perspective, disruptions in daily routines for students and changes in social dynamics for residents are anticipated. The construction of a dispensary might also affect healthcare accessibility temporarily. The influx of temporary workers could lead to negative impacts such as uncontrolled movement, difficulty in identifying strangers, and an increased risk of diseases like COVID-19 and HIV/AIDS.

Additionally, negative issues such as increases in local prices, crime, prostitution, and alcohol abuse may arise. The presence of a large number of workers may increase the spread of communicable diseases. The impacts are expected to be short-term during the construction phase but could have medium to long-term consequences if not adequately addressed. The cumulative effect of multiple construction activities could amplify the overall impact on the community and the environment. Risks related to public safety and construction workers may increase during the construction phase, including increased traffic volume leading to higher road accident risks, especially on local roads. Residents of local settlements along these roads will be exposed to increased risks for accidents due to the passage of construction vehicles and machines. Mitigation measures will play a crucial role in determining the significance of these impacts. The sources of harmful effects to the general public are identified in Table 6.6.

Table 6.6: Source of the harmful effects on health and community safety

| Type of harmful effect | Sources of the threat |
|------------------------|---|
| Accident risk | <ul style="list-style-type: none"> ○ During excavation work ○ Movements and operations of heavy equipment ○ Access to danger zones ○ Transport, handling and storage of the materials ○ Concrete batching and mixing plant |
| Indirect health risk | <ul style="list-style-type: none"> ○ Environmental pollution ○ Contamination of water or/and food |

6.4.8 Conflicts and grievances

During the Construction phase of the proposed development in Pangarawe Area, Gombero Village, the potential for conflicts and grievances arises due to the transformation of the local landscape and disruption of daily life. The noise, dust, and increased traffic associated with construction activities may lead to tensions among the residents and project stakeholders. The students of Rubawa Primary School, along with the inhabitants of Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages, will likely be directly affected socially. The construction may disrupt the normalcy of their routines, potentially causing discomfort and dissatisfaction within these communities.

The impact can be considered localized, as it primarily affects the immediate vicinity of the construction site. While the disturbances are expected to be short-term during the construction phase, the social consequences may linger, depending on the effectiveness of mitigation measures. The impact is reversible once the construction is completed, but the social relationships and dynamics within the affected communities may experience lasting changes.

Considering the significance of the impact, it is crucial for the project planners and implementers to proactively engage with the local communities, addressing concerns, and implementing measures to minimize disruptions. Failure to manage these conflicts and grievances could lead to long-term social implications and strain relationships between the project and the affected communities.

6.4.9 Gender Discrimination

The project's implementation may exacerbate existing gender disparities in the local community and within the academic institution. The construction and operation phases could potentially limit women's participation and access to employment opportunities, especially in traditionally male-dominated roles such as construction labor and managerial positions. Also, concerns arise about potential gender discrimination due to entrenched societal norms favoring men in employment and decision-making. This bias could lead to unequal job distribution, wage gaps, and limited female involvement in key project decisions, perpetuating existing gender disparities and hindering women's empowerment. This impact extends to students of Rubawa Primary School and residents of Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima Villages

Moreover, the lack of gender-sensitive facilities and services in the project plan might adversely affect female students' access to education and healthcare, particularly if their needs are not adequately addressed in the design of hostels, cafeterias, and dispensaries. Without proactive measures to mitigate these impacts, the project risks perpetuating unequal power dynamics and

hindering women's empowerment and social inclusion in the region. Therefore, a comprehensive gender analysis and the integration of gender-responsive strategies are essential to ensure that the project fosters gender equality and contributes positively to the social fabric of the community. This impact is direct, indirect, localized, cumulatively. However, the significance of these impacts varies based on individual perspectives, emphasizing the need to minimize negative consequences and maximize positive outcomes for affected communities.

6.4.10 Influx of people

The construction phase is likely to witness an increased population in the immediate vicinity, affecting the social fabric of the surrounding communities, including Rubawa Primary School and residents from Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages. The direct impact will be localized, primarily affecting these specific communities in the short term. Students from Rubawa Primary School may experience disruptions to their daily routines, and residents of the mentioned villages may face challenges related to increased noise, traffic, diseases and changes in the social dynamics of their communities. While the impact is direct and localized, it is also reversible, as the construction phase is a temporary disturbance.

The overall significance of the impact on these communities is likely to be moderate, considering the specific and temporary nature of the construction-related influx of people. However, the project planners should implement mitigation measures to minimize any potential negative effects on the social well-being of the affected communities. Additionally, the cumulative impact of the construction phase should be carefully monitored to ensure the overall well-being and resilience of the communities involved.

6.4.11 Insecurity and theft

During this phase, the influx of construction materials, equipment, and the presence of a large workforce may lead to increased vulnerability to theft and insecurity. This can affect the local communities, including students from Rubawa Primary School and residents of Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages. The social aspect of this impact is direct, localized, and short-term. Students may face challenges in terms of safety, and local residents may experience disruptions to their daily lives due to increased security concerns. The insecurity and theft issue during the Construction phase can be considered reversible and insignificant in the long run, as it is expected to diminish once the construction is completed. However, the immediate impact on the affected communities during the short-term construction period should be addressed through appropriate security measures and community engagement initiatives. It is crucial to implement security protocols to safeguard both the construction site and the surrounding areas, mitigating the negative effects on the local population. Additionally, efforts should be made to communicate and collaborate with the affected communities to ensure that their concerns are heard and addressed, fostering a positive relationship between the project and the local residents.

6.4.12 Food Insecurity

The influx of construction workers and the utilization of nearby resources may lead to disruptions in local agricultural activities, affecting the livelihoods of communities in Rubawa Primary School, Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages. This impact is direct, as it directly influences the availability and accessibility of food resources. The social aspect of this impact is profound, as students from Rubawa Primary School and residents of the

aforementioned villages may experience heightened food insecurity due to the changes in their local environment.

The impact is localized to the immediate vicinity of the construction site. It is expected to be of moderate intensity, affecting the affected communities during the construction phase, which is a short-term impact. However, if not mitigated, the long-term consequences may exacerbate food insecurity. This impact can be considered significant for the affected communities. The cumulative effect of multiple construction activities in the region may exacerbate the overall impact on food security.

6.4.13 Child labor

During construction phase of the proposed development in MU-Tanga Campus, poses a potential risk of child labor, a social impact that requires vigilant monitoring and preventive measures. Child labor could arise from the demand for cheap labor during construction, affecting the well-being and education of children in the surrounding areas. Specifically, students from Rubawa Primary School, and residents from Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages may face disruptions in their daily lives and potential economic pressures.

The social impact is direct and localized, as it directly affects the immediate communities surrounding the construction site. The consequences are significant and potentially irreversible, as the exploitation of child labor can have lasting effects on the physical and mental development of children. In the short term, the construction phase may provide temporary employment opportunities, but in the long term, it risks perpetuating a cycle of poverty and hindering the educational progress of the affected children. The overall impact is deemed significant and calls for measures to mitigate child labor and ensure the well-being of the community members. The cumulative effects associated with this impact could extend beyond the construction phase, impacting the social fabric of the communities involved.

B. NEGATIVE ENVIRONMENTAL IMPACTS

The ESS3 ‘Resource Efficiency and Pollution Prevention and Management’ recognizes that development projects often generate pollution to air, water, and land, and consume finite resources that may threaten people, ecosystem services and the environment. Impacts caused by pollution are described hereunder.

6.4.14 Impairment of air quality due to dust and gas emission

The construction activities, such as earthmoving, excavation, and transportation of construction materials, can generate significant amounts of dust particles and pollutant gases, leading to elevated levels of airborne particulate matter. This impact is likely to affect the surrounding areas, including Rubawa Primary School, Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages.

The students of Rubawa Primary School and the residents of the aforementioned villages may experience both social and environmental consequences. Socially, the increased dust in the air could pose health risks, particularly for vulnerable populations such as children, elderly individuals, and those with respiratory conditions. Additionally, the construction-related dust may disrupt daily activities and contribute to discomfort among the local communities. Environmentally, the dust can settle on vegetation, bodies of water, and soil, potentially impacting

local ecosystems. The fine particles may have negative effects on plant health, water quality, and soil fertility.

The impact is direct, as it directly results from the construction activities, and it is localized to the immediate vicinity of the Pangarawe area. The duration of this impact is short-term, occurring primarily during the Construction phase. However, if proper mitigation measures are not implemented, the impact could extend into the medium-term. The impairment of air quality due to dust is considered reversible if appropriate dust control measures are applied and if the construction activities cease. While the impact is significant in terms of local health and environmental concerns, it is likely to be manageable with proper mitigation strategies. Overall, this impact is of moderate significance, and its cumulative effects can be minimized through effective dust control and community engagement measures.

6.4.15 Increased Noise level

The increased noise level during the construction phase of the proposed establishment at Mzumbe-Tanga Campus in Pangarawe area, Gombero Village, Mkinga District, Tanga Region, is anticipated to have significant and direct impacts on the surrounding communities. Students from Rubawa Primary School, as well as residents of Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages, will likely experience disruptions in their daily lives due to the elevated noise levels. This impact is localized, as it primarily affects the immediate vicinity of the construction site. The noise pollution may lead to disturbances in classrooms at Rubawa Primary School, affecting students' concentration and academic performance. Residents in the nearby villages may also experience discomfort and potential health issues.

From an environmental perspective, the increased noise level can disturb local environment, potentially leading to short-term disruptions in the behavior and habitats in the area. The impact is likely reversible once the construction is completed, making it a short-term effect. However, the social impact on students' education and the well-being of the local communities could be considered moderate or significant, depending on the duration and intensity of the noise.

6.4.16 Increased vibration

During the construction phase of the proposed establishment at MU-Tanga Campus in the Pangarawe Area, heavy machinery and activities such as excavation are expected to generate increased vibration, which may have environmental and social impacts on nearby communities. Residents of Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages, as well as students from Rubawa Primary School, are likely to experience direct and localized effects, such as disturbances to daily life and the learning environment. Socially, construction-related noise and vibration could cause discomfort, stress, and potential health concerns. Environmentally, vibration may lead to soil compaction, damage to structures, and disruptions to ecosystems. While primarily short-term and reversible, the cumulative effects could have long-term consequences on the community's social fabric and local environment. Mitigation measures are essential to minimize adverse effects during and after construction, emphasizing the importance of careful planning and community engagement.

6.4.17 Impact on climate change

Construction activities will result in emissions from fuel-powered equipment, containing pollutants like carbon dioxide, nitrogen oxides, sulphur dioxides, and particulate matter, contributing to climate change and environmental degradation. This indirect but significant impact can affect the region on a large scale. Students and residents of Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages will experience direct impacts such as noise and dust, as well as potential long-term changes in the local economy and social dynamics. Habitat disruption and water pollution are also concerns, but reversible with proper mitigation measures. Socially, the project may create jobs and improve infrastructure but could also lead to displacement or changes in traditional lifestyles. These social impacts are expected to be both short-term and medium-term, with some persisting long-term.

6.4.18 Generations of Solid Wastes

Currently, in the area for the proposed establishment there is no waste. However, during construction phase of this project may be the source of an increasing waste materials (which may be hazardous and non-hazardous at the area where the project is taking place, activities are more likely to generate waste in form of;

- Material wastes such as sand, aggregates, concrete, timber, nails, roofing sheets, steel reinforcement bars, barbed wire (for fencing works resulting from mobilisation and construction works).
- Packaging materials such as cement bags, plastic bags, timber and paper boxes, including cushioning materials (to protect packaging contents).
- Hazardous substances such as paints, scrap metals, cement, adhesives and cleaning solvents.
- Plastic bottles from drinking water.
- Food wastes

This may be accentuated by the fact that some of the waste materials contain hazardous substances while some of the waste materials including metal cuttings and plastic containers are not biodegradable and can have long-term and cumulative effects on the environment. These wastes can cause further pollution and will also pose a problem to human health if not well disposed. Also, these wastes may contaminate land or be washed into local surface and ground water resources and impair the quality of these receiving bodies. Other associated impacts include flies and increased bird population (attracted by food waste). This impact is considered to be local, negative, short term and high significance.

6.4.19 Generations of Liquid Wastes

The generations of liquid wastes generated during construction, if not managed properly, may lead to water pollution and soil contamination, affecting the local ecosystem. This could potentially harm aquatic life, degrade water quality, and pose risks to the health of the surrounding environment. In terms of social impact, the communities near the project site, including Rubawa Primary School and villages such as Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima, may face challenges related to water quality and availability. The construction phase could disrupt local water sources, impacting the daily lives of residents who depend on them for domestic use and agriculture. Additionally, the noise and dust generated during construction may lead to temporary inconveniences for the nearby communities.

The impact is both direct and localized, affecting the immediate vicinity of the construction site. The environmental effects are likely to be reversible if proper waste management practices are implemented, while the social impacts may persist in the short to medium term until the construction is completed. The significance of the impact is moderate, considering the potential disruptions to water sources and the temporary inconvenience to the local communities. Although the impact is primarily localized, there may be indirect repercussions on a regional scale if downstream water bodies are affected.

6.4.20 Erosion of Exposed Surfaces

This refers to the gradual wearing away of soil and other materials from the construction site due to exposure to natural elements such as wind and water. The clearing of land, excavation, and alteration of topography during construction can exacerbate this erosion process. This impact is direct, as it directly results from the construction activities taking place on-site. It is also considered moderate in significance, as while erosion is a common occurrence during construction, proper erosion control measures can mitigate its effects. The impact is expected to be short-term, as erosion control measures can be implemented during and after construction to prevent further degradation. However, if not properly managed, erosion can lead to long-term consequences such as soil degradation and habitat destruction, making it potentially irreversible if left unchecked. Additionally, construction activities may induce erosion in surrounding areas, further exacerbating the impact. Therefore, proactive measures to address erosion are crucial to minimize its negative effects on the environment and surrounding communities.

6.4.21 Loss of Visual Aesthetics

The introduction of new academic structures, hostels, a cafeteria, a dispensary, staff houses, and a reservoir tank may disrupt the existing landscape and alter the visual appeal of the natural surroundings. This could include changes to the skyline, greenery, and overall ambiance of the area. The social and environmental implications on the nearby communities are multifaceted. Students from Rubawa Primary School and residents of Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages might experience both direct and indirect impacts. The direct effects could involve increased noise, dust, and traffic during construction, potentially affecting the daily lives of the local population. Indirectly, the altered visual landscape might lead to a decrease in the aesthetic value of the area, impacting the overall well-being of the communities.

In terms of geographic scale, the impact is likely to be localized during the Construction phase, primarily affecting the immediate vicinity of the proposed development. The nature of the impact is expected to be moderate, as it involves changes to the visual aspects of the landscape rather than more severe alterations to the environment. The timeline of the impact is generally short-term, corresponding to the construction period. However, the altered visual aesthetics may have long-term consequences, persisting beyond the immediate construction phase. While the impact is reversible to some extent (through potential landscape restoration efforts post-construction), the long-term alterations may have irreversible aspects, especially if mature trees are removed or if vegetation is significantly disturbed.

6.4.22 Loss of vegetations

The construction activities, including excavation, land clearing, and infrastructure development, will result in the removal of vegetation cover in the project area. This loss of vegetation will disrupt the local ecosystem, leading to soil erosion, environmental destruction. Additionally, the removal of vegetation can exacerbate issues such as soil degradation and water runoff, further impacting the surrounding environment and communities including students from Rubawa Primary School and people residing in Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages. However, some efforts may be made to mitigate this impact through reforestation or landscaping, the loss of vegetation will have lasting effects on the ecosystem of the project site and its surroundings.

6.4.23 Impact on natural resource (Energy and water)

The construction activities will require a considerable amount of energy, primarily for powering construction equipment, lighting, and other machinery. This increased demand for energy may lead to higher emissions of greenhouse gases and air pollutants, contributing to environmental degradation and climate change.

Moreover, the construction phase will require a substantial amount of water for various purposes such as mixing concrete, dust suppression, and worker sanitation. This increased demand for water could strain local water resources, potentially leading to water shortages or conflicts with local communities and ecosystems.

Overall, the impact on natural resources during the construction phase of this project is direct, significant, and short to medium-term. However, some of the impacts may be reversible once construction is complete, such as the immediate strain on local water resources, others, such as the emissions of greenhouse gases, may have long-term and irreversible effects on the environment. Additionally, the construction activities may induce further environmental impacts, such as habitat fragmentation and soil erosion, further exacerbating the project's overall impact on the environment.

6.5 Possible Potential Impacts during Demobilisation Phase

There will be need to demolish the temporary structures that will be used for storage and pit latrines for the construction workers. The construction rubble and construction wastes will have to be cleared from the site in readiness for the operation phase of the project.

A. POSITIVE SOCIAL IMPACT

6.5.1 Reduced noise levels

The heavy machinery and the 150 construction workers will leave the site thereby reducing the amount of noise from the project site. The reduced noise levels are particularly beneficial for the local residents, including students from Rubawa Primary School and people residing in Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages. Socially, this impact directly affects the well-being of the community by creating a more peaceful environment conducive to learning, daily activities, and overall quality of life. The reduction in noise pollution is a direct and localized effect, specifically benefiting the immediate vicinity of the proposed project.

In terms of the environmental and social impact, the reduced noise levels contribute to the well-being of the community, fostering a more pleasant living and learning environment. The impact is

direct, as it directly influences the local noise levels, and it is localized, as it primarily affects the immediate vicinity of the project. The significance of this impact is moderate, as it enhances the quality of life for the local residents but may not have broader implications beyond the project's immediate surroundings. The effect is short-term and reversible, as the noise reduction is contingent on the continued implementation and maintenance of the project. Overall, this aspect of the project demonstrates a positive contribution to the local community's social and environmental conditions.

B. NEGATIVE SOCIAL IMPACT

6.5.2 Loss of employment

Once construction of the project is finished, all construction workers, including 150 individuals from Rubawa Primary School and residents of Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages, face unemployment. This demobilization phase involves reducing or terminating project-related activities, impacting the local workforce and their livelihoods. While the project may enhance educational and healthcare opportunities, the loss of employment could lead to economic challenges and social unrest. The impacts are concentrated around the project site, with the loss of employment having a significant localized effect. These impacts vary in duration, with employment loss likely short-term but environmental impacts potentially lasting into the medium term. Some environmental effects can be mitigated, but others, like habitat disruption, may be irreversible.

6.5.3 Loss of business opportunities

The construction project in Pangarawe is poised to disrupt the livelihoods of local traders and small-scale entrepreneurs, affecting their income streams. These individuals, who rely on selling construction materials and food to workers, face potential displacement or business interruptions. The repercussions extend beyond economic losses, as the project threatens to hinder the growth of community enterprises. Moreover, students of Rubawa Primary School and residents of neighboring villages like Gombero and Vunde Manyinyi could experience social disruptions due to altered routines and income sources.

However, the environmental impact, characterized by noise and dust pollution, is expected to be short-term, it necessitates effective mitigation measures. Although the repercussions are localized, they are significant, particularly for businesses and communities in the immediate vicinity of the project site. However, with appropriate planning and mitigation strategies, such as dust control and noise reduction, the adverse effects can be managed. Ultimately, once construction is completed and the community adjusts to the new facilities, the loss of business opportunities and social disruptions are expected to be reversible in the long term.

B. NEGATIVE ENVIRONMENTAL IMPACTS

6.5.4 Dust and noise pollution from demolishing works

In the event of future rehabilitations and upgrading, the building needs to be demolished necessitating disposal of demolition waste. The noise pollution and air quality will be most affected during the demolition work with the emission of dust particles from machinery like excavators, electric grinders and mixer. The continuous demolition works will release airborne particles, contributing to dust pollution, while the machinery and equipment used in the process will generate substantial noise.

This impact is direct, localized, and short-term. The students of Rubawa Primary School and the residents of Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages will be affected socially and environmentally. The noise pollution may disrupt daily activities, affecting the overall well-being of the community. Additionally, dust pollution poses health risks, especially to vulnerable groups such as children and the elderly. The impact is reversible once the demolition phase is completed, but mitigation measures should be implemented to minimize adverse effects on the local population. In the long term, the construction of new facilities is likely to bring positive social and economic benefits to the region, making the overall impact significant but with short-term localized negative consequences.

6.6 Possible Potential Impacts during Operations Phase

During operation phase there are number of effects, these effects will affect the environment of the vicinity as described below:

A. POSITIVE SOCIAL IMPACT

6.6.1 Increase of admission of students to MU

The proposed project will provide adequate academic facilities to academic institutions, people and the country at large hence number of students enrolled at MU will be increased. These will increase admission of students from high schools and other colleges as a result access to higher education will be enhanced for the benefit of the country. Also, the proposed project components shall provide adequate and conducive space for training, seminars, workshops etc. This impact is high, national and will be long term.

6.6.2 Increase of revenue to MU

MU will increase students' enrolment which in return will increase revenues through university fees. This will increase academic institution's financial standing which will enhance good governance and efficient running of the Universities/colleges. Thus, the goals of academic institutions to become center for seeking knowledge and disseminating it to a wide spectrum of beneficiaries at national and regional levels are going to be fully realized. This impact is high, national and will be long term.

6.6.3 Job creation

Jobs to be created during the operation phase of the project can be divided into two (2) categories: direct and indirect jobs; their volume depends strongly on the level of operational activities. Direct jobs are those related to operational services, teaching, Indirect jobs are those created by the positive impacts of the institution to economic sectors. These include cleanliness, stationeries, catering and commercial activities. In addition to that, indirect jobs will include agriculture, livestock, energy and water sector. The ripple effect (or catalyst) on the entire regional and national economy is also the origin of the creation of 'indirect' jobs. This impact is high, regional and will be long term.

6.6.4 Increased commercial and social activities around project locations

Construction of the proposed project components is anticipated to attract more businesses due to demand of various services and goods required to sustain the University. The University will also cause growth of the existing businesses around the project location. This surge in economic and social interactions will have a direct impact on the surrounding communities, specifically affecting

students from Rubawa Primary School, as well as residents of Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages.

Socially, the project is likely to create employment opportunities, stimulate local businesses, and enhance community engagement. Students from Rubawa Primary School may benefit from potential educational collaborations or outreach programs. However, this could also lead to increased traffic, noise, and changes in the local lifestyle, impacting the residents' daily lives. In terms of duration, the social and environmental impacts are likely to be both short-term and long-term. The immediate construction and operational phases may bring short-term disruptions, while the long-term effects will depend on how well the project is managed and integrated into the existing community and ecosystem. The impacts are potentially reversible with proper mitigation measures and management practices in place.

Considering the significance of the impacts, they may be considered moderate, given the potential positive and negative consequences. Cumulatively, over time, the project's effects could become more pronounced, especially if not adequately addressed. The overall significance of the impact is subjective and would require thorough monitoring and assessment during and after the project implementation to determine the extent of its consequences.

6.6.5 Government Revenue Collection and economic growth

Different governmental regulatory authorities such as National Environmental Management Committee (NEMC), Mkinga District Council, TANESCO, Fire and Rescue Force, and OSHA will benefit from the collection of revenues from the proposed project at MU. The collected amount of money is used to develop the national economy and improving the living standard of people. This impact is considered as Regional, positive, long term and of high significance.

6.6.6 Growth of Trade and Increased Investment

It is envisaged that the establishment of MU-Tanga campus and increased enrolments of students will attract a number of investors from within and outside surrounding communities to invest in meeting the needs of the increased population in the area. This is likely to enhance the development of the centres surrounding MU-Tanga campus to Gombero ward. It is also expected that service providers such as food vendors and general kiosks be established and increase during construction phase to provide services to both skilled and unskilled laborer working in MU for proposed project. This impact is high, local and will be long term.

6.6.7 Production of skilled labor force for implementing various development policies, plans and goals for sustainable social and economic growth of the Nation

The project shall increase enrollment and production of quality professionals. Thus, the proposed of MU-Tanga campus will contribute to FYDP III through generation of more skilled labor to support industrialization. Thus, contributing to the Tanzania economy through generation of quality graduates that are relevant to the labor market requirements. This impact is moderate, national and will be long term.

6.6.8 The Growth of Banking Activities in the Project Area

The growth of population, investment and trading activities in the projects area will attract some Banks to open their offices at MU and the surrounding communities of Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages and the neighbouring village. Currently,

there is no Bank in the area, but it is expected that the increase in students' enrolments, employment and income of the people living in the area or working in the proposed establishment will consequently result to an increased rotation of funds in the area hence acts as attraction to banking institutions in the area.

Also, the presence of academic facilities, hostels, staff houses, and a reservoir tank is likely to attract increased economic activity, leading to the growth of banking services. This growth will primarily affect the local population's financial landscape, offering improved access to Banking facilities and services. Students from Rubawa Primary School and residents of Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages will benefit socially from enhanced educational infrastructure and healthcare facilities.

It is also expected that, both skilled and unskilled employees at MU will be paid their money through banking system and this play a major role for most of the Banks to be attracted to simplify the access of funds to their customers hence the opening of the bank branches seems to be inevitable. This impact is moderate, national and will be long term.

B. NEGATIVE SOCIAL IMPACTS

6.6.9 Increased incidences of diseases and ill health

The primary school students in Rubawa, along with the residents of Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages, are likely to be affected. The impact is anticipated to be both direct and indirect, with localized and potentially regional consequences. The influx of students and staff, coupled with the construction activities, may lead to increased waste generation, air and water pollution, and habitat disruption. These environmental changes could indirectly affect the health of the nearby communities. Socially, the project may strain local healthcare resources, leading to increased incidences of diseases among the community members. Also, the concentration of a large number of people within the proposed project area could contribute to increased levels of communicable diseases such as Sexually Transmitted Diseases (STDs), HIV/AIDS, TB, COVID-19 and other ailments due to interaction and concentration of people from various places. Workers tend to be tempted to engage in sexual relationships with women and young girls in the project area. In addition, prostitutes may be attracted to the area due to the presence of workers who are usually perceived to possess a lot of money.

The impact is likely to be moderate and reversible in the short to medium term if appropriate mitigation measures are implemented. However, if not addressed, the consequences could become more severe over the long term, making the impact significant and potentially irreversible. The cumulative effect of these changes could further exacerbate the health and environmental challenges faced by the communities in the project vicinity. Therefore, careful consideration and comprehensive mitigation strategies are crucial to minimize the adverse impacts and ensure sustainable development in the region.

6.6.10 Increased pressure on social services and utilities

The project area and nearby communities lack sufficient social and infrastructure services, including healthcare, places of worship, and water supply. As a result, the anticipated increase in student enrollment in the project area could further strain the already limited social infrastructure. This heightened demand is likely to impact various aspects of the local community, including students from Rubawa Primary School and residents of Pangarawe, Gombero, Vunde Manyinyi,

Jirihini, Kichangani, and Dima villages. From a social perspective, the influx of students and staff may strain existing social services such as healthcare and education, potentially leading to overcrowding and increased demand for medical services in the dispensary. Additionally, the heightened pressure on utilities may result in challenges related to water supply and waste management in the region.

The project may have direct and indirect consequences. Direct impacts could include habitat disruption and changes in local water usage patterns due to the construction of the reservoir tank. Indirectly, the increased population may lead to changes in land use, potentially affecting local ecosystems. The impact is likely to be localized to the immediate vicinity of the campus, but the cumulative effect of increased human activities could have broader regional implications. The project's influence is expected to be both short-term, during the construction phase, and long-term, as the operational phase unfolds. However, some impacts may be reversible, such as changes in land use, others, like habitat disruption, may be irreversible. The significance of the impact depends on the capacity of local social and environmental systems to adapt and cope with the changes. Overall, the proposed development project is expected to have a moderate to significant impact on the social and environmental aspects of the Pangarawe area.

6.6.11 Incidence of Gender Based Violence

The increased population and diverse activities associated with the academic block, student hostels, cafeteria, dispensary, staff houses, and reservoir tank may contribute to a heightened risk of GBV, impacting both the students and staff members. The nature of the project, if not managed properly, can create an environment where instances of GBV may occur, affecting the well-being and safety of individuals. In a social context, the communities surrounding the project site, including Rubawa Primary School, Pangarawe, Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages, will experience diverse effects. Socially, the influx of students and staff may bring about changes in local dynamics, potentially leading to cultural shifts, increased demand for social services, and alterations in community structures.

The impact can be considered indirect, localized, and moderate, as it is not the primary focus of the project but may arise as a consequence of the increased population and activities. The effects are likely to be localized to the immediate vicinity of the campus and may not have a widespread regional or national impact. In terms of duration, the impact is anticipated to be both short-term and medium-term, contingent on effective mitigation measures and community adaptation. While certain aspects may be reversible with proper management, others, such as cultural shifts, could be more long-term and challenging to reverse. The significance of the impact on GBV is contingent on the effectiveness of preventive measures, making it a crucial consideration for the project's overall success.

6.6.12 Disruption of traffic flow

The disruption of traffic flow is anticipated to occur due to increased vehicular movement associated with the functioning of academic facilities, hostels, cafeteria, dispensary, staff houses, and reservoir tank. This disruption can be categorized as a direct, high, and significant impact. Direct, as it directly affects the traffic flow in the area surrounding the campus such as Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima Villages; high, due to the potential magnitude of the disturbance caused by the influx of vehicles; and significant, given its potential to impede the

movement of people and goods, impacting both the local community and the operational efficiency of the facilities. The duration of this impact is expected to be medium to long-term, persisting throughout the operational lifespan of the facilities.

Regarding these measures can be implemented to mitigate traffic disruptions, such as improved road infrastructure or alternative transportation options, the overall impact may still be considered irreversible, as the increased vehicular traffic is inherent to the ongoing operation and use of the campus facilities.

6.6.13 Health and safety risks due to fire hazards

Buildings are very prone to fire hazards because of different types of combustible materials and machines, which are used and installed, respectively. Electrical fault is by large the main culprit in fire accidents in buildings in Tanzania. The components of a fire are fuel (combustible substance), heat and oxygen. Some chemicals used in laboratories and training workshops may also cause fire eruption if not handled appropriately. Unless all three are present fire will not occur. Fire can cause the following effects:

- i. Loss of lives;
- ii. Serious Injuries;
- iii. Loss of properties etc.

These risks could result from inadequate fire prevention and control measures, improper storage of flammable materials, faulty electrical installations, or human error. The impact of these risks is direct, high, and significant, posing immediate threats to the health and safety of individuals on the campus. The risks are short-term but have the potential to become long-term if not properly addressed. However, some impacts may be reversible with appropriate interventions, the potential for irreversible consequences, such as loss of life or property, underscores the critical need for proactive fire safety measures.

6.6.14 Increased level of crimes

The commencement of this project is expected to improve criminal activity in its area of operation. This increase is predicted to be a by-product of projected population growth including recruitment of workers and students plus incoming individuals drawn to invest in a growing range of goods and services in the Gombero ward, pose challenges largely in Ward sociological fabric. The significance of this effect is varied, including direct, indirect, and cumulative components. The increase in crime is a direct result of the demographic changes brought about by the project. Impacts are expected to be medium to long-term, extending beyond the immediate operational phase, and have the potential to have a lasting impact on local communities. Fortunately, the nature of the impact is considered to be reversible, allowing for mitigation measures such as enhanced protection and local programs to combat adverse social consequences, restore status which appears to have hardened in the affected area.

6.6.15 Increased Water Demand

This demand surge will stem from the need for water supply to the newly established facilities, including student hostels, staff houses, cafeteria, and reservoir tank. The impact is direct, significant, and likely to be long-term and irreversible, as it involves the continuous operation and maintenance of the campus infrastructure. The increased water demand could also induce further stress on local water sources, potentially affecting the surrounding environment and community water access from Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima Villages.

6.6.16 Increased Energy Demand

This demand is expected to result from the continual use of facilities such as academic blocks, student hostels, cafeteria, dispensary, and staff houses. The operation of these facilities would necessitate regular energy consumption for lighting, heating, cooling, and various other operational needs. The impact is direct, significant, and likely to be long-term, as the demand for energy is expected to persist throughout the operational lifespan of the facilities. However, measures can be taken to improve energy efficiency and mitigate this impact, the overall increase in energy demand is anticipated to be irreversible, especially as the campus expands and activities intensify. Additionally, this increased energy demand may indirectly affect surrounding communities and ecosystems through heightened resource extraction and emissions associated with energy production, further underlining its significance.

6.6.18 Health and Safety hazards

Five categories of Health and Safety hazard are likely to cause harm to environment and human. These are;

- Physical Hazards (involve environmental and can cause harm),
- Chemical Hazards (Caused by exposure to chemicals),
- Biological Hazards (Pose a threat to the health of living organisms primarily at the human).
- Ergonomic Hazards (related to efficiency and comfort at the workplace),
- Psychological Hazards (Affect the mental well-being/Health of the employees) The following table 6.7 describes the key hazards and risks associated with the proposed project,

Table 0:7: Health and Safety Hazards and associated risks

| Category | Type of Hazard | Associated risk |
|----------------------|----------------------------|---|
| Physical Hazard | Fire and electrical | Loss of properties, injuries and death |
| | Noise and Vibration | Loss of hearing and body discomfort |
| | Moving parts/Mechanical | Injuries and death |
| | Slippery | Injuries and death |
| Chemical Hazard | Liquid, vapor and solvents | <ul style="list-style-type: none"> ○ Respiratory diseases ○ Damage of lungs ○ Injuries and death |
| | Fumes and gases | |
| | Acids | |
| Biological Hazard | Microorganisms | <ul style="list-style-type: none"> ○ Skin irritations ○ Allergies ○ Infections |
| | Virus, Fungus and bacteria | |
| | Insects and parasites | |
| Ergonomic Hazard | Manual Handling | <ul style="list-style-type: none"> ○ Awkward postures ○ Back pain ○ Eye strain ○ Fatigue and stress |
| | Repetitive movements | |
| | Lifting | |
| | Sitting Positions | |
| Psychological Hazard | Overwork and tiredness | Health effect on human body |
| | Abuse and Harassments | Mental illness |
| | Discrimination | Mental illness |

Source: 3Es (2023)

C. NEGATIVE ENVIRONMENTAL IMPACTS

6.6.19 Increased Water Pollution

Wastewater from MU-Tanga campus is discharged into receiving environment upon treated in WSP. Water pollution will mainly be caused if sanitation systems used during project operation will be inadequate. This is due to the fact the proposed project will cause an increase in students' enrolment. Onsite sanitation systems always cause groundwater and surface water pollution. Other liquid wastes will include chemicals from laboratories and cleanliness activities. It should also be noted that oil spills on the soil have the potential to pose long-term threats to groundwater quality. Simple laboratory measurements and transport models developed in different studies can anticipate the degree of long-term groundwater contamination easily. Thus, the risk of water degradation is assessed as important, which may have an indirect impact on the surface water too. This impact is moderate, local and will be medium term.

6.6.20 Storm Water Generation and Overflow

The area for the proposed establishment has no any existing facilities and is covered by indigenous vegetation hence no stormwater will be generated. However, due to the establishments of these facilities a lot of storm water will be generated due to presence pavements, concrete surfaces and building roofs. The structures will tend to compromise the infiltration capacity of the land surface hence rendering water free to the environment. The storm water generated might have impacts on structures downstream as well as being a factor for soil erosion and poor water quality.

6.6.21 Impact from poor hygienic condition

Poor cleanliness of supporting facilities such as toilets and washrooms may invite flies that are agent of diseases like cholera and diarrhea. Bad odour and bad visual is the outcome of poor hygienic condition that may impact human health condition. This impact is localized, negative, short-term and of moderate significance.

6.6.22 Generation of solid and hazardous wastes

The construction and subsequent operation of the proposed facilities at the MU-Tanga campus is expected to generate a significant amount of waste from cardboard, boxes, cardboard, food scraps and plastic bottles, and voucher items. Also, hazardous waste from health centre and laboratory like chemical, pharmaceutical and non-pharmaceutical waste will be produced. The significance of these impacts is complex, with direct consequences affecting the immediate environment and indirect and cumulative effects that can spread over a wider area. In the short term, weeds improper management may result in local environmental degradation and pollution, not only in the project area but in the surrounding ecosystem. posing challenges to local environmental sustainability Whether the impact is reversible or irreversible depends on how waste management is implemented during and after the operation phase improve effectively.

6.6.23 Generation of Liquid waste

The establishment of MU-Tanga campus is expected to generate liquid waste from different sources such as rainwater runoff, sanitation systems, and laboratory water usage. This liquid waste is foreseen to have a negative impact, persisting over an extended period. Despite its longevity, the overall significance of this impact is projected to be relatively low. It is emphasized to implement plans for managing and reducing this impact during the development phase. This impact it is expected to be direct, short term, local and potentially reversible.

6.6.24 Contribution on Climate Change

The project phase will generate direct and indirect CO₂ emissions into the atmosphere, contributing to existing greenhouse gas emissions from cooking, waste management and other activities. The infrastructure used in the MU-Tanga campus, which includes cooking fuels such as coal, wood and natural gas, and resources such as electricity, water, paper, wood and food all contribute to carbon dioxide emissions. Anticipated changes in consumption patterns driven by advances in technology and modernization may intensify these emissions. Importantly, the impact is not confined to the immediate area but extends beyond, which has been identified as a moderate level of international anxiety with long-term consequences.

The importance of this impact is threefold: direct emissions, resulting from on-site activities; indirect emissions, associated with off-site applications; and the cumulative effects of population growth and changes in consumption patterns. The long-term consequences will be evident, the nature of impact is largely irreversible due to the nature of CO₂ continuous emissions so the impact of climate change on the operational phase of the proposed project is questionable significant and complex with local, regional and international implications.

6.7 Possible Potential Impacts during Decommissioning Phase

The life span of the proposed project is 100 years. However, if effective operation and maintenance is in place may last for a very long time. During a certain period, it is possible that infrastructure facilities will be retrofitted at the sites, so major structural changes and expansions may be necessary. At the end of the plant life, a scheduled plant will be necessary to remove the site component, a process referred to as decommissioning.

A. NEGATIVE SOCIAL IMPACT

6.7.1 Loss of employment and business opportunities

People employed by the project will lose their jobs. This will have significant impact on these people and their families. Other dependents of the project, such as suppliers of various services (e.g., security and cleaning companies) and goods (such as food stuff and stationaries) will lose the business opportunities. This impact is considered negative, long term and of moderate significance. This impact is high, local and will be moderate term.

6.7.2 Loss of revenue and business opportunities

Ending the project means losing revenues to both MU and government agencies such as TANESCO, Mkinga District Council, NEMC, OSHA and Fire and Rescue Force. As discussed above both local and central government are receiving revenue/annual fees from the project. In case of the decommissioning of the project, revenue generated will cease. This impact is negative, short-term and of minor significance.

B. NEGATIVE ENVIRONMENTAL IMPACT

6.7.3 Loss of aesthetic value due to haphazard disposal of demolished waste

In the event of future rehabilitations and upgrading, the buildings may need to be demolished necessitating disposal of demolish wastes. Haphazard disposal may cause contamination of soil and water bodies. This impact is moderate, local and will be medium term. This impact is moderate, local and will be long term.

6.7.4 Dust and noise pollution from demolishing works

The building needs to be demolished necessitating disposal of demolition waste. The noise pollution and air quality will be most affected during the demolition work with the emission of dust particles from machinery like excavators, electric grinders and mixer. The impact receptors are likely to include site workers and residents in the neighboring areas. The substances which will most significantly contribute to air pollution will be particulate matter (PM₁₀ and PM_{2.5}). PM₁₀ and PM_{2.5} may cause health hazards when inhaled in significant amounts and can also reduce the visibility. This impact is moderate, local and will be short term.

6.7.5 Healthy hazards to workers from demolishing work

Demolishing works will include activities that may generate substantial amounts of dust and may also pose workers to risks of accidents. Pulling down a structure, engineered foundations, and other structures will all lead to generation of dust, noise and may cause accidents to operators. This impact is considered as negative, short-term, adverse, reversible and of moderate significance.

6.8 Cumulative impacts

Cumulative impacts are incremental changes caused by the project together with other presently ongoing, or reasonably foreseeable future planned actions/projects within the Project Area. Cumulative impacts act with others in such a way that the sum is greater than the parts. This is, however, not always the case – sometimes they will simply be the sum of the parts, but that sum becomes significant. The project will have both positive and negative cumulative impacts during its implementation as a direct result of the project. The nature of cumulative impacts can be both temporary in nature (restricted to the construction phase) and permanent (occurring in both the construction and operation phases).

6.8.1 Cumulative Impacts from existing major facilities

6.8.1.1 Noise

The noise impact assessment described was performed using the baseline assumption that noise impacts from construction and operating proposed project were additive to the noise sources already in existence area from all existing nearby operation, commercial activities and other noise sources. The cumulative effects of the existing operation and other noise sources, together with the project, are assessed to not exceed the recommended ambient noise levels.

6.8.1.2 Socio economic Issues

The cumulative impact on the Tanzania and Tanga City economy will be strongly a positive one. Significant additional resources will be realized by the result of this project, which is consistent with the government's long term development plan. The additional licensing income, among other sources of additional income, will add to the already increasing government revenues and economic growth resulting from expanded and diversified business development in Mkinga District Council.

6.8.1.3 Increase of traffic congestion

Increase of traffic congestion will be a result from increased number of cars of people who will be living in proposed project. This impact will add the present problem of traffic on road leading to the site. To manage this impact the proponent should install appropriate traffic warning signs

instructing occupants and visitors to reduce speed, will be placed at the vicinity of the entrance to the site.

6.9 Project alternatives

The discussion and analysis of alternatives in Environmental Impact Assessments should consider other practicable strategies that will promote the elimination of negative environmental impacts identified. This section is a requirement of The Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations, 2018, and is critical in consideration of the ideal development with minimal environmental disturbance.

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

6.9.1 Alternative Site

The EIA Guidelines, Annex 2 (1992) states that —project options should be provided within the constraints of the aim and broad economic, technical and environmental factors. In the context of this study therefore the choice of site has been dictated by the following the factors:

- Ownership of the project area. This area for the proposed establishment is the property of the MU as such it does not involve complicated issues of displacing people, compensation and settlement.
- The land located meets the user requirements for developing MU-Tanga Campus and their infrastructures.
- Currently the proponent does not have any other alternative site allocated for this project.
- The site is easily accessible from many parts of the Tanga City and is not connected to all utilities needed such as electricity and road infrastructure.
- Land is general flat therefore allow economical construction and design of building.
- The site is within the area where there are no any buildings in the surroundings.

Based on the above, the recommended alternative is the “Proposed Alternative” because it recognizes the viability and need for the proposed development, is designed to address environmental issues and concerns, meets all local regulatory requirements and supports communication and close relations during all stages of the development between the developers and the surrounding communities.

6.9.2 Alternative Construction Technologies

Within the construction sector, various options exist for selecting building materials. The decision regarding building materials can significantly influence factors such as longevity and aesthetic

appeal of structures, construction costs, and environmental impact. In this context two alternatives were evaluated; the utilization of burnt bricks and concrete bricks.

Alternative one: Use of burnt bricks.

In Tanzania, use of burnt bricks is cheap because they are locally made and can be close to the project sites. The traditional fired/burnt bricks are made from soil that is mixed with water, dried in the sun there after baked using wood fuel.

Advantages of burnt bricks.

- Bricks are strong and durable;
- They require low maintenance cost;
- Have excellent thermal mass i.e., in winter they keep the buildings warmer while in summer they keep the buildings cooler; and
- They are fire resistant.

Disadvantage of burnt bricks.

For large projects, large amounts of firewood and soil will be required to produce adequate number of bricks. This can lead to destruction of natural forests and land degradation due to formation of borrow pits.

Alternative two: Use of Concrete blocks

Concrete blocks are made from a mixture of quarry dust and cement to which water has been added. Then the mixture is compacted using a manual machine to ensure strength and quality.

Advantages of Concrete blocks

- Concrete blocks allow users to produce uniform blocks of greater strength;
- Concrete blocks can be made on site so transportation costs are minimized; and
- Because Concrete blocks are cured in the sun, there is no fuel needed thereby helping to curb deforestation as such they are environmentally friendly;
- Concrete blocks are strong and durable; and Concrete blocks are fire resistant.

Disadvantage of concrete blocks

- The bricks are usually expensive due to increased costs of cement.

6.9.6 Alternative of liquid waste management

During the operational phase, it is anticipated that the daily wastewater about 1,188.35m³/day will be produced if the population projection regarding the MU-Tanga campus Masterplan was yet done. The estimation is based on the assumption that an average individual generates approximately 80% of wastewater per day. Therefore, it is crucial to address the appropriate management and disposal of this wastewater volume. Given that the Mkinga District Council lack public wastewater treatment service, hence, the proposed university campus needs to have a wastewater treatment system to return the used water in acceptable conditions to the basin, using primary and secondary treatments. The selection of water treatment processes to be used at the proposed campus was influenced by the necessity to meet economic viability, effluent standards, social acceptance, and environmental aesthetics. The factors included in decisions on water treatment processes include Contaminant removal capacity, treatment reliability, existing conditions, flexibility of treatment processes, costs implications, environmental compatibility, and land availability and will be discussed as follows:

Alternative one: Use of wastewater stabilisation ponds

Use of wastewater stabilisation ponds is one of the commonly methods used of treating wastewater. Although this is one of the cheapest ways of treating wastewater, the method requires more space than the other wastewater treatment facilities. Since space is not a limiting factor for the project, this is a preferred option.

Advantages of using WSP include:

- As compared to septic tanks, WSP do not require emptying of wastewater as it is discharged into the environment after its treatment;
- Cheap and easy to operate;

Disadvantages of using WSP include:

- WSP require more space than other wastewater treatment facilities;
- If not properly managed, wastewater stabilisation ponds result into breeding grounds for mosquitoes;
- Can generate odour if the system is not operating effectively; and
- Has the potential to pollute recipient water body if there is system failure as such it needs personnel to manage to ensure that it operates effectively and efficiently;

Considering that the campus has enough space to accommodate the wastewater stabilisation ponds away from other structures such as class rooms, students' hostels and the administration block, the alternative was preferred.

Alternative two: Constructed Wetland Constructed

Wetlands are engineered system designed and constructed to mimic natural processes taking place in the natural wetlands. Constructed Wetlands remove pollutants in wastewater through the combination of physical, biological and chemical processes. Two types of constructed wetlands exist based on the flow of wastewater through them. 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 final effluent will be discharged into a seasonal river, the proposed engineered wetland will protect the receiving waters from the problems of nutrient overload by removing excess nutrients. Additionally, with the proposed engineered wetlands some of the heavy metals will be taken up and used by wetland plants and converted to less harmful chemical forms in the soil.

Alternative three: Use of septic tanks

Use of septic tanks to manage wastewater was one of the options that were considered. Advantages of using septic tanks over wastewater stabilisation ponds (WSP) include;

- Septic tanks are easier to operate than WSP as such they do not require personnel to manage its operations except when there are blockages;
- Septic tanks do not generate odor as they are usually under cover;
- Septic tanks do not require a lot of space as compared to WSP; and
- Septic tanks are not left open as the case is with WSP which become breeding ground for vector insects and pose as potential hazards to the general public and children in case of drowning.

The main disadvantage of using septic tanks is that they need periodic emptying, and this could raise the operation cost over time. With the large volume of effluents that will be discharged from the project during operation, the septic tanks will need to be emptied time and again making the alternative not viable.

Conclusion

Considering that the project area for proposed establishment of MU-Tanga campus has enough space to accommodate the wastewater stabilization ponds away from other structures such as classrooms, students' hostels and the administration block, the alternative was preferred. Hence, *alternatives one* was thought to be the best alternative solution to wastewater management for the proposed.

6.9.7 Solid Waste Management Alternatives

The proposed establishment will generate a considerable large amount of solid waste from hostels, stationeries, workshops, laboratories, restaurants and offices. The University considered three alternatives namely;

- a) Construction of composting facility for biodegradable waste like food remains from cafeteria.
- a) Collected by the Mkinga District Council.

Alternative one; Alternative one will involve transportation of huge amounts of waste to the proposed composting facility that will be established at MU-Tanga campus. Composting facility will be used for the controlling decomposition of organic waste such as food remain from cafeteria, yard trimmings and other sources within the campus. This composting facility will facilitate the natural breakdown of organic matter into nutrient-rich compost, which later on will be used as a soil amendment. Properly managed composting facilities will minimize odours and prevent the release of greenhouse gases.

Alternative two: Alternative two will involve transportation of huge amounts of waste to the Mpirani landfill. Since solid waste management is a service and doesn't generate any revenue, such practice will become a burden to the University. The generated amount will require at least one trip per day to Mpirani landifill which is about 11.5km from the MU-Tanga campus which is so far hence this alternative is not possible for MU to implement and prefer to establish their own management system known as Composting facility and incinerator. Therefore, alternative two was not preferred due to distance and time.

Alternative three: alternative three will involve integrated solid waste management; where by management will start with:

- Efforts to reduce waste generation:
- Waste segregation and sorting into degradable and non-degradable; and recyclables and non-recyclables.
- Waste recycling: at this stage, all recyclables' wastes will be collected and sold to recycles (includes papers and plastic containers).

6.9.4 Water Supply Alternative

Alternative one: Water Supply (surface water) from the operating water utility company

Water Supply (surface water) from the operating water utility (Tanga UWASA), the option is considered to be appropriate as the water supply network has been recently rehabilitated and therefore can guarantee reliable, clean and safe water supply to the MU-Tanga Campus. The Tanga UWASA water supply has to be considered the major source of water supply to the project.

Alternative Two: Groundwater Extraction

Statistics from Mkinga District Council and within the vicinity of the proposed project area suggest that groundwater is another alternative option for water supply and can supplement the water supply at the project at such times of water shortage and scarcity.

Alternative Three: Rainwater Harvesting

This is another option that has to be looked at. The rainwater will be harvested from both roof and land catchment. It will entail the design of rainwater harvesting system.

Conclusion: The proponent will use water from Tanga UWASA and Rainwater Harvesting.

6.9.5 Alternative Energy Sources

The main source of energy for the university is Electricity, supplied by the national grid. For the proposed infrastructure, the University considered four alternative sources of energy namely; electricity, diesel power generators, and solar energy.

- ***Alternative one - Electricity:*** As it is the case in most of developing countries, supply of electricity from national grids is not reliable as it mostly originates from hydroelectric power generators, which depend on rainfall frequency, intensity and pattern.
- ***Alternative two - Diesel generators:*** These utilize fossil fuels, which tend to emit greenhouse gases especially when operated for a long time. As such, diesel generators are used as standby power supply during outages.
- ***Alternative three - Solar energy:*** the last alternative considered was the installation of solar panels to harvest solar energy. It is intended that the solar energy be used for lighting within the buildings. It is also intended to install solar lights in various locations along the streets.

Conclusions: an evaluation of the three alternatives based on capital costs, availability of adequate supply, reliability, and environmental protection revealed that at least three options could be used together. Therefore, it is planned to connect the proposed infrastructure to electricity from the National grid as a basic power supply and backup generator. Provisions will be made for installing solar panels in the future. Hence, contractor during design period of the proposed establishment should consider space for installation of solar panel in the future. However, number of solar panels to be installed is not estimated.

6.9.6 No Project/Action Alternative

The no project alternative entails retaining the current status quo (No construction of the proposed MU-Tanga campus at Pangarawe area). Adopting the No Project alternative, this option would mean avoiding the predicted impacts of the project implementation, and missing the predicted positive impacts of the project.

The “No Action Alternative” is likely to have the greatest implications on the socio-economic environment of the area and surrounding communities and the country at large. Due to the proposed quality of the development, it is anticipated that it would provide a major opportunity for employment, foreign exchange revenue, benefits associated with the building office and potentially significant business opportunities for existing and new induced support businesses. If this alternative were adopted, the proponent would need to find an alternative site for the development. Hence, the proposed establishment has many potential benefits as compared to negative ones that can be easily mitigated.

CHAPTER 7: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

7.1 Introduction

The Environmental and Social Management Plan (ESMP) is presented below in table 7.2. This ESMP for the proposed project and based on the assessment undertaken as part of the ESIA, a series of mitigation measures have been identified which aim to reduce and / or eliminate the predicted impacts of the project. These mitigation measures will be appropriately applied to the project mobilization, construction and operation, decommissioning and this management plan provides a strategic framework for their implementation. The Proponent and Contractor shall implement components relevant to design, mobilization of materials and machines and actual construction. The estimated costs for implementing the mitigation measures are just indicative. Additionally, the ESMP include an estimate of the costs of the measures so that the project proponent can budget the necessary funds. Appropriate bills of quantities should clearly give the actual figures. In any case the consultant used informed judgment to come up with these figures.

7.2 Purpose of the ESMP

The purpose of the ESMP is to describe the measures that should be implemented by the proponent during the implementation of the project to eliminate or reduce to acceptable levels key potential impacts, social and health impacts related to project activities. The specific measures set out in the ESMP must be fully adhered to by all the project parties. In particular, the project must strive to avoid significant impacts on the bio-physical, socioeconomic or health aspects during implementation. Avoidance through good, detailed design of site-specific works and through preparation of the detailed site specific ESMPs will be key to success in this area. Where impacts cannot be avoided, they must be mitigated against using appropriate measures. The ESMP has been developed:

- To bring the project to comply with Government of Tanzania applicable national environmental and social legal requirements social policies and procedures;
- To outline the mitigating/enhancing, monitoring, consultative and institutional measures required to prevent, minimize, mitigate or compensate for adverse environmental and social impacts, or to enhance the project beneficial impacts.
- To provide an operational reference and tool for environmental management during project rehabilitation and operation activities.

7.3 ESMP Implementation Responsibility

The environmental and social mitigation measures incorporated in the detailed engineering design shall be handed over to the contractor during construction period. The Contractor shall take stock of the contents of the Environmental and Social Management Plan of the Project. MU holds the ultimate responsibility for meeting the requirements outlined in EMA 2004, Tanzania's Environmental Legislation. The primary obligation for executing these requirements rests with the contractor, who will appoint safeguard specialists overseen by a contractor resident engineer. The project proponent is tasked with ensuring the presence of adequate resources, skills, training, capacity-building programs, communication processes, and documentation control systems to ensure the effective implementation and integration of ESMP requirements. This involves having competent staff with sufficient training and experience to cover the EIA requirements for the HEET project in the designated project area.

MU Project Implementation Unit (MU-PIU) is responsible for assessing the management and execution of the ESMP through monitoring and environmental audits. Any identified non-

compliance during the evaluation requires corrective action by the contractor. The MU-PIU oversees the implementation and monitoring of the ESMP, with overall responsibility for supervising all environmental management activities, aided by consultants (WB POM, 2021). It is essential to note that the ESMP is not the sole document or management system tasked with addressing project impacts. Instead, each project-related subcontractor or material supplier must establish their own management systems to minimize and prevent environmental and social risks.

Therefore, the contractor must integrate the ESMP into their "project management system," which serves as the framework for managing their activities and prepare C-ESMP. This system defines responsibilities, internal reporting requirements, relationships for mitigation and monitoring actions related to the ESMP, and precise mechanisms for monitoring and evaluating the implementation of various ESMP requirements. The contractor is also obligated to ensure that project implementation complies with national and international EHS legislation and regulations, as well as contractual technical and quality specifications in line with the project's quality plan if required. Also, the contractor shall appoint an Environmental, Social, Health and Safety Officer to oversee the E&S aspects who are familiar with the compliance requirements, including WB EHS guidelines (WB POM, 2021).

The successful execution of this plan will necessitate extensive self-monitoring and regular reporting to the PIU. It is anticipated that, throughout the project implementation stage (construction), both the MU and contractor will enlist the services of consultants, including environmental and social specialists, as well as environmental health and safety officers (EHS). These personnel will be appointed based on the specifications outlined in the following table for effective management and monitoring.

Table 0:1: Roles and responsibilities of respective entities

| Entity | Responsibilities |
|-----------------------------------|-------------------------|
| Project Implementation Unit (PIU) | Refer Table 3.5 |
| NEMC | Refer Table 3.5 |
| Design Consultants | Refer Table 3.5 |
| Supervision Engineer/Consultant | Refer Table 3.5 |
| Contractor | Refer Table 3.5 |

7.4 Environmental and Social Cost

The costs for implementing the mitigation measures have been estimated based on previous similar projects and engineering judgment. The estimated cost for environmental and social management of an establishment is to be included in the Contractor's Bill of Quantities (BOQ) during decommissioning. Also, the principal environmental and social cost includes the cost for implementing the mitigation measures proposed. Additional costs for implementing environmental and social management measures have been estimated and MU shall cover all the costs proposed in the ESMP.

Table 0:2: Proposed Environmental Social Management Plan (ESMP for planning phase, construction phase, demobilisation phase, operation & maintenance phase and decommissioning phase.

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|--------------------------------|---|---|------------------------------|--------------------------------|
| MOBILISATION PHASE | | | | |
| POSITIVE SOCIAL IMPACTS | | | | |
| 1 | Job Creation and employment opportunities | <ul style="list-style-type: none"> ○ The contractor will be urged to hire as much local labor that is unemployed but willing to work hard as possible, up to a maximum of 50% unskilled labor. This will guarantee that the initiative benefits the local population better. ○ Employment should be based on the idea that everyone should have equal access to opportunities. ○ Communities close to the project site will be urged to develop high-quality goods and services. ○ Opportunities for employment will be made available in accordance with qualifications, accepted interviewing procedures, and grading systems. ○ Conduct fair and transparent recruitment processes to ensure equal opportunities for all interested individuals, promoting inclusivity and diversity Local communities shall be encouraged to produce quality goods and services for the project. ○ Implement training programs to enhance the skills of the local workforce, ensuring they acquire the necessary qualifications for available job opportunities. ○ Ensure strict adherence to labor standards and regulations, providing a safe and supportive working environment for all employees ○ Both professional and unskilled laborers hired for the project should receive fair remuneration. | Contractor/ UPIU/ Consultant | N/A Part of its project |
| 2 | Increased Business/trade opportunities | <ul style="list-style-type: none"> ○ Encourage the project to prioritize the procurement of goods and services from local businesses. This can include construction materials, equipment, and various services required during the mobilization phase. ○ Implement training programs to equip local residents with skills relevant to emerging market opportunities. This can include workshops on entrepreneurship, vocational training, and business management. ○ Promote environmentally and socially sustainable business practices to ensure that the increased market opportunities contribute to long-term economic and community well-being ○ Implement fair and transparent procurement processes to ensure that local suppliers have equal opportunities to participate. This can include clear guidelines, open bidding processes, and fair evaluation criteria ○ Ensure monitoring of labour standards among contractors, sub-contractors, workers and service providers; and | Contractor/ UPIU/ Consultant | N/A Part of its project |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|--------------------------------|--|---|------------------------------|--------------------------------|
| | | <ul style="list-style-type: none"> ○ Qualified local vendors/ entrepreneurs should be given priorities to supply different goods and services to the project. | | |
| 4 | Increased Revenues to local authorities | <ul style="list-style-type: none"> ○ Local authorities can strategically plan and implement tax structures that ensure optimal revenue collection during the peak construction activities. This may involve revising tax rates on construction-related transactions and services ○ Promote local economic development projects that align with the construction activities to sustain economic transactions beyond the construction phase. ○ Encourage local businesses to provide goods and services required for the construction, fostering a symbiotic relationship. ○ Awareness creation for the people in the area on the importance of paying revenues. | Contractor/ UPIU/ Consultant | N/A Part of its project |
| NEGATIVE SOCIAL IMPACTS | | | | |
| 5 | Food Insecurity and inflation of prices on other social services | <ul style="list-style-type: none"> ○ Encourage traders to supply food and other products to the project area. ○ Sensitization of the surrounding communities in order to make them aware of the employment and hence income generating opportunities with the proposed establishment. ○ Provide more avenues for service providers e.g., cafeteria and restaurants. | Contractor/ UPIU/ Consultant | N/A |
| 6 | Disruption of Economic and Social Activities | <ul style="list-style-type: none"> ○ Inclusion of local leaders (Ward/sub-ward chairpersons/executive officers or /and councilors. ○ Introduction of traffic management plan and routing traffic flow to alternative roads will reduce the impact. ○ Exploring alternative routes or diversions with proper simulation before implementation. ○ Provision of temporary traffic lights and flagmen will also reduce the impact. ○ Contractor shall Develop and implement a comprehensive traffic management plan to minimize disruptions along the road. This plan should include designated routes for construction vehicles and scheduling deliveries during non-peak hours ○ Contractor shall conduct awareness programs for the local community, including food vendors, passengers, drivers, and students, to inform them about the upcoming disruptions. Provide information on alternative routes and timing to minimize inconvenience ○ Environmental and Social Specialists of MU should explore the possibility of temporarily relocating key services, such as food vendors or public transportation, to less affected areas during the mobilization phase. This can help maintain essential services without significant interruption ○ Establish effective communication channels between the construction team and the local community to address concerns and provide real-time updates on construction activities. This fosters transparency and community engagement. | Contractor/ UPIU/ Consultant | 10,000,000 |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|-----|--------------------------------------|--|------------------------------|---------------------------------|
| 7 | Increased level of crimes | <ul style="list-style-type: none"> ○ Employ people from the surrounding areas to reduce number of migrant workers. ○ Establish community-based security in collaboration with village/ward leaders. ○ The contractor shall establish his own security to protect his properties and should establish community policing to support insufficient police force. ○ The community should be encouraged to participate in security matters by providing information on suspects. This can only be done by making community to own the project as well. ○ The cooperation of local people together will help to lessen criminal incidents and maintain security of people and their properties. ○ Participatory community security measures (ulinzi shirikishi) should be encouraged in the surrounding communities of Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages. ○ Deploy trained security personnel to monitor the construction site, deterring potential thieves and enhancing overall security. ○ Install surveillance cameras strategically across the construction site to monitor activities and provide evidence in case of theft or security incidents ○ Implement strict access control measures, limiting entry points and ensuring that only authorized personnel have access to the construction site. ○ Install adequate lighting around the construction site to minimize areas of darkness, reducing the likelihood of unauthorized access and theft. ○ Foster a positive relationship with the local communities by involving them in the construction process, creating a sense of ownership and reducing the likelihood of theft. ○ Establish secure storage facilities for construction materials and equipment, ensuring they are locked and well-protected when not in use. ○ Conduct regular security audits to identify vulnerabilities and make necessary improvements to the security infrastructure | Contractor/ UPIU/ Consultant | 2,000,000 |
| 8 | Increased Traffic and road accidents | <ul style="list-style-type: none"> ○ The contractor should ensure the proper selection of appropriate transportation route with consultations with stakeholders, avoiding large agglomerations as well as good Site Practices such as signage and signal personnel where appropriate and vehicle lighting (front and back). ○ Contractor shall develop a comprehensive traffic management plan to regulate the flow of vehicles and minimize congestion during the mobilization phase. ○ Contractor should coordinate and schedule deliveries of building materials and equipment during off-peak hours to reduce the impact on regular traffic. ○ Implement reduced speed limits in construction zones and install clear signage to alert drivers about the presence of construction-related activities | Contractor/ UPIU/ Consultant | N/A Part of its project cost |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|---------------------------------------|---|--|------------------------------|---------------------------------|
| | | <ul style="list-style-type: none"> ○ Conduct public awareness campaigns to inform local residents, businesses, and commuters about the upcoming construction activities and potential traffic disruptions. ○ Work closely with local traffic authorities to monitor and manage traffic flow effectively, ensuring the safety of both construction personnel and the general public ○ Encourage and facilitate alternative transportation methods for construction workers to reduce the number of individual vehicles on the road. ○ Establish emergency response protocols to promptly address and manage any road accidents that may occur. | | |
| NEGATIVE ENVIRONMENTAL IMPACTS | | | | |
| 9 | Loss of vegetations due to exploitation of borrow pits/quarries and other natural resources | <ul style="list-style-type: none"> ○ Develop a comprehensive reforestation plan to replace cleared vegetation. ○ Close supervision of earthworks shall be observed in order to confine land clearance within the project site. ○ The contractor shall be instructed to give the uprooted trees to the residents through ward/village governments or any other arrangement may seem convenient provided he does not contravene the Forest Acts 2002. ○ Appropriate landscaping programs must be planned and put into action in order to aid in the re-vegetation of a portion of the project area following construction shall be designed and implemented. ○ Encourage the retention of vegetative cover by avoiding complete bulldozing to ground level. ○ Implement low-impact construction methods that minimize disturbance to existing vegetation. ○ Implement efficient resource management practices to minimize the extraction of building materials. ○ Ensure that building materials are sourced from legitimate and sustainable suppliers to prevent unauthorized exploitation of natural resources ○ Monitor and control water and energy use to minimize additional demands on these resources. ○ Explore alternative sources for building supplies to reduce the impact on indigenous trees ○ Implement reforestation and restoration programs post-construction to rehabilitate affected areas and enhance environment ○ Raise awareness among local communities about the importance of preserving natural resources and involve them in conservation efforts. ○ Ensure strict adherence to environmental regulations and guidelines to prevent overexploitation and degradation of natural resources | Contractor/ UPIU/ Consultant | N/A Part of its project cost |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|--------------------------------|---|---|------------------------------|---------------------------------|
| 10 | Contamination and Impaired Quality of Receiving Body-Land and Water | <ul style="list-style-type: none"> ○ Efficient collection and disposal system based on the principles of reduction, re-use and recycling of materials, shall be instituted at project areas; ○ Introduction of waste disposal bins, warning notices, posted at strategic points; ○ No, on site burial or open burning of solid waste shall be permitted; ○ Wastes not suitable for incinerations and general municipal waste dumping (e.g., Batteries, plastics, rubbers, tires, etc.) shall be removed for recycling, treatment, and/or disposal by licensed contractor as appropriate; and ○ Instructions to contractor to put on his/her methodologies for handling hazardous waste such as oils, lubricants and non-combustible waste during bidding process. ○ Wastewater from toilets should be well managed through the proper managed septic tank and soak pit treatment. | Contractor/ UPIU/ Consultant | 20,000,000 |
| 11 | Increased Air pollution and climate change | <ul style="list-style-type: none"> ○ Implement the use of cleaner fuels and advanced technologies for construction machinery and transportation to reduce emissions of CO₂, NO_x, and fine particulates ○ Prioritize the preservation of existing vegetation and implement a comprehensive tree planting program to offset the loss of trees during construction ○ Install and enforce effective emission control devices on diesel-powered trucks to minimize the release of pollutants into the air. ○ Optimize construction site management practices to minimize the duration and intensity of activities that contribute to air pollution, such as efficient scheduling and material storage ○ Conduct awareness campaigns for the local community and workers regarding the environmental impact of air pollution and climate change, promoting sustainable practices ○ Establish a comprehensive monitoring system to regularly assess air quality and emissions during construction. Report findings to relevant authorities and the community | Contractor/ UPIU/ Consultant | 8,000,000 |
| CONSTRUCTION PHASE | | | | |
| POSITIVE SOCIAL IMPACTS | | | | |
| 1 | Jobs creation and Employment opportunities | <ul style="list-style-type: none"> ○ Ensure that the contractor prioritizes the hiring of local residents, both skilled and non-skilled, from Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages. ○ Collaborate with local employment agencies to identify qualified candidates within the community. ○ Implement training programs to enhance the skills of the local workforce, enabling them to qualify for skilled positions and fostering long-term employability ○ Establish contractual agreements with the contractor to adhere to the employment targets, ensuring the stipulated number of skilled and non-skilled laborers are hired from the local community. | Contractor/ UPIU/ Consultant | N/A Part of its project cost |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|-----|--|---|------------------------------|---------------------------------|
| | | <ul style="list-style-type: none"> ○ Facilitate the growth of self-employment opportunities by encouraging the establishment of businesses such as restaurants and food vendors to meet the increased demand generated by the project ○ Encourage the contractor to contribute to community economic development initiatives, such as supporting local businesses and entrepreneurs, thereby fostering long-term economic resilience. ○ Implement a monitoring and reporting system to track the employment impact throughout the construction phase, ensuring compliance with the outlined measures | | |
| 2 | Income to local suppliers and service providers | <ul style="list-style-type: none"> ○ Purchasing materials from as many local suppliers. ○ Prioritize hiring local workers for various construction-related tasks, contributing to increased employment opportunities in Gombero ward. ○ Provide training and support to local suppliers and service providers to enhance their capacity to meet the increased demand. ○ Actively involve and engage local suppliers for construction materials needed during the establishment phase. ○ Provide training and support to local suppliers and service providers to enhance their capacity to meet the increased demand. ○ Implement fair and transparent procurement processes to ensure that local suppliers have equal opportunities to participate in supplying materials and services for the project. ○ Integrate environmentally sustainable practices in construction to minimize negative impacts on the local environment, ensuring long-term benefits for the community. ○ Maintain open and transparent communication with local suppliers and service providers to address any concerns and ensure that they are well-informed about project developments | Contractor/ UPIU/ Consultant | N/A Part of its project cost |
| 3 | Increased skills and impart knowledge to local communities | <ul style="list-style-type: none"> ○ Develop and implement structured training programs for both skilled and non-skilled laborers in the local communities. ○ Contractor shall provide on job skills and training. ○ Actively engage the local workforce in construction activities, providing hands-on experience with new equipment and technologies ○ Implement capacity building initiatives to equip individuals with essential skills required for their roles in the construction process ○ Establish a system for continuous monitoring and evaluation of the training programs to ensure their effectiveness ○ Involve local communities in the planning and execution of skill development initiatives to ensure relevance and sustainability. | Contractor/ UPIU/ Consultant | N/A Part of its project cost |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|--------------------------------|--|--|------------------------------|---------------------------------|
| | | <ul style="list-style-type: none"> ○ Implement a monitoring and evaluation system to track the effectiveness of the skills transfer programs. ○ Regularly assess the impact on individuals and the community to make necessary adjustments for continuous improvement. | | |
| 4 | Improved quality of life and living standard | <ul style="list-style-type: none"> ○ Conducting awareness programs to promote understanding and tolerance among the diverse workforce. ○ Encouraging cultural exchange initiatives to foster positive interactions between the local community and newcomers. ○ Conducting awareness programs to promote understanding and tolerance among the diverse workforce. ○ Encouraging cultural exchange initiatives to foster positive interactions between the local community and newcomers. ○ Conducting awareness programs to promote understanding and tolerance among the diverse workforce. ○ Encouraging cultural exchange initiatives to foster positive interactions between the local community and newcomers. ○ Providing temporary housing solutions for construction workers to minimize any strain on local resources and infrastructure | Contractor/ UPIU/ Consultant | N/A Part of its project cost |
| NEGATIVE SOCIAL IMPACTS | | | | |
| 5 | Prevalence of Communicable diseases | <ul style="list-style-type: none"> ○ Provide awareness to public on pathways communicable diseases. ○ Provide Voluntary Counselling and Testing (VCT) centers for HIV/AIDS at MU and the surrounding communities. ○ Work close to government and private institutions that deal with the spread of communicable diseases ○ Provide more healthcare services and medical equipment for treatment. ○ Work close to government and private institutions that deal with the spread of communicable diseases. ○ Provide easy access to free or affordable condoms on the construction site and within the local communities to encourage safe sexual practices and reduce the risk of STDs, including HIV/AIDS. ○ Establish regular health screening programs for construction workers to detect and address any potential communicable diseases early. This can include HIV testing, counseling, and access to medical care. ○ Foster community involvement in promoting health awareness and responsible behavior. Engage community leaders to support initiatives that discourage risky behaviors and emphasize the importance of health in the long term. | Contractor/ UPIU/ Consultant | 5,000,000 |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|-----|---|---|------------------------------|--------------------------------|
| | | <ul style="list-style-type: none"> ○ Implement campaigns to reduce the stigma associated with HIV/AIDS and other communicable diseases. This can help create a supportive environment for affected individuals to seek testing and treatment without fear of discrimination. ○ Increase security measures to discourage the influx of sex workers to the construction area. This may involve collaboration with local law enforcement to maintain a safe and secure environment. | | |
| 6 | Occupational Safety and Health impacts | <ul style="list-style-type: none"> ○ Institute good site practices include preventing public access to the construction site by securing equipment and demarcating excavation, using warning signs with appropriate text (local language) and graphic displays. ○ Contractor should have registered and qualified health and safety personnel in the project during construction phase. ○ Contractor shall develop and implement C-ESMP ○ Implement traffic management and safety initiatives, such as heavy truck operator and driver training and testing, speed limit enforcement, maximum load limitations, and adherence to all Tanzanian transportation laws and standards. ○ Awareness campaigns /Education on HIV and STDs shall be provided to workers; ○ Appropriate working gear (such as nose, ear and mouth mask and clothing) and good construction site management shall be provided. ○ The contractor is responsible for barricading the building site, maintaining it hygienically, and providing enough facilities, such as trash cans, fire extinguishers, and a clean, safe water supply. ○ A well-stocked First Aid kit (administered by medical personnel) shall be maintained at the construction site. The medical personnel shall also be responsible for primary treatment of ailments and other minor medical cases as well as providing health education to the workforce. ○ The establishment of reporting systems for the public to voice concerns or grievances over perceived hazards to their health and safety caused by the construction operation. ○ There will be proper signs on site to warn workers of safety requirements as regards machines with moving parts and other equipment at site. ○ Develop and implement an emergency plan including spill response. ○ Safe scaffoldings and railings will be provided at heights. ○ Creating a thorough health and safety plan and educating all contractor employees on it. | Contractor/ UPIU/ Consultant | 25,000,000 |
| 7 | Community Health, Safety and Security impacts | <ul style="list-style-type: none"> ○ Contractor should have registered and qualified health and safety personnel in the project during construction phase. | Contractor/ UPIU/ Consultant | 25,000,000 |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|-----|---------------------------------|--|------------------------------|--------------------------------|
| | | <ul style="list-style-type: none"> ○ Establish a health and safety monitoring system to ensure that workers comply with health protocols and minimize the risk of communicable diseases, including regular health check-ups and screenings. ○ Implement a comprehensive training program for all construction workers, emphasizing the importance of adhering to safety protocols, respecting local communities, and following a code of conduct to minimize negative impacts. ○ Implement disease prevention programs, including awareness campaigns and access to healthcare facilities, to address potential increases in diseases such as COVID-19 and HIV/AIDS. ○ Collaborate with local law enforcement to enhance security around construction sites, addressing concerns related to crime, prostitution, and alcohol abuse. Implement security measures within labor camps to ensure the safety of workers and the community. ○ Develop a comprehensive traffic management plan to mitigate the risks associated with increased traffic volume during the construction phase. This includes speed limits, road signage, and coordination with local authorities to enforce safety measures. ○ Conduct regular health impact assessments to monitor and address any emerging health issues within the project area, ensuring a prompt response to potential risks. ○ Properly manage labor camps to ensure adequate living conditions, sanitation facilities, and medical services for imported skilled workers, reducing the likelihood of negative impacts on local communities. ○ Work closely with local authorities to monitor and regulate prices of goods and services to prevent unjustified increases, ensuring that the local community is not adversely affected by inflation. ○ Foster collaboration with local authorities, community leaders, and relevant stakeholders to jointly address emerging challenges, promote transparency, and ensure that the project's social impacts are effectively managed. ○ Creating drainage channels to direct storm water movement. ○ Creating stone pitching where soils have been excavated | | |
| 8 | Conflicts and grievances | <ul style="list-style-type: none"> ○ Conduct workshops and awareness programs for construction workers on cultural norms and local sensitivities, emphasizing respectful behavior towards married women and school children. ○ Implement a structured grievance resolution mechanism that allows local community members to express concerns related to construction activities. This mechanism should ensure prompt and fair resolution of issues. ○ Contractor shall develop and implement GRM | Contractor/ UPIU/ Consultant | 5,000,000 |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|-----|---------------------------------|---|------------------------------|---------------------------------|
| | | <ul style="list-style-type: none"> ○ Implement effective dust control measures, such as water spraying and covering construction materials, to minimize the impact on the local environment and address concerns about dust and flying stones ○ Organize regular meetings between construction project representatives and the local community to discuss ongoing activities, address concerns, and foster open communication ○ Appoint a dedicated community liaison officer who serves as a point of contact between the construction team and the local community, facilitating communication and addressing grievances promptly ○ Ensure timely and transparent communication about the construction schedule, potential disruptions, and any necessary adjustments to minimize surprises and conflicts. ○ Implement regular monitoring of construction activities to ensure adherence to guidelines and regulations, with penalties for non-compliance, thereby promoting responsible conduct among construction workers. | | |
| 9 | Gender Discrimination | <ul style="list-style-type: none"> ○ Conduct awareness programs for all project stakeholders, including workers, community members, and decision-makers, emphasizing the importance of gender equality and discouraging discriminatory practices. ○ This project will ensure that there is involvement of women in project activities. ○ Provide specific training sessions for project staff on recognizing and addressing gender biases. This includes promoting fair treatment and equal opportunities for both men and women. ○ Implement transparent and inclusive hiring practices that ensure equal opportunities for men and women in employment and project-related activities. | Contractor/ UPIU/ Consultant | 5,000,000 |
| 10 | Influx of people | <ul style="list-style-type: none"> ○ Enhance efforts to prioritize hiring from local communities (Gombero ward) to minimize external migration for employment. ○ Implement skills training programs for the local population to enhance their employability and competitiveness for construction-related jobs ○ Organize job fairs and information sessions to ensure transparent communication about employment opportunities, reducing misinformation and speculation ○ Establish regular communication channels with the local communities to address concerns, provide updates, and gather feedback on employment-related issues ○ Collaborate with local authorities to develop and enforce policies that regulate the influx of people during construction, ensuring a balanced impact on the local population. ○ Implement monitoring mechanisms to ensure fair hiring practices and adherence to the preference for local employment, with penalties for non-compliance. | Contractor/ UPIU/ Consultant | N/A Part of its project cost |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|-----|---------------------------------|--|------------------------------|---------------------------------|
| | | <ul style="list-style-type: none"> ○ Implement job rotation programs and skill development initiatives to ensure a diverse range of individuals can participate in the construction activities, reducing intense competition for specific roles | | |
| 10 | Insecurity and theft | <ul style="list-style-type: none"> ○ Deploy trained security personnel to monitor the construction site, deterring potential thieves and enhancing overall security. ○ Install surveillance cameras strategically across the construction site to monitor activities and provide evidence in case of theft or security incidents ○ Implement strict access control measures, limiting entry points and ensuring that only authorized personnel have access to the construction site. ○ Install adequate lighting around the construction site to minimize areas of darkness, reducing the likelihood of unauthorized access and theft. ○ Foster a positive relationship with the local communities by involving them in the construction process, creating a sense of ownership and reducing the likelihood of theft. ○ Establish secure storage facilities for construction materials and equipment, ensuring they are locked and well-protected when not in use. ○ Conduct regular security audits to identify vulnerabilities and make necessary improvements to the security infrastructure | Contractor/ UPIU/ Consultant | 5,000,000 |
| 11 | Food Insecurity | <ul style="list-style-type: none"> ○ Develop a comprehensive plan in collaboration with local communities to ensure sustainable food sources during the construction phase. ○ Strengthen local supply chains for food by working with local farmers and vendors to meet the increased demand. ○ Implement mechanisms to monitor and control the prices of essential goods, especially food items. ○ Conduct awareness campaigns to educate the community about the potential impacts on food prices and steps being taken to mitigate the situation ○ Ensure efficient construction management to complete the project within the stipulated timeframe, minimizing the duration of increased demand for resources | Contractor/ UPIU/ Consultant | N/A Part of its project cost |
| 12 | Child labor | <ul style="list-style-type: none"> ○ MU will conduct regular monitoring of project workers in relation to health, working conditions, hours of work, minimum age, and the other requirements of national law. ○ Develop and enforce a comprehensive Labor Management Plan that strictly adheres to local and international labor laws and standards, particularly those related to the employment of minors. ○ Establish educational support programs to encourage children to stay in school and pursue their education. This can include scholarships, tutoring services, and awareness campaigns promoting the value of education. ○ Control school dropout by collaborating with the local government and schools in the Gombero Ward. | Contractor/ UPIU/ Consultant | 5,000,000 |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|------------------------------|--|--|------------------------------|--------------------------------|
| | | <ul style="list-style-type: none"> ○ Cooperate with relevant authorities like Ministry of Labor to control child labor ○ Create awareness raising to the communities on the importance of education to the children. ○ The local authorities should develop bylaws to control the engagement of children in petty business or work in project related activities | | |
| ENVIRONMENTAL IMPACTS | | | | |
| 13 | Impairment of air quality due to dust and gases emission | <ul style="list-style-type: none"> ○ Implement effective dust suppression techniques, such as using water sprays or dust suppressants on construction sites to minimize the release of fugitive dust. ○ Prioritize the preservation of existing vegetation during construction to reduce the need for extensive clearance, minimizing the disturbance that contributes to dust emission. ○ Cover sand and aggregate stockpiles to prevent wind erosion and reduce the dispersion of particulate matter into the air. ○ Opt for construction practices that minimize soil disturbance and dust generation, such as limiting heavy machinery movement. ○ Provide workers with appropriate PPE, including masks and respiratory protection, to safeguard their health against potential exposure to airborne particulate matter. ○ Conduct awareness programs for the local community to educate them about the temporary nature of the air quality impact, its potential health risks, and the implemented mitigation measures. ○ Establish a monitoring system to regularly assess air quality during construction, ensuring that concentrations of PM2.5 and PM10 remain within acceptable limits. ○ Develop a responsive action plan to promptly address any exceedance of emission limits or unexpected air quality issues, ensuring a proactive approach to mitigation. | Contractor/ UPIU/ Consultant | 10,000,000 |
| 14 | Increased Noise level | <ul style="list-style-type: none"> ○ Implement construction activities during specific time windows to minimize disruption during sensitive hours, such as early mornings or late evenings when community activities are at a minimum. ○ Install temporary acoustic barriers or soundproofing measures around noisy machinery and construction sites to contain and reduce the propagation of noise. ○ Ensure that all construction equipment undergoes regular maintenance to reduce noise emissions. Well-maintained machinery tends to operate more quietly. ○ Providing ear protection materials for the workers in noisy area. ○ Proactively communicate construction schedules and potential noise impacts to the local community. Seek feedback and address concerns to foster understanding and cooperation ○ Provide training to construction workers on the importance of minimizing noise pollution and adopting practices that contribute to a quieter working environment | Contractor/ UPIU/ Consultant | 5,000,000 |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|-----|---------------------------------|--|------------------------------|---------------------------------|
| 16 | Increased vibration | <ul style="list-style-type: none"> ○ Explore and implement advanced construction techniques that minimize vibrations. This may include the use of specialized equipment designed to reduce ground vibrations during activities like blasting and impact pile driving. ○ Establish effective communication channels with the local community to provide timely information about construction schedules and activities that may cause vibrations. This helps residents to take necessary precautions and prepares them for potential disruptions. ○ Install vibration monitoring devices in key locations to continuously monitor ground vibrations during construction. This real-time data can be used to assess the impact and adjust construction methods accordingly to stay within acceptable limits ○ Modify construction methods to minimize vibration generation. For example, consider alternative pile driving techniques or adjust blasting procedures to reduce the intensity of vibrations ○ Foster an open dialogue with the local community to address concerns and gather feedback. This engagement can help in refining mitigation measures based on community input and building a collaborative approach to managing the impact | Contractor/ UPIU/ Consultant | 2,000,000 |
| 14 | Impact on climate change | <ul style="list-style-type: none"> ○ Implement the use of renewable and cleaner energy sources for construction equipment to minimize the emission of greenhouse gases. This could involve using electric or hybrid machinery powered by sustainable energy. ○ Install and enforce the use of emission control technologies on fuel-powered equipment to reduce the release of carbon dioxide and noxious gases into the atmosphere during construction activities. ○ Optimize construction practices to minimize the overall carbon footprint, such as efficient waste management, recycling of materials, and reducing energy-intensive processes where possible ○ Raise awareness among local residents in Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages about the potential impacts of construction on climate change. Engage with the community to foster understanding and support for sustainable construction practices. ○ Adhere to green building standards and certifications that promote environmentally friendly construction practices. This includes designing and constructing buildings that are energy-efficient and have minimal environmental impact. ○ Implement a robust monitoring system to track and report greenhouse gas emissions during construction. This will help in identifying areas for improvement and ensuring compliance with emission reduction measures. | Contractor/ UPIU/ Consultant | N/A Part of its project cost |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|-----|---------------------------------|---|------------------------------|--------------------------------|
| | | <ul style="list-style-type: none"> ○ Ensure strict adherence to local environmental regulations and standards governing construction activities. Regular inspections and enforcement measures can help prevent excessive emissions and promote responsible construction practices. ○ Plan for post-construction rehabilitation efforts to offset any environmental impact caused during the construction phase. This could involve planting trees, restoring natural habitats, or other measures to enhance the local environment. | | |
| 15 | Generation of Solid waste | <ul style="list-style-type: none"> ○ Contractor shall provide waste handling facilities such as waste bins and skips for temporarily holding domestic waste generated at the site. ○ Maintaining cleanliness on site to reduce the amount of solid and liquid waste produced during construction and associated tasks. ○ Consult Environmental Officer from Mkinga District Council about the suitable the permit for disposing solid and hazardous waste at Mpirani landfill ○ Implement a comprehensive waste segregation system to separate recyclable materials from hazardous and non-biodegradable waste. ○ Adhere to proper disposal methods for hazardous substances and materials, following established guidelines and regulations. ○ Employ certified waste disposal services to ensure safe handling of hazardous waste ○ A special focus on waste minimization will be made in order to cut down on the amount of solid waste generated during site preparation and construction. ○ Topsoil shall be stockpiled and used for reclamation or re-vegetation at the site during landscaping. ○ Develop a detailed waste management plan that outlines proper disposal methods, recycling procedures, and strategies for reducing waste generation. ○ Ensure adherence to the waste management plan throughout the construction and operational phases ○ Conduct training sessions for construction and operational staff on proper waste handling, segregation, and disposal practices. ○ Unusable construction trash, including broken pipes, formwork, and other building supplies, will be disposed at a designated area | Contractor/ UPIU/ Consultant | 1,000,000 |
| 16 | Generations of Liquid Wastes | <ul style="list-style-type: none"> ○ Enforce and adhere to best practices in waste management to ensure that all liquid wastes are handled and disposed of in an environmentally responsible manner, minimizing health risks and pollution ○ Conduct awareness programs for the local community in Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages educating residents about the importance of proper waste disposal and its impact on health and the environment. ○ Contractor shall be instructed to put in place acceptable procedure for handling hazardous waste such as oils, lubricants and non-combustible waste. | Contractor/ UPIU/ Consultant | 1,000,000 |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|-----|---------------------------------|---|------------------------------|---------------------------------|
| | | <ul style="list-style-type: none"> ○ Wastewater will be discharged directly to the existing WSP and the proposed one that will be established under HEET project. ○ Establish a monitoring system to regularly assess the effectiveness of waste management practices during construction. Enforce strict compliance measures to ensure that all generated liquid wastes are treated and disposed of according to established standards. ○ Collaborate with local environmental regulatory authorities to ensure that the construction activities comply with existing regulations and standards for waste management. ○ Develop and implement an emergency response plan to address any unforeseen incidents or spills during the construction phase, minimizing the potential for long-term environmental damage. ○ Explore opportunities for reusing or recycling treated water where applicable, reducing the overall volume of liquid waste generated and promoting sustainable water management practices. | | |
| 19 | Erosion of Exposed Surfaces | <ul style="list-style-type: none"> ○ Implement thorough compaction and resurfacing techniques during construction to minimize exposed surfaces prone to erosion. ○ Introduce erosion control measures such as the use of erosion control blankets, sediment barriers, and vegetative cover to reduce the impact of rain, trampling, and vegetation clearance. ○ Construction will be done as per engineering design and procedure of which a maximum requirement of compaction strength is achieved during the construction. That is maximum dry density (MDD) specified in the design manual by consultant. ○ Maintain gravel fill and/or re-vegetate around the structures. ○ Plan construction activities considering weather conditions to avoid exacerbating erosion during periods of heavy rainfall. ○ Most of construction activities will be done during dry weather. ○ Engage with local communities in Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages to raise awareness about the potential impacts of construction and involve them in decision-making processes. ○ Implement measures to protect local resources during construction to minimize disruptions to the communities. ○ Establish a monitoring system to track erosion control measures and enforce compliance with construction guidelines to prevent excessive sedimentation in runoffs. ○ Develop plans for post-construction restoration, including replanting vegetation and rehabilitating affected areas to promote environmental recovery. | Contractor/ UPIU/ Consultant | N/A Part of its project cost |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|-----|---|---|------------------------------|---------------------------------|
| 20 | Loss of visual aesthetics | <ul style="list-style-type: none"> ○ Avoidance and minimizing strategies for disposed wastes. ○ All structures should adhere to set standards in terms of quality, shapes, height, color etc. ○ Integrate landscaping initiatives and create green spaces within and around the project site. Planting trees and maintaining natural elements will help preserve the visual appeal and soften the urbanized look. ○ Implement visual barriers such as construction fences, temporary screens, or artistic panels to shield construction activities from direct view. This will minimize the visual intrusion experienced by residents ○ Enforce strict construction schedules to limit noisy and visually disruptive activities to specific hours, reducing the impact on the community during peak times. ○ Foster open communication with the local community to gather feedback and address concerns related to visual changes. This involvement can help tailor mitigation efforts to meet community expectations. ○ If nighttime construction is necessary, use low-impact lighting to minimize light pollution. Shielding and directing lights away from residential areas will preserve the night sky's visual quality. ○ Develop comprehensive plans for the post-construction period, including the restoration of altered landscapes. This may involve replanting native vegetation and restoring natural features to enhance the visual aesthetics | Contractor/ UPIU/ Consultant | 2,000,000 |
| 21 | Loss of vegetations | <ul style="list-style-type: none"> ○ Implement a comprehensive plan for revegetation and reforestation in and around the construction site to restore the indigenous trees. ○ Integrate green construction practices to minimize the need for extensive clearing of natural vegetation. ○ Explore alternative construction methods that reduce the ecological footprint. ○ Close supervision of earthworks shall be observed in order to confine land clearance within the project site. ○ Implement erosion control measures, such as the installation of sedimentation barriers and erosion control blankets, to prevent soil erosion from wind and water. ○ Regularly review and update the environmental management plan based on monitoring and feedback. | Contractor/ UPIU/ Consultant | N/A Part of its project cost |
| 22 | Impact on natural resource (Energy and water) | <ul style="list-style-type: none"> ○ Promote the use of renewable energy sources, such as solar or wind power, to reduce reliance on fossil fuels. Optimize machinery and vehicle operations to minimize fuel consumption. ○ Implement recycling and reuse systems for water used in construction activities. Utilize alternative water sources, such as rainwater harvesting, to reduce dependency on municipal water. | Contractor/ UPIU/ Consultant | 3,000,000 |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|--------------------------------|---------------------------------|---|------------------------------|---------------------------------|
| | | <ul style="list-style-type: none"> ○ Establish a comprehensive monitoring system to track energy and water usage throughout the construction phase ○ Conduct awareness campaigns to educate the local community about the importance of resource conservation during construction ○ Implement strict regulations and guidelines to ensure responsible resource management. Regularly assess and audit resource consumption to identify areas for improvement. ○ Ensure that the construction complies with environmentally friendly building standards. Implement rainwater harvesting, energy-efficient lighting, and insulation to reduce overall resource impact | | |
| DEMobilisation Phase | | | | |
| POSITIVE SOCIAL IMPACT | | | | |
| 1 | Reduced noise level | <ul style="list-style-type: none"> ○ Removing all working and damaged construction mechanical equipment's | Contractor/ UPIU/ Consultant | 5,000,000 |
| NEGATIVE SOCIAL IMPACTS | | | | |
| 2 | Loss of employment | <ul style="list-style-type: none"> ○ Implement skill development programs to enhance the employability of the affected workers. ○ Provide training in areas with high demand in the local job market. ○ Informing workers, the project duration when employing them ○ Establish job placement services to assist displaced workers in finding alternative employment opportunities. ○ Educating the labour force on the need to save part of their wages. ○ Paying severance benefit to all laid off workers according to the provision of the labour laws. ○ Establish community support programs to provide financial assistance or counseling services to those facing immediate economic challenges. | Contractor/ UPIU/ Consultant | N/A Part of its project cost |
| 3 | Loss of business opportunities | <ul style="list-style-type: none"> ○ Offer training programs to local traders and entrepreneurs to diversify their products and services. This can help them adapt to changing circumstances and explore alternative business opportunities beyond construction-related activities ○ Establish clear communication channels between the construction project management and local businesses. This ensures that businesses are informed about the project timeline, allowing them to plan for potential disruptions and adjust their operations accordingly. ○ Encourage collaboration among local businesses to create a network that can collectively address challenges and explore new business opportunities. This can foster resilience and community support. | Contractor/ UPIU/ Consultant | N/A Part of its project cost |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|--|---|--|------------------------------|---------------------------------|
| | | <ul style="list-style-type: none"> ○ Facilitate the establishment of support services for construction workers, such as designated areas for purchasing food from local entrepreneurs. This ensures that some business activities can continue despite the temporary disruptions. ○ Advocate for and facilitate access to government assistance programs for affected businesses. This could include tax relief, low-interest loans, or other financial support measures. ○ Work with local authorities and businesses to develop long-term plans for economic resilience, considering potential future construction projects and identifying strategies to minimize the impact on local businesses. | | |
| ENVIRONMENTAL IMPACTS | | | | |
| 4 | Dust and noise pollution from demolishing works | <ul style="list-style-type: none"> ○ Employ dust control technologies such as water spraying systems to minimize the release of dust particles during demolition activities. This will help maintain better air quality ○ Implement noise reduction strategies, including the use of sound barriers, noise-dampening equipment, and scheduling noisy activities during specific times to minimize disruption to nearby residents. ○ Provide workers with personal protective equipment (PPE) such as masks and ear protection to mitigate health risks associated with dust inhalation and prolonged exposure to high noise levels ○ Conduct awareness programs for local residents, informing them about the demolition schedule, potential impacts, and measures being taken to mitigate dust and noise pollution. This foster understanding and cooperation ○ Establish a monitoring system to regularly assess air quality and noise levels. Implement a reporting mechanism to promptly address any deviations from acceptable standards, allowing for quick corrective actions ○ Explore and utilize demolition methods that generate less dust and noise, such as mechanical methods that are more controlled and produce fewer airborne particles. | Contractor/ UPIU/ Consultant | 5,000,000 |
| OPERATIONAL AND MAINTANANCE PHASE | | | | |
| POSITIVE SOCIAL IMPACTS | | | | |
| 1 | Increase of admission of students to MU | <ul style="list-style-type: none"> ○ Gender and disabled groups will be considered during the student's selection process ○ MU shall increase advertisement to attract more students to study the priority programmes for the Nation | UPIU | N/A Part of its project cost |
| 2 | Increase of revenue to MU | <ul style="list-style-type: none"> ○ Innovate business activities linked with academic activities for enhancing income of the University ○ Implement robust financial management practices to ensure that the increased revenue is allocated efficiently and effectively. | UPIU | N/A |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|-----|---|---|------------------|--------------------------------|
| | | <ul style="list-style-type: none"> ○ Establish financial reserves for unforeseen circumstances and to secure the long-term financial stability of MU ○ Develop a comprehensive risk management plan to identify and mitigate potential risks that could impact the financial stability and success of MU. ○ Implement a robust monitoring and evaluation system to track the outcomes and impacts of the new buildings and other initiatives. ○ Develop and expand online education programs to reach a wider audience and attract students from different geographic locations. | | |
| 3 | Job creation | <ul style="list-style-type: none"> ○ Implement skill development programs and training initiatives to enhance the employability of local residents. This could include vocational training in areas relevant to the institution's operations, such as hospitality, agriculture, and business management. ○ Prioritize the hiring of local residents for various positions within the institution. This can be facilitated through collaboration with local employment agencies or community outreach programs to connect potential employees with job opportunities. ○ Foster partnerships with local businesses in the cleanliness, stationery, catering, and commercial sectors to ensure a mutually beneficial relationship. This can stimulate economic growth in the community and create additional job opportunities. ○ Establish initiatives or support existing programs that promote entrepreneurship within the community. This could involve providing mentorship, or resources to aspiring entrepreneurs, thereby creating new businesses and job opportunities. ○ Engage with the local community through regular communication channels to inform them about job opportunities, skill development programs, and other initiatives. Educate the community on the long-term benefits of the institution and how they can actively participate in and benefit from its operations. | UPIU | N/A |
| 4 | Increased commercial and social activities around project locations | <ul style="list-style-type: none"> ○ Establish platforms for ongoing dialogue between the university and local businesses to understand their needs and concerns. ○ Offer training programs and workshops to local residents to enhance their skills and make them more employable in the growing market. ○ Collaborate with local vocational institutions to provide specialized training in areas related to the services and goods in demand. ○ Organize cultural and social events on the university campus that attract residents from the surrounding areas, fostering a sense of community and promoting local businesses. ○ Develop and implement policies that prioritize the procurement of goods and services from local businesses, thereby supporting the local economy. | UPIU | N/A |
| 5 | Government Revenue | <ul style="list-style-type: none"> ○ The project will allocate a portion of its generated revenue to various governmental regulatory authorities such as the NEMC, MORUWASA, TANESCO, FIRE and | UPIU | N/A |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
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| | Collection and economic growth | Rescue Force, and OSHA. This financial support will enable these authorities to carry out their functions effectively and contribute to overall regional development. <ul style="list-style-type: none"> Local authorities should identify the new sources of revenue in the area. Strengthening revenue collection mechanisms. Awareness creation for the people in the area on the importance of paying revenues. | | |
| 6 | Growth of Trade and Increased Investment | <ul style="list-style-type: none"> Sensitize the community to invest to accommodate business opportunities inclined by the increasing students' enrolment. | UPIU | N/A |
| 7 | Production of skilled labor force for implementing various development policies, plans and goals for sustainable social and economic growth of the Nation | <ul style="list-style-type: none"> The project aims to boost student enrollment, indicating a proactive approach to meet the growing demand for skilled professionals in alignment with national development policies. MU is committed to providing high-quality education to its students, ensuring that graduates possess the necessary skills and knowledge to contribute effectively to the nation's development goals. The project emphasizes aligning its curriculum and training programs with the priorities outlined in national development policies. This ensures that graduates are well-prepared to address the specific needs and challenges of the country. MU recognizes its crucial role in supporting Tanzania's industrialization efforts. By tailoring its educational programs to meet the demands of the labor market, the institution directly contributes to the development of a skilled workforce that can drive economic growth in the industrial sector | UPIU | N/A |
| 8 | The growth of banking activities in the project area | <ul style="list-style-type: none"> The project anticipates a surge in banking institutions establishing offices in the area. This growth is attributed to the overall expansion of banking activities driven by factors such as population growth, increased investments, and heightened trading activities. Factors like the rise in student enrollment at MU, the creation of employment opportunities, and increased income for residents and workers are expected to contribute to the circulation of funds in the local economy. This, in turn, makes the area more attractive for additional Banking institutions. The expectation is that both skilled and unskilled employees at MU will receive their payments through the Banking system. This integration of the payment system is likely to further incentivize Banks to operate in the area | UPIU | N/A |
| NEGATIVE SOCIAL IMPACTS | | | | |
| 9 | Increased incidences of diseases and ill health | <ul style="list-style-type: none"> Implement proactive health interventions during and after the project to address the specific health concerns of the local communities. This may include vaccination programs, health education, and access to healthcare services. | UPIU | 35,000,000 |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|-----|---|---|------------------|--------------------------------|
| | | <ul style="list-style-type: none"> ○ A safety, health and environment induction course shall be conducted to all students and workers, putting more emphasis on HIV/AIDS, which has become a national disaster as well as other emerging pandemics such as COVID 19 and dengue fever. ○ The proponent shall conduct medical examinations for their workers annually. ○ The project shall include information education and communication component (IEC) in its budget. This will help to raise more awareness on HIV/AIDS and means to suppress its incidence. ○ Introduce preventive measures to reduce the likelihood of disease transmission. This could involve promoting hygiene practices, ensuring clean water and sanitation facilities, and establishing protocols for waste disposal to minimize environmental health risks. ○ Engage with local communities to raise awareness about the importance of health and hygiene. Encourage community participation in health programs and empower them to take ownership of their well-being. ○ Establish a robust system for monitoring and surveillance of health conditions in the affected areas. This includes early detection of potential outbreaks, tracking disease trends, and implementing timely responses. ○ Collaborate with local health authorities and organizations to leverage their expertise and resources. This partnership can enhance the effectiveness of health interventions and ensure a coordinated response to health challenges. ○ Develop and implement emergency response plans to handle any sudden increases in disease incidences. This includes having protocols in place for rapid deployment of medical teams and resources in the event of an outbreak. | | |
| 10 | Increased pressure on social services and utilities | <ul style="list-style-type: none"> ○ Use of water conservatively by instituting technologies (e.g., self-lock water taps) and awareness raising notices to users, etc. ○ Establishment of water reservoir tanks and introducing rainwater harvest system; ○ Investing in training and capacity building programs for local service providers to enhance their ability to cope with increased demand. This could involve training healthcare professionals, utility workers, and other service providers to efficiently manage the rising needs of the community. ○ Conducting outreach programs to involve the local community in the planning and implementation process. This engagement helps in identifying specific needs and concerns of the community, ensuring that the development initiatives are culturally sensitive and well-received. ○ Implementing employment generation programs that focus on local hiring. By prioritizing the employment of local residents, the impact on housing, transportation, and other services can be mitigated, reducing the strain on social services. | UPIU | 10,000,000 |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|-----|------------------------------------|---|------------------|--------------------------------|
| | | <ul style="list-style-type: none"> ○ Implementing measures to optimize the use of resources, such as energy-efficient technologies and water conservation practices. This can contribute to reducing the overall demand on utilities, making them more sustainable in the face of increased pressure. ○ Establishing strong partnerships with local government authorities to jointly plan and implement infrastructure projects. This collaboration ensures that the development aligns with the overall growth strategy of the area and leverages available resources efficiently. Extraction of underground water resources; | | |
| 11 | Incidence of Gender Based Violence | <ul style="list-style-type: none"> ○ Plan that ensures project awareness raising strategy (for workers and community members), a list of GBV service Providers to which GBV survivors will be referred, revisions to the GRM to ensure it can address GBV complaints, and information on GBV allegation procedures in the workplace. ○ Implement comprehensive awareness programs within Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages to educate residents about the importance of gender equality, consent, and the prevention of GBV. ○ Promote community dialogues to address cultural norms contributing to GBV and encourage positive behavioral changes. ○ Establish and enforce clear institutional policies at MU-Tanga campus to prevent and address GBV among students and staff. ○ Provide support services such as counseling and helplines within MU-Tanga campus to assist those affected by GBV. ○ Conduct training sessions for MU students and staff on recognizing and responding to signs of GBV. ○ Equip community leaders and relevant stakeholders with the skills to identify and address GBV issues effectively. ○ Create safe spaces within MU and the surrounding community where individuals can seek refuge and support. ○ Implement security measures to enhance the safety of students and residents, particularly during vulnerable times. ○ Establish a robust monitoring and evaluation system to track the effectiveness of interventions in reducing GBV. ○ Regularly assess the incidence of GBV and adjust strategies accordingly to address emerging challenges. ○ Collaborate with local authorities and law enforcement to ensure a swift response to reported cases of GBV. Also, foster partnerships with local organizations working on GBV prevention to leverage resources and expertise | UPIU | 15,000,000 |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|-----|---|---|------------------|--------------------------------|
| | | <ul style="list-style-type: none"> ○ Empower students with the knowledge and skills to advocate against GBV and contribute to a safer community. ○ Support community-led initiatives that empower individuals, especially women, to challenge and overcome GBV | | |
| 12 | Disruption of traffic flow | <ul style="list-style-type: none"> ○ Develop a comprehensive traffic management plan that considers the anticipated increase in vehicular and non-motorized traffic during the operational phase. This plan should outline specific measures to mitigate congestion and enhance safety in the surrounding areas. ○ Strategically place additional signboards to guide and inform road users about the changes in traffic patterns, entrances, and other relevant information. Clear signage can help prevent confusion and improve overall traffic flow. ○ Implement coordinated traffic control measures to optimize the flow of vehicles and ensure smooth operation near university entrances. This may involve the deployment of traffic personnel during peak hours or special events to manage the increased traffic. ○ Launch a public awareness campaign to inform the community, including students, faculty, and local residents, about the expected changes in traffic conditions. This could include distributing informational materials, organizing workshops, and using digital platforms to educate the public. ○ Explore the use of technology, such as smart traffic lights or traffic monitoring systems, to enhance traffic flow efficiency. These solutions can be integrated with the existing infrastructure to dynamically manage traffic based on real-time conditions. ○ Establish a feedback mechanism for the community to report any issues related to traffic disruption. This allows for continuous monitoring and adjustment of the traffic management plan based on feedback from the users. | UPIU | 10,000,000 |
| 13 | Health and safety risks due to fire hazards | <ul style="list-style-type: none"> ○ Adequate number of portable fire extinguishers shall be placed at strategic locations. ○ Regular fire and other disaster drills and awareness training shall be conducted. ○ Fire detectors and sprinkler systems shall be installed in the buildings. ○ The proponent shall insure buildings against fire Hazards. ○ Workers will be sensitized on appropriate fire prevention measures. ○ Good housekeeping shall be maintained at all sites to reduce the fire risk. ○ The design of the buildings shall strictly adhere to the Fire Safety Standards. | UPIU | 10,000,000 |
| 14 | Increased level of crimes | <ul style="list-style-type: none"> ○ Increase the presence of law enforcement and security personnel in the affected areas. ○ Implement advanced surveillance systems and technologies to monitor and respond to criminal activities. ○ Establish community policing programs to foster collaboration between law enforcement and local residents. | UPIU | 20,000,000 |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|-----|---------------------------------|---|------------------|--------------------------------|
| | | <ul style="list-style-type: none"> ○ Develop and implement community outreach programs to raise awareness about crime prevention strategies. ○ Encourage community members to actively participate in crime prevention through neighborhood watch programs. ○ Conduct regular awareness campaigns to educate residents about the potential risks and how to protect themselves. ○ Strengthen partnerships with local government agencies, community leaders, and NGOs to create a coordinated response to crime. And establish communication channels for sharing information and coordinating efforts to address security concerns. ○ Introduce social programs and initiatives aimed at addressing the root causes of crime, such as unemployment, poverty, and lack of educational opportunities. ○ Support community development projects that contribute to a positive and inclusive social environment | | |
| 15 | Increased Water Demand | <ul style="list-style-type: none"> ○ Install water conserving taps that turn- off automatically when water is not in use. ○ Encourage water reuse/recycling during occupation phases. ○ Roof catchments of building blocks should be provided with rainwater harvesting systems (gutters, down pipes and water storage facilities) to enhance collection and storage of the resulting run-off. Such water can be used in watering flower gardens, general cleaning etc. ○ Implement comprehensive water resource management strategies to ensure sustainable use. ○ Monitor water sources regularly to assess the impact on local water availability. ○ Promote water-efficient technologies and practices within the establishment to minimize consumption. ○ Implement water conservation measures such as rainwater harvesting and reuse/recycling ○ Conduct awareness programs to educate local communities about responsible water usage. ○ Involve local communities in the planning and implementation of water management initiatives. ○ Establish a robust monitoring and reporting system to track water usage, community impacts, and the effectiveness of mitigation measures. And share regular updates with stakeholders and the public to maintain transparency. | UPIU | N/A |
| 16 | Increased Energy Demand | <ul style="list-style-type: none"> ○ Put off all lights immediately when not in use or are not needed. ○ Use energy conserving electric lamps for general lighting. ○ Integrate energy-efficient technologies and equipment in laboratory operations, focusing on reducing energy consumption without compromising functionality. | UPIU | N/A |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|---------------------------------------|---------------------------------|--|------------------|--------------------------------|
| | | <ul style="list-style-type: none"> ○ Implement advanced climate control systems that optimize heating, ventilation, and air conditioning (HVAC) to ensure energy is used more efficiently, adapting to specific needs and usage patterns ○ Replace traditional lighting systems with energy-efficient LED lighting and incorporate motion sensors to automatically control lighting based on occupancy, reducing unnecessary energy consumption. ○ Invest in renewable energy sources, such as solar panels or wind turbines, to supplement the energy demand and decrease reliance on traditional, carbon-intensive sources. ○ Conduct awareness programs to educate staff on energy conservation practices, encouraging them to adopt behaviors that contribute to energy efficiency in their daily operations. ○ Implement protocols and procedures to enhance operational efficiency, minimizing idle time for equipment and ensuring that energy-intensive processes are streamlined for maximum productivity. ○ Conduct regular energy audits to identify areas of improvement and track energy performance over time. This will help refine energy-saving strategies and address any emerging issues promptly. ○ Engage with local energy providers to explore collaborative measures, such as demand-response programs or incentives for adopting energy-efficient practices. | | |
| NEGATIVE ENVIRONMENTAL IMPACTS | | | | |
| 17 | Increased water pollution | <ul style="list-style-type: none"> ○ Wastewater will be discharged directly into the proposed WSP at the campus. ○ Implement advanced treatment technologies to ensure that wastewater, especially from laboratories, undergoes proper treatment before being released into WSP. ○ Implement strict compliance measures to ensure that the hazardous liquid waste meets acceptable environmental standards before disposal. ○ Conduct educational programs within Gombero ward particularly Pangarawe area to raise awareness among community members and MU-Staff about the potential environmental impact of improper wastewater disposal. ○ Promote responsible laboratory practices and waste management to reduce the generation of hazardous liquid waste. ○ Collaborate with local communities in Gombero ward to create awareness about the environmental consequences of water pollution. And involve community members in monitoring activities and reporting any observed anomalies in water quality. ○ Develop and implement emergency response plans to address any accidental spills or releases of hazardous substances into the wastewater system. | UPIU | 8,000,000 |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|-----|---|---|------------------|--------------------------------|
| 18 | Increased storm water generation and overflow | <ul style="list-style-type: none"> ○ The design of storm water drainage will be given a high priority for the new buildings. ○ The design shall provide sufficient greenery area for facilitating soil infiltration. ○ Creating rainwater management systems can help prevent runoff and promote infiltration. This may include the use of rainwater harvesting tanks, drainage systems, and water retention areas for collecting and distributing rainwater. ○ Installing permeable pavements to promote infiltration and reduce runoff. ○ Constructing retention and detention basins to temporarily store stormwater and control the release of runoff into the drainage system ○ Incorporating vegetative swales and buffer strips to slow down and filter stormwater, promoting natural infiltration and reducing soil erosion ○ Utilizing green roofs on buildings to absorb and slow stormwater runoff, reducing the volume and velocity of water entering the drainage system | UPIU | N/A |
| 19 | Impact from poor hygienic condition | <ul style="list-style-type: none"> ○ Provision of adequate toilets for students and workers. ○ Sensitisation of workers on understanding of potential health and safety issues related to poor hygienic condition. ○ Construction of WSP for disposal of liquid wastes. ○ Regular Inspection and maintenance of the waste water system network ○ Improve dust suppression mechanisms within the MU premise | UPIU | 5,000,000 |
| 20 | Generation of solid and hazardous wastes | <ul style="list-style-type: none"> ○ Provision of dust bins or rubbish pits for the wastes produced. ○ Ensure that the scrap metals and other hazardous wastes are well managed stored and dispersed off via licensed scrap metal dealers. ○ Prohibit open burning since will increase pollutant gases to the atmosphere. ○ Implement a comprehensive waste segregation system to categorize different types of waste materials. ○ Establish incinerator at health Centre, Student hostel and Staff house to ensure proper management of all non-biodegradable waste like sanitary pad etc. ○ Establish recycling facilities or system to process recyclable materials such as paper, cardboard, plastics, and metals. ○ Implement a waste segregation system that separates waste into different categories such as recyclables (paper, plastic, glass, metal), organic waste (food scraps, yard waste), and non-recyclables. Provide clearly labeled bins for each category in easily accessible areas. ○ Conduct awareness campaigns and workshops to educate students, faculty, and staff about the importance of waste management, proper segregation, and the benefits of recycling and composting. | UPIU | 10,000,000 |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|------------------------------|---------------------------------|---|------------------|--------------------------------|
| | | <ul style="list-style-type: none"> ○ Establish a composting system for organic waste generated in cafeterias areas. The compost produced can be used for landscaping and gardening projects on campus. ○ Implement a system for collecting and properly disposing of electronic waste (e-waste) such as old computers, printers, and other electronic devices. ○ Provide training for staff on safe handling and storage of hazardous materials to reduce the risk of accidents and spills. ○ Implement secure storage facilities with appropriate containment measures to prevent leaks or contamination ○ Regularly monitor waste generation, segregation, and disposal practices on campus. | | |
| 21 | Generation of Liquid waste | <ul style="list-style-type: none"> ○ Ensure that the wastewater is properly treated through WSP before being discharged into the open environment. ○ Develop and implement comprehensive waste management plans specifically targeting liquid waste generated. This includes proper disposal methods, recycling initiatives, and the use of environmentally friendly practices. ○ Optimize sanitation systems to minimize liquid waste production. This may involve the installation of water-efficient fixtures, regular maintenance to address leaks, and the use of technologies that reduce water usage in sanitation facilities. ○ Implement strategies to control and manage rainwater runoff to prevent contamination. This could involve the installation of permeable surfaces, green infrastructure, and drainage systems designed to capture and treat runoff before it enters water bodies. ○ Promote water-efficient practices in laboratories to reduce water consumption. This may include the use of advanced equipment that minimizes water usage, recycling systems for laboratory water, and the adoption of best practices in water conservation. ○ Establish monitoring programs to regularly assess liquid waste generation and ensure compliance with environmental regulations. This involves conducting regular inspections, implementing corrective actions when necessary, and maintaining records to track the effectiveness of mitigation measures ○ Conduct training programs for staff involved in construction and operation to raise awareness about the importance of liquid waste management. Promote a culture of environmental responsibility and provide guidelines for responsible waste disposal. ○ Develop and implement emergency response plans to address unforeseen spills or incidents related to liquid waste. This includes having the necessary equipment and trained personnel to respond promptly to minimize the impact on the environment. | UPIU | 10,000,000 |
| DECOMMISSIONING PHASE | | | | |
| POSITIVE IMPACT | | | | |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|--------------------------------|--|---|--------------------------------|--------------------------------|
| 1 | Improved Environmental Conservation | <ul style="list-style-type: none"> ○ Develop and implement a comprehensive environmental conservation plan that outlines specific measures to protect environment in the area during and after decommissioning. ○ Implement environmental restoration programs to rehabilitate any areas disturbed during decommissioning phases. ○ Conduct environmental education programs for the local community, emphasizing the importance of environmental conservation and the role of the academic institution in promoting sustainable practices. ○ Collaborate with local farmers, beekeepers, and other community members to integrate sustainable practices into their activities, ensuring a harmonious coexistence with the protected environment. ○ Work closely with relevant government agencies to ensure that the abandonment and decommissioning process adheres to all regulatory requirements for environmental conservation | Contractor/ MU-PIU/ Consultant | 10,000,000 |
| NEGATIVE SOCIAL IMPACTS | | | | |
| 2 | Loss of employment and business opportunities | <ul style="list-style-type: none"> ○ Seminars shall be conducted on alternative means of livelihood after termination of job. ○ Implement comprehensive employment transition programs for affected workers, including skill development and retraining initiatives to enhance their employability in alternative sectors. ○ Establish a support mechanism for local businesses affected by the decommissioning, providing training, and resources to adapt to new market conditions ○ Conduct regular and transparent communication with stakeholders, including affected communities, to keep them informed about the decommissioning process, potential impacts, and mitigation measures. ○ Work closely with local government authorities to identify and implement measures to offset the negative impact on the affected persons, such as creating alternative employment opportunities or initiating community development projects | Contractor/ MU-PIU/ Consultant | N/A |
| 3 | Loss of revenue to institutions and the government | <ul style="list-style-type: none"> ○ Explore alternative revenue streams to compensate for the loss incurred from the discontinued project. ○ Identify and develop new projects or initiatives that can generate income for both institutions and the government ○ Implement economic development programs in Gombero, Vunde Manyinyi, Jirihini, Kichangani, and Dima villages ward to stimulate local economic opportunities. ○ Encourage entrepreneurship and job creation to offset the negative economic impact on residents. ○ Engage with the affected communities to understand their needs and concerns. ○ Implement social support programs or initiatives to assist individuals and businesses impacted by the loss of economic opportunities | Contractor/ MU-PIU/ Consultant | N/A |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|---------------------------------------|---|---|--------------------------------|--------------------------------|
| NEGATIVE ENVIRONMENTAL IMPACTS | | | | |
| 4 | Loss of aesthetic value due to haphazard disposal of demolished waste | <ul style="list-style-type: none"> ○ Formulate a comprehensive waste management plan specifically tailored for the decommissioning phase. And, clearly outline procedures for the segregation, collection, transportation, and disposal of demolished waste. ○ Implement demolition techniques that minimize the generation of waste and reduce environmental impact. ○ Opt for methods that allow for the salvage and reuse of materials, thereby decreasing the amount of waste generated. ○ Conduct a thorough site characterization and assessment to identify potential environmental sensitivities and vulnerabilities. This will aid in determining appropriate disposal methods and areas, preventing contamination of soil and water bodies. ○ Identify and designate specific areas for waste disposal, ensuring they are environmentally suitable and comply with regulations. ○ Implement measures to prevent leachate from entering soil and water bodies. ○ Establish a monitoring and inspection program to assess the effectiveness of waste disposal measures. ○ Regularly inspect the disposal areas to identify and address any issues promptly. ○ Engage with the local community to raise awareness about the importance of proper waste disposal during decommissioning. Also, encourage community participation in waste management initiatives | Contractor/ MU-PIU/ Consultant | N/A |
| 5 | Dust and noise pollution from demolishing works | <ul style="list-style-type: none"> ○ Restrict demolition activities to specific time periods during the day when noise impact is likely to be less disruptive, such as during normal working hours. This can help minimize the disturbance to both site workers and residents ○ Inform and engage with residents and workers in the surrounding areas about the timing and nature of the demolition work. Providing regular updates and addressing concerns can contribute to better community understanding and cooperation. ○ Implement a comprehensive air quality monitoring system to track the emission of dust particles during demolition. This can help identify any exceedances of air quality standards and trigger immediate corrective actions. ○ Dust suppression techniques, such as water spraying or misting systems, to control the release of dust particles into the air. This can help mitigate the impact on air quality and reduce potential health hazards. ○ Provide site workers with appropriate PPE, such as masks or respirators, to minimize their exposure to airborne particulate matter and protect their health during the demolition activities. | Contractor/ MU-PIU/ Consultant | 10,000,000 |

| S/N | Environmental & Social concerns | Mitigation/Management/ Enhancement measures | Responsible part | Estimated cost (TZS) Per Annum |
|---|---|--|--------------------------------|--------------------------------|
| | | <ul style="list-style-type: none"> ○ Ensure strict adherence to local regulations and standards related to noise and air quality during demolition. This includes obtaining necessary permits and approvals, as well as complying with established limits for noise and air pollutant emissions | | |
| 6 | Health hazards to workers from demolishing work | <ul style="list-style-type: none"> ○ Personal protective equipment (PPE), e.g., helmets, boots, goggles, earplugs, gloves and others will be provided and their use enforced to all workers involved in demolishing of structures during closure. ○ Contractor shall have registered and qualified HSE personnel to ensure health and safety of workers within the project area. ○ All workers involved in the demolishing work will be provided with training on health and safety matters ○ In case of injuries, a well-equipped first aid kit will be onsite and injured workers will be provided first aid service by a trained first aider. ○ Hygienic conditions within the working areas will be maintained and enforced | Contractor/ MU-PIU/ Consultant | 15,000,000 |
| Total cost of mitigation measure (TZS) | | | | 317,000,000 |

CHAPTER 8: ENVIRONMENTAL AND SOCIAL MONITORING PLAN

8.1 Introduction

Monitoring refers to the systematic collection of data through a series of repetitive measurements over a long period of time to provide information on characteristics and functioning of environmental and social variables in specific areas over time. There are four types of monitoring that are relevant to this ESIA.

- **Baseline monitoring:** the measurement of environmental parameters during a pre-project period and operation period to determine the nature and ranges of natural variations and where possible establish the process of change.
- **Impact/effect monitoring** involves the measurement of parameters (performance indicators) during establishment, operation and decommissioning phase in order to detect and quantify environmental and social change, which may have occurred as a result of the project. This monitoring provides experience for future projects and lessons that can be used to improve implementation methods and techniques.
- **Compliance monitoring:** takes the form of periodic sampling and continuous measurement of relevant parameter levels for checking compliance with standards and thresholds – e.g., for waste discharge, air pollution.
- **Mitigation monitoring** aims to determine the suitability and effectiveness of mitigation programs designed to diminish or compensate for adverse effects of the project.

Among the key issues to be monitored will be: (i) the status of the biological conditions; (ii) status of the physical works; (iii) the technical and environmental problems encountered; (iii) proposed solutions to the problems encountered; and (v) the effectiveness of environmental and social measures adopted. To ensure that mitigation measures are properly done, monitoring is essential. Table 9.1 provides details of the attributes to be monitored, frequency, and institutional responsibility and estimated costs. These costs are only approximations and therefore indicative. Costs that are to be covered by the proponent are to be included in the project cost.

8.1.1 Objectives of ESMoP

The ESMoP applies to and will be implemented throughout all phases of the project: mobilization, construction, operation, and decommissioning. The objective of the ESMP is to set out clearly the key components of environmental and socio-economic management for the proposed project and thereby ensure that the following concepts are realized throughout the mobilization, construction, operation, and decommissioning.

- Negative impacts on the physical, biological and socio-economic environments are mitigated.
- Benefits that will arise from the development of the proposed project are enhanced;
- Support smooth implementation of project with minimum losses to environmental and social infrastructure.
- Compliance and guided by National, International laws, standards and guidelines e.g. effluents standards, noise level standards, occupational and safety standards etc. and best practice is achieved; and
- Good will and good relations with communities, and governments at local and national levels are maintained.

8.2 Monitoring Frequency and reporting

Monitoring frequency is proposed for each critical parameter depending on the likelihood and level

of change over time. Some parameters take longer time to show changes while others would change in very short time. Ambient air levels of pollutant gases in and around the project should be measured annually. Air emissions should be monitored after the air pollution control device for particulate matter (or alternatively an opacity level of less than 10%). Frequent sampling for parameters should be undertaken during start-up and continue throughout the operation and demobilisation phase. Some monitoring may have to continue even beyond demobilisation for impacts such as effects of the wastewater discharged into the environment.

Other parameters such as income, revenue, employment, changes in livelihoods, use of resources (water, energy) and changes in norms and values will be monitored on annual basis, so as to allow for change to take place.

Monitoring data should be analyzed and reviewed at regular intervals and compared with the operating standards so that any necessary corrective actions should be taken. Proponent is required to maintain records of air emission, effluents, hazardous waste sent off site as well as other parameters, fires, emergencies, accidents and ill health that may impact on the environment or workers. Records of monitoring results should be kept in an acceptable format and easily accessible, and information reviewed and evaluated to improve the effectiveness of the environmental protection.

8.3 Monitoring Plan

The proposed monitoring plan (Table 8.1) will be used by the proponent or the hired consultant for monitoring the proposed facilities during construction period and contains the following;

- The predicted impacts to be monitored as per schedule.
- Main parameters to be monitored.
- The sampling area.
- Where possible units or methods to be applied are indicated.
- The levels or target standards to be observed are also shown.
- The approximate costs. However, costs might change with the fluctuations of the shilling and cost escalations.

Table 0:1: Proposed Environmental and Social Monitoring Plan (ESMoP) for mobilisation/planning phase, construction phase, demobilisation phase, operation phase and decommissioning phase

| Potential Impacts | Monitoring Indicator | Monitoring Action | Monitoring Frequency | Means of verification | Target level/Standards | Responsibility | Estimated cost (TZS) per annum |
|---|--------------------------------------|---|-------------------------------------|-----------------------|--|---------------------|--------------------------------|
| MOBILISATION OR PRE-CONSTRUCTION PHASE | | | | | | | |
| Job Creation and Employment Opportunities | Number of local consultants employed | <ul style="list-style-type: none"> ○ Systematic monitoring of the recruitment processes, ensuring compliance with employment quotas for local residents, and verifying that job opportunities are accessible to both formal and informal sectors ○ Assessing the fulfillment of commitments made in the ESIA report regarding job creation during the mobilization phase. ○ Regular reporting and documentation of employment data, including the number of jobs created, the demographic profile of the workforce, and any challenges faced | Once, on commencement of assignment | Employment records | N/A | MU-PIU / Consultant | N/A |
| Noise and dust generation | Day and night noise levels | <ul style="list-style-type: none"> ○ Continuous monitoring of noise levels and dust emissions at the construction site. ○ Implementing dust control measures, such as water spraying and installing noise barriers, as well as scheduling noisy activities during times that minimize disruption to the local community ○ Periodic reporting and analysis of monitoring data will inform adjustments to the construction | Monthly | Inspection | In compliance with WB and TBS standards: <ul style="list-style-type: none"> • Daytime noise levels < 60 dB • Night-time noise levels < 50 Db | MU-PIU / Consultant | 2,000,000 |

| Potential Impacts | Monitoring Indicator | Monitoring Action | Monitoring Frequency | Means of verification | Target level/Standards | Responsibility | Estimated cost (TZS) per annum |
|--------------------------------------|---|--|----------------------|-----------------------|-------------------------|---------------------|--------------------------------|
| | | process to ensure compliance with environmental standards and regulations. | | | | | |
| Increased Traffic and road accidents | Number of accidents or near miss | <ul style="list-style-type: none"> ○ Regular monitoring of road infrastructure, traffic flow, and accident occurrences ○ Monitoring team will analyze data on traffic volume, road conditions, and incidents to identify trends and potential risks associated with the increased activity during the mobilisation phase. ○ Implementing traffic management plans, enhancing road safety measures, and conducting awareness campaigns, may be initiated based on the monitoring findings to minimize the impact of increased traffic and reduce the likelihood of road accidents. | Daily | Observation | No traffic/Accidents | MU-PIU / Consultant | 2,000,000 |
| Safety and health risks | Number and type of safety equipment such as mask, helmet gloves, safety boot and earplugs | <p>The monitoring action for safety and health risks of the proposed project involves a systematic and continuous assessment to ensure the effective implementation of safety measures. This includes;</p> <ul style="list-style-type: none"> ○ Regular inspections of the construction site, equipment, and work practices to identify and mitigate potential hazards. ○ Safety protocols and procedures will be monitored for adherence, | Weekly | Observation | Zero incidence/accident | MU-PIU / Consultant | 2,000,000 |

| Potential Impacts | Monitoring Indicator | Monitoring Action | Monitoring Frequency | Means of verification | Target level/Standards | Responsibility | Estimated cost (TZS) per annum |
|---------------------------------------|--|--|----------------------|-----------------------|---|---------------------|--------------------------------|
| | | <p>and any deviations will be addressed promptly.</p> <ul style="list-style-type: none"> ○ Health monitoring of workers will be conducted to detect and manage any occupational health issues. ○ Emergency response plans will be reviewed and tested, and feedback from workers and the local community will be actively sought to enhance the overall safety performance. | | | | | |
| Generation of solid and liquid wastes | Solid and Liquid waste (Kg for Solid waste, Litres for Liquid waste) | <p>The monitoring action for the generation of solid and liquid wastes involves regular and systematic oversight of waste management practices. This includes;</p> <ul style="list-style-type: none"> ○ Monitoring the types and quantities of solid and liquid waste generated during the mobilisation activities related to the establishment of the academic building, students' hostels, cafeteria and dispensary ○ Assess compliance with waste disposal regulations and environmental standards, ensuring that proper waste handling procedures are followed to minimize adverse impacts on the surrounding environment and communities. | Monthly | Observation | Environmental compliance with The Environmental Management (Solid Waste Management) Regulation, 2009 as amended in 2016 | MU-PIU / Consultant | 2,000,000 |

| Potential Impacts | Monitoring Indicator | Monitoring Action | Monitoring Frequency | Means of verification | Target level/Standards | Responsibility | Estimated cost (TZS) per annum |
|---|---|---|----------------------|-----------------------|------------------------|---------------------|--------------------------------|
| CONSTRUCTION PHASE | | | | | | | |
| Creation of employment | -Number of local people employed -Number of women employed | <ul style="list-style-type: none"> ○ Regular tracking of employment statistics, verifying that the promised jobs are being created as planned, and assessing the distribution of employment benefits among local residents. ○ Evaluating the quality of jobs, ensuring fair wages and safe working conditions. ○ Stakeholder engagement and feedback mechanisms will be utilized to address concerns promptly | Quarterly | Records | N/A | MU-PIU / Consultant | N/A Parts of the project |
| Increase in business activities within the project area | Number of local people selling goods at the project site | <p>The monitoring actions for this impact of involve regular assessments and observations to track the extent and nature of business growth. This includes;</p> <ul style="list-style-type: none"> ○ Ongoing surveys and evaluations to monitor the number of new businesses established, changes in employment levels, and the types of businesses flourishing. ○ Assess the impact on local infrastructure, such as roads and utilities, to ensure they can accommodate increased business activities. ○ Periodic stakeholder consultations and engagement are crucial to gather feedback from the local community, allowing adjustments | Quarterly | Interview | N/A | MU-PIU / Consultant | N/A |

| Potential Impacts | Monitoring Indicator | Monitoring Action | Monitoring Frequency | Means of verification | Target level/Standards | Responsibility | Estimated cost (TZS) per annum |
|------------------------------------|---|---|----------------------|---|--|---------------------|--------------------------------|
| | | to be made to the project plan as needed. | | | | | |
| Conflicts and grievances | Number of meetings held during the mobilisation Phase and throughout the project Phases -Number of complains and Incidences - Number and types of grievance reported and solved | The monitoring actions for this impact of involves the establishment of a comprehensive system to identify, assess, and address any conflicts or grievances that may arise during the construction process. This includes; <ul style="list-style-type: none"> ○ Regular monitoring of community feedback, conducting stakeholder consultations, and maintaining open communication channels to promptly address and resolve any disputes. ○ The monitoring team will document and analyze reported conflicts, implementing mitigation measures as necessary, and ensuring that grievance resolution is fair, transparent, and culturally sensitive | Weekly | -Observation of records of complains -Analyse records of workers and community grievance | No complains | MU-PIU / Consultant | 2,000,000 |
| Impact on gender during employment | Number of men and women employed | The monitoring action for the impact on gender during the construction phase involves regular and systematic assessments to ensure gender equality and address potential disparities in employment opportunities. This includes; <ul style="list-style-type: none"> ○ Ongoing data collection on the number of male and female | Monthly | Observation of records of complains | No Violations and harassments to vulnerable groups | MU-PIU / Consultant | 3,000,000 |

| Potential Impacts | Monitoring Indicator | Monitoring Action | Monitoring Frequency | Means of verification | Target level/Standards | Responsibility | Estimated cost (TZS) per annum |
|-----------------------------------|--|---|----------------------|--------------------------------|--|---------------------|--------------------------------|
| | | <p>workers employed, their job roles, and the wages they receive.</p> <ul style="list-style-type: none"> ○ Assessing the working conditions to guarantee a safe and inclusive environment for all genders. ○ Periodic reviews should be conducted to identify any gender-specific challenges or issues that may arise during the construction activities | | | | | |
| Air pollution from noxious gasses | Measurement of ambient gaseous (Noxious gasses (CO, CO ₂ , NO, NO _x , SO _x)) | <p>The monitoring action for air pollution from noxious gases involves regular and systematic assessments of air quality. This includes;</p> <ul style="list-style-type: none"> ○ The continuous measurement and analysis of emissions from construction activities that may release noxious gases into the atmosphere. ○ Monitoring stations will be strategically placed to capture data on air pollutants, and real-time monitoring devices will be employed to track levels of harmful gases. ○ Periodic site inspections and air quality assessments to ensure compliance with established environmental standards and regulations. ○ If elevated levels of noxious gases are detected, immediate corrective | Quarterly | Measurement of ambient gaseous | <p>TBS / WHO Guidelines</p> <ul style="list-style-type: none"> • SO₂ < 0.5mg/m³ • CO < 10 - 30mg/m³ CO₂ < 500-600 • NO_x < 0.12-0.2 <p>Conforming to EC directive 89/336/EEC and ISO 12103-1</p> | MU-PIU / Consultant | 3,000,000 |

| Potential Impacts | Monitoring Indicator | Monitoring Action | Monitoring Frequency | Means of verification | Target level/Standards | Responsibility | Estimated cost (TZS) per annum |
|---|---|---|----------------------|-----------------------------------|---|---------------------|--------------------------------|
| | | <p>actions should be implemented to mitigate the impact, and adjustments to construction practices may be made to minimize air pollution.</p> <ul style="list-style-type: none"> ○ Regular reporting and communication of monitoring results to relevant stakeholders will be integral to maintaining transparency and accountability throughout the construction phase | | | | | |
| Impaired Air quality due to dust emission | Measurement of particulate matter (PM ₁₀ & PM _{2.5}) | <p>The monitoring action for air pollution from dust emission during the construction phase involves the regular and systematic assessment of dust levels in and around the project site. This includes;</p> <ul style="list-style-type: none"> ○ The implementation of air quality monitoring stations strategically placed to measure particulate matter and dust concentrations. ○ Frequent inspections of dust control measures, such as water spraying and dust suppression systems, to ensure their effectiveness. ○ Real-time monitoring tools and periodic site visits will be employed to promptly identify any exceedances of acceptable dust levels through visual inspection. Also, the data collected shall | Quarterly | Measurement of particulate matter | TBS / WHO Standard (PM ₁₀ < 0.05-0.15 mg/m ³ & PM _{2.5} <0.025-0.075 mg/m ³) | MU-PIU / Consultant | 3,000,000 |

| Potential Impacts | Monitoring Indicator | Monitoring Action | Monitoring Frequency | Means of verification | Target level/Standards | Responsibility | Estimated cost (TZS) per annum |
|-----------------------------------|--|---|----------------------|-----------------------|--|---------------------|--------------------------------|
| | | inform timely corrective measures and adjustments to mitigate the impact of dust emissions on air quality, safeguarding both the environment and the well-being of the local community. | | | | | |
| Noise generation | Day and night noise levels | The monitoring action for noise generation during the construction phase involves regular and systematic assessments of the decibel levels produced by construction activities. This includes; <ul style="list-style-type: none"> ○ The use of sound measuring devices positioned strategically across the construction site and its immediate surroundings. ○ Track variations in noise levels to ensure compliance with established environmental regulations and standards. ○ Identification and implementation of mitigation measures if noise levels exceed permissible limits. | Monthly | Inspection | In compliance with WB and TBS standards: <ul style="list-style-type: none"> • Daytime noise levels < 60 dB • Night-time noise levels < 50 dB | MU-PIU / Consultant | 2,000,000 |
| Solid and liquid waste generation | Solid and Liquid waste (Kg for Solid waste, Litres for Liquid waste) | The monitoring actions for solid and liquid waste generation during the construction phase of the proposed development involve regular and systematic checks to ensure compliance with environmental and social standards outlined in this ESIA report. This includes; | Weekly | Observation | Environmental compliance with The Environmental Management (Solid Waste Management) Regulation, 2009 as | MU-PIU / Consultant | 3,000,000 |

| Potential Impacts | Monitoring Indicator | Monitoring Action | Monitoring Frequency | Means of verification | Target level/Standards | Responsibility | Estimated cost (TZS) per annum |
|-------------------------|--|---|----------------------|--------------------------------|-------------------------|---------------------|--------------------------------|
| | | <ul style="list-style-type: none"> ○ Continuous observation and documentation of waste disposal practices, both solid and liquid, to assess their impact on the surrounding environment. ○ Routine inspections, data collection on waste quantities and types, and verification of adherence to waste management protocols. ○ Immediate corrective measures should be implemented if any deviations or non-compliance are identified, with ongoing reporting and communication to stakeholders to maintain transparency throughout the construction phase. | | | amended in 2016 | | |
| Health and Safety risks | - Number and type of safety equipment such as mask, helmet gloves and earplugs | <ul style="list-style-type: none"> ○ Ongoing surveillance of construction activities to identify and mitigate potential hazards to both workers and the surrounding community. ○ Regular site inspections, safety audits, and the enforcement of safety protocols to ensure compliance with health and safety standards. ○ Emergency response plans should be in place, and incidents should be documented and analyzed for continuous improvement. ○ Community engagement should be implemented, with feedback | Quarterly | Inspection; Voluntary testing; | Zero incidence/accident | MU-PIU / Consultant | 10,000,000 |

| Potential Impacts | Monitoring Indicator | Monitoring Action | Monitoring Frequency | Means of verification | Target level/Standards | Responsibility | Estimated cost (TZS) per annum |
|---|--|--|----------------------|------------------------------------|--------------------------|---------------------|--------------------------------|
| | | mechanisms to address any health and safety concerns raised by local residents | | | | | |
| Impact on natural resource (Energy and water) | Amount of water and energy consumed | The monitoring action for the impact on natural resources (energy and water) during the construction phase involves regular and systematic assessment of energy and water consumption. This includes; <ul style="list-style-type: none"> ○ Monitoring the usage patterns, identifying potential sources of inefficiency or waste, and implementing measures to optimize resource utilization. ○ Track the project's adherence to sustainable practices, ensuring that energy is sourced efficiently, and water usage is minimized. | Monthly | Measurement/ records / Observation | Efficient use of water | MU-PIU / Consultant | 3,000,000 |
| Increase in accident incidences | -Number of humps on the local road; -Number of warning signs erected; -Number of people using PPEs; -Number of people | The monitoring actions for this impact involve regular and systematic surveillance to identify, assess, and manage potential risks. This includes; <ul style="list-style-type: none"> ○ Implementing safety protocols, conducting regular safety audits, and maintaining incident reporting mechanisms. ○ Encompass on-site safety measures, adherence to construction standards, and the use of personal protective equipment. | Quarterly | Inspection | Zero accident/ incidence | MU-PIU / Consultant | 4,000,000 |

| Potential Impacts | Monitoring Indicator | Monitoring Action | Monitoring Frequency | Means of verification | Target level/Standards | Responsibility | Estimated cost (TZS) per annum |
|-----------------------------|--|--|---------------------------|-----------------------|--|---------------------|--------------------------------|
| | trained Presence of a first aid kit | <ul style="list-style-type: none"> ○ Tracking accident statistics, analyzing root causes, and promptly addressing any emerging safety concerns. ○ Continuous communication and training programs for construction workers are essential to ensure awareness of safety practices | | | | | |
| DEMobilISATION PHASE | | | | | | | |
| Reduced noise levels | All equipment removed | The monitoring actions for this impact involve regular assessments and measurements to ensure compliance with the specified noise reduction measures. This includes; <ul style="list-style-type: none"> ○ Monitoring noise levels during the dismantling and removal of construction equipment and structures. ○ The monitoring team will use sound measuring devices to quantify noise levels and compare them against predetermined standards and regulations. | Once upon Decommissioning | Inspection | In compliance with WB and TBS standards: <ul style="list-style-type: none"> • Daytime noise levels < 60 dB • Night-time noise levels < 50 dB | MU-PIU / Consultant | 2,000,000 |
| Loss of employment | Severance benefits | The monitoring action for air pollution from dust emission involves regular and systematic assessments to ensure compliance with environmental standards. This includes; <ul style="list-style-type: none"> ○ Continuous air quality monitoring to detect any increase in dust levels. | Once upon Decommissioning | Inspection | N/A | MU-PIU / Consultant | N/A |

| Potential Impacts | Monitoring Indicator | Monitoring Action | Monitoring Frequency | Means of verification | Target level/Standards | Responsibility | Estimated cost (TZS) per annum |
|--------------------------------|----------------------|--|---------------------------|-----------------------|------------------------|---------------------|--------------------------------|
| | | <ul style="list-style-type: none"> ○ Monitoring mechanisms may include the use of air quality monitoring stations strategically placed around the construction site. ○ Routine inspections, data collection, and analysis should be conducted to identify sources of dust emissions and assess the effectiveness of dust control measures. ○ Corrective actions to be taken if dust levels exceed permissible limits, ensuring that appropriate measures are promptly implemented to mitigate the impact on air quality and prevent harm to the environment and local communities | | | | | |
| Loss of business opportunities | Materials paid for | <ul style="list-style-type: none"> ○ Regular assessments to quantify the number of individuals affected, identify the reasons for demobilization, and assess the socio-economic consequences on the local community. ○ Implementation of mitigation measures to address any adverse effects, ensuring a proactive and responsive approach to minimize the impact of employment loss during the demobilization phase. ○ Regular reporting and feedback mechanisms should be established to facilitate continuous | Once upon Decommissioning | Records | N/A | MU-PIU / Consultant | N/A |

| Potential Impacts | Monitoring Indicator | Monitoring Action | Monitoring Frequency | Means of verification | Target level/Standards | Responsibility | Estimated cost (TZS) per annum |
|--|---|--|---------------------------|-----------------------|---|---------------------|--------------------------------|
| | | improvement and adaptability in addressing emerging challenges related to employment dynamics | | | | | |
| Poor waste management | Site clear of construction wastes and scrap metal | The monitoring actions for this impact involve regular and systematic checks on waste disposal practices. This includes; <ul style="list-style-type: none"> Assessing whether waste generated during the construction phase is appropriately collected, segregated, and disposed of in compliance with environmental regulations. Monitoring teams should track waste management procedures to ensure that potential environmental and social impacts are minimized. | Once upon Decommissioning | Inspection | Environmental compliance with The Environmental Management (Solid Waste Management) Regulation, 2009 as amended in 2016 | MU-PIU / Consultant | 4,000,000 |
| OPERATIONAL AND MAINTANANCE PHASE | | | | | | | |
| Creation of employment | -Number of local people employed -Number of women employed | <ul style="list-style-type: none"> Regularly assessing and documenting the number and types of jobs generated, ensuring compliance with agreed-upon employment targets, and evaluating the socio-economic impact on local communities. Monitoring should extend to the maintenance of a diverse and inclusive workforce, with attention to gender equality and the involvement of local residents. The monitoring process will also track any potential adverse effects on | Annually | Records | N/A | UPIU-MU | N/A |

| Potential Impacts | Monitoring Indicator | Monitoring Action | Monitoring Frequency | Means of verification | Target level/Standards | Responsibility | Estimated cost (TZS) per annum |
|--|--|--|----------------------|-----------------------------------|---|----------------|--------------------------------|
| | | employment conditions and community well-being, allowing for timely adjustments and interventions to maximize positive impacts and address any emerging issues | | | | | |
| Community Health and Safety | -Inspection of the emergency and detection systems; -Verification of security system and access to the campus - Inspection of available health facility in the dispensary; | The monitoring action for this impact, involve systematic and ongoing assessments to ensure the well-being of the local community. This includes: ○ Regular inspections of infrastructure and facilities, health impact assessments, and continuous air and water quality monitoring. Emergency response drills and training sessions should be conducted to prepare for any unforeseen incidents. ○ Additionally, community feedback mechanisms and grievance redress processes should be established to address any health or safety concerns raised by the local population promptly. | Quarterly | Measurement of ambient gaseous | Zero incidence/ accident | UPIU-MU | 3,000,000 |
| Impaired Air quality due to dust and ambient pollutant gases immission | Measurement of particulate matter | The monitoring action for solid and liquid waste generation involves a systematic and regular assessment of the project's waste management practices. This includes; ○ Monitoring the quantity and types of solid and liquid waste produced, tracking disposal methods, and | Quarterly | Measurement of particulate matter | TBS / WHO Standard (PM ₁₀ < 0.05-0.15 mg/m ³ & PM _{2.5} <0.025-0.075 mg/m ³) | UPIU-MU | 3,000,000 |

| Potential Impacts | Monitoring Indicator | Monitoring Action | Monitoring Frequency | Means of verification | Target level/Standards | Responsibility | Estimated cost (TZS) per annum |
|-----------------------------------|------------------------|--|----------------------|-----------------------|--|----------------|--------------------------------|
| | | <p>ensuring compliance with environmental regulations.</p> <ul style="list-style-type: none"> ○ Identify any deviations from the approved waste management strategies outlined in the ESIA report. ○ Continuous surveillance and periodic audits should be conducted to assess the effectiveness of waste management measures, mitigate potential environmental impacts, and promote sustainable practices throughout the project's lifecycle. | | | <p>TBS / WHO Guidelines</p> <ul style="list-style-type: none"> • SO₂ < 0.5mg/m³ • CO < 10 - 30mg/m³ CO₂ < 500-600 • NO_x < 0.12-0.2 <p>Conforming to EC directive 89/336/EEC and ISO 12103-1</p> | | |
| Solid and liquid waste generation | Solid and Liquid waste | <p>The monitoring action for solid and liquid waste generation involves a systematic and regular assessment of the project's waste management practices. This includes;</p> <ul style="list-style-type: none"> ○ Monitoring the quantity and types of solid and liquid waste produced, tracking disposal methods, and ensuring compliance with environmental regulations. ○ Identify any deviations from the approved waste management strategies outlined in the ESIA report. ○ Continuous surveillance and periodic audits should be conducted to assess the effectiveness of waste management measures, mitigate potential | Weekly | Observation | <p>Environmental compliance with The Environmental Management (Solid Waste Management) Regulation, 2009 as amended in 2016</p> | UPIU-MU | 3,000,000 |

| Potential Impacts | Monitoring Indicator | Monitoring Action | Monitoring Frequency | Means of verification | Target level/Standards | Responsibility | Estimated cost (TZS) per annum |
|---------------------------|---|--|----------------------|--------------------------------|-----------------------------------|----------------|--------------------------------|
| | | environmental impacts, and promote sustainable practices throughout the project's lifecycle. | | | | | |
| Health and Safety risks | - Number and type of safety equipment such as mask, helmet gloves and earplugs | The monitoring action involves regular and systematic checks to ensure compliance with established health and safety protocols. This includes; <ul style="list-style-type: none"> ○ Ongoing assessment of workplace conditions, machinery safety, emergency response procedures, and the overall well-being of workers, students, and the local community. ○ Identify and address any potential health and safety risks promptly, fostering a secure and healthy environment throughout the project's operational lifecycle. | Quarterly | Inspection; Voluntary testing; | Zero incidence/ accident | UPIU-MU | 3,000,000 |
| Impact due to Fire hazard | -Records of authorized HSE; -Presence of fire alarm; -Presence of firefighting equipment and records of servicing; -Presence of fire hazard signs; | <ul style="list-style-type: none"> ○ Regular inspections of electrical systems, fire suppression equipment, and potential ignition sources. ○ Continuous monitoring of fire risks and readiness to address emergencies is crucial. ○ Training staff, students, and nearby communities on fire safety protocols and conducting regular drills would contribute to effective preparedness. ○ Maintaining communication channels with local emergency | Quarterly | Inspection | Fire and Rescue Force Regulations | UPIU-MU | 1,000,000 |

| Potential Impacts | Monitoring Indicator | Monitoring Action | Monitoring Frequency | Means of verification | Target level/Standards | Responsibility | Estimated cost (TZS) per annum |
|---------------------------|---|---|----------------------|----------------------------|-------------------------|----------------|--------------------------------|
| | - Presence of fire exit signs | <p>services and periodically reviewing and updating the Fire Prevention and Emergency Response Plan to ensure its relevance and efficiency in mitigating fire hazards.</p> <ul style="list-style-type: none"> ○ Regular reporting and documentation of fire-related incidents, near misses, and corrective actions taken should be part of the monitoring system to enhance accountability and continual improvement. | | | | | |
| Increase in Energy Demand | <p>-Availability and condition of solar panels;</p> <p>- Presence of energy conserving electric lamps</p> | <ul style="list-style-type: none"> ○ Regular monitoring of electricity and other energy sources used in the academic building, students' hostels, and cafeteria. ○ Ensure that the increased energy demand aligns with the projected estimates and complies with environmental standards. ○ Assessing the efficiency of energy use, identifying areas for potential optimization, and implementing measures to enhance energy sustainability | Quarterly | Inspection | Efficient use of Energy | UPIU-MU | 5,000,000 |
| Increase in water demand | <p>-Presence of water conserving taps;</p> <p>-Presence of gutters on roofs;</p> | <ul style="list-style-type: none"> ○ Monitoring the water usage within the academic building, students' hostels, and cafeteria to ensure compliance with established standards and sustainable practices. ○ Assessing water extraction rates, usage efficiency, and the potential impact on local water sources. | Quarterly | Inspection and measurement | Efficient use of water | UPIU-MU | 5,000,000 |

| Potential Impacts | Monitoring Indicator | Monitoring Action | Monitoring Frequency | Means of verification | Target level/Standards | Responsibility | Estimated cost (TZS) per annum |
|-------------------------------------|--|--|----------------------|--------------------------------|---|----------------|--------------------------------|
| | -Presence of notices on water serving means; | Additionally, monitoring should extend to the surrounding areas to identify any unintended consequences on the water supply for nearby communities. | | | | | |
| Prevalence of Communicable diseases | Number of people who have undergone HIV/AIDS test/ Number of people tested by gender and Condoms distributed to end users | <ul style="list-style-type: none"> ○ Ongoing surveillance of water quality, sanitation practices, and healthcare accessibility. ○ Regular health assessments of the local population, assessing the incidence of communicable diseases. ○ In case of any adverse trends, immediate corrective measures and interventions should be implemented, such as improving sanitation facilities, enhancing healthcare services, and conducting awareness campaigns. ○ Identify and address potential health risks, ensuring the well-being of the community and preventing the escalation of communicable diseases during the project's operational and maintenance phases | Annually | Observation of medical records | All workers reached with testing services and condoms | UPIU-MU | 4,000,000 |
| Total | | | | | | | 74,000,000 |

CHAPTER 9: COST BENEFIT ANALYSIS

9.1 Introduction

Cost Benefit Analysis (CBA) is the systematic process for calculating and comparing absolute costs and benefits of Business Resources. Costs and benefits are expressed in concrete monetary terms. The evaluation is often argumentative. However, CBA is a general method of project evaluation. This chapter describes the cost-benefit approach and estimation methods for the major costs and benefits of the proposed establishment. Cost benefit analysis estimates and compares the total benefits and costs of a project to the members of a specified community and project owner. CBA may be conducted at various geographical levels (international, national, state or regional). Critically, the principles and methods of CBA are the same at any spatial level. However, impacts that are transfers within one spatial level, such as the nation, may be benefits or costs at another spatial level, for example at regional level.

9.1.1 Relevance and challenges

Determining whether the proposed establishment is feasible in absolute terms benefits should outweigh the costs. The relevance and challenges of quantifying CBA lies within its relevance for business operations; help to compare and prioritize measures and identify the most suitable project if comparison has to be made. However, not all data/information necessary for the assessment is readily available to allow for an accurate and comprehensive assessment.

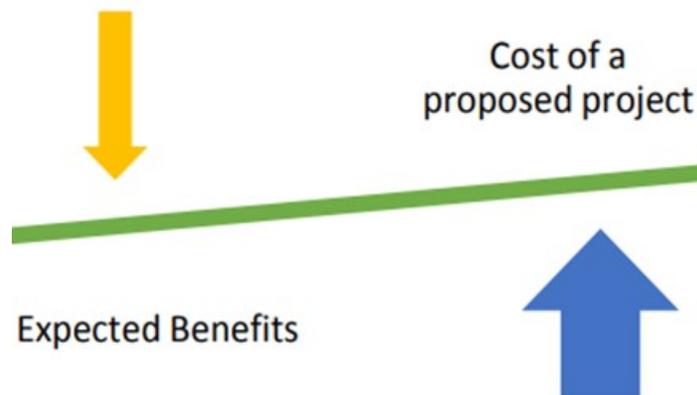


Figure 0:1: Cost and Benefit Analysis for CBA (Source: Author works through Google)

This section aggregates the costs and benefits as well as describes the following:

- a. Costs:**
 - Project investment
 - Environment
 - Socio-economic
- b. Benefits:**
 - Income
 - Environment
 - Socio-economic

9.2 Estimated Environmental and Social cost related to the project.

According to Chapters 8 and 9, the expected annual expenses for adopting enhancement measures, impact management, and monitoring processes are around TZS 391,000,000. The environmental costs could not be precisely calculated; hence they are not included in the anticipated expenditures for mitigation. The expenditures for these will also be short term because some of the affects won't be seen until the construction phase, especially if mitigation measures are fully adopted. Bills of Quantities contain comprehensive information on the construction expenses for each project.

9.2.1 Environmental cost

Analysis of environmental cost-benefit tradeoffs is evaluated in terms of both adverse and advantageous effects. The examination also takes into account whether the affects are reversible and whether the associated expenses are reasonable. The annual costs for monitoring and mitigating the indicated consequences are TZS. 74,000,000 and TZS. 317,000,000, respectively.

9.2.2 Community cost

The neighboring communities will bear the costs of the project's adverse environmental and social effects, such as noise pollution, deteriorated air quality, and safety and health hazards. But the use of mitigating strategies will lessen the expected effects. Other than the aforementioned, no other community events will be interfered with. MU is dedicated to reducing the detrimental effects on society and the environment.

9.2.3 Government cost

Through the Ministry of Education, Science and Technology (MoEST), the Government of the United Republic of Tanzania has obtained funding from the World Bank to support higher education as a driving force in the country's emerging economy. The project aims to revive the crucial areas for innovation, economic growth, and relevance to the labor market. Additionally, as was already noted, taxes collected during both project phases will help the government both directly and indirectly. In addition to increasing tax revenue, the investment will boost corporate development, industrialization, and economic growth.

9.3 Benefits related to the proposed establishment.

The proposed establishment at the university brings about direct and indirect benefits to the university, neighboring community, and the government. However, the primary benefits of the project can be further categorized as direct and indirect. While building construction projects may have some negative impacts, they are generally minimal compared to the positive benefits. Certain impacts resulting from the project cannot be precisely quantified and therefore cannot be included in benefit-cost analysis estimations. Overall, the benefits of the project are evident throughout all phases, including mobilisation, construction, operation, and decommissioning. These benefits include employment opportunities, public benefits, revenue generation, and multiplier effects that create linkages with the local and national economy.

a) Direct Benefits

The project's implementation will result in numerous employment prospects, enhance the visual appeal, provide a favorable learning environment for students, generate entrepreneurial opportunities for the local community, and contribute to the growth of skilled workforce due to

increased enrollment and the availability of conducive conditions for independent studying. Many of these intangible benefits directly benefit the stakeholders involved in the project.

b) Indirect Benefits

The proposed establishment brings about indirect advantages, primarily seen in the form of enhanced government revenue generated through various sectors such as TANESCO, RUWASA, TRA, etc. It also promotes cultural exchanges, infrastructure development, and economic growth. However, due to the project's reliance on inputs from different sectors, and these sectors relying on inputs themselves, there will be successive rounds of interactions among them, leading to additional output from each sector of the economy.

9.3.1 Benefits to MU

The proposed establishment will bring long-lasting benefits to MU throughout its lifespan. Completion of the project will serve as a catalyst for increased student enrollment, resulting in a potential annual monetary value growth. This will significantly enhance MU financial capacity and sustainability. Additionally, the improved financial standing will not only boost enrollment but also contribute to good governance and efficient university operations. The project will support MU in delivering high-quality education, conducting impactful research, and providing valuable public services. It will also contribute to the university's reputation and image, offering intangible benefits.

9.3.2 Benefits to the Local Community

The proposed establishment of new buildings infrastructures at MU aims to enhance the university's infrastructure and increase its capacity. This expansion is expected to generate a demand for various types of staff, including technical, administrative, and academic personnel. Throughout the construction and operational phases, the project will create additional employment opportunities for individuals residing near the MU, Tanga campus, particularly in roles related to operations and maintenance. Unskilled workers will benefit from daily wage opportunities, while the university's presence will foster business prospects in the surrounding area. These business opportunities align with the government's efforts to promote job creation for Tanzanians. Although specific salary details are yet to be determined, it is anticipated that employment will provide workers with income, improving their quality of life and potentially enhancing their lifestyles. Furthermore, the benefits of employment and income will extend beyond the workers themselves, positively impacting their dependents and others in the community.

However, the availability of suitably qualified local individuals will determine the extent of employment opportunities and associated benefits. Therefore, capacity building initiatives are crucial to realize these benefits. Alongside capacity building, it will be necessary to establish policies that encourage real estate developers within the economic sector to hire local laborers with the necessary skills and experience. Additionally, the project is expected to bring about the following economic and social advantages:

- Increased economic activity in the local area.
- Enhanced infrastructure and services within the vicinity of the campus.
- Potential growth in related industries, such as hospitality, transportation, and retail.
- Improved access to education and research opportunities for the local community.
- Strengthened collaboration between the university and local stakeholders.

- Heightened prestige and reputation for MU as a leading educational institution.

9.3.3 Benefits to the Government

The project is expected to bring various benefits to the government. These advantages include cost savings for the government due to reduced financial reliance on MU. It is projected that the project's operational phase will enhance MU financial capacity and sustainability through generated earnings. As a result, the government will have the opportunity to allocate the saved budget share for other development plans. Additionally, the project will contribute to the realisation of National Policies such as Education Reforms by expanding student enrollment in different degree programs, thereby increasing MU financial capacity.

Furthermore, the government will benefit from an increased number of experts graduating from MU, particularly in priority disciplines across various fields. This will enable the government to utilize local experts in future projects instead of relying on foreign experts, tapping into internal resources.

9.4 Conclusion on Cost Benefits Analysis

The project's environmental and social costs are relatively low in value when compared to the benefits it will bring. The option of not proceeding with the project is rejected as it is necessary and desirable to have institutions that help in delivering high-quality education, conducting impactful research, and providing valuable public services. The project will directly promote investment in different businesses and services, as well as improve Tanzania's reputation as a preferred investment destination. These factors will create more employment opportunities for Tanzanians and contribute to poverty eradication efforts. Therefore, the implementation of the project will bring overall benefits to the country.

CHAPTER 10: DECOMMISSIONING PLAN

10.1 Preliminary Decommissioning Plan

The project is anticipated to last for several years based on buildings standards and regulation (Though the exact years for project lifespan will be stated after project design), and this document outlines an initial decommissioning plan. The plan aims to establish practical decommissioning approaches that can be executed safely, without endangering the public's health and safety, decommissioning personnel, or causing harm to the environment. It adheres to the guidelines and regulations set by relevant regulatory agencies. The purpose of this preliminary decommissioning plan is to ensure that the decommissioning and final disposition of the project though it's not expected to happen are taken into account during the project's initial design phase.

This preliminary plan will remain a dynamic document and undergo revisions throughout the operational life of the project. Regular reviews and updates will be conducted to incorporate any changes in facility construction or operation that may impact the decommissioning process.

The Contractor will be required to prepare a detailed Demolition Plan and Construction Management Plan to the satisfaction of the proponent and relevant authorities prior to the commencement of works on site.

10.2 Objectives of the Plan

The initial plan aims to prioritize the inclusion of decommissioning as a crucial factor right from the beginning of the project, throughout the design phase, and during the operation phase. The plan serves the following objectives:

- The primary objective of the preliminary plan is to ensure that designers of the building and infrastructure are fully aware of decommissioning requirements during the initial project design. This means that if there are design options available for materials, system components, and component locations that can enhance decommissioning, those choices should be made.
- Another goal of the preliminary plan is to identify the potential decommissioning options and the final status of the facility. These options will be evaluated and narrowed down to the preferred decommissioning method as the end of the project lifespan approaches.
- The final purpose of the preliminary plan is to demonstrate to regulatory agencies that important considerations regarding decommissioning are taken into account as early as possible during the initial project design.
- Additionally, the plan serves as a starting point to showcase various aspects related to decommissioning, such as methods, costs, schedules, and the operational impact on the infrastructure facilities.
- The plan acts as the initial reference to show that aspects like decommissioning techniques, expenses, timelines, and operational effects on decommissioning will undergo continuous evaluation and improvement throughout the operational lifespan.

The plan will outline feasible decommissioning methods for the project, providing a general description. This description should demonstrate the practicality of the considered methods and their ability to ensure the health and safety of the public and decommissioning personnel. Design personnel should thoroughly examine the proposed decommissioning methods and take measures to incorporate design features that will facilitate the decommissioning process. Key considerations include:

- a. Estimating the required manpower, materials, and costs to support the decommissioning activities.

- b. Describing the intended final disposition and status of the plant and site after decommissioning.
- c. Discussing the commitment to allocate adequate financing for the decommissioning process.
- d. Identifying the necessary records to be maintained throughout the construction and operation phases that will aid in decommissioning, such as a complete set of "as built" drawings.

10.3 Preliminary Plan

10.3.1 Project Removal Methodology and Schedule

The proponent is responsible for financing and carrying out all aspects of project decommissioning, which includes engineering, environmental assessment, permitting, construction, and mitigation activities related to the removal of the building facilities, as outlined in this Plan. The Proponent must also address the environmental impacts during and after the project removal by promptly responding to defined events during the monitoring phase.

Furthermore, the university is obligated to safely remove the facilities and its accompanying structures in a manner that:

- Minimizes any adverse environmental effects.
- Meets the company's obligations under the Environmental Management Act (2004).
- Restores the site to a condition suitable for various uses.
- Pays all outstanding dues to workers, the government, suppliers, and other relevant parties.

The process of project removal will commence six months after closure and extend for a period of 2 years. During the initial six months following closure, the proponent will conduct an inventory of all components requiring removal or disposal. This inventory will encompass the identification of buildings and structures, to be demolished. Additionally, the method of disposal will be finalized. This information will be crucial for the development of the final decommissioning plan, which will then undergo approval by NEMC.

Upon approval of the decommissioning plan, the removal of metal parts will be prioritized within the first month to prevent any potential vandalism. Subsequently, in the second month of the decommissioning process, the focus will shift towards removing concrete structures and foundations. The resulting debris will be repurposed as fill material for rural roads.

10.3.2 Component to be demolished.

The elements of the project that need to be demolished are typically built using load-bearing masonry walls along with roofs made of steel or timber frames, as well as metal roofs.

1. Buildings and other infrastructure

- All construction elements, such as buildings, pillars, platforms, or ramps supporting machinery or equipment, will be dismantled and secured to ensure safety. The areas previously occupied by these structures will be restored and replanted with vegetation as necessary.
- Equipment that is no longer functional will be sold through an auction process to scrap dealers.
- The future utilization of the water supply infrastructure (pipeline) will be determined in collaboration with the National and District Closure Committees. The project aims to transfer the pipeline infrastructure to the district for its ongoing use.

All disturbed areas will be landscaped and re-vegetated using indigenous trees.

10.3.3 Decommissioning Phase

Project decommissioning has five phases:

- Pre-removal monitoring;
- Permitting;
- Interim protective measures;
- Project removal and associated protective actions; and
- Post-removal activities, including monitoring of environment and socio-economic activities.

The initial three phases will occur before the Project is removed, specifically within the first six months. The fourth phase, which involves the removal of the project and necessary protective measures, will take place six months after project closure. The fifth phase will commence after complete removal of the project, and due to its medium scale and relatively moderate impacts, it will continue for at least two years.

The following description outlines the activities that will occur in each phase:

- a. **Pre-removal monitoring:** This phase involves assessing the environmental and socio-economic conditions of the project and its surroundings. The purpose is to identify any environmental or social liabilities that need to be addressed before obtaining closure permits. Additionally, this period will include inventorying all assets and facilities that require disposal and preparing a final decommissioning plan for approval by the National Environment Management Council (NEMC).
- b. **Permitting:** The proponent will acquire all necessary permits required for the project's removal. This includes permits from MoEST, TCU, NEMC, Local Government Authorities, and others as necessary.
- c. **Interim Protective Actions:** This phase focuses on implementing any interim measures necessary to safeguard human health and the environment during the removal process.
- d. **Project Removal:** As mentioned earlier, the project will be completely removed within a six-month timeframe.
- e. **Post-Removal Activities:** Following the project's removal, monitoring activities will continue for a period of two years to assess any lingering impacts.

Detailed information regarding the decommissioning of the project and its associated impacts, as well as proposed measures to restore the site to its former state, are provided in Table 10.1. The estimated cost for the decommissioning plan is TZS 190,000,000, which is subject to change based on currency value and other economic factors at that time.

Figure 0:1: Decommissioning and Closure Plan

| Activity | Closure Plan | Responsibility | Estimated Budget |
|--|--|--------------------------|------------------|
| Take apart all the equipment and dismantle the structures. | <ul style="list-style-type: none"> ○ Take apart electrical devices such as air conditioners, generators, and other machinery. ○ Consult with TANESCO (Tanzania Electric Supply Company) to disconnect the power supply for the building project. ○ All concrete and metal structures, including offices, washrooms, and pavements, will be demolished. ○ Warning signs will be displayed, and a fence will be erected around all commercial buildings. ○ Qualified engineers will supervise all disassembling and demolition activities. ○ The Closure Committee will oversee and monitor all closure activities to ensure proper execution. ○ Technical assistance during the closure phase will be sought by consulting relevant stakeholders. | MU and Closure Committee | 100,000,000 |
| Personal Protective Equipment (PPE) | <ul style="list-style-type: none"> ○ During the closure phase, it is mandatory for all workers to wear suitable personal protective equipment (PPE) such as a helmet, safety boots, dust mask, safety gloves, goggles, protective garments, and a safety vest. | MU and Closure Committee | 20,000,000 |
| Waste Management | <ul style="list-style-type: none"> ○ During the closure phase, proper waste sorting will be implemented for efficient management. ○ A review process will be established to regularly update the waste management plan to adapt to changes in building plans, schedules, community standards, and recognized best practices. ○ Instead of being dumped on land, debris can be utilized to fill feeder roads, providing an alternative use. ○ Metal materials will be collected and transported to steel factories for recycling and subsequent metal production. ○ All hazardous wastes discovered during the decommissioning of the building will be cleaned up and disposed of in accordance with regulations. ○ The closure committee will ensure that no waste is disposed of in water bodies. | MU and Closure Committee | 20,000,000 |
| Rehabilitation of project site | <ul style="list-style-type: none"> ○ A suitable re-vegetation plan will be executed to restore the site to its original condition. ○ Measures will be implemented during the vegetation period to control surface water runoff and prevent erosion. ○ Regular monitoring and inspection of the area will be carried out to identify any signs of erosion, and necessary actions will be taken to rectify any occurrences. ○ Fencing and signage will be installed to limit access and minimize disturbances in newly vegetated areas. | MU and Closure Committee | 50,000,000 |

CHAPTER 11: CONCLUSION

Based on the thorough assessment of environmental and social impacts, it is concluded that the proposed establishment of the Academic Block, two (2) Student Hostels, Cafeteria, Dispensary, four (4) Staff Houses, and Reservoir Tank at Mzumbe-Tanga Campus, Pangarawe Area, Gombero Village, Gombero Ward, Mkinga District, Tanga Region, is deemed feasible with proper implementation of recommended mitigation measures.

The study recognizes the importance of sustainable development and emphasizes the need for ongoing monitoring and adherence to environmental and social safeguards during the construction and operational phases of the project. Additionally, it highlights the significance of community engagement and collaboration with relevant authorities to ensure the long-term success and positive contribution of the proposed development to the region.

In conclusion, the Environmental and Social Impact Statement serves as a valuable tool for decision-makers, stakeholders, and the community to make informed choices regarding the project, taking into account its potential impacts and benefits.

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3. Mzumbe University-Tanga campus Master Plan, 2023 – 2043.
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6. The Tanzania Development Vision 2025 of 2000.
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29. United Republic of Tanzania, 2008. The Workers Compensation Act (No.20), 2008
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33. United Republic of Tanzania, 2021. National Environmental Policy (2021).
34. World Health Organisation (WHO). Air Quality Guidelines Global Update, 2005. PM 24-hour value is the 99th percentile.

APPENDICES

Appendix 1: Certificate of Occupancy

THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF LANDS, HOUSING AND HUMAN SETTLEMENTS DEVELOPMENT

Telegrams: LANDS
Telephone: 2121241-9
In reply please quote:
Ref. No. LR/T 6887



LAND REGISTRY,
P.O Box 1191,
Dar es Salaam,
Date: 01 Feb, 2023

MZUMBE UNIVERSITY
P.O Box 1
MZUMBE-MOROGORO
Sir/Gentlemen/Madam,

RE: TITLE NO: 6887 LAND OFFICE NO: 1356957
PLOT NO. 1 BLOCK A AT PANGARAWI

I have the honour to enclose herewith duplicate of the Certificate of Title Numbered as above please.


REGISTRAR OF TITLES

Copy to: Commissioner for Lands
Your LD File No: MKG/LD/1250 refers

Land Form 23 A.

TANZANIA

THE LAND ACT 1999
(NO. 4 OF 1999)

CERTIFICATE OF OCCUPANCY

(Under Section 29)

Date of Issue:

Title Number: 6887 TNG

Land Office Number: 1356957

Land: PLOT NO 1 BLOCK "A" AT PANGARAWA AREA IN MKINGA DISTRICT COUNCIL.

Term: NINETY NINE (99) YEARS

TITLE No: 6887 ING
 REGISTERED ON: 1.2.2023
 AT: 1.00 PM
 Senior Asst. Registrar of Titles



TANGANYIKA STAMP DUTY ACT
 Stamp Duty Shs: 730 189 /- Paid
 On Original Receipt Shs: 923006151479607
 of: 06.01.2023
 Stamp Duty Officer

THE UNITED REPUBLIC OF TANZANIA
 THE LAND ACT, 1999
 (NO. 4 OF 1999)
 CERTIFICATE OF OCCUPANCY
 (Under Section 29)

TANGANYIKA STAMP DUTY ACT
 Stamp Duty Shs: 100/= Paid
 Receipt No: 923006151479607
 of: 06.01.2023
 Stamp Duty Officer

Title No. 6887 ING

L.O. No. 1356957

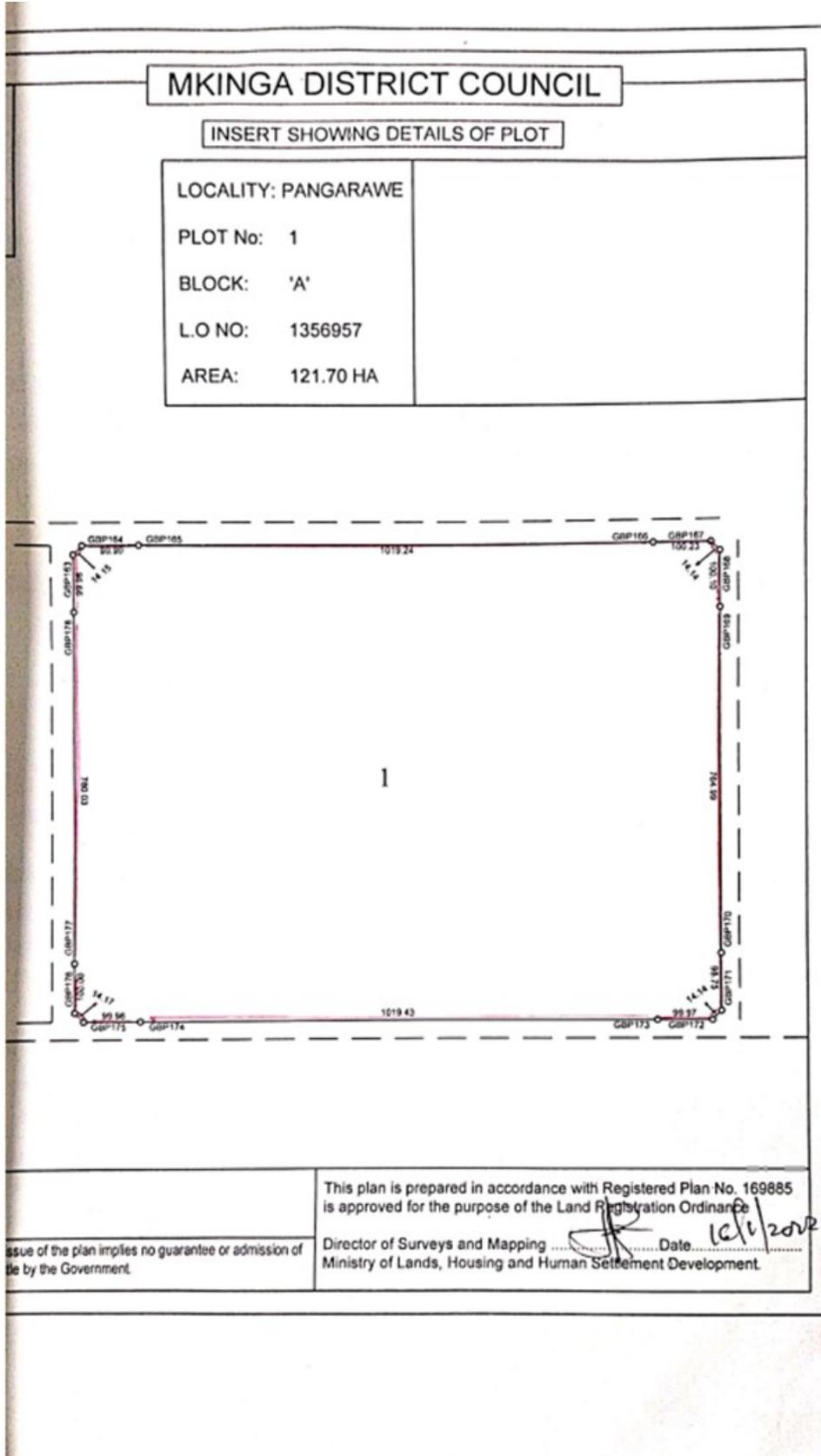
File No. MKG/LD/1250

On the 31st day of January Two Thousand Twenty Three

THIS IS TO CERTIFY that MZUMBE UNIVERSITY Established Under The University Act (No 7 of 2005) of P.O. Box 1, MZUMBE-MOROGORO OF MOBILE NO. +255 023 131212 (hereinafter called "the Occupier") is entitled to the Right of Occupancy (hereinafter called "the Right") in and over the land described in the Schedule hereto (hereinafter called "the land") for a term of Ninety nine (99) years from the First day of January two thousand and twenty three according to the true intent and meaning of the Land Act and subject to the provisions thereof and to any regulations made hereunder and to any enactment in substitution here for or amendment thereof and to the following special conditions:-

1. The Occupier having paid rent up to the thirtieth day of June 2023, shall hereafter pay rent of fourteen million six hundred one thousand nine hundred ninety six (Tshs. 14,601,996/=) Tanzanian Shillings Only a year in advance on the first day of July in every year of the term without deduction PROVIDED that the rent may be revised by the Commissioner for Lands.
2. The Occupier shall:-
 - i. Be responsible for the protection of all beacons on the land throughout the term of the Right. Missing beacons will have to be re-established at any time at the Occupier's expenses as assessed by the Director responsible for Surveys and Mapping.

- (i) Do everything necessary to preserve the environment and protect the soil, prevent soil erosion on the land and do all things which may be required by authorities responsible for environment and to achieve such objective.
 - (ii) Erect on land Buildings in permanent materials designed for use in accordance with the conditions of the right and which conform to the building line (if any) decided by the **Mkinga District Council** (hereinafter called "**the Authority**")
 - (iv) Submit to the Authority building plans within Six months from the date of commencement of the **Right**
 - (v) Begin building construction within six months after the approval of the building plans by the Authority.
 - (vi) Complete the building construction within Thirty Six months from the date of commencement of the **Right**.
 - (vii) Plant, maintain, protect and preserve or conserve not less than five trees on the land within thirty six months from the day of commencement of the Right. The occupier may plant fruit or wood trees depending on the climatic conditions of such land or as it can be directed by planning authority and shall ensure such trees are kept, maintained or replaced throughout the term of such Right of occupation.
3. **USER:** The land and the existing buildings erected thereon shall be maintained and used for **Educational Buildings Purpose Only. Use Group 'K' classes (d)** as defined in Urban Planning Act (Use Groups and Use Classes) Regulations 2018.
 4. The Occupier shall not assign the Right within three years of the date hereof without prior approval of the Commissioner.
 5. The Occupier shall deliver to the Commissioner notification of disposition in prescribed form before or at the time the disposition is carried out together with the payment of premia, taxes and dues prescribed in connection with that disposition.
 6. The **President** may revoke the right for **good cause** and in **public interest**.



SCHEDULE

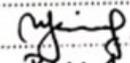
ALL that Land known as **Plot No. 1 Block 'A'** situated at **PANGARAWA** in **MKINGA DISTRICT COUNCIL** containing **One Hundred Twenty One Point Seven (121.70) Hectares** shown for identification only edged **Red** on the plan attached to this Certificate and defined on the Registered Survey Plan Numbered **169885** deposited at the Office of the Director for Surveys and Mapping at Dodoma.

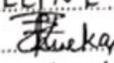
Given under my hand and my official seal the day and year first above written.


ASSISTANT COMMISSIONER FOR LANDS

WE, the within named **MZUMBE UNIVERSITY** hereby accept the terms and conditions contained in the foregoing Certificate of Occupancy.

SEALED with the **COMMON SEAL** of the said)
MZUMBE UNIVERSITY)
and **DELIVERED** in the presence of us)
this **25TH** day of **JANUARY**, 2023)

Name: **PROF. WILLIAM J. MWEEMA**)
Signature: )
Postal Address: **Box 1 MZUMBE**)
Qualification: **AOVC**)

Name: **EVELINE E. KWELA**)
Signature: )
Postal Address: **1 MZUMBE**)
Qualification: **AG. CORPORATE COUNSEL**)

Appendix 2: Ambient Gases Measured at Project area

| S/N | Point | Coordinate | O ₂ | O ₃ | CO ₂ | CO | NO | SO ₂ | H ₂ S | CH ₄ |
|---------------------------|------------------|---------------------|----------------|----------------|-----------------|-------------------|-------------------|-------------------|------------------|-----------------|
| | | | % | % | % | mg/m ³ | mg/m ³ | mg/m ³ | % | % |
| 1 | Academic Block | -4.99753 & 38.95179 | 21 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | Students Hostels | -4.99241 & 38.95572 | 21 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | Cafeteria block | -4.99229 & 38.95431 | 21 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | Dispensary block | -4.99893 & 38.95895 | 21 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | Staff Houses | -4.99542 & 38.94947 | 21 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | Reservoir tanks | -4.99184 & 38.95054 | 21 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| TBS Limits | | | 19.5 | 0.1 | *0.6 | 15 | 0.12 | 0.5 | - | - |
| WHO/IFC Guidelines | | | 23.5 | 0.12 | 0.5 | 30 | 0.2 | 0.5 | 20 | - |

Appendix 3: Particulate Matter Levels Measured at Project area.

| S/N | Point | Coordinate | PM ₁₀ | PM _{2.5} | VOCs |
|---------------------------|------------------|---------------------|----------------------|----------------------|----------------------|
| | | | (µg/m ³) | (µg/m ³) | (mg/m ³) |
| 1 | Academic Block | -4.99753 & 38.95179 | 1 | 1 | 0.000 |
| 2 | Students Hostels | -4.99241 & 38.95572 | 1 | 1 | 0.000 |
| 3 | Cafeteria block | -4.99229 & 38.95431 | 1 | 1 | 0.000 |
| 4 | Dispensary block | -4.99893 & 38.95895 | 1 | 1 | 0.001 |
| 5 | Staff Houses | -4.99542 & 38.94947 | 1 | 1 | 0.000 |
| 6 | Reservoir tanks | -4.99184 & 38.95054 | 1 | 1 | 0.000 |
| TBS Limits | | | 150 | 75 | - |
| WHO/IFC Guidelines | | | 50 | 25 | - |

Appendix 4: Noise levels (in dBA) recorded at Project area.

| S/N | Point | Coordinate | Average Noise level in dBA |
|--|------------------|---------------------|----------------------------|
| 1 | Academic Block | -4.99753 & 38.95179 | 30.9 |
| 2 | Students Hostels | -4.99241 & 38.95572 | 35.5 |
| 3 | Cafeteria block | -4.99229 & 38.95431 | 35 |
| 4 | Dispensary block | -4.99893 & 38.95895 | 35.5 |
| 5 | Staff Houses | -4.99542 & 38.94947 | 31.5 |
| 6 | Reservoir tanks | -4.99184 & 38.95054 | 35 |
| Environmental Management (Standards for Control of Noise and Vibration Pollution) Regulations, 2015 | | | 60 |
| WHO/IFC Guidelines | | | 85 |

Appendix 5: Vibration levels recorded at Project area.

| S/N | Point | Coordinate | Vibration (mm/s) |
|---------------------------|------------------|---------------------|------------------|
| 1 | Academic Block | -4.99753 & 38.95179 | <0.00 |
| 2 | Students Hostels | -4.99241 & 38.95572 | <0.00 |
| 3 | Cafeteria block | -4.99229 & 38.95431 | <0.00 |
| 4 | Dispensary block | -4.99893 & 38.95895 | <0.00 |
| 5 | Staff Houses | -4.99542 & 38.94947 | <0.00 |
| 6 | Reservoir tanks | -4.99184 & 38.95054 | <0.00 |
| TBS Limits | | | 5 |
| WHO/IFC Guidelines | | | 5 |