ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED CONSTRUCTION OF COLLEGE OF MEDICINE AT KIGOMA CAMPUS LOCATED ON PLOT NO.1, BLOCK 'U', KITENGE AND UKUMBI STREETS IN MACHINJIONI WARD, KIGOMA UJIJI MUNICIPALITY IN KIGOMA REGION

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EXECUTIVE SUMMARY

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED CONSTRUCTION OF COLLEGE OF MEDICINE LOCATED AT MACHINJIONI WARD, KIGOMA UJIJI MUNICIPALITY IN KIGOMA.

Introduction

The Muhimbili University of Health and Allied Sciences (MUHAS), through the Government of the United Republic of Tanzania (URT) has received financing from the World Bank to implement Higher Education for Economic Transformation Project (HEET). MUHAS is among the High Learning Institutions selected to establish Eight buildings including college of Medicine under the HEET project. MUHAS intends to construct college of medicine within Kigoma Special Economic Zone (KISEZ) at Machinjioni Ward, Kigoma Ujiji Municipality.

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

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

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

Project Description

The site is located in Kitenge Mtaa and Ukumbi Mtaa, in Machinjioni Ward, Kigoma Ujiji Municipality, Kigoma Region. MUHAS- Kigoma Campus is located on plot number 1 Block "U", Kitenge/Ukumbi Mtaa,Machinjioni Ward, Kigoma ujiji Municipality at Latitude 4.534200 South and Longitude 29.414000 East. It is bordered with undeveloped plots to the North, West, East and South. MUHAS-Kigoma campus can be accessed through Wakuha Road when coming from Kichangachui primary school. Neither wildlife nor domestic animal was observed at the project site.

Government of the United Republic of Tanzania through the Ministry of Education, Science and Technology (MoEST) is implementing the Higher Education for Economic Transformation (HEET) project. HEET is a five-year project through the World Bank support, to promote higher education as a catalytic force in the new Tanzanian economy. The project is designed to revitalize and expand the capacity of universities to contribute to key areas for innovation, economic development, and labour market relevance, by investing in requisite infrastructure for modern and effective teaching and research, and by training to the highest standard the teachers, researchers and administrators needed by universities to achieve to their full potential.

The broad objective of the project is to construct the school of medicine at Kigoma comprising of eight (8) buildings namely, Administration Block Building; Multi User; Teaching Laboratory ; Academic Block Building; Anatomy and Pathology Laboratory Building; Undergraduate Students Hostel Building 250 Students (100 Male & 150 Female); Student and Staff Cafeteria (50 Staff & 120 Students); Sports and recreation grounds equipped with sporting facilities for students/staff and Staff Apartments Building.

The main source of electricity at the proposed site is from Tanzania Electric Supply Company (TANESCO) but there will be standby generator which will be used when there is shortage of electrical supply. The water source at the site is mainly from KUWASA and the same shall be during construction and operational period. Solid wastes shall be collected at the solid waste transfer stations on site and then transported to municipal dump site for disposal.

Policy, Legal and Institutional Framework

Tanzania is committed to attaining sustainable development goal. A few policies that have a close bearing to education sector and construction industry are; National Environmental Policy (NEP) of 1997; Construction Industry Policy (2003); National Land Policy (1995); National Human Settlements Development Policy (2000); National Gender Policy (2002); Energy Policy (1992); The National Water Policy (URT, 2002); The National Health Policy (URT, 2003); The Tanzania Development Vision 2025; The Women, Gender and Development Policy (2000); and The National Strategy for Gender and Development (2005).

Relevant legislation includes; Environmental Management Act No. 20 of (2004), Cap. 191; The Water Supply and Sanitation Act No. 12 of 2009; The Land Act, 1999; The Urban Planning Act (2007); Occupation Health and Safety (2003); Employment and Labour Relations Act No. 6 0f 2004; Engineers Registration Act and its Amendments 1997 and 2007; The Contractors Registration Act (1997); The Architects and Quantity Surveyors Act (1997); The Local Government Laws (Urban Authorities) Act (1999); Public Health Act 2009; Sexual Offences (Special Provisions) Act (1998*;* The Child Act, 2009, Fire and Rescue Act (2007); Environmental Impact Assessment and Auditing Regulations (2005); The Environmental Regulations (Standards for control of noise and Vibrations, 2014; The Environmental Management (Air Quality Standards) Regulations, 2007; Environmental Management (Solid waste Management) Regulation, 2009 GN. NO. 263.

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

i. World Bank's Environmental and Social Framework (ESF);
ii. World Bank relevant Environmental and Social Standards (ESSs)

This ESIA has applied 6 relevant standards out of 10 ESSs, which are:

- ESS1- Assessment and Management of Environmental and Social Risks and Impacts;
- ESS2 - Labour and Working Conditions;
- ESS3 - Resource Efficiency and Pollution Prevention and Management;
- ESS4 - Community Health and Safety;
- ESS8 – Cultural Heritage; and
- ESS10 - Stakeholder Engagement and Information Disclosure.

Baseline Environment

The site is comprised of a high area on the north side of the KISEZ area and is characterized by high ridges that are dispersed throughout it. These ridges are between 160 and 180 meters above sea level, and they can be found in the site's north, centre, and south-west corners, providing commanding elevations and ample room for the University complex and other large buildings. In order to offer a natural storm drainage system, the majority of the ridges are also

broken up by steep river valleys that slope down in the north, south, east, and west directions. Two higher hills run south-west of the location and have allowed for the natural development of a small seasonal dam or water body that might be used for recreational purposes.
Physical observation and the finger test confirmed that the type of the soil is san-loam soil.
Most part of the project area is not in use, covered by vegetation, this area is used for graving by neighbors.
MUHAS-Kigoma campus water will be supplied by KUWASA and water storage tanks of different capacities will be installed on different points within the university campus to ensure the supply of water is available even in the moments of insufficient water supply by KUWASA. Also, to ensure the reliable and sufficient water within the university campus will also drill boreholes which will be registered to Tanganyika basin and the monitoring of water quality parameters will be done accordingly.
MUHAS Kigoma campus is extensively wooded with grassland, shrubs, woodlands, and thickets with species of *Acacia* and *Comiphora,* other dominant plants include coconut palm, cashew, mango, banana, and pawpaw, which are typical of locations with moderate rainfall of 750- 1000mm.
The project is located at Kigoma Special Economic Zone (KISEZ) in Kitenge and Ukumbi Mtaa which is the property of Muhimbili University of Health and Allied Sciences (MUHAS)

Stakeholder Engagement and Public Consultation
Stakeholders' identification and engagement process was conducted based on EIA and Audit Regulations, 2005 and its amendment of 2018 and World Bank Environmental and Social Standards (ESS10) and Stakeholders Engagement Plan (SEP) prepared for the project. The SEP covers both national and sub-national engagement; however, a greater focus was placed on sub-national stakeholders. The SEP provides details on the engagement needed associated with project activities. The project involved various stakeholders considering gender, vulnerable people as well as people with special needs. They were consulted to get their views throughout the project life. In addition, a mechanism was put in place to address grievances, Gender based Violence (GBV), Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH).

Key stakeholders were consulted during ESIA study, include the following; Kigoma Ujiji Municipal Council (Environmental Officer, Town Planner and Community development Officer), Occupational Safety and Health (OSHA), Tanzania Electric Supply Company Limited (TANESCO), Fire and Rescue Forces (Kigoma), Legal and Human Rights Centre (LHRC), Tanzania Gender Network Programme (TGNP),Machinjioni Ward Office (WEO); and Kitenge and Ukumbi Development Committees. Also scoping reports was submitted to the Ministry of Education, Science and Technology (MoEST), Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC) and Tanzania Eletric Supply Company Limited (TANESCO), Fire and Rescue Forces (Kigoma), Legal and Human Rights Centre (LHRC), Tanzania Gender Network Programme (TGNP) to seek for comments/issues. The main issues and concerns identified include the following:

- Waste Management-There must be proper solid waste and wastewater collection system during construction and operation phase;
- Developer and contractor must cooperate with local government authority during both phases of the project; and
- Contractor and developer must adhere to all provisions of Occupational Safety and Health Act 2003

Assessment of Environmental and Socio-Economic Impacts
(a) The assessed environmental risks and impacts were based on:

i. World Bank Environmental Health and Safety Guidelines (EHSGs);
ii. Effects related to climate change;
iii. Effects of any material threat to the protection, conservation, maintenance and restoration of natural habitats and biodiversity;
iv. Effects related to ecosystem services and the use of living natural resources; and those related to the design of the physical facilities.

(b) The assessed socio-economic risks and impacts were based on:
i. Threats to human security through crime or violence; and
Risks that project impacts fall disproportionately on individuals and groups who because of their particular circumstances, may be disadvantaged or vulnerable.

Identified Environmental and Social Impacts
The development of the college of medicine at Kigoma campus shall cause a wide range of environmental and social impacts on a number of receptors. The impacts are of both positive and negative nature. The identified significant environmental impacts during construction phase include; air and noise pollution; waste generation and management; occupational safety and health risks; erosion of cleared areas; loss of vegetation, and construction vibration. Social impacts during construction are employment opportunities; GBV and sexual harassment; community health and safety risks Transmission of Vector Borne and Communicable Diseases; Impacts associated with Transmission of Sexually Transmitted Infections; Impacts associated with Spreading of Covid 19 Pandemic; and Impacts on Labour and Working Conditions.

The identified significant environmental impacts during operation phase include; health and safety risks due to fire hazards, waste generation and management. The Social Impacts are benefits to communities resulting from employment, reduction of gender gap in enrollment and completion rates increase in economic activities, regional integration, increased revenue to the council and country as a whole, increased pressure on social services and utilities,

Consideration of Alternatives
Different alternatives were considered in this study including no project alternative, alternative sites, alternative designs, Energy Alternative, Wastewater treatment Alternatives. The no project alternative was disqualified because choosing that alternative shall mean to remain with the status quo (without project) and losing all the benefits of the project. Existing water sources KUWASA was preferred than other water sources like rainwater harvesting. Electricity from National grid was preferred, however solar energy shall be explored and if feasible shall be used. For wastewater management, onsite sanitation system was preferred because there is no sewer system.

Environmental and Social Management Plan
The options to minimize or prevent the identified adverse social and environmental impacts as well as a monitoring plan have been suggested in this report and are contained in the ESMP. Many of them are based on good engineering practices. The Environmental and Social Management Plan (ESMP) presents the implementation schedule for the proposed mitigation measures to both environmental and social impacts as well as planning for long-term monitoring activities. The ESMP also includes the associated environmental costs needed to implement the recommended mitigation measures. The engineering designs shall include the mitigation measures recommended in this report.
Cost Benefit Analysis

This project is purely a service and therefore it is not possible to convert all the social benefits into monetary terms. Therefore, an indicative and elementary description of the environmental and social costs and benefits was presented and compared (qualitatively). The comparison of the positive and negative impacts of the project showed that the project has more benefits than costs.

Project Decommissioning

As decommissioning will take place in the remote future (approximately 50 years), the specific conditions for mitigation are generally inherently uncertain. In view of this, specific mitigation measures pertaining to environmental impacts of decommissioning works cannot be proposed at the moment with a reasonable degree of certainty.

A decommissioning plan that takes environmental issues into consideration shall be prepared by the developer prior to the decommissioning works. Should it be done, decommissioning may entail a change of use (functional changes) or demolition triggered by change of land use.

This ESIA has prepared brief outline of the works required to demolish the proposed project on the site incase it happen. This Plan will be used as a reference document that provides the framework to ensure that demolition activities on the site do not adversely affect the health, safety, traffic or the environment of the public and neighbouring properties. The identified significant environmental impacts during decommissioning phase include; air (dust) and noise pollution; waste generation and management; occupational safety and health risks; and vibration. Social impacts during construction are employment opportunities and community health and safety risks

The Contractor will be required to prepare a detailed demolition plan and construction management plan to the satisfaction of the developer and relevant authorities prior to the commencement of works on site.

Conclusion

The ESIA study results show that although there are some limited negative environmental implications of the project, the project will have high benefits to MUHAS, the Community and Tanzania as a whole. The associated negative impacts, to a large extent have been minimized through good engineering design and envisaged construction practices. Specific mitigation measures have been suggested in this report to offset some of the inherent adverse impacts. Implementing these mitigation measures would increase environmental soundness of the project.

It can therefore be concluded that, the proposed construction of college of medicine with eight buildings project will entail no significant impacts provided that the recommended mitigation measures are adequately and timely implemented. The identified impacts will be managed through the proposed mitigation measures and implementation regime laid down in this ESIA. The developer is committed in implementing all the recommendations given in this ESIA and further carrying out the environmental auditing and monitoring schedules.

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God bless you!

ACRONYMS AND ABBREVIATIONS

ARN	Application Reference Number
BCR	Benefit Cost Ratio
BI	Building Inspector
BATNEEC	Best Available Technology Not Entailing Excess Cost
CBD	Central Business District
CDO	Community Development Officer
CISCO	Commercial & Industrial Security Corporation
CITES	Convention on International Trade in Endangered species of Wild Fauna and Flora
CRB	Contractors Registration Board
DoE	Division of Environment
KUWASA	Dar es salaam Water Supply and Sanitation Authority
ESIA	Environmental and Social Impact Assessment
EIA	Environmental Impact Assessment
ESMF	Environmental and Social Management Framework
ESF	Environmental and Social Framework
EMA	Environmental Management Act
EMO	Environment Management Officer
EMP	Environmental management Plan
ERB	Engineers Registration Board
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standards
EWURA	Energy and Water Utilities Regulatory Authority
GFA	Ground Floor Area
GBV	Gender Based Violence
GMU	Gender Management Unit
GOT	Government of Tanzania
GRM	Grievance Redress Mechanism
HEET	Higer Education for Economic Transformation Project
HIV	Human Immune Deficiency Virus
IAPS	Interested and Affected Parties
ICT	Information and Communication Technologies
IFC	International Finance Corporation
LHRC	Legal and Human Right Centre
LGA	Local Government Authorities
MARPOL	Marine Pollution from ships
MEO	Mtaa Executive Officer
MUHAS	Muhimbili University of Health and Allied Science
NCIP	Northern Corridor Initiative Project
NEMC	National Environment Management Council
NEP	National Environmental Policy
NGO	Non-Governmental Organisation
OSHA	Occupational Safety and Health Authority
PCU	Project Coordination Unit
PPA	Project Preparation Advance
PPE	Personal Protective Equipment
SEA	Strategic Environmental Assessment
TAC	Technical Advisory Committee
TACAIDS	Tanzania Commission for AIDS

TGNP	Tanzania Gender Network Program
TANESCO	Tanzania Electricity Supply Company Limited
TANROAD	Tanzania National Roads Agency
TARURA	Tanzania Rural and Urban Roads
TMA	Tanzania Meteorological Authority
TPO	Town Planning Officer
ToR	Terms of Reference
UDSM	University of Dar Es Salaam
URT	United Republic of Tanzania
VAT	Value Added Tax
VEO	Village Executive Officer
WB	World Bank
WEO	Ward Executive Officer

CHAPTER ONE
1.0 INTRODUCTION

1.1 Background

1.1.1 Developer

Muhimbili University of Health and Allied Sciences (MUHAS) came into being University by His Excellence the President of the United Republic of Tanzania in 2007. MUHAS was conceived in 1963 when the then Dar es Salaam College of Medicine was established. In 1968 the School became a Faculty of Medicine and was upgraded to a Muhimbili University College of Health Sciences (MUCHS), a constituent college of the University of Dar es Salaam in 1991 with the aim of nurturing it to a full-fledged university and was later merged with the Muhimbili hospital to create the Muhimbili Medical Centre (MMC). Over the years MUCHS made significant achievements in terms of increased student enrollment and development of several new academic programs. The Parliament Act No 9 of 1991 that established MUCHS was repealed in 2005 through the universities Act no 7 of 2005. Subsequently, in 2007 Article 1 of the Charter of Incorporation established MUHAS; in line with the Universities act no 7 of 2005.

MUHAS has grown from a small Unit with an enrolment of 10 students and a single program, Doctor of Medicine (MD) to an institution with an enrolment of 4,200 students with a total of 91 accredited academic programs, which includes 10 diploma programs, 14 undergraduate programs and 67 postgraduate programs. It has developed from a Faculty of Medicine, which housed all current academic units as departments to an institution with 5 Schools, 2 Institutes and 12 Directorates.

1.1.2 The HEET Project

The Government of the United Republic of Tanzania through the Ministry of Education, Science and Technology (MoEST) is implementing the Higher Education for Economic Transformation (HEET) project. HEET is a five-year project through the World Bank support, to promote higher education as a catalytic force in the new Tanzanian economy. The project is designed to revitalize and expand the capacity of universities to contribute to key areas for innovation, economic development, and labour market relevance, by investing in requisite infrastructure for modern and effective teaching and research, and by training to the highest standard the teachers, researchers and administrators needed by universities to achieve to their full potential.

The Project is geared towards meeting the following strategic objectives (i) to increase enrolment in priority disciplines, (ii) to improve the relevance and quality of programs at universities to meet the conditions and standards of the current and future labour market, (iii) to strengthen system-level coordination, management, and regulations to ensure quantity, quality and relevance of higher education in Tanzania, and (iv) to increase the rate and extent of graduate employability through improving the relevance of curricula and create new and demand- driven programs.

1.1.3 The Project at MUHAS Kigoma Campus

1.1.3.1 Proposal

MUHAS has received funding to support its strategic development plans through the Higher Education for Economic Transformation (HEET) Project. The HEET project is supported by the Government of the United Republic of Tanzania (GoT) through the World Bank financing with the Project Development Objective (PDO) of strengthening the learning environment and labour market alignment of priority programs at beneficiary higher education institutions and improving the management of the higher education system. The project among other things shall finance construction of College of Medicine at Kigoma Campus.

1.1.3.2 The Need for ESIA Study

The ESIA study is conducted in accordance with the Environmental Impact Assessment and Audit regulations (2005); and, formulated after the Environmental Management Act (EMA) No. 20 of 2004. The Regulations give mandate to NEMC to oversee the EIA process, which culminates with an award of the EIA Certificate by the Ministry responsible for Environment. The EIA Certificate is among the prerequisite approvals required before the project takes off. This project will need this approval before it is implemented. In addition, ESIA study will adhere to the World Bank Environmental and Social Framework (ESF), Environmental and Social Standards (ESSs) and Environmental and Social Safeguarding Policies.

To comply with the legal requirements governing construction industry and Environmental safeguards in Tanzania, MUHAS has awarded the contract for the provision of consultancy services to undertake Environmental and Social Impact Assessment for the proposed Project. Objective

1.2 Objectives of HEET Project

The broad objective of the project as stipulated in the HEET's Project Appraisal (PAD) of 2021 is to strengthen the learning environment and labour market alignment of priority programs at beneficiary higher education institutions and improve the management of the higher education system at MUHAS campus.

Specifically, the project has the following activities;

Construct the school of medicine at Kigoma comprising of eight (8) buildings namely, Administration Block Building; Multi User; Teaching Laboratory; Academic Block Building; Anatomy and Pathology Laboratory Building; Undergraduate Students Hostel Building 250 Students (100 Male & 150 Female); Student and Staff Cafeteria (50 Staff & 120 Students); Sports and recreation grounds equipped with sporting facilities for students/staff and Staff Apartments Building.

1.3 Project Justification and Rationale

Tanzania has made significant strides in increasing access to basic education since 2015, witnessing a 24.5% rise in primary enrolment from 2015 to 2018, surpassing 10 million pupils in 2019. Secondary enrolment also grew in 2013/14, but challenges arise in absorbing the growing number of basic education graduates into higher education. The higher education sector in Tanzania grapples with persistent issues like a skills gap between university graduates and industry demands, low enrolment and completion rates in STEM fields, insufficient infrastructure, weak academia-industry connections, and limited research capacity. The World Bank's Higher Education for Economic Transformation (HEET) project addresses these concerns by focusing on infrastructure investment, quality assurance, and gender disparities. The project aims to enhance higher education quality, relevance, and equity, supporting academic program development, research centers, and partnerships. It provides scholarships, grants, and loans, benefiting over 100,000 students and 3,000 faculty members by 2028.

The HEET project aligns higher education with economic priorities, developing workforce skills, expanding STEM and business education, improving teaching quality, and fostering university-industry collaborations. By addressing gaps in Tanzania's higher education, the project aims to boost economic growth and transformation, recognizing higher education's crucial role in innovation, economic development, and social inclusion. As basic education graduates increase, the HEET project invests in infrastructure and quality assurance, particularly in engineering, medical sciences, agriculture, energy, and natural resource management, supporting Tanzania's economic transformation. The Government of Tanzania uses the HEET project to enhance public universities' operational capacities, aligning them with economic goals for sustainable growth.

The University infrastructure at MUHAS Main Campus cannot support modern technologies due to limited space, size and orientation. The existing infrastructures were designed to serve a small number of students, but now due to increase in number of students enrolling per year, the facilities can no longer support more diploma, undergraduate and postgraduate students. The laboratories, libraries, hostels, lecture rooms are not only inadequate to support undergraduate studies appropriately, but also not fit for advancing research for postgraduate studies and community-related laboratory challenges. Therefore, the University needs state-of-the-art science College of Medicine campus, equipment and facilities to support teaching and advanced research to contribute to national development.

1.4 Nature of the project

1.4.1 National Requirements

As per the national regulatory framework, i.e., the third schedule of The Environmental Management Act, 2004 and first schedule of Environmental Impact Assessment and Audit Regulations amendments of 2018 the project (Multi-storey buildings) falls under "Type A" projects which a full EIA study is mandatory. Therefore, a full EIA study is being conducted to fulfil the provision of these regulations.

1.4.2 World Bank Environmental and Social Requirements

In order to reduce, minimize and mitigate adverse impacts and undue harm of its development projects to the environment, all World Bank-financed projects are guided by Environmental and Social Framework (ESF). Implementation of the Project is anticipated to have both positive and negative environmental and social impacts albeit on local scale and hence Environmental and Social Standard 1 (ESS1) is applicable. According to HEET ESMF, the WB classification under ESS1, the project has been given the risk assessment of "**Substantial**" due to the likelihood of environmental and social impacts generated by the project.

1.5 Objectives of this ESIA Study

The objective of ESIA is to assess the environmental and social impacts of the building construction and operations and recommend mitigation measures to address the negative and positive impacts. This is in line with the Environmental Management (EIA and Audit) (Amendment) Regulations of 2018 and World Bank Environmental and Social Standards (ESS1). Specifically, this ESIA study foresee all environmental, social and economic effects of the proposed project design before the project come into the actual implementation. This study therefore, addressed the social, economic, and environmental issues associated with the project and provided relevant mitigation plan to prevent or minimize adverse impacts and enhance the positive ones.

1.6 Rationale of the EIA

To ensure that no segment of the population is adversely affected and the physical cultural resources are given the due attention. Therefore, this ESIA study was carried out to identify constraints, risks and mitigation measures on the project affected community by adhering to new Environmental and Social Framework (ESF) while applying the relevant World Bank Environmental and Social Standards (ESSs) which are ESS1, ESS2, ESS3, ESS4, ESS8 and ESS10. The ESIA provides input to the design proposals of the DUCE teaching and office buildings project. The ESIA findings and recommendations contained in this report will be incorporated in the overall project design, specifically assist in the development of mitigation and enhancement measures of the identified risks, opportunities and impacts.

1.7 Scope of Work

This study entailed the following: -

i. To provide a description of the relevant parts of the project including project location, design, components and activities.
ii. To review of policies, legislation, standards and regulations governing Environment at International, Regional and Local levels
iii. To assemble, evaluate, and present baseline data on the relevant environmental and social characteristics of the project area.
iv. To make consultation with government agencies, local communities and the private sector operating in near the project area.
v. To assess and quantify the potential environmental impacts resulting from the construction of proposed office building, especially within the zone of influence of the project.
vi. Describe alternatives that were examined in the course of developing the proposed project and identify other alternatives, which would achieve the same objectives
vii. To develop an Environmental and Social Management Plan (ESMP) detailing actions and responsibilities for impacts mitigation and monitoring.

The ToR (See appendix II) formed the basis for the study, and for that matter, this report.

1.8 General Methodology

This ESIA was conducted in accordance with the EIA and Audit Regulations (2005) and its amendments of 2018, The World Bank Environmental and Social Standards (ESSs) and Environmental and Social Framework (ESMF) for HEET Project. The approach and methodology that was used to acquire data and information for compilation of ESIA is provided in subsequent sub sections.

1.8.1 Study Team

The EIA being a multidisciplinary field involved a team of experts. Table 1.2 below presents the team members who participated in the scoping exercise.

Table 1.1: Study Team

NAME	PROFESSION	
Regina Kabogwi	Team Leader, Environmentalist	General Coordination of the Team and provide link between the developer, team and NEMC
Valerian Mella	Environmental Engineer	Documents review, Field survey for Biophysical data Collection, Preparation of Scoping and ESIA Report
Farida Mzee	GBV/Gender Expert	Documents review, Field survey for Social data Collection, Stakeholder's consultations, Gender and GBV data Collection, Preparation of Scoping report and ESIA Report
Ignatius Ngamesha	Sociologist	Documents review, Field survey for Social data Collection, Stakeholder's consultations, Preparation of Scoping report and ESIA Report

1.8.2 Scoping Exercise

Scoping excise was used to identify the key issues of concern at an early stage in the EIA process in accordance with the EMA of 2004 and its EIA and Audit Regulations, 2005 and the 2018 amendment as part of the ESIA processes. There are project benefits accrued from the process of scoping early, such as appropriate site selection and identification of possible alternatives. Scoping also identifies and initiates involvement of all interested and affected parties (IAPS) such as the proponent and planning and members of the public. The results of scoping study determine the scope, depth of the terms of reference (TOR) to be addressed within the Environmental Statement (EIS). Scoping exercise was conducted in November 2023 and the TOR was approved by NEMC (Appendix II) in December 2023.

1.8.3 Desk Work Study

Desk work study involved identification and review of both local and international policies and laws relevant to the project; collection and review of previous study reports as well as literal collection and review of information and data on the physical, social, economic, cultural scope. The consultant noted that the important issues reflected in the ToR deserve special reference to the existing official information particularly in the following documents:

- Environmental and Social Management Framework (ESMF) for HEET Project
- Country Policies and legislation relevant to the project
- World Bank Environmental and Social Standards (ESS)
- World Bank General Environmental, Health and Safety guidelines
- Project Design Drawings
- MUHAS Master plan 2018/2019- 2022/2023

1.8.4 Field Survey

The field visits were essential to fully realize the scope of the project, the biophysical environment specific to the location and the socio-economic conditions in the project area. Three visits to the project area were made during scoping stage and four visits during detailed ESIA stage. All visits were made between September and November 2023. The team used the fieldwork to conduct interview with stakeholders and collection of information on the state of the environment. Information collected includes site land use, water supply, wastewater collection, solid waste management, traffic issues, and other indicators related to environmental and socio-economic trends of MUHAS and surrounding. Other information was appraised through key informant interviews and experts' observations.

1.8.5 Onsite Measurements

The onsite measurements conducted for this study includes dust (particulate matter) measurements (ppm), ambient air measurements (respective units), noise levels measurements dBA) and vibrations measurements (vibrations per Second) to establish baseline environment at the project area. Measurements was done by consultant for two days including weekend and weekdays from 09th and 11 th November 2023. Saturday (11th Oct) was selected to represent weekend. For noise measurements was performed during day and night. Results of the measurements are presented in chapter 4 of this report.

1.8.5.1 Selection and description of measured sampling stations

The monitoring stations were established as per Environmental Management (Air Quality) regulations of 2007. The criteria followed included: predominant wind direction (leeward and windward) at the area during the study, workers'/operators' positions and nearest local communities as possible receptors, size of the area to be covered, the areas where pollution was expected, as well as areas that pollutants from the project activities are likely to disperse to. Other criteria include areas that are easily definable and with easy future access in case of need for comparison measurements or another monitoring study. Moreover, the selection criteria for sampling stations considered point source emissions and nearby receptors (i.e., workers or operators at their working locations) that is likely to be affected by the proposed project.

1.8.5.2 Dust (Particulate matter) concentrations in terms of PM10

Dust levels in terms of PM_{10} were measured using Casella Micro dust Pro 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. The device has been tested according to the standard delivery schedule and complies with the EN 50081-1:1992 and EN 50081-2:1993 standards. 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 average values were compared with prescribed available limit to check their compliance with both TBS standards, WHO standards.

1.8.5.3 Ambient Pollutant Gases Emission

Levels of ambient pollutant gases were measured using Portable Multi Gas Detector-71-0028RK, in accordance with manufacturer's procedure that meet ISO 9001:2008 protocol. The measuring device undergoes automatic calibration once it is switched ON by pumping in fresh air into the sensors to allow toxic sensors to be set to zero. Three measurements were recorded periodically at each station and used to calculate the average value of each pollutant in each station. The average values were then compared with TBS-NES limits and World Health Organization (WHO) guidelines to check their level of compliance.

1.8.5.4 Noise Levels

Noise measurements were carried out using sound level meter (model CEM DT-8852 data logger), with reference to the international standards namely IEC 61672:1999, IEC 61260:1995 and IEC 60651, as well as ISO 19961:2003 and ISO 3095:2001. During testing, the digital sound level meter was set to A-weighting scale to enable 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. At each station, at least eight measurements were performed and used to calculate the average levels.

1.8.5.5 Ground Vibration

Ground vibrations were measured by using an XTECH SDL-800 vibration meter data logger to quantify the ground vibration at the study area. A meter has an accuracy of ±5%, acceleration of 200 m/s2, a wide frequency range of 10 Hz to 1 kHz for capturing almost all possible vibrations for workplace assessments. The XTECH vibration meter data logger is designed to measure vibration at the workplace according to European standard EN 14253:2003. At each identified station, vibration readings were recorded after every 5 seconds three times and their mean value was used to represent the vibration level at that particular station.

1.8.6 Stakeholders consultations

A consultation map/plan was prepared in accordance with the HEET stakeholder's Engagement Plan (SEP) and the recommendations in the World Bank ESS10. The consultation programme maps out the stakeholder engagement process in each phase of the ESIA study. The programme is adaptive and subject to change based on stakeholder responses/requirements. A combination of various types of consultation techniques was be used like face to face meetings, interviews and serving of scoping report and request for issues. The overall consultation process was designed to comply with the requirements for public consultation as prescribed in Tanzania's EIA and Audit regulations for stakeholder engagement, and World bank guidelines for stakeholder's engagement.

Issues raised by stakeholders are presented in chapter 5 of this report while the list of names, addresses and signatures of stakeholders consulted are found in appendix III and IV.

1.8.7 Project Impact Assessment

Superimposing project elements onto the existing social and environmental natural conditions made it possible to identify the potential impacts of the proposed construction of college of Medicine.

1.8.7.1 Identifying Environmental Impacts

The checklist method was used to identify the impacts and mitigation measures. The ESMF for the HEET project was also used as a framework in identification of impacts. A key guiding assumption in this study is that the project will be designed, constructed and operated with due care for safety and

environmental matters using current and practical engineering practices and/or Best Available Technology Not Entailing Excess Cost (BATNEEC). The implementation schedule of the mitigation measures is summarized in the ESMP.

Several project alternatives were considered including that of not implementing the project. The fundamental environmental protection strategy and environmental considerations influencing engineering design were incorporated. However, reasonable regard to technological feasibility and economic capability were considered. The assessment entailed the following:

1.8.7.2 Collection of Baseline Data

The collection of baseline data was conducted subsequent to defining the scope of the EIA. These data allow the study team to determine whether more detailed information on environmental conditions at the development site and its surroundings are needed and where such information can be obtained. Both primary and secondary data were collected. Primary data were collected by direct measurement, observations and using semi-structured interviews with respective and targeted parties (as explained in the previous section). Secondary data were obtained from various relevant sources of information such as education and health reports and many other official and non-official documents and the Internet.

1.8.7.3 Review of Policies, Legal and ESMF for HEET Project

The study also reviewed country policies, laws and regulations and World Bank standards relevant to the project. This allowed the study team to update and enhance their understanding of National policies, legislation and institutional arrangements for environmental management in Tanzania and relevant international procedures to ascertain the optimal management of impacts.

1.8.7.4 Predicting Environmental Impacts

This was done by using "best estimate" professional judgment of the experts and case studies as analogous or references. The environmental and social impacts were identified and their potential size and nature were predicted. The prediction of impacts specified the impact's causes and effects and its secondary and tertiary consequences for the environment and the social aspects.

1.8.7.5 Identifying Mitigation and Management Options

The options for dealing with identified and predicted impacts were considered. This enabled the study team to analyze proposed mitigation measures. A wide range of measures have been proposed to prevent, reduce, remedy or compensate for each of the adverse impacts evaluated as being significant. Analysis of the implications of adopting different alternatives was done to assist in clear decision-making.

1.8.7.6 Determining the Significance of Impacts

The key activity was to evaluate the significance of impacts, the major criteria used was

- The level of public concern
- Scientific and Professional Evidence concerning
    a) Resource loss, ecological damage
    b) Negative Social Impacts
    c) Resource use options etc.

1.9 ESIA Report Structure

- **Chapter one** presents the introduction on the background information of the proposed project, its development objectives and the proposed project implementation arrangements.
- **Chapter two** presents the project description, in which there is a description of the location and relevant components of the project and their activities.

- **Chapter three** illustrates policy, legal and administrative framework, which are the relevant National policies, acts and World Bank standards applicable to construction projects.
- **Chapter four** presents the baseline information relevant to environmental characteristics, which gives details concerning the Bio-physical environment, socio-economic and Gender equality and Gender Based Violence issues at the project area.
- **Chapter five** presents the consultation exercise at the project area detailing the list of stakeholders consulted and the issues raised.
- **Chapter six** describes the positive and negative environmental impact of the project that are likely to be generated from the different phases (the planning and designing, construction, operation and maintenance and the demobilization phases).
- **Chapter seven** presents the mitigation measure for the potential negative impact of the project.
- **Chapter eight** presents the Environmental and Social Management Plan (ESMP).
- **Chapter nine** presents the Environmental Monitoring Plan that contains the proposed institutions to carry out the monitoring activities, the monitoring indicators, time frame and the proposed budget for monitoring.
- **Chapter ten** presents the cost benefit analysis of the project.
- **Chapter eleven** provides the decommissioning plan for the proposed project.
- **Chapter twelve** presents the summary and conclusions of the study.

Appendices, this section presents some key primary information collected during the study as attached at the end of this report.

CHAPTER TWO
2.0 PROJECT DESCRIPTION

2.1 Location and Accessibility

Kigoma is located in the western part of the Tanzania, stretching along the shores of lake Tanganyika and borders Burundi and Democratic republic of congo (DRC). The region is situated between latitude 6°51' and 3°5'S and Longitude 29°05' and 31°5'E . With an area of 45,075 square kilometres (km^2), it occupies 4.8 percent of the Tanzanian mainland.

Kigoma Ujiji Municipal Council is one of the two (2) Councils in Kigoma District. Other Districts are Kibondo, Kakonko, Kasulu, Uvinza, and Buhigwe. Kigoma Ujiji Municipal Council was established under the Local Government Authority, from a town council to a municipal council on the 1st July, 2005. The Municiplaity has two divisions that is Kigoma north and kigoma south. The council has 19 wards and 68 mitaa.

MUHAS- Kigoma Campus is located on plot number 1 Block "U", Kitenge/Ukumbi Mtaa,Machinjioni Ward, Kigoma ujiji Municipality at Latitude 4.534200 South and Longitude 29.414000 East. It is bordered with undeveloped plots to the North, West, East and South. MUHAS-Kigoma campus can be accessed through Wakuha Road when coming from Kichangachui primary school.

2.2 Proof of Land Ownership and Land Use

The project is located at Kigoma Special Economic Zone (KISEZ) in Kitenge and Ukumbi Mtaa which is the property of Muhimbili University of Health and Allied Sciences (MUHAS) for the term of ninety-nine years (See certificate of occupancy in Appendix III). The whole campus has a total area of 19.16 ha (equivalent to 191,600sqm). The certificate of occupancy show that the area should be used for Education Buildings purposes only, Use group "K" use classes (d) as defined in the Urban Planning (use group and use classes), Regulations of 2018.

2.3 Project Components and design

2.3.1 Project Components

The project shall have the following components

i. Administration Block Building with 1,220sqm
ii. Multi User Teaching Laboratory with1,779sqm
iii. Academic Block Building 5,267sqm
iv. Anatomy and Pathology Laboratory Building 1,281sqm
v. Undergraduate Students Hostel Building 250 Students (100 Male & 150 Female) with 919sqm
vi. Student and Staff Cafeteria (50 Staff & 120 Students) 395sqm
vii. Sports and recreation grounds equipped with sporting facilities for students/staff 11,500sqm
viii. Staff Apartments Building 887sqm

2.3.2 Project Design

The project design is currently in progress; however, the building rules and regulations will be in accordance with Urban planning (Space and standards) regulations of 2018 and minimum requirements for physical resources provided for under the standards and guidelines for University Education in Tanzania, 2019. The following are the key design criteria that shall be followed during the design of the buildings;

- Functional space and relationship (Performance and adequacy).

- Coordination of Services network to ease installations and management.
- Effective security and Safety provisions in terms of escape, control and supervisions.
- Sufficient power and water supply with back-up facilities.
- Balanced indoor and outdoor spaces relationship to create conducive health environment.
- Design for future changes with adequate flexibility to allow for technological development.
- Flexible and adaptable infrastructure to meet unpredicted needs.
- Environmental responsiveness with considerations of renewable energy systems, solid waste management, waste water treatment and rainwater harvesting.

2.3.2.1 Climate Change risks mitigation and adaptation in the Project Design

To address the risks associated with climate change, including heat, drought, floods, and water scarcity, the proposed project design incorporates infrastructure elements focused on promoting low energy consumption, rainwater harvesting, effective stormwater management, natural ventilation, and adequate lighting. The key features of the design include:

- **Open Spaces**: The central area of the site emphasizes open spaces with the use of native plants to facilitate stormwater treatment and infiltration. These open spaces prioritize maximizing tree canopy cover, offering shade, and enhancing ecosystem services.
- **Greenery Walkways**: The design prioritizes pedestrian movement over motorized transport to minimize air emissions (greenhouse gases) and enhance carbon sequestration. Walkways are strategically placed to control unrestricted movement that can lead to vegetation destruction, with trees planned along access roads and footpaths to improve the landscape and mitigate the effects of sun radiation.
- **Green Areas**: Every zone/block incorporates green areas to facilitate cross ventilation into buildings. Additionally, green belts and conservation zones are designated to preserve the ecosystem, prevent land degradation, and enhance the mountainous scenery. The use of native and artificial trees and grasses is proposed to reduce soil erosion in vulnerable areas.
- **Energy-Efficient Buildings**: The project emphasizes constructing buildings with low energy consumption, featuring provisions for cross ventilation through adequate openings, motion sensors in public areas for automatic light control, presence sensors in offices and classrooms, proper orientation to minimize indoor discomfort and harness natural air, and measures to reduce the impact of sunlight, such as fan installation and solar lights along pathways. The design also maximizes the use of renewable energy sources like solar and wind, and utilizes biogas from wastewater treatment for cooking.
- **Low-Footprint Buildings**: The project aims to minimize the environmental footprint by increasing green spaces, incorporating rainwater harvesting, stormwater management, and waste management systems, and adopting water-efficient processes.

2.3.2.2. Disaster risk management

The planned project will include measures for fire prevention and firefighting facilities. The building itself will be equipped with systems for managing solid and liquid waste, aimed at preventing the spread of diseases. Furthermore, the campus will utilize two access roads (Kawawa and Wakuha roads) to facilitate convenient pedestrian and vehicular movement to and from the site, with the intention of preventing traffic congestion and minimizing the risk of accidents. These roads will be securely linked to a sufficiently spacious parking area capable of accommodating cars. The project site will implement an emergency management plan, clearly delineating responsibilities for various emergency tasks, specifying who is responsible for what, when, and how. For a detailed clarifications see Annex 11.

2.4 Project Activities

The proposed project will be the construction of eight buildings. The undertaking involves various phases from the planning phase all the way to the construction and operation phase. Each specific phase has its own activities which are well elaborated in following sections;

2.4.1 Pre -Construction Phase

The following are the main activities which to be executed on the site as pre- construction activities

- **Architectural, Engineering and Services Designs**- Preparation of Architectural drawings, engineering drawings, services drawings, BoQ shall be done by the procured Consultants to fits the client's (MUHAS) requirements.
- **Topographical Survey**- Done by Surveyors to establish the boundaries and the ground levels
- **Geotechnical investigations**-done by the geotechnical engineers to determine the physical properties of rock and soil around the site.
- **Environmental Impact Assessment**-This is underway
- **Acquisition of various permits/ certificates** (i.e Building Permit)- This shall be obtained once EIA certificate obtained.

2.4.2 Construction Phase

2.4.2.1 Activities

The following are the main activities to be executed on the site during construction phase

Table 2.2: Description of Project Activities and Environmental Issues during Construction phase

SN	Activity	Description	Environmental/ Social Issue
1	Site Clearance	This involves clearance of vegetation to pave way for construction activities. The contractor shall ensure that clearance is confined within the areas requring permanent construction.	• Loss of vegetation • Noise • Dust • Vibrations • Emissions to air • Solid waste generation • Occupational safety and health • Community Health, Safety and security risk
2	Foundation excavation	This involves cutting of the land to a required depth that foundation shall lie. The excavation activities shall be limited to the required areas and the excavated soil shall be used for landscaping activities to match the surrounding environment. Excavators shall be used.	• Noise • Dust • Vibrations • Emissions to air waste generation (spoil soil) • Solid waste generation • Occupational safety and health • Community Health, Safety and security risk
3	Material transportation	Materials (fine and course aggregates) from quarries will be transported by trucks to the construction site. Water shall be supplied by the borehole at site and KUWASA articulation system, other materials like cement, timber and reinforcement bars	• Noise • Dust • Vibrations • Emissions to air • Occupational safety and health • Community Health, Safety and security risk

SN	Activity	Description	Environmental/ Social Issue
		will be transported by trucks to the construction site.	
4	Material Storage-	Materials like aggregates and sand will be stockpiled at the site ready for use. Cement and reinforcement bars will be stored in special storage rooms. Timber will directly be used at the required areas and consequently there will be no stockpiling of timber at the sites.	• Loss of amenity
5	Actual construction works	This involves masonry, concrete works and related activities. Generally masonry and related activities will include stone shaping, concrete mixing, plastering, slab construction, construction of foundations, and erection of building walls and curing of fresh concrete surfaces. These activities are known to be labour intensive and will be supplemented by machinery such as concrete mixers.	• Noise • Dust • Vibrations • Solid waste generation • Liquid waste (sewage) • Occupational safety and health • Community Health, Safety and security risk
6	Steel Structure works	The buildings will be reinforced with structural steel for stability. Structural steel works will involve steel cutting, welding and erection.	• Noise • Solid waste generation (metal cuts) • Occupational safety and health • Community Health, Safety and security risk
7	Installation of power, communications lines, water, foul water systems	This involves electrical work and plumbing activities. Electrical work during construction of the premises will include installation of electrical gadgets and appliances including electrical cables, lighting apparatus, sockets etc. In addition, there will be other activities involving the use of electricity such as welding and metal cutting.	• Solid waste generation (garbage) • Occupational safety and health • Community Health, Safety and security risk
8	Landscaping	Landscaping shall be done to match with the surrounding environment to improve the aesthetic value or visual quality of the site once construction ceases, the proponent will carry out landscaping.	• Noise • Dust • Solid waste generation (rubbles) • Occupational safety and health • Community Health, Safety and security risk

Source:Consultant, September, 2023

2.4.2.2 Duration

The duration of this phase will be three months.

2.4.2.3 Types and Sources of Project Requirements

Types and sources of project requirements during the construction phase are shown in Table 2.3.

Table 2.3: Types and Sources of project requirements during the construction phase

Requirements	Type	Source	Quantity (Approx)
Raw Materials	Aggregates	Kigoma (licenced suppliers shall be used)	500,000-550,000 tons
	Blocks	Kigoma (licenced suppliers shall be used)	60,000 -70,000 tons
	Sand	Kigoma (licenced suppliers shall be used)	200,000-250,000 tons
	Cement	Cement Industries in Dar es Salaam	100,000-125,000Tons
	Water	KUWASA	15-24M Litres
	Reinforcement bars	Kigoma (licenced suppliers shall be used)	4,000-4,500Tons
	Timber	Kigoma (licenced suppliers shall be used)	100-150 Tons
Manpower	Skilled	Contractor	50
	Unskilled	Local People	250
Equipment	Excavator	Contractor	3
	Dozer	Contractor	3
	Motor grader	Contractor	5
	Plate compactor	Contractor	4
	Water Boozer (Emergency)	Contractor	5
	Tippers/ Dampers	Contractor	15
	Concrete mixers	Contractor	10

Source:Consultant, November, 2023

2.4.2.4 Transportation of Construction Materials

Materials (fine and coarse aggregates) from quarries will be transported by trucks to the construction site. Water from KUWASA system will be available from the site. Other materials like cement, timber and reinforcement bars will be transported by trucks to the construction site. Trucks carrying construction materials shall use Wakuha road before entering project area. These two roads do not have restrictions to trucks as long as tonnage is within allowable range. Contractor shall prepare Traffic Management Plan (TMP) which shall be approved by MUHAS and the WB before the commencement construction starts.

2.4.2.5 Storage of Construction Materials

Materials like aggregates and sand will be stored within the project site for use. Cement and reinforcement bars will be stored in special storage rooms. The materials for storage shall be manageable not to cause nuisance to community. Timber will directly be used at the required areas and consequently there will be no stockpiling of timber at the construction site.

2.4.2.6 Waste Generation and Management

Types, amounts and treatment/disposal of wastes during the construction phase are shown in Table 2.4

Table 2.4: Types, amounts and treatment/disposal of wastes during the construction phase

Waste	Types	Amount	Treatment/ Disposal
Solid Waste (Degradable)	General garbage (food remains, cardboards and papers etc)	75kg/day (based on generation rate of 0.25kg/day/person and 150 people)	To be collected in a large skip bucket at each site and disposed at the authorized area twice a week
	Remnants of timber	6-10kg/day	Shall be given to recyclers
Solid Waste (Non-Degradable)	Scrap Metals (drums, iron sheets etc)	10-20kg/day	Given to companies authorised to collect hazardous wastes.
	Plastics	5-7kg/ day	Given to plastic recyclers
	Tins, glasses	3-5kg/day	To be collected at waste collection point at site and disposed at the authorized area twice a week
Liquid waste	Sewage	9.6m^3/day (Based on 300 people, water consumption rate of 40L/capita/day and wastewater discharge factor of 80%)	Wastewater is channelled to temporary septic tank cum soak away system at site

Source: Consultant, November, 2023

2.4.3 Operation phase

2.4.3.1 Activities

The activities that are expected to be executed during operational phase are presented in table 2.5.

Table 2.5: Description of project activities and environmental issues during operational phase

SN	Activity	Description	Environmental/ Social Issue
1	Education /training activities/Research	The new buildings shall be used to impart knowledge to the students and research activities. Classrooms, seminar rooms, laboratories, libraries, auditoriums, lecture theatres etc shall be used for teaching and research purposes. The facilities shall provide space for training of about 5,000 students and staff.	• Solid waste mainly papers, cardboards, electronic wastes, etc • Liquid waste -Domestic sewage • Hazardous waste management (Laboratory waste, electronic wastes etc)
3	Office works	Several office activities shall be carried out within the buildings. This project shall develop staff offices that can accommodate about 100 staff.	• Solid waste mainly papers, cardboards, food waste, electronic wastes etc • Liquid waste -Domestic sewage

SN	Activity	Description	Environmental/ Social Issue
4	Good housekeeping of the area	MUHAS will hire a private cleaning firm which will be responsible for the cleanliness of the eight buildings and the outside premises. Cleaning operations will involve the use of substantial amounts of water, disinfectants and detergents. Enough waste bins shall be provided in each building, cleaning firm shall be responsible for collection and disposal to the collection point before being transported to the authorized dumpsite. Electronic wastes shall be collected and stored in a special bund room before given to authorized recycler.	• Solid waste -mainly yard waste, leaves, papers, cardboards, food waste, electronic wastes etc • Liquid waste -from cleaning of surfaces
5	Maintenance	The buildings and associated facilities will be repaired and maintained regularly during the operational phase of the project. Such activities will include repair of building walls, roofs and floors. Maintenance of machines, electrical gadgets and equipment, repairs of leaking water pipes, painting and replacement of worn out materials among others. This shall be the responsibility of the developer.	• Solid waste – mainly rubles, pieces of wood, metals, plastics, tins, electronic wastes etc • Liquid waste -from cleaning of surfaces, paints

Source: Consultant, November, 2023

2.4.3.2 Duration

The duration of this phase will be more than fifty (50) years

2.4.3.3 Types, Amounts and Sources of Project Requirements

Types and sources of project requirements during the operational phase are shown in Table 2.6

Table 2.6: Types and sources of project requirements during the operation

Requirements	Source	Quantity
Water	KUWASA	Assumptions. • There shall be 5000 people (Staff and students) • Water consumption rate is 80L/day Therefore, water demand is =400m^3 per day
Electricity	• TANESCO (National Grid)	• 50-70 MwHr/ month •

Source: Consultant, November, 2023

2.4.3.4 Waste Generation and Management

Types, amounts and treatment/disposal of wastes during the operation phase are shown in Table 2.7

Table 2.7: Types, amounts and treatment/disposal of wastes during the operation phase

Waste	Types	Amount	Treatment/ Disposal
Solid Waste (General garbage)	Papers, food wastes cardboards, tins, glasses and all general garbage	Approximately 1.5tones/day (based on generation rate of 0.3kg/day/ person and 5,000people)	To be collected in garbage collection area at site ready to be disposed at the authorized area
Solid wastes (Hazardous)	Electronic wastes	100-200kg/year	Shall be stored in special bund room before given to companies authorised to collect hazardous wastes.
	Laboratory wastes	100-200kg/year	
Liquid waste	Sewage	32m^3/day (Based on 400m^3/day water demand and wastewater discharge factor of 80%).	Water is channelled to Centralized biodigester

Source: Consultant, November, 2023

2.5 Declaration That the Project is not Within or Near Sensitive Environment

The EIA and Audit regulations amendments of 2018 requires the proponent to declare if the project is within or near any environmental sensitive areas, these includes water bodies (lakes, river etc, protected forests, National parks, wetlands etc. MUHAS and ESIA Consultant, hereby declare that the project area is neither within nor near environmental sensitive area.

2.6 Project Budget

Since the design and bills of quantities are not available at the moment, a budget of about 20,000,000,000 (20 billion) have been allocated for the project.

CHAPTER THREE
3.0 POLICY, ADMINISTRATIVE AND LEGAL FRAMEWORK

3.1 Environmental Management Regulation in Tanzania

A clean and safe environment is the constitutional right of every Tanzanian citizen. Regulation on environmental management in the country is mainly vested on two public institutions, the National Environment Management Council (NEMC) and the Division of Environment (DoE) in the office of the Vice President. NEMC undertakes enforcement, compliance, and review of environmental impact statements whereas the DoE provides the policy formulations and technical back-up and executes the overall mandate for environmental management in the country. The EIA certificate is issued by the minister responsible for environment. There are many policies and pieces of legislation on environmental management in Tanzania, the relevant ones to this project briefly discussed below.

3.2 National Policies

Environmental awareness in the country has significantly increased in recent years. The government has been developing and reviewing national policies to address environmental management in various sectors. Among others, the objective of these policies is to regulate the development undertaken within respective sectors so that they are not undertaken at the expense of the environment. The national policies that address environmental management as far as this project is concerned and which form the corner stone of the present study include the following:

3.2.1 National Environmental Policy (NEP) of 2021

Tanzania currently aims to achieve sustainable development through the rational and sustainable use of natural resources and to incorporate measures that safeguard the environment in any development activities. The environmental policy document seeks to provide the framework for making the fundamental changes that are needed to bring consideration of the environment into the mainstream of the decision-making processes in the country.

The National Environmental Policy, 1997 stresses that for a framework law to be effective, environmental standards and procedures have to be in place. For example, Chapter 4 of the policy (Instruments for Environmental; Policy), Section 61, states that "*As part of the (National Environmental Policy) strategy in the implementation of the National Environmental Guidelines, specific criteria for EIA conduct will be formulated".* This policy is relevant to the proposed project as it restates the need to protect the environment regardless of the importance of the proposed development. This policy provide framework for the EMA 2004 and EA and Audit regulations of 2005 and its amendment of 2018 which guided this EIA Study.

3.2.2 Education and Training Policy of 2014

Education and Training policy (2014) is the result of restoration and finally cancelled by the Education and Training Policy (1995), Vocational Education and Training Policy (1996), National Higher Education Policy (1999) and Information and Communication Technology for Basic Education Policy (2007). The Education and Training policy 2014 is designed to provide direction for education and training in considering changes in economic, social, scientific and technological challenges of education and training nationally, regionally and internationally, to increase opportunity, efficiency and quality of education and in training and human resources to meet the standards of a country with middle economy by 2025.

The specific objectives of the policy is to have:

i. Framework, flexible structures and procedures to enable Tanzanians to develop in different ways in the currents of academic and professional;
ii. Education and training with highly recognized quality standards nationally, regionally and internationally;

iii. Access to a variety of opportunities in education and training
iv. Increased human resources according to national priorities;
v. Management and effective operation of education and training in the country;
vi. Sustainable system of financing education and training in the country; and
vii. Education and training system centred cross-cutting issues.

Regarding Environment, policy statement no 3.7.1 states that *The government will put in place a mechanism that will ensure that the content of the care for the environment is integrated into the curriculum of education and training at all levels.* The policy statement no 3.7.3 states that *The government will strengthen the partnership between the public and private sectors to facilitate availability of modern infrastructure and services at all levels of education and training.* This project is part of Government efforts to achieve the objectives of this policy.

3.2.3 Construction Industry Policy (2003)

The Construction Industry Policy intends to support sustainable construction sector by promoting application of costs effective and innovative technologies and practice to support socio-economic development activities such as road-works, water supply, sanitation, shelter delivery and income generating activities. It also ensures application of practices, technologies and products which are not harmful to both environment and human health. There is no room for this project contractors not to adhere to construction standards as required by the National Bureau of Standards (Item 8.2 of the Policy). The policy also requires contractors to promote sustainable building environmental practices as required by national laws (Item 8.2.2 of the policy). The proposed project shall comply with the sustainable building practices.

3.2.4 National Land Policy (1995)

The policy recognizes the need for protecting the environment. It stresses protecting the environment and natural ecosystem from pollution; degradation and physical destruction. Important sections of the policy relevant to the proposed project are section 2.4 (on use of land to promote socio-economic development; section 2.8 (on the protection of land resources), section 3 (iii) and section 4 (on land tenure). This policy is relevant and guides the proponent in terms of occupancy, land use and land-use change at the project site. MUHAS is a legal owner of the project area, having certificate of occupancy showing that the land use of the area is educational purposes.

3.2.5 The National Water Policy (URT, 2002)

The overall objective of this policy is to develop a comprehensive framework for the sustainable management of the water resources in the country. This framework promotes the optimal, sustainable and equitable development and use of water resources for the benefit of all Tanzanians, based on a clear set of guiding principles. The policy provides for beneficiaries' participation in water supply schemes and addresses cross-sectoral interests in water, watershed management and integrated and participatory approaches for water resources planning, development and management. The policy provides a shift of Government roles from service provider to that of coordination, policy and guidelines formulation, and regulation. This policy is relevant to this project because it provides framework for sustainable management of water resources during project implementation.

3.2.6 The National Employment Policy (NEP) 2008

The NEP intends to promote employment and efficient utilization of human resources in achieving national development goals in Tanzania. It acknowledges the problem of unemployment in Tanzania but strives to create a good environment for employment (Items 2.4 & 2.5 of the NEP).

The construction sector is acknowledged as one of the rapidly growing sectors in employment creation due to public construction projects in both urban and rural areas (Item 1.2.2 of the NEP). The relevant issues to note include the following: -

- Creating enabling environment for promoting and encouraging the private sector and other stakeholders to allocate investment in labour and protect marginalized groups (Item 3.2 of the NEP).
- Rationalising of employment of foreigners in Tanzania (Item 3.13 of the NEP). This will include skills transfers; work permits and control of foreign workers without required skills.
- Reducing the impact of HIV/AIDS in work place (Item 3.14 of the NEP).
- Improving access employment opportunities and productive resources for disabled (Item 3.15 of the NEP).
- Mainstreaming environmental issues in employment creation as required under the National Environmental Policy and Laws (Item 3.16 of the NEP).
- Eliminating Child labour in work place (Item 3.22 of the NEP).
- Mainstreaming gender in employment (Item 3.24 of the NEP).
- Provision of rights to Workers' Organisations at place of work (Item 4.3 of the NEP).

Regarding gender, the policy also calls for affirmative actions aimed to facilitate access to productive employment opportunities among women both in wage and self-employment in public and private sectors. MUHAS shall implement this policy by providing equal opportunities for both genders, prohibiting child labour and providing conducive environment for workers during construction and operation of the project.

3.2.7 The National Health Policy, 2017

This Policy is a revision of the 2003 Health Policy, which emphasized on the need for increasing community involvement in health development and improved access and equity in health and health services. One of 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 developer shall comply to the provisions of this policy.

3.2.8 The Community Development Policy (CDP), 1996

The Policy envisages that community development is achieved when people are enabled to develop their capacity to identify their problems and plan ways of solving them. Therefore, members of the community are to be involved in planning, decision making and implementation of development initiatives. One of the emphasized areas in this policy is to expand and develop infrastructure and using local labour in works such as roads, water, schools, dispensaries and godowns. An increase in social services is considered an indicator of community development i.e. good housing, health, education, nutrition, clean environment and safe water (Items 10 & 11 of the CDP). Improvement of Education sector through this project is part of Government efforts to achieve the objectives of this policy.

3.2.9 The Women, Gender and Development Policy (2000)

The key objective of the women and gender and development policy is to provide guidelines to ensure that gender sensitive plans and strategies are developed in all sectors and institutions. Moreover, the policy emphases on gender quality and equal opportunity of both men and women for them to participate equitably in development projects as it requires proper and effective project management to ensure that gender issues get the attention and priority they deserve. Therefore, this project shall insure women's participation is incorporated in all levels of project planning and implementation

3.2.10 The National Strategy for Gender and Development (2005)

The strategy outlines the step for laying out the foundation for promoting gender equality and equity in the country's institutions. As the Beijing Platform for Action if vital in enforcing the rights of women, the Tanzania government has committed itself to supporting initiatives that focusing on alleviating gender inequality in economic, education, training and employment at all levels. One of the aim of this project is to alleviate students gender inequality at MUHAS.

3.2.11 National Policy on HIV/AIDS (2001)

The overall goal of the National HIV/AIDS policy is to provide a framework for leadership and coordination of the National multi-sectorial response to the HIV/AIDS epidemic. This includes formulation, by all sectors, of appropriate interventions which will be effective in preventing transmission of HIV/AIDS and other sexually transmitted infections, protecting and supporting vulnerable groups, mitigating the social and economic impact of HIV/AIDS. Emphasis is placed on women who work as food vendors and other small businesses who are at risk and vulnerable of contracting HIV/AIDS infection due to integration of seasonal contractual workers and vice versa. Therefore, this policy is relevant in this respect since it provides the larger framework for intervention and production of HIV/AIDS for all people (Item 3 of the NPH).

3.2.12 Energy Policy (2015)

The policy guides sustainable development and utilization of energy resources to ensure optimal benefits to Tanzanians, contributing to economic transformation. The Policy document covers the following areas or subsectors: (i) Electricity generation, transmission, distribution, interconnection, power trading and rural electrification; (ii) Petroleum and gas upstream, midstream and downstream activities; (iii) Renewable energy, energy conservation and energy efficiency including Feed-in-tariff; and (iv)Cross-cutting issues including subsidies, institutional, legal, regulatory as well as monitoring and evaluation frameworks. The proposed project proposes to use grid electricity from Tanzania Electric Supply Company Limited (TANESCO). The project also intends to install a standby generator in case of a power outage. The setup of the generator will consider environmentally friendly options to minimize pollution.

3.3 Legal Framework

3.3.1 Environmental Management Act No. 20 of (2004), Cap. 191

The Environmental Management Act (EMA) is a piece of legislation that forms an umbrella law on environmental management in Tanzania. Its enactment has repealed the National Environment Management Council Act. 19 of (1983) while providing for the continued existence of the National Environment Management Council (NEMC).

Among the major purposes of the EMA are to provide the legal and institutional framework for sustainable management of the environment in Tanzania; to outline principles for management, impact and risk assessment, the prevention and control of pollution, waste management, environmental quality standards, public participation, compliance and enforcement; to provide the basis for implementation of international instruments on the environment; to provide for implementation of the National Environmental Policy; to provide for establishment of the National Environmental Fund and to provide for other related matters.

Part III, Section 15(a) states that *in matters pertaining to the environment, the Director of Environment shall coordinate various environment management activities being undertaken by other agencies to promote the integration of environment considerations into development policies, plans, programmes, strategies projects and undertake strategic environmental assessments with a view to ensuring the proper management and rational utilization of environmental resources on a sustainable basis for the improvement of the quality of human life in Tanzania*.

Part VI of the EMA deals with Environmental Impact Assessments (EIA) and other Assessments and directs that an EIA is mandatory for all development projects. Section 81(2) states that *An Environmental Impact Assessment study shall be carried out prior to the commencement or financing of a project or undertaking*, while Section 81(3) states *a permit or licence for the carrying out of any project or undertaking in accordance with any written law shall not entitle the Developer or developer to undertake or to cause to be undertaken a project or activity without an environmental impact assessment certificate issued under this Act*. This EIA is conducted to respond to provisions of this act.

3.3.2 The Water Supply and Sanitation Act No. 12 of 2019

This is a legislation that provides for sustainable management and adequate operation and transparent regulation of water supply and sanitation services; provides for establishment of water supply and sanitation authorities as well as community owned water supply organizations; and provides for appointment for service providers. The main aim of this law is to ensure the right of every Tanzanian to have access to efficient, effective and sustainable water supply and sanitation services for all purposes by considering among others protection and conservation of water resources and development and promotion of public health and sanitation; and protection of the interest of customers. Under this law, the Minister responsible for water affairs shall establish water authority and cluster water authorities in order to achieve commercial viabilities. MUHAS shall comply to all provisions of this act because the proposed project shall use water supplied by KUWASA which is recognized by this law.

3.3.3 The Land Act, CAP 113 R.E 2019

This law declares all land in Tanzania "Public land" to be held by the state for public purposes. The Acts empower the President of the United Republic of Tanzania, to revoke the "Right of Occupancy" of any landholder for the "public/national interest" should the need arise. The laws also declare the value attached to land. The law as amended in 2004 recognizes the role of land in economic and urban development. 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 LGA has the power to impose conditions on the development of any area according to the land-use planning approved by the Minister. This project has been designed according to the requirements of this law.

3.3.4 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. Section 29-(1) of the law states that *Notwithstanding the provisions of any other written law to the contrary, no person shall develop any land within a planning area without planning consent granted by the planning authority or otherwise than in accordance with planning consent and any conditions specified therein.* Building permit will be issued before construction and therefore the project complies to the provisions of this act.

3.3.5 Occupational Health and Safety Act (2003)

The law provides for safety, health and welfare of persons at work places; to provide for protection of persons other than persons at work against hazards to health and safety arising out of or connection with activities of persons at work; and to provide for connected matters. Section 62 of the law states that *where in a workplace, workers are employed in any process involving exposure to any offensive substance or environment, effective protective equipment shall be provided and maintained by employer for the use of the persons employed*. In this project the contractor (during construction) shall provide PPEs as per provision of this act including, overall dress, boots, helmets, ear plugs etc depending on the exposure.

Section 58 present the issue of first aid box and it states that *There shall be provided and maintained a first aid box or cupboard to the prescribed standard and the first aid box or cupboard shall be distinctively marked "*FIRST AID*" having only appliances or stocks of first aid equipment*. A well-stocked first aid kit shall be provided at the construction site.

Section 24 (1) states that "a *thorough pre-placement and periodic occupational medical examination for fitness for employment and for employees shall be carried out by a qualified occupational health physician or where necessary a qualified medical practitioner as may be authorized by the chief inspector*. Developer shall conduct medical examination to all those who require employment before employing them.

3.3.6 Employment and Labour Relations Act Cap 366 R.E 2020 GNNO 140

The Act makes provisions for core labour rights and procedures, establishes basic employment standards, provides a framework for collective bargaining and provides for the settlement of disputes. The proposed project must meet the minimum standards of labour laws in Tanzania provided under Sections 5 – 25 of the Act including prohibition on child and forced labour, discrimination and harassment, and so forth. MUHAS shall comply to the provisions of this act.

3.3.7 Engineers Registration Act and its Amendments 1997 and 2007

The Acts regulate the engineering practice in Tanzania by registering engineers and monitoring their conduct. It establishes the Engineering Registration Board (ERB) (Section 25 of the Act). Laws require any local and foreigner engineers to register with ERB before practicing in the country (Section 10 of the Act). This means that the Engineers contracted for construction of the MUHAS project must be registered with ERB.

3.3.8 The Contractors Registration Act (1997)

The Contractors Registration Act requires contractors to be registered by the Contractors Board (CRB) before engaging in practise and entitled class in respect to the costs of the project (Section 7 of the Act). It also requires foreign contractors to be registered by the Board before gaining contracts in Tanzania. This Act requires contractors in any site to abide to labour laws and Occupational Health and Safety regulations in construction industries. Furthermore, in execution of the works, the contractors are obliged to supply materials for the work and exercise control over type, quality and materials used during construction. The developer shall comply with the law requirement during the recruitment of contractors for project implementation.

3.3.9 The Local Government Laws (Urban Authorities) Act (1999)

This act established the local governments and urban authorities with mandates to spearhead developments in districts and urban centres (for cities and municipalities) respectively. By this law, the authorities have mandates to formulate bylaws to enhance environmental management within their district/urban authorities. The proposed construction of a college of medicine will be located within Machinjioni Ward, Kigoma Ujiji Municipality and therefore its development and operation shall abide to all bylaws formulated by the mentioned local governments.

3.3.10 Public Health Act (2009)

An Act provide for the promotion, preservation and maintenance of public health with the view to ensuring the provision of comprehensive, functional and sustainable public health services to the general public and to provide for other related matters. Section 66 of the Act state that: *(1) A block or premises shall not be erected without first submitting the plans, sections and specifications of the block site for scrutiny on compliance with public health requirements and approval from the Authority. (2) A block or premises or its part or any structure shall not be occupied until a certificate of occupancy has*

been granted. (3) The provisions of subsections (1) and (2) shall not apply to the dwelling houses in the rural areas or houses erected in urban which have been recognized as such under the Squatter Upgrading Programme. The developer shall abide to this law.

Section 54 of this law states that "A *person shall not cause or suffer from nuisance, likely to be injurious or dangerous to health, existing on land, premises, air or water*". Therefore, Developer (MUHAS) shall develop this project so that nobody suffers from nuisance or cause danger to people's life.

3.3.11 Fire and Rescue Act (2007)

According to the Act, among others, the functions of the force are to

a) '*Extinguish fire;*
b) *Grade cities, municipalities, townships and villages into various fire and rescues services levels;*
c) *Conduct fire inspection and investigations for purposes of obtaining information relating to the causes of fire and loss inflicted by fire;*
d) *Conduct studies on investigation of arson and accidental fire;*
e) *Conduct training for fire department personnel, other officers and voluntary fire fighters;*
f) *Prepare fire statistics and fire service information; and*
g) *Conduct fire tests on protection facilities, equipment and materials*.

In section 3(1) (g) it covers premises of facility used as a place for storage flammable liquids, gas or chemicals. 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. Developer shall comply of all the provisions of this Act during construction and operation of the project.

3.3.12 The Workers Compensation Act no 20 of 2008

The law provides for compensation to employees for disablement of death caused by or resulting from injuries or diseases sustained or contracted in the course of employment (Section 19 of the Act); to establish the Fund for administration and regulation of workers' compensation and to provide for related matter. This act is very relevant to this project as workers will be exposed to various hazards during construction and operation of the four colleges. This law is relevant to the project as workers will be exposed to various hazards during construction of the facilities. The proposed project will adhere to the provisions of the Act when dealing with issues pertaining to injuries of workers in the cause of performing their duties. The contractor of the proposed project must be register with Workers Compensation Fund and make monthly contribution.

3.3.13 The HIV and AIDS (Prevention and Control) Act of 2008

The Act requires every institution registered and operating in Tanzania to do the following (Sections 19 – 32 of the Act):-

- Promote public awareness on causes, transmission, consequences, prevention and control of HIV/AIDSN;
- Reduce the spread and adverse effects of HIV/AIDS;
- Protect the rights of orphans;
- Discourage negative traditions and practices which enhance the spread of HIV/AIDS;
- Increase access, care and support to persons living with HIV/AIDS.

The Act also requires every employer in consultation with the Ministry of Health to establish and coordinate a workplace programme on HIV/AIDS for employees. The contractors and MUHAS in the proposed project will have to comply with the provisions of this Act.

3.3.14 The Child Act, 2009

Part II of the Act defines a child in Tanzania as a person below the age of 18 years. Part II, Section 78 of the Act, provides for prohibition of exploitive labour to children. Every child shall be protected from labour exploitation and any work that is likely to (a) deprive the child of his health or development; (b) exceeds six hours a day; (c) is inappropriate to his age, and (d) the child receives inadequate remuneration. The developer shall adhere to this act by strictly prohibiting of employment to children under 18years.

3.3.15 Sexual Offences (Special Provisions) Act (1998*)*

Also known as SOSPA amended several written laws to incorporate special provisions on sexual violence and other offences to enhance personal integrity, dignity, liberty and security of women and children. More significantly, SOSPA introduced severe punishments for sexual offences such as imprisonment of rape perpetrators for a minimum sentence of 30 years and compensation to a survivor of sexual violence. MUHAS shall comply to provisions of this act during construction and operation phase of the project.

3.3.16 The Prevention and Combating of Corruption Act (2007)

This law has established the Prevention and Control of Corruption Bureau (PCCB), which is one of the government organs mandated with handling all types of corruption incidents including those related to gender and sexual violence such as demand or offer of sexual favours in exchange for official services. For instance, Section 125 of the PCCB states that "*any person being of position or authority, who in the exercise of his authority, demands or imposes sexual favours or any other favour on any person as a condition for giving employment, a promotion, a right, a privilege or any preferential treatment, commits an offence and shall be liable on conviction to a fine not exceeding five million shillings or to imprisonment for a term not exceeding three years or both*". MUHAS shall comply to this act.

3.3.17 National Social Security Fund Act No.153 of 2005 Cap. 50 R.E. 2015

An Act to establish the National Social Security Fund and to provide for its constitution, administration and other matters related to the Fund. Section 6-(1) of the act states that "*This Act shall apply in Mainland Tanzania in relation to a person who is-*

(a) employed in the formal or informal sector; and

(b) *self-employed, other than a person who is registered or insured under any other written law*.

While section 6-(2) states that *Every insured person shall be issued with a registration number upon registration*. MUHAS submits contributions of its employees every month to the fund and shall make sure that the contractor does the same for its employees.

3.4 Relevant Regulations and Guidelines

3.4.1 Environmental Impact Assessment and Auditing Regulations, 2005 (as amended in 2018)

These regulations set procedures for conducting EIA and environmental audit in the country. They are made from Section 82 and 230 of EMA 2004 and prescribe that the Minister responsible for environment shall formulate regulations and guidelines on how EIA shall be conducted. EIA and Audit are applicable to all projects contained in Third Schedule of the EMA 2004 and First Schedule of the EIA and Audit Regulations. A project of this nature is also covered in both schedules. It is thus a legal binding requirement to undertake the EIA of this project (Regulations 4 – 15).

These regulations also prescribe the stages and/or the EIA process, which are in principal managed by NEMC. The procedure is as follows: -

- Project registration and Screening before approval is made;
- Conducting of EIA under the approved Scope and Terms of Reference;
- Review of process of Environmental Impact Statement;

- Decision of the Minister & Issue of EIA Certificate;
- Project Implementation;
- Environmental Audit; and Monitoring.

This EIA is conducted in accordance to the provisions of these regulations.

3.4.2 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 dispose solid waste and license to own or operate solid waste disposal site. MUHAS shall abide to the regulations by ensuring that solid waste generated on site does not lead to pollution within the project area or around the neighbouring area.

3.4.3 The Environmental Management (Air Quality Standards) Regulations, 2007

These Regulations regulate the air pollution from human activities including construction. It requires any person or company to comply with minimum standards of air quality issued by the National Environmental Standards Committee (Regulations 4 & 7). It also prohibits emission of hazardous substances, chemicals and gas that create air pollution. The proposed project will have to comply with the limits of emissions (Regulation 9).

The objectives of these regulations are to set baseline parameters on air quality and emissions and enforce minimum air quality standards. These Regulations stipulate the role and powers of the National Environmental Standards Committee. According to the regulations, the approval of a permit for emission of air pollutants shall be guided by ambient, receptor, emission and specification standards approved by the Minister. Offences and penalties for contraveners are also provided for in the regulations.

Emission limits of sulphur and nitrogen dioxides, carbon monoxide, lead, ozone, black smoke and suspended particulate matter together with their test methods are specified. Tolerance limits and test methods for dust, sulphur dioxide and nitrogen oxides from cement factories into the air as well as from motor vehicles are also given. Even though the project operations shall not generate air emissions but during construction air pollution is expected. Developer shall monitor the air quality from the construction site with guidance from these regulations.

3.4.4 The Environmental Management (Standards for Control of Noise and Vibration Pollution) Regulations, 2015

These Regulations provides for control and standards of noise pollution and vibrations in any environment resulting from human activities (Regulation 5). They give permissible noise levels and tolerance limits for environmental vibrations as provided by the National Environmental Standards Committee (Regulations 9 & 10).

Section 7.-(1) of the regulation states that *Except as otherwise provided in these Regulations, no person shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise that annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and that of the environment*.

The permissible limits are provided for in the Schedule 1 to the Regulations, for this project the standard are shown in Table 3.1 below.

Table 3.1: Maximum Permissible Noise Levels for General Environment

COLUMN 1		COLUMN 2	
FACILITY		NOISE LIMITS dBA (Leq)	
		DAY	NIGHT
A.	Any building used as hospital, convalescence home, home for the aged, sanatorium and institutes of higher learning, conference rooms, public library, environmental or recreational sites.	45	35
B.	Residential building	50	35
C.	Mixed residential (with some commercial and entertainment)	55	45
D.	Residential and industry small–scale production and commerce	60	50
E.	Industrial area	70	60

Source: The Environmental Management (Standards for control of noise and Vibrations) Regulations, 2014

It is evident that construction of the project shall produce noise and vibrations owing to the use of heavy machinery therefore these regulations shall be used to monitor noise and vibrations.

3.4.5 The Environmental Management (Soil Quality Standards) Regulations, 2007

These regulations set limits for soil contaminants in agriculture and habitat, enforce minimum soil quality standards, prescribe measures designated to maintain, restore and enhance the sustainable productivity of the soil and prescribe minimum soil quality standards for sustaining ecological integrity and productivity of the soil. According to the regulations, among others, the National Environmental Standards Committee has the powers to set pollutant limits and specify procedures for determination of the quality of soil for protection of the soil from degradation as a result of anthropogenic activities such as agricultural and mining activities and waste disposal.

Owners and operators of a main polluting activity are required to voluntarily register with NEMC and obtain a soil pollutants discharge permit. Obligations of polluters are also given. According to the regulations, the NEMC plays a crucial role in soil quality compliance and enforcement. Recording and reporting requirements, Offences and penalties for non-compliance as well as how appeals against aggrieved decisions should be handled are stipulated. Contaminant limits for selected soil pollutants mainly halogenated hydrocarbons (example, trichloethylene, dichloromethane, tetrachloroethylene, carbon tetrachloride, etc.), fuel hydrocarbons (benzene, ethylbenzene, total xylenes, toluene, etc.), organic and inorganic pesticides (lindane, Atrazine, DDT, sulphur, Hexachlorobenzene, Aldrin, etc.) and their respective test methods are specified. The Regulations also cover contaminant limits for some heavy metals (e.g. arsenic, cadmium, nickel, copper, zinc, etc.) together with their test methods.

Most of the pollutants covered in these regulations will not be produced from the project activities. However, there is a potential for soil pollution from petroleum hydrocarbons due to the use of fossil fuels for running machineries, plants and vehicles during the construction phase. Nonetheless, the developer is committed to abide to the provisions of these regulations should any of the project activity produce anyone of the pollutants covered in the regulations.

3.4.6 Environmental Management (Water Quality Standards) Regulations, 2019

The regulations provide for water pollution and water quality standards, in respect to compliance by polluters and enforce minimum water quality standards prescribed by the National Environmental Standards Committee. The established committee may prescribe classifications, criteria and procedure for measuring standards for water quality and enforcement of legal water resources management requirements and monitoring. In fulfilling the requirements of the regulations, the

project proponent will have to undertake monitoring of both domestic water and wastewater and ensure compliance with the acceptable discharge standards. These Regulations provide procedures for the following:-

- Protection of human health and conservation of the environment through protection of water sources and ground water (Regulation 5)
- Enforcement of minimum water quality standards prescribed by the National Environmental Standards Committee (Regulation 8)
- Establishing water usages for purposes of establishing environmental quality standards and values for each usage (Regulation 7)
- Prohibition of illegal discharges and pollutions in view of avoiding contamination which is detrimental to water usages (Regulations 9 – 17).

Monitoring of water quality within MUHAS shall be done in accordance with these regulations.

3.4.7 Environmental Management (Hazardous Waste Control and Management) Regulations, 2021

These Regulations apply to all categories of hazardous waste and to the generation, collection, storage, transportation, treatment, recycling, reuse, recovery and disposal of hazardous waste and their movements in, into and out of Mainland Tanzania. The Act (EMA 2004) defines hazardous wastes as any solid, liquid, gaseous or sludge waste which by reason of its chemical reactivity, environmental or human hazardousness, its infectiousness, toxicity, explosiveness and corrosiveness is harmful to human health, life or environment. Section 16. -(1) of the regulation's states that *A person who intends to collect, store or transport hazardous waste shall apply for a permit to the Minister by filling Form No. 1 prescribed in the Fifth Schedule and submit it to the Council for consideration*. For this project, hazardous wastes are expected during construction phase only (i.e scrap metals, used oils), therefore MUHAS handling measures of hazardous wastes shall be done according to the provisions of this Regulation, specifically by commissioning a person/firm that have a permit recognized by this regulation.

3.4.8 Urban Planning (Planning and Space Standards) Regulations, 2018

These regulations revoke the urban planning and space standards regulations of 1997 and that of 2011. Urban Planning and Space Standards includes standards for residential areas, building lines and setbacks, plot coverage and plot ratio, health and educational facilities, golf courses, passive and active recreation, public facilities by planning levels, public facilities by population size, parking agriculture show grounds, standards for electricity supply and its way leave, way leave for water supply, road width, communication pylons, sewerage treatment plants, ponds, transportation terminals, stream/river valley buffer zone, beaches and industrial plots and recommended colors for land uses.

3.4.9 The Environmental Management (Fees and Charges) Regulations, 2021

These regulations revoke The Environmental Management (Fees and Charges) Regulations, 2008. The Regulations apply in relation to an act or service in respect of which fees and charges are payable under the Act and Regulations made thereunder. Section 4-(1) of these regulations itemize all undertakings which fees and charges apply, it states that *A person shall not, upon payment of fees and charges prescribed in the Schedule to these Regulations, carry on any of the following:*

a. *Environmental Impact Assessment;*
b. *Environmental Compliance Monitoring and Audit;*
c. *registration of Environmental Experts; d) Environmental Quality Standards;*
d. *ozone Depleting Substances;*
e. *management of waste;*
f. *biosafety;*
g. *noise and Vibrations; or*
h. *other activities related to the environment."*

For this project, the fees for Environmental Impact Assessment includes registration fees and EIA review fees have been paid dully to NEMC. Therefore, MUHAS have fully complied to these regulations.

3.4.10 The Environmental Management (Registration and Practice of Experts) Regulations, 2021 G.N 267

These Regulations apply to registration, categorization, practicing and conduct of environmental experts and firms of environmental experts registered and certified under these Regulations to conduct-

a) environmental impact assessment;
b) environmental audit; or
c) any other environmental study that may be required to be undertaken under the Act or its Regulations.

The objectives of these Regulations are to-

a) establish a system of registration, categorization and practicing of environmental experts;
b) provide for qualifications for persons who may conduct environmental studies;
c) provide for a system of nurturing competence, knowledge and consistence of environmental experts in the carrying out of environmental impact assessment and environmental audits; and
d) provide for a code of conduct, discipline and control of environmental experts.

The consultants who have conducted this ESIA have been registered by these Regulations. Also, developer shall use consultant registered by these regulations when conducting annual audits for the project.

3.5 World Bank Environmental and Social Framework (ESF)

The World Bank's Environmental and Social Framework sets out the Bank's commitment to sustainable development, through a Bank Policy and a set of Environmental and Social standards that are designed to support Borrowers' projects, with the aim of ending extreme poverty and promoting shared prosperity. The E&S Framework comprises of: (1) Vision for Sustainable Development, which sets out the Bank's aspirations regarding environmental and social sustainability; (2) The World Bank Environmental and Social Standards for Investment Project Financing, which sets out the mandatory requirements that apply to the Bank; and (3) The Environmental and Social Standards, together with their Annexes, which set out the mandatory requirements that apply to the Borrower and projects.
The World Bank Environmental and Social Standards for Investment Project Financing sets out the requirements that the Bank must follow regarding projects it supports through Investment Project Financing.

3.5.1 World Bank Environmental and Social Standards (ESS)

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. The E&S standards are expected to: (a) support Borrowers in achieving good international practice relating to environmental and social sustainability, (b) assist Borrowers in fulfilling their national and international environmental and social obligations; (c) enhance non-discrimination, transparency, participation, accountability and governance; and (d) enhance the sustainable development outcomes of projects through ongoing stakeholder engagement.

The ten ESSs as per the WB ESF are: ESS 1: Assessment and Management of Environmental and Social Risks and Impacts; ESS 2: Labor and Working Conditions; ESS 3: Resource Efficiency and Pollution Prevention and Management; ESS 4: Community Health and Safety; ESS 5: Land Acquisition,

Restrictions on Land Use and Involuntary Resettlement; ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; ESS 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities; ESS 8: Cultural Heritage; ESS 9: Financial Intermediaries; and ESS 10: Stakeholder Engagement and Information Disclosure. Given the nature of activities of this project, with the exception of ESS 9: Financial Intermediaries which is not listed in the ESMF of 2021, only six ESSs (ESS1, ESS2, ESS3, ESS4,ESS8 and ESS10) are applicable to this project.

3.5.2 World Bank Environmental and Social Standards Applicable to the project

The following Table 3.3 below summarises The World Bank Environmental and Social Standards applicable to the project:

Table 3.3: The World Bank Environmental and Social Standards (ESS) Applicable to the Project

No	The Applicable Environmental and Social Standard (ESS)	Purpose/Objectives	Reason for its Application in the Project
1	ESS1: Assessment and Management of Environment al and Social Risks and Impacts	YES	The project will generate environmental and social risks and hence they will be screened, identified and prevention and mitigation measures implemented to prevent, reduce, mitigate and address these impacts. Site-specific ESMP will be prepared by contractor during construction to recommend E&S measures to be incorporated into designs of the specific subprojects.
2	ESS2: Labour and Working Conditions	YES	The project will engage community and contracted workers. The standard will promote the health and safety of these workers and ensure fair working conditions. Further a project GRM that is attentive to GBV/SEA will be in place to manage project related grievances from project affected people and other stakeholders in order to address them appropriately. In line with ESS2, the project will establish and operate a worker grievance mechanism to enable project workers to raise workplace concerns, including work-related sexual harassment.

No	The Applicable Environmental and Social Standard (ESS)	Purpose/Objectives	Reason for its Application in the Project
3	ESS3: Resource Efficiency and Pollution Prevention and Management	YES	Construction materials such as wood, sand, gravel and water are expected to be supplied by authorized vendors. Mitigation measures are put in place to ensure that methods of extraction of the materials and transportation do not lead to soil erosion, pollution of water bodies, air. Site specific environmental and social assessment will determine the significance of the likely impacts and risks and mitigation measures will be included in the ESMP. It is anticipated that e-waste will be collected separately and later on taken to the designated registered vendor by the National Environmental Management Council (NEMC) for recycling and proper disposal.
4	ESS4: Community Health and Safety	YES	Construction activities (excavation, vehicle operations, work at height, use of chemicals, use of crane or other heavy equipment etc.) may have irreversible effects of disability or fatality to community. Localized negative impacts (like dust emissions, accidents, etc.) to sensitive receptors such as schools, religious buildings and community centers will need to be managed. The Project will require Contractors to prepare appropriate plans for emergency preparedness and response, management and safety of hazardous materials, traffic and road safety, security personnel, etc. as per the requirement of ESS4. Implementation of the Project is likely to trigger influx of workers or job seekers and their followers into sub-project areas. If a significant labor influx does occur, the project will develop and implement a Labor Influx Management Plan in line with ESS2, and ESS4. The project workforce could facilitate an increase in the transmission of HIV and other communicable diseases to members of the local/host communities. Implementation of the sub-projects. As the situation permits and depending on the public health circumstances, the project will ensure compliance with national law, policies and protocol requirements as well as World Health Organization

No	The Applicable Environmental and Social Standard (ESS)	Purpose/Objectives	Reason for its Application in the Project
			and World Bank guidance regarding the COVID-19 situation in relation to stakeholders' consultations, project worksites and related areas.
5	ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	NO	This ESS is not relevant to the proposed project as the site is legally owned by DUCE
6	ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	NO	The project is situated at a distance from protected areas and delicate habitats. Should the project involve the procurement of natural resource commodities like timber, it becomes crucial to identify the origin and implement a mechanism to guarantee that Primary Suppliers do not cause substantial impact on sensitive ecosystems or degrade natural habitats."
7	ESS 7: Indigenous People/ Sub- Saharan African Historically Underserved Traditional Local Communities	NO	This standard is deemed irrelevant, given that the project will primarily be executed in regions where communities meeting the criteria of ESS7 are generally not present in the area.
8	ESS 8: Cultural Heritage	YES	This is applicable for all projects with new construction due to likelihood of "chance finds "of physical cultural resources during excavation activities for foundations, etc.
9	ESS 9: Financial Intermediaries	NO	This ESS is not relevant to the project, since its not reflected in the HEET ESMF of 2021.
10	ESS10: Stakeholder Engagement and Information Disclosure	YES	A Stakeholders Engagement Plan (SEP) has been prepared to guide implementing agencies on how to 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. In ensuring that the project complies to the ESS10, the ESIA has been prepared by consulting stakeholders that include local communities, etc.

Source: Project HEET ESMF, 2021

3.5.3 Project Classification According to the World Bank ESF

According to the WB ESF, The Bank will classify all projects (including projects involving Financial Intermediaries (FIs)) into one of four classifications: **High Risk, Substantial Risk, Moderate Risk or Low Risk**. In determining the appropriate risk classification, the Bank takes into account relevant issues, such as the type, location, sensitivity, and scale of the project; the nature and magnitude of the potential environmental and social risks and impacts; and the capacity and commitment of the Borrower (including any other entity responsible for the implementation of the project) to manage the environmental and social risks and impacts in a manner consistent with the ESSs. Other areas of risk may also be relevant to the delivery of environmental and social mitigation measures and outcomes, depending on the specific project and the context in which it is being developed. These could include legal and institutional considerations; the nature of the mitigation and technology being proposed; governance structures and legislation; and considerations relating to stability, conflict or security.

The Bank will disclose the project's classification and the basis for that classification on the Bank's website and in project documents. The Bank will review the risk classification assigned to the project on a regular basis, including during implementation, and will change the classification where necessary, to ensure that continues to be appropriate. Any change to the classification will be disclosed on the Bank's website. According to the WB ESF the HEET project is given the risk assessment of **Substantial** due to the likelihood of environmental and social impacts generated by the project.

3.5.4 World Bank Group ESHS 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. Specific guidelines which will be used is Environmental, Health, and Safety (EHS) Guidelines: Environmental Waste Management. As stipulated earlier the guidelines will be used together with the Environmental, Health, and Safety General Guidelines. 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 will 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 will be based on the professional opinion of qualified and experienced persons.

3.6 Institutional Framework for the Management of Environment

3.6.1 Overall Management Responsibility at National Level

The institutional arrangement for environmental management in Tanzania is well spelt out in Part III of the EMA (2004). There are seven (7) institutions mentioned by the act, of which the Minister Responsible for the Environment is the overall in-charge for administration of all matters relating to the environment.

Table 3.5 Lists key Institutions relevant to the ESIA Process

Level	Institution	Role and Responsibility

National level	Vice President's Office (Division of Environment,)	• 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 order to ensure that the environment is not degraded • Prepare and issue a report on the state of the environment in Tanzania; • Coordinate the implementation of the National Environmental Policy
	Vice President's Office - NEMC	• Carry on environmental audit and environmental monitoring • Carry out surveys which will assist in the proper management and conservation of the environment • Undertake and co-ordinate research, investigation and surveys in conservation and management • Review and recommend for approval of environment impact statements • Enforce and ensure compliance of the national environmental qualit 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 Education Science and Technology	• Issuing policy guidance • Providing legal frameworks • Issuing licenses, provisions of certificates of compliances • Enforcement of laws and regulations • Project monitoring.
	Tanzania Commission for Universities (TCU)	• Mandate to recognise, approve, register and accredit Universities • Conduct regular and impromptu periodic evaluation of universities, their systems and programmes • Advise the government and the general public on matters related to higher education in Tanzania as well as international issues pertainir to higher education, including advice on program and policy formulation and other best practices. • Providing support to universities in terms of coordinating the admission of students, offering training and other sensitisation interventions in key areas like quality assurance, university leadershi and management, fund raising and resources mobilisation, entrepreneurial skills and gender mainstreaming.
	Occupation Safety and Health Authority OSHA	• Approval of building plans for the proposed project • Monitoring Health and Safety of workers in working premises
Project Funding Institutions	World Bank	• Project financing • Ensure the project is carried out to the highest environmental standards strictly in accordance with the ESIA and the mitigation measures set out in the ESMF. • Provide second line of monitoring compliance and commitments ma in the ESMPs through supervision.

Project Proponent	MUHAS	• Project implementation including mitigation measures • Ensure environmental compliance by the Sector Ministry • Review and approve the contractor's site-specific ESMP (C-ESMP) • Ensure contractor's compliance of the C-ESMP • Regular monitoring and reporting on the progress on the implementation of the ESMP. • Liaise with the DoE and the NEMC on matters involving the environment and all matters with respect to which cooperation or shared responsibility is desirable or required. • Oversee the preparation of and implementation of all ESIA"s require for investments.
Regional level	Kigoma Regional Secretariat Office	• Responsible for environmental coordination of all advice on environmental management in the region and liaises with the Direct and the Director General on implementation and enforcement of the Environment Act. • A Regional Environment Management Expert appointed by the Minister responsible for Regional Administration heads the secretari • The Regional Environment Management Expert is responsible for advising the local authorities on matters relating to the implementation and enforcement of the Environment Act. The Expe links the region with the Director of Environment and Director General. • Advice on implementation of development projects and activities at Regional level.
Municipal level	Kigoma-ujiji Municipal Council	• Oversee and advice on implementation of national policies at distr level • Oversee enforcement of laws & regulations • Advice on implementation of development projects and activities district level
Ward Level	Machinjioni	• Oversee general development plans for the Ward. • Provide information on local situation and Extension services • Technical support & advice • Project Monitoring
Street (*mtaa*) level	Ukumbi/Kitenge	• Information on local social, economic and environnemental situation • View on socio-economic and cultural value of the sites and on propos plant operations • Rendering assistance and advice on the implementation of the proje • Project Monitoring (watchdog for the environment, ensure wellbeing residents and participate in project activities.

3.7 Overall Management Responsibility at Project Level

To ensure the sound development and effective implementation of the proposed project, it will be necessary to identify and define the responsibilities and authority of the various key project implementors. The following entities will be involved:

i. Funding Institution
ii. MUHAS PIU
iii. Contractor; and
iv. Consultant

3.7.1 Funding Institutions (GoT and World Bank)

The HEET project funders will have an overarching responsibility to ensure that the project is carried out to the highest environmental standards strictly in accordance with the ESF, ESSs and EIS.

3.7.2 PIU-MUHAS

The proponent responsibility is to ensure that the implementation process of the ESMP and Mitigation measures are in line with the relevant national policies and legislations and World Bank Environmental and Social Standard (ESS1). MUHAS has the Project implementation Unit (PIU) responsible for supervision and monitoring the implementation of the project construction activities. The management of all project activities during operation is under the PIU, in collaboration with other departments and units depending on the nature of the activity. In general, the PIU falls under the management of MUHAS executing day-to-day activities in the project. The PIU is guided by management meetings that are chaired by the Deputy Vice Chancellor. The management meetings provide support, guidance and oversight of the progress of the PIU. Further, the PIU has designated the Environmental and Social Safeguard Specialists responsible for supervision and monitoring the implementation of the project. The responsibilities of the PIU member are as highlighted hereunder.

Environmental Specialist:

Environmental Specialists should have a minimum bachelor's degree in environmental sciences/environmental engineering, forestry, or related fields with experience in the construction industry. The said is responsible for the following functions:

- Monitor compliance with environmental regulations and ensure proper waste management and pollution control practices.
- Responsible for overseeing the implementation of mitigation measures.
- Monitor environmental impacts and coordinate with consultants and contractors.
- Play a crucial role in managing and minimizing the environmental impact of construction projects.
- Assess and address potential environmental risks and develop strategies for environmental management.

Social and Community Engagement Specialist:

The social specialists have a minimum bachelor's degree in social sciences and experience in building and construction projects. The social specialist is responsible for;

- The social aspects of the construction project. She ensures compliance with social performance standards.
- Overseeing the implementation of mitigation measures, monitoring social impacts, and coordinating with stakeholders.
- Involved in stakeholder engagement activities and reporting on social performance.
- Building positive relationships with the local community and stakeholders affected by the construction project.
- Engagement with community members, address concerns and facilitate communication between the project team and the community.

Health and Safety Specialist:

The health and safety specialist is a holder of a bachelor's degree in environmental health and safety or a relevant discipline. The social specialist is responsible for the following;

- To work with the site health officer to implement health and safety measures on the construction site.
- Collectively, they develop and enforce safety protocols, conduct risk assessments, and monitor compliance with health and safety regulations in all project stages.

Site Engineer:

The site engineer shall be a registered engineer with the Engineers Registration Board (ERB) and experienced in supervising construction sites. The site engineer is responsible for;

- Responsible for the technical aspects of the construction project.
- Overseeing the construction activities, coordinating with contractors and subcontractors, and ensuring the design and construction aligns with the ESIA/ESMP requirements.
- Working closely with the environmental and social specialist to address any technical issues related to environmental and social aspects.
- To work closely with the consultant in ensuring the construction follows the required quality standards and available laws and regulations.

3.7.3 The Contractor

The project will be implemented by a Contractor who will be responsible for the implementation of the proposed project in accordance with the Technical Specifications required. The Contractor shall implement the project entirely in accordance with the ESIA mitigation measures detailed in the C-ESMP for the different phases of the work as well as the Code of Conduct. It is required that before commencement of actual construction, the Contractor should submit a work site plan that complies with the national environmental guidelines and an C-ESMP for the different phases of the work. The C-ESMP shall specify the location of sources of materials and disposal area of construction debris as well as other related matters. The plan shall take into consideration the mitigation measures proposed in this ESIA project report.

The Contractor shall have a Project Environmental, Health and Safety Site Officer (EHSSO), and Project Social Site Officer (SSO) who will be the Contractor's focal point for all environmental and social matters. The EHSSO and SSO will be routinely on-site for the duration of the construction works. Both officers will have minimum of Bachelor's Degree in their respective specialization. The officers among others will be responsible for the following tasks:

i. Drafting environmental and social aspects during project implementation;
ii. Managing environmental, social, health and safety aspects at the worksites;
iii. Participating in the definition of the no working-areas;
iv. Recommending solutions for specific environmental and social problems;
v. Facilitating the creation of a liaison group with the stakeholders at the project site and shall monitor the compliance of C-ESMP;
vi. Organizing consultations at critical stages of the project with the stakeholders and interested parties;
vii. He/She will be required to liaise with MUHAS Safeguard specialists on the level of compliance with the ESMP including health and safety achieved by the contractor regular for the duration of the contract;
viii. Controlling and supervising the implementation of the ESMP;
ix. Preparing environmental and social health and safety progress or "audits" reports on the implementation status of measures and management of site works.

3.7.4 The Consultant

The project Consultant will be responsible for design review and supervision of the construction phase of the proposed project. The Consultant shall ensure compliance of EIS and C-ESMP. The Consultant shall have a shall have a Project Environmental, Health and Safety Site Officer (EHSSO) and Project Social Site Officer (SSO) who will be the focal point for all environmental, health and safety and social matters. The EHSSO and SSO will be routinely supervised on-site for the duration of the construction works. Both officers will have minimum of Bachelor degree in their respective specialization.

3.8 Institutional Capacity in implementing ESIA

As indicated in the POM, MUHAS structure comprises of Coordinator, Assistant Coordinator, Portfolio Leaders, Consultants, Contractors and the MUHAS-Mlogazila Community (See Figure 4.2). Coordinator will be responsible in coordinating and managing functions of the project at the institution level such as organising financial procurement, E&S and monitoring and evaluation (M&E). Similarly, will be providing support geared towards building capacity of the staff in the implementation of the project in order to observe issues of E&S as recommended by the MoEST and the World Bank as stipulated in the POM, PAD and ESMF.

Environmental and Social Safeguards Specialist at MUHAS will ensure that different activities of the project meet the country legal and World Bank requirements in regard to Environment and Social Standards. The environmental and Social Safeguard Team will work closely with the consultants Contractors and the MUHAS community to implement E&S activities. The team will also work closely with consultants and contractors to ensure the implementation observes project E&S standards as indicated by ESS1, ESS2, ESS3, ESS4, ESS8 and ESS10. In addition, consultants and contractors will provide technical assistant to the institution on how to implement the project by observing the standards given by the government and the World Bank as shown in PAD, POM and ESMF. In the implementation of the project the team will ensure that MUHAS community and the nearby surroundings understand the project, cooperate, and own it. The process of addressing issues of E&S standards in the project implementation will also involve other stake holders such as Ubungo Municipal Council, OSHA, Police Force, TANESCO, NEMC, TGNP and KUWASA.

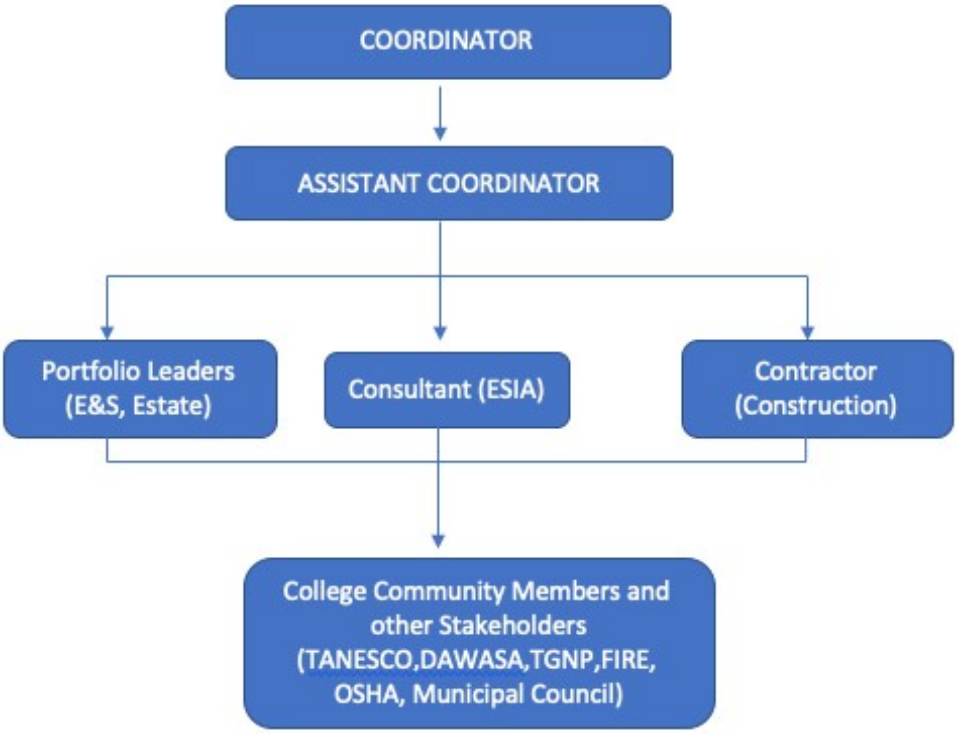

Figure 3.2: Institutional Project Implementing Team (PIT)

CHAPTER FOUR
BASELINE ENVIRONMENT AND SOCIAL CONDITIONS

4.0 Introduction

This part postulates the baseline environmental details of an area prior to the project development. It describes the physical, biological and social environment that could be affected by the project development.

4.1 Biophysical Environment

4.1.1 Climate

The climatic condition of the project site is similar to that of Kigoma region. The climate of Kigoma region is characteristically tropical with a distinct long wet rainy season beginning from late October to May with short dry spell of 2-3 weeks in January or February followed by a prolonged dry season. Annual rainfall is variable ranging from 600 mm- 1600 mm being the heaviest in highlands, intermediate in the lower slopes and low in the valley bottom and lake- off shore areas. Mean daily temperatures range between 25^{o}C in December, January to 28^{0}C in September. Temperature varies inversely with altitude (TMA, 2021).

4.1.1.1 Rainfall

The annual rainfall average of Machinjioni ward is 860mm in its bimodal pattern. The dry season during June and September giving a maximum average rainfall of 140 mm per month and the long rainy season between November and April which gives a monthly rainfall average of up to 1000mm

4.1.1.2 Temperature

The average annual low and high temperature in Machinjioni ward is 19.2ºC and 29.2 ºC respectively and the average yearly temperature is 24.15°C with a mean seasonal change of ± 4ºC . There are noticeable differences in temperature in Kigoma, August to October is the hottest period of the year when temperature can rise up to 30°C the weather is quite cool from November to July with temperature hovering around 18ºC (TMA, 2012).

4.1.1.3 Humidity

Humidity of the air varies with the rainfall pattern and is maximum during lengthy rain. Maximum humidity occurs around dawn, averaging 96% and the minimum humidity occurs in the afternoons with an average of 67%.

4.1.2 Topography and Soil

Kigoma region is a gently inclined plateau with steep hills rising very sharply from 800 m above sea level along Lake Tanganyika to an altitude of 1,750 m above sea level to the East. The landscape descends from the North and East along the gently rolling hills with three types of major perennial rivers of Malagarasi, Luiche and Ruchungi. The Malagarasi and Luiche rivers comprise major drainage in Kigoma Region. The descent leads to the rivers valley at the altitude of 1,000m above sea level and swampy and flat area at 800m above sea level where the rivers join Lake Tanganyika.

4.1.3 Land Use

Most part of the project area is bare, covered by vegetation. This area is currently used for agricultural activities by neighbours. The rest of the area is allocated for Kigoma Special Economic Zone (KISEZ) where the government and private companies are set to invest.

4.1.5 Utilities

4.1.5.1 Electricity

The project area will be served by TANESCO. The project will have a standby generator at place in case of power outbreak.

4.1.5.2 Water Supply

The proposed project shall get its water from KUWASA. MUHAS- Kigoma campus water will be supplied by KUWASA and water storage tanks of different capacities will be installed on different points within the university campus to ensure the supply of water is available even in the moments of insufficient water supply by KUWASA. Also, to ensure the reliable and sufficient water within the university campus may opt to drill boreholes which will be registered to Tanganyika basin and the monitoring of water quality parameters will be done accordingly.

4.1.6 Biological features

4.1.6.1 Flora

MUHAS Kigoma campus is extensively wooded with grassland, shrubs, woodlands, and thickets with species of *Acacia* and *Comiphora,* other dominant plants include coconut palm, cashew, mango, banana, and pawpaw, which are typical of locations with moderate rainfall of 750-1000mm.

4.1.6.1 Fauna

Small animals, reptiles, and amphibians were observed during the field survey, the region is not susceptible to large mammals, reptiles, or amphibians. Field survey and the locals stakeholder's consultation revealed that, the most present fauna species are small wild creatures such as Ants, termites, lizards, hares, and various types of birds, including quail, owl, crow, and francolin. Domesticated animals including sheep, goats, and cattle were also seen grazing.

4.1.7 Access roads

MUHAS-Kigoma campus can be accessed through a tarmac Kawawa road which is 3km from wakuha road, a rough road that leads into the project site

4.1.8 Neighboring area

MUHAS-Kigoma neighbourhood are those that are part of Kigoma special economic zone. The project will be boarded by Kigoma referral hospital on the south, while on the east, west and north future plans are yet to be set.

4.1.9 Onsite Measurement Results

4.1.9.1 Ambient dust (particulate matter) in terms of PM10

The sampling methodology is provided in **section 1.8.5.** The measured particulate matter (PM_{10}) concentrations associated with project site were within the detectable levels in the ambient air. The average PM_{10} concentrations recorded at eight (8) sampling locations ranged from 0.01 to 0.04 mg/m^3, with the maximum values been measured in the northern side which is mostly caused by wind movements and other human activities (Appendix VIIIa). PM_{10} values measured some stations were **BELOW** corresponding limits prescribed by TBS and IFC/WHO for ambient air quality**.** Similarly, all stations were having PM_{10} values satisfying the US OSHA standard limit of 15 mg/m^3 recommended purposely for inert or nuisance dust.

Some dust abatement strategies and/or technology should be enforced as special attention to mitigate the effects that any associated with generated particulates while ensuring prescribed levels are met. These include:

- Improved process design, operation and maintenance, cleanness and other management practices to reduce dust generation;
- Employing dust suppression technique, such as applying water or non-toxic chemicals to minimize dust from vehicle movements during dry and/or windy weather. Dusty areas such as internal access roads and bare area with loose soils should be suppressed down and compacted to reduce dust generation;
- Stock piled materials should be covered or stored properly;
- Planting of trees around the project area as trees absorb these toxic chemicals through their stomata or pores, effectively filtering these chemicals from the air. Trees also mitigate the greenhouse gas effect by trapping heat, reduce ground level ozone levels and release life giving oxygen
- Provision of PPE to workers and their use should be made mandatory to dust prone areas;
- Implementing Environmental Monitoring Program for the sites by monitoring the dust levels of dust (in term of PM_{10}) under quarterly basis (after every three months).

4.1.9.2 Ambient pollutant gases

The sampling methodology is provided in **section 1.8.5.** Instruments could not detect the concentration of CO (Carbon monoxide), NO_2 (Nitrogen dioxide), SO_2 (Sulfur dioxide), CH_4 (Methane gas) and H_2S (Hydrogen sulfide). Methane (CH4) and Hydrogen sulfide (H_2S) levels were measured across the sampling stations as shown in Plate 4.5, recorded levels for unlegislated CH_4 have no significant affects to the environment and human health. Levels of CO2 (Carbon dioxide) were found to be within their corresponding limits prescribed by TBS and WB/IFC for ambient air quality as displayed in Appendix VIIIb.

Based on the results, the following mitigation measures should be employed in order to reduce the emitted pollutant gases to an unacceptable level:

- The use of good quality fuels for trucks and machinery
- Maintaining stable operating conditions i.e., minimize emission by maintaining proper air and fuel ratio
- Ensure appropriate uses of machineries as per manufactures guidelines

4.1.9.3 Noise levels

The sampling methodology is provided in **section 1.8.5.** The average noise levels were ranging from 40dB (A) to 30dB (A) for day time and 34db(A) to 30 dB(A) during night time, with the maximum values been noted close to the road. The main contributors of recoded noise levels were primarily from movement of vehicles.

Based on the measured noise levels, the following abatement and control strategies are recommended as mitigation measures for laborers and nearby locals in noisy zones to avoid sound lever induced hearing damages:

- Check the performance of the major equipment periodically, in order to troubleshooting and fix the problem by lubricating, repairing and etc. These include regular servicing and proper lubrication and maintenance of noisy machines to reduce noise levels; maintenance should consider of the following:
  - replacement or adjustment of worn or loose parts;
  - balancing of unbalanced equipment;

- lubrication of moving parts;
- use of properly shaped and sharpened cutting tools.

- Use of machinery or equipment of superior technology as a noise minimization strategy;
- Reduce the noise exposure level of the laborers by employing part time operators or altering their activity zones between safe and unsafe acoustical zones;
- Installation of barriers between noise sources and receivers can be attenuating the noise levels
- Encourage the use of noise protectors i.e. earplugs where necessary however this should be done with carefully because workers if not done properly as workers would not be able to communicate; in noise; that they will not be able to hear warning signals; and they would not hear conversation; 'when wearing protector devices, hence appropriate trainings should be done including the use of signals before applying such methodology.

4.1.9.4 Ground Vibrations

The sampling methodology is provided in **section 1.8.5.** As detailed in table below, all assessed locations had the ground vibrations levels below the TBS limit (TZS 1471:2011) of 5mm/s. The mean ground vibration level recorded in both areas was below the limits. As shown in Appendix VIIId, there were no significance difference in vibration levels, hence it is obvious that, vibration in the assessed areas were mainly contributed by other natural and anthropogenic activities. The detected ground vibration was assumed to be originating from vehicle and human movements that were moving near by the measuring points.

4.2 Socio-Economic Environment

4.2.1 Land use and administration

Land use of Machinjioni Ward is dominated by commercial/ residential uses, institutional uses, burial areas, small scale farming and various industries. The project area is located in Kitenge and Ukumbi Street in Machinjioni Ward.

4.2.2 Population

According to census conducted in 2022, Machinjioni Ward has population of 5163 of which male are 2363 and female are 2800. The average household size is 5.7, with 904 households.

4.2.3 Education Services

Machinjioni Ward has several education services of which some are privately and others are publicly owned as shown in Table 4.5. The proponent shall have social cooperate responsibility on education and other social services through various contributions (e.g., construction of schools etc).

Table 4.5: Education Services in Machinjioni Ward

Type of Education Services	Public	Private	Total
Primary School	2	0	2
Secondary School	1	1	2
Higher Learning Institutions	0	0	0

Source: Ward Executive Officer, 2023

4.2.4 Health Services

All streets (mitaa) have dispensaries. There are no health centres while there is one dispensary in Machinjioni Ward. Table 4.6 shows different health services in the area. The mode of health services delivery in Ilala District is like other districts in Tanzania, based on preventive, promotive and curative care. The line of operation starts from the dispensary, health centre to the District Hospital.

Table 4.6: Health Services in Machinjioni Ward

Type of Health service	Public	Private	Total
Hospitals	0	0	0
Health Centers	0	0	0
Dispensaries	1	0	1
Laboratory	0	0	0
Pharmacy	0	2	2

Source: Ward Executive Officer, 2023

4.2.5 Safe and Clean Water Services

The main source of water for Machinjioni residents is KUWASA articulation system. All streets are served by the system. However, individuals have other sources of water including boreholes, shallow wells and rain water harvesting systems to argument the water supplied by KUWASA. This project shall use water supplied by KUWASA as well.

4.2.6 Energy

Machinjioni Ward depends on different sources of energy, such as electricity, kerosene, firewood, solar, compressed petroleum gas etc. The main source of power at Machinjioni Ward is electricity, which is generated, transmitted and supplied by a sole utility agent, Tanzania Electric Supply Company Limited (TANESCO). The whole ward has TANESCO network. Residents commonly use liquified petroleum gas for cooking.

4.2.7 Economy

Most of residents of Machinjioni ward under-go their economic activities outside of the area. Large percent of people in the ward are government servants; employed in a private sector; or self-employed in various areas. Self-employed people majorly engage in small businesses such food and fruits vending, street shop owners, bodaboda and bajaji drivers.

4.2.8 Sports and Games

The major sport in Machinjioni Ward area is football whereby there are 4 sports grounds (2 primary school ground and 2 secondary school grounds). The major recreational and sports areas are scattered throughout the ward. This gives an opportunity to the Machinjioni residents to participate in sports even outside the ward.

4.2.9 Culture and Ethnicity

Machinjioni residents originated from different locations in Tanzania and other part of the world, the culture of the area is Mixed Culture but dominated by *Waha*. But nowdays, almost all tribes from Tanzania can be found in the area especially Chaga, Sukuma, Luguru, Ha, Pare, Nyakyusa, Wahaya, Kurya, Ngara, etc. So, it is difficult to state clearly what is the culture of the area. The common language used is Kiswahili where by all people within the area can use in communication.

4.2.10 Waste Management

Machinjioni Ward has no central sewerage system therefore Households and Institutions use onsite sanitation system mainly septic tank system with VIP and pour-flush toilets being dominants types of latrines in the area. Solid waste collection from the household is done by a contracted companies (by Kigoma Ujiji Municipal Council). Collection is done once per week; residents pay 2,500/= per month for the service while commercial and office buildings pay up to 20,000 per month. This project shall be responsible for the waste generated during construction and operation phase from generation to disposal.

4.3 Gender issues

4.1.3 Introduction

MUHAS is deeply devoted to gender equality and inclusion. The anti-sexual assault and prejudice policy as well as a gender unit, guidelines, and other measures were all formed by MUHAS to handle gender concerns. By admitting more female students and holding and attending awareness-raising seminars, MUHAS has essentially been putting the national strategy for gender mainstreaming into practice. However, in order to follow the national encouragement for gender equality, the institution needs to develop the gender program of activities to sustain, and support the efforts that have been established.

MUHAS is deeply devoted to gender equality and inclusion. The University provides equal chances in employment of staffs, provision of expertise skills to both staff and students, students' enrolment, assessment and leadership and promotions for staff. Through a developed gender policy, MUHAS is committed in promoting gender equality and fairness. This gender strategy is the result of the Tanzanian government's commitment in numerous programmes such as the National Development Vision (2025) and the United Republic of Tanzania's constitution. Furthermore, the Tanzanian government is devoted to the concept of properly incorporating all people in the country's development.

In addition, it has signed all international treaties aiming at eradicating gender bias against women. Moreover, there is Gender Desk which is guided by the guidelines from the Ministry of Community Development, Gender, Women and Special Groups. Currently the desk has not received any case on gender-based violence between staff and staff and staff and students. However, there are cases among students.

4.3.2 Gender-Based Violence Status

4.3.2.1 Gender-Based Violence issues from past Construction Project

It was reported that, MUHAS has not experienced any case of gender-based violence in the past construction activities at the campus. However, some of the major issues raised by MUHAS staff and Kitenge/Ukumbi residents the kinds of gender-based violence that can be acerbated by the construction project were economic violence, abusive language to women and other services providers as construction workers sometime neglect to pay for service and provides demeaning comments to service providers and abusing of labourers (men and women) in terms of extremely low wage which may results into conflicts as well as risky to sexual behaviour.

4.3.2.2 Viewpoint on Gender Based Violence Issues associated to Project Implementation

Though participants during interview and focus group discussions did not show to have experiences of gender-based violence being caused by construction projects, they pointed out some of the issues they think can be exacerbated by project during the implementation:

- Women who seek employment may face demands for sexual favours or sex corruption;

- Women in the community may risk being subjected to verbal harassment in the form of insults and demeaning comments and unwanted gestures and touches by construction workers;
- Construction workers can easily be involved in risky sexual behaviour with the surrounded communities including students which can cause conflicts and misunderstanding among the community;
- The construction site may lack good infrastructure to accommodate workers such as enough toilets and venerated rooms for both men and women;
- Mistreating of labourers (men and women) in terms of extremely low wage which may results into conflicts; and
- Construction activities on the sites may cause noise pollution to the nearby hospital, churches whereby children and patients can be disturbed.

CHAPTER FIVE
5.0 STAKEHOLDER CONSULTATIONS AND PUBLIC INVOLVEMENT

5.1 Introduction

Public consultation as recommended by the World Bank Environmental and Social Standard (ESS10-"Stakeholders Engagement and Information Disclosure") recognizes the importance of open and transparent engagement between the borrower and project stakeholders as an essential element of good international practices which is an essential requirement of the ESIA process. This aim to ensure public participation and acceptance of the project as well as limiting adverse impacts that would be produced when the project is being implemented. Similarly, it helps to uncover issues that the preparation team may not have been identified nor addressed in the EIA. If the community participates in the early stages of project preparation, then it should it be possible to develop a close relationship between the community and the project team thereby allowing the community to put forward valuable proposals before project implementation. A Stakeholders Engagement Plan (SEP) has been prepared to guide implementing agencies on how to provide stakeholders with timely, relevant, understandable and accessible information The Objectives of public consultation are to:

- Share information about project components and proposed project activities with the community in the project areas, and also with relevant stakeholders
- Gather different viewpoints and opinions, and understand the concerns and sensitivities of local authorities and communities on environmental problems in the project areas, especially problems that were not identified by the EIA team. Using this information, public concerns can be addressed in time, during project design and when the selection between alternative solutions is made
- Perform a thorough and comprehensive evaluation of all environmental impacts and propose the most effective mitigation measures that exactly address the expected adverse environmental impacts of the project

The Methodology for Stakeholders consultation has been presented in a Methodology section (See section 1.8).

5.2 Stakeholders Consulted

In line with ESS10, ESS1 and the ESF, stakeholder engagement will focus on broad inclusion and ensuring meaningful engagement with and participation of members affected directly by the project. The project stakeholders are individuals or groups who are affected or likely to be affected by the project affected parties (PAP) and who may have an interest in the project and/or the ability to influence its outcome, either positively or negatively (other interested parties OIPs). The identification of stakeholders under the HEET project will be based on (a) their roles and responsibilities; (b) possible influence/interest on the project; and (c) their particular circumstances they may be disadvantaged or vulnerable in different ways from each other. Stakeholders consultation will also be done in the phases of construction and operation of the project.

A summary of the consultation programme which contains stakeholders identified for this project is presented in Table 5.1 below. The consultation program maps out the stakeholder engagement process in each phase of the ESIA study. The program is adaptive and subject to change based on stakeholder responses/requirements. A combination of various types of consultation techniques was used like face-to-face meetings, interviews and serving of scoping report and requests for issues. The overall consultation process was designed to comply with the requirements for public consultation as prescribed in Tanzania's EIA and Audit regulations for stakeholder engagement, and World Bank guidelines for stakeholders' engagement.

Table 5.1: Stakeholders Identified and Consultation Programme

ESIA Phase	Stakeholders Identified and Consultation Plan	Method of Consultation
Project Inception State (October 2023)	• MUHAS (Project Coordinator, Estate manager, Procurement officer, Warden, Human Resources officer)	Face to face consultation
Scoping Phase (November 2023)	Consultation with Stakeholders including; • Kigoma Ujiji Municipal Council (Town Planner and Environmental management Officer) • Occupational Safety and Health Authority (OSHA) • Machinjioni Ward Executive Officer (WEO)	Face to face consultation
	• Kitenge Mtaa and Ukumbi Mtaa Development Committee	Meeting
Detailed ESIA Study (November 2023-January 2024)	• Ministry of Education, Science and Technology (MoEST) • Tanzania Commission for Universities (TCU) • Fire and Rescue Forces (Kigoma) • Tanzania Electric Company limited (TANESCO), • Kigoma Water Supply and sanitation Authority (KUWASA) • Legal and Human Right Centre (LHRC) • Tanzania Gender Network Programme (TGNP) • MUHAS Gender Unit Officer (Dean of Students, Director of Postgraduate and undergraduate) • Kigoma Ujiji District Commissioner	Face to face consultation
	• Kitenge and Ukumbi Mtaa Development Committee	Meeting

Source: Consultant, 2023

Table 5.2: Issues Response Table

Authority / institution	Position/Designation	Issues raised	Response
Kigoma Ujiji Municipal Council	Environmental Management officer	• During Site clearance and construction, the neighbouring community must be informed • MUHAS should prevent noise pollution during construction • The source areas for construction materials must be identified to prevent soil erosion and occurrence of boreholes where mosquitoes can breed.	• All stakeholders including neighbours shall be informed • MUHAS shall comply accordingly
	SLO	• The land ownership reads Title deed number 4202 KGLR of 14th October for 99 years • User group K is for educational purpose only. • The Plot reads Plot number 4202 block 'U' Ujiji, Kigoma Ujiji Municipal	• The proponent acknowledges the provided information.
	Division officer	• This project by the Muhimbili University of Health and Allied Sciences is a good project bound to contribute in the increase in economic standards of Ujiji citizens. • The project site provided to MUHAS is safe with no conflicts. • MUHAS should prioritize provision of non-skilled labour opportunities to residents near the project site	• The proponent acknowledges the provided information and shall take heed of advice given.
Fire and rescue forces	Inspector	• We recommend time on construction plan review and fire protection plan to be inspected and bill generated for fire plan and construction fee certificate and other	• The proponent will do as advised

Authority / institution	Position/Designation	Issues raised	Response
		government procedures according to fire and rescue building regulations of 2015	
Kigoma Special Economic Zone	Managing director	• The area is good under the regional administration of Kigoma supervised by SPV (KISEZ) • We encourage MUHAS to increase speed and start construction soon	• The proponent acknowledges the provided information and shall take heed of advice given.
MLHHSD-Kigoma	Gender Focal Person	• MUHAS has been provided with a plot for construction of a college of Medicine • The project site is a legit government property that was planned for since 2009 and ownership documents are already provided • MUHAS should construct proper modern buildings	• The proponent acknowledges the provided information and shall take heed of advice given.
Roofing sheets and steel rods industry	Project neighbour	• The project is accepted	• The proponent acknowledges the provided information
Third man limited	HR officer	• The Project is welcomed and a good cooperative relationship is anticipated	• The proponent acknowledges the provided information
NextGen Solawazi Limited	Renewable Energy Engineer	• NextGen welcomes MUHAS to KISEZ • This project investment is very benefitial to NextGen since it increases the availability of a health facility and increases power demand which is very essential for NextGen's future plan of solar plant expansion	• The proponent acknowledges the provided information

Authority / institution	Position/Designation	Issues raised	Response
Ministry of Education, Science and Technology	Environmental Officer	• The study must refer to National and World Bank Regulations and draw a clear picture of how they will be enhanced during project implementation. • The ESIA must include the guidelines provided in the ESMF and ESF	• Reference has been made to both WB standards and national Regulations
Tanzania Council of Universities (TCU)	Officer	• No objection for the project • Consultant (Architect) is argued to observe the minimum requirements for physical resources provided for under the standards and guidelines for University Education in Tanzania, 2019	• N/A • Consultant has been advised
MUHAS-Main campus	Director of students services	• Proper estimations should be done to allow waste water and solid waste infrastructure to accommodate use by all students and staff involved in the project • MUHAS should engage transport service providers in ensuring proper transportation of students and all projects' personnel to and from the Kigoma campus whenever necessary especially during the project operational phase	• Proper waste management systems will be adhered to throughout the project
	Gender Focal person	• Seminars and sensitizations on should be done to all project workers and service providers • The contractor should have a social welfare representative and a proper GBV reporting system to all and enhance intensive ans extensive consideration for gender issues • The gender unit at MUHAS has been financially and administratively empowered to deal with gender issues	• All gender related issues shall be adhered to and implemented as advised during all project phases • MUHAS acknowledges the information provided

Authority / institution	Position/Designation	Issues raised	Response
		and preparing online reporting systems to enhance GBV issues prevention and control. • MUHAS gender unit is included in the HEET project committee and shall therefore work to ensure that the project is gender inclusive and adheres to implementing the recently reviewed MUHAS gender policy	
	Students Organization	• The project is acknowledged and understood • The project designs should be revised to support disabled students and other individuals, ramps and lifts should be included • The project design should be revised and ensure proportionality between the targeted enrolment and design facilities and infrastructure • The hostels component of the project should be designed at maximum capacity to accommodate more than the enrolment target so as to accommodate extra students when necessary • The project process should involve representatives from different MUHAS academic departments at student and administrative levels.	• MUHAS shall include all suggested inputs in the project design and implementation as advised

Source: Fieldwork, December 2023

CHAPTER SIX

6.0 ASSESSMENT OF IMPACTS AND IDENTIFICATION OF ALTERNATIVES

This section outlines the identification and assessment of the impacts in each stage of the proposed project. Two zones of impact namely the core impact zone and influence impact zone are considered as follows;

i. The core Impact zone- The core impact zone includes the area immediately bordering the project (100m radial distance from the project boundary). In the case of this project, local impacts will be the site of the construction and the immediate surrounding areas.

ii. The influence impact zone- includes the area beyond 100m from the proposed site. Most of the positive impacts are expected to go beyond Machinjioni Ward boundaries, Kigoma Ujiji Municipal, Kigoma Region and all Regions within Tanzania. On another note, due to the fact that from new facilities MUHAS will be in a position to host medical and research students both local and international from within East African Regions and beyond.

6.1 Impact Identification

According to the WB ESF the HEET project is given the risk assessment of Substantial due to the likelihood of environmental and social impacts generated by the project. The assessment of environmental and social risks has been analysed based on the type of the proposed project nature of civil works is limited to the construction of the college of medicine at Kigoma campus.

The proposed project can cause a wide range of environmental and social impacts on a number of receptors. The EIA identifies these impacts for the purposes of mitigating the adverse ones or enhancing the benefits. Impact *identification* is a process designed to ensure that all potentially significant impacts are identified and taken into account in the EIA process. A number of 'tools' are available to assist in impact identification. The simplest, and most frequently used, *checklists* of impacts method was used for this project. The following subsections present the impacts identified to associate with the project.

6.1.1 Impact Identified to be associated with construction phase

The following impacts were identified to be occurring during the construction phase of the project.

6.1.1.1 Environmental Impacts

i. Increased noise Levels
ii. Impact to air quality
iii. Waste management problems during construction
iv. Occupational safety and health risks
v. Erosion of cleared areas
vi. Construction vibration
vii. Loss of vegetation
viii. Fire hazards risk

6.1.1.2 Social Impacts

i. Benefits to communities resulting from employment
ii. Community health, safety and security Risk
iii. Gender-based violence (GBV), equity, rape and sexual harassment

iv. Gender inequity in employment
v. Transmission of vector-borne and communicable diseases
vi. Impacts associated with transmission of sexually transmitted infections
vii. Impacts associated with spreading of covid 19 pandemic
viii. Impacts on labour and working conditions

6.1.2 Impacts associated with Demobilization Phase

The following impacts are associated with the demobilization phase:

6.1.2.1 Environmental Impacts

i. Increased noise
ii. Impact to air quality
iii. Waste management problems

6.1.2.2 Social Impacts

i. Benefits to communities resulting from employment

6.1.3 Impacts Associated with Operation Phase

The following impacts are associated with the operation phase:

6.1.3.1 Environmental Impacts

i. Health and safety risks due to fire hazards
ii. Increased wastes during operations
iii. Increased surface water run-off

6.1.3.2 Social Impacts

i. Improved enrolment
ii. Creation of employment opportunities
iii. Reduction of gender gap in enrolment
iv. Increased capacity for gender-friendly and responsive learning environments
v. Increase in skilled workforce
vi. Increased pressure on social services and utilities

6.2 Impact Assessment

The impact assessment stage comprises a number of steps that collectively assess the manner in which the hydropower Project will interact with elements of the physical, biological, cultural or human environment to produce impacts to resources/receptors. The steps involved in the impact assessment stage are described in greater detail below.

6.2.1 Impact Prediction

6.2.1.1 Introduction

The impact assessment process predicts and describes impacts that are expected to occur for different phases of the Project at Kigoma Campus. Where possible, impacts are quantified to the extent practicable, which may include increase in noise or air pollution levels above acceptable standards; volume of waste or water discharged, etc. For each impact, its significance is evaluated by defining and evaluating two key aspects:

- The **magnitude** of the impact; and
- The **sensitivity** of the feature or receptor that will be impacted.

6.2.1.2 Impact Magnitude

Magnitude essentially describes the intensity of the change that is predicted to occur in the resource/receptor as a result of the impact. A magnitude rating tends to reflect a combination of the size of an area that may be affected, the duration over which the aspect may be altered, and the size, degree or scale of that change. In essence, magnitude is a descriptor for the degree of change that is predicted to occur in the resource or receptor.

For positive impacts (which are mostly socio-economic impacts) magnitude is generally categorised as 'Positive' unless sufficient information is available to support a more robust characterisation and to assign the degree of magnitude as Small, Medium or Large. For instance, if the number of jobs to be assigned to local community members is confirmed or if the size or value of the contribution to the national, regional or district economy is known then a magnitude rating can be assigned. If not, then the significance rating is assigned based on the sensitivity of the feature impacted by a specific activity or change. The term '**magnitude'** therefore encompasses all the characteristics of the predicted impact including:

- Extent;
- Duration;
- Scale;
- Frequency; and
- Likelihood (only used for unplanned events).

The definitions for characteristics of magnitude used during the impact assessment are summarized in Table 6. 1.

Table 6.1: Impact Characteristic Terminology

Characteristic	Definition	Designations
Type	A descriptor indicating the relationship of the impact to the Project (in terms of cause and effect).	Direct Indirect Induced
Extent	The "reach" of the impact (e.g., confined to a small area around the Project Footprint, projected for several kilometres, etc.).	Local Regional International
Duration	The period over which a resource / receptor is affected.	Temporary Short-term Long-term Permanent
Scale	The size of the impact (e.g., the size of the area damaged or impacted, the fraction of a resource that is lost or affected, etc.).	[no fixed designations; intended to be a numerical value]
Frequency	A measure of the constancy or periodicity of the impact.	[no fixed designations; intended to be a numerical value]

Source: UNEP, 2019

The evaluation of pre-mitigation impact significance takes into account control measures that are already part of, or embedded within, the Project design. This avoids the situation where an impact is assigned a magnitude based on a hypothetical version of the Project that considers none of the embedded controls that are defined as part of the Project description. Examples of embedded controls could include acoustic reduction measures around noisy equipment or servitude and buffer requirements the development is obliged to implement

and is part of the layout. Additional mitigation measures aimed at further reducing the significance of impacts are proposed where necessary or appropriate and are assessed as part of the 'residual' impact significance rating.

In the case of **type**, the designations are defined universally (i.e., the same definitions apply to all resources/receptors and associated impacts). For these universally defined designations, the definitions are provided in Table 6.2.

Table 6.2: Designation Definitions

Designation	Definition
Type	
Direct	Impacts that result from a direct interaction between the Project and a resource/receptor (e.g., between occupation of a plot of land and the habitats which are affected).
Indirect	Impacts that follow on from the direct interactions between the Project and its environment as a result of subsequent interactions within the environment (e.g., viability of a species population resulting from loss of part of a habitat as a result of the Project occupying a plot of land).
Induced	Impacts that result from other activities (which are not part of the Project) that happen as a consequence of the Project (e.g., influx of camp followers resulting from the importation of a large Project workforce).
Extent	
Local	Impacts that affect an area in proximity to the development area within an area defined on a resource/receptor-specific basis.
Regional	Impacts occurring at a regional scale as determined by administrative boundaries or which affect regionally important resources or ecosystems.
International	Impacts that extend across international boundaries or affect resources such as features, resources or areas protected by international conventions.
Duration	
Temporary	Impacts are predicted to be of short duration (in the order of days) and/or intermittent/occasional.
Short-term	Impacts that are predicted to last only for the duration of the construction period
Medium-term	Impacts that will continue for a period of 5 to 10 years following the completion of the construction phase e.g., where the impact may reverse or affected resources or receptors recover within this period of time.
Long-term	Impacts that will continue for the life of the Project, but will either cease when the Project stops operating or is decommissioned, or where the impact may reverse or the affected resource / receptor recovers or reverts to a near natural state after 10 or within 20 years following the completion of the construction phase.
Permanent	Impacts that cause a permanent change in the affected receptor or resource (e.g., removal or destruction of ecological habitat) that endures substantially beyond 20 years following the completion of the construction phase.

Source: UNEP, 2019

In the case of **scale** and **frequency**, these characteristics are not assigned fixed designations, as they are typically numerical measurements (e.g., number of acres affected, number of times per day, etc.).
The terminology and designations are provided to ensure consistency when these characteristics are described in an impact assessment deliverable. However, it is not a requirement that each of these characteristics be discussed for every impact identified.

For unplanned events (e.g., accidental release of hazardous materials) the **likelihood** of the impact occurring is taken into consideration in deriving the magnitude rating. The likelihood of an impact occurring as a result of an unplanned event is expressed as a probability and is designated using a qualitative scale (or semi-quantitative, where appropriate data are available), according to the attributes described in Table 6.3.

Table 6.3: Definitions for Likelihood Designations (only used for unplanned events)

Likelihood	Definition
Unlikely	The event is unlikely but may occur at some time during normal operating conditions.
Possible	The event is likely to occur at some time during normal operating conditions.
Likely	The event will occur during normal operating conditions (i.e., it is essentially inevitable).

Source: UNEP, 2019

Likelihood is estimated on the basis of experience and/or evidence that such an outcome has previously occurred.

It is important to note that likelihood is a measure of the degree to which the unplanned event is expected to occur, not the degree to which an impact or effect is expected to occur as a result of the unplanned event. The latter concept is referred to as uncertainty, and this is typically dealt with in a contextual discussion in the impact assessment deliverable, rather than in the impact significance assignment process.

In the case of impacts resulting from unplanned events, the same resource/receptor-specific approach to concluding a magnitude designation is utilised, but the 'likelihood' factor is considered, together with the other impact characteristics, when assigning a magnitude designation. There is an inherent challenge in discussing impacts resulting from (planned) Project activities and those resulting from unplanned events. To avoid the need to fully elaborate on an impact resulting from an unplanned event prior to discussing what could be a very low likelihood of occurrence for the unplanned event, this methodology incorporates likelihood into the magnitude designation (i.e., in parallel with consideration of the other impact characteristics), so that the "likelihood factored" magnitude can then be considered with the resource/receptor sensitivity/vulnerability/importance in order to assign impact significance. Rather than taking a prescriptive (e.g., matrix) approach to factoring likelihood into the magnitude designation process, it is recommended that this be done based on professional judgment, and assisted by quantitative data (e.g., modelling, frequency charts) where available.

Once the impact characteristics are understood, these characteristics are used (in a manner specific to the resource/receptor in question) to assign each impact a magnitude. In summary, magnitude is a function of the following impact characteristics:

- Extent;
- Duration;
- Scale;
- Frequency; and
- Likelihood.

Magnitude essentially describes the degree of change that the impact is likely to impart upon the resource/receptor. As in the case of extent and duration, the magnitude designations themselves (i.e., negligible, small, medium, large) are universally used and across resources/receptors, but the definitions for these designations will vary on a resource/receptor basis, as is discussed further below. The universal magnitude designations are:

- Positive;
- Negligible;
- Small;
- Medium; and
- Large.

The magnitude of impacts takes into account all the various dimensions of a particular impact in order to make a determination as to where the impact falls on the spectrum (in the case of adverse impacts) from negligible to large. Some impacts will result in changes to the environment that may be immeasurable, undetectable or within the range of normal natural variation. Such changes can be regarded as essentially having no impact, and should be characterised as having a negligible magnitude.

6.2.1.3 Sensitivity

In addition to characterizing the magnitude of impact, the other principal step necessary to assign significance for a given impact is to define the sensitivity/vulnerability/importance of the impacted resource/receptor to the type of activity proposed (e.g., habitat clearance, topsoil removal, etc.) or the consequences of a Project activity (e.g., dust, noise, water pollution, or induced population influx). This requires a range of physical, biological, cultural or human factors to be taken into account and may also need to include other factors such as legal protection, government policy, stakeholder views and economic value.

Characterization of sensitivity for a physical or biological resource or receptor (e.g., a water feature or parameter, cliff, vegetation type) will take into account its conservation status and importance (on a local, national and international scale), its vulnerability to disturbance, and its resilience to recover or withstand a specific impact or type of impact. Where the receptor is human or cultural, the value of that social and cultural heritage receptor/s and its vulnerability to the impact is considered, taking into account the receptor's resilience, including ability to adapt to change or use alternatives where available.

As in the case of magnitude, the sensitivity/vulnerability/importance designations themselves are universally consistent, but the definitions for these designations will vary on a resource/receptor basis. The universal sensitivity/vulnerability/importance designations are:

- Low;
- Medium; and
- High.

6.2.1.4 Evaluating Significance

Once magnitude of impact and sensitivity/vulnerability/importance of resource/receptor have been characterized, the significance of the impact is assigned using the impact significance matrix shown in Table 6.4.

For impacts resulting from unplanned events (typically accidents, such as a major oil spill or other event that cannot be reasonably foreseen), the above methodology is applied but likelihood is also considered when assigning the magnitude designation, as classified in Table 6.2.

Table 6.4: Impact Significances

Evaluation of Significance		**Sensitivity/Vulnerability/Importance of Resource/Receptor**		
		Low	**Medium**	**High**
Magnitude of Impact	**Negative Impacts**			
	Negligible	Negligible	Negligible	Minor
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Critical
	Positive Impacts			
	Positive	Minor	Moderate	High

UNEP, 2019

The matrix applies universally to all resources/receptors, and all impacts to these resources/receptors, as the resource/receptor- or impact-specific considerations are factored into the assignment of magnitude and sensitivity designations that enter into the matrix. The following are definitions of impact significancy;

- An impact of **Negligible significance** is one where a resource/receptor (including people) will essentially not be affected in any way by a particular activity or the predicted effect is deemed to be 'imperceptible' or is indistinguishable from natural background variations.
- An impact of **Minor significance** is one where a resource/receptor will experience a noticeable effect, but the impact magnitude is sufficiently small (with or without mitigation) and/or the resource/receptor is of low sensitivity/ vulnerability/ importance. In either case, the magnitude should be well within applicable standards.

- An impact of **Moderate significance** has an impact magnitude that is within applicable standards, but falls somewhere in the range from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit. Clearly, to design an activity so that its effects only just avoid breaking a law and/or cause a major impact is not best practice. The emphasis for moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that impacts of moderate significance have to be reduced to minor, but that moderate impacts are being managed effectively and efficiently.
- An impact of **Major significance** is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. An aim of IA is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted (i.e. ALARP has been applied). An example might be the visual impact of a facility. It is then the function of regulators and stakeholders to weigh such negative factors against the positive ones, such as employment, in coming to a decision on the Project.
- An impact of **Critical significance** after all feasible mitigation measures have been identified and assessed warrants the highest level of attention and concern. As with residual impacts of major significance, the regulators and stakeholders will need to closely evaluate whether the positive impacts of the project outweigh residual negative impacts of critical significance. In many cases residual critical impacts can be considered as a potential fatal flaw of the project.

6.3 Potential Environmental Impacts during construction phase

Negative Impacts

6.3.1 Increased Noise Levels

Construction activities normally generate a lot of noise. Noises from vehicles during construction phase may rather be significant. Noises will also arise from various construction machinery at site and transportation of materials. The existence of high noise levels may cause significant impact on surrounding neighbors. During construction noise levels are expected to reach 80dBA if not controlled (TBS Standard is 55dBA during day and 45dBA during night). Most of the deterrent noises shall be confined during the construction period only because operation phase is not associated with noise, which is rather a shorter period compared with the lifetime of the proposed buildings. This impact will be "**moderate negative impact**".

6.3.2 Impacts to Air Quality

Air pollution by dust emissions from various sources is an issue for consideration during design stage particularly in the choice of technologies and practices to be used under the project. The main impact of dust is the impairment of local air quality, the extent of which will depend on quantities emitted, duration and prevailing atmospheric conditions. Dust will mainly be generated from earth movements (excavation, levelling, dumping), wheels of trucks and machinery moving /traveling along unpaved surfaces, handling and transport of soil, and wind erosion from exposed surfaces. At the construction site, the possible impacts are expected across (at a radial distance of ± 0.5km. The dispersion area of exhaust and dust (up to standard

levels of air quality) will depend on the concentration of machinery and equipment at the site and the capacity of their engines.

Along the proposed project areas, the adjacent areas including residential ares are relatively open, without impediment to air movement hence enhance dilution of air pollutants. Also, the leafy vegetation should be able to filter out a considerable content of low-level airborne pollutants. Thus, ventilation and vegetation are anticipated to lessen the air pollution problem. Moreover, sprinkling of the open areas with water during construction work will further lessen the generation of dust, and consequently alleviate the air pollution problem. This impact is moderately significant.

Reduction in air quality depends on equipment type, quantities, duration, distance from sensitive environments and prevailing atmospheric conditions, particularly wind and moisture of the air. The main source of emission of atmospheric pollutants emanates from the exhaust from engines (in construction equipment trucks/tipper, excavators, etc.). Various internal combustion engines will release greenhouse gases (GHGs), notably carbon-dioxide (CO_2), small quantities of noxious gases such as nitrogen oxides (NOx), sulphur oxides (Sox), and hydrocarbons. There will be truck journeys by vehicles mobilizing construction materials, land clearance etc. to the project sites followed by several truck journeys. Consequently, any reduction in air quality, although virtually certain will be moderate and localized. This impact will be "**moderate negative impact**".

6.3.3 Waste management problems during construction

Site clearance, construction activities, and domestic activities create wastes (solid and liquid) that need to be disposed. Such wastes include:

- Demolition materials/ waste (rubbles)
- Excavated materials from the earth works;
- Timber from used formwork;
- Paints, lubricants and petroleum wastes;
- Containers, cement paper bags and other packaging materials;
- Metal, glass, plastic containers and other unwanted materials;
- Food remains; and
- Wastewater (Sewage)

These wastes may have a direct impact on the neighbouring premises. Disposal of the same solid wastes off-site could also be a social inconvenience if done in wrong places. The offsite effects could be un-aesthetics view, pest breeding, unhygienic conditions, chocking of nearby drains and stream and pollution of physical environment.

If wastewater is not well managed it has the potential to cause soil and ground water pollution, cause diseases to Community and surrounding areas, become nuisance due to smell and bad look.

Proper waste management will however be taken into consideration and proper dumping done according to the requirements and directions of the Kigoma Ujiji Municipal Council. Estimation of waste quantities is provided in Section 2.3 of this report. This impact will be "**major negative impact**".

6.3.4 Occupational Safety and Health risks

Construction sites always present an element of danger. Construction workers are likely to encounter accidental injuries as a result of the intensive engineering and construction activities including erection and fastening of materials, metal grinding and cutting, concrete work, steel erection and welding among others. Such injuries can result from accidental falls

from high elevations, injuries from hand tools and construction equipment cuts from sharp edges of metal sheets and collapse of building sections among others. Deaths have also been experienced as a result of poor construction activities leading to occupational health and safety concerns. Workers are also likely to be exposed to diseases from building materials during the construction phase of the Project. Occupational health and safety of the workforce will have to be monitored by the respective contractor's supervisors and foremen. As long as proper procedures are followed and personal protective equipment (PPE) provided and their use enforced, risks of accidents and incidents can be substantially reduced. This impact will be "**moderate negative impact**".

6.3.5 Erosion of Cleared Areas

Earthworks during construction will have an impact on soil erosion. There will be mass soil material movement from the site and from one area to another. The removal of the concrete cover will accelerate soil movement by erosion by agents notably water, wind and machinery. The sites have very loose sand soils, which are very prone to erosion. Incorporating appropriate soil conservation measures and proper drainage facilities during construction would mitigate the impacts. This impact will be "**moderate negative impact**".

6.3.6 Construction Vibration

Construction activity can result in varying degrees of ground vibration, depending on equipment and method employed. Vibration will be produced by construction vehicles, plant and machinery during delivery of materials, processing of materials, and actual construction work. For this project, construction activity that is expected to generate the most severe vibrations is excavation of basement. Due to an increase in activities and number of operational vehicles, the impacts vibration will cause disturbance to neighbours and physical damage to properties near the construction site. This impact will be "**moderate negative impact**".

6.3.7 Loss of Vegetation

Construction activities might involve clearance of about 100 matured trees (for both sites) causing the following impacts from the environmental point of view; Loss of natural vegetation causing ecological imbalance, Loss of natural habitat for small animals and birds, Loss of a natural source of Oxygen. However, the existing situation shows that the habitats are highly modified due to fires and human developments. This impact will be "**moderate negative impact**".

6.3.8 Fire hazards risk

Fire hazards in in this project can vary depending on the specific activities, facilities, and conditions within the campus. Common hazards to be expected and cautious about include laboratories with flammable materials, residential halls with cooking equipment, overcrowded student events, and off-campus housing with varying safety standards. In occurrence of firefighting and rescue efforts standards misalignment, the project is prone to subject the Community at a risk of fire out breaks resulting to casualties and losses.

6.4 Potential Social Impacts during construction phase

Positive Impacts

6.4.1 Benefits to communities resulting from employment

The proposed project development will benefit nearby communities in terms of employment and creating linkages with local economy by the supply of goods and services during

construction. The local people either shall be employed directly by the contractor or indirectly by other businesses linked to it (i.e. selling of food to workers. About 200 people are expected to be employed during this phase.

Negative Impacts

6.4.2 Community Health, Safety and Security Risks

Due to technological developments and investment in labour saving equipment, the skilled workforce needed for the Project is estimated to be 200 workers out of them skilled labour shall be around 140. The skilled construction workers will be imported to the area of construction. A smaller number of local low-skilled jobs may be envisaged. These will include protection and guarding of the construction companies' properties. Low skilled workers will be hired within 20km radius of project area and wider if necessary.

It is expected that the increased number of workers and higher concentration of residents near construction sites will have impact on neighbouring areas. Uncontrolled movement of workers will affect the Community. Due to this a limited regime of movement of workers in the area around the construction sites and mode of movement must be well organized and defined by agreement between the Employer (MUHAS) and the Contractor(s).

Impacts on the health and safety of the community may arise during construction as a result of noise, vibration, dust and other emissions from earth moving activities, GBV and sexual harassment and transmission of STDs and communicable diseases which have been already been addressed in different chapters of the ESIA. Other risks involve;

- **Accidents and Incidents due to Traffic-**The traffic related to construction will contribute to reduced road safety on especially on local roads where some contractor's facilities are located, especially where the traffic passes through classrooms, hostels, offices and workshops. The traffic to construction site will depart from the public roads. Residents and staff using these haulage roads will be exposed to increased possibilities for accidents and injuries. Traffic consisting of heavy vehicles and machinery is especially risky.
- **Security Risks-** A potential increase in crime may be experienced during the construction period if mitigation measures are not introduced. With an increase in construction activities and the possibility of job seekers arriving, it may be more difficult to identify strangers in the area. In addition, the increase in disease associated with the entry of a temporary labour force into an area could also occur. There may also be negative issues that need to be managed such as increases in local prices, crime, prostitution or alcohol consumption.
- **Social Conflicts-** Entry of a temporary labour force into an area could cause different negative impacts to the community. The situation when temporary workers come from different parts of Kigoma Region and they are from different social and cultural backgrounds could easily create conflicts with the local social environment. Due to this, workers must receive training and sign a labour code of conduct, in order not to create conflicts with the local environment.

Influx of temporary workers and their inadequate behaviour could cause issues. Contractors will be aware of avoiding where possible these kinds of situations and any effects of such issues must be subject to fair compensation. Despite strengthened measures for impacts reduction, sometimes it is not easy to control workers. Awareness of employees about the

measures proposed, as well as negative effects that could occur is essential for the safe implementation of the project. This impact will be "**moderate negative impact**".

6.4.3 Gender-based violence (GBV), rape and sexual harassment

The report on GBV for this project shows that there is no record of GBV within the campus even if there are major projects implemented within the campus (Report attached as appendix XII). However, due to labor influx to the campus on daily bases (there shall be no construction camp at the site) for this project, the acts of GBV, sexual harassment, and other sexual offenses such as rape might happen. About 300 skilled and unskilled workers are expected to be working for the project contractor during the construction phase. The following impacts/ risks have the potential to happen during the construction phase if proper mitigation measures are not going to be implemented;

- Construction workers may engage in sexual fraternization with nearby residents. In addition to this being a driver of HIV infection, it will lead to domestic conflicts, GBV, and domestic violence.
- Women who seek employment may also face demands for sexual favors before being employed which amounts to sexual harassment. Even when employed, women may face continuous and unwanted demands for sex and risk losing their jobs if they do not give in.
- Community residents, patients and staff may also face the risk of being subjected to verbal harassment in the form of insults and demeaning comments in addition to unwanted gestures and touches by construction workers.
- Sexual harassment of women (workers) might also happen as a result of mixing of women and men at worksites.
- Outright rape is also a risk at construction sites. As a result, domestic violence and gender-based violence might happen.

This impact will be "**moderate negative impact**".

6.4.4 Gender inequity in employment

During the construction phase at the site, the potential risk that may result into gender inequality may include unequal distribution of work, discrimination against women, and unequal pay for women, among others. It should be noted that despite various efforts in regard to gender equality, such as legislation, policies and other initiatives in Tanzania, the construction sector remains one of the most male dominated sectors; women are mostly under-represented in all construction occupations and professions. As such circumstance, project implementers such as engineers, director, and mangers in the MUHAS project are likely to be men. Thus, women are likely to face challenges associated with cultural and structural barriers, such as harassment and discrimination, limited networking opportunities and long working hours which may result in poor career prospects and high levels of stress. Moreover, women may experience difference in wages or salaries. The different in wages maybe associated with the gap in education between men and women, different types of posts held in the construction site, differences in amount of work experiences as well as difference in the working days and capability to negotiate salary. This impact will be "**moderate negative impact**".

6.4.5 Impacts associated with Transmission of Vector Borne and Communicable Diseases

Communicable diseases are caused by viral, bacterial, parasitic and fungal pathogens that are airborne or that are transmitted through an infected person, animal or environmental source. Communicable diseases include malaria, tuberculosis (TB), measles and bacterial infections such as colds, gastric infections (eg diarrhoea) and the like.

Communicable diseases expected to be experienced at the campus include Malaria, tuberculosis, gastroenteritis, pneumonia, acute respiratory infection, diarrhoea, etc. HIV/AIDS and other sexually transmitted diseases and Covid 19 impacts are presented separately in *Section 6.4.6 and 6.4.7*. Some of these diseases are water borne and caused by poor sanitary conditions and poor-quality drinking water.

The presence of an external workforce working in construction sites at MUHAS where interaction with Kitenge and Ukumbi community is possible could lead to the increased transmission of communicable diseases within the Institute. It is expected that there shall be no construction camps within the MUHAS campus, workers shall come in the morning and leave in the evening. The profile of any disease transmission will be influenced by the existing disease profile of Kigoma Region and the diseases profile of the other parts of Tanzania workers are sourced from. In addition, if opportunistic workers (those hoping to find employment on the Project or from related activities) migrate to Kigoma campus, this could also impact on the transmission of communicable diseases.

Finally, overcrowding, poor hygiene and sanitation at Construction sites and poor waste management can also facilitate the spread of communicable diseases. There is the potential for increased transmission between contractor's workers living and then onwards into MUHAS workers' and the students through interactions. Students will be at particular risk of diarrhoeal diseases due to their poor sanitary behaviors, while the staff will be at risk of more severe health outcomes as a result of their frailty.

During construction, modifications to the environment and in-migration into the area are likely to increase the risk of transmission of malaria. Modifications to the environment can create small water pools (e.g. wheel ruts and footprints) offering new mosquito breeding grounds and leading to increased vector densities and human-vector interaction. Any influx of people into the area may play an indirect role in increasing the malaria burden. This may result from an increase in pressure on medical facilities and inadequate waste management. The highly endemic nature of malaria means that the proposed buildings are unlikely to significantly add to the already high disease burden of the community during the wet season. However, modifications to the environment may change the breeding patterns of mosquitoes extending the high risk malaria season for transmission from its peak.

As above, poor hygiene, sanitation and waste management can all result in increased risk of transmission of water borne communicable diseases such as Hepatitis A and E and Typhoid through increased risk of contamination of water and food with faecal matter. In addition, these factors can also result in increased number of pests, such as rats, which can contribute to disease transmission.

Communicable diseases have the potential to impact Project workforce and neighbouring areas. It is anticipated that during the construction period the workforce will comprise up to 300 employees, both skilled and unskilled. Local labour will (as far as possible) be sourced from Kigoma Region. This impact will be "**moderate negative impact**".

6.4.6 Impacts associated with Transmission of Sexually Transmitted Infections

The annual incidence of HIV in Tanzania among adults, ages 15 to 64 years, is 0.29 percent (0.40 percent among females and 0.17 percent among males). This corresponds to approximately 81,000 new cases of HIV annually among adults, ages 15 to 64 years, in the country. In addition, prevalence of HIV among adults, ages 15 to 64 years, in Tanzania is 5.0

percent (6.5 percent among females and 3.5 percent among males). This corresponds to approximately 1.4 million people living with HIV (PLHIV), ages 15 to 64 years in Tanzania.
It is anticipated that during the construction period, the necessary workforce will comprise up to 300 people, who shall enter the Kigoma Campus and leave daily (there shall be no camp within the campus). The Project could result in increased transmission of STDs including HIV/AIDS
during construction due to:

- Presence of a mainly male workforce, with higher incomes, who may engage in high-risk sexual activities with young MUHAS female students
- Workers establishing casual relationships with young girls. This may result in transactional sex or circumstances where the women assume they are in a more serious relationship, which will end in marriage.
- Engagement in casual high-risk sexual activity by transport drivers at their end destination (MUHAS Campus). Transport drivers typically have higher rates of STDs and HIV/AIDS than the general population.
- Increased number of CSWs, who may have higher infection rates of STDs and HIV, near construction sites.
- In-migration, resulting in the mixing of people with higher HIV/AIDS or STD prevalence rates than the host community, which may promote the transmission of the disease.

While there is access to treatment for STIs including HIV/AIDS in the communities, it is limited in terms of quality. Furthermore, there are significant taboos around STDs, which may influence people's willingness to access treatment. Any lack of access to treatment could affect the long-term health of those who contract STDs other than HIV, including fertility, damage to internal organs and long-term disability or even death. Increased transmission of STDs including HIV/AIDS has the potential to affect Kitenge and Ukumbi community. However, impacts could spread regionally due to vehicle movements and especially if there shall be the presence of CSWs nearby. The increase in risk of STDs including HIV/AIDS will be long-term, as it can take time for prevalence/ incident rates to return to baseline levels. Furthermore, those infected with HIV/AIDS will have health effects, which last beyond the duration of the construction activities. This impact will be "**moderate negative impact**".

6.4.7 Impacts associated with Spreading of Covid 19 Pandemic Disease

The World Health Organization declared COVID-19 a global pandemic after assessing
both its alarming levels of spread and severity, and the alarming levels of inaction. Consequentially, WHO issued various guidance and measures to prevent the spread of the virus. The measures have been adopted worldwide. Similarly, the Tanzania government has since then issued several guidance and directives. At MUHAS there are no baseline data on the impact of the Covid 19 to the Community.

During project execution (civil works), large numbers of workers will be required to
assemble together in meetings, toolbox talks and even at work sites; varied number of workforce including suppliers of material and services are also expected to come in from various places in the country which may be COVID-19 hot spots; and interaction of workers with the project host community will happen as workers find accommodation close to work sites, and/or return to their homes after works. The potential for the spread of any infectious disease like COVID-19 by projects is high.

There is also the risk that the project may experience large numbers of its workforce becoming ill and will need to consider how they will receive treatment, and whether this will impact on local healthcare services including the project host community. The presence of international

workers, especially if they come from countries with high infection rates, may also cause social tension between the foreign workers and the local populations.

Recognizing the potent risk this may present, it is difficult to clearly outline exhaustive mitigation measures under the mitigation impacts. As such, there is need for MUHAS and the contractor to develop and adopt COVID-19 Standard Operating Procedure (SOPs) in line with the WB guideline for covid-19 considerations in construction/civil works projects; Ministry of Health Directives and site-specific project conditions. These SOPs need to be communicated to all workers and enforced to the latter without fail. This impact will be "**moderate negative impact**".

6.4.8 Impacts on Labour and Working Conditions

According to the European Foundation for the Improvement of Living and Working Conditions (2012), whilst labour laws have influence in the United Republic of Tanzania with regard to minimum standards, the actual working conditions are often not in line with the legal provisions. The substance of labour law is often undermined and employees are subjected to conditions well below the specified minimum working conditions. Informal sector employed most people in kigoma which is the source of labour force for the project. Formal employment is limited. Lack of employment is an issue in the communities, especially the youth. As such, many people will lack knowledge and experience of formal employment and associated requirements.

Workers' rights including occupational health and safety need to be considered to avoid accidents and injuries, loss of man-hours, labour abuses and to ensure fair treatment, remuneration and working and living conditions. These issues should be considered not only for those who are directly employed by the Project, but also their sub-contractors and those within the supply chain.

Worker Health and Safety

Bearing in mind the nature of the activities being undertaken during construction, worker health and safety is a key risk area with the potential for accidents that may result in injuries and potential fatalities as well as lost man- hours. Many national companies may currently not meet international safety requirements and standards. Employees working informally and those with limited or without awareness of their rights (for example, migrant workers, or those newly entering the labour market) are likely to be most at risk.

Worker Rights

The labor laws in Tanzania are generally in line with international labor laws and Tanzania has ratified the eight core International Labour Organisation (ILO) conventions:

- Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87);
- Right to Organise and Collective Bargaining Convention, 1949 (No. 98) ;
- Forced Labour Convention, 1930 (No. 29);
- Abolition of Forced Labour Convention, 1957 (No. 105);
- Minimum Age Convention, 1973 (No. 138);
- Worst Forms of Child Labour Convention, 1999 (No. 182);
- Equal Remuneration Convention, 1951 (No. 100) ; and
- Discrimination (Employment and Occupation) Convention, 1958 (No. 111).

However, the implementation of workers' rights is unlikely to be fully aligned with these requirements. Enforcement of laws is also often limited. There is therefore a risk that some

subcontractors/ suppliers on the proposed project may not be fully compliant with Tanzanian legal requirements related to labour conditions. Forced labour and child labor are unlikely to occur in sub-contractor organisations but may occur in the supply chain, particularly in relation to the provision of food supplies. Discrimination is likely to occur as women are generally not employed in construction activities and may not be selected by contractors.

Sensitive receptors for this impact will be Project employees especially the unskilled employees who have a poor understanding of the requirements of Occupational Health and Safety (OHS) standards and their labour rights as enshrined in the law. This impact will be "**moderate negative impact**".

6.5 Potential Environmental Impacts during demobilization phase

Negative Impacts

6.5.1 Increased Noise

Demobilization activities normally generate a lot of noise. Noises can arise from vehicles during the demolition of temporary structures and transportation of rubbles. During demobilization noise levels are expected to reach 80dBA if not controlled. Most of the deterrent noises shall be confined during the demobilization period only, which is rather a shorter period compared with the lifetime of the proposed project. This impact will be "**Minor negative impact**".

6.5.2 Impact to Air Quality

Demobilization activities such as demolition of temporary structures, transportation of rubbles, and landscaping always involve production of dust. During construction dust levels are expected to be around 0.2 ppm if not well controlled. If not properly controlled, the dust can cause bronchitis to the workers at the site and people living/working near the project site. This impact will be "**Minor negative impact**".

6.5.3 Waste Generation and Management

Demobilization activities will generate a lot of rubble and spoil soils. The waste generated need adequate haulage facilities and at the right time. Inadequate management of the waste shall create unsightly condition on site. The types and quantities of waste have been presented in section 2 of this report. This impact will be "**moderate negative impact**".

6.6 Potential Social Impacts during demobilization phase

Positive Impacts

6.6.1 Employment Opportunities

During demobilization phase, the project will benefit nearby communities in terms of employment and creating linkages with local economy by the supply of goods and services. The local people either shall be employed directly by the contractor or indirectly by other businesses linked to it (ie selling of food to workers). Many people are expected to be employed during this phase. This impact will be "**high positive impact**".

6.7 Potential Environmental Impacts during Operational Phase

Positive Impacts

6.7.1 Strengthening the culture of environmental and social risk mitigation

The environmental and social risk mitigation measures put in place under the project will contribute to strengthening the culture of environmental and social risk mitigation in the colleges, especially for future projects. This impact will be "**high positive impact**".

Negative Impacts

6.7.2 Health and safety risks due to fire hazards

Buildings are 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. Unless all three are present fire will not occur. Fire can cause the following effects: Loss of lives, Serious Injuries, Loss of properties etc. This impact will be "**moderate negative impact**".

6.7.3 Increased wastes during operations

During the operation phase it is expected a lot of solid and liquid wastes will be generated from the activities that will be taking place in the building. Solid waste will mainly comprise of paper, food waste, cardboards, electronic wastes etc. The offsite effects could be un-aesthetics view, pest breeding, unhygienic conditions, chocking of nearby drains and stream and pollution of physical environment.

Liquid waste will mainly consist of wastewater from bathrooms, pantry and lavatories (wastewater discharge values are given in Chapter 2). If wastewater is not well managed it has the potential to cause soil and ground water pollution, cause diseases to Community and surrounding areas, become nuisance due to smell and bad look.

If these wastes are not properly managed, they have the potential to change the aesthetic scenery of the MUHAS premises and the surrounding areas as well as cause public health problems. This impact will be "**moderate negative impact**".

6.7.4 Increased surface water run-off

The project shall involve roofing of the buildings and paving the project area thus reducing water infiltration into the ground. This implies that surface runoff from the site will increase. The project will occupy an area of about 23,248sqm out of 191600m^2 . The amount of runoff will increase slightly due to lowered infiltration of rainwater into the soil. Uncontrolled storm water have the potential to cause floods or water logging either within MUHAS campus or surrounding areas. Floods can cause damage to properties, injuries to people or even loss of life, depending on the magnitude. Water logging can be breeding sites for diseases vectors especially mosquitos, but also cause visual pollution apart from blocking access (if happen on access road). This impact will be "**moderate negative impact**".

6.8 Potential Social Impacts during Operational Phase

Positive Impacts

6.8.1 Improved enrolment

Poor and adequate infrastructure has been identified as one of the primary causes of low enrolment in Educational institutions. The project is expected to increase enrolment levels at the participating institutions, including of women and girls overall, as well as in non-female traditional courses. This impact will be "**high positive impact**".

6.8.2 Creation of employment opportunities

Increased employment opportunities will be created as more student's enrolment when facilities are improved and increased at the respective institutions. In addition, increased enrolment means more teachers will need to be employed. More population at the institutions will also translate to more opportunities for the local economy as demand for goods and services trickle down to the local businesses. The program will translate to overall measurable economic and employment growth for the country. This impact will be "**moderate positive impact**".

6.8.3 Reduction of gender gap in enrolment

A special focus of HEET is to promote and increase the enrolment of girls in Higher Educational institutions. Gender breakdown in enrolment will be monitored throughout the project including providing for an enabling environment for safety of women from sexual harassment and provision of gender friendly facilities to enhance retention and completion for women and girls. This impact will be "**moderate positive impact**".

6.8.4 Increased capacity for gender friendly and responsive learning environments

The project will develop infrastructure with increased capacity to enrol women and facilities that will attract them to enrol. This impact will be "**moderate positive impact**".

6.8.6 Increase in skilled workforce

The project will help increase the likelihood of students' employment after graduation by providing good quality and relevant medicine related training programs to students, researches, and exchange opportunities for trainers and management staff in academic, industry, and health and allied sciences areas. This impact will be "**moderate positive impact**".

Negative Impacts

During operational phase most of social impacts such as the risk of GBV, Sexual harassment and transmission of communicable and vector borne diseases are likely to return to baseline levels (apart from the increased pressure on social services). This is because the project buildings are being constructed within existing campus, which already have mechanisms for GBV, sexual harassment and provides a transit route for disease transmission. This impact will be "**moderate negative impact**".

6.8.8 Increased pressure on social services and utilities

The proposed project is expected to add a good number of students and staff. The increase in the number of people at the project area has the potential to increase pressure on social services and utilities such as water, electricity, sewerage systems, etc. It was estimated in Chapter 2 that, the project shall demand 62 cubic meters of water per day, 30MWh-50MWh of electricity per month and it shall produce 49.6 cubic meters of wastewater. The demand may strain the existing service delivery system in one way or the other. However, Consultation with KUWASA have shown that there is enough water to save the project without affecting the community and Onsite sanitation system shall be used by septic tank handling of waste water. This impact will be "**moderate negative impact**".

6.9 Summary of Impacts Significance Before application of Mitigation Measures

The matrix shown below (Table 6.5) gives the summary of the impacts identified and respective significance ratings prior to application of mitigation measures. The methodology is provided in section 6.5.

Table 6.5: Summary Significance of impacts before application of Mitigation Measures

		Impact Significance Rating		
S/N	**Environmental and Social Impacts**	**Construction Phase**	**Demobilization Phase**	**Operation Phase**
	Environmental Impacts			
1.	Increased Noise Levels	Moderate	Minor	Negligible
2.	Impacts to Air Quality	Moderate	Minor	Negligible
3.	Waste Generation and Management	Major	Moderate	Major
4.	Occupational Safety and Health	Moderate	Minor	Negligible
5.	Erosion of cleared areas	Moderate	Minor	Negligible
6.	Construction Vibrations	Moderate	Minor	Negligible
7.	Loss of Vegetation	Moderate	Minor	Negligible
8.	Increased Vibrations	Moderate	Minor	Negligible
9.	Health and safety risks due to fire hazards	Minor	Negligible	Moderate
10.	Increased surface water run-off	Minor	Negligible	Moderate
	Social Impacts			
1.	Improved enrolment	Negligible	Negligible	High
2.	Reduction of gender gap in enrolment	Negligible	Negligible	High
3.	Benefits to communities resulting from employment	High	Moderate	High
4.	Increased capacity for gender friendly and responsive learning environments	Negligible	Negligible	High
5.		High	Moderate	High
6.	Community Health, Safety and Security Risk	Moderate	Minor	Minor
7.	Gender based violence (GBV), equity, rape and sexual harassment	Moderate	Minor	Minor
8.	Gender inequity in employment	Moderate	Minor	Minor
9.	Impacts associated with Transmission of Communicable Diseases	Moderate	Minor	Minor
10.	Transmission of Sexually Transmitted Infections	Moderate	Minor	Minor
11.	Impacts associated with Spreading of Covid 19 Pandemic	Moderate	Minor	Minor
12.	Impacts on Labour and Working Conditions	Moderate	Minor	Minor
13.	Increased pressure on social services and utilities	Minor	Minor	Moderate

Source: Consultant, 2023

6.10 Project Alternatives

Consideration of project alternatives is crucial in ensuring that the developer and decision-makers have a wider base from which they can choose the most appropriate option. The following alternatives are considered and will be examined in detail during the EIA process:

6.10.1 No project alternative

The no project alternative entails retaining the current status quo (No construction of the proposed buildings). Adopting this option would mean acknowledging the technical and cost convenience in proper MUHAS organization in a single campus as well as avoiding most of the negative effects associated with the presence of the building and missing all the positive benefits such as;

- Creation of employment opportunities
- Reduction of gender gap in enrolment
- Increased capacity for gender-friendly and responsive learning environments

- Institutional Fiscal Efficiency and Transparency
- Increase in skilled workforce
- Encourage Regional integration
- Strengthening the culture of environmental and social risk mitigation

6.10.2 Alternative Site

The option of using another site apart from that of the proposed one was also considered. However, the proposed site was observed to have the following advantages over others;

- The site is owned by MUHAS so no need to buy another piece of land for this purpose.
- The planned land use of the project site is for educational use purposes so it fits with the intended use
- The site has all infrastructures in the vicinity including roads, water supply, wastewater management plan, electricity, etc.
- The site is in a good location due to the road network and easy access to public transportation.

6.10.3 Energy Alternative

The use of other alternative energy sources apart from power from the National grid and diesel generators were considered. As it is the case in most of developing countries, the 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. On the other hand, diesel generators, which are mainly used during power interruptions, emit a lot of greenhouse gases especially when they are run for a long time. Solar energy was considered and the design team shall explore the feasibility of using this alternative at the proposed site. However National grid shall be the key energy source.

6.10.4 Technology and Building Materials Alternatives

Construction technology involves the choice of building materials and the technique and means used to erect buildings. As with the building design process, cautious consideration of contextual conditions is crucial to developing appropriate construction technologies. In addition, any selected technology must be constantly reviewed and, if necessary, upgraded during the construction process. A number of construction technologies were considered. The following criteria were used to select the most suitable technology options for this project;

- The use of locally available, low-energy-consumption building materials, especially those produced with renewable energy sources;
- The use of materials from sustainable production chains (e.g., avoid use of timber from savage deforestation);
- The use of non-toxic materials; and
- The use of materials easily dismantled (and recyclable as building materials or energy sources).

6.10.5 Collection, Treatment, and Disposal of Sewage

Five alternatives were considered for managing liquid waste from the proposed academic building facilities at MUHAS:

Alternative 1: Construction of Waste stabilization ponds

Waste stabilization Ponds in which blackwater, greywater or faecal sludge are treated by natural occurring processes and the influence of solar light, wind, microorganisms and algae. WSP are suitable for low-income because of its low cost and where conventional wastewater treatment is not suitable due to the lack of resources. Further, the advantage of these systems, in terms of **removal of pathogens**, is one of the most important reasons for its use.

Alternative 2: Up-flow anaerobic sludge blanket (UASB)
UASB would treat wastewater using anaerobic digestion to break down organic matter and produce biogas and nutrient-rich effluent. This promotes resource recovery and generation of energy. However, additional aerobic treatment may be needed to fully remove nutrients before discharge depending on location. Moreover, UASB has higher cost implication and requires space, infrastructure and technical operation and maintenance.

Alternative 3: Constructed wetland
Wetlands mimic natural systems to biologically treat wastewater through physical, chemical and biological processes. They are lower maintenance than mechanical plants but require land area. Surface flow wetlands could produce odour issues while subsurface flow has operational challenges.

Alternative 4: Septic tank and soak away pits
Multi septic tanks connected to underground soak away pits would be a low-cost option but require regular emptying and pose contamination risks if not properly managed and maintained. Space is also required for multiple soak pits considering there would be numerous buildings and the expected number of students and staff is high.

Alternative 5: Centralized Biodigester
is a large-scale facility that processes organic waste materials to produce biogas. In the biodigester facility, the organic waste undergoes anaerobic digestion, a biological process where microorganisms break down the organic matter in the absence of oxygen. This process produces biogas and digestate. he biogas produced from the organic waste can be used on-site to generate electricity and heat or upgraded to natural gas

In conclusion, given the space limitations and benefits of connecting to existing sewer infrastructure, Centralized Biodigester is recommended as the most feasible and sustainable liquid waste management alternative for the proposed project.

6.10.6 Design Alternative
The proposed project will involve the construction of eight buildings. This is the appropriate design given the nature of the use and the available space. Also, the National Human Settlement Policy encourages multi-storey buildings against horizontal expansion as strategy for space minimization. Prime land is becoming a scarce commodity and therefore optimal use is encouraged.

CHAPTER SEVEN
7.0 ENHANCEMENT AND MITIGATION MEASURES

7.1 Introduction

This chapter is devoted to describing measures or interventions that shall be implemented so as to minimize the potential impacts identified in the preceding chapter. Many of the mitigation measures put forward are good engineering practices that shall be adhered to during all the project phases.

7.2 Enhancement Measures for Positive Social Impacts during the construction phase

7.2.1 Employment benefits to the community

Enhancement Measures

- The contractor shall be motivated to hire local individuals who are willing to work diligently but are currently unemployed, with an emphasis on utilizing up to 50% unskilled labor, as long as it remains feasible. This approach aims to maximize the benefits of the project for the local population.
- Employment opportunities should be offered fairly to individuals of all genders.
- The contractor is responsible for offering on-the-job training.
- Local communities shall be motivated to produce high-quality goods and services within shops located near the project site.

7.3 Mitigation Measures for Negative Environmental Impacts during the construction phase

7.3.1 Increased Noise Levels

- Wherever possible all construction equipment will comply with the requirements of Tanzania Bureau of Standards (TBS) on noise emission in the environment by equipment for use outdoors. All the equipment shall bear the TBS marking and the indication of the guaranteed sound power level and shall be accompanied by an TBS declaration of conformity;
- Construction works will not be permitted during the night; the operations on site shall be restricted to the period 07.00 -18.00 h;
- All vehicles and machinery used at the construction sites will be subject to regular maintenance. The vehicles and machines that are excessively noisy due to poor engine adjustment or damage noise control devices shall not be operated until corrective measures have been taken;
- The **construction traffic management plan** (TMP) will establish speed limits for construction vehicles and machinery at the construction site and the haulage roads used, and organize traffic so as to avoid as much as possible populated areas;
- MUHAS Staff and students will to the best of the project's efforts be kept informed on due time of the planned works and the noise levels and periods during which they will occur;
- The location of noisy equipment will be chosen as far as possible from sensitive receptors (hostels, offices). When near sensitive receptors, construction works will be scheduled and provided with the necessary resources so that the time of exposure is as short as possible;
- Good management practice will be used to distribute heavy noise equipment at the site so as to avoid the cumulative effects of noise;
- Workers shall be told to maintain tranquillity at site

7.3.2 Impacts to Air Quality

- Accesses and construction sites will be kept moist to reduce dust formation. Water sprays should be implemented all the time.
- In the dry season, hygroscopic additives will be used in water to increase its presence in the ground;
- Dust-generating activities will be slowed down in days of strong wind;
- Ground will be moistened during loading and unloading of aggregates in trucks;
- Truck dumpers carrying spoil or other dusty materials will be covered with tarps;
- Loaded trucks should be washed down prior to exit from the working site to ensure that loose material is not tracked onto the roads;
- Hoardings will be constructed around the construction sites to minimize the spread of dust;
- Vehicles and construction machinery will be required to be properly maintained and to comply with relevant emission standards;
- No unnecessary idling of construction vehicles at the construction sites will be allowed;
- Construction truck traffic will be optimized so as to get a minimum number of trucks carrying the maximum volume of materials. This will be addressed in the Construction Traffic Management Plan;
- The truck routes will be planned to avoid peak traffic hours or routes with heavy traffic.

7.3.3 Waste management problems during construction

The main mitigation measures during the construction phase to minimize wastes and to manage wastes would be contained in the **Waste Management Plan** which shall Contain among other things;

- All demolition waste/materials which can be reused at site as follows;
    - Salvaging easy-to-remove items like doors, hardware, appliances, iron sheets, and fixtures for reuse.
    - Wood cut-offs can be used for cripples, lintels, and blocking to eliminate the need to cut full length lumber. Scrap wood can be chipped on site and used as mulch or groundcover.
    - Brick, concrete and masonry can be recycled on site as fill, subbase material or driveway bedding.
- The demolition materials which cannot be reused/ recycled shall be collected as garbage at the transfer station and disposed off at the authorized area
- Brick, concrete and masonry can be recycled on site as fill, subbase material or driveway bedding
- Identification and classification of the different waste types that could be generated at the construction site (due to the materials used and waste generated in different sections) according to the Environmental Management Regulations (Hazardous Waste Control), 2009;
- Completely separate hazardous from non-hazardous waste streams at the construction site should be done;
- Immediate removal of waste material (concrete, iron, rocks, etc.) waste from site
- Collection and disposal of municipal solid alike waste generated in the construction site and camps (food, beverages, packaging waste such as paper, bottles, glass, etc., glass bottles) according to national legislation (separation of recycling waste materials from the waste stream that will be disposed at pugu dumpsite). Recyclable waste shall be given to an authorized recycling company;

- Signing a contract with the company for waste collection (registered by NEMC) and transportation for the collection and transport of the hazardous waste generated at the construction site to the authorised dumpsite;
- Ensuring that the contracts signed with the companies dealing with waste recycling and recovery will take delivery and acceptance of the waste streams is performed on a frequent basis so that the construction sites remain clean at any time;
- Reusing excavated soil and construction waste as much as possible;
- The separate collection of possible hazardous waste (motor oils, vehicle fuels) and sub-contracting an authorized collector and transporter to transport, recovery or finally dispose the hazardous waste;
- Establishing the Temporary Hazardous Waste Storage Points according the national legislation on handling, labelling, storage and management with hazardous waste;
- Establishing and following the hazardous waste management procedure;
    - Ensuring that the hazardous waste is packaged and labelled showing the R and S phrases (risk and safety statements of the hazardous waste) and it is temporary stored on safety storage facility equipped with adequate ventilation, fire resistant conditions especially if there are VOC emissions, mercury containing lamps, asbestos materials form demolition works (if any);
    - Ensuring that the access to these temporary hazardous waste storage points be only allowed for trained and equipped staff, and entrance prohibited for untrained workers and public;
- Promptly cleaning up All waste spills;
- Making available for inspections full records of the type of waste stream generated, quantity composition, origin, disposal destination and method of transport for all different waste streams;
- Contractor shall cooperate with Machinjioni Ward for smooth collection of solid wastes from the project area
- Undertaking the selective removal and storage of top soil;
- The removal of topsoil from the soil surface so as to serve for reuse in the restoration of disturbed areas not occupied by the proposed project;
- The reuse of topsoil to restore cuttings;
- Burning and burying of wastes shall be strictly prohibited
- All liquid wastes are to be disposed either to the sewer along the main roads or treated and disposed onsite

7.3.4 Occupational Safety and health risks

- The Proponent through the Contractor is committed to adherence to the occupational health and safety rules and regulations stipulated in Occupational Safety and Health Act, 2003.
- Appropriate working gear (such as nose, ear mask and clothing) and good construction site management shall be provided.
- During farm setup and construction phase the contractor shall ensure that the construction site is hygienically kept with adequate provision of facilities including waste disposal receptacles, sewage, firefighting and clean and safe water supply.
- A well-stocked First Aid kit (administered by first aider) shall be maintained at each farm area and construction site. The first aider shall also be responsible for primary treatment of ailments and other minor medical cases as well as providing some health education to the workforce.
- **Health and Safety Management Plan** shall be prepared by contractor and adhered during construction taking stock of HSMP in
- Qualified contractor preferably class 1 shall be used

7.3.5 Erosion of Cleared Areas

- There shall be no construction activities on the ground during rainy season
- The contractor shall deliberately re-cover exposed soils with pavements for smooth operations and unpaved area shall be covered with grass to overcome erosion by moving water in the area.
- The project site shall be fenced to prevent the effect of wind
- Proper drainage channels shall be provided to direct water to designated area.
- Proper grading to promote sheet flow and minimize flow concentration on unconsolidated soil.

7.3.6 Construction Vibration

- The Earth moving equipment shall be operated as far away from vibration sensitive areas as possible
- Earth moving and ground impacting operations shall be phased so as not to occur in the same time period because vibrations are additive.
- Night time activities shall be avoided as people feel more vibrations during night time hours.
- Dynamic compaction. A smaller falling weight will produce smaller vibrations;
- Select demolition methods not involving impact, where possible;
- Avoid vibratory rollers and packers near sensitive receptors.
- Monitoring of vibrations during the performance of critical work processes will be undertaken in buildings which are within a distance of 20-30 meters from the area where the these works take place.

7.3.7 Loss of Vegetation

- Wherever possible mature trees (especially baobab) shall be retained. If the tree is not in the direct construction area it shall be left there as long as it does not interfere with the construction activities.
- Close supervision of earthworks shall be observed in order to confine land clearance within the project area boundaries.
- Appropriate vegetation shall be planted as part of land scaping of the project

7.4 Mitigation Measures for Negative Social Impacts during construction phase

7.4.1 Community Health, Safety and Security

- Construction work shall commence on site only when the **Health & Safety (H&S) Plan** has been adequately developed by the Contractor and accepted by MUHAS;
- Emergency Preparedness and Response Plan will be developed prior to construction works starting;
- Traffic Management Plan will be developed for safe access to construction sites with minimum negative impact on the existing roads and in parallel to ensure community safety.
- MUHAS and the Contractor/s will openly and transparently inform MUHAS community of the affected places for planned activities that follow quarterly;
- The traffic flow through the site and within the public areas will be coordinated with the responsible traffic engineers;
- An Emergency Plan will be developed, including to cover for the management of cases of incidents during the transportation of raw materials/hazardous substances;

- Workers will receive training and guidance in how to avoid conflicts with the local community members and sign a labour code of conduct, in order to avoid creating conflicts with the local environment;
- Avoidance of unauthorized entry into contractor's facilities will be considered in their design and siting. The design, layout and site location of facilities should facilitate natural surveillance by police and the safeguards engaged by Contractor/s;
- Workers shall be provided with identification cards and shall put on uniforms all the time while at the campus
- Adequate selection of qualified security guards with appropriate training;
- All necessary permits will be obtained prior to the start of construction phase from responsible institutions responsible for urban planning, communal works, water protection, electricity and telecommunication.
- The Contractor/s will take into consideration all proposed preventive, mitigation and compensation measures included within the ESIA
- During construction, all building materials must be accommodated within the proposed site and not along the road to reduce inconvenience to road users

7.4.2 Gender based violence (GBV), equity, rape and sexual harassment

- Contractor and implementing agency to prepare and implement a **GBV Action plan** to include at minimum, in conformance with local laws and customs, equal opportunity for employment;
- Contractor to prepare and enforce a No Sexual Harassment Policy in accordance with national law where applicable
- All workers and Community and stakeholders will be educated on preventing and responding to sexual harassment and GBV ahead of any project related works.
- Workers shall be provided with identification cards and shall put on uniforms all the time while at the campus
- The community within the vicinity of the college where construction will take place will also be educated on gender-based violence and sexual offences such as sexual harassment, rape and defilement in the context of labour influx and the prevention and response measures.
- Strategies such as male involvement will be employed in preventing and responding to GBV and sexual harassment
- Partnerships will be established with relevant government agencies and NGOs to ensure survivors of GBV and sexual offences access survivor centred services such as medical care, psychosocial support, legal redress, safety, etc as and when necessary
- Impose zero tolerance on sexual harassment, all forms of gender-based violence and discrimination at all phases of the project

7.4.3 Gender inequity in employment

- MUHAS and contractor shall ensure that women get adequate employment opportunities during recruitment and job postings.
- The contractor shall carry out regular sensitisation and awareness campaigns for workers to promote gender equity in employment during the construction works and during operation
- During programme inception, contractor shall disclose standard operating procedures, guidelines and management systems established to ensure the promotion of gender equality and social inclusion
- Programme staff and trainers need to include male and female representatives from diverse ethnic groups. They will need to receive training on gender equality and social inclusion within the context of the programme.

- The contractor shall provide gender disaggregated data, separate bathing, changing, sanitation facilities for men and women

7.4.4 Impacts associated with Transmission of Vector Borne and Communicable Diseases

In order to minimise negative impacts from communicable diseases, a ***Worker Health and Safety Management Plan*** will be developed and will include the following mitigation measures:

- Develop and implement pre-employment screening measures for workers, which will cover applicable diseases. Individuals found to be suffering from communicable diseases will need to seek treatment prior to mobilization to site. However, no one should be denied employment because of their health status as long as they are able to undertake the required duties (following treatment if relevant).
- Workers should receive training as part of their induction and then at least every 6 months on potential high risk communicable and vector borne diseases, symptoms, preventative measures and transmission routes as well as treatment options. This will be particularly important for diseases with which non-local workers are unfamiliar and in case of any emerging disease outbreaks.
- A Worker Code of Conduct should be developed providing a site code of behaviour including worker-worker interactions, worker-community interactions and development of personal relationships with members of the Community. This would apply to all Project workers and visitors to the construction sites within MUHAS.
- In the event of a new disease, increased transmission or outbreak compared to the baseline, the Project should interact with local health care facilities and workers to ensure there is an appropriate response in place. This involves community education and awareness, training of health care workers etc
- For all contractors and sub-contractors, at worker sites the following will be implemented at a minimum in order to minimize disease transmission:
    - Providing workers with appropriate sanitary facilities which are appropriately designed to prevent contamination.
    - Developing a robust waste handling system to avoid the creation of new vector breeding grounds or attracting rodents to the area.
    - Implementing measures to reduce the presence of standing water onsite through environmental controls and source reduction to avoid the creation of new breeding grounds.
    - Ensuring the construction site is kept clean and free from any accumulation of wastes as well as supplied with clean potable water.
    - Ensuring appropriate food preparation and monitoring measures are in place.
    - Monitoring to ensure that all standards are being met by the relevant departments.
- The workforce will be provided with access to treatment at health facilities near the site. Access to health care should include direct employees, sub-contractors and employees of the supply chain working on based on site.
- The Project should prepare and implement a **Vector Borne Disease Management Plan** focusing on malaria, which includes vector control, avoidance, diagnosis, treatment and training.
- The Project should implement TB prevention measures including testing and referral for treatment for all personnel working on the Project. This approach should be explained clearly to the workforce along with making it clear that there are no consequences for their employment.
- The Project should monitor the emergence of major pandemics through World Health Organization (WHO) alerts and in the event of a pandemic review mobilization and

demobilization of ex-patriate Project personnel and/ or implement appropriate control measures and Emergency Response Plans.

7.4.5 Impacts associated with Transmission of Sexually Transmitted Infections

The following mitigation measures are recommended:

- Development of a Code of Conduct / rules for worker-Community interaction and on-site behaviour.
- The Project should develop an **STD Management Plan** designed to minimize the spread of HIV infection and other STDs. The plan should be prepared with the assistance of a specialist in sexually transmitted diseases. A typical plan would include, among other things, the following measures:
    - An HIV/AIDS training course and on-going education on transmission of HIV/AIDS and STDs, to employees, through workshops, posters and informal information sessions;
    - Encouragement of employees to determine their HIV status;
    - Supply of condoms/ femidoms at the construction site(s) and Development of a comprehensive Construction Site Management Plan, including rules for on-site behaviour, entrance and exit policies and prohibition of sex workers on site.
    - As part of STD Management Plan, information should be provided to workers on STD prevalence rates in Tanzania as well as the expectations of local communities if a women is made pregnant by a worker (e.g., marriage, financial implications etc.).
    - Workers should have access to confidential health care for the treatment of STDs through medical facilities/ health care at Project site.
    - The Project should partner with other NGOs and CBOs to support the provision of information, education and communication campaigns around safe sexual practices and transmission of STDs.
- **A Grievance Mechanism** should be developed, whereby affected people can raise issues and concerns associated with social vices, prostitution and the behaviour of workers and drivers.

7.4.6 Impacts associated with Spreading of Covid 19 Pandemic Disease

- The Contractors will develop SOPs for managing the spread of Covid-19 during project execution and submit them for the approval of the Supervision Engineer and the Client before mobilizing to site. The SOPs shall be in line with the World Bank guidance on COVID-19, Ministry of Health Directives and site-specific project conditions;
- Mandatory provision and use of appropriate Personal Protective Equipment (PPE) shall be required for all project personnel including workers and visitors;
- Avoid concentration of more than 15 workers at one location. Where there are two or more people gathered, maintain social distancing of at least 2 meters;
- All workers and visitors accessing worksites every day or attending meetings shall be subjected to rapid Covid-19 screening which may include temperature check and other vital signs;
- Install handwashing facilities with adequate running water and soap, or sanitizing facilities at entrance to work sites including meeting venues and ensure they are used;
- Ensure routine sanitization of shared social facilities and other communal places routinely including wiping of workstations, door knobs, hand rails etc;

7.4.7 Impacts on Labour and Working Conditions

In order to minimise negative impacts from labour and working conditions, the following mitigation measures should be applied:

Employment and Procurement

The Project shall develop a **Human Resources Policy, Labour and Employment Plan** as well as specific recruitment policies and procedures, specifically:

- The Project should priorities the recruitment of workers and procurement of goods and services from within the Dar es Salaam then to national companies. This will not apply to the provision of highly technical equipment. The Project should develop a fair and transparent employment and procurement policy and processes to avoid any potential for nepotism or favouritism. The policy should be shared with the Ward and Mtaa Leaders.
- A **Local Recruitment Procedure** shall be developed by Contractor which outlines the percentage of skilled, semi-skilled and unskilled employment that should be sourced from the Different locations in Dar es Salaam. For unskilled workers this target should be set as high as possible ie at least 90%. The procedure will also include requirements for recruitment of vulnerable groups (women and disabled workers) to ensure equal opportunities, involvement of ward and mtaa leaders in ensuring local employment is achieved, no hiring of workers at the gate etc. The requirements of this procedure will form part of the Conditions of Contract with subcontractors.
- Contractor will notify Municipal Council, Ward and Mtaa leaders of the specific jobs and the skills required for the Project, prior to the commencement of construction phase. This will give the local population time to prepare and apply for the available job opportunities on time. This is mainly applicable to unskilled and semi-skilled workers who will be locally sourced.
- Employment and procurement opportunities will be publicly advertised in appropriate newspapers, Municipal Offices and Ward and Mtaa offices and in all relevant languages in a timely manner, to allow fair competition.
- There will be no requirement for applicants to make payments for applying for, or securing, employment on the proposed Project.
- The Project will ensure that recruitment procedures are transparent and monitored to ensure that those recruited present their actual experience, geographical location, health status, and age and that requirements for local employment are being met.
- The Project will develop and implement a program of up-skilling, training and development for workers to assist them in accessing opportunities associated with the Project and in finding work following completion of their contracts.
- The Project will provide training on health and safety and quality standards required by the Project for provision of goods and services to the Project to ensure that local businesses have the opportunity to benefit.
- The Project will ensure that contracts are unbundled to allow a number of small businesses to provide goods and services rather than the supply being monopolized by one larger sub-contractor.
- The Project will develop a Workers Grievance Mechanism.

Management System

The Project should develop a **Human Resources Policy, Labour and Employment Plan** These requirements should also be passed on to any subcontractors. Key issues with the Human Resource (HR) management will include, but not be limited to the following:

- Provision of clear and understandable information regarding rights under national labour and employment law, and any applicable collective agreements, including those related to hours of work, wages, overtime, compensation, etc.
- Provision of reasonable working conditions and terms of employment.
- Provision of employment, compensation/remuneration and working conditions, including working hours, based on equal opportunity and fair treatment, avoiding discrimination on any aspects.
- Provision of adequate welfare facilities on site.
- Implementation of a grievance mechanism for the Project workers.
- Adoption and implementation of a sexual harassment policy.
- Adoption of open attitude towards freedom of association.

The Project will develop a H&S programme which will include risk assessments (such as working at heights, confined space machine guarding), work permit systems and a H&S management system, in line with industry best practice, including worker performance safety tracking (safety observations) to assure worker safety. All workers will receive induction and continuous training regarding this system

Sub-Contractor and Supplier Management

- Subcontractor and Supplier Contracts should make explicit reference to the need to abide by Tanzanian law, international standards (in particular World Bank Occupational Health and Safety Guidelines) and the ratified ILO conventions and the Project Proponent's policies relating to health and safety, labour and welfare standards.
- As part of the subcontractor and supplier selection process, Contractor should take into consideration performance with regard to worker management, worker rights, health and safety as outlined in Tanzanian law, international standards and the Proponent's policies.
- Contractor should provide support to sub-contractors and suppliers to ensure that labour and working conditions are in line with Tanzanian legislation and World Bank Occupational Health and Safety Guidelines through gap analysis, awareness raising and information provision, as necessary.
- Regular checks / audits by Contractor should be undertaken to ensure the relevant labour laws are adhered to at all times.

Workers' Rights

- Contractor should ensure no employee or job applicant is discriminated against on the basis of his or her gender, marital status, nationality, ethnicity, age, religion or sexual orientation.
- All workers (including those of subcontractors) should, as part of their induction, receive training on worker rights in line with Tanzanian legislation to ensure that positive benefits around understanding labour rights are enhanced. This process should be formalized within the Code of Conduct that would be provided by Contractor.
- All workers (including those of subcontractors and suppliers) should have contracts, which clearly state the terms and conditions of their employment and their legal rights. These contracts should be aligned with Tanzanian labour law, the ILO core conventions and the requirements of World Bank Occupational Health and Safety Guidelines. Contracts should be verbally explained to all workers where this is necessary to ensure that workers understand their rights.

- The Project should put in place a worker grievance mechanism that should be accessible to all workers, whether permanent or temporary, directly or indirectly employed. The worker grievance mechanism should be open to Contractor and the subcontractor workforce in the event that their grievance is not adequately resolved by their direct employer. Contractor would then have the authority to act to resolve this grievance.
- All workers (including those of Contractor and the subcontractor) should have access to training on communicable diseases and STDs and community interactions in general.
- Contractor should undertake surveillance and assurance that no children or forced labour is employed directly, and to the extent possible by third parties related to the Project and primary suppliers where such risk may exist.

7.5 Mitigation Measures for Negative Environmental Impacts during demobilization phase

7.5.1 Increased Noise Levels

- Vehicles carrying materials/equipment/wastes shall be restricted to work during day time only.
- The impacts of noise will further be minimized by proper choice of plant and machinery (i.e. fitted with noise silencers or reducers)
- Machine operators in various sections with significant noise levels shall be provided with ear plugs.
- The workforce shall be educated on the issue of maintaining tranquillity at site

7.5.2 Impact to Air Quality (Dust)

- Water sprinkling shall be applied to open earth areas to reduce dust emission.
- Trucks transporting debris materials/wastes shall be covered if the load is dry and prone to dust emissions.
- The site shall be fenced; this will prevent the dust at the ground to be picked up by the wind.

7.5.3 Waste Generation and Management

- The contractor shall have adequate facilities for handling the construction waste. A large Skip Bucket shall be provided at the site.
- The skip bucket shall be collected by a contracted waste collector/municipal truck once a week at the authorized municipal designated area
- Onsite dumping, burying and burning of solid waste shall not be permitted
- Liquid waste from toilet and bathrooms shall be directed to the septic tank cum soak away system at site.

7.6 Mitigation Measures for Environmental Impacts during Operation Phase

7.6.1 Health and safety risks due to fire hazards

- Sufficient portable fire extinguishers will be strategically positioned.
- Smoking will only be allowed in specified zones.
- The architectural design of the structures will strictly adhere to Fire Safety Standards, including the inclusion of exit staircases for multi-floor buildings.
- Fire detection systems and alarms will be installed in educational buildings.
- Firefighting training will be offered to the Community.
- Regular fire drill exercises will be conducted, with a minimum of once annually.

- Drawings (including electrical) shall be submitted to TANESCO and fire department for review and approval before operation phase

7.6.2 Increased wastes during operations

- MUHAS will engage a private cleaning company to perform daily maintenance of the structures and surrounding areas.
- All hazardous waste, including electronic waste, will be gathered and handed over to a NEMC-approved hazardous waste collector for proper disposal or recycling.
- Feasible opportunities for recycling or reusing solid waste will be explored and pursued.
- Ordinary household waste, including paper, food scraps, and yard debris, will be collected at an on-site transfer station before being transported to an authorized landfill at least twice a week.

7.6.3 Increased surface water run-off

- Roofs of all buildings shall be installed with gutters and downward pipes to direct rain water to the designated storm water drains within the site
- The paved area surrounding the buildings shall have a slope towards storm water channels that direct storm water to the large storm water channel along Kawawa road.
- Designs shall explore option for rain water harvesting and if found feasible it shall be implemented.

7.7 Mitigation Measures for social Impacts during Operation Phase

7.7.1 Increased pressure on social services and utilities

- Alternative measures like use of solar power, water recycling shall be explored and implemented if found feasible.
- The borehole at site shall be used to augment water supply be used for project
- Use of energy savers bulbs shall be given high priority
- Use of air conditioning shall be kept to a minimum and maintenance of the cool indoor environment using natural ventilation system shall be strongly explored during the design process.
- The project shall have its own facilities for solid waste collection
- All project buildings shall use onsite sanitation system to avoid putting pressure on sewer network

CHAPTER EIGHT
8.0 ENVIRONMENTAL AND SOCIAL IMPACT MANAGEMENT PLAN

8.1 Impact Management plan

Below are the provided plans for the implementation of mitigation measures for the proposed project. These plans outline institutional responsibilities, timelines for action, and estimated costs. It's important to note that the proposed costs are only approximate, and the developer will determine the actual costs and include them in the overall project budget if the suggested changes are implemented. According to the Environmental Management Act (URT 2004), the National Environmental Management Council (NEMC) is responsible for ensuring compliance with all authorized conditions. The specific measures can be found in Table 8.1. The developer is fully committed to implementing the mitigation measures recommended by the Environmental and Social Impact Management Plan (ESMP).

8.2 Implementation of the Management Plan

The contractor will receive and be responsible for the implementation of environmental and social mitigation measures, as outlined in the detailed engineering design, during the construction period. It is expected that the contractor will familiarize themselves with the contents of the Environmental and Social Management Plan (ESMP) related to the project. The implementation of the ESMP during the construction period will be closely monitored by a supervising firm on behalf of the management team. Once the construction phase is complete, the building management and the real estate firm in charge of managing the block will continue to implement the ESMP during the operation phase.

8.3 Environmental and Social Cost

The principal environmental and social cost includes the cost for implementing the mitigation measures proposed. These costs are indicated in Table 8.1. The developer shall cover all the costs proposed in the ESMP.

Table 8.1: Environmental and Social Impact Management Plan for the Proposed Project at MUHAS

Identified Impact	Mitigation Measure	Responsible Institution	Relative Annual cost (TZS)
Management of Environmental Impacts During Construction Phase (2.5 Years)			
Increased Noise Levels	○ Wherever possible all construction equipment will comply with the requirements of Tanzania Bureau of Standards (TBS) on noise emission in the environment by equipment for use outdoors. All the equipment shall bear the TBS marking and the indication of the guaranteed sound power level and shall be accompanied by an TBS declaration of conformity; ○ Construction works will not be permitted during the night; the operations on site shall be restricted to the period 07.00 -18.00 h; ○ All vehicles and machinery used at the construction sites will be subject to regular maintenance. The vehicles and machines that are excessively noisy due to poor engine adjustment or damage noise control devices shall not be operated until corrective measures have been taken; ○ The construction traffic plan will establish speed limits for construction vehicles and machinery at the construction site and the haulage roads used, and organize traffic so as to avoid as much as possible populated areas; ○ Residents near the construction will to the best of the project's efforts be kept informed on due time of the planned works and the noise levels and periods during which they will occur; ○ The location of noisy equipment will be chosen as far as possible from sensitive receptors. When near sensitive receptors, construction works will be scheduled and provided with the necessary resources so that the time of exposure is as short as possible; ○ Good management practice will be used to distribute heavy noise equipment at the site so as to avoid the cumulative effects of noise; ○ Construction activities that generate high levels of noise, such as drilling or blasting, should be scheduled during periods when the hospital experiences lower occupancy or when it is less sensitive to noise, such as weekends or non-peak hours ○ Workers shall be told to maintain tranquillity at site	Contractor/ Proponent	4,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Relative Annual cost (TZS)
	○ Training construction workers on the importance of minimizing noise and adhering to noise control measures is essential. Encourage workers to be sensitive to noise levels and to take necessary precautions to reduce disturbances to nearby facilities, including the hospital		
Impacts to Air Quality	○ Accesses and construction sites will be kept moist to reduce dust formation. Water sprays should be implemented all the time. ○ Dust-generating activities will be slowed down in days of strong wind; ○ Ground will be moistened during loading and unloading of aggregates in trucks; ○ Truck dumpers carrying spoil or other dusty materials will be covered with tarps; ○ Loaded trucks should be washed down prior to exit from the working site to ensure that loose material is not tracked onto the roads; ○ Hoardings will be constructed around the construction sites to minimize the spread of dust; ○ Vehicles and construction machinery will be required to be properly maintained and to comply with relevant emission standards; ○ No unnecessary idling of construction vehicles at the construction sites will be allowed; ○ Construction truck traffic will be optimized so as to get a minimum number of trucks carrying the maximum volume of materials. This will be addressed in the Construction Traffic Management Plan; ○ The truck routes will be planned to avoid peak traffic hours or routes with heavy traffic.	Contractor/ Proponent	4,000,000
Waste management problems during construction	○ The main mitigation measures during the construction phase to minimize wastes and to manage wastes would be contained in the Waste Management Plan which shall Contain among other things; ○ Identification and classification of the different waste types that could be generated at the construction site (due to the materials used and waste generated in different sections) according to the Environmental Management Regulations (Hazardous Waste Control), 2009; ○ Completely separate hazardous from non-hazardous waste streams at the construction site should be done;	Contractor/ Proponent/ Kigoma Ujiji Municipal Council	12,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Relative Annual cost (TZS)
	○ Immediate removal of waste material (concrete, iron, rocks, etc.) waste from site ○ Collection and disposal of municipal solid alike waste generated in the construction site and camps (food, beverages, packaging waste such as paper, bottles, glass, etc., glass bottles) according to national legislation (separation of recycling waste materials from the waste stream that will be disposed of in the solid waste City dumpsite). Recyclable waste shall be given to an authorized recycling company; ○ Signing a contract with the company for waste collection (registered by NEMC) and transportation for the collection and transport of the hazardous waste generated at the construction site to the authorised dumpsite; ○ Ensuring that the contracts signed with the companies dealing with waste recycling and recovery will take delivery and acceptance of the waste streams is performed on a frequent basis so that the construction sites remain clean at any time; ○ Reusing excavated soil and construction waste as much as possible; ○ The separate collection of possible hazardous waste (motor oils, vehicle fuels) and sub-contracting an authorized collector and transporter to transport, recovery or finally dispose the hazardous waste; ○ Establishing the Temporary Hazardous Waste Storage Points according the national legislation on handling, labelling, storage and management with hazardous waste; ○ Establishing and following the hazardous waste management procedure; ○ Ensuring that the hazardous waste is packaged and labelled showing the R and S phrases (risk and safety statements of the hazardous waste) and it is temporary stored on safety storage facility equipped with adequate ventilation, fire resistant conditions especially if there are VOC emissions, mercury containing lamps, asbestos materials form demolition works (if any); ○ Ensuring that the access to these temporary hazardous waste storage points be only allowed for trained and equipped staff, and entrance prohibited for untrained workers and public;		

Identified Impact	Mitigation Measure	Responsible Institution	Relative Annual cost (TZS)
	○ Contractor shall cooperate with Machinjioni Ward Offices for smooth collection of solid wastes from the project area ○ Promptly cleaning up All waste spills; ○ Making available for inspections full records of the type of waste stream generated, quantity composition, origin, disposal destination and method of transport for all different waste streams; ○ Undertaking the selective removal and storage of top soil; ○ The removal of topsoil from the soil surface so as to serve for reuse in the restoration of disturbed areas not occupied by the proposed project; ○ The reuse of topsoil to restore cuttings; ○ Burning and burying of wastes shall be strictly prohibited ○ All liquid wastes are to be disposed either to the sewer along the main roads or treated and disposed onsite		
Occupational Safety and Health risks	○ The Proponent through the Contractor is committed to adherence to the occupational health and safety rules and regulations stipulated in Occupational Safety and Health Act, 2003. ○ Appropriate working gear (such as nose, ear mask and clothing) and good construction site management shall be provided. ○ During construction phase the contractor shall ensure that the construction site is hygienically kept with adequate provision of facilities including waste disposal receptacles, sewage, firefighting and clean and safe water supply. ○ A well-stocked First Aid kit (administered by first aider) shall be maintained at each farm area and construction site. The first aider shall also be responsible for primary treatment of ailments and other minor medical cases as well as providing some health education to the workforce. ○ **Health and Safety Management Plan** shall be prepared by contractor and adhered during construction taking stock of HSMP in **appendix XI.** ○ Qualified contractor preferably class 1 shall be used	Contractor/ Proponent/ OSHA	12,000,000
Erosion of Cleared Areas	○ There shall be no construction activities on the ground during rainy season	Contractor/ Proponent	2,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Relative Annual cost (TZS)
	○ The contractor shall deliberately re-cover exposed soils with pavements for smooth operations and unpaved area shall be covered with grass to overcome erosion by moving water in the area. ○ The project site shall be fenced to prevent the effect of wind ○ Proper drainage channels shall be provided to direct water to designated area. ○ Proper grading to promote sheet flow and minimize flow concentration on unconsolidated soil.		
Construction Vibration	○ The Earth moving equipment shall be operated as far away from vibration sensitive areas as possible ○ Earth moving and ground impacting operations shall be phased so as not to occur in the same time period because vibrations are additive. ○ Night time activities shall be avoided as people feel more vibrations during night time hours. ○ Dynamic compaction. A smaller falling weight will produce smaller vibrations; ○ Select demolition methods not involving impact, where possible; ○ Avoid vibratory rollers and packers near sensitive receptors. ○ Monitoring of vibrations during the performance of critical work processes will be undertaken in buildings which are within a distance of 20-30 meters from the area where these works take place.	Proponent	2,000,000
Loss of Vegetation	○ Wherever possible mature trees (especially baobab) shall be retained. If the tree is not in the direct construction area it shall be left there as long as it does not interfere with the construction activities. ○ Close supervision of earthworks shall be observed in order to confine land clearance within the project area boundaries. ○ Appropriate vegetation shall be planted as part of land scaping of the project	Proponent /Contractor	10,000,000
Management of Social Impacts During Construction Phase (1 Year)			
Community Health, Safety and Security Risk	○ Construction work shall commence on site only when the **Health & Safety (H&S) Plan** has been adequately developed by the Contractor and accepted by MUHAS; ○ **Emergency Preparedness and Response Plan** will be developed prior to construction works starting;	Contractor/ Proponent	12,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Relative Annual cost (TZS)
	○ **Traffic Management Plan** will be developed for safe access to construction sites with minimum negative impact on the existing roads and in parallel to ensure community safety. ○ MUHAS and the Contractor/s will openly and transparently inform the surrounding community of the affected places for planned activities that follow quarterly; ○ The traffic flow through the site and within the public areas will be coordinated with the responsible traffic engineers; ○ An **Emergency Plan** will be developed, including to cover for the management of cases of incidents during the transportation of raw materials/hazardous substances; ○ Workers will receive training and guidance in how to avoid conflicts with the local community members and sign a labour code of conduct, in order to avoid creating conflicts with the local environment; ○ Avoidance of unauthorized entry into contractor's facilities will be considered in their design and siting. The design, layout and site location of facilities should facilitate natural surveillance by police and the safeguards engaged by Contractor/s; ○ Adequate selection of qualified security guards with appropriate training; ○ All necessary permits will be obtained prior to the start of construction phase from responsible institutions responsible for urban planning, communal works, water protection, electricity and telecommunication. ○ Workers shall be provided with identification cards so as to identify and distinguish them while at the site ○ The Contractor/s will take into consideration all proposed preventive, mitigation and compensation measures included within the ESIA. ○ During construction, all building materials must be accommodated within the proposed site and not along the road to reduce inconvenience to road users		
Gender based violence (GBV), equity, and sexual harassment	○ Contractor and implementing agency to prepare and implement a **GBV Action plan** to include at minimum, in conformance with local laws and customs, The GBV	Proponent/ Contractor	20,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Relative Annual cost (TZS)
	Action Plan will be survival centered and identify the actors and steps to be followed in case of GBV o Contractor to prepare and enforce a No Sexual Harassment Policy in accordance with national law where applicable o All workers and surrounding community and stakeholders will be educated on preventing and responding to sexual harassment and GBV ahead of any project related works. o The community within the site where construction will take place will also be educated on gender-based violence and sexual offenses such as sexual harassment, rape and defilement in the context of labour influx and the prevention and response measures. o Strategies such as male involvement will be employed in preventing and responding to GBV and sexual harassment o Partnerships will be established with relevant government agencies and NGOs to ensure survivors of GBV and sexual offenses access survivor centred services such as medical care, psychosocial support, legal redress, safety, etc as and when necessary o Impose zero tolerance on sexual harassment, all forms of gender-based violence and discrimination at all phases of the project		
Gender inequity in employment	o MUHAS and contractor shall ensure that women get adequate employment opportunities during recruitment and job postings. o The contractor shall carry out regular sensitisation and awareness campaigns for workers to promote gender equity in employment during the construction works and during operation o During programme inception, contractor shall disclose standard operating procedures, guidelines and management systems established to ensure the promotion of gender equality and social inclusion o Programme staff and trainers need to include male and female representatives from diverse ethnic groups. They will need to receive training on gender equality and social inclusion within the context of the programme.	Proponent	5,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Relative Annual cost (TZS)
	○ The contractor shall provide gender disaggregated data, separate bathing, changing, sanitation facilities for men and women		
Impacts associated with Transmission of Vector Borne and Communicable Diseases	In order to minimise negative impacts from communicable diseases, a Worker Health and Safety Management Plan will be developed and will include the following mitigation measures: ○ Develop and implement pre-employment screening measures for workers, which will cover applicable diseases. Individuals found to be suffering from communicable diseases will need to seek treatment prior to mobilization to site. However, no one should be denied employment because of their health status as long as they are able to undertake the required duties (following treatment if relevant). ○ Workers should receive training as part of their induction and then at least every 6 months on potential high risk communicable and vector borne diseases, symptoms, preventative measures and transmission routes as well as treatment options. This will be particularly important for diseases with which non-local workers are unfamiliar and in case of any emerging disease outbreaks. ○ A Worker Code of Conduct should be developed providing a site code of behaviour including worker-worker interactions, worker-community interactions and development of personal relationships with members of the Community. This would apply to all Project workers and visitors to the construction sites within MUHAS. ○ In the event of a new disease, increased transmission or outbreak compared to the baseline, the Project should interact with local health care facilities and workers to ensure there is an appropriate response in place. This involves community education and awareness, training of health care workers etc ○ For all contractors and sub-contractors, at worker sites the following will be implemented at a minimum in order to minimize disease transmission: • Providing workers with appropriate sanitary facilities which are appropriately designed to prevent contamination. • Developing a robust waste handling system to avoid the creation of new vector breeding grounds or attracting rodents to the area.	Proponent/ Contractor	12,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Relative Annual cost (TZS)
	• Implementing measures to reduce the presence of standing water onsite through environmental controls and source reduction to avoid the creation of new breeding grounds. • Ensuring the construction site is kept clean and free from any accumulation of wastes as well as supplied with clean potable water. • Ensuring appropriate food preparation and monitoring measures are in place. • Monitoring to ensure that all standards are being met by the relevant departments. • The workforce will be provided with access to treatment at health facilities near the site. Access to health care should include direct employees, sub-contractors and employees of the supply chain working on based on site. ○ The Project should prepare and implement a Vector Borne Disease Management Plan focusing on malaria, which includes vector control, avoidance, diagnosis, treatment and training. ○ The Project should implement TB prevention measures including testing and referral for treatment for all personnel working on the Project. This approach should be explained clearly to the workforce along with making it clear that there are no consequences for their employment. ○ The Project should monitor the emergence of major pandemics through World Health Organization (WHO) alerts and in the event of a pandemic review mobilization and demobilization of ex-patriate Project personnel and/ or implement appropriate control measures and Emergency Response Plans.		
Impacts associated with Transmission of Sexually Transmitted Infections	The following mitigation measures are recommended: ○ Development of a Code of Conduct / rules for worker- community interaction and on-site behaviour. ○ The Project should develop an **STD Management Plan** designed to minimize the spread of HIV infection and other STDs. The plan should be prepared with the assistance of a specialist in sexually transmitted diseases. A typical plan would include, among other things, the following measures:	Proponent/ Contractor	40,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Relative Annual cost (TZS)
	• An HIV/AIDS training course and on-going education on transmission of HIV/AIDS and STDs, to employees, through workshops, posters and informal information sessions; • Encouragement of employees to determine their HIV status; • Supply of condoms/ femidoms at the construction site(s) and Development of a comprehensive Construction Site Management Plan, including rules for on-site behaviour, entrance and exit policies and prohibition of sex workers on site. • As part of STD Management Plan, information should be provided to workers on STD prevalence rates in Tanzania as well as the expectations of local communities if a woman is made pregnant by a worker (e.g., marriage, financial implications etc.). • Workers should have access to confidential health care for the treatment of STDs through medical facilities/ health care at Project site. • The Project should partner with other NGOs and CBOs to support the provision of information, education and communication campaigns around safe sexual practices and transmission of STDs. ○ A **Grievance Mechanism** should be developed, whereby affected people can raise issues and concerns associated with social vices, prostitution and the behaviour of workers and drivers.		
Impacts associated with Spreading of Covid 19 Pandemic	○ The Contractors will develop **Standard Operation Procedures** (SOPs) for managing the spread of Covid-19 during project execution and submit them for the approval of the Supervision Engineer and the Client before mobilizing to site. The SOPs shall be in line with the World Bank guidance on COVID-19, Ministry of Health Directives and site-specific project conditions; ○ Mandatory provision and use of appropriate Personal Protective Equipment (PPE) shall be required for all project personnel including workers and visitors; ○ Avoid concentration of more than 15 workers at one location. Where there are two or more people gathered, maintain social distancing of at least 2 meters;	Proponent/ Contractor	15,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Relative Annual cost (TZS)
	○ All workers and visitors accessing worksites every day or attending meetings shall be subjected to rapid Covid-19 screening which may include temperature check and other vital signs; ○ Install handwashing facilities with adequate running water and soap, or sanitizing facilities at entrance to work sites including meeting venues and ensure they are used; ○ Ensure routine sanitization of shared social facilities and other communal places routinely including wiping of workstations, door knobs, hand rails etc;		
Impacts on Labour and Working Conditions	In order to minimize negative impacts from labor and working conditions, the following mitigation measures should be applied: *Employment and Procurement* The Project shall develop a **Human Resources Policy, Labour and Employment Plan** as well as specific recruitment policies and procedures, specifically: ○ The Project should priorities the recruitment of workers and procurement of goods and services from within the Dar es Salaam then to national companies. This will not apply to the provision of highly technical equipment. The Project should develop a fair and transparent employment and procurement policy and processes to avoid any potential for nepotism or favouritism. The policy should be shared with the Ward and Mtaa Leaders. ○ A Local Recruitment Procedure shall be developed by Contractor which outlines the percentage of skilled, semi-skilled and unskilled employment that should be sourced from the Different locations in Dar es Salaam. For unskilled workers this target should be set as high as possible ie at least 90%. The procedure will also include requirements for recruitment of vulnerable groups (women and disabled workers) to ensure equal opportunities, involvement of ward and mtaa leaders in ensuring local employment is achieved, no hiring of workers at the gate etc. The requirements of this procedure will form part of the Conditions of Contract with subcontractors.	Proponent/ Contractor	15,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Relative Annual cost (TZS)
	○ Contractor will notify Municipal Council, Ward and Mtaa leaders of the specific jobs and the skills required for the Project, prior to the commencement of construction phase. This will give the local population time to prepare and apply for the available job opportunities on time. This is mainly applicable to unskilled and semi-skilled workers who will be locally sourced. ○ Employment and procurement opportunities will be publicly advertised in appropriate newspapers, Municipal Offices and Ward and Mtaa offices and in all relevant languages in a timely manner, to allow fair competition. ○ There will be no requirement for applicants to make payments for applying for, or securing, employment on the proposed Project. ○ The Project will ensure that recruitment procedures are transparent and monitored to ensure that those recruited present their actual experience, geographical location, health status, and age and that requirements for local employment are being met. ○ The Project will develop and implement a program of up-skilling, training and development for workers to assist them in accessing opportunities associated with the Project and in finding work following completion of their contracts. ○ The Project will provide training on health and safety and quality standards required by the Project for provision of goods and services to the Project to ensure that local businesses have the opportunity to benefit. ○ The Project will ensure that contracts are unbundled to allow a number of small businesses to provide goods and services rather than the supply being monopolized by one larger sub-contractor. ○ The Project will develop a Workers Grievance Mechanism. *Management System* The Project should develop a **Human Resources Policy, Labour and Employment Plan** These requirements should also be passed on to any subcontractors. Key issues with the Human Resource (HR) management will include, but not be limited to the following:		

Identified Impact	Mitigation Measure	Responsible Institution	Relative Annual cost (TZS)
	○ Provision of clear and understandable information regarding rights under national labour and employment law, and any applicable collective agreements, including those related to hours of work, wages, overtime, compensation, etc. ○ Provision of reasonable working conditions and terms of employment. ○ Provision of employment, compensation/remuneration and working conditions, including working hours, based on equal opportunity and fair treatment, avoiding discrimination on any aspects. ○ Provision of adequate welfare facilities on site. ○ Implementation of a grievance mechanism for the Project workers. ○ Adoption and implementation of a sexual harassment policy. ○ Adoption of open attitude towards freedom of association. The Project will develop a H&S programme which will include risk assessments (such as working at heights, confined space machine guarding), work permit systems and a H&S management system, in line with industry best practice, including worker performance safety tracking (safety observations) to assure worker safety. All workers will receive induction and continuous training regarding this system *Sub-Contractor and Supplier Management* ○ Subcontractor and Supplier Contracts should make explicit reference to the need to abide by Tanzanian law, international standards (in particular World Bank Occupational Health and Safety Guidelines) and the ratified ILO conventions and the Project Proponent's policies relating to health and safety, labour and welfare standards. ○ As part of the subcontractor and supplier selection process, Contractor should take into consideration performance with regard to worker management, worker rights, health and safety as outlined in Tanzanian law, international standards and the Proponent's policies. ○ Contractor should provide support to sub-contractors and suppliers to ensure that labour and working conditions are in line with Tanzanian legislation and World		

Identified Impact	Mitigation Measure	Responsible Institution	Relative Annual cost (TZS)
	Bank Occupational Health and Safety Guidelines through gap analysis, awareness raising and information provision, as necessary. o Regular checks / audits by Contractor should be undertaken to ensure the relevant labour laws are adhered to at all times. *Workers' Rights* o Contractor should ensure no employee or job applicant is discriminated against on the basis of his or her gender, marital status, nationality, ethnicity, age, religion or sexual orientation. o All workers (including those of subcontractors) should, as part of their induction, receive training on worker rights in line with Tanzanian legislation to ensure that positive benefits around understanding labour rights are enhanced. This process should be formalized within the Code of Conduct that would be provided by Contractor. o All workers (including those of subcontractors and suppliers) should have contracts, which clearly state the terms and conditions of their employment and their legal rights. These contracts should be aligned with Tanzanian labour law, the ILO core conventions and the requirements of World Bank Occupational Health and Safety Guidelines. Contracts should be verbally explained to all workers where this is necessary to ensure that workers understand their rights. o The Project should put in place a worker grievance mechanism that should be accessible to all workers, whether permanent or temporary, directly or indirectly employed. The worker grievance mechanism should be open to Contractor and the subcontractor workforce in the event that their grievance is not adequately resolved by their direct employer. Contractor would then have the authority to act to resolve this grievance. o All workers (including those of Contractor and the subcontractor) should have access to training on communicable diseases and STDs and community interactions in general.		

Identified Impact	Mitigation Measure	Responsible Institution	Relative Annual cost (TZS)
	○ Contractor should undertake surveillance and assurance that no children or forced labour is employed directly, and to the extent possible by third parties related to the Project and primary suppliers where such risk may exist.		
Management of Environmental Impacts During Mobilization Phase (3 Months)			
Increased Noise Levels	○ Vehicles carrying materials/equipment/wastes shall be restricted to work during day time only. ○ The impacts of noise will further be minimized by proper choice of plant and machinery (i.e., fitted with noise silencers or reducers) ○ Machine operators in various sections with significant noise levels shall be provided with ear plugs. ○ The workforce shall be educated on the issue of maintaining tranquillity at the site	Proponent	1,000,000
Impact to Air Quality (Dust)	○ Water sprinkling shall be applied to open earth construction areas to reduce dust emission. ○ Trucks transporting debris materials/wastes shall be covered if the load is dry and prone to dust emissions. ○ The site shall be fenced; this will prevent the dust at the ground to be picked up by the wind.	Proponent	1,000,000
Waste Generation and Management	○ The contractor shall have adequate facilities for handling the construction waste. A large Skip Bucket shall be provided at the site. ○ The skip bucket shall be collected by a contracted waste collector/municipal truck once a week to city dumpsite • Onsite dumping, burying and burning of solid waste shall not be permitted • Liquid waste from toilet and bathrooms shall be directed to the septic tank cum soak away system at site.	Proponent	2,000,000
Management of Environmental Impacts During Operation Phase (50 Years)			
Health and safety risks due to fire hazards	• Adequate number of portable fire extinguishers shall be placed at strategic locations. • Smoking shall be prohibited except for designated areas • The design of the buildings shall strictly adhere to the Fire Safety Standards (eg provision of exit stairs for building with more than 1 floor)	Proponent	10,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Relative Annual cost (TZS)
	• Teaching building shall be equipped with fire detectors and alarms • Firefighting training shall be provided to Students and Staff • Fire drill exercise shall be practiced at least once a year • Drawings (including electrical) shall be submitted to TANESCO and fire department for review and approval before operation phase		
Increased wastes during operations	• MUHAS shall hire a private cleanliness company to clean the buildings and premises on daily basis • All hazardous wastes including electronic wastes shall be collected and disposed/ recycled off by NEMC authorised hazardous waste collector • Wherever possible, solid waste shall be recycled or reused. • Domestic garbage such as papers, food wastes, yard waste shall be collected at a new transfer station at site before disposal to authorised dump site at least twice a week. • Wastewater from building shall be directed to septic tanks as part of onsite sanitation • Wastewater from hostel building shall be treated and disposed onsite, the type of treatment system shall be proposed by design team	Proponent/ Kigoma Ujiji Municipal Council	12,000,000
Increased surface water run-off	• Roofs of both buildings shall be installed with gutters and downward pipes to direct rain water to the designated storm water drains within the site • The paved area surrounding the buildings shall have a slope towards storm water channels that direct storm water to the large storm water channel along Kawawa road • Designs shall explore option for rain water harvesting and if found feasible it shall be implemented.	Proponent	5,000,000
Management of Social Impacts During Operation Phase (50 Years)			
Increased pressure on social services and utilities	• Alternative measures like use of solar power, water recycling shall be explored and implemented if found feasible. • The existing borehole at site may be used for the project • Use of energy savers bulbs shall be given high priority	Proponent	10,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Relative Annual cost (TZS)
	• Use of air conditioning shall be kept to a minimum and maintenance of the cool indoor environment using natural ventilation system shall be strongly explored during the design process. • The project shall have its own facilities for solid waste collection		
		Total	206,000,000

Source: Consultant, December, 2023

CHAPTER NINE

9.0 ENVIRONMENTAL AND SOCIAL MONITORING PLAN

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 also relevant to this EIA.

- **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 methods and techniques.

- **Compliance monitoring**: takes the form of periodic sampling and continuous measurement of levels of 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.

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 developer should be included in the project cost.

Table 9.1: Social and Environmental Monitoring Plan for the Proposed Project at MUHAS

Environmental Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility for monitoring	Annual costs estimate (Tsh)
Pre-construction Phase								
Air Quality	Dust (PM_{10})	Once before construction start	Project sites	g/Nm^3	*Micro-dust Pro (TZS 837 Part 3)*	<0.25 TBS/WHO	Proponent	600,000
Noise Baseline	Noise level	Once before construction start	Project sites	dBA	*Noise Level Meter*	<55 (Day Time) <45(Night Time) TBS/WHO	Proponent	400,000
Construction and Construction Phase								
Air Quality	Dust (PM_{10})	Once in three months	Project sites	g/Nm^3	*Micro-dust Pro (TZS 837 Part 3)*	<0.25 TBS/WHO	Contractor/ Proponent	2,400,000
Noise pollution	Noise level	Once in three months	Project sites	dBA	*Noise Level Meter*	<55 (Day Time) <45(Night Time) TBS/WHO		1,600,000
Employment opportunity	Percentage of local construction labourers	Twice a year	Project sites	Number of local people employed in the project	Records, inquiries and observation	>140	Proponent/ Contractor/ Machinjioni Ward leaders	3,000,000
Safety and health risks	Number and type of safety equipment such as mask, helmet gloves and ear plugs.	Daily	Project sites	Number of safety measures provided	Records, inquires and inspection	-	Contractor/ Proponent/ OSHA	5,000,000

Environmental Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility for monitoring	Annual costs estimate (Tsh)
	Health and sanitation facilities in site.							
Waste Management	Solid and Liquid waste collection facilities	Once a week	Project sites	Presence of Skip bucket and Proper connection of wastewater system to the sewer network	Observations	At Least 1 Skip bucket and connection to sewer.	Contractor/ Proponent	2,000,000
Soil erosion	Soil erosion	Once per Month during dry season and weekly during rainy season	Project Sites	Area eroded	Observations and measurements	No erosion at all	Contractor/ Proponent	2,000,000
Vibrations	Vibrations	Once per year	Project sites	Number per minute	Observations and Measurements	TBS STANDARDS	Contractor/ Proponent	2,000,000
Gender based violence (GBV), equity, rape and sexual harassment	GBV	Monthly	Project site and the whole of Community	Number of GBV	Records and Inquiries	Zero cases of GBV	Contractor/ Proponent	3,000,000
Gender inequity in employment	Female workers	Monthly	Project site	Number of female workers	Records and Inquiries	Adequate number of female workers	Contractor/ Proponent	2,000,000
Transmission of Vector	Community and	Monthly	Project site and the	Number of workers got ill	Records	Zero (0)	Contractor/ Proponent	2,000,000

Environmental Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility for monitoring	Annual costs estimate (Tsh)
Borne and Communicable Diseases	Contractor's Workers		whole of Community	from communicable diseases				
Impacts associated with Transmission of Sexually Transmitted Infections	Community and Contractor's Workers	Monthly	Project site and the whole of Community	Number of workers got ill from STDs	Records	Zero (0)	Contractor/ Proponent	2,000,000
Impacts associated with Spreading of Covid 19 Pandemic	Contractor's workers	Dailly	Project Site	Number of workers got ill from STDs	Records	Zero (0)	Contractor/ Proponent	4,000,000
Impacts on Labour and Working Conditions	Contractor Workers	Daily	Project Site	Preparation and implementation of Human Resources Policy, Labor and Employment Plan	Records, Observations, Inquiries	Presence of the Plan and Enforcement	Contractor/ Proponent	2,000,000
Operation phase								
Safety risk due to fire	Awareness and Signage number of	Once a year	Project sites	Number of safety measures provided	Records, injuries and inspection		Proponent/ OSHA / Fire and rescue forces	5,000,000

Environmental Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility for monitoring	Annual costs estimate (Tsh)
	fire extinguishers							
Waste Management	Solid and Liquid waste	Twice per week	Project sites	Presence of Waste Collection facilities Proper connection of wastewater system to the sewer network	Observations	At least 1garbage collection point Proper connection to sewer	Proponent/ Kigoma Ujiji Municipal council	2,000,000
Increased pressure to Social Services and Utilities	Water Supply, Electricity, Sewer system, Solid waste collection facilities	Monthly	Machinjioni Ward	Respective Units	Records, Inquiries, Observations	No decrease of service provision	Proponent/ Ward leaders	6,000,000
Total monitoring costs								**47,000,000**

Source: Consultant, 2023

CHAPTER TEN

10.0 COST BENEFIT ANALYSIS OF THE PROJECT

10.1 Introduction

This section is supposed to addresses financial, economic and an extended cost-benefit analyses for the proposed project. However, this project is purely a service and therefore it is not possible to convert all the social benefits into monetary terms. Therefore, what is presented in this section is rather an indicative and elementary description of the environmental costs and benefits. It is based on the indicative costs for implementation of mitigation measures as well as the cost of monitoring.

10.2 Benefits related to the project

Several benefits are associated with the proposed construction of college of medicine and all other buildings both at local and national level in terms of improved education the multiplier effects associated with linkages with local and national economy. Likewise, there are costs that must be incurred in order to gain the expected benefits. Table 10.1 below gives the list of benefits and costs of the project from the environmental, social and economic point of view.

Table 10.1: Benefits and Costs of the Project

Environmental and Social Benefits	Environmental and Social Costs
• Benefits to communities resulting from employment • Dust pollution • Improved enrolment • Creation of employment opportunities • Reduction of gender gap in enrolment • Increased capacity for gender friendly and responsive learning environments • Institutional Fiscal Efficiency and Transparency • Increase in skilled workforce • Encourage Regional integration • Strengthening the culture of environmental and social risk mitigation	• Community Health, Safety and Security Risk • Erosion of cleared areas • Increased Noise Levels • Waste management problems during construction • Erosion of Cleared Areas • Impacts to Air Quality • Construction Vibration • Waste Generation and Management • Increased Traffic congestion • Erosion of Cleared Areas • Gender based violence (GBV), equity, rape and sexual harassment • Gender inequity in employment • Increased pressure on social services and utilities • Health and safety risks due to fire hazards • Increased wastes during operations Transmission of Vector Borne and Communicable Diseases • Impacts associated with Transmission of Sexually Transmitted Infections • Impacts associated with Spreading of Covid 19 Pandemic • Impacts on Labour and Working Conditions

Source: Consultant, September 2023

Since some of the impacts will only to be realized during construction phase, the costs for these will also be short term, especially if mitigation measures are fully implemented. From the table it can be observed that all the Environmental and Social Costs can be mitigated properly, and the benefits of having colleges outweigh by far the costs that shall be incurred for implementing this project.

CHAPTER 11
11.0 DECOMISSIONING PLAN

11.1 Introduction

Decommissioning will occur in the far future, hence the precise circumstances for mitigation are typically unpredictable. As a result, precise mitigation strategies for the environmental effects of decommissioning activity cannot be recommended at this time with a high degree of assurance.

The developer must create a thorough decommissioning strategy that takes environmental concerns into account before beginning the decommissioning procedures. If decommissioning is carried out, it may involve demolition brought about by a change in the land's use or a change in usage (functional changes). Therefore, what is described here is only a conceptual decommissioning plan that outlines what has to be done when decommissioning become necessary.

11.2 Preliminary Decommissioning Plan

This part gives a concise description of the tasks necessary to demolish the planned project on the area, should that scenario arise. The framework for ensuring that demolition activities on the site don't negatively impact the environment, traffic, or the health of the general public and nearby properties is provided by this Plan, which will be used as a reference document.

Before starting demolishing activities on site, the Contractor will be expected to create a thorough demolition plan and construction management plan to meet the requirements of the developer as well as required authorities.

11.2.1 Type of buildings to be demolished

The blocks that will be demolished are typically made of load-bearing masonry structures, steel or timber roof frames, and roofing made of metal. The blocks are built on top of a slab of concrete supported by strip and pad footings.

11.2.2 Demolition Methods

Before undertaking demolition operations on site, it is expected that the contractor will create a complete demolition plan. In the meanwhile, the following demolition process will serve as a guide:

- Bobcats, 3-5t excavators, and dingo-style loaders will be used along with hand labor to strip out and remove non-structural components.
- With the aid of small to medium-sized vehicles, the materials will be removed from the location.
- The buildings will be dismantled using heavier machinery, such as hydraulic excavators weighing 15 to 40 tons. These tools will be outfitted with rock breakers, pulverizes, and similar devices that will be utilized in succession.
- The expert in question will be hired to offer additional engineering guidance about back propping, or temporary support, of the building during deconstruction.
- Erosion prevention measures will be installed during demolition. The management of dust and subsequent discharge into storm water drainage channels will be among them.

11.2.3 Materials Handling

Excavators, bobcats, and other mechanical equipment will be used for material handling, and these materials will be loaded onto trucks (bogie tippers and semi-trailers) to a designated trash facility or recycling location, the waste will be transported off-site.

The contractor shall submit a Demolition Waste Management Plan to Kigoma Ujiji Municipal Council which outlines the objectives of:

- Maximization, reuse and recycling of demolition material
- Minimization of waste disposal
- Evidence of implementation for specified arrangements of waste management

Reusable items will be stored at the facility. Collection vehicles will also be able to park here with recycling and disposal bins. The hazardous wastes will be handled differently. A certified specialist will inspect the hazardous items and prepare a report. The removal of hazardous items shall follow EMA 2004. The hygienist will offer a final clearance report, which will contain tip dockets from waste facilities.

11.2.4 Proposed Sequence

The Contractor will be required to prepare the following documentation prior to the commencement of demolition and/or excavation works:

- Dilapidation Survey
- Construction Waste Management Plan
- Demolition Management Plan

The demolition process is often carried out in the opposite order from building. Interior decorations will basically be removed. After that, services like air conditioning, conduit, and piping will be taken out. Where necessary, exteriors will be taken off before the building is destroyed with the use of heavier machinery. The site's demolition and clean up are anticipated to take three months.

11.2.5 Protective Measures

Before the start of the demolition process, an A Class hoarding will be placed around the perimeter of the construction site. Additionally, overhead protection in the shape of a B Class hoarding will be supplied everywhere there is a risk of debris falling into public spaces. To facades where items may fall more than 4 meters, scaffolding will be installed. To contain trash and dust on the site, the scaffolding will be covered with chain wire and shade cloth. To minimize dust dispersal from the demolition site, dust control techniques will be implemented. To guarantee adherence to the safety regulations and established work techniques, the contractor will have a senior representative on the job site at all times.

11.2.6 Traffic Management

An extensive traffic management strategy must be provided in order to control construction traffic throughout the decommissioning phase. The Contractor will create this plan for the various demolition phases. All traffic will be restricted to the perimeter of the property during demolition. The location will continue to be secured and off-limits to pedestrians.

11.2.7 Occupational Health and Safety

A detailed Occupational, Health and Safety (OH&S) Policy will be provided by the Contractor prior to work initiation. A detailed Site Safety Plan will be prepared for the specific project.

11.2.8 Environmental Management Plan

A detailed Environmental Management Plan will be provided by the Contractor prior to the commencement of the work.

11.2.9 Potential Impacts and Mitigation Measures

Dust and Noise Pollution

Since the demolition work is anticipated to be completed utilizing the traditional manner using mechanical breakers and jackhammers, the demolition operations for the remaining portion (foundation structure) will be accompanied by the emission of a lot of dusts. However, other demolition strategies, such as explosive methods can be used.

Mitigation Measures

- Water sprinkling shall be applied to open earth to reduce dust emission.
- Trucks transporting construction materials shall be covered if the load is dry and prone to dust emissions.
- The demolition area shall be fenced by iron sheets; this will prevent the dust at the ground to be picked up by the wind.
- Community notification shall be undertaken where appropriate where work is likely to cause dust impact on the public and nearby residents.
- Sound construction equipment, with noise sinks, shall be used
- Machine operators in various sections with significant noise levels shall be provided with noise protective gear.
- Construction equipment shall be selected, operated and maintained to minimize noise.

Increased Waste

A lot of demolition waste is expected as a result of the demolition of these blocks. These shall include walls concrete, reinforcements, pipes etc. Most of the materials shall be salvaged and recycled.

Mitigation Measures

- All materials which can be reused shall be reused
- Materials that cannot be reused shall be sent to the authorized dumpsite

11.2.10 Costs for Undertaking the Mitigation Measures

The cost for undertaking Mitigation measures during decommissioning is estimated to be Tsh 200,000,000.

CHAPTER 12
12.0 CONCLUSIONS AND RECOMMENDATIONS

12.1 Summary

MUHAS, through the Government of the United Republic of Tanzania (URT) has received financial support from the World Bank to implement Higher Education for Economic Transformation Project (HEET). MUHAS is among the High Learning Institutions selected to establish Eight buildings including college of Medicine under the HEET project. MUHAS intends to construct eight buildings within MUHAS-Kigoma compound at Machinjioni Ward, Kigoma Ujiji Municipality.

MUHAS- Kigoma Campus is located on plot number 1 Block "U", Kitenge/Ukumbi Mtaa,Machinjioni Ward, Kigoma ujiji Municipality at Latitude 4.534200 South and Longitude 29.414000 East. It is bordered with undeveloped plots to the North, West, East and South. MUHAS-Kigoma campus can be accessed through Wakuha Road when coming from Kichangachui primary school.

The project shall involve Construction of the school of medicine at Kigoma comprising of eight (8) buildings namely, Administration Block Building; Multi User; Teaching Laboratory; Academic Block Building; Anatomy and Pathology Laboratory Building; Undergraduate Students Hostel Building 250 Students (100 Male & 150 Female); Student and Staff Cafeteria (50 Staff & 120 Students); Sports and recreation grounds equipped with sporting facilities for students/staff and Staff Apartments Building.

The main source of electricity at the proposed site is from Tanzania Electric Supply Company (TANESCO) but there will be standby generator which will be used when there is shortage of electrical supply. The water source at the site is mainly from KUWASA and the same shall be during construction and operational period. Solid wastes shall be collected at the solid waste transfer stations on site and then transported to municipal dump site for disposal.

Key stakeholders were consulted during ESIA study, include the following; Kigoma Ujiji Municipal Council, Occupational Safety and Health (OSHA), Tanzania Eletric Supply Company Limited (TANESCO), Fire and Rescue Forces (Kigoma), Legal and Human Rights Centre (LHRC), Tanzania Gender Network Programme (TGNP), Machinjioni Ward Office (WEO); Kitenge Mtaa and Ukumbi Mtaa Development Committee and Kitenge Mtaa Development Committee. Also scoping reports was submitted to the Ministry of Education, Science and Technology (MoEST), Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC) and Tanzania Electric Supply Company Limited (TANESCO), Fire and Rescue Forces (Kigoma), Legal and Human Rights Centre (LHRC), Tanzania Gender Network Programme (TGNP) to seek for comments/issues. The main issues and concerns identified include the following:

- Waste Management-There must be proper solid waste and wastewater collection system during construction and operation phase;
- Developer and contractor must cooperate with local government authority during both phases of the project; and
- Contractor and developer must adhere to all provisions of Occupational Safety and Health Act 2003

The construction of eight building at MUHAS shall cause a wide range of environmental and social impacts on a number of receptors. The impacts are of both positive and negative nature. The identified significant environmental and social impacts during construction phase include; Employment opportunities; air and noise pollution; waste generation and management; occupational safety and health risks; erosion of cleared areas; construction vibration and community health and safety risks. The identified significant environmental and social impacts during operation phase include; benefits to communities resulting from

employment, reduction of gender gap in enrollment and completion rates increase in economic activities, regional Integration, increased revenue to the council and country as a whole, increased pressure on social services and utilities, health and safety risks due to fire hazards, waste generation and management.

Different alternatives were considered in this study including no project alternative, alternative sites, alternative designs, Energy Alternative, Wastewater treatment Alternatives. The no project alternative was disqualified because choosing that alternative shall mean to remain with the status quo (without project) and losing all the benefits of the project. Existing water sources (boreholes) was preferred than other water sources like rainwater harvesting. Electricity from National grid was preferred, however solar energy shall be explored and if feasible shall be used. For wastewater management, onsite sanitation system was preferred because there is no sewer system.

The options to minimize or prevent the identified adverse social and environmental impacts as well as a monitoring plan have been suggested in this report and are contained in the ESMP. Many of them are based on good engineering practices. The Environmental and Social Management Plan (ESMP) presents the implementation schedule for the proposed mitigation measures to both environmental and social impacts as well as planning for long-term monitoring activities. The ESMP also includes the associated environmental costs needed to implement the recommended mitigation measures. The engineering designs shall include the mitigation measures recommended in this report.

The EIA study results show that although there are some limited negative environmental implications of the project, the project will have high benefits to the MUHAS and Tanzania as whole. The associated negative impacts, to a large extent have been minimized through good engineering design and envisaged construction practices. Specific mitigation measures have been suggested in this report to offset some of the inherent adverse impacts. Implementing these mitigation measures would increase environmental soundness of the project.

12.2 Conclusions

It can therefore be concluded that, the proposed construction of eight buildings project at Muhas Kigoma Campus will entail no significant impacts provided that the recommended mitigation measures are adequately and timely implemented. The identified impacts will be managed through the proposed mitigation measures and implementation regime laid down in this ESIA. The developer is committed in implementing all the recommendations given in this ESIA and further carrying out the environmental auditing and monitoring schedules.

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APPENDICES

Appendix I: Approved terms of reference

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED CONSTRUCTION OF COLLEGE OF MEDICINE AT KIGOMA CAMPUS LOCATED AT MACHINJIONI WARD, KIGOMA UJIJI MUNICIPAL IN KIGOMA REGION.

1. INTRODUCTION

Muhimbili University of Health and Allied Sciences (MUHAS) came into being University by His Excellence the President of the United Republic of Tanzania in 2007. MUHAS was conceived in 1963 when the then Dar es Salaam College of Medicine was established. In 1968 the School became a Faculty of Medicine and was upgraded to a constituent College of the University of Dar es Salaam in 1991 with the aim of nurturing it to a full-fledged university and was later merged with the Muhimbili hospital to create the Muhimbili Medical Centre (MMC). Over the years MUCHS made significant achievements in terms of increased student enrollment and development of several new academic programmes. The Parliament Act No 9 of 1991 that established MUCHS was repealed in 2005 through the universities Act no 7 of 2005. Subsequently, in 2007Article 1 of the Charter of Incorporation established MUHAS; in line with the Universities act no 7 of 2005.

MUHAS has grown from a small Unit with an enrolment of 10 students and a single program, Doctor of Medicine (MD) to an institution with an enrolment of 4,200 students with a total of 91 accredited academic programs, which includes 10 diploma programs, 14 undergraduate programs and 67 postgraduate programs. It has developed from a Faculty of Medicine, which housed all current academic units as departments to an institution with 5 Schools, 2 Institutes and 12 Directorates.

MUHAS has received funding to support its strategic development plans through the Higher Education for Economic Transformation (HEET) Project (P166415). The HEET project is supported by the Government of the United Republic of Tanzania (GoT) through the World Bank financing with the Project Development Objective (PDO) of strengthening the learning environment and labour market alignment of priority programs at beneficiary higher education institutions and improving the management of the higher education system. Using these funds, MUHAS intends construct College of Medicine at Kigoma Campus. The project shall involve construction of eleven (8) buildings namely;

i. Lecture Theatres
ii. University Research Animal Facilities
iii. College of Medicine Infrastructures
iv. Library Building
v. Shared Research, Training and Innovations Laboratory Facilities
vi. ICT Unit
vii. Undergraduate students hostel building
viii. Postgraduate student's apartments building
ix. Students and Staff Cafeterias
x. Sports and recreation grounds equipped with sporting facilities including students/staff with special needs and
xi. Staff apartments building

The detailed scope for undertaking Environmental and Social Impact Assessment is intended to guide the Consultant to address relevant environmental and social issues during the assessment process. Among others, the EIA shall be conducted in accordance with the requirements of the Environmental

Management Act (2004) and World Bank Standards. The Consultant shall do everything necessary to meet the objectives of the services and not less than the following task that should be undertaken during the Environmental and Social Impact Assessment. In the process of consultation (Scoping process) with relevant stakeholders like environmental authorities, the Consultant may further be required to finalize the TOR according the agreement with these stakeholders.

2. SCOPE OF WORK

Task 1: Description of the Proposed Project

The Consultant shall provide a brief description of the relevant parts of the project using maps of appropriate scale where necessary and include the following information:-

- Project justification;
- Location;
- General layout, size, and capacity;
- Area of influence of the Project
- Pre-construction activities
- Construction activities
- Schedule of project activities
- Staffing and support;
- Facilities and services
- Operation and maintenance activities
- Life span

Task 2: Description of the Environment

Assemble, evaluate, and present baseline data on the relevant environmental characteristics of the study area. Include information on any changes anticipated before the project commences. Modify the lists below to show the critical information for this project category or which is relevant to it. Environmental characteristics of the study area shall be presented on a map to facilitate the understanding of the study area:

(a) Physical environmental: This shall cover geology; topography; soils; climate and meteorology; physical structures at site, utilities and services available.

(b) Biological environment: All flora and fauna present at the project site

(c) Socio-cultural environmental; population, land use; planned development activities community structure; goods and services; recreation; public health; Gender equality and GBV, HIV/AIDS, Cultural/ historic properties and attitudes to the project.

Task 3: Legislative, Policies, Administration Framework

Describe the pertinent regulations and standards governing environmental quality, health and safety, protection of sensitive areas, protections of endangered species, siting, and land use control at international, national regional and local levels. The Consultant shall undertake a review of policies, legislation and administrative framework within which the environmental management of the proposed construction of the Postgraduate and Faculty of Humanities Buildings will be carried out. The following and any other relevant legislation and policies shall be reviewed:-

- **Policies**
  - National Environmental Policy (NEP) of 2021
  - Education and Training Policy (2014)
  - Construction Industry Policy (2003)
  - National Land Policy (1995)
  - National Human Settlements Development Policy (2000)
  - National Gender Policy (2002)
  - Energy Policy (1992)
  - The National Water Policy (URT, 2002)
  - The National Health Policy (URT, 2003)
- **Acts and Regulations**
  - Environmental Management Act No. 20 of (2004), Cap. 191
  - The Water Supply and Sanitation Act No. 12 of 2009
  - The Land Act, 1999
  - The Urban Planning Act (2007)
  - Occupation Health and Safety (2003)
  - Employment and Labour Relations Act No. 6 0f 2004
  - Engineers Registration Act and its Amendments 1997 and 2007
  - The Contractors Registration Act (1997)
  - The Architects and Quantity Surveyors Act (1997)
  - The Local Government Laws (Urban Authorities) Act (1999)
  - Public Health Act 2009
  - The Tanzania Development Vision 2025
  - Fire and Rescue Act (2007)
  - Environmental Impact Assessment and Auditing Regulations (2005)
  - The Environmental Regulations (Standards for control of noise and Vibrations, 2014
  - The Environmental Management (Air Quality Standards) Regulations, 2007
  - Solid waste Management Regulation, 2009 GN. NO. 263
- **World Bank Environmental and Social Standards**
  - ESS1- Assessment and Management of Environmental and Social Risks and Impacts;
  - ESS2 - Labor and Working Conditions;
  - ESS3 - Resource Efficiency and Pollution Prevention and Management;
  - ESS4 - Community Health and Safety;, and
  - ESS10 - Stakeholder Engagement and Information Disclosure (ESS10).

Task 4: Stakeholders Involvement

Assist in coordinating the ESIA with other government agencies, in obtaining the views from affected groups, and in keeping records of meetings and other activities, communications, and comments and their disposition. Establish the views of the public with regards to the potential impacts of the proposed construction of the proposed Postgraduate and Faculty of Humanities buildings. Identify the different groups of stakeholders, and then use the most appropriate method to establish their views. Particular attention shall be paid to the disadvantage groups (e.g. children, the elderly and women) that may be affected by the proposed Construction of the Postgraduate and Faculty of Humanities buildings.

The Consultant shall undertake an open and transparent consultation process to ensure that the views of interested and affected parties are and approximately incorporated in the project design.

Task 5: Analysis of Alternatives to the Proposed Project

Describe alternatives that were examined in the course of developing the proposed project and identify other alternatives, which would achieve the same objectives. The concept of alternatives extends to siting, design, technology selection, construction techniques and phasing, and operating and maintenance procedures. Compare alternatives in terms of potential environmental and social impacts; capital and operating costs; suitability under local conditions; and institutional, training, and monitoring requirements. When describing the impacts, indicate which are irreversible or unavoidable and which can be mitigated. To the extent possible, qualify the costs and benefits of each alternative, incorporating the estimated costs of any associated mitigating measures. Include the alternative of not constructing the project to demonstrate environmental and social conditions without the project.

Various environmental and social criteria should be developed to select the best alternatives.

Task 6: Identification, Analysis and Assessment of Potential Impacts

The Consultant shall identify, analyze and assess environmental and social impacts of the proposed construction of the Postgraduate and Faculty of Humanities buildings. The Consultant shall distinguish between positive and negative impacts, direct and indirect impacts, and immediate and long-term impacts. Identify impacts that are unavoidable or irreversible. Wherever possible, describe impacts quantitatively, in terms of environmental components affected (area, number), environmental and social costs and quality of available data, explaining significant information deficiencies and any uncertainties associated with the predicted impacts.

The assessment should focus on the potential for negative environmental and social impacts caused by planned and unplanned (spontaneous) Air and noise pollution; Safety and health risks and increased pressure on social services and utilities.

The significance of impacts of the proposed construction of the Postgraduate and Faculty of Humanities buildings shall be assessed, and the basis of this assessment shall be specified. The consultant should take into consideration existing by-laws, national and international environmental standards, legislation, treaties, and conventions that may affect the significance of identified impacts. The consultant shall use the most up to date data and methods of analyzing and assessing environmental and social impacts. Uncertainties concerning any impact shall be indicated.

Task 7. Mitigation Measure

The consultant shall suggest cost-effective measures for minimizing or eliminating adverse impacts of the proposed construction and operation of the Postgraduate and Faculty of Humanities buildings. The costs of implementing these measures shall wherever possible be estimated and presented. If compensation is recommended as one form of mitigation, the Consultant shall identify all the names and physical addresses of people to be compensated.

Task 8. Environmental and Social Management Plan (EMP)

The Environmental Management Plan focuses on three genetic areas: implementation of mitigation measures, institutional strengthening and training, and monitoring. The consultant shall prepare an Environmental and social Management Plan, Which will include proposed work programme, budget estimates, schedules, staffing and training requirements and other necessary support services to implement the mitigation measures. Institutional arrangements required for implementing this management plan shall be indicated. The cost of implementing the monitoring and evaluation including staffing, training and institutional arrangements must be specified. Where monitoring and evaluation will require inter-agency collaboration, this should be indicated.

Identify institutional needs to implement environmental assessment recommendations. Review the authority and capability of institutions at local, regional, and national levels and recommend how to strengthen the capacity to implement the environmental and social management and monitoring plans. The recommendations may cover such diverse topics as new laws and regulations, new agencies or agency functions, inter-sectoral arrangements, management procedures and training, staffing, operation and maintenance training, budgeting, and financial support.

Prepare detailed arrangements to monitor the implementations of mitigating measures and the impacts of the project during construction and operation. Include in the plan an estimate of capital and operating costs and a description of other required inputs.

3. REPORTING

The ESIA reports should be concise and limited to significant environmental Issues. The Main text should focus on findings, conclusions, and recommended actions supported by summaries of the data collected and citations for any references used in interpreting data. Detailed or un-interpreted data are not appropriate in the main text and should be presented in appendices or separate volume. Unpublished documents used in the ESIA may not be readily available and should also be assembled in appendices. In organizing the ESIA reports according to the outline in the Environmental Impact Assessment and Audit Regulations (2005). The main report contains separate an Executive Summary both in English and Swahili. The following is the tentative Schedule that shall be followed for completion of the work;

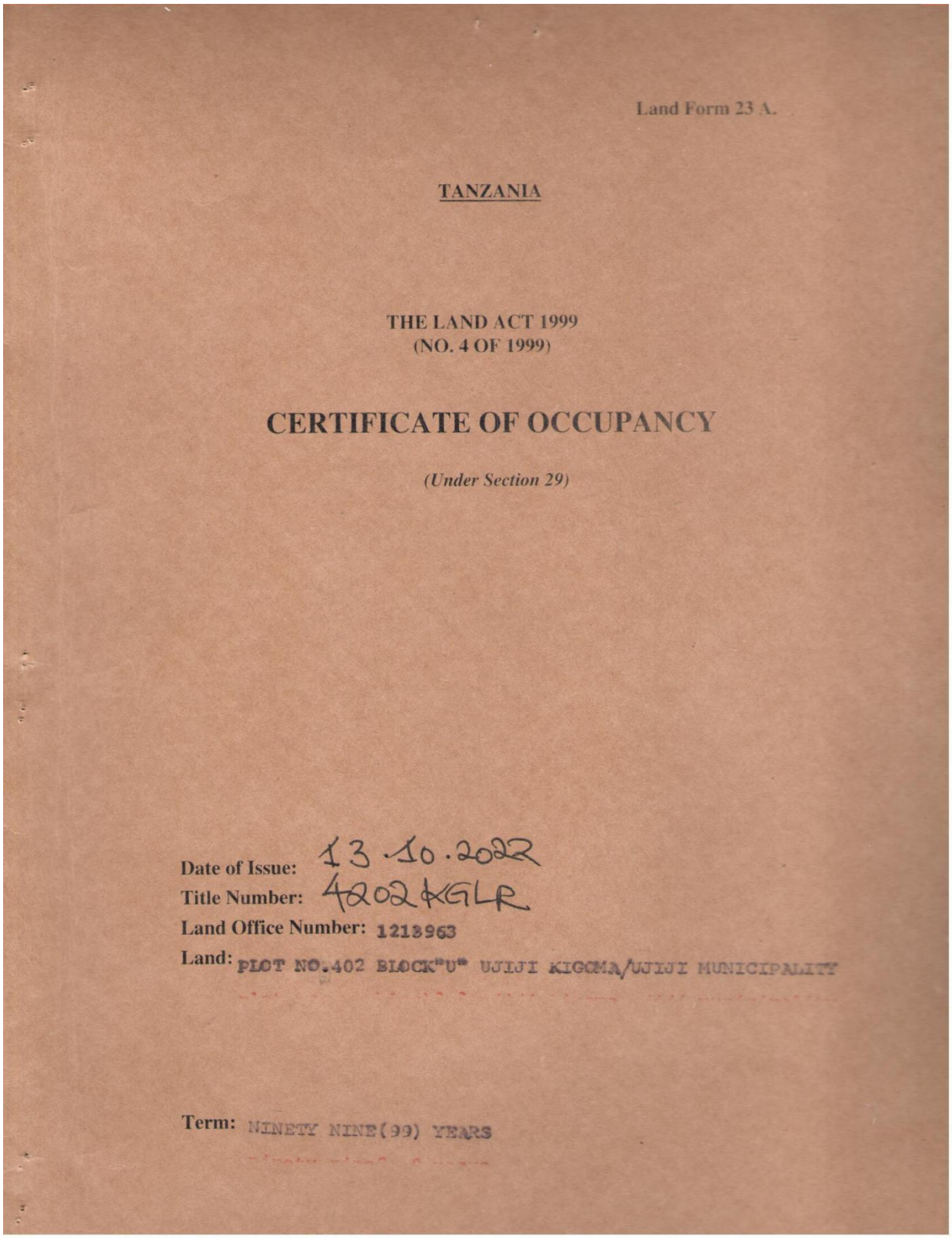
S/N	EIA Process	Reports Submitted To NEMC/DoE	Approval From NEMC/DoE	Actors	Time Allocated
1.	Scoping and Screening	Scoping Report and Draft ToR	Approved ToR and Budget for site verification	Consultant/ NEMC	14 Days

2.	Environment Impact Assessment	Draft EIA Report	N/A	Consultant	2 weeks
3.	Site Verification	N/A	N/A	Client, Consultant, NEMC, Sector	1 week
4.	TAC Meeting	N/A	Comments to be Incorporated in the Final EIA	Client, Consultant, NEMC, Sector Ministries, Selected Stakeholders	2 weeks
5.	Submission of Final EIA	Final EIA	N/A	Consultant, NEMC	1 Week

4. STAFFING

The Consultant should employ an Environmental Impact Assessment Expert (registered), Environmental Engineer, Sociologist and GBV Expert to carry out the EIA study. In addition, the Consultant may wish to absorb other supporting staff to facilitate efficient expedition of the work.

Appendix III: Certificate of Occupancy



Land Form 23 A.

TANZANIA

THE LAND ACT 1999
(NO. 4 OF 1999)

CERTIFICATE OF OCCUPANCY

(Under Section 29)

Date of Issue: 13.10.2022
Title Number: 4202 KGLR
Land Office Number: 1213963
Land: PLOT NO.402 BLOCK"U" UJIJI KIGOMA/UJIJI MUNICIPALITY

Term: NINETY NINE(99) YEARS

Form L.R.53

UNITED REPUBLIC OF TANZANIA

MINISTRY OF LANDS AND HUMAN SETTLEMENTS DEVELOPMENT

Telephone: +255 2221458

Fax number: +255 22 212 4576

REGISTRAR OF TITLES

P.O BOX 1322.
KIGOMA

Received from the Registrar of Titles, Land Registry Kigoma.

Certiface ot Title No. 4202 KGLR

In the name of MUHIMBILI UNIVERSITY OF HEALTH & ALLIED SCIENCE

In respect of L.O NO 213963

Plot no. 402 "U"

Block .....

Location UJIJI

Date 17-10-2022

Mobile No. .....

.....

ASSISTANT REGISTRAR OF TITLES.

Form L.R.53

TITLE No: 4202 KGLR
REGISTERED ON: 13.10.2022
AT: 01.00PM
Senior Asst. Registrar of Titles

Land Form No. 22

TANGANYIKA STAMP DUTY ACT
Stamp Duty Shs: 19,090/= Paid
On Original Receipt No: 92227112869043
of: 28.09.2022
Stamp Duty Officer

TANGANYIKA STAMP DUTY ACT
Stamp Duty Shs: 100/= Paid
Receipt No: 92227112869043
of: 28.09.2022
Stamp Duty Officer

THE UNITED REPUBLIC OF TANZANIA

THE LAND ACT, 1999
(No. 4 OF 1999)

CERTIFICATE OF OCCUPANCY
(Under section 29)

Title No. 4202 KGLR
L.O. No.1213963
L.D. No. KUMC/LD/80626

The 14th day of October Two Thousand and Twenty Two

THIS IS TO CERTIFY that **MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES established under Universities Act No. 7 of 2005** of P.O.B0X **65001, DAR ES SALAAM** (hereinafter called "the Occupiers") **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 **Ninety Nine (99) years** from the first day of **July, Two Thousand and Twenty Two** according to the true intent and meaning of the Land Act and subject to the provisions thereof and to any regulations made there under and to any enactment in substitution thereof or amendment thereof and to the following special conditions:-

1. The Occupier having paid rent up to the thirtieth day of June, **2023** shall thereafter pay rent of shillings **Four Million and Twenty Three Thousand Six Hundred (4,023,600/=)** 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.

(ii) Do everything necessary to preserve the environment and protect the soil and prevent soil erosion on the land and do all things which may be required by the authorities responsible for environment and to achieve such objective.

(iii) Maintain on the land buildings (hereinafter called "the 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 **Kigoma/Ujiji Municipal Council** (hereinafter called "the **Authority**").

(iv) At all times during the term of the Right have on the land buildings as approved by the Authority and maintain them in good order and repair to the satisfaction of the Commissioner for Lands (hereinafter called "the Commissioner").

(v) Not erect or commence to erect on the land buildings except in accordance with building plans and specifications which shall have been first approved the Authority.

(vi) Approval of Plans of any buildings erected thereon shall not imply that the construction of such a building will satisfy the occupier's obligation under the conditions of the Right and shall not imply waiver or modification of any condition in the Right.

3 **USER: The land and the buildings to be erected thereon shall be used for Educational Purposes Only. Use Group "K" Use Class (d) as defined in the Urban Planning (Use Groups and Use Classes) Regulations, 2018.**

4 The occupier shall not assign the Right within three years of the date hereof without the prior approval of the Commissioner.

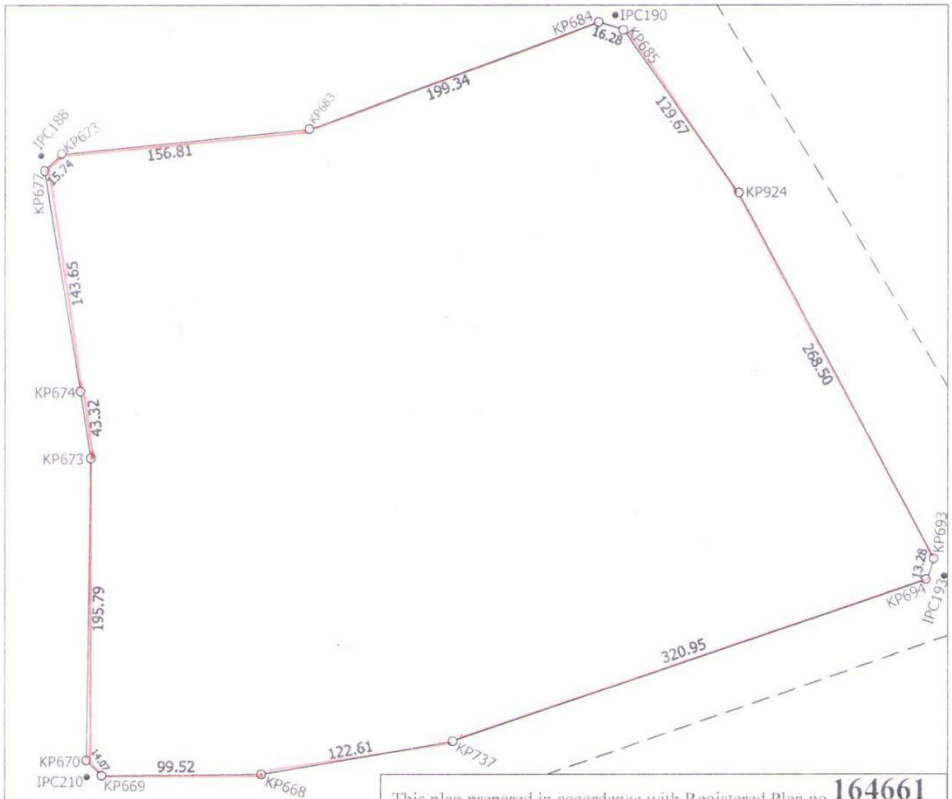
5 The Occupier shall deliver to the Commissioner notification of disposition in prescribed form before or at the time the disposition is carried out together with the payment of all premia, taxes and dues prescribed in connection with that disposition.

6 The President may revoke the right for good cause or in public interest.

KIGOMA/UJIJI MUNICIPALITY

N

INSET SHOWING DETAIL OF PLOT
Location. UJIJI
Block "U"
Plot No.402
L.O. No. 1213963
Area 19.16 Ha



This plan prepared in accordence with Registered Plan no. 164661
is approved for the purpose of Land Registration Ordinance.
For Director of Surveys and Mapping.....
Date.....12·10·2022.....
Ministry of Lands,Housing and Human Settlements Development KGM.

The issue of this plan implies no guarantee or admission of the tittle by the government

Appendix VI: Health and safety management plan

1.1 General

The project shall be implemented in compliance to labour laws in Tanzania, in particular, the Occupational Health and Safety Act (2003). Clauses to protect the health and safety of workers shall be included in the contract documents for implementation stage. All personnel are expected to comply fully with health and safety law and the associated approved codes of practice. Contractors are, in addition, to be aware of and pay due attention to guidance issued by the Health and Safety Executive as well as that issued by trade bodies and authorities, which constitute industry 'best practice'. Method and policy statements submitted for these works will be reviewed by the Site Project Manager and Safety Adviser to ensure that these standards are met. On such occasions that they fail to meet the standard they will be returned for amendment action.

1.2 Health and Safety Management System

1.2.1 Safety Training and Promotion

The aims of safety training programmers are:

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

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

1.2.1.1 Health and Safety Induction Training

New or reassigned employees shall be given Health& Safety induction training pertaining to Health& Safety management and general safety rules and procedure, site specific Health& Safety rules and their responsibility and accountability in safety performance. Health& Safety induction shall be given to all categories of personnel at site by Health& Safety Manager. Health& Safety induction shall be recorded in the prescribed format. All employees shall acknowledge such training by signing relevant document.

1.2.1.2 On the Job Training

Based on the trade, individuals are given On the Job training. These trainings shall be focused on the safe ways of working in a particular trade including hazards involved. This shall be conducted by the foremen/supervisors in collaboration with Safety personnel and trainees' performance after the programme shall be assessed to evaluate the effectiveness of the training. All risk assessment and related knowledge shall be done by the Health & Safety Manager.

1.2.1.3 Refresher courses

Refresher courses shall be conducted to update the skill and safe methods of work for a particular job. This shall be conducted periodically for welding/cutting, plant and equipment operation, defensive driving and hazards in electrical installation.

1.2.1.4 Tool Box Talks

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

All trainings that are carried out shall be formally recorded on dated and signed by attendees and the copies shall be kept with the project safety focal point.

1.2.1.5 Safety Promotion

Safety Promotion schemes shall be developed and implemented at site to promote safety awareness amongst the workforce. Individuals with best safety performance shall be recognized and rewarded. A safety suggestion scheme shall be implemented at site to encourage the workforce to come up with good safety practices and suggestions for improving working condition. The best suggestion shall be selected and the person shall be rewarded.
Health& Safety posters and banners including HIV/AIDS shall be displayed around the worksite to raise the awareness among the workforce. The posters shall be prepared in English and Swahili languages.

1.2.2 Safety inspection and Follow up Actions

Contractor's Health& Safety Manager along with supervisory staff shall carry out frequent inspection with the focus on safety aspects at site and prepare reports of inspection. The frequency of inspection shall be determined by site activities and general conditions. However, the inspection shall be conducted at a minimum of once a week. Where high – risk activities are being carried out inspection shall be done at least once daily.
The inspection reports shall be discussed with the site managers and various sub – contractors (if any). In addition to these, the site staff will accompany the Engineer and other staff of Consultant for their site safety inspection.
Remedial action to rectify any deficiency identified or unsafe practices discovered during the safety inspection by developer shall be implemented immediately.

1.2.3 Reporting of Accidents, incidents & Investigation and Accident Statistics

Tanzania laws on incident reporting and investigation procedures shall be adhered. Such law requires reporting to the Chief inspector of Occupational Safety and Health Authority (OSHA) all lost time injuries (LTI) within twenty-four hours from the time of incident. Contractor will play this role to ensure that local requirements are followed. As per Contract Agreement the Contractor shall notify the Consultant and developer within 48 hours or as soon as reasonable possible after the occurrence of any accident which has resulted in damage or loss of property, disability or loss of human life, or which has or which could reasonably be foreseen to have a material impact on the environment and shall submit to the Consultant and developer no later than 28 days after the occurrence of such an event in the agreed format, a summary report thereof. All incidents including near misses shall be reported to the Consultant, regardless the potential of the incident.

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

Incident data, if properly collected and analysed, indicates the trend and can show where and how problems arise. A monthly safety performance report of the project shall be included in the Monthly Progress Report after the end of each month.

1.2.4 Hazard Identification and Risk Assessment

The purpose of the hazard identification and risk assessment is to identify all potential hazards and associated risks during construction. The contractor will take relevant measures to control all critical, high and moderate hazards. Low potential hazards will be totally eliminated. General risk assessment of this project has already been done and submitted to the relevant parts per Tanzania’s Occupational Safety and Health Laws.

Depend on the severity of hazards we will be able to take necessary preventive and control measure to mitigate the hazards. Prior to the commencement of any activity, detailed hazard identification shall be done by the site supervisory staff with the assistance of Health& Safety Manager and the hazards shall be communicated to the whole team deemed to execute the task. The hazards analysis done shall be produced to Consultant for approval and mitigating measures shall be taken up to their satisfaction. Risk assessment shall be done per Occupational Safety and Health Act, number five of 2003.

1.2.5 Industrial Health and Hygiene

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

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

1.2.1.1 Hazardous substances

Material Safety Data Sheet (MSDS) of all hazardous materials that are used on site (if any) shall be obtained. An inventory shall be kept of all such materials with the relevant MSDS and shall be available for the inspection of consultant. An assessment shall be conducted in relation to the intended usage of the hazardous substances on site and adequate precautionary and control measures shall be taken according to the assessment. Such MSDS shall be available for inspection from Tanzania Health and Safety law enforcer. An assessment shall be conducted in relation to the intended use of the hazardous substances on site and adequate precautionary and control measures shall be taken according to the assessment.

1.2.1.2 Heat

Illness due to heat comprises a wide range of problems from minor inconvenience to critical medical emergency and death. The functioning of the thermoregulatory system of the body gets upset, (balance between heart gain and heat loss), which results in the subsequent loss of salt and water. This takes the following forms like heat rashes; heat cramps; heat exhaustion and hear stroke. Following precautions shall be taken against heat stress.

- Wear light, airy clothes.
- Drink plenty of water even if you do not feel thirsty.
- Wear sunglass/balaclava while working outside.
- New employees shall give adequate time to acclimatize with the hot environment before deploying to the work site.

1.2.1.3 Dust

Dust control will be initiated prior to any activity in dusty condition. Such control will adopt but not limiting to de-dusting procedures. In case of unavoidable dust emissions, introduction of PPEs will be adopted. In any case no personnel shall be exposed directly to harmful airborne contaminants of Silica, Rust (ferrous oxide), Blasting grit, Asbestos, Glass wool & Paint solvent mist. Water sprinkling system shall be adopted to control the dust on all identification areas of the Project.

1.2.1.4 Noise

The Contractor shall comply with the applicable Tanzanian laws, orders and regulation concerning the prevention, control and abatement of excessive noise. Industrial deafness is cause by over exposure to high levels of noise from plant, machinery or construction processes. No employees shall be exposed to noise dose that exceeds 85 dB (A), unless they are wearing suitable hearing protectors, which effectively reduce the sound level at the user's level to or below 85 dB (A). Consideration shall be given first to reducing the noise level at source.
The precautionary measures for the exposure limits shall be as follows:

- 80 to 85 dB (A) – Provide hearing defends with proper training to use them.
- 85 dB (A) – Signposts shall be erected to inform all employees and public that usage of car defenders is mandatory in the area.
- 115dB (A) – No exposure to steady noise irrespective of hearing protection.
- 135 dB (A) – No exposure to impulse noise irrespective of duration of hearing protection.

1.2.1.5 Vibration

Vibration causes health hazards in two ways;

- Vibration of body parts due to hand held tools like concrete vibrator, plate compactor, jackhammer, hand drill, hand grinder etc.
- Vibration of the whole body experienced while traveling in vehicle and operating equipment like dozer, grader, roller etc.

Excess vibration will result in discomfort to the worker, which leads to a decrease in efficiency and finally causes damage to health. Vibrating equipment shall be equipped with proper handles to prevent causing any impact on the operator. Personnel shall be given intermittent rest or shall be changed and replaced frequently.

1.2.1.6 Sanitary Facilities

Adequate sanitary conveniences will be provided in strategic point of the workplace. Such conveniences are lavatories, showers, and washbasins. Such facilities shall be kept clean and in good working condition at all times. Domestic wastes shall be collected per environmental management plan and Environmental Guidelines.

1.2.6 Personal Protective Equipment (PPE)

PPE protects the employee from identified non-eliminated hazards at the site. Personal protective equipment safeguards the employee from the identified hazards so which he is exposed. PPE is the last line of defence for employee protection. PPE does not and cannot eliminate hazard, it can only prevent or reduce exposure to hazards and reduce the severity of the consequent injury.

All employees of the contractor shall be provided with necessary PPEs and ensure that the contractor and sub – contractor personnel are also properly protected by appropriate PPE. Such provision will be free of charge. Employees shall be trained by line supervisors for the correct utilization of the PPE. Individuals shall not be allowed to work if they are not equipped with the appropriate PPE. Suitable signboards shall be kept in work area indicating the potential hazards (e.g. noise, radiation etc) and PPE that is required to be worn in that area/for that activity, in applicable languages and visual signs. The signage will be in Kiswahili and English languages and posted in visible areas.

1.2.7 First Aid Facilities

All accidents, which involve personal injury, whether it is minor or major, shall be given medical treatment and report to concerned Supervisor. A first aid station shall be set up at the site office and a trained first aider will be in charge of the station. All injury cases, except minor injuries shall sent to medical centre present at University premises for treatment. In case of an accident with personal injury doctors will attend such person in a prescribed hospital. Only ambulance will be allowed to transfer the casualties. Adequate number of first Aid boxes will be fixed in strategic points where employees will be notified the nearest location of the same, telephone number of Emergency control room will be also displayed. Adequate number of first Aid boxes shall be available site. There shall be one trained first aider in a group of 20 persons. First aid boxes shall be frequently inspected by the trained first aider and updated.
The Contractor shall comply with the Government medical or labour requirements at all times and provide, equipment and maintain base dressing stations where and at all times have trained first aider for attending minor injuries.

1.2.8 Fire Prevention and Fighting Facilities

Construction sites premises are very prone to fire hazards because of different kind of combustible material used in all the above places. The components of a fire are fuel (combustible substance), heat and oxygen. Unless all three are present fire will not occur. A fire hazard evaluation shall be conducted all the project sites and camp to identify the fire risk at each location. Depend upon the risk factors fire prevention and fighting system shall be provided and maintained.
Following steps shall be taken to implement fire prevention system at our project premises.

- All the employees shall be education about the fire hazards, firefighting methods and precautionary measures specific to this project.
- Adequate number of portable fire extinguishers shall be placed at strategic locations.
- All employees shall be demonstrated the operation of portable fire extinguishers.

- Good housekeeping shall be maintained at all sites to reduce the fire risk.

1.2.9 Road safety management

This project as relies heavily on road transport. Analysis shows that road accidents contribute a major portion of total accidents in such construction projects. To avoid road accidents, the following measures shall be adopted during the execution of project;

- A transport coordinator shall be appointed to control the movement of vehicles and equipment and he shall be responsible for safe and smooth deployment of fleet.
- All drivers and operators shall possess a valid Tanzania license for the types of vehicle being driven or machinery operated.
- All vehicles shall be kept in a plot with good conditions and preventive maintenance system shall be followed.
- An in-house training on defensive driving techniques and safe tipping operation shall be imparted to all drivers before allotting vehicles to them.
- The drivers shall follow all traffic rules and regulation of Tanzania.
- Over speeding shall not be allowed at any case and if observed do so disciplinary actions shall be taken against the defaulter.
- Drivers shall not allow working more than 8 hours shift period. The shift period includes loading, unloading, waiting and driving time.
- No vehicle shall be allowed to drive after consuming alcohol/drugs, some medicines, under fatigue or when sick or ill.
- Nobody is allowed to drive if under the influence of alcohol or drugs.
- Drivers shall wear necessary PPEs while driving.
- A driver forum shall be constituted and shall meet once in a month or immediately after an incident to discuss the general safety issues as well as specific leaning points from incidents.
- Only one person shall direct the driver/operator
- Beware signage shall be established on public institutions' entrances

1.2.10 Traffic management plan

This project involves movement of heavy traffic both at the site and outside the Site. All drivers are instructed to strictly follow the minimum speed of 20 KPH at the site. Adequate sign boards will be placed at the relevant location and flag man will be assigned whenever necessary. Anybody found violating the traffic rules will be punished.

1.2.11 Sub-Contractors

Subcontractors are treated as integral part of the contact and subject to the same standard of treatment as that of main contractor's employees in all matters pertaining to Health& Safety. List of subcontractors shall get approved by developer prior to their deployment in the project.

On arrival of Subcontractor's employees, Health& Safety Manager shall conduct induction program. Sub-contractor employees shall participate in all Health& Safety activities along with Contractor's personnel working under the Contract.

1.2.12 General Safely Rules

All personnel working at site always shall strictly follow following Health& Safety rules:

- Never take their eyes off the job, pay attention to what you are doing.
- Shall be on the lookout for hazardous conditions that could lead to an accident.
- Shall pay attention to what you are doing.
- Shall be in a continuous observation of hazardous conditions that could lead to an accident.
- Shall report all first aid injuries, lost time accidents and near misses immediately to their supervisors.
- Shall wear proper uniforms and other personal protective equipment necessary for the job that they have to do.
- Shall ensure that they have the right tools and equipment for the job.
- Check the tools condition before using it.
- Shall always use provided personal protective equipment like overall, helmet, goggles, shoes and balaclavas etc.
- Shall know the location of the nearest fire extinguisher first aid box.
- Shall always keep work place clean and tidy.
- Shall not play with fire. Smoking in 'No Smoking' area only.
- Shall not interfere with overhead electrical supplies and appliances.
- Shall observe all warning signs, labels and hazard notices.
- Shall not overtake and over speed vehicles in high traffic areas. Shall observe all speed limits and traffic controls.
- Shall not use unstable material/platform for working, climbing and standing purpose.
- Shall not abuse toilets and welfare facilities provided for their use.
- Shall always take care when lifting load. Keep straight back and bent knees
- Shall not keep any material or obstacle in access ways or exit path.
- Shall not operate cranes over or in the close proximity of power lines.
- Shall take sufficient water and fluid regularly during hot and humid weather conditions.
- Safety is everybody's responsibility.

1.3 Safety in Various Construction Activities

1.3.1 Excavation

Excavation is one of the important phases of the construction activity. Any insufficient attention to the safety aspects may cause of accident, therefore we shall take utmost care in planning and executing all excavations. The following precautionary measures shall be followed:

- The area to be excavated shall be inspected thoroughly by a competent person for any underground services or structures.
- It shall be ensured that a person having good knowledge and experience supervises all excavations.
- All mechanical excavations shall be carried out only in the presence of an authorized banks man.
- The integrity of excavation and supports shall be inspected prior to the commencement of work on daily basis.
- No soil or other materials shall be stored close to the sides of the excavation and at least 1m clearance shall be provide for storage and dumping of excavated materials.
- Edges of excavations shall be barricaded to prevent falling of persons and materials.
- If vehicular traffic is allowed near to the excavation, contractor shall provide adequate lighting, warning signs and concrete blocks painted with reflective paints.
- Excavations exceeding 1m shall be demarcated with solid barricades plus warning tapes. The rest shall be barricaded with warning tapes.

- Where there is a possibility of ingress of water then pumping sumps shall be established with pumps being readily available for use and additional ladders placed for use in the event of emergency evacuation.
- Adequate means for entry and exit shall be provided for excavations over 1.5m and it shall be either ramp or ladder.
- All the personnel engaged shall be made aware about safe digging practices, hazards in the operation and emergency procedures.
- Adequate number of strong and stable temporary crossing with handrails shall be provided for personnel.

1.3.2 Reinforcement Steel Work

Reinforcement steel work is an essential part of any construction phase. The activity involves unloading, bar bending, cutting and fixing of bars in position and people's unsafe acts. The main hazards are handing hazards, working with machinery, using of electricity, falling of material on body and taken.

- Loading and unloading of steel shall be done by proper lifting equipment lifting tackles and under proper supervision.
- All persons handling steel bars shall be provided with necessary PPE required for the job.
- The lengthy steel bars shall be stored in safe manner to avoid in tripping hazards and protruding hazards. Proper signage shall also be provided.
- Bar cutting machines and bending machines shall be in good working condition and provided with emergency stop switches and necessary guards. Both the machine shall be placed in such a way that the operation on it shall not create any danger to nearby workers.
- The electrical connections to the machine shall be done by electrician by providing appropriate circuit breakers and proper earthling after conducting risk assessment.
- Persons deployed for cutting and bending shall be trained and instructed about the job and its inherent hazards.
- The work area shall be kept clean and steel cut pieces will be kept separate.
- Adequate number of works shall be deployed to handle and fix the steel.
- The tools used for fixing the steel in place shall be inspected regularly and maintained properly.
- If the steel fixing work is at height or in an excavated pit/trench, safety measures shall be taken in accordance with the accordance with the particular procedure.

1.3.3 Concreting

This includes shuttering, formwork, de-shuttering and concreting. The main hazards are falling of objects; struck by object, falling of persons from height, crush injuries and impact injuries, ergonomic related, tripping and slipping. The following practices shall be adhered to ensure the safe operation in these activities.

- The persons deployed on work shall be given a safety induction related to the job. They shall participate in the risk assessment.
- The persons deployed on work shall have well experience and provided with all tools in good working condition.
- Handling, erection and dismantling of heavy shuttering shall be done with proper lifting equipment under close supervision.
- Required PPE shall be provided to all persons engaged in the job.
- The workers shall be informed about the hazards of the activity.
- The area shall be barricaded to prevent the entry of unauthorized persons and visitors.

- Hand tools shall be inspected on daily basis.
- There shall be effective communication between the crew members while erecting and dismantling the shuttering.
- Good housekeeping shall be maintained all over the area.
- Formwork for the concreting shall be inspected by a competent person, prior to the pouring.
- The concrete pump shall jack-up properly and park at firm and level ground.
- Two persons wearing reflective jackets shall be deployed to hold the concrete pouring pipe.
- Always look for overhead electrical cables while parking the concrete pump.
- Temporary platforms shall be provided on steel work for people to stand while working at the area.
- Tipping shall be away from overhead power lines

1.3.4 Material Handling

1.3.4.1 Mechanical Handling

Lifting equipment and lifting gears shall be inspected per Occupational Safety and Health Laws of this Country and should be used for handling of construction materials. All lifting equipment shall be checked and ensured that they are in good operating condition and free form defects. All lifting equipment and tackles shall have valid third party certificate. Inspection intervals shall be as per Tanzania laws and safety regulations. Inspection and certification shall be done from Tanzania's approved competent authority which is Occupational Safety and Health Authority (OSHA). Color coding system for lifting equipment shall be followed. All lifting operations shall be done by experienced persons and supervised by competent persons. In case of tandem lifting only the Project Manager shall authorize such lifting. The following safe practices shall be adhered in all mechanical lifting operation. The following safe practices shall be adhered in all mechanical lifting operation.

- All lifting equipment and tackles shall be maintained in good operative condition.
- Every dangerous and rotating parts of lifting equipment shall be guarded.
- Care shall be taken to avoid the overloading lifting equipment and tackles.
- All lifting operation shall be performed under the supervision of an experienced and trained supervisor.
- Signalman with reflective jacket shall be deployed with the lifting equipment.
- Only one signalman shall direct the operator
- Proper communication shall be maintained between the operator and signalman during the operation.
- Wind speed shall be taken into consideration before lifting and if it exceeds the safe limit all lifting operation shall be ceased.
- Extreme care shall be taken while working near overhead power lines and safe distance shall be maintained.
- Toolbox talks shall be conducted before lifting operation for prevention of incidents.
- Only the project Manager shall authorize tandem lifting.

1.3.4.2 Manual Handling

Correct manual lifting and handling procedures can prevent back injuries and strains that account for a major portion of all industrial injuries. Before handling any material, its weight, size, shape and physical

characteristics are to be seen and further action shall be taken accordingly. Following are the measures to prevent the incidents during manual handling.

- Load to be lifted shall be assessed for its weight, shape and size.
- Load shall be sized up ad assistance sought if necessary.
- Proper method and posture of lifting shall be adopted.
- Load being carried shall not obstruct the view in front.
- Do not change position of load while moving.
- Slipping and tripping hazards shall be taken care of.

1.3.5 Working at Height

1.3.1.1 Scaffolding

Proper scaffolding and working platform shall be provided to work at height. All scaffolds shall be designed by a competent person and shall be made of good and standard materials. Prior to use, all scaffolds shall be subjected to the inspection of Consultant and shall get approval. All persons involved in the erection and dismantling of scaffold shall be trained and experienced for the same. No persons other than the supervisor involved shall be permitted to be upon any part of an incomplete scaffold.

- All personnel shall be provided with necessary PPE.
- Persons with vertigo shall not be allowed to work at any height.
- All poles, planks and general materials used for scaffolding shall be kept in good condition and be inspected by a competent person on each occasion before being issued from stores.
- As long as the scaffold is in use, supervisor concerned shall inspect it daily before allowing persons to work on it and satisfy himself that the scaffold is complete and is fit for use.
- Subsequent to rain or heavy wind, the scaffolding supervisor shall inspect all scaffolds prior to restart the work.
- All working platforms shall be close boarded and all boards shall be lashed and secured.
- Handrail and toe board shall be provided for all scaffolds and the planks shall be tied to the ledgers properly.
- Scaffolds shall be supported adequately wherever possible
- Always ensure that no loose items and materials are left at height that may fall on person working or passing beneath.
- In case of mobile towers, the height shall never exceed three times the length of the shortest side and there shall be only one working platform on a mobile scaffold.
- The mobile tower shall only be moved by pulling or pushing the base and the working platform shall be clear of men and materials when the tower is being moved.
- The wheels of mobile tower shall be turned outwards and brakes shall be on and locked before use.
- Diagonal bracing shall be fitted on all lifts on all sides and cross bracing shall be fitted at the base and every alternative lifts of an independent tower scaffold.
- Adequate ladders shall be provided for the access to and egress form the scaffold.

1.3.1.2 Ladders

- All ladders shall be factory made and of sound construction.
- Wooden ladders shall not be used with the scaffold.
- If the work is being done in and around electrical equipment and/or cables only wooden (non-conductive) ladders shall be used.

- Ladders shall not be painted.
- Ladders shall be secured properly at top and base.
- Ladder shall be extended for at least on meter above the landing.
- Ladders shall not be used as working platform or part of load bearing component of a scaffold.
- The base to height ratio of ladder shall be maintained as 1:4 such that the angle is 750 from the horizontal can be maintained.

1.3.6 Heavy equipment and workshop

Construction project mostly depends on heavy equipment like Dozer, Excavator, Grader, Wheel Loader, Backhoe and Crane. So, the safe operation and maintenance of heavy equipment play a major role in accident prevention. A workshop facility shall be set up in the lay down area to perform routine maintenance and repairs of equipment deployed for the project. Following measures shall be taken to ensure safe operation and maintenance of equipment and plant:

- Equipment shall be put into service after obtaining approval by a competent technical authority.
- All the operators shall have valid Tanzania license and thoroughly educated about the safe operation and maintenance of equipment.
- It shall be ensured that operators are performing daily checks before commencing the activity and report abnormalities, if any.
- All operators shall undergo frequent refresher training on safe operation and basic firefighting.
- No one shall be allowed to travel in the cabin along with the operator.
- Equipment shall be transported from one place to another only by low bed trailers and proper lashing shall be ensured while transporting through road.
- Adequate space shall be available in the workshop for free movement of vehicle / equipment and each activity shall be performed in a clearly defined area.
- Hazardous activities like painting, welding, cutting, grinding etc. shall segregate from other activities normally will do in dedicated booths.
- Storage of hazardous materials shall be in a secured and dedicated area as per Tanzania Policy standards.
- Emergency exit, fire alarm and firefighting equipment, first aid box, requirement to wear PPE and other necessary safety information shall be displayed at prominent locations with visible signs.
- Adequate lighting and ventilations shall be provided in all work places.
- Adequate provision shall be made for the collection, temporary storage and disposal of solid and liquid waste material from all workplace.
- Good housekeeping standards shall be maintained.
- Smoking and consumption of food shall be restricted to designate area.
- No horseplay or practical work jokes shall be allowed in work place.

1.3.7 Cable Laying, Termination and Jointing& Electrical Works:

Laying of high voltage and low voltage cable and other Electrical works are one of the activities in this project. The main hazards involved in these are struck by, falling of materials, fall of persons, and failure of lifting equipment and tackles, fire and burn injuries. Following precautionary measures shall be taken to avoid any incidents during this stage.

- Risk assessment shall be conducted prior to execution of such job.
- All electrical works shall be performed by qualified persons who shall be provided with adequate and necessary personal protective equipment.

- Prior to maintenance operations on any electrical equipment or appliances, the electrical current shall be disconnected, (lockout and tag out) with a lock or any other adequate means and tagged out to ensure the prevention of reenergizing of the equipment by any person during work.
- Employees working in electricity shall be instructed in using the proper fire extinguishers in electrical fires such as Dry Chemical and CO2 extinguishers.
- Water or extinguishers containing water shall not be used in extinguishing electrical fires which occur in electrical equipment or conductors as water is a good conductor which causes electrical shocks for the person using the extinguisher.
- Metal ladders or non-insulated hand tools shall not be used while working in electrical installations. (Handles of all hand tools used shall be insulated and wooden ladders shall be used)
- When the fuse or circuit breaker disconnect the electrical circuit, electrical current shall not be re-connected before inspecting the cause of the fault and repair it and thus replace the fuse with other fuse of the same rating or the circuit breaker shall be returned to its first position by a qualified employee.
- Electrical circuit shall not be overloaded to prevent occurrence of fires.
- Electrical wires shall not be passed through doors or windows and shall be kept away from heating sources such as heaters and shall not be hung from nails to prevent the damage or wearing of the insulating material.
- Defective or corroded electrical wires shall not be used and shall immediately replace.
- Cable drums shall be placed on level and firm ground and properly wedged to prevent rolling off.
- Jacks and other accessories for cable laying shall be inspected by a competent person to make sure that if is free from defects.
- Rollers shall be placed properly to avoid the over exertion of force on cables while laying.
- The winch shall be fixed firmly on ground to prevent any unintended movement while pulling the cable.
- Experienced and trained persons shall be deployed for cable laying and winch operation.
- All cable jointing and terminations shall be done by certified and approved cable jointers.
- Adequate fire safety measures shall be taken care while termination and jointing the cable.
- The area shall be barricaded to prevent the entry of unauthorized persons during the operation.
- In case a person receives an electrical shock, this person shall not be touched, first, disconnect the power and remove the injured person away using a piece of wood or any other insulated material, and then, first aid shall be provided to the injured person such as Cardiac Pulmonary Resuscitation (CPR). The doctor shall be informed immediately or the injured person shall be taken to the nearest hospital.
- When recharging batteries, employees shall be instructed not touch the battery liquids, and shall be provided with adequate and suitable personal protective equipment when doing that (Face shield, rubber gloves, aprons) and when refilling batteries by acid, acid shall be added to water (and not water to acid), in case any burns by the effects of acids occurred, immediately flush the burn with big amount of water.

1.3.8 Portable Power and Hand Tools

The main causes of most injuries involving hand tools are the use of unsuitable tools, their incorrect use or their incorrect storage. Inspect the tool and ensure that it is in good condition. Unsafe tools include wrenches with cracked or worn jaws, screwdrivers with broken tips etc.

- Select the right tools for the job.
- Use all tools correctly.
- Keep tools in a safe place.

- We shall train the workers to select the right tools for each job, and ensure that the tools are available.
- Protect the edges of the sharp tools while carrying.
- Tools shall not be kept lying on floor, walkways or scaffolds,
- Tools shall not throw from one level to another. It shall be lifted and lowered by hand lines.
- All guards and covers shall be securely fitted and correctly adjusted.

1.3.9 Transportation

This section outlines the procedure and guideline for avoidance for motor vehicle accidents.

- Every person driving a motor vehicle or operating a machine must possess valid driving licenses appropriate to the class of vehicle being driven.
- All drivers should observe posted speed limits. Adverse weather conditions, traffic and light (visibility) require lower speeds than posted speed limit. Maximum speed limit must be limited 40 KPH in camps and 60 KPH on haul roads.
- All vehicles shall be parked uniformly and where provided, in designated parking areas. Parked vehicle shall not be obstructing other vehicle, roads, and access ways for fire hydrants.
- Vehicle shall be maintained in good condition and regular inspection carried out to check steering system, foot and parking breaks, tyres, seat belts, horn, Head lights, tail lights, stop light and indicators, rear view mirrors, wind shield wipers and washer, crank case and radiator level.
- Drivers and passengers in all vehicles including buses should wear seat belts.
- Driver shall slowdown in inter section, blind corners and stop completely at all stop.

Appendix VII: Disaster Management and Monitoring Plan

1.4.1 Introduction

An emergency situation in an office building may be due to manmade hazards like fire, power outage etc. or due to natural disasters viz. earthquake, flooding etc. A hazard is defined as a dangerous condition or events that threaten or have the potential for causing injury to life or damage to property or the environment is called hazard. Hazards can be categorized in various ways, but based on the origin, they worldwide are basically grouped in two broad headings:-

1. Natural Hazards (hazards with meteorological, geological or even biological origin)
2. Unnatural Hazards (hazards with human-caused or technological origin)

A disaster is the product of a hazard such as earthquake, flood or windstorm coinciding with a vulnerable situation, which might include communities, cities or villages. There are two main components in this definition: hazard and vulnerability. Without vulnerability or hazard there is no disaster. A disaster occurs when hazards and vulnerability meet.

1.4.2 Objective of Disaster Management Plan

The objective of a Disaster Management Plan is to ensure effective mitigation plan and best possible protection of the members of the society during a disaster occurrence.

1.4.3 Importance of Multi-hazard Management Plan

This Disaster Management Plan is designed as per the present need and the major strategies to respond to any unexpected situation have also been considered. In the multi-hazard mitigation plan, all the disasters will be handled properly following the given procedure. The main features of the Disaster Management Plan are:

- It gives importance to all the disasters equally and helps to mitigate the situation beforehand.
- All the line authorities are assigned with their proper role and responsibilities, which are clearly indicated in this plan.

1.4.4 Risk Assessment and Vulnerability Analysis

Disaster can occur at any point of time. It is essential to consider the mitigation plan and protection for all the society members during occurrence of a disaster. If the society i.e. the residents of the building are aware of the actions to be taken during a disaster, then the effect of disaster can be reduced or avoided. Following types of natural disaster can occur with a prior indication or without any prior indication.

1.4.4.1 Natural Disasters: Natural Disasters occur naturally with or without any prior indication.

i. **Cloud Burst and flood due to heavy rainfall -**A cloudburst is an extreme amount of precipitation, sometimes with hail and thunder, which normally lasts no longer than a few minutes but is capable of creating flood conditions. Sudden cloudburst can cause a flood to occur. This is one of the natural disasters. During the thunderstorms, the air mass that goes up from the lower level carries a certain amount of water in it. Sometimes that air current abruptly stops moving and the water mass falls down forcefully on the surface of earth. This natural phenomenon is known as cloudburst. Flooding may occur due to the following reasons

- If the rainwater does get the access to the natural stream or municipal drains
- Delay in water flow from all runoff towards the natural streams

- Slow discharge of water
- Flow diversion
- Chocked up drains.

The proposed site does not fall in any flood prone areas. Even if heavy rain fall are received, a well-designed storm water drains are proposed as also there shall be a District Council/ TARURA storm water drain of adequate capacity around the site.

ii. **Lightning Strike-** Lightning can score a direct hit on a high-rise building. It can strike the overhead power line which enters the building, or a main power line that is blocks away. Lightning can strike branch circuitry wiring in the walls of the building. Lightning can strike an object nearby, such as a tree or the ground itself and cause a surge. Voltage surges can be created by cloud to cloud lightning. A highly charged cloud which passes overhead can also induce a voltage surge.

Buildings are protected from lightning by metallic lightning rods extending to the ground from a point above the highest part of the roof. A lightning arrester is a device used on electrical power systems and telecommunications systems to protect the insulation and conductors of the system from the damaging effects of lightning. The typical lightning arrester has a high-voltage terminal and a ground terminal. The conductor has a pointed edge on one side and the other side is connected to a long thick copper strip which runs down the building. The lower end of the strip is properly earthed. When lightning strikes it hits the rod and current flows down through the copper strip. These rods form a low-resistance path for the lightning discharge and prevent it from travelling through the structure itself.

1.4.4.1 Unnatural Disasters: These kinds of disasters generally occur due to human error or negligence.

i. **Fire-** Fire is a hazard which is caused mainly due to human negligence. There are other reasons like electrical short circuit, rain water seepage in electrical installations. A full proof fire fighting system is designed for the buildings which meets all fire safety norms and has a mitigation plan to tackle the fire hazard. During construction all safety precautions will be taken to handle the fire hazard. During construction fire can break out due to following reasons:

- Electrical loose connection
- Electrical short circuit
- Storage of Inflammable material like diesel, paint at site

Post Occupancy: The proposed project is designed with utmost care for all fire safety norms for its residents and the building as a whole. The normal cause of fire in the proposed project post-occupancy is electrical short circuit, loose plug tops used by residents, storage of highly inflammable material like diesel, etc. The building will be constructed with all fire safety norms to mitigate such calamities during operation phase of the building. Fire proof material will be used as per design for various components of the building. Electrical cables and switches will be TBS certified and will have the minimum fire rating to mitigate any fire hazard. The cabling and jointing will be done by professional agencies to avoid any mistake while installation.

ii. **Buildings collapse-** To protect against building collapse, hardening of the buildings structural systems may be required. Designers should balance the hardening of the building envelope so that the columns, walls, windows and glazing have an approximately equal response for damage/ injury. This is a multi disciplinary effort of the architect, structural engineer, mechanical engineer and other design team members in order to achieve a balance building envelope.

iii. **Vehicle Accidents-** Traffic flow to and within the site shall be maintained so that there are no obstructions to existing traffic flow on access roads. Also, road side parking will be avoided. The entry/ exit to the site will be with adequate curvature at kerbs so that vehicles coming out/ entering the project area do not impinge on road traffic directly. Regular maintenance and upkeep of the internal roads within project site will ensure smooth traffic flow.

iv. **Security breach -**Included in this category are bomb threat, riots & vandalism: bomb threats could be genuine or false and many a time they turn out to a hoax. Unscrupulous elements with the intention of creating a panic tend to resort to such hoax calls. Confirmed militants however resort to such deeds with the intention of destruction and strike terror. It would therefore be prudent to assess the genuinity of bomb threats. The threats are usually through phone calls, giving very little time to react or through mail, giving a certain date of an explosion that could occur. It is very rare that the caller will identify himself and the message sent through any messenger for fear of easy identification.

1.4.5 Mitigation and Preparedness

1.4.5.1 Following measures will be taken during construction to avoid fire hazard

- Training of workers on fire hazards during construction
- Tool box talk to workers on fire hazard and dos and don'ts
- Constant check on electrical connections
- No loose connection
- All plugs should have plug-tops
- Fire extinguishers at site at various location
- Regular check on cooking facilities at labour hutment by project manager
- Separate storage for highly inflammable material like diesel, paint.

1.4.5.2 Following measures will be taken during operation phase to avoid fire hazard

To protect the building and the residents from any fire hazard houses will be equipped with any one or combination of following installations.

- Primary fire fighting line
- Secondary fire fighting line wherever false ceiling is provided.
- Fire detection and alarm system
- Central fire store
- Separate water tanks of required capacity for fire fighting
- Easy access to fire engine during any fire hazard inside the building premises
- Automatic sprinklers system while smoke is detected.

1.4.5.3 During earthquake following measures should be taken

- At first few seconds inhabitants should stay calm and open doors for easy access
- After the tremor subsides, Managing Committee shall instruct the residents for safe evacuation of the building
- Intimate the external authorities like Fire Brigade for rescue operation
- Building users who are safe should be moved out of the building to a safer relief location

- If people are buried in debris, relief agencies should be called for safe rescue of the people
- Arrange for relief and rehabilitation space
- Arrange for medical assistance, food.
- Inhabitants should not drive during earthquake
- Inhabitants should not move closer to any electrical pole or line while evacuation Process

1.4.5.4 Measures to be taken during Flood/ Cloudburst

- Managing committee should arrange for safe evacuation of the residents
- Intimate the external authorities as mentioned in this plan
- Arrange for relief and rehabilitation space
- Arrange for medical assistance, food.
- Residents should not drive during flood
- Residents should not move closer to any electrical pole or line while evacuation process
- Switch off the main power supply of the building

The following preparedness is recommended to handle bomb threats

- Try to identify the caller and take as much information as possible
- Inform emergency controller to call police and get their guidance for further action. The local police station to be intimated immediately on receipt of such calls. The police is trained to handle such threats and have access to special bomb detection and disposal squads.
- Human life is most important and on receipt of such threats, emergency controller will take a call to evacuate the site with the employees assembling at the site emergency assembly point. All employees will be clearly informed about the threats and panic will be minimized.
- Follow the evacuation instruction on public address system.

1.4.6 Inventory of Resources

1.4.6.1 Medical Equipment -First Aid Kit

- Bandage 15 Nos (Small, Medium and large – 5 each)
- Cotton 10 Pack
- One polythene wash bottle (2 x 500 ml) for washing eyes
- Soframycine ointment
- Dettol A pair of splints (350 mm x 75 mm x 6mm)

Appendix VIII: Baseline data on Air quality, Noise and Vibrations

Appendix VIIIa: Average ambient particulate matter values measured onsite

Site	Sampling Point	Average PM_{10} (mg/m^3)
Project site	Point 1	0.02
	Point 2	0.03
	Point 3	0.04
	Point 4	0.03
	Point 5	0.04
Project Neighbor	Point 6	0.02
	Point 7	0.04
Access Road	Point 8	0.02
AVERAGE		**0.028**
TBS LIMITS [TZS845:2005]		0.06-0.09
IFC (2007) and WHO AQG 2006		0.05
US OSHA Standard Limit for Inert or Nuisance Dust		15

Source: MUHAS-Kigoma Site visit and measurement, 2023

Appendix VIIIb: Average ambient pollutant gases recorded points

Site	Sampling Point	CO_2	CO	NO2	SO_2	CH_4	H_2S
		ppm	mg/m^3	ppm	ppm	mg/m^3	mg/m^3
Project Site	Point 1	345	0.0	0.00	0.00	0.00	0.00
	Point 2	360	0.0	0.00	0.00	0.00	0.00
	Point 3	295	0.0	0.00	0.00	0.00	0.00
	Point 4	290	0.0	0.00	0.00	0.00	0.00
	Point 5	270	0.0	0.00	0.00	0.00	0.00
Project neighbors	Point 6	310	0.0	0.00	0.00	0.01	0.01
	Point 7	305	0.0	0.00	0.00	0.00	0.00
Access Road	Point 8	295	0.0	0.00	0.00	0.00	0.00
AVERAGE		**323**	**1.3125**	**0.69**	**0.625**	**0.00**	**0.00**
TBS Limits		-	15	0.12	0.12	-	0.1
WHO/IFC Guidelines		500	30	0.2	0.2	-	0.1
Maximum standard for natural concentration of CO_2 in fresh air or at the atmosphere		600	-	-	-	-	-

Source: MUHAS-Kigoma site visit measurements, 2023

Appendix VIIIc: Noise levels recorded at the project site

Site	Sampling Point	Average Noise Levels Measured onsite in dBA	
		Day time Noise	Night Time Noise
Project site	Point 1	37	32
	Point 2	30	34
	Point 3	35	30
	Point 4	33	31
	Point 5	34	32
Project Neighbors	Point 6	39	30
	Point7	30	31
Access Road	Point 8	42	32
TBS-NES Limits		**45**	**35**
WB/IFC Guideline		**55**	**45**

Source: MUHAS-Kigoma site visit measurements, 2023

Appendix VIIId: Summary of the ground vibration levels at different locations

Site	Sampling Point	Vibrations (mm/s)
Project site	Point 1	0.02
	Point 2	0.03
	Point 3	0.04
	Point 4	0.12
	Point 5	0.05
Project Neighbors	Point 6	0.07
	Point 7	0.05
Access Road	Point 8	0.09
TBS LIMIT (TZS 1471:2011)		5mm/s

Source: Site visit, 2023