UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

MOSHI CO-OPERATIVE UNIVERSITY (MoCU)
CHUO KIKUU CHA USHIRIKA MOSHI

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT ON THE PROPOSED CONSTRUCTION OF AN ACADEMIC BUILDING OF TWO-STOREY ON BLOCK "M" PLOT AT USHIRIKA STREET, MFUMUNI WARD, MOSHI MUNICIPAL COUNCIL IN KILIMANJARO REGION.

Proponent:

Moshi Co-operative University (MoCU)
06 Sokoine Road, 25121 Mfumuni
P.O.BOX 474, Moshi, Tanzania
Tel: +255 272 754 401
Fax; +255 272 750 806
Phone: +255 272 751 833
Email: info@mocu.ac.tz
Website; www.mocu.ac.tz

January, 2024

EXECUTIVE SUMMARY

1.0 Overview

The Moshi Co-operative University (MoCU) was formed by upgrading the former Moshi University College of Co-operative and Business Studies (MUCCoBS) into a full-fledged University in September, 2014. The main Campus is located about 1.16 km from Moshi Municipal centre. During the academic year 2022/2023, the University had a total number of 9,186 students. According to the corporate strategic plan (CSP), MoCU plans to increase students' enrolment to 13,000 by 2038. This increase requires the expansion of teaching and learning infrastructure. To address emerging needs for additional teaching and learning facilities, MoCU intends to construct a two-story academic building through the support of Higher Education for Economic Transformation (HEET) project. The building will accommodate a video conference, computer workshop, saver room, computer laboratories, staff offices, multimedia studio, and toilets to meet the needs of students and staff including people with special needs. The proposed academic building will cover a total area of 1,390m^2.

Higher Education for Economic Transformation (HEET) is a five-year project funded by the government of the United Republic of Tanzania through the World Bank credit (IDA 68870) to promote higher education for economic transformation. Following the National Legislative requirements and World Bank Environmental and Social Standards (ESSs), World Bank Environment and Social Framework (ESF) and the Environmental and Social Management Framework (ESMF), MoCU commissioned COLBA Consulting Ltd to undertake an Environmental and Social Impact Assessment (ESIA) for the proposed construction of an academic building at the main campus in Moshi.

The Consultant conducted a scoping exercise and filled the environmental impact assessment (EIA) certificate application form before submitting the same to National Environmental Management Council (NEMC) for approval. The Terms of Reference (ToR) which were used to guide the ESIA study was approved by NEMC on 21st June 2023 through its letter (reference number HF 88/145/85/02). This report offers a comprehensive report on the Environmental and Social Impact Assessment (ESIA) study conducted from 7th June 2021 to 14th July 2023 in Moshi.

1.1 Description of the Proposed Project Site

The proposed project site is in an open area within the main Campus and it shares borders with a block wall fence on the west and north sides of about 1m, Nyerere Hall about 15m on the south-eastern side and the Directorate of Undergraduate Study building about 12m in the eastern side. The site is covered by vegetation like six *Tectona grandis* trees, one *Azadirachta indica* tree, one *Peltophorum pterocarpum tree,* eight *Senna siamea* trees, one *Trichilia prieureana* tree and two (2) *Delonix regia* trees and some short grass.

1.2 Policy, Administrative and Legal Framework

In carrying out the ESIA assignment for the proposed project, policies deemed relevant for this assignment were considered. The policies include the National Environmental Policy (1997), the National Human Settlement Development Policy, 2000, the National Water Policy, 2002, the National Sustainable Industrial Development Policy (1996), the National Land Policy (1997), the National Energy Policy (2015), the National Investment Promotion Policy (1996), the National Employment Policy, 2008, the National Policy on HIV/AIDS, 2001, the Construction Industry Policy, 2003, the National Health Policy, 2008, the National Gender Policy, 2000,the National Health Policy 2017, the Education and Training Policy, 2014 and the National Transport Policy, 2003.

The assignment was also guided by relevant laws including: the Environmental Management Act, No.20 of 2004, the Land Act, 1999, the Occupational Health and Safety Authority Act, 2003, the Standards Act No. 2, 2009, the Water Resources Management Act No. 11, 2009, the Environment Impact Assessment and Audit Regulations, Gn No. 349 of 2005 (Revised 2018), Water Resource Management Act, 2009, the Land Use Planning Act No. 6, 2007, Roads Act, 2007, the HIV and AIDS (Prevention and Control) Act, 2008, the Public Health Act, 2009, the

Employment and Labour Relations Act, 2004, the Local Government Urban Authorities Act Cap. 288 R.E 2002, the Engineers Registration (Amendments) Act No. 24, 2007.

Furthermore, the assignment considered Environment and Social Framework (ESF), HEET Project Environmental and Social Management Framework (ESMF), relevant World Bank Environmental and Social Standards (ESSs) as well as international agreements, conventions and treaties.

1.3 Stakeholder Engagement

According to WB Environmental and social standard ten (ESS10) the stakeholder consultations were carried out during the preparation of the scoping report and ESIA study which aims to identify stakeholders' concerns raised during one-to-one session(s). The stakeholders consulted were from the Moshi Municipal Office, Mfumuni Ward Office, Ushirika Street Office, MoCU-Moshi Main Campus, Neighbours, Non-Governmental Organisations (NGOs), Occupation Safety, Health Authority (OSHA), Pangani Basin Water Board (PBWB), Ministry of Education Science and Technology (MoEST) and Fire and Rescue Force, Tanzania Building Agency (TBA), Tanzania Commission for universities (TCU), National Council for Technical and Vocational Education (NACTVET). The major issues raised by each stakeholder were recorded and documented as follows:

i) Increased student Enrolment: The project is anticipated to lead to a significant increase in student enrolment, boosting the University's reputation and attracting diverse students.
ii) Risk of fire break out due improper wiring system, use of sub-standard electrical equipment and mishandling of fuel for generators in use;
iii) Economic Benefits: The project will generate income for entrepreneurs in the project area through business opportunities related to construction, supplies, and ongoing services.
iv) Occupational health hazards and safety risks to workers such as falls, cuts, fractures and electrical shocks, and ailments from harsh ambient effects, pollution and unsanitary conditions
v) Gender-based violence, sexual exploitation and harassment**:** There is a chance that women and youth would be treated unfairly during the project staff recruitment process.

1.4 Description of the major significance environmental and social impacts

The proposed project 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; impaired air quality, and vibration and noise generation; waste generation; occupational safety and health risks and hazards; erosion of cleared areas; and loss of vegetation.

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 and waste generation. The positive Social Impacts to communities are employment, reduction of gender gap in enrolment 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.

1.5 Project Alternatives Considerations

Different alternatives were considered in this study including no project alternative, alternative sites, alternative designs, Energy Alternative and 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, offsite sanitation system was preferred by channelled the generated wastewater via the MUWSA sewer network into Waste Stabilization Ponds (WSP) in Njoro for treatment.

1.6 Mitigation Measures for Potential Impacts

The ESIA identifies potential adverse environmental impacts and proposes measures to mitigate any adverse impacts. Mitigation measures were identified for the following potential impacts:

(a) Noise pollution due to site clearance

With regard to the noise pollution, the following measures will be considered to mitigate the impact:

i) Regular maintenance of all used machines;
ii) Site mobilisation works will be on day time only;
iii) The site will be fenced by iron sheet before levelling; and
iv) Noise protective gears will be provided to workers.

(b) Vegetation clearance

To minimise the environmental impact, vegetation clearance shall be limited to areas strictly required for project implementation. Additionally, a comprehensive tree planting program shall be launched upon project completion to restore the lost vegetation and enhance the ecosystem's resilience.

1.6.1 Dust emission due to site clearance

To effectively minimise dust emission and its adverse effects, a multi-pronged programme involving the following measures will be adopted:

i) Regularly spray water on areas prone to dust generation, such as construction sites, haul roads, and stockpiles;
ii) Enclose the entire construction area with a fence to significantly reduce dust emissions and ensure a cleaner and safer environment for both workers and surrounding communities, and;
iii) Cover cleared materials with appropriate materials while awaiting disposal. This simple yet effective measure can significantly minimise dust emissions and contribute to a cleaner and safer construction site.

1.6.2 Occupational Health Hazards to workers

To mitigate this impact, the following measures will be undertaken:

i) Water spray to all area where dust emission is high;
ii) Regular service of all used trucks including their engines;
iii) Covering all stockpile at the site;
iv) Cover up the waste while it is being transported by truck from the site;
v) Provide safety gears to the site clearance crews, including safety boots, and uniforms;
vi) Create a designated emergency assembly point; and
vii) Provide induction training to the crews.

1.6.3 Health hazards due to mismanagement of hazardous waste

To effectively manage and minimise the environmental impact of hazardous waste generated at construction sites, a comprehensive approach involving proper collection, storage, and disposal will be adopted. This approach shall ensure that hazardous wastes are handled safely and responsibly to prevent harmful substances from entering the environment and pose potential risks to human health and ecosystems.

1.6.4 Pollution due to mismanagement of domestic solid waste

To effectively reduce pollution arising from mismanagement of domestic solid waste, multiple mitigation measures will be employed:

i) Ensuring proper design of systems for collection, transportation and disposal of solid wastes;
ii) Ensuring availability of sufficient bins for disposal. These bins will be clearly labelled for different waste streams, such as organic waste, recyclables, and hazardous waste.
iii) Designing and constructing chambers for collecting waste before transporting it to the dump site. These chambers will be paved and roofed to prevent contamination from spills and ensure proper handling of waste during storage, and;
iv) Sorting of solid waste at source.

1.6.5 Impacts due to HIV/AIDS

To effectively combat the spread of HIV/AIDS in the construction site, a multifaceted approach encompassing sensitization campaigns, voluntary counselling, and testing programs will be implemented. This comprehensive strategy will raise awareness, promote responsible behaviour, and promote access to testing services and safeguard the well-being of construction workers as well as surrounding communities.

1.6.6 Loss of Employment

To effectively mitigate the detrimental impact of job losses after decommissioning, an approach encompassing skill development and social security enrolment will be implemented to empower individuals and safeguard their livelihoods.

1.7 Environmental and Social Management Plan

To address the potential environmental and social impacts of the project, a comprehensive Environmental and Social Management Plan (ESMP) has been meticulously crafted. The ESMP serves as a roadmap for mitigating, eliminating, offsetting, or reducing the project's negative impacts while maximising its positive contributions. The measures and actions outlined in the ESMP will be implemented through a collaborative approach, with the MoCU playing a pivotal role in coordination. The project Proponent bears the responsibility for overseeing the implementation of the ESMP, including the preparation of regular environmental monitoring reports. The total budget estimated for executing the ESMP is TZS 50,500,000, with the contractor assuming the responsibility for this cost. Any additional costs associated with the ESMP will be covered by the client.

1.8 Environmental Monitoring Plan

Throughout the project's operational phase, a rigorous environmental monitoring plan (EMP) will be adopted to ensure project implementation adheres to environmental regulations and established standards. The (EMP) outlines detailed measures for mitigating potential environmental impacts, identifying sampling areas, specifying desired targets and standards, defining monitoring parameters, and establishing the frequency of monitoring activities at various project levels. The plan shall involve the University, Occupational Safety and Health Administration (OSHA) and /or NEMC. The University (client) bears the primary responsibility for environmental mitigation and monitoring during the operational phase. The Occupational Safety and Health Authority (OSHA) and the NEMC will conduct annual Environment Health Safety (EHS) reviews, based on project implementation status and the sensitivity of any emerging environmental issues. These reviews will thoroughly assess the environmental concerns raised and ensure they are addressed effectively. The overall budget for implementing the EMP is estimated at TZS 67,500,000. The contractor will bear the responsibility for covering this cost. Any additional expenses incurred in relation to the ESMP will be borne by the client.

1.9 Environmental Cost Benefit Analysis

Through rigorous and streamlined rapid appraisal methods, potential environmental impacts raised by stakeholders were thoroughly evaluated. These simplified techniques, encompassing focused interviews,

participatory workshops, and rapid site assessments, facilitated a swift and comprehensive assessment of the project's environmental impacts. The assessment revealed that the project is associated with multiple benefits including enhanced teaching and learning environment. Overall, the project is anticipated to operate in an environmentally sustainable manner.

1.10 Decommissioning

While the proposed project is not anticipated to be decommissioned before the completion of the construction contract, decommissioning procedures will be in place for such an event. The primary decommissioning activity will involve demobilising personnel, and equipment as well as clearing the project site. Potential negative impacts of decommissioning include demolition of temporary infrastructure, aesthetic changes to the surrounding area, loss of employment and income for off-site service providers, and noise and dust emissions from demolition activities. Additionally, workers involved in demolition may face safety hazards, and environmental contamination could occur if demolition waste is not managed appropriately. The estimated cost for project decommissioning is TZS 26,000,000, subject to adjustments based on the prevailing economic conditions at the time of decommissioning.

1.11 Conclusion and Recommendation

Based on the comprehensive assessment conducted, it is concluded that the proposed project's activities will have manageable or reversible negative impacts on the biophysical and socioeconomic environments. The extent of these impacts will hinge on the effectiveness of the proposed mitigation measures and the quality of oversight during project implementation. The anticipated environmental, socioeconomic, and cultural impacts of the project are minimal and will neither compromise its value nor implementation. The project is expected to generate more positive impacts than negative ones in the long-run. This ESIA report indicates a high likelihood that the identified negative impacts will be effectively mitigated through the proposed measures. Additionally, all engaged consultants and the client will be obliged to adhere to any additional conditions set by NEMC, OSHA, World Bank ESF, HEET Project - ESMF and other relevant authorities.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATE

ACKNOWLEDGEMENT

Moshi Co-operative University (MoCU), the Project Proponent, would like to express sincere gratitude to all individuals, agencies and institutions who contributed to the completion of this Environmental and Social Impact Assessment (ESIA) study for the proposed construction of the academic building of two storeys at Moshi Main Campus. Special thanks to Moshi Municipal Council, Mfumuni Ward Executive Office and Ushirika community for providing valuable support and collaboration throughout the study.

Further, MoCU would like to thank various government Agencies for their contributions related to specific areas and issues in the project, Occupational Health and Safety Authority (OSHA), Pangani Basin Water Board (PBWB), Tanzania Building Agency (TBA), Fire and Rescue Force and Moshi Urban Water and Sewerage Authority (MUWSA).

MoCU would also like to thank COLBA Consulting Ltd, especially all Key and Non-Key Experts for undertaking this study successfully. Several other persons were involved in one way or another in the execution of this study. To all those, MoCU extends many thanks.

LIST OF ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
AQS	Air Quality Standards
BoQ	Bill of Quantities
CAPP	Child Abuse and Protection Plan
CBA	Cost Benefit Analysis
CCP	Chuo cha Polisi (Tanzania Police School)
CO	Carbon monoxide
CRB	Contractor Registration Board
CSMP	Construction Safety Management Plan
CSR	Community Social Responsibility
dBA	decibel
DoS	Dean of Student
EA	Environmental Audit
EHS	Environmental Health and Safety
EHSG	Environmental Health and Safety Guidelines
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMA	Environmental Management Act
EMO	Environmental Management Officer
EMP	Environmental Monitoring Plan
ERB	Engineer Registration Board
ESCP	Environmental and Social Commitment Plan
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESSs	Environmental and Social Standards
EWURA	Energy and Water Utilities Regulatory Authority
FGD	Focus Group Discussion
GBV	Gender Based Violence
GRM	Grievance Redress Mechanism
GN	Government Notice
H_2S	Hydrogen Sulphide
HEET	Higher Education for Economic Transformation
HIV	Human Immunodeficiency Virus
HPD	Hearing Protection Devices
HSMP	Health and Safety Management Plan
IAP	Interested and Affected Part
ICHF	Improved Community Health Fund
ICT	Information Communication Technology
ILO	International Labour Organization
ISO	International Standards Organization
KCMC	Kilimanjaro Christian Medical College
KIIs	Key Informant Interviews
MCDO	Municipal Community Development Officer
MoCU	Moshi Co-operative University
MoCUSO	Moshi Co-operative University Students Organization
MoEST	Ministry of Education Science and Technology
MUCCoBS	Moshi University College of Co-operative and Business Studies

MUWSA	Moshi Urban Water Supply Authority
NEMC	National Environment Management Council
NEP	National Environmental Policy
NGO	Non-Government Organization
NHIF	National Health Insurance Fund
NO	Nitrogen Monoxide
NO_2	Nitrogen dioxide
NSSF	National Social Security Fund
O_3	Ozone
OSHA	Occupational Safety and Health Authority
PAPs	Project Affected Persons
PGDO	Police Gender Desk Officer
PM	Particulate Matter
PPE	Personal Protective Equipment
ppm	parts per million
PTW	Permit to Work
RPF	Resettlement Policy Framework
SEP	Stakeholder Engagement Plan
SO_2	Sulphur dioxide
STD	Sexual Transmitted Disease
TAC	Technical Advisory Committee
TANESCO	Tanzania Electric Supply Company Limited
TBS	Tanzania Bureau of Standards
TCU	Tanzania Commission for Universities
TDV	Tanzania Development Vision
TGNP	Tanzania Gender Networking Programme
TMP	Traffic Management Plan
ToR	Terms of Reference
TTCL	Tanzania Telecommunication Limited
TZS	Tanzania Standards
URT	United Republic of Tanzania
WBG	World Bank Group
WEO	Ward Executive Officer
WHO	World Health Organization
WSP	Waste Stabilization Pond

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

Moshi Co-operative University (MoCU) came into being as a result of transforming Moshi University College of Co-operative and Business Studies (MUCCoBS) into a full-fledged University in September 2014. The history of MoCU dates way back to 5th January 1963 when the Co-operative College Moshi was established. The College's primary responsibility was training of human resources in the co-operative sector under the then Ministry of Co-operatives and Community Development. The College was subsequently established through the Co-operative College Act No. 32 (Repealed) of 1964 as an autonomous institution with its own Governing Board. In 2004, the Co-operative College Moshi was transformed into MUCCoBS as the Constituent University College of Sokoine University of Agriculture (SUA) through Government Notice No. 172 of 2004. The University is governed by its own Charter, made under the Universities Act No. 7 of 2005.

1.2 Description of the HEET Project

As part of the Higher Education for Economic Transformation (HEET) project, Moshi Cooperative University (MoCU) is among the beneficiaries of a government grant through the World Bank to revitalise its infrastructure and expand capacity to meet the demands of a growing student population. Based on the HEET Project Appraisal Document (PAD) of 2021 the project aims to: modernise teaching, research, and outreach services; enhance the university's ability to contribute to innovation, economic development, and labour market relevance. In response to the increasing enrolment, projected to reach 13,000 students by 2038, MoCU has allocated TZS 2,673,476,369 for the construction of a two-storey academic building in Moshi. This intervention will address the current shortage of adequate and high-quality infrastructure.

Supported by the World Bank, the MoCU main campus plans to construct a two-storey academic building comprising a ground floor and a first floor. The ground floor will feature a video conference room (7.0m x 10.8m), a computer workshop (7.0m x 6.85m), a saver room (7.0m x 3.8m), two computer labs (7.0m x 10.8m each), a reception area (4.0m x 3.0m), restrooms for male and female staff, people with special needs, students, and a cleaner's store. The first floor will include 12 staff offices (3.5m x 7.0m each), a multimedia studio (5.998m x 7.93m), additional restrooms for male and female staff and disabled individuals, a cleaner's store, and restrooms for male and female students. The proposed academic building will have a total area of 1,390 square metres and will be situated on Block "M", section II, Ushirika Street, Mfumuni Ward, Moshi Municipality in Kilimanjaro Region.

The construction of an academic building at MoCU's main campus aims to enhance enrolment in priority disciplines, elevate the relevance and quality of educational programs to align with the evolving demands of the labour market, strengthen system-wide coordination, management, and regulations to foster the overall quality and relevance of higher education in Tanzania. In addition, it will boost graduates' employability through enhanced and demand-driven curricula.

MoCU Main Campus, henceforth referred to as the Project Proponent, has engaged COLBA Consulting Ltd (the Consultant), located at P.O. Box 60132, Dar es Salaam, to conduct a comprehensive Environmental and Social Impact Assessment (ESIA) for the proposed project that adhere to both National Legislative requirements; World Bank ESSs; Environment and Social Framework (ESF) as well as the HEET Project's Environmental and Social Management Framework (ESMF). The Environmental and Social Impact Assessment (ESIA) process unfolded in a series of phases. The initial step involved project registration with the National Environmental Management Council (NEMC). Subsequently, NEMC approved the Terms of Reference (ToR) via its letter with reference number HF 88/145/85/02 (Appendix 2). The approved ToR guided the study that was conducted from June 7, 2021, to July 14, 2023; culminating in the production of a scoping report. This report was submitted to NEMC for review, followed by NEMC verification. Upon completion of these steps, the consultant proceeded to file an application for an ESIA certificate. This application involved the online submission of the scoping report, Terms of Reference (ToR), and a completed ESIA certificate application form to NEMC.

1.3 Project Objectives and Rationale

1.3.1 Main Objective

The HEET Project main objective is to strengthen learning environment and labour market alignment of priority programmes at beneficiary higher education institutions and improve the management of higher education system (PAD, 2021). In order to achieve this the proposed construction project is to enhance the learning environment and foster better alignment between MoCU's priority programmes and the demands of the labour market.

1.3.2 Specific objectives

The project is specifically designed to:

i) Increase enrolment in priority disciplines;
ii) Elevate the relevance and quality of ICT programmes delivery, and;
iii) Enhance the employability of graduates in the labour market.

1.3.3 Rationale

The proposed project demonstrates Tanzania's Development Vision 2025 which embraces the development of high-quality education at all levels. The emphasis goes hand in hand with the education system's transformation by enhancing scientific and technological programmes to increase productivity. More specifically, the focus will be to increase the number of student enrolment, produce graduates who meet the needs of employers, improve the teaching environment with upgraded facilities and learning equipment, strengthen access to a network of specialised trainers, develop a framework of core curricular competencies, quality assurance standards, and state-of-the-art facilities for up-to-date training of the workforce in the region's priority sectors.

Therefore, it is clearly stated in various documents of the Government's development agenda (The National Development Vision 2025, the National Five-Year Development Plan of 2021/2022-2025/2026) that, all development initiative that aims to promote good quality of life, employment and other sustainable economic investments are highly needed and encouraged. The proposed project development is therefore, in line with the national development agenda and its operation will potentially enhance economic and employment gains as it will add the chance for business opportunities, tax and revenue availability.

The National FYDP III 2021/22-2025/26 and the national Higher Education for Economic Transformation (HEET) project 2021/22 – 2025/26 create opportunities for Moshi Co-operative University (MoCU) to expand its training and learning infrastructure and increase student enrolment. This initiative aligns well with the University's Corporate Plan (CP), which aims to address the challenge of inadequate and outdated teaching and learning facilities to meet the ever-growing demand for programs and services in the co-operative sector. The HEET Project at MoCU will support the construction of an academic building equipped with appropriate ICT infrastructure, enabling students to engage in ICT practical training as part of their career development. This technology will facilitate the creation and dissemination of digital content, ultimately strengthening the entire teaching and learning process at the University.

1.4 Nature of the Project

The proposed project falls under the "Type B" classification as per Regulation 5 (1) of the First Schedule of the Environmental Impact Assessment and Audit Regulations (Amendment) 2018. This category of projects is perceived to be associated with moderate adverse environmental impacts. Consequently, a comprehensive assessment is warranted to determine the magnitude, extent, and significance of these impacts and to formulate suitable mitigation measures.

Furthermore, from a risk assessment standpoint, Type B1 projects are categorised as having a "moderate risk" under the World Bank's ESS1 (Environmental and Social Standards: Assessment and Management of Environmental and Social Risks and Impacts). Consequently, the project necessitates a comprehensive ESIA study in accordance with Item 13 "Building and Civil Engineering Industry" sub-items (a), (b), and (c) of the First

Schedule. Sub-item (a) holds relevance to the proposed project. To facilitate the study, the project has been registered at the NEMC following the approval of the scoping study (Appendix 2).

1.5 Objectives of the ESIA Study

1.5.1 Main objective

The primary goal of the ESIA is to identify and evaluate potential environmental impacts associated with the proposed project, assess alternative approaches, and design appropriate mitigation, management, and monitoring measures, adhering to the World Bank's Environmental and Social Standards: Assessment and Management of Environmental and Social Risks and Impacts (ESS1). Considering the nature of the activities to be supported under the project, the ESIA was conducted with full compliance with the ESMF (2021) and the World Bank's guidelines.

The main objective of the assignment is to conduct ESIA for the proposed construction of an academic building at the MoCU main campus. The purpose is to foresee the cumulative environmental and social effects of the proposed project activities before their actual implementation. Therefore, the study addresses the social, economic, and environmental issues associated with the project activities. The study provides relevant plans to prevent or minimise adverse impacts, identify the organisational capacity and competence needed and monitor the plans' effectiveness.

The ESIA study strictly adhered to the approved Terms of Reference (ToR) and comprehensively incorporated all applicable international standards and national legislative guidelines. These include the Environmental Management Act No. 20 of 2004 (Sections 7(f), 81(1), Third Schedule), the EIA and Audit Regulations (2005), and the EIA and Audit (Amendment) Regulations, 2018. Specifically, the ESIA complied with Section 81(1) and the Third Schedule of the Environmental Management Act No. 20 of 2004 (EMA) and Regulation 7(f) of the First Schedule of the Environmental Management (EIA and Audit) Regulations (Amendment), 2018.

1.5.2 Specific objectives

The ESIA study was specifically designed to:

i) Conduct environmental screening and scoping to identify social and environmental issues within the project sites and surrounding areas;
ii) Identify, predict, and analyse both positive and negative social and environmental impacts that the proposed project may face in the foreseeable future;
iii) Develop cost-effective mitigation measures aimed at eliminating or minimising potential negative impacts while promoting positive ones.
iv) Outline the relevant regulations and standards governing environmental quality, health and safety, endangered species protection, and land use control at both the national and local levels.
v) Prepare an Environmental and Social Management Plan (ESMP) and a Health and Safety Management Plan (HSMP) for the construction, operation, demobilisation, and maintenance phases of the project.

1.6 Scope of ESIA Study

The ESIA study aligns closely with the scoping report approved by NEMC and the Terms of Reference (ToR) for this assignment. The ToR outlines the minimum requirements for conducting the ESIA study, providing guidance for the construction of the proposed academic building project. Furthermore, the ESIA study was conducted in line with Environment and Social Framework (ESF) as well as the HEET Project's Environmental and Social Management Framework (ESMF).

Consequently, the scope of this ESIA encompasses the following aspects:

i) **Comprehensive description of the proposed project:** This includes project location, design, components, activities, and all phases of the project lifecycle.

ii) **Thorough analysis of the applicable policy, legislative, and institutional framework:** This involves identifying and examining the relevant regulations, laws, and institutional structures that govern the proposed project.
iii) **Collection, evaluation, and presentation of baseline data:** This entails gathering and assessing existing environmental, socioeconomic, and cultural information about the project's area of influence.
iv) **Engaging in public consultations:** This involves seeking input from relevant authorities, organisations, communities, and any other interested or potentially affected parties.
v) **Identification and assessment of potential impacts:** This involves recognizing and evaluating the biophysical, socioeconomic, and cultural impacts that may arise from the project's implementation.
vi) **Development of mitigation and management strategies:** This involves formulating measures to avoid, minimise, or offset any adverse biophysical and socioeconomic impacts.
vii) **Creation of project-specific management plans:** This includes developing a Health and Safety Management Plan (HSMP), Environmental and Social Management Plan (ESMP), and Environmental Monitoring Plan (EMP), incorporating detailed mechanisms and action plans for impact mitigation.
viii) **Framework for implementation**: This involves creating a system for implementing the ESMP and EMP throughout the project cycle.

1.7 Methodology of the Study

Before commencing the actual fieldwork, a kick-off meeting was held on June 7th, 2023, with the Proponent and key team members. During the meeting, the objectives, scope, logistical coordination, and proposed work plan were finalised. Data collection primarily relied on qualitative methodologies, including focused interviews, participatory workshops, and physical observation. The latter involved not only physical observation but also documentation of relevant biodiversity elements (flora, habitats, fauna, and avifauna), landscape features, physical characteristics, and infrastructure.

Additionally, the process considered the availability and accessibility of utility services, land use patterns, vegetation cover, livelihood options, and areas (if any) reserved for unique socio-cultural events such as traditional rituals. Furthermore, the consultant gathered secondary data from various documents and reports available from different institutions.

Subsequently, a reconnaissance survey was conducted to collect site-specific data. The collected data was then subjected to a comparative analysis to predict potential impacts and recommend mitigation measures to address the project's adverse impacts and risks. All key findings were evaluated against the regulations and guidelines outlined in section 1.5.1.

1.7.1 ESIA Team

A team comprising of multidisciplinary experts in environmental and social fields collaborated to conduct a comprehensive resource assessment. Their tasks included generating baseline data, evaluating potential impacts, and suggesting mitigation measures. The environmental team engaged in interactive discussions with other project professionals, employing a checklist for data gathering, analysis, and presentation.

Reconnaissance investigations were carried out by team members to identify critical elements for analysis and issues relevant to the design and planning process. Regular team meetings were convened to discuss the progress of investigations and analyses, fostering data integration for a holistic understanding of both the natural and built environment systems. Baseline data for the study area were gathered through a combination of desk reviews, field observation and stakeholder consultations.

1.7.2 Communication with Stakeholders

1.7.2.1 Identification of stakeholders

Stakeholders were identified according to their roles and significance in relation to the proposed project, encompassing organizations, groups, or individuals. Extensive consultations were carried out, engaging various institutions and other crucial stakeholders, which included the following

i) Moshi Cooperative University Management
ii) Ministry of Education, Science and Technology;
iii) Moshi Municipal;
iv) Moshi Urban Water and Sanitation Authority (MUWSA);
v) Moshi Cooperative University Students Organisation (MoCUSO);
vi) Ushirika Street and Mfumuni Ward Leaders;
vii) The neighbouring communities to MoCU (Moshi Secondary School)
viii) Staff of MoCU Health Centre
ix) MoCU vendors
x) Tanzania Building Agency (TBA)
xi) Pangani Basin Water Board (PBWB)
xii) Fire and Rescue Force-Kilimanjaro Regional Office
xiii) Occupational Health and Safety Authority (OSHA) Northen zone.
xiv) MoCU HEET Project Implementation Unit

The concern. issues and responses from the identified stakeholders have been presented in Appendix 4-7 of this report.

1.7.2.2 Involvement of stakeholders

The ESIA study team, in partnership with MoCU officials, visited both the proposed project area and the adjacent community. The consultant submitted introductory letters individually addressed to each stakeholder. These letters outlined the project, emphasized the necessity for an ESIA, and encouraged stakeholders to openly express their concerns to the consultants. During these visits, physical observations were made, and interviews with stakeholders were conducted to gather baseline data and identify areas of concern. The Identified Affected Parties (IAPs) were actively engaged through direct consultations, focus group discussions (FGDs), and key-informant interviews (KIIs). These interactions delved into a predetermined checklist of guiding questions and/or issues, prepared beforehand to facilitate discussions. During the consultations, key issues were meticulously presented, discussed, and analysed to assess their significance before being incorporated into the ESIA report. The consultation process and information-sharing sessions were designed to be participatory, allowing IAPs to actively participate through dialogue and discussions on various aspects related to project formulation, design, construction, and operation. Their valuable perspectives and preferences proved to be instrumental in identifying potential impacts and formulating effective mitigation measures.

1.7.2.3 Identification of stakeholders' concerns

The stakeholders raised several issues and concerns. To ensure accuracy, issues raised by individuals or groups were cross-verified through discussions with other groups (triangulation). The significant issues raised by each stakeholder group were summarized and subjected to further analysis. Chapter 5 of this report integrate details of the stakeholders consulted, including names and signatures of those interviewed, along with a record of the main issues raised.

1.7.3 Physical Environment

Data was collected regarding the current physical environment, with a specific focus on aspects such as topography, soils, and general drainage and hydrology cond*itions.*

(a) Climate, soils and topography

Data on climate, geology, topography, and soils was acquired by collating information from existing reports and source agencies. Maps were scrutinized to extract specific data, such as the general area's topography. Additionally, fieldwork was conducted to supplement and validate the existing information concerning topography and soils and to gain first-hand knowledge of other physical aspects.

(b) Hydrology and drainage

The characteristics of surface and groundwater were evaluated through both field investigations and the examination of maps and data from prior reports.

(c) Air quality, Vibration and Noise

Measured {Parameters and Selection of measured air quality, noise and vibration stations

The measured four (4) stations were established/selected based on the norms prescribed by local standards (Environmental Management (Air Quality Standard) Regulations, 2007) and international guidelines. The norms include: predominant wind direction (leeward and windward) at the area during the study, direction to the nearest local communities as possible receptors, size of the area to be covered, the areas where generated air pollutants, noise and vibrations were expected, as well as areas that pollutants from proposed project are likely to disperse to. The measured parameters include: (i) Dust as particulate matter in terms of TSP, PM10 and PM2.5; (ii) Ambient pollutant gases i.e., Sulphur dioxide (SO_2), Nitrogen dioxide (NO_2), Carbon monoxide (CO), Hydrogen Sulphide (H_2S), Methane (CH_4) and Volatile Organic Compounds (VOCs); (iii) ambient noise, and (iv) ground vibrations.

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

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

Ambient pollutant gases

Ambient gases concentrations (i.e. CO, NO_2, SO_2, H_2S, CH_4 and VOC) were measured using "Aeroqual series 500 monitors (S-500)" at four stations. The ambient gases were measured in accordance with the manufacturer's procedure that meets ISO 9001:2008 protocol. The device was elevated at a height of 1.5 meters above the ground; once the device is switched ON, it performs an automatic calibration for three minutes by pumping in fresh air into the sensors so as set the toxic sensors to zero. Ambient pollutant gases were measured at each station during the day and night hours. The measured gases levels were then compared with their respective TBS-NES limits and World Health Organization (WHO) guidelines to check their compliance.

Noise levels

Baseline noise data were recorded at four stations established during the daytime (Lday) and night-time (Lnight) in accordance to ISO 1996 -1:2003 using a digital sound level meter. On taking measurements, the meter was set to the "A" weighed measurement scale, which enables the meter to respond in the same manner as the human

ear. The meter was held approximately 1.5 m above the ground and at least 0.5 m away from hard reflecting surfaces such as walls. Periodic measurements were taken to grasp the mean daytime and night-time hours noise values for each station. The averaged Lday and Lnight values were calculated and compared with their respective local standards and international guidelines.

Ground vibrations

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

1.7.3 Biological Environment

The condition of the flora and fauna in the study area was established through a review of pertinent literature and on-site field investigations. Vegetative communities were identified and categorized into different community types, and the dominant tree species were identified. The properties of the vegetation were described based on the identification process. Fauna information was obtained from existing literature covering reported species, along with field observations.

1.7.4 Socio-Environment

To identify the cultural and social factors linked to the construction and operation of the proposed project, community members in the surrounding areas were interviewed, and an examination of economic and social literature was carried out. Additionally, rapid field appraisal techniques, combined with desk research, were utilized to investigate socio-economic considerations within the project area. These efforts were undertaken to gather information that addresses the factors specified in the provided terms of reference. The factors include:

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

The consultant conducted a thorough evaluation of the project's socioeconomic implications, assessing both the potential positive and negative impacts. The assessment focused on the likelihood of each impact occurring and its potential severity. Potential positive impacts revolved around prospects for job creation, economic growth, infrastructure development and increased property values. The assessment of negative impacts revolved around: displacement of residents and businesses; environmental externalities such as air, water and noise pollution as well as habitat destruction, and increased traffic congestion, especially during construction and post-construction phases

1.7.4.2. Project's Impact Identification

By overlaying project elements onto the existing social and environmental conditions, the potential impacts of the proposed project were discerned. The checklist method was employed to identify impacts, resulting in a comprehensive list of key impacts such as noise pollution and waste management. Additionally, the environmental impact matrix method was used to pinpoint impacts of major concern. A fundamental assumption in this study is that the project will be executed with careful consideration for safety and environmental concerns, utilizing current and practical engineering practices and/or the Best Available Technology Not Entailing Excess Cost (BATNEEC). The schedule for implementing mitigation measures is summarized in the Environmental and Social Management Plan (ESMP).

1.7.4.3. Development of Mitigation Measures

In the EIA process, when impacts, whether adverse or significant, were identified and could not be effectively addressed through design controls, mitigation measures were formulated following the Mitigation Hierarchy. Initially, attempts were made to develop measures focused on avoidance or prevention, followed by efforts to minimise or reduce adverse impacts or enhance potential beneficial impacts. For any remaining significant and moderate residual impacts, additional mitigation measures were devised.

Potential positive impacts revolved around prospects for job creation, economic growth, infrastructure development and increased property values. The assessment of negative impacts revolved around: environmental externalities such as air, water and noise pollution as well as habitat destruction, and increased traffic congestion, especially during construction and post-construction phases.

1.8 Structure of the Report

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

Executive Summary

Table of Contents

Acknowledgement

List of Acronyms

Introduction

i) Project background and description
ii) Policy, administrative and legal framework
iii) Baseline/ Existing conditions
iv) Stakeholders Analysis
v) Assessment of Impacts and Identification of Alternatives
vi) Environmental Mitigation Measures
vii) Environmental and Social Management Plan
viii) Environmental and Social Monitoring Plan
ix) Resource Evaluation / Cost-Benefit Analysis
x) Decommissioning and Closure
xi) Summary and Conclusions
xii) References

Appendices

CHAPTER TWO

2.0 PROJECT DESCRIPTION

2.1 Location and Accessibility

The main campus of Moshi Co-operative University (MoCU) is situated on Block "M" along Ushirika Street in Mfumuni Ward, within Moshi Municipality in the Kilimanjaro Region. The campus is located along Sokoine Road and is approximately 1.16 kilometres from the centre of Moshi Municipality. The campus is readily accessible from Moshi Municipality via well-maintained tarmac roads, which are accessible throughout the year.

2.2 Land Use, Size and Ownership

Moshi Co-operative University (MoCU) has uncontested legal ownership of the proposed project site, holding all necessary documentation to substantiate its ownership. The land, designated for educational use under Use Group "K" and Use Group "O" (Class A) categories as per the Town and Country Planning (Use classes) Regulations, 1960, has been thoroughly surveyed and planned. The entire land area spans approximately 32.62 hectares within the main campus. The envisioned two-story academic building is designed to occupy a total area of 1,390 square metres (Table 2) of legally owned land.

2.3 Site Description

The proposed project site is situated within an open area of the main campus in Moshi, bordered by a block wall fence approximately 1 metre away on the west and north sides. The site is adjacent to Nyerere Hall on the south-eastern side at a distance of about 15 metres and the Directorate of Undergraduate Study building approximately 12 metres away. The GPS coordinates and site location map are provided in Table 1 and Figure 1, respectively. The site is currently covered with vegetation consisting of short grass, six *Tectona grandis* trees, one *Azadirachta indica* tree, one *Peltophorum pterocarpum* tree, eight *Senna siamea* trees, one *Trichilia prieureana* tree, and two *Delonix regia* trees. In addition, the Geotechnical investigation report shows that the proposed site is suitable for the construction of the academic building.

The envisioned academic building will complement the extensive existing infrastructure on the campus, which includes a multipurpose hall, lecture halls, seminar rooms, administration blocks (Plate 1), health centre buildings, canteen buildings, Ushirika stadium, security guard offices at the two main entrance gates, and student hostels. The proposed site seamlessly integrates with these existing facilities through a well-maintained internal road network.

Moreover, the proposed site enjoys convenient access to the nearby TANESCO power line, ensuring a reliable electricity supply. Additionally, two standby diesel-powered generators serve as an alternative power source, providing backup in case of any disruptions to the main power supply. The site also boasts ample water storage capacity, with one elevated concrete water storage tank capable of holding 45,000 litres and one ground concrete water storage tank with a storage capacity of 65,000 litres. This ensures a consistent supply of water for various purposes.

Safety measures have been prioritised, with a designated emergency evacuation assembly point readily accessible. The site also features a well-maintained garden, contributing to pleasant and conducive learning. In addition to the existing water storage tanks, the site benefits from a robust water supply infrastructure provided by the Moshi Urban Water Supply and Sewerage Authority (MUWSA). Two drilled boreholes further supplement the water supply, with the boreholes serving as the primary water source. Moreover, the site features a sewer pipe network that connects to the MUWSA sewer line, ensuring efficient management of domestic wastewater.

Plate 1: Administration building within MoCU main Campus
(Source: Field Visit on 7thJune 2023)

Table 1: GPS Coordinates of Proposed Site

Point	Latitude (S)	Longitude (E)
1	-03.33486^0	37.33741^0
2	-03.33495^0	37.33724^0
3	-03.33469^0	37.33712^0
4	-03.33459^0	37.33737^0

Source: Field Visit on 7th June 2023

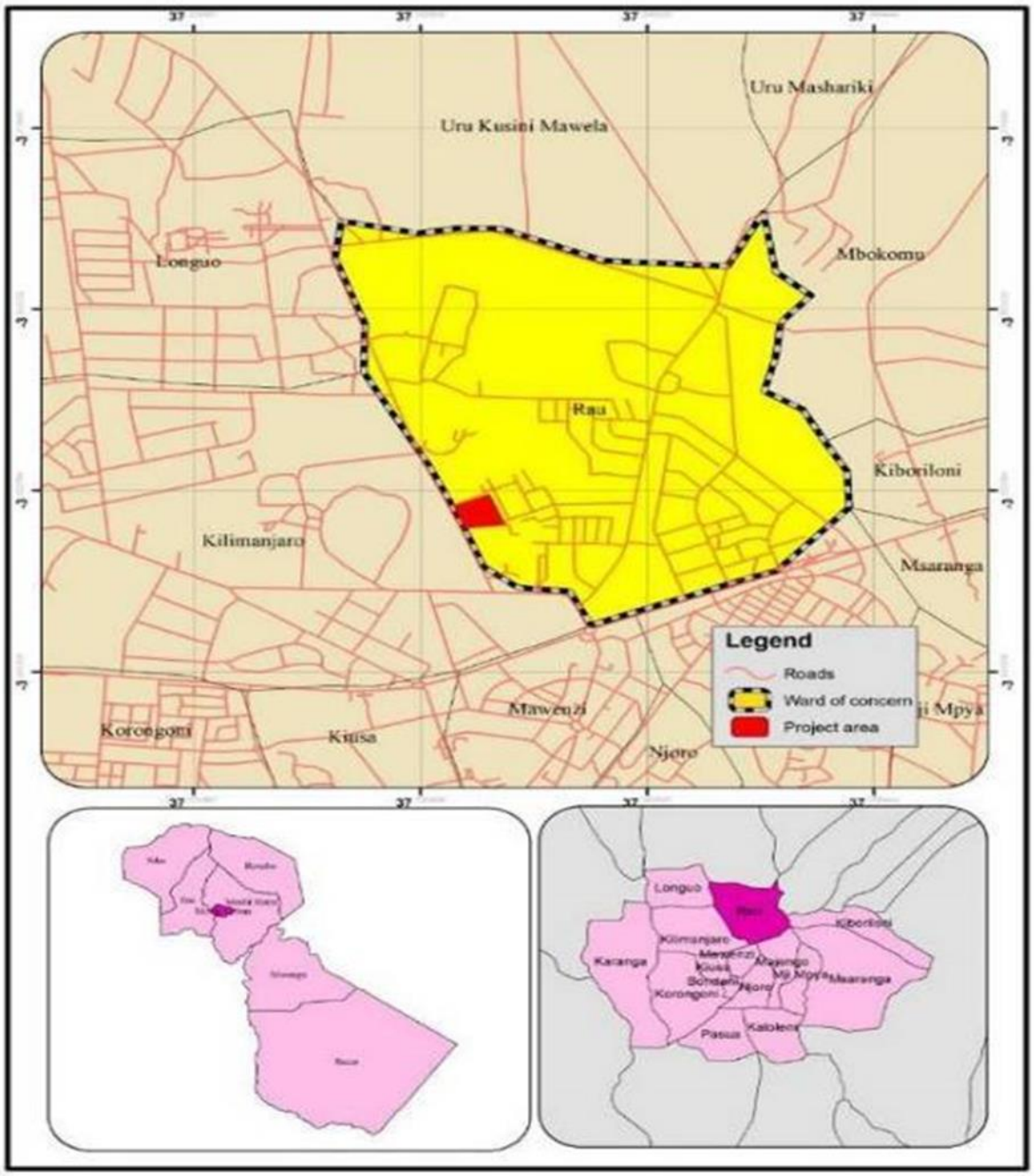


Figure 1: MoCU main Campus site location map

Source: Field Visit, June 2023

2.4 Project Activities

Throughout the project's lifespan, from the design and mobilisation phases to the construction, operation, and decommissioning stages, a range of activities will be implemented. Among others, the implementation of the activities will be guided by the HEET Project Operational Manual (POM, 2021) These activities are comprehensively summarised in the following sections.

2.4.1 Project design

The project involves the construction of a two-story academic building that incorporates architectural principles to maximise user comfort and energy efficiency. The building's orientation has been carefully considered to minimise

the impact of harsh sunlight while optimising its potential as a source of renewable energy. The design also ensures that the building meets user specifications and allows for ample natural ventilation and green spaces.

The proposed academic building will incorporate comprehensive safety measures to minimise the risk of accidents and injuries to workers, staff, students, and visitors. Clearly visible safety warning signs will be strategically placed throughout the building. These signs will be designed to reflect light transmission, ensuring optimal visibility during night-time. The safety warning signs will prominently display essential safety information, including emergency exit routes, firefighting equipment locations, and emergency assembly areas.

The building will include a designated storage room designed to meet stringent safety and storage standards. The storage room's floor will be paved with concrete and maintained clean and dry. The interior walls, ceilings, and floors will be constructed using non-flammable materials with a minimum fire resistance rating of two hours. The storage room will be clearly marked with appropriate signage and provide two designated exit routes. Additional considerations for the storage room include: Ample natural ventilation to ensure adequate air circulation, at least one large sink for handwashing and equipment cleaning; A safety shower and eyewash station for emergency response, and; appropriate fire extinguishers strategically placed within the room.

A dedicated area for storing cleaning materials will be provided, with each chemical substance assigned a designated storage location. Strict adherence to storage arrangements will be enforced to prevent potential hazards. Clear instructions will be posted to ensure proper segregation of incompatible materials, such as flammable, reactive, and toxic substances. The design will ensure that the two buildings adhere to World Bank Environmental and Social Standards including WB ESF and the HEET project's ESMF.

2.4.1.1 Prioritization methodology and technical design of buildings

The proposed academic building will prioritise environmental and social considerations. The building's design will strategically incorporate solar energy utilisation, minimising reliance on conventional fossil fuels. This will not only reduce the building's carbon footprint but also contribute to energy independence and cost savings. Water-efficient fixtures and appliances will be installed to minimise water consumption. This will promote sustainable water management practices. The building will be designed to accommodate the needs of individuals with disabilities, ensuring equal access and participation for all users. This includes features such as ramps and accessible restrooms. By prioritising universal accessibility, the building fosters an inclusive and welcoming environment for all members of the academic community. By incorporating these environmental and social considerations, the proposed academic building demonstrates a commitment to sustainability, climate change and variability, environmentally friendly practices, resource conservation, and inclusivity in all phases of the project. This aligns with the university's values of environmental stewardship and social responsibility.

(a) Use of Energy

The proposed academic building will be designed with a focus on energy efficiency and sustainability. The design will incorporate several strategies to reduce energy consumption and minimise the building's environmental impact. The design will seek to maximise the use of natural light and ventilation: the building will be oriented to maximise the use of natural daylight thereby reducing the need for artificial lighting during the day; natural ventilation will also be utilised to minimise the reliance on air conditioning systems, which will conserve energy and improve indoor air quality.

Other strategies will hinge on photo sensor controls that will be installed to automatically adjust lighting levels based on ambient light conditions, which will further reduce energy consumption and ensure that lighting is only used when necessary, and; Installation of energy-efficient lighting and appliances that will be used throughout the building to minimise further energy consumption. Moreover, construction materials with high thermal insulation properties will be used to reduce heat gain from the outside during hot seasons. This will help maintain a comfortable indoor temperature and reduce the need for air conditioning.

By implementing these strategies, the proposed academic building will significantly reduce its energy consumption and environmental footprint. This aligns well with the national commitment to sustainable and responsible resource management. Future endeavours to harness the use of solar power will consider the following:

(i) Building orientation and shading

To optimise the performance of the photovoltaic (PV) system, it is crucial to mount it on the south-facing segment of the building and minimise shading from surrounding vegetation. Additionally, ensuring that adjacent structures, particularly on the building's south-facing side, are properly configured is of paramount importance.

(ii) Roof design and specifications

To accommodate a solar photovoltaic (PV) system, the roof structure must be capable of supporting the weight of the PV equipment, which typically ranges from three to six pounds per square foot. Additionally, a thorough analysis of rooftop wind loads should be conducted in advance to guarantee that both the roof structure and the solar equipment can withstand the expected wind forces.

(iii) PV Equipment and installation considerations

Anticipating the placement and mounting methods of PV panels can significantly streamline the installation process. For instance, if penetrating hardware is to be used for panel mounting, building owners can proactively install the mounting brackets during the roof installation phase. Additionally, electrical conduits will need to be routed from the PV system to the building's electrical panel. Planning the location and configuration of PV electrical equipment, including the inverter, other balance-of-system components, and safety equipment, can be seamlessly integrated into the roof design process.

To facilitate a seamless and cost-effective PV system installation in the future, it is essential to incorporate PV system considerations into the roof design process from the outset. Proactive planning and early integration of PV system elements, such as pre-installing mounting hardware, routing electrical conduits, and configuring electrical equipment, streamline the installation process and minimise disruptions.

(b) Efficient use of water

The project will be designed with water efficiency in mind throughout all phases. Easy-to-clean surfaces will be incorporated to minimise water usage. Sustainable water-saving measures will be implemented, including the installation of water-efficient fixtures in toilets, such as low-flow toilets and low-flow lavatories, sinks, and shower heads. During the operational phase, the user department will be responsible for closely monitoring and promptly replacing or repairing old and leaky units to ensure continued water efficiency.

(c) Efficiency use of materials

The selection of materials for interior spaces will be carefully examined to guarantee the realisation of sustainability goals. To ensure compliance with building standards, material choices should prioritise sustainability criteria. Thus, the designer should opt for materials that exhibit non-toxic and breathable characteristics. The design process should carefully consider embodied energy, long-term performance, aesthetic appeal, and salvage potential.

(d) Efficient use of site

To effectively utilise the available space, designers must carefully consider how people will interact with the proposed building and its surroundings. Designers should clearly understand human behaviour patterns, preferences, and needs. Architects should endeavour to create spaces that promote usability, accessibility, and a sense of well-being. To achieve these desires, the designers are required to uphold the sustainable design principles that underscore the importance of preserving the natural environment; ensure the designed building is integrated with its surroundings, creating a harmonious relationship between the built environment and the natural

landscape. Moreover, designers should carefully consider the placement and intensity of exterior lighting fixtures, ensuring that they are directed downwards and shielded to prevent unnecessary light spillage. In summary, creating sustainable and people-centric designs should consider the impact of buildings on both people's well-being and the natural environment. This focus has the potential to contribute to the development of healthy, sustainable, and harmonious communities.

(e) Considerations for people with special needs

The designer will consider people with special needs in a building design. The design will consider installation of toilets and handrails (in key areas) for people with special needs and simplify pool entry. Where necessary the design will also incorporate portable lifts or manually folding ramps on all automated lifts, bridge-plates, and ramps to deal with platform-level issues; visual and tactile warning systems at the edge of platforms or full safety barriers along the entire platform; railings and posts painted in bright contrasting colours; audible signs to help people with visual impairments find gates and identify assistance technology used to adapt an automobile display for people with special needs and the hallways should be of 1.07m its wide in minimum.

Designers should incorporate features that cater to the needs of people with special needs, ensuring that the building is accessible and inclusive for all. The designers should consider: Installing toilets and handrails in key areas specifically designed for people with special needs; pool entryways that are easy to navigate for people with mobility challenges; incorporating portable lifts or manually folding ramps, alongside automated lifts, bridge-plates, and ramps, to addresses platform-level accessibility issues. The designers should also consider visual and tactile warning systems, or full safety barriers, along the edges of platforms to provide clear guidance for people with visual impairments. Where relevant, the designers should consider painting railings and posts in bright contrasting colours to enhance visibility and safe navigation for people with visual impairments.

The designers of the proposed project might also consider incorporating assistive technology (AT) tools to further enhance the user experience for people with special needs. AT encompasses a wide range of technological items, devices, software, product systems, or any equipment that can be utilised to improve functionality, increase capability, and enhance the work performance of individuals with special needs.

(f) Construction waste management

The increasing awareness regarding the environmental impacts from construction waste calls for the need to manage construction waste. Therefore, the project will develop a waste management plan that will address waste management from all construction activities. This will help to protect the environment since wastes from construction and demolition works contribute significantly to environmental pollution

(g) Reduce, Reuse & Recycle Strategy

Effective waste management requires awareness of the impact of construction waste on the environment. The project can potentially generate substantial waste, including debris from demolition, excavation, and construction activities. This waste could end up in landfills, contributing to environmental pollution and depleting valuable resources. In response to these concerns, the proposed project should implement a comprehensive waste management plan that addresses waste management throughout all construction phases. This proactive approach will minimise waste generation, promote resource recovery, and ensure responsible waste disposal. The waste management plan should consider: reducing waste generation at the source, such as careful selection of materials, efficient construction practices, and minimising over-ordering of materials; segregating waste streams at the construction site to facilitate recycling and diversion from landfills; identifying opportunities to reuse or salvage materials from demolition or construction activities, which reduces the need for new materials and conserves resources, and; ensuring that non-recyclable waste is disposed of responsibly in designated landfills or through approved waste disposal methods.

(h) Interior design of a building

Architectural and interior design parameters should encompass a wide spectrum of considerations, ranging from physical aspects like aesthetics to technical aspects like sustainability. The focus of the design should not only consider creating spaces that are not only visually appealing but also functional, comfortable, and environmentally sound. The interior design should consider the use of sound-absorbing materials, such as acoustic panels and carpeting, that can significantly reduce ambient noise levels, making spaces more conducive to relaxation, productivity, and focused work. The design should carefully consider the interplay of various elements, including texture, pattern, form, scale, light, and colour, to create harmonious and inviting environments.

(i) Corridor and pathways

In office settings, exit pathways and corridors should be well-designed to ensure safe evacuation during emergencies. To maintain safety and comply with OSHA and standards for fire protection, specific requirements must be met regarding exit access and door widths. The design should consider standard thresholds including a minimum exit access width of 0.914 metres (3 feet) and a minimum door width of 0.813 metres (2 feet 8 inches).

Other critical issues worth considering include a clear signature, which should be visible and strategically placed to guide occupants toward emergency exits; confirming that lighting is provided throughout exit pathways and corridors to warrant clear visibility during evacuation; ensuring pathways and corridors are clear of clutter, debris, or any obstructions that could hinder movement, and; instituting regular inspection and maintenance of exit doors, hardware, and signage to ensure proper functionality.

(j) Potential consideration in building design

Architects, designers, engineers, and other construction professionals to be engaged in the proposed construction should prioritise sustainability throughout the entire building process. It is imperative to meet a range of objectives, including resource and energy efficiency, reduction of CO_2 and GHG emissions, pollution prevention, noise mitigation, improved indoor air quality, and harmony with the surrounding environment. Achieving these goals requires the adoption of energy-saving practices, optimization of material usage, and minimization of material waste. Energy-efficient design strategies, such as optimising building orientation, utilising natural ventilation and daylighting, and employing high-performance building materials, are worth pursuing because they can significantly reduce energy consumption. Similarly, it is crucial to promote the use of locally sourced and recycled materials to reduce transportation emissions and support local economies. Opting for materials with low embodied energy is an important milestone towards reducing the project's environmental footprint.

It is vital to effectively implement waste reduction strategies, such as careful planning and ordering of materials, utilise prefabrication techniques, and adopt efficient construction practices so as to reduce waste generation. These strategies not only conserve resources but also lower disposal costs and promote a more environmentally conscious approach to construction.

Table 2: Project Design Components

Building type	Design Components	Designed Use	Area Coverage m^2
Two Storey Academic Block	Ground floor	One video conferencing room measuring 7.0 metres by 10.8 metres; one computer workshop measuring 7.0 metres by 6.85 metres; one saver room measuring 7.0 metres by 3.8 metres; two computer labs, each measuring 7.0 metres by 10.8 metres; a welcoming reception area measuring 4.0 metres by 3.0 metres; two in one room toilets for males staff; two in one room toilets for females staff; two in one room toilets for males disabled; two in one room toilets for females disabled; two in one room toilets for male students; three in one room toilets for females students, and; one room for cleaner store.	1,390m^2
	First floor	Twelve individual staff offices, each measuring 3.5 metres by 7.0 metres; multimedia studio measuring 5.998 metres by 7.93 metres; two in one room toilets for male staff toilets; two in one room toilets for female staff; two in one room toilets for males with special needs; two in one room toilets for females with special needs; one room for cleaner store; two in one room toilets for males students; three in one room toilets for females students, and; one store room for cleaners.	1,390m^2
Total floor area for academic block			2,780m^2

2.4.2 Mobilisation and Construction Phase

2.4.2.1 Mobilisation

The mobilisation phase will mark the commencement of the project's execution. It will be initiated once all necessary permits and approvals are secured. During this crucial phase, the contractor will undertake several essential tasks to prepare the site for construction activities:

i) **Personnel Recruitment:** The contractor will assemble the project team, hiring both administrative and engineering personnel to manage and oversee the construction process;
ii) **Equipment Transfer:** Essential construction equipment will be transported to the site, ensuring that the necessary tools and machinery are readily available for construction works.
iii) **Construction of Temporary Facilities:** To provide a secure and functional workspace for site management and security personnel, temporary buildings will be constructed. This includes a site manager's office and a security office.
iv) **Equipment Assembly:** Construction equipment will be assembled and prepared for operation, ensuring its readiness for the upcoming construction tasks.
v) Materials Yard Establishment: A designated materials yard will be established to organise and store construction materials effectively. This will ensure that materials are readily accessible and protected from damage.

2.4.2.2 Construction

The construction phase will mark the transformation of the project's blueprint into a tangible structure. This comprehensive phase will involve several activities including the initial step to excavate the foundation, creating a solid base upon which the structure will rest; transportation of construction materials, including concrete, steel,

and other essential components to ensure a steady supply for the construction process; pouring and carefully moulding concrete to form the building's foundations, walls, and other structural elements.

Other activities will entail erecting the building's framework, floors, and exterior walls; bracing and installing structural elements, such as beams, columns to provide the building with stability and support; embedding electrical and water conduits within the structure to facilitate the distribution of electricity and water throughout the building; undertaking finishing works, including plastering, painting, and flooring installation to create the desired interior and exterior finishes and; performing minor civil works, such as landscaping, paving, and drainage systems to enhance the functionality and aesthetics of the surrounding.

(a) Materials to be used for the construction phase

The construction of the proposed academic building will draw upon a range of essential materials, each playing a crucial role in shaping the structure and ensuring its functionality. These materials include cement that will serve as the binding material to hold together sand and aggregates, forming the foundation, walls, and other structural elements of the building; sand that will be mixed with cement and water to create mortar to fill gaps and provides a smooth surface for masonry work, and; aggregates to provide the bulk and strength to concrete thereby enhancing its load-bearing capacity.

Other construction materials will include steel reinforcement bars to provide tensile strength, enabling the structure to withstand tension and resist cracking; timber that will potentially be used for structural framing, flooring, and other interior applications; bricks that will be employed for wall construction, providing strength, fire resistance, and a traditional architectural aesthetic, and; corrugated sheets that will be mainly used for roofing and where appropriate fencing.

Contractors might consider procuring these materials domestically. This arrangement will not only reduce transportation costs and support local industries but also promote sustainability by minimising the negative environmental impact associated with long-distance transportation.

(b) Quality control for construction materials

In the proposed construction, quality control will play a pivotal role in ensuring that the building meets the highest standards of strength, serviceability, and long-term durability. Designers should consider reducing the overall life-cycle cost of a building, minimise future maintenance expenses and maximise the value of the investment. Thus, they should prioritise the use of high-quality concrete, a fundamental building material that significantly impacts the structure's durability and longevity. The contractor should select concrete with superior strength and resistance to fire and bacterial growth to extend the building's service life, minimise annual maintenance costs and ensure the well-being of its occupants. It is also recommended to use concrete with an easily cleanable surface to facilitate regular maintenance and upkeep, further enhancing the building's long-term performance and reducing the burden of future maintenance expenses

Quality control within the project will encompass the examination of mechanical properties in steel bars through diverse techniques, including tensile testing, bending testing, impact testing, and visual Inspection. Visual Inspection, a straightforward yet effective quality control method, involves scrutinising the surface of steel bars for defects or deformities. This approach will be employed in conjunction with other testing techniques to ensure the high quality of steel bars. The materials anticipated for use in this project are outlined in Table 3.

Table 3: Estimated Materials for the Proposed Construction

Type of materials	Quantity	Potential Source
Aggregates	595 m3	Local Supplier i.e KIA borrow pits
Cement	6810 bags	Locally available in Moshi Municipal

Sand	604 m3	Local Supplier i.e *Nyumba ya Mungu* borrow pits
Water	4.5m3 per day	MUWSA
Steel bars	44 tones	Local supplier in Moshi Municipal
Iron sheets	200pcs	Local supplier in Moshi Municipal
Electrical cables	25 rolls	Locally available
Timbers	640 pcs	Local supplier in Moshi Municipal

Source: Field Visit on June 2023

(c) Storage facilities and materials yard

A storage facility will be established on-site to store building materials required during the construction phase. Bulky materials like aggregates, sand, steel bars, cement, and others will be appropriately stored at the designated project site. The project Proponent will implement storage mechanisms to ensure the well-being of construction workers, students, staff, visitors, and the communities/local vendors around the construction site. The project developer will procure construction materials as needed at each stage of the project construction to prevent the accumulation of building materials and facilitate proper storage on-site.

The materials from the borrow pits will be transported by trucks to the construction site. Upon delivery, some materials will be used right away, while others like gravel, stones, and sand will be stacked in designated backyards to be established on-site. Storage of construction materials will be conducted in a specified yard or facility within the project site. The selection of potential site locations will primarily consider factors such as the required land size, available space, accessibility, haulage distances for transferring construction equipment, and the presence of sensitive environmental and social receptors within and adjacent to the site.

(d) Machinery and equipment

A diverse range of equipment and machinery will be employed throughout the construction phase, as outlined in Table 4.

Table 4: Equipment and Machinery to be Used During Construction

SN	Machinery/Equipment	Activity required
	Construction Equipment: Type and Characteristics	
1.	Backhoe excavator	General earthworks, e.g., excavation of drains
2.	Bulldozer with ripper	General earthworks
3.	Wheel loader	General earthworks and transport of concrete
4.	Motor grader	General grading works, including earthworks
5.	Vibrating/sheep foot roller compactor	Compaction works
6.	Truck-mounted crane	Lifting of construction materials e.g., precast culverts, paving blocks
	Construction Machines	
1.	Concrete mixer	Preparation of concrete (batch concrete mixing)
2.	Concrete truck mixer (mobile concrete mixer)	Concrete mixing
3.	Small site dumper	Transport of construction and waste materials
4.	Quarry dump trucks	Transport of stones and aggregates
5.	Dump trucks	Transport of construction materials and wastes
6.	Concrete batch plant	Concrete mixing in a concentrated way
7.	Equipment for geotechnical investigations	Geotechnical investigation works
8.	Concrete vibrator and poker	Vibrating concrete

SN	Machinery/Equipment	Activity required
9.	Dewatering pump	Dewatering to allow for waterless construction
10.	Generator, mobile workshop, welding facilities	Repair and maintenance of machinery and equipment
	Transport Facilities	
3	Light duty vehicles	Transport of light construction materials and machines
4	Water tanker truck	Dewatering of earth surfaces to attain effective compaction, minimising generation of dust
5	Dump trucks	Transport of construction materials (sand, gravel, aggregates, cement etc.)

Source: Field Visit, June 2023

2.4.2.3 Demobilisation of construction phase

This phase encompasses operations associated with concluding the construction phase of the proposed project. Activities to be undertaken during this stage will involve dismantling temporary structures constructed to support the construction phase, disassembling installations and equipment in the workshop, and transporting any remaining construction materials from the site back to the contractor's office. Additionally, all machinery utilised during the construction process will be taken off-site.

i) Trees planting programme

The tree planting programme will involve the introduction of indigenous trees to replenish those removed during the construction phase, along with the establishment of a garden to enhance the aesthetic appeal of the area. Contemporary gardens will be designed to fill open spaces post-construction and preserve the land's greenery. This effort aims to mitigate the impact of wind on features and prevent soil erosion.

2.4.3 Operation phase

The anticipated activities during the operational phase will include:

i) Daily academic activities;
ii) Utilisation of the academic building by staff and students;
iii) Operation and maintenance of the building and ancillaries;
iv) Training on health and safety management;
v) Training related to hazard management;
vi) Waste management, and;
vii) Storage and management of maintenance materials and equipment.

2.4.4 Decommissioning phase

The decommissioning phase will mark the final stage of a project's life cycle. It will encompass dismantling, removal, and disposal of structures, equipment, and materials that will no longer be needed or have reached the end of their useful life. The process will be carefully planned to ensure safe, environmentally responsible, and cost-effective closure of projects. The process entails restoring the project site to its original state or preparing it for a new purpose, minimising environmental impact and maximising the site's value; safe removal of hazardous materials and remediating contaminated sites to mitigate environmental risks and safeguard public health. Additionally, the process will also focus on: recovering and reusing valuable materials from the decommissioned structure, reducing the demand for similar resources promoting sustainable practices, and ensuring adherence to environmental regulations and overseeing the proper disposal of hazardous materials and waste.

In summary, decommissioning shall ensure a sustainable and responsible approach to the closure of projects. Through careful planning, execution, and adherence to environmental regulations, it will minimise environmental impact, conserve resources, and pave the way for future development.

2.5 Waste Generation and Management

2.5.1 During construction phase

Waste management shall be an integral aspect of sustainable construction practices. Its implementation will seek to minimise the environmental footprint from construction waste, conserve resources, and contribute to a more sustainable future. The practices to be adopted will encompass segregation, recycling, and environmentally friendly disposal methods. Table 5 outlines the significant waste generation related to the project construction, along with the corresponding methods for treatment and disposal.

Table 5: Waste Generation and Management during Construction Phase

Type of waste	Sources	Disposal / Management Procedure
Debris and Rubble (overburden)	● Site clearance ● Excavation for foundation and storm water channel	The collected debris and rubble will undergo thorough sorting to eliminate any hazardous materials or contaminants. Subsequently, the sorted materials will be stockpiled near the construction site, serving either as a base material for other construction projects or for site recovery purposes after the completion of construction.
Biodegradable Materials Mainly Domestic Waste (food, paper, wood etc.)	● Construction crew ● Offices	Biodegradable materials will be gathered and placed in designated areas for temporary solid waste collection, awaiting transportation to authorised dump sites by Municipal trucks. This will enhance solid waste segregation, promoting the reuse of other garbage and aiming to minimise the volume of waste sent to dumpsites.
Non- biodegradable materials (Plastic, glass, cut piece of reinforcement bar)	Construction crew	These wastes will be gathered and placed in a specially designated area for temporary storage of hazardous waste, awaiting pickup by authorised dealers for proper hazardous waste disposal.
Domestic wastewater	Toilets and floor cleaning	The waste will be directed into the sewer pipe network, which connects to the Municipal sewer line leading to the Waste Stabilization Ponds (WSP) situated in the Njoro area for treatment.
Gaseous emission	Trucks delivering construction materials and machines used during compaction	All used machines will regularly be serviced to avoid incomplete fuel combustion and recommended fuel will be of low sulphur contents as per EWURA standards

Type of waste	Sources	Disposal / Management Procedure
Dust emission	Excavation, trucks passing on unpaved roads and construction materials at the site.	Water spray practice shall be employed twice a day for all areas where dust emission is expected. All stockpiles found at the site shall be covered with suitable materials.

Source: Field Visit, June 2023

2.5.2 During operation phase

2.5.2.1 Solid Wastes

At its peak occupancy, the proposed academic building is anticipated to accommodate up to 376 individuals. During this period of full operation, a variety of solid waste is expected to be generated, including waste paper, packaging materials, plastics, and organic waste (food scraps). The project will ensure that all solid wastes are sorted at the source to promote proper solid waste management. The collected recyclables will be sorted according to their type, including papers, bottles, plastics, food and general waste, office waste, paper, and cardboard. All decomposable waste will be stored in separate chambers before being collected by authorised dealers and transported to the designated dump site. Similarly, plastic bottles will be collected in separate chambers and taken by authorised dealers for disposal. The collection of solid waste from the project site to the dump site will be carried out twice a week by Municipal trucks.

2.5.2.2 Liquid waste

The day-to-day operations of the academic building are expected to generate liquid waste, primarily in the form of domestic wastewater from washrooms. It is estimated that approximately 17.664 cubic metres of wastewater will be produced daily. Aligning with the Ministry of Water's Design Manual of 2009, roughly 80% of the consumed domestic water will be transformed into domestic wastewater. This wastewater will be channelled into the sewer network connected to the MUWSA sewer line and transported to the Waste Stabilization Ponds (WSP) in Njoro for treatment.

2.5.2.3 Hazardous waste

The proposed construction activities will generate large quantities of waste materials both liquid and solid. About 100 litres of used oil will be generated per 6 months and about 150 kg of scrap metal will be generated during the same period. In general, hazardous waste shall be properly disposed of or prepared to be handled by an authorised agent. As a general rule, all hazardous waste must be properly managed and disposed of in a responsible manner.

2.5.2.4 Electronic waste (E-waste)

The operation of the project is expected to generate electronic waste (e-waste), including damaged bulbs, computer components, printer cartridges, TVs, and cable wires. An estimated 250 kilograms of e-waste will be produced every six months. This e-waste will be collected in designated containers labelled for e-waste management and stored on-site until proper disposal arrangements are made.

2.5.2.5 Stormwater management

To maintain proper drainage functionality and prevent waterlogging, the project developer will ensure that the project design integrates seamlessly with the existing stormwater drainage system. During the construction phase, measures will be taken to safeguard the existing drainage system from any potential damage or obstruction. Upon completion of the construction phase, the project developer will ensure that the entire area is paved with concrete, facilitating the unobstructed flow of stormwater towards the drainage system.

2.5.2.6 Waste generation and its management during Decommissioning phases

In the decommissioning phase, much of the demolition waste will be generated, these will among others include demolished concrete from foundations, mild steel from piping, and some paint remains. Table 6 shows the sorts of wastes that are expected to be generated during this phase.

Table 6: Wastes to be Generated During Decommissioning Phase

S/N	Types of Waste	Quantity	Management
1	Concrete	30m^3	To be sorted and reuse for street road maintenance
2	Electrical wastes	3kg/day at generation rate of 0.1kg/day/person	To be sold to authorised dealers registered by NEMC
3	Timber	2000kg	Reused as firewood
4	Plastics	6kg/day at generation rate of 0.2kg/day/person	Collected by authorised dealers for recycling
5	Scrap metal	3kg/day at generation rate of 0.1kg/day/person	To be collected and sold to authorised dealers for scrap waste management (with permits for scrap waste collection and disposal)
6	Domestic solid waste	19.86kg/day at generation rate of 0.662kg/d/person	To be sorted and collected into dustbins while waiting for collection schedule from Municipal trucks into Mtakuja dumpsite

Source: Field Visit on June 2023

2.6 Summary of Proposed Project Schedule

The project schedule will provide a detailed overview of the activities involved in implementing the proposed project, along with the estimated time duration for each task. It is crucial to acknowledge that the proposed time-frame outlined in Table 7 of this report may be subject to modifications due to unforeseen circumstances, such as the client's financial constraints or other uncontrollable factors.

Table 7: Summary of the Proposed Project Schedule

S/N	PROJECT PHASE	No of workers	TIME FRAME	CURRENT STATUS
1	Project Design and Environmental Study	4	4 months	Ongoing
2	Project Mobilisation	10	1 month	Yet to be done
3	Project Construction	30	8 months	Yet to be done
4	Project Demobilisation	10	1 month	Yet to be done
5	Project Operation	5	50 years	Yet to be done
6	Project Decommissioning	15	5 months	Yet to be done

2.7 Project Supporting Facilities

2.7.1 Labour force

The anticipated project activities are projected to engage approximately 70 individuals, comprising both skilled and unskilled labour. This workforce will include labourers, senior managers, middle and junior managers, as well as part-time support staff/hired staff and technicians. Additionally, there will be on-site workers responsible for maintaining good housekeeping, ensuring the well-being of students, staff, and non-staff workers, and safeguarding the environment throughout the project's lifespan.

Priority for employment of unskilled labour will be given to local communities in and around the project site. However, skilled staff that will be recruited from various locations during the project implementation will include:

i) Engineers for the overall supervision of construction works;
ii) Surveyors;
iii) Technicians to oversee artisans;
iv) Other skilled labourers, encompassing artisans specialising in woodwork, steel fixing, concrete works, metalwork, operators and drivers for the operation of construction machinery, equipment, heavy-duty trucks, and light-duty vehicles, as well as construction machines. Additionally, support staff such as accountants, may also be needed.

Employment opportunities within the proposed project will adhere to the employment and labour laws of the United Republic of Tanzania. Equal employment opportunities will be provided to both qualified males and females. Seasonal employees will not be issued contracts; instead, their compensation will be based on performance. The strict prohibition of child labour will be enforced throughout the project implementation following the Contractor's Child Abuse and Protection Plan (CAPP). During its operational phase, the proposed academic building is anticipated to accommodate a total of 376 individuals, comprising both staff members and students.

2.7.2 Sources of water

The project's operations will primarily rely on water provided by the MUWSA and boreholes as an alternative water source. The designated site is currently linked to MUWSA's water infrastructure. Moreover, the Proponent plans to elevate three water storage tanks of 5,000 litres capacity on the proposed Academic building to be used for supplying water into washrooms. During the construction phase, it is projected that approximately 3,500 litres per day will be utilised. Of this amount, around 1,350 litres per day (calculated based on a consumption rate of 30 workers at 45 litres per capita, as per the Ministry of Water's 2009 water design manual) will be allocated for construction workers, while the remaining 2,150 litres per day will be allocated for other purposes.

The daily water demand at the project site during the operational phase will be contingent upon the occupancy of the proposed academic building. Based on an estimated consumption rate of 80 litres per capita per day, the total daily water usage is anticipated to reach approximately 30.08 cubic metres, catering to the domestic needs of the academic building's occupants.

2.7.3 Sources of Energy

The primary energy source for the proposed project will be TANESCO, supplemented by a standby generator with a capacity of approximately 250kVA, serving as an alternative power source. These energy sources will be used during both the construction and operation phases. During the construction phase, an estimated 800 units of power will be consumed per month, while the operation phase is expected to require approximately 600 units of power per month. It is anticipated that the project will not lead to any power shortages, eliminating the necessity for an additional power source exclusive to the project.

2.7.4 Occupational Health and Safety Management and Security

2.7.4.1 Health and Safety

The proposed project is dedicated to upholding the highest health and safety standards throughout its implementation. The contractor will adhere to the Health and Safety Management Plan (HSMP) to guarantee a secure working environment in compliance with OSHA regulations. The contractor is expected to collaborate closely with experts from the OSHA to provide extensive occupational safety and health training for workers, disseminate essential health risk information, and maintain an unwavering commitment to safety protocols.

During the construction phase, the contractor will ensure the availability of well-equipped first-aid stations, a standby ambulance, and trained first-aid personnel to promptly address any emergencies. Furthermore, the civil works contract will explicitly outline the contractor's responsibility to conduct comprehensive awareness programs on environmental, social, health, and safety (ESHS) matters at the project site. To promote worker well-being, the contractor will provide portable toilets and changing rooms for both male and female workers, prioritising hygiene

and cleanliness. This comprehensive approach underscores the project's unwavering commitment to the health and safety of all individuals involved. The Proponent shall also comply with ESS2-Labour and working condition and ESS4- community health and safety.

2.7.4.2 HIV/AIDS and STDs

MoCU stands in solidarity with the Government's initiatives to curb HIV/AIDS and sexually transmitted infections (STIs). In line with this commitment, the Contractor is mandated to develop and implement comprehensive HIV/AIDS prevention and awareness programs within the construction site. The following measures shall be implemented during the mobilisation phase:

i) **Heightened Awareness:** Sensitize all site staff and labourers about the risks and consequences of unprotected sexual interactions, including the transmission of STIs and particularly HIV/AIDS.
ii) **Public Awareness Campaigns:** Engage a subcontractor, preferably a non-governmental organisation (NGO), local health facilities, or HIV/AIDS experts, to conduct public awareness-raising campaigns on HIV/AIDS prevention at least every two months. These campaigns should include the distribution of educational materials.
iii) **Community Outreach:** Extend awareness campaigns and training to the immediate local communities and project staff.
iv) **HIV/AIDS and STD Clinic:** Establish an HIV/AIDS and STD clinic at the project site or utilise an existing qualified and equipped local clinic throughout the project implementation period. The clinic will provide professional screening, diagnosis, counselling, and treatment for individuals affected by STIs. Serious HIV/AIDS cases will be referred to relevant authorities within Moshi
v) **Condom Distribution**: Ensure adequate supplies of protective gear, such as condoms, are available to all site staff and labourers.
vi) **NGO Collaboration:** Collaborate with NGOs experienced in HIV/AIDS and STD alleviation programs to seek their expertise and support.
vii) **Behavioural Change Strategies:** Continuously evaluate and explore opportunities for enhancing HIV/AIDS and STD-related behavioural change interventions.
viii) **Coordination with Local Authorities:** Regularly liaise with the Regional or Municipal Medical Officer and their designated local representatives or agents to report progress and coordinate HIV/AIDS and STD alleviation measures on-site. This initiative will involve the National AIDS Control Programme.

2.7.4.3 Traffic management

To ensure the safety and smooth flow of traffic during the construction phase, the contractor, under the supervision of the client, will develop and implement a comprehensive Traffic Management Plan (TMP). Temporary traffic-control facilities will be strategically placed within the campus to regulate traffic movement. The Contractor will designate specific access roads and alternative entry/exit gates around the project site to minimise disruptions and maintain a seamless traffic flow. An adequate number of flag-persons, traffic control signboards, and warning devices will be deployed, with regular inspections conducted to identify and address any road damage or maintenance needs. The access road will be regularly maintained to ensure its optimal condition. Existing internal access roads will be kept in a safe and trafficable condition to support the continued operation of campus activities. These roads will serve as a backup whenever necessary. The contractor will allocate sufficient resources to maintain a smooth riding surface and ensure the road's safety for traffic at all times.

2.7.4.4 Security and fire issues

To safeguard the construction site, the perimeter will be enclosed by an iron sheet fence with a designated entry gate. A security guard, deployed by the contractor, will provide round-the-clock security services. All construction workers will be issued with identity cards for easy identification. Security lights will be installed to illuminate the site during night-time. In the event of a fire emergency, a comprehensive fire emergency plan will serve as the foundation for routine induction training for all workers.

Recommended fire-fighting equipment, including portable fire extinguishers, water hydrants, horse reels, and compression foam units, will be strategically placed throughout the project site. Sensitive and hazardous areas, such as the power supply room, excavated areas, and locations where objects are prone to falling and causing damage or injuries, will be clearly marked. The project Proponent or Contractor bears sole and complete responsibility for the safety of the building during all project phases and shall address any claims that may arise as a result of the project. Upon completion of construction, the installed firefighting equipment will be inspected and approved by fire experts, with regular maintenance thereafter. A designated area for emergency assembly will be demarcated, and emergency exit routes will be clearly marked.

2.8 Offsite Facilities

To maximise procurement efficiency and potentially lower material costs, the contractor will prioritise sourcing essential construction materials from local suppliers throughout the project implementation phases. Sand, aggregates, and stone for construction works could be procured from registered suppliers within Moshi Municipality. Similarly, other construction materials, including cement, iron bars, nails, timbers, and paints, may be sourced from licensed suppliers in Moshi. This approach of favouring local suppliers holds the potential to significantly reduce material acquisition costs while simultaneously supporting the local economy.

2.9 Description of Institutional, Spatial and Temporal Boundaries

2.9.1 Institutional boundaries

The proposed project will be executed within the boundaries of the institutional governance framework. Nationally, oversight for the project will be provided by entities such as the World Bank Tanzania, Ministry of Education Science and Technology, Ministry of Lands, Housing and Human Settlements Development, and the Vice President's Office – Division of Environment. Various government agencies, including the NEMC, OSHA, Contractor Registration Board (CRB), and Engineers Registration Board (ERB), will also play roles in managing the project.

At the municipal level, the Moshi Municipal Council will be responsible for monitoring the project through various experts within the Municipal Executive Director's Office. The Office of the Municipal Executive Director operates through the Ward Executive Officer and Street Executive Officer, contributing to the effective governance and oversight of the project at the local level.

2.9.2 Temporal boundaries

Project managers shall establish a detailed schedule outlining the start and end dates for each project phase. This schedule will clearly identify any intermediate milestones that serve as checkpoints to evaluate the project's progress. The schedule will function as a critical monitoring tool to assess whether the project is on track for completion within the specified timeframe and budget constraints. By clearly defining the start and end dates of each project phase, project managers are better equipped to proactively identify
potential risks and implement corrective measures if necessary.

2.9.3 Spatial boundaries

Project managers must establish a detailed plan outlining the physical boundaries of the project site, encompassing the areas where construction activities will take place. This preliminary assessment plays a pivotal role in enhancing project planning, management, and stakeholder engagement. In the context of the proposed construction, key considerations include: identifying the specific areas required for clearing, levelling, and foundation work to gauge whether there is adequate space for these activities; determining the space needed for efficient storage and handling of construction materials so as to minimise disruptions and ensure safety, and; identifying and delineating sensitive areas within the project site for more effective protection and moderation of negative environmental impact. By proactively addressing these considerations, project managers can effectively manage the spatial boundaries, fostering a well-planned, safe, and sustainable construction process.

The project's positive ramifications extend far beyond the immediate construction site, influencing various geographical scales. At the local level, within Nganga Mfumuni Ward in Moshi Municipality, the project will augment the availability of academic buildings, ICT workshops, and a cutting-edge Multimedia studio. This enhanced infrastructure is anticipated to stimulate enrolment in ICT programs and reshape the educational landscape of Kilimanjaro.

On a national scale, the project's impact is expected to elevate academic infrastructure and potentially influence ICT program enrolmentenrolment across the entire country. The project's alignment with global trends in advancing educational facilities and ICT capabilities suggests that its influence may extend beyond Tanzania's borders. The multifaceted impact of the proposed Academic Building underscores its profound significance and far-reaching influence on various scales. This project holds immense promise for transforming the educational landscape not only locally but also nationally and potentially internationally.

CHAPTER THREE

3.0 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

Given the regulatory framework governing the proposed development, this environmental assessment section delves into the applicable policies and legislation relevant to the project. These policies and regulations guide both the planning and implementation phases of the project. Additionally, the study examines the institutional frameworks that govern the project's activities.

3.1 Relevant Policies to the Project

The government of Tanzania has actively formulated and revisited national policies aimed at overseeing developments within specific sectors. The pertinent national policies relevant to this project comprise the following:

3.1.1 The National Environmental Policy, 2021

The policy outlined in section 1.1 acknowledges the importance of preserving the environment and natural resources for the benefit of current and future generations. These resources provide several advantages and opportunities for socioeconomic development at both the local and national levels, including enhanced livelihoods and the supply of essential environmental goods and services. The policy emphasises the need for the public to address environmental challenges in a context-specific manner. The proposed ICT building poses a particular challenge in terms of managing e-waste generation. The policy hypothesised that increased reliance on electrical and electronic equipment may lead to a surge in e-waste accumulation, potentially introducing toxic substances that pollute the land and groundwater, posing significant threats to human health and the environment.

The project will adhere to the policy objectives outlined in section 2.2.3, which aim to establish a national framework for harmonised and coordinated environmental management to enhance the well-being of present and future generations. Under this policy, the project developer will implement an effective waste management system for both solid and liquid waste. Liquid waste will be connected to the existing sewer system, while solid waste will be carefully sorted at the source before being collected and disposed of by authorised entities.

3.1.2 The National Land Policy, 1997

The policy underscores the paramount importance of environmental protection, placing a strong emphasis on safeguarding environmental and natural ecosystems from pollution, degradation, and physical destruction. Key policy sections relevant to the proposed project include section 2.4 (addressing land utilisation for socio-economic development), section 2.8 (pertaining to land resource conservation), and sections 3 and 4 (focusing on land tenure). These sections hold direct relevance and provide guidance to the project developers regarding occupancy, land use, and land-use alterations at the project site.

To ensure compliance with policy requirements, the proposed project implementation will utilise existing land that is legally owned by the Proponent and designated for educational purposes. Additionally, generated waste (both solid and liquid) will be effectively managed at the project site. Domestic wastewater will be channelled through a sewer pipe network, while solid waste will be collected in designated bins and transported to an authorised dealer for proper disposal.

3.1.3 The National Human Settlement Development Policy, 2000

This policy acknowledges the inextricable link between human settlements and the imperative for sustainable development. It emphasises the need to manage the environment and address land planning issues in a manner that promotes an enhanced quality of life by facilitating the provision of housing infrastructure and related support services. Moreover, the policy underscores the importance of safeguarding the environment of human settlements and ecosystems from pollution, degradation, and destruction to achieve sustainable development. The project

developer must adhere to national human settlement regulations throughout the implementation of the proposed project.

3.1.4 The National Water Policy, 2002

Water is an indispensable resource for social and economic progress, as well as environmental preservation. The National Water Policy (2002) acknowledges the critical role of water in domestic consumption, agriculture, and cross-border matters. It also upholds the principle that every individual has the right to equitable access and utilisation of the nation's water resources for their personal benefit and the nation's overall development. The policy advocates for promoting social and economic development while simultaneously safeguarding the environment. It emphasises the importance of proper wastewater disposal to prevent the degradation of water resources. To protect water sources from contamination, the policy mandates that all water users obtain the necessary permits before extracting and using water for their activities.

The Proponent shall ensure that all the requirements of this policy are strictly adhered to. The Proponent will continue to utilise the MUWSA sewer line for the management of domestic wastewater. All sewer pipes within the MoCU Moshi Main Campus will be thoroughly inspected and replaced if any damage is identified to prevent contamination.

3.1.5 The National Energy Policy, 2015

The policy prioritises the well-being and living standards of Tanzanians by establishing a reliable and efficient system for the production, procurement, transportation, distribution, and utilisation of energy in a manner that is environmentally sustainable. The project Proponent holds the responsibility of ensuring efficient energy consumption and evaluating environmentally sustainable alternative energy sources.

3.1.6 The National Policy on HIV/AIDS, 2001

The Policy lays the foundation for a coordinated national response to the HIV/AIDS epidemic, encompassing the development of effective interventions across all sectors to prevent HIV/AIDS and other sexually transmitted infections (STIs), protect vulnerable groups, and mitigate the social and economic impacts of HIV/AIDS. To shield workers and communities in the vicinity of the project area from HIV/AIDS, the project Proponent will implement awareness-raising programs. The project contractor will engage with HIV/AIDS activists to gather insights and collaborate on effective prevention strategies.

3.1.7 The National Investment Promotion Policy, 1996

The ground-breaking National Investment Promotion Policy (NIPPO) signalled a pivotal shift from a government-controlled economy towards a market-oriented approach. This transformative policy opened up Tanzania to a plethora of foreign and domestic investment opportunities across diverse sectors. At the heart of NIPPO lies an unwavering commitment to fostering private sector participation as the cornerstone of economic advancement. The policy establishes a level playing field for both domestic and foreign investors, ensuring equitable treatment and equal access to resources.

The relevance of NIPPO to infrastructure development lies in its potential to create an enabling environment for the establishment of conducive teaching and learning infrastructure, leading to the development of enhanced skills essential for innovation and economic transformation. Therefore, the project Proponent will uphold the principle of equal opportunity for both local and foreign firms willing to participate in the construction activities.

3.1.8 The Construction Industry Policy, 2003

The Construction Industry Policy fosters a supportive environment for the growth of a robust, efficient, and environmentally friendly construction sector, contributing to sustainable economic and social progress. The policy promotes the adoption of cost-effective and cutting-edge technologies and methodologies to fuel construction industry growth. This includes utilities and ensuring the utilisation of techniques, technology, and products that do

not pose a threat to the environment or human health. In adherence to this policy, the proposed construction project will employ low-impact materials sourced from authorised dealers. These materials will be certified for construction in accordance with Tanzania Bureau of Standards (TBS) guidelines.

3.1.9 The National Gender Policy, 2000

At its core, this policy seeks to create a gender-equitable and inclusive environment that embraces diversity and upholds the rights and dignity of all individuals, regardless of gender. Its objective is to guarantee equal opportunities for both men and women to participate in development initiatives, acknowledging the substantial contributions of all members of society. This policy's emphasis on gender equality and inclusion aligns with the Sustainable Development Goals (SDGs), particularly SDG 5, which advocates for gender equality and women's empowerment. By promoting gender equality, this policy can lead to a more just and equitable society, where everyone has the opportunity to reach his/her full potential.

The Proponent will oversee that the project is implemented in a fair and equitable manner, ensuring that everyone has an equal chance to participate and succeed. The site environment will prioritise the safety and well-being of all users, particularly women, by implementing measures to prevent gender-based harassment, discrimination, and violence. These measures may include: a clear and comprehensive code of conduct that outlines prohibited behaviours and establishes reporting procedures; designated safe spaces and support staff available to assist users who feel unsafe or threatened; regular training and awareness-raising campaigns to educate users about gender-based violence and how to prevent it, and; a commitment to investigating and responding promptly to all reports of gender-based violence. In addition to these safety measures, the site environment will also be designed to be convenient and welcoming for all users, including women.

3.1.10 The National Health Policy 2017

The National Health Policy envisions a healthy community that effectively contributes to individual as well as national development. The policy sets the framework for the country's commitment to provision of good quality, equitable, accessible, affordable, sustainable, and gender sensitive basic health services. The proposed project is committed to upholding the utmost health and safety standards during its execution. The contractor will strictly adhere to the Health and Safety standards, ensuring a secure working environment where employees receive fundamental health care in accordance with the National Health Policy.

3.1.11 The National Employment Policy, 2008

The policy envisions a society where all Tanzanians are engaged in sustainable and decent gainful employment, enabling them to generate a decent income and enhance their quality of life and social well-being. Aligned with Tanzania's Development Vision 2025, which aims to reduce poverty, the policy's mission is to tackle the emerging challenges of globalisation and ensure productive and sustainable employment in both rural and urban economies. This mission and vision will be achieved by creating a conducive legal framework, addressing skill-related barriers to employment, and expanding opportunities for all to participate in income-generating activities.

The implementation of the proposed project will create an equitable environment where all individuals have the chance to contribute to the industry's success and benefit from its growth. Through effective community engagement and collaboration with prospective consultants, unemployed female candidates and young people will be reached through community organisations and leaders. To effectively address the cultural barriers that hinder women's participation in construction projects, the project Proponent will sensitise workers and supervisors about gender equality and foster a supportive workplace culture that welcomes and respects all employees. Additionally, effective oversight through monitoring and evaluation (M&E) will be implemented to measure the effectiveness of equal employment initiatives, ensuring continuous progress towards gender parity.

3.1.12 Cultural Property Policy,1997

The Cultural Property Policy safeguards our cultural legacy by establishing guidelines for the preservation, protection, and ethical management of cultural heritage and archaeological remnants. This ensures that these irreplaceable treasures are passed down to future generations. The policy mandates cultural resource impact studies prior to any land development.

As a responsible steward, the project Proponent is committed to preventing the exploitation or degradation of cultural properties. While no cultural properties have been identified within the MoCU main campus, the contractor is obligated to halt construction and notify the relevant authorities if any archaeological remains or cultural property are unearthed during project implementation.

3.1.13 The Education and Training Policy, 2014

The Education and Training Policy (2014) sets the direction and standards of education and training initiatives in Tanzania. It underscores the significance of high-quality education and training as a catalyst for national development across all levels One of its specific objectives is to have educated and knowledgeable Tanzanians able to contribute to national development. Central to achieving this objective is the imperative development of learning infrastructure. The proposed project has the potential to enhance equitable access to quality ICT education, thereby nurturing the intellectual and personal growth of individuals.

3.1.14 The National Transport Policy, 2003

The policy is pertinent to the proposed project as the transportation of construction materials from their source to the project site is a critical component. To comply with the policy's guidelines, all trucks utilised for material transportation will be equipped with covered tops to prevent wind-induced release of materials and dust emissions. Regular truck maintenance will be conducted to minimise gas emissions caused by incomplete fuel combustion. Moreover, load limits will be strictly adhered to prevent road damage resulting from excessive weight. This commitment to environmental responsibility aligns with the Sustainable Development Goals (SDGs), particularly SDG 13, which advocates for urgent action to combat climate change and its impacts. By adopting sustainable transportation practices, the project Proponent can significantly reduce its environmental footprint and contribute to a more sustainable future.

3.1.15 The National Occupational Health and Safety Policy, 2009

The Occupational Health and Safety (OHS) Policy serves as a cornerstone for safeguarding the health, safety, and well-being of workers in all industries. This comprehensive policy clearly defines the responsibilities of employers, employees, and the government in ensuring a safe and healthy work environment.

At the heart of the policy lies the crucial need to reduce workplace accidents and illnesses, as highlighted in section 2.3. By fostering a culture of OHS hazard prevention among employers and employees, the proposed project aims to reap significant social and economic benefits, including enhanced productivity, competitiveness, and overall quality of life for the working population. This achievement will undoubtedly contribute to improved public health and safety.

Furthermore, section 3.1 of the policy underscores the unwavering commitment to occupational health and safety issues, demanding the establishment of an institutional framework as a shared responsibility among all stakeholders. The policy further emphasises the imperative of bolstering awareness, education, and training programs on occupational health and safety at all levels, as outlined in section 3.5. In line with the pollution control measures outlined in section 3.8.1, institutions are mandated to implement effective measures for managing hazardous wastes and emissions stemming from production processes and work activities.

3.2 Relevant Legal Framework

This section provides the legal framework pertinent to the proposed project. The project Proponent will adhere to the following legislations.

3.2.1 The Environment Management Act No.20, 2004

The Environmental Management Act No. 20 of 2004 establishes a robust legal and institutional framework aimed at ensuring sustainable environmental management in alignment with the National Environmental Policy. Sections 72, 110, and 141 mandate land users and occupiers to safeguard, enhance, and utilise the land in an environmentally sustainable manner. Within this legislation, the National Environmental Management Council (NEMC) is granted the authority to enforce, assess, and oversee environmental impact assessments. Sections 81 and 82 of the Environmental Management Act No. 20 of 2004 dictate that projects falling under the mandatory EIA list in Schedule 3 must undergo an Environmental and Social Impact Assessment (ESIA). In compliance with these provisions of the Act, the Proponent conducted an ESIA for the proposed construction of an Academic building. Furthermore, the Proponent is steadfast in ensuring ongoing adherence to this legislation, demonstrating a commitment to promoting the sustainable management of the environment by protecting land and ensuring proper waste disposal practices.

3.2.2 The Land Act (Cap 113. R.E. 2018)

The Land Act (Cap 113 R.E. 2018) serves as the foundational framework for land management and administration in Tanzania. This comprehensive law governs the classification of land, ownership rights, land use planning, and dispute resolution mechanisms. The Act encompasses a wide range of provisions, including: the one that classifies land into village land, general land, and reserved land, each with distinct ownership and management regimes; a provision that recognizes and protects customary rights of occupancy for village land, ensuring security of tenure for rural communities. Other provisions mandate land use planning at both national and local levels to guide land development and prevent haphazard urbanisation; establish a system for registration of land titles to provide legal certainty and protect property rights, and; provide acceptable mechanisms for resolving land disputes.

The Land Act aims to guide those exercising authority to ensure that existing property rights, long-standing occupation, or customary land use are clearly defined and protected by law. It also mandates that the Land Act be used productively and sustainably. Furthermore, the Act requires the payment of full, fair, and prompt compensation to any individual whose right of occupancy, recognized occupation, or customary use of land is revoked or otherwise negatively affected by the State under this Act or is acquired under the Land Acquisition Act.

While there are no currently pending legal issues related to the proposed construction, the project Proponent must ensure that any emerging concerns/disputes are recognized and addressed through acceptable land dispute resolution mechanisms, including mediation, conciliation, and adjudication through land tribunals and courts.

3.2.3 The Land Use Planning Act (Cap 116 2007)

The Land Use Planning Act (Cap 116 2007) serves as a crucial tool for regulating and guiding land use development in Tanzania. The legislation establishes a framework for promoting sustainable, efficient, and equitable land use practices across the country. The legislation seeks to: promote sustainable land use practices that conserve natural resources, protect the environment, and support long-term economic and social development; enhance land use efficiency by ensuring that land is used for its most appropriate purposes and that development aligns with infrastructure and service capacities; promote equitable access to land and land use opportunities for all Tanzanians thereby fostering social inclusion and reducing disparities; foster active participation of communities in land use planning processes, ensuring that local needs and preferences are considered.

The legislation has a broad spectrum of provisions that: establishes a hierarchical land use planning framework, with national, regional, and district-level plans guiding land use decisions; mandates the preparation of land use plans at all levels, outlining land use zones, development regulations, and infrastructure requirements; requires

public participation and consultation in the preparation and implementation of land use plans to ensure transparency and accountability. The other two provisions seek to: provide mechanisms for enforcing land use plans, including zoning regulations, building permits, and enforcement actions against non-compliant developments, and; mandate regular review and update of land use plans to adapt to changing circumstances and ensure relevance.

To ensure full compliance with the legislation, the Proponent must: secure the necessary land use planning approvals from relevant authorities before commencing construction activities to ensure that the proposed project aligns with the approved land use plans and zoning regulations, and; strictly adheres to the building codes and standards set forth in the Act to safeguard the structural integrity, safety, and environmental compatibility of the construction project. Furthermore, compliance requires the Proponent to fully implement mitigation measures proposed by this ESIA report to minimise environmental harm. Moreover, the Proponent must obtain all necessary permits and licences from relevant authorities before commencing construction activities.

3.2.4 The Urban Planning Act, 2007 and its Amendment Cap 355, 2017

The Urban Planning Act, 2007, and its Amendment Cap 355, 2017, is a legislation for governing the organisation, development, and regulation of urban areas in Tanzania. The legislation aims to achieve sustainable land development in urban areas, preserve and enhance amenities, provide mechanisms for granting consent to develop land and establish powers to control land use practices. Section 29(3) of the Act mandates the conduct of an Environmental and Social Impact Assessment (ESIA) for developments that require planning consent. This requirement underscores the importance of considering environmental and social impacts before embarking on new projects. The Act also addresses matters related to land acquisition and compensation, ensuring fair and equitable treatment of landowners affected by land acquisition processes.

Furthermore, the Act outlines procedures for enforcing urban planning regulations, addressing urban planning issues, and enhancing conservation and environmental protection. These measures aim to promote social justice in land acquisition for planning purposes. In compliance with the Urban Planning Act, 2007, and its Amendment Cap 355, 2017, the proposed Academic Building will be constructed at a location specified in the Proponent's Land Use Masterplan. This adherence to the Act ensures that the project aligns with the overall urban planning framework and promotes sustainable development principles.

3.2.5 The Water Resources Management Act 2009) and its Amendment Cap 331 of 2022

The Water Resource Management Act of 2009 stands as a key legislation addressing the safeguarding of water resources and the regulation of water extraction for diverse purposes. Section 39 (1) within this legislation mandates that individuals owning or occupying land, where activities or processes may cause or are likely to cause water source pollution, must take reasonable measures to prevent such pollution. The Act explicitly prohibits the discharge of waste streams into water bodies without authorization from a water officer and necessitates compliance with prevailing environmental requirements for receiving water provisions throughout the project's construction, operation, and decommissioning stages.

The project Proponents will primarily depend on water supplied by the MUWSA and boreholes as an alternative water source. In doing so, they commit to ensuring strict adherence to all stipulations of the Water Resource Management Act of 2009 throughout the project's implementation. This encompasses the proper management of generated domestic liquid waste and the handling of construction waste, such as soil materials, to prevent siltation in water bodies and mitigate turbidity issues. Additionally, the project will be integrated into the public sewage system, with full compliance with the provisions of the Water Resource Management Act.

3.2.6 The Occupational Health and Safety Act No. 5, 2003

The Occupational Health and Safety Act No. 5, 2003, particularly sections 73–76, prioritises the protection of worker health against occupational hazards. Employers are mandated to provide protective gear to ensure

employee safety. The Act explicitly requires routine medical examinations for staff, safe access and a secure workplace, fire prevention measures, a clean and safe water supply for workers, hygienic facilities, laundries, and first aid stations.

Furthermore, the owner or occupier is not liable for any health injuries unless those injuries directly resulted from a violation of the Act. Additionally, Section 62 requires employers to provide and maintain suitable protective equipment for employees working in factories or other workplaces where workers may be exposed to hazardous substances or environments. Moreover, the Act states that if an employer's failure to provide PPE results in injuries or deaths, penalties may be imposed.

In cases where an individual suffers severe physical harm due to a factory or workplace owner or occupier violating any laws, regulations, or guidelines, the Proponent may be subject to fines and/or imprisonment. However, the occupier or owner is not liable for any health injury unless the injury was directly caused by a violation of the Act.

To comply with this Act, the Proponent is responsible for providing the necessary protective gear to workers. Additionally, basic requirements such as access to safe and clean water, proper toilets, and changing rooms will be met. Workers will undergo regular medical examinations and induction training. An emergency assembly point will also be established.

3.2.7 The HIV and AIDS (Prevention and Control) Act, 2008

The Act provides for the prevention, treatment, care, support and control of HIV and AIDS for promotion of public health. The Act also requires provisions for appropriate treatment, care and support to people living with or at risk of HIV and AIDS. The Act requires the provision of gender-responsive HIV and AIDS education, distribution of condoms and support for people living with HIV and AIDS. The Proponent/Contractor will adhere to this Act by ensuring that construction workers are aware of HIV /AIDs and other STDs to protect them and communities around the project area against HIV/AIDS infection.

3.2.8 The Water Supply and Sanitation Act (Cap 272, 2019)

Part IV of the Water Supply and Sanitation Act stipulates that water supply and sanitation authorities are responsible for providing water supply and sanitation services. The Act specifically designates the Water Supply and Sanitation Authorities (WSSA) as the entities tasked with ensuring the provision of adequate and reliable water supply and sanitation services.

To enable the effective fulfilment of their responsibility to provide adequate and dependable service, the Act grants WSSA the power to access any land for the purpose of laying water pipe networks and to charge fees to cover the financial obligations associated with the operation and upkeep of water supply and sanitation networks.

As stipulated in the Act, the Proponent will use clean water provided by the Moshi Urban Water Supply and Sanitation Authority (MUWSA). Furthermore, the Proponent shall adhere to Section 68(1) of the Act, which prohibits the disposal, discharge, or causing the disposal or discharge of unauthorised waste into sanitation systems. The Proponent will ensure that any domestic wastewater generated within the project area is directed to the MUWSA sewer pipe network.

3.2.9 The Standards Act No. 2, 2009

The Act fosters standardisation and specifications for commodities and services. It also re-establishes the Tanzania Bureau of Standards (TBS) and outlines the Bureau's responsibilities, governance, and oversight. This legislation holds significance for this project as it regulates the quality of materials used in the construction of the proposed project. The Proponent must ensure that all building materials employed are approved by TBS and procured from authorised suppliers.

3.2.10 The Public Health Act (Cap 242, 2009)

The Act places a strong emphasis on Solid and Liquid Waste Management, advocating for the management of solid and liquid wastes generated in accordance with sustainable plans prepared by the respective Authority. It also seeks to promote, preserve, and maintain public health with the aim of ensuring the provision of comprehensive, functional, and sustainable public health and related services to the general public.

This Act is particularly relevant to the proposed project, especially Section 66, which stipulates that:

i) A building or premises shall not be erected without submitting the plans, sections, and specifications of the building site for scrutiny to ensure compliance with public health requirements and seeking approval from the Authority, and;
ii) A building or premises, or any part thereof, or any structure shall not be occupied until a certificate of occupancy has been granted.

Throughout the execution of the proposed project, the Proponents will adhere to the provisions of the Act.

3.2.11 The Employment and Labour Relation Act (Cap.366 R.E 2019)

This Act safeguards fundamental labour rights and establishes essential employment standards. The Act provides comprehensive anti-discrimination protections. It specifically mandates that organisations should "promote equal opportunity in employment and strive to eliminate discrimination in any employment policy or practice." The Act prohibits employers, trade unions, and employers' organisations from discriminating against employees on various grounds, including gender, pregnancy, marital status, family responsibility, disability, HIV/AIDS, and age. Employee harassment based on any of these grounds is also prohibited. The Act further compels employers to take proactive measures to ensure that both men and women have the right to a safe and healthy workplace. The Act outlines basic employment standards, provides a framework for collective bargaining, and enables the prevention and resolution of conflicts. The Proponent is responsible for ensuring that the Contractor complies with all applicable employment laws and regulations. Moreover, the Proponent must foster a workplace culture that is free from discrimination and promotes equal opportunities for all employees.

3.2.12 The Local Government (Urban Authorities) Act (Cap. 288 R.E 2002)

The Act empowers local governments and urban authorities to spearhead development initiatives within their respective jurisdictions. This authority extends to the formulation of bylaws that enforce environmental management practices within their districts or urban centres. In line with the Act's provisions, the Proponent is obligated to embrace and implement sound environmental management practices throughout the project's lifecycle.

3.2.13 The Engineers Registration (Amendment) Act (Cap 63, 2007)

The Act establishes an Engineers Registration Board (ERB) responsible for regulating the conduct of engineers and overseeing their registration and related matters. It prohibits any unregistered engineer from engaging in professional engineering work or services, including professional services, consultation, planning, designing, or supervising the construction or operation of public or privately owned public utilities, buildings, machines, equipment, processes, works, or projects where public interest and welfare or the safeguarding of life, public health, or property are concerned or involved and require the application of engineering principles and data. Furthermore, the Act prohibits the engagement of unregistered engineers in engineering works. In adherence to the Act, the Proponent shall employ a registered engineer to supervise all construction work at the site.

3.2.14 Contractors Registration Act CAP R.E 2002

The Act establishes a framework for contractor registration and a board to oversee their conduct. It empowers the Contractors Registration Board to access and inspect any construction, installation, erection, or alteration site to verify and ensure that the works are being carried out by registered contractors and adhere to all applicable

regulations and laws of the country. It mandates that no entity, whether corporate or unincorporated, can engage in contracting activities unless it is registered as a contractor or one of its shareholders is registered as a contractor. The board has the authority to take legal action against non-compliant contractors. To comply with the Act, the Proponent must engage registered firms or contractors to undertake all construction activities at the site. A thorough due diligence process will be conducted to verify the eligibility of contractors as per the conditions set forth in the Act.

3.2.15 The Fire and Rescue Force Act No.14 of 2007

The Act facilitates the organisation, administration, discipline, and operation of the Fire and Rescue Force. Section 4 of Part II of the Act establishes a fire brigade (Fire and Rescue Force) for mainland Tanzania. Section 5 of the Act outlines the Force's duties and responsibilities. One of the Force's primary functions is to enhance public awareness of fire prevention and firefighting services. Section 13 mandates that the Force provide, maintain, or cause to be provided and maintained, fire hydrants and other water facilities necessary for ensuring optimal utilisation of available water resources in the event of a fire outbreak. Provisions for fire escape maintenance are elaborated in section 22, where subsections 1-3 detail the requirements and specifications to be met for building safety.

To comply with the provisions of this Act during project implementation, the Proponent must apply for and obtain a valid fire certificate. Additionally, the Proponent will ensure that fire extinguishers are readily available in each area and that additional firefighting equipment, such as baskets filled with dry sand, are prepared for rescue missions. Firefighting equipment will be maintained every 6 months to ensure proper functioning.

3.2.16 The Roads Act, Cap 167 of 2007

The Roads Act regulates the alteration, expansion, construction, or realignment of public roads and access roads, including the compensation provisions for those affected by these changes. Section 15 outlines the Minister's authority to grant approval for the development of such infrastructure. Section 16 addresses compensation for land and vegetation lost during road construction. Section 35 stipulates that the owner holds the authority to decide on the construction of an access road in accordance with the specified conditions.

Sections 39 and Regulation 42 specify the prohibition of certain types of traffic, as well as maximum vehicle weight, speed, and dimensions. Section 40 allows for an appeal to the Proponent if approval for the proposed access road development is denied. Additionally, the Act promotes road safety by mandating the installation of road signs and speed humps to prevent accidents, and it identifies the authority responsible for carrying out road projects.

The proposed project will use existing public roads and is therefore obligated to adhere to the requirements of this Act. Specifically, Contractors must: comply with speed limits, road signs, and other traffic regulations outlined in the Act to ensure safety and prevent accidents; be cautious and adopt safe driving practices, especially avoiding distractions and maintaining a safe following distance; ensure that vehicles are well-maintained and in compliance with road safety regulations to prevent mechanical breakdowns and accidents.

3.2.17 The Finance Act, 2019

Section 43 (5) of the Finance Act stipulates that individuals registered with a Taxpayer Identification Number (TIN) for conducting business or investments are obligated to fulfil their tax obligations in accordance with the Income Tax Act. To adhere to the provisions of the Finance Act, the project Proponent will ensure that all applicable taxes are withheld and remitted to the Tax authorities throughout all phases of project implementation

3.2.18 Social Security (Regulatory Authority) Act (Cap. 135 R.E 2015)

The Social Security Act defines the structure and guidelines for overseeing and regulating social security services in Tanzania. The Social Security Regulatory Authority, empowered by the act, issues directives for the efficient

and effective operation of the social security sector, particularly protecting and safeguarding the interests of members. In adherence to the Social Security Act, the contractor must comply with the provisions of the Social Security (Regulatory Authority) Act and guarantee that personnel working on the project are registered with an authorised Social Security Fund.

3.2.19 The Persons with Disability Act Cap 183, 2010

The Act safeguards individuals with disabilities from all forms of discrimination and fosters public understanding of their abilities, contributions, and rights. In alignment with this objective, Section 27 (1) and (2) of the Act protects the right to education and training in an inclusive environment for persons with disabilities, enabling their admission to both public and private training institutions. Furthermore, the Act establishes the fundamental requirements for persons with disabilities in terms of education, training, employment, and health, which are crucial for safeguarding their safety and well-being.

To effectively implement the Persons with Disabilities Act, the Proponent and all parties contracted to implement the project must: refrain from any form of discrimination based on disability, ensuring equal opportunities in education, employment, healthcare, and access to public facilities; public and private spaces, including buildings, transportation, and communication networks, are accessible to persons with disabilities, eliminating physical and communication barriers.

The implementation requires providing reasonable adjustments to accommodate the needs of individuals with disabilities, enabling their full participation in all aspects of the project, and conducting public awareness campaigns and educational programs to promote understanding, acceptance, and respect for persons with disabilities.

3.2.20 The Child Act Cap 13 of 2019

The Child Act provides a comprehensive guide on child-related matters, addressing the rights, protection, and overall well-being of children in Tanzania. This legislation champions the care and safeguarding of children, granting limited work opportunities to children under 14 years of age, provided that such work does not compromise their health, education, or development. Section 78(1) of the Act explicitly safeguards children by prohibiting their employment in exploitative activities. To uphold the Child Act, the Proponent and the Contractor will ensure that no children are employed on the project site and that any form of child discrimination and abuse is strictly prohibited.

3.2.21 The Universities Act, 2005

The Universities Act outlines the mechanisms for monitoring and overseeing the overall administration and performance of universities in Tanzania. The Tanzania Commission for Universities (TCU) is tasked by the Act to: promote the development, dissemination, and utilisation of knowledge for the betterment of society, as well as harness knowledge for the creation of practical goods and services; uphold quality standards in higher education to ensure the delivery of high-quality teaching and learning outcomes; promote noble ideals of national unity and shared identity within universities, fostering a sense of belonging and collective responsibility; promote gender equality, balance, and equity in all aspects of university life, ensuring equal opportunities and participation for all genders. Although the mandates outlined in the Act may not directly impact the planned construction activities, they will become applicable upon project decommissioning. Therefore, the Proponent is obligated to comply with the Act's provisions from the outset.

3.2.22 The Architects and Quantity Surveyors (Registration) Act, 2010

The Act lays out the framework for the establishment and mandate of the Architects and Quantity Surveyors Registration Board. It expressly prohibits unregistered architects and quantity surveyors from practising their professions. Furthermore, the Act mandates that clients engage the services of a registered and authorised

architect or quantity surveying firm for projects involving these fields. In accordance with the Act, the Proponent shall employ a registered firm to undertake architectural and quantity surveying services for the proposed building.

3.2.23 The National Health Insurance Fund Act (CAP- 395 R.E. 2015)

The Act requires the employer and employees to be registered by the fund. The following sections detail who has to register and the rate of contribution; Section 8 shows that all contributing employers and employees shall be registered with the Fund. Section 9(1) indicates that Bach employer shall make a monthly contribution to the Fund of an equivalent of three per cent of his employee's salary. The Treasury shall deposit the monthly contribution of the employee together with another three per centum contribution from the employer to the Fund. During construction, contractor(s) shall abide by this Act, where all contracted employees shall be registered with the Fund and monthly contribution will be paid in time and during operation the Proponents will ensure any new employee associated with proposed project is registered with the Fund and monthly contribution is paid in time.

3.2.24 The Contractors Registration Act No. 17 of 1997

The act provides for registration of contractor(s) and establishes a board to regulate the conduct of contractor(s). The act provides for the contractor(s) registration board to enter and inspect any site for construction, installation, erection or alteration works for the purpose of verifying and ensuring that the works are being undertaken by registered contractor(s) and that all works comply with all governing regulations and laws of the country. The act mandates registration for both individual contractors and companies participating in construction activities. To comply, corporations must be registered or have at least one registered shareholder acting as a contractor. The board has the power to take legal action to the contrary. This act is in force, to comply the Proponent shall engage registered contractor(s) to undertake all the construction activities at site.

3.3 Relevant Regulations Framework

3.3.1 The Environment Impact Assessment and Audit Regulation, G.N No. 349, 2005 and its amendment of 2018

The Environment Impact Assessment and Audit Regulation have been enacted to implement the provisions of the EMA Cap 191 Sections 82(1) and 230(2), outlining the procedures for conducting Environmental Impact Assessment (EIA). Prior to project implementation, Regulations 12-17 establish the requirements for conducting EIA procedures and the steps involved in undertaking an EIA study. Specific requirements include: NEMC approval of the scoping and Terms of Reference (TOR) to guide the EIA study; Execution of the EIA by registered experts; consideration of the social, cultural, and economic impacts of the project, and; provision of opportunities for public participation (any person likely to be affected or any interested party).

Overall, the EIA process is guided by NEMC, culminating in the issuance of an Environmental Certificate by the Ministry responsible for Environment. This certificate is one of the prerequisite approvals required before project execution. Adhering to all relevant guidelines, the Consultant entrusted with this Environmental and Social Impact Assessment (ESIA) study strictly followed the directives outlined in the report. This comprehensive report presents in-depth details pertaining to the conducted EIA process, which will be submitted for certification upon approval.

3.3.2 Environmental Management (solid waste management) Regulations 2009 as amended in 2016

The Regulation sets forth provisions for the effective control and management of the environment, encompassing the handling and disposal of hazardous materials. It delineates the classification and characteristics of hazardous wastes and establishes a comprehensive framework for managing all types of hazardous waste throughout its lifecycle, including generation, transportation, treatment, and disposal. The Regulation also mandates that individuals engaged in the generation or transportation of hazardous waste must adhere to these requirements. Additionally, it imposes a responsibility on the owners or operators of facilities that generate hazardous waste to implement recommended processes for minimising waste generation. To ensure compliance with the regulation, the Proponent, Contractors, and occupants of the proposed academic building will adhere to the established waste management protocol, as previously mentioned in section 3.2.10.

3.3.3 Environmental Management Act (Air Quality Standards) Regulations, 2007

The regulations establish minimum air quality standards and impose limitations on the release of hazardous substances, chemicals, materials, or gases. They define emission thresholds, outlining the maximum allowable quantity and specific tolerance limits for emissions from projects that generate pollutants. These regulations establish mandatory air quality standards and mandate developers and operators to adhere to predefined standards and processes.

Regulation 8 of the Environmental Management Act (Air Quality Standards) Regulations, 2007 prohibits the emission or release of hazardous substances into the environment, including chemicals, gases, or mixtures containing gaseous and hazardous compounds, unless authorised. The Proponent is deeply committed to upholding air quality standards and will ensure that the contractor maintains acceptable air quality standards throughout all phases of construction.

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

Promulgated under Sections 143, 144, and 230 (2) (s) of the Environmental Management Act of 2004, these Regulations aim to establish minimum soil quality standards that will safeguard, restore, and enhance the long-term productivity of soils. Section 21(1) of the Regulations expressly prohibits the discharge of industrial, commercial, or other effluents into the soil without prior consent from the NEMC or its authorised representatives.

The Regulations impose specific obligations on the Proponent, including adhering to soil quality standards set by the National Environmental Standards Committee. Additionally, the Proponent is mandated to: refrain from any activities that could pollute the soil; abstain from discharging any hazardous substances, chemicals, oils, or oil mixtures onto the soil, except as permitted by these Regulations or other applicable laws; cooperate with environmental inspectors and promptly address any identified environmental concerns; comply with all guidelines and regulations imposed by local government authorities regarding sewage and sludge collection, transportation, and disposal. Adherence to these Regulations and the implementation of the outlined measures will ensure that the project is conducted in an environmentally responsible manner, safeguarding soil quality and preventing potential environmental harm.

3.3.5 The Environmental Management (Water Quality Standards) Regulations, 2007

Enacted in accordance with Sections 143, 144, and 230 (2) (s) of the Environmental Management Act of 2004, these Regulations establish permissible limits for municipal and industrial effluents, ensuring the protection of water resources from pollution. The Regulations also specify special permissible limits for chrome tanning industries, vegetable industry, and fertiliser industry, safeguarding water quality from specific pollutants associated with these sectors. Furthermore, the Regulations stipulate taste, colour, and smell limits for potable water, ensuring its suitability for consumption.

To protect public health and the environment, the Regulations mandate that anyone conducting activities near water sources must adhere to safe distances between water supply systems and potential pollution sources. Regulation 19(1) empowers the NEMC to issue licences for the discharge of water-polluting substances and identify such pollutants. The eighth schedule of the Regulations provides a comprehensive list of safe distances between water supply systems and various pollution sources. Sub-regulation 3 authorises local government environmental management officers to recommend to the council categories of human activities that they deem to be the most polluting. In addition, Regulation 34 mandates local government authorities (LGAs) to develop rules and standards for sewage and sludge collection, transportation, and disposal, ensuring the proper management of these wastes.

To comply with these Regulations, the Proponent shall implement effective wastewater management practices to prevent environmental degradation and pollution. By adhering to these Regulations and implementing the outlined

measures, the Proponent will contribute to the protection of water resources and the preservation of environmental integrity.

3.3.6 The Environment Management (Registration and Practice of Environmental Experts) Regulations, 2021

Regulations 14-15 outline the application process for environmental expert registration and explicitly prohibit unregistered individuals from conducting environmental studies without a valid practising certificate for environmental impact assessments, audits, or related studies. These Regulations also establish the qualifications required for individuals to conduct environmental impact assessments and audits. The ESIA study was carried out by a qualified and registered firm that fulfilled all the necessary requirements to conduct the assessment.

3.3.7 The Environmental Management (Fee and Charges) Regulations, 2021

The Environmental Management (Fee and Charges) Regulations, 2021 are regulations enacted by the Tanzanian Government to establish fees and charges for various environmental services and activities including: environmental assessments, environmental compliance monitoring and audit, registration as an environmental expert, environmental quality standards, management of waste, Biosafety, noise and vibration, and other environmental related activities. The Proponent is aware of the regulations and will pay the charges prescribed in the schedule of these regulations.

3.3.8 The Environmental Management (Standards for Control of Noise and Vibrations Pollution) Regulations, 2015

These Regulations, titled Environmental Management (Standards for the Control of Noise and Vibrations Pollution), aim to regulate noise and vibration pollution and minimise their adverse effects on human health and the environment. Objective 4 of Regulation (c) specifically focuses on controlling noise and vibration, outlining mitigation measures to reduce their levels. Additionally, the Regulations: (d) establish baseline parameters for permissible noise and vibration levels based on practical considerations and acceptable limits; (e) enforce minimum noise and vibration limits set forth by the National Environmental Standards Committee; (f) provide guidance and support to developers, such as industrialists, in adopting environmentally friendly technologies to reduce noise and vibration, and; (g) ensure the protection of human health and the environment from various sources of noise and vibration pollution. During the project implementation phase, the Proponent will be required to implement the Noise and Vibration Management Plan proposed here to effectively minimise unreasonable noise or vibration pollution emissions into the environment.

3.3.9 The Environmental Management (Prohibition of Plastic Carrier Bags) Regulations, 2019

These regulations institute a complete prohibition on the import, export, manufacturing, sale, and use of plastic carrier bags, irrespective of their thickness. This measure is designed to safeguard human and animal health, as well as the environment, by mitigating the potential adverse effects associated with the use of plastic carrier bags. Moreover, the regulations offer economic and financial incentives to encourage the production and importation of alternative carrier bags. Given the Proponent's awareness of these requirements, the use of plastic carrier bags at the project site is strictly prohibited.

3.3.10 The HIV and AIDS (Counselling and Testing, Use of ARVs and Disclosure) Regulations, 2010

This regulation emphasises the promotion of HIV/AIDS counselling and testing without any form of discrimination. It instructs the Ministry responsible for Health to create educational materials aimed at discouraging stigma and discrimination against individuals living with HIV and AIDS. Both the Proponent and the contractor are required to actively encourage workers to voluntarily seek HIV and AIDS counselling and testing services, which are available at MoCU.

3.3.11 The Environmental Management (Hazardous Waste control and Management) Regulations, 2021

The Hazardous Waste Control and Management Regulations, 2021 aim to comprehensively manage hazardous waste in Tanzania to protect human health and the environment. Section 10(1) of the EMA mandates that no individual shall sell, offer for sale, use, pack, or store wastes in containers or packaging unless they are clearly labelled in English or Swahili. Regulations enacted under EMA sections 110.128, 133, 135, and 230 provide a comprehensive framework for managing all types of hazardous waste throughout their lifecycle, encompassing generation, staging, transportation, treatment, and disposal, as well as their movement into and out of mainland Tanzania.

Individuals involved in the generation, handling, or transportation of hazardous waste, or those under the jurisdiction of these regulations, are guided by environmental and sustainable development principles, including the precautionary principle, the polluter-pays principle, and producer extended responsibility (Regulation 4). Furthermore, the owner or controller of a facility or premises that generates hazardous and toxic wastes is obligated to minimise waste generation through the adoption of clean production principles, manufacturing process improvements focused on raw material and energy conservation, and end-to-end product cycle monitoring (Regulation 5).

Regarding hazardous waste management, every Tanzanian citizen is responsible for protecting the environment from the harmful effects of hazardous waste and for notifying the relevant authority of any hazardous waste-related activity or occurrence that poses a potential risk to the environment or human health (Regulation 6). Regulation 35 stipulates that electrical and electronic wastes must be separated from other waste streams and disposed of separately into designated receptacles prescribed by the council or local government. Additionally, the council or local government is responsible for ensuring that individuals handling these wastes are equipped with appropriate protective gear, receive adequate training in safe handling procedures, and have access to the necessary waste handling equipment.

The Proponent must adhere to the EMA provisions throughout all project phases. Any generated hazardous waste must be collected and stored in a designated, clearly marked bin for onsite hazardous waste storage, pending collection by an authorised disposal agent.

3.3.12 Fire and Rescue (Fire Precautions in Buildings) Regulations, 2015

The Fire and Rescue (Fire Precautions in Buildings) Regulations of 2015 outline the means of escape in regulation 3(1) - 4(1), specifying exit facilities that ensure safe evacuation for occupants from all types of buildings. These means encompass exit staircases, firefighting lobbies, smoke stop lobbies, exit passageways, and escape corridors. Additionally, Regulation 17 – 18 mandates that exits and access facilities must be clearly visible, and building occupants should have direct access to the required exit(s). In adherence to these regulations, the Proponent is obligated to ensure that any space designated for emergency exits is well-identified, appropriately labelled, and maintains its intended use throughout all project phases.

3.3.13 The Urban Planning (Use Groups and Use Classes), Regulations 2018

The Urban Planning (Building) Regulations are applicable to all planning zones designated by the Minister under Section 8 of the Act. This means that individuals cannot erect or commence the construction of any building until they have obtained a building permit. The building permit form, as prescribed in Form 2 of the Fourth Schedule, must be signed by a structural engineer who will verify the structural integrity of the building and a Registered Town Planner who will confirm that the land use is consistent with the planning authority's designated purpose for that area. This permit authorises the holder to construct the building in accordance with the approved plan and subject to all the conditions imposed by the Regulations.

The proposed project site is designated for educational purposes, specifically Use Group "K" use class (b), Use Group "G" use class (a), and Use Group "O" use class (a), as defined in the Town and Country Planning (Use

classes) Regulations, 1960. The total land area, as per the title deed attached to this ESIA study, is 32.62 hectares, which complies with the regulatory requirements.

Moreover, any subsequent modifications or alterations to the approved plan, whether proposed or mandated, must be submitted to the Authority for approval in the same manner as the original plan. No such modifications or alterations can be implemented during the construction phase until they have been approved by the Authority and the details are endorsed on the original building permit.

3.3.14 The Urban Planning (Planning and Space Standards) Regulations, 2018

Formulated under section 8 of the Act, these regulations, particularly Regulation 3 (vi), delineate the minimum planning and space standards applicable to educational facilities in a college accommodating 500 to 1000 students within an area spanning 4 hectares to 8 hectares. Given the planned project in an area measuring 32.62 hectares, the project site's size is deemed sufficient and aligns with the stipulated regulatory requirements.

3.3.15 The Urban Planning (Application for Planning Consent) Regulations, 2018

Under Regulation 5, planning consent is mandated for approved schemes of public interest, provided they do not conflict with or substantially deviate from the scheme's provisions, nor adversely impact the amenities of any land. As the proposed project is situated in an area designated for educational purposes according to the Proponent's Land Use Masterplan, there is no need to seek planning consent for the project.

3.3.16 The Environmental Management (Control and Management of Electrical and Electronic Waste) Regulations, 2021

These Regulations govern the management of electrical and electronic equipment waste (e-waste) in Tanzania. They cover all aspects of e-waste handling, from generation to disposal, with the primary goal of protecting human health and the environment while promoting sustainable development. The Regulations mandate that e-waste be packed and stored in containers that meet international standards. They also promote environmentally sound e-waste management practices, including on-site and off-site recovery, recycling, treatment, dismantling, storage, and disposal.

To comply with these Regulations, the Proponent will implement measures to extend the lifespan of electrical and electronic equipment installed at the project site. In case of damaged e-waste, designated collection vessels will be available, and a temporary e-waste handling area will be paved, roofed, and equipped with a bund wall to prevent rainwater contamination. Additionally, an approved dealer will be engaged to collect e-waste from the project site for re-use or export.

3.3.17 The Universities (General) Regulations, 2013

According to Regulation 4(1), anyone wishing to establish a university in Tanzania must first obtain a Provisional License from the Commission and adhere to the Minimum Guidelines and Norms for Governance Units established by the Commission. In the context of the proposed project, Regulation 6 states that the holder of a Provisional License may, among other things, develop physical infrastructure and facilities for the university's academic and administrative functions. Generally, the development activities of all universities, whether domestic or foreign, operating or intending to operate in Tanzania, shall be governed by the provisions of the Act and regulations as outlined in Regulation 3(1). The Proponents must adhere to the regulation's provisions during the construction of the proposed academic building.

3.3.18 The Standards (Certification) regulations, 2009

This regulation establishes the procedures for inspecting and granting licences to commodities before they are sold for consumption. It applies to all construction materials provided by manufacturers or contractors during the construction phase. Regulation 3 mandates that every application must include a comprehensive description of the inspection and testing scheme that the applicant currently employs or intends to implement to guarantee the

appropriate quality of the products for which the licence is being sought. As per the regulation, the Proponent is responsible for ensuring that all construction materials supplied by the contractor undergo testing by the Tanzania Bureau of Standards (TBS). This is to ensure that the materials meet the required quality standards. The test results should be readily accessible to anyone conducting quality monitoring during the construction phase.

3.4 National Development Plans and Related Strategies

3.4.1 Tanzania Development Vision (TDV) 2025

The National Development Vision (TDV) 2025 aims to guide Tanzania's economic and social development initiatives by 2025, leading to the achievement of middle-income status through economic transformation and growth. The TDV emphasises the importance of enabling environments for the country's development, with advanced technologies, high production, and modern infrastructure being crucial for success in the 21st century. The construction of a two-storey academic building at MoCU's main campus aligns with the TDV's vision by enhancing the learning environment and amenities, contributing to Tanzania's socioeconomic growth potential.

3.4.2 National Plan Action to End Violence against Women and Children in Tanzania 2017/18 – 2021/22

The Five-Year National Plan of Action to End Violence Against Women and Children (NPAVAWC 2017/18 - 2021/22) consolidates eight separate action plans to create a comprehensive strategy for eradicating violence against women and children in Tanzania. The plan emphasises evidence-based strategies to enhance prevention and response services, tailored to the Tanzanian context to improve coordination, service delivery, prevention measures, and innovative solutions. The proposed project must comply with the plan by prohibiting gender-based violence, sexual harassment, and abuse, promoting women's participation in education and employment, and refraining from hiring minors.

3.4.3 The National Five-Year Development Plan 2021/22 - 2025/26

YDP III prioritises fostering competitiveness and promoting industrialization to support human development. The plan focuses on enhancing manufacturing efficiency and productivity using Tanzania's rich resource endowment. One of its goals is to bolster the competitiveness and productivity of diverse sectors, including production, manufacturing, and services, through robust capacity building in science, technology, and innovation. The ultimate objective is to empower Tanzanians to seize the opportunities available within the country. In alignment with FYDP III, the proposed project will amplify MoCU's innovation and technology capabilities, thereby strengthening teaching and learning, research, publication, and service delivery.

3.5 Applicable International Standards and Conventions

i) ILO Convention; C148 Working environment (Air pollution, Noise and Vibration) Convention, 1977 (Ratified by United Republic of Tanzania on 30:05:1983) which protects workers against Occupational hazards in the working Environment due to Air pollution, Noise and Vibration. These forms of pollution have significant implications for the planned construction works and must be minimised to protect the health of workers and the surrounding community.

ii) ILO Convention; C182 Worst Forms of Child labour Convention, 1999 (Ratified by United Republic of Tanzania on 12:09:2001), is a landmark international treaty that aims to protect Tanzanian children from the most hazardous and exploitative forms of work. The treaty plays a crucial role in the proposed construction project, ensuring the complete prohibition of child labour and all forms of child exploitation.

iii) The Basel Convention on Control of Trans-boundary Movements of hazardous wastes and their disposal of 1989. This convention exists to protect both human health and the environment from the harmful impacts associated with the creation, handling, transboundary movement, and disposal of hazardous and other waste. Its relevance to the proposed construction project is undeniable, as it establishes a framework for safeguarding construction workers and the surrounding community from the detrimental

effects of waste. The Proponent is committed to ensuring proper waste management throughout the project lifecycle.

iv) Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa (1991). The convention was signed in 1991 by African nations prohibiting the import of any hazardous (including radioactive) waste and Dumping of Hazardous Wastes at Sea and Internal Waters. Article 4 of the convention further requires "All Parties to take appropriate legal, administrative and other measures under their jurisdiction to prohibit the import of all hazardous wastes, for any reason, into Africa from non-Contracting Parties. Such import shall be deemed illegal and a criminal act." The implementation of the project must observe these restrictions.

v) The Vienna convention on the ozone layer prevention of 1985. The convention addresses and mitigates the depletion of the ozone layer in the Earth's stratosphere. The convention aims to promote international cooperation in research and monitoring, as well as the adoption of measures to reduce or eliminate substances that contribute to ozone depletion. The Proponent is committed to ensure that project activities do not contribute to the depletion of ozone layer

3.6 World Bank Environmental and Social Standards (ESSs), 2018

The Word Bank ESSs establish and guide the project's compliance with good international practices pertaining to environmental and social sustainability throughout the project life cycle. Table 8 (below) summarises the applicability of each ESS.

Table 8: World Bank Environmental and Social Standards (ESSs)

Environmental and Social Standard (ESS)	Applicable (YES/NO)	Requirements	Commitment
ESS1: Assessment and Management of Environmental and Social Risks and Impacts	YES	Evaluate, handle, and track the environmental and social risks and impacts of the intended project throughout its life cycle	The Consultant for Supervision of Construction of the proposed academic building and the Proponent will analyse project operations as well as associated environmental and social risks and impacts during the construction and operation phases.
ESS2 Labour and Working Conditions	YES	Develop and implement written procedures for managing labour that are relevant to the project. These procedures will outline how project-related personnel will be managed, in compliance with national law and this ESS. The procedures will also address how the ESS will apply to various groups of project workers, including direct workers, and how the borrower will ensure that third parties manage their workers per the ESS. Child or forced labour will not be employed or engaged in the proposed project. Measures relating to occupational health and safety will be applied to the project.	The Proponent will ensure that contractors and subcontractors follow policy-led objectives that promote gender equality, non-discrimination and fair treatment in recruitment and employment, adherence to national labour laws, including the prohibition of child and forced labour, and the combating of gender-based violence, particularly sexual harassment.
ESS3 Resource Efficiency and Pollution Prevention	YES	Develop and implement resource efficient and pollution prevention measures that are both technically and financially feasible. These measures should be proportional to the risks and impacts associated with the project and will align with Good International Industry Practice (GIIP), specifically the Environmental, Health, and Safety Guidelines (EHSGs).	Throughout the project's implementation, the contractor will ensure that construction materials are obtained from government-approved sources, and water will be obtained from water supply authorities. Moreover, the proposed new structures must have a modest footprint in order to maximise green space coverage and contribute to greenhouse gas reduction. Furthermore, the project will use the pollution prevention and emergency response plan developed as part of the ESIA to reduce any potential pollution sources from the scheduled activities. The risks identified for enhancing the system to comply with ESS1 are applicable.
ESS4 Community Health and Safety	YES	Assess the risks and impacts of the project on the health and safety of the impacted communities and suggest mitigation, especially those who	The Proponent shall collaborate closely with student leaders and street leaders to communicate to their communities about health and safety risks and preventive measures for accidents associated with

		may be particularly susceptible due to their circumstances.	material transportation and other human health issues, including GBV risk mitigation and HIV and AIDS prevention during construction. The Proponent shall ensure that the contractor has fenced the project site for enhancing safety and security.
ESS5 Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	NO	1.Avoid or minimise involuntary resettlement by exploring project design alternatives 2.Avoid forced eviction. 3.Mitigate unavoidable adverse impacts from land acquisition or restrictions on land use through timely compensation for loss of asset. 4. Improve living conditions of poor or vulnerable persons who are physically displaced. 5.Ensure that resettlement activities are planned and implemented with appropriate disclosure of information.	The Proponent legally owns the land. Thus, there will be neither acquisition nor restrictions and resettlement with respect to Land use.
ESS6 Biodiversity Conservation and Sustainable Management of Living Natural Resources	NO	6.Prevent any negative impacts on biodiversity and habitats as per the mitigation hierarchy outlined in ESS1. 7.Develop and implement a Biodiversity Management Plan when significant risks and adverse impacts on biodiversity have been identified.	The project site only contains a small number of trees (19) slated for removal. Similarly, the identified reptile and amphibian species are not classified as threatened on the IUCN Red List. Consequently, the Environmental and Social Standard 6 (ESS6) on Biodiversity Conservation & Sustainable Management of Living Natural Resources is not applicable to this project.
ESS7 Indigenous People/Sub-Saharan African Historically Underserved Traditional Local communities	NO	8.Ensure that the development process fosters full respect for the human rights, dignity, aspirations, identity, culture, and natural resource-based livelihoods of Indigenous 9.Avoid adverse impacts of projects on Indigenous Peoples	The proposed site is located in a planned urban area where there are no indigenous people. Therefore, ESS7 does not apply in this project.
ESS8 Cultural Heritage	YES	1.Protect cultural heritage from the adverse impacts of project activities. 2.Address cultural heritage as an integral aspect of sustainable development	The proposed site is located in a planned urban area. Presently, there is no designated cultural heritage, but there exists potential to uncover resources of cultural significance during the implementation phases, especially excavation activities.

		3.Promote meaningful consultation with stakeholders regarding cultural heritage 4.Promote the equitable sharing of benefits from the use of cultural heritage	
ESS9 Financial Intermediaries (FIs)	NO	Not Applicable to the HEET Project	The Proponent is a Higher Learning Institution, not a Financial Intermediary. Therefore, ESS9 does not apply in this project.
ESS10 Stakeholder Engagement and Information Disclosure	YES	Engage with stakeholders throughout the project life cycle.	The Proponent has engaged stakeholders as per SEP requirements for HEET Project.

3.7 World Bank Environmental Health and Safety (EHS) Guidelines

The project Proponent must adhere to the relevant EHS requirements established by the World Bank Group (WBG). The EHS General Guidelines (Table 9) provide quantitative limits and best international management practices for mitigating potential environmental impacts.

Table 9: World Bank EHS Guidelines Applicable

EHS Guideline	Content & Relevance to MoCU Project
General EHS Guidelines (2007)	These performance standards and measures represent commonly accepted benchmarks for establishing new facilities using existing technology at cost-effective levels. Implementing EHS principles in existing facilities may necessitate the development of site-specific targets and a corresponding implementation timeline.
EHS Guidelines for - Air Emissions and Ambient Air Quality, 2007	The requirements outlined in these standards will be incorporated into the analysis and management strategies for emissions management during the construction and operational phases of the proposed academic building Moshi. This establishes a framework for effectively managing significant emissions sources, including specific recommendations for impact assessment and monitoring.
General EHS Guidelines 3 Community Health and Safety (2007)	Crucial for managing potential health and safety risks to communities. The project poses no significant physical risks due to the implementation of well-defined mitigation measures. There appears to be no risk of displacement, loss of livelihoods, or cultural disruption. Exposure to infectious and airborne diseases, and air pollution is anticipated but effective mitigation measures are in place.
Waste Management Facilities (2007)	The guidelines establish requirements for the Proponent to effectively manage potential risks associated with waste management facilities. In operational terms, the Proponent has: identified waste streams likely to be generated; assessed the risks posed by these waste streams; developed mitigation measures to address the identified risks; established specific procedures and methods for managing the waste streams. There are plans to: organise on-site training sessions for personnel involved in waste handling and safety procedures, and; conduct M&E to assess the effectiveness of waste management practices.

EHS Guideline	Content & Relevance to MoCU Project
General EHS Guidelines 1 Environmental (2007)	The guideline outlines a number of requirements that project Proponents must meet to manage potential environmental risks including emissions of air pollutants, discharges of wastewater, excessive noise levels, and; use and storage of hazardous materials. The following are the tentative mitigation measures in place: The Proponent has identified all potential environmental impacts, assessed its significance and appropriate mitigation measures; developed an environmental management plan, and; established an appropriate M&E program to track the impacts and assess the effectiveness of the mitigation measures.
WHO Ambient Air Standards	The WHO Ambient Air Quality Guidelines (AQG) offers a set of evidence-based recommendations of limit values for specific air pollutants to help countries achieve air quality that protects the public from respiratory illnesses, cardiovascular diseases, lung cancer and other health effects. To comply with the AQG, the Proponent must: implement stringent emission controls to reduce the release of harmful air pollutants; establish a robust air quality monitoring network for informed decision-making, and; raise public awareness about the health risks of air pollution and promote behavioural changes that contribute to overall emission reductions.

3.8 Institutional Framework for Environmental Management

In Tanzania, the Environmental Impact Assessment (ESIA) process involves a diverse range of stakeholders, each with distinct roles and responsibilities. The Environmental Management Act (EMA, Cap 191) entrusts the National Environmental Management Council (NEMC) with the oversight of the assessment process and the facilitation of public participation.

The Act grants NEMC the authority to determine whether a proposed project necessitates an ESIA, to approve consultants for conducting ESIA studies, to solicit public feedback, and to issue certificates of approval via the Minister responsible for the environment. NEMC currently serves as the designated authority for ESIA reviews, including site visits, overseeing the conduct of all Technical Advisory Committee (TAC) meetings, and monitoring and auditing the environmental performance of projects. Table 10 provides a detailed description of Legal and Institutional Arrangement.

Table 10: Legal and Institutional Arrangement

Level	Institution	Role and responsibility
National Level	Vice President's Office Division of Environment	i) Approval and signing of EIA certificate, ii) To coordinate Environmental Management Policy, Environment Management Act and EIA guidelines. iii) To approve, sign and issue an Environmental Certificate. iv) To advise the Government on all environmental matters. v) To enforce and ensure compliance with the national environmental quality standards. vi) To provide policy direction and leadership in all matters, particularly those about hazardous waste management under the Environmental Management Act.
	National Environment	i) Project registration, approval of ToR, and ESIA review. ii) Environmental Monitoring and Compliance Auditing. iii) Advise Government on all environmental matters.

Level	Institution	Role and responsibility
	Management Council (NEMC)	
	Ministry of lands, housing and human settlements development	i) Authority over the national land including the project area. ii) Enforce law and regulations in the area of influence of the project.
	Ministry of Education, Science and Technology (MoEST).	i) To develop and implement Policies on Education, Research, Library Services, Science, Technology, Innovation, Skills, Training Development and their implementation. ii) To improve Basic Education Development through Teachers Training Accreditation and Professional Development. iii) Teachers' Professional Standards Development. iv) Schools Accreditation and Quality Assurance. v) Development of Local Expertise in Science, Technology and Innovation. vi) Coordinate roles of Departments, Parastatal Organizations, Agencies. Programmes and Projects under the Ministry.
	Pangani Basin Water Board	i) Issuing water use permit for drilled borehole. ii) Water quality monitoring for surface and groundwater.
	Moshi Urban Water Supply and Sewerage Authority	i) Potable water supply and sanitation (sewerage) within the project area. ii) Owner of the water supply and sewerage utility in the project site.
	Occupational Safety and Health Authority (OSHA) under Prime minister office	i) Issuing certificates of compliance. ii) Designated Authority for occupational safety matters. iii) Registration of workplace.
Project Proponent	MoCU main Campus	i) Project investment and project cycle implementation, monitoring and auditing; ii) Conduct ESIA study and follow-up on ESIA certificate. iii) Land acquisition and payment of compensations. iv) Paying applicable taxes and charges. v) Project operation and decommissioning.
Project Financial	World Bank	Project financing
Regional Level	Kilimanjaro Region	i) Oversee and advice on implementation of national policies at Regional level ii) Oversee enforcement of laws & regulations iii) Advice on implementation of development projects and activities at Regional level
Local Government Authorities &Communities	Moshi Municipal Council	i) Oversee and advice on implementation of national policies at Municipal level, ii) Oversee enforcement of laws & regulations iii) Advice on implementation of development projects and activities at Municipal level
	Ward Office and Street Office at	i) Project monitoring (as watchdogs for the environment, ensure the well-being of residents) and participate in project activities

Level	Institution	Role and responsibility
	(MoCU main Campus)	ii) To extend administrative assistance and advice on the implementation of the project, iii) Managing the community's relations
	Local communities, NGOs, CSOs, FBOs	i) Project monitoring (as watchdogs) ii) Provide assistance and advice on the implementation of the project, iii) Part of the project beneficiaries through employment opportunities, income generation and CSR projects

3.9 World Bank Environmental and Social Framework

The World Bank Environmental and Social Framework (ESF) is a set of policies and guidelines established by the World Bank Group to ensure projects funded by the bank are environmentally and socially sustainable. It covers issues such as biodiversity conservation, climate change, and community health and safety. The ESF promotes sustainable development, protects people and the environment, and helps governments manage risks and improve development outcomes. It also encourages countries to develop and improve their own environmental and social policies, aligning with the ESF's standards. The framework categorizes projects based on potential environmental and social risks, encourages stakeholder engagement, emphasizes environmental and social assessments, requires Environmental and Social Management Plans, and establishes grievance redress mechanisms. The proposed project shall comply with the ESF in all its activities throughout the project cycle.

3.10 Indicative Permits and Authorisations

Adhering to the legal and regulatory framework outlined in the preceding sections, the Proponent must obtain the specified certificates and permits detailed in Table 11. It is important to note that the provided list may not encompass all necessary requirements, and therefore, the Proponent is accountable for obtaining any additional relevant permits from the pertinent authorities.

Table 11: Legal Certificates, permits to be secured

SN.	Required Certificate, Licence or Permit	Relevant Act/Regulation	Responsible authority	Remarks
1.	EIA Certificate	EMA No. 20, of 2004	VPO-DoE through NEMC	This report is part of the application
2.	Building permit: Obtain permission to commence construction works	Local Government Act (District Authorities), 1982	Moshi Municipal Council	Obtained before commencing construction
3.	Fire and Rescue Certificate	Fire and Rescue Act, No. 14 of 2007	Commissioner General of Fire and Rescue Force, Ministry of Home Affairs	To be acquired during operation phase
4.	Certificate of Registration of Workplace	Occupational Health and Safety Act, 2003, S. 15-17	Occupational Safety and Health Authority (OSHA)	To be acquired before commencing construction
5.	Workplace Compliance Certificate	Occupational Health and Safety Act, 2003, S. 15-17	Occupational Safety and Health Authority (OSHA)	To be acquired during operation phase

Source: Field Visit on June 2023

3.11 Institutional Framework

The ESIA practice in Tanzania allocates distinct functions and responsibilities to all parties engaged in the ESIA process for any proposed development project where ESIA is mandatory. According to the Environmental Management Act (EMA), Cap 191, the National Environmental Management Council (NEMC) is granted the authority to enforce, ensure compliance, review, and monitor Environmental Impact Assessments (EIAs). NEMC also plays a role in facilitating public participation in environmental decision-making and oversees and coordinates all matters related to the environment.

3.11.1 Key players in proposed project implementation

To guarantee the robust development and successful implementation of the proposed project, it is essential to identify and delineate the responsibilities and authority of the key project implementors. The entities involved are the HEET Project funding institutions (the Government of Tanzania and the World Bank), MoCU, National Environmental and Management Council and Contractor(s).

(a) The Government and World Bank

The Government and the World Bank will bear a primary responsibility to ensure that the project is executed in strict adherence to the highest environmental standards as outlined in the ESF, ESSs, and EIS.

(b) UPIU- MoCU

The proponent is responsible for ensuring that the implementation process of the Environmental and Social Management Plan (ESMP) and mitigation measures aligns with relevant national policies, legislations, and the World Bank Environmental and Social Standard (ESS1). MoCU has established a Project Implementation Unit (PIU) tasked with supervising and monitoring the implementation of project construction activities. The management of all project activities during operation falls under Section 8.2 of the UPIU, which collaborates with other departments and units based on the nature of the activity. In general, the UPIU operates under the management of MoCU, overseeing day-to-day project activities. Management meetings, chaired by the Vice-Chancellor, guide the UPIU by providing support, guidance, and oversight of its progress. Additionally, the UPIU has designated Environmental and Social Safeguard Specialists responsible for supervising and monitoring the project's implementation.

(c) The Contractor

The implementation of the project will be entrusted to a Contractor, who bears the responsibility for executing the proposed project in strict accordance with the required Technical Specifications. The Contractor is obligated to implement the project entirely in compliance with the Environmental and Social Impact Assessment (ESIA) mitigation measures detailed in the Environmental and Social Management Plan (ESMP).

Prior to commencing actual construction, it is mandatory for the Contractor to submit a work site plan that adheres to national environmental guidelines and includes an ESMP for various phases of the work. This environmental plan should outline the location of material sources, the disposal area for construction debris, and other relevant details, considering the proposed mitigation measures in this ESIA project report.

The Contractor is required to designate a Project Environmental, Health, and Safety Site Officer (EHSSO) and a Project Social Site Officer (SSO) as focal points for all environmental and social matters. These officers, both holding a minimum of a Bachelor's Degree in their respective specializations, will be consistently present on-site throughout the construction works. Among their responsibilities are the following tasks:

i) Drafting environmental and social aspects during project implementation;
ii) Overseeing environmental, social, health, and safety aspects at the worksite;

iii) Contributing to the definition of no-working areas;
iv) Providing recommendations for addressing specific environmental and social issues;
v) Facilitating the establishment of a liaison group with stakeholders at the project site and monitoring compliance with the Environmental and Social Management Plan (ESMP);
vi) Coordinating consultations at critical project stages with stakeholders and interested parties;
vii) Maintaining regular communication with MoCU Safeguard specialists to assess the contractor's compliance with the ESMP throughout the contract duration;
viii) Monitoring and supervising the implementation of the ESMP;
ix) Generating environmental and social progress or "audits" reports on the status of measure implementation and the management of site works

(d) Consultant

The Project Consultant will oversee the design review and supervise the construction phase of the proposed project. It is the Consultant's responsibility to ensure compliance with the Environmental Impact Statement (EIS) and the Construction Environmental and Social Management Plan (C-ESMP). The Consultant is required to appoint a Project Environmental, Health, and Safety Site Officer (EHSSO) and a Project Social Site Officer (SSO) who will serve as focal points for all environmental, health and safety, and social matters. The EHSSO and SSO will be regularly monitored on-site throughout the construction works. Both officers are mandated to hold a minimum of a Bachelor's degree in their respective specializations.

CHAPTER FOUR

4.0 SOCIO-ECONOMIC PROFILE AT THE PROJECT AREA

4.1 Overview

This chapter delves into socio-economic and environmental parameters surrounding the project's core location, the MoCU main Campus area at Ushirika Street in Mfumuni Ward, and its broader sphere of influence, encompassing Moshi Municipal and Kilimanjaro Region. The environmental insights gleaned from this chapter will be interwoven with the project concept and its components to effectively identify, evaluate, and formulate mitigation measures for potential environmental impacts.

The proposed project is located within Moshi Municipal Council, one of six local government authorities in Kilimanjaro Region. The Municipality is administratively divided into Moshi East and Moshi West divisions. Its western border is shared with Moshi Rural District, while its eastern border abuts Hai District. The Municipality comprises 22 Wards: Bondeni, Kaloleni, Karanga, Kiboriloni, Kilimanjaro, Kiusa, Korongoni, Longuo, Majengo, Mawenzi, Mjimpya, Msaranga, Njoro, Rau, Pasua, Ng'ambo, Mfumuni, Miembeni, Soweto, Boma mbuzi, and Shirimatunda. The project site, located within Moshi Co-operative University, falls within Mfumuni Ward.

4.2 Site Description

4.2.1 Biophysical Characteristics (Climate, Soil, Hydrology, Trees)

As outlined in the Moshi Municipal Council Strategic Plan 2018/2019-2022/2023, the average annual temperature in Moshi Municipality hovers around 25°C. July stands as the coldest month, with an average temperature of 17°C, while December is the warmest month, averaging 34°C. Rainfall patterns are characterised by short showers during the October-December period and extended rainfall from March to May. Rainfall variability in mountainous areas is notably influenced by altitude and slope orientation. The average annual rainfall ranges from 500 mm in the plains to over 2,000 mm in the mountainous regions.

The project's construction phase will be carefully executed to minimise its environmental impact, particularly on the local climate. As per the Moshi Municipal Council Strategic Plan 2018/2019-2022/2023, the alluvial soil found at the project site within MoCU is fertile and well-suited for supporting various types of crops and vegetation. This soil fertility has enabled the MoCU management to enhance the campus landscape by planting a diverse range of trees. Additionally, this alluvial soil proves advantageous for building construction.

A site visit conducted in June 2023 revealed no permanent rivers or water sources that could be potentially impacted by the proposed project. The main campus of MoCU is characterised by gently sloping terrain, with the overall site sloping eastward. The Rau stream, located further to the east, is unlikely to be affected by runoff from the construction site due to the distance and the gentle slope of the land.

The Moshi Municipal Council has been actively engaged in tree planting campaigns, aligned with the government's initiative to plant 1.5 million trees annually to combat climate change. Under this program, the council has registered 36 tree nursery groups and individuals to ensure a steady supply of tree seedlings for the community. Currently, approximately 23,200 hectares, equivalent to 40% of the municipality's land, are covered with trees. The council has prioritised planting shade trees, ornamental trees, and indigenous water-conserving trees around water sources, open spaces, and residential areas. In 2017, the council launched an initiative to plant fruit trees in primary and secondary schools, resulting in the planting of 1,400 fruit trees. To accommodate the construction of the proposed academic building, certain existing trees will need to be cleared. The project Proponent will undertake a tree replacement program in other areas of the MoCU main campus to compensate for the trees removed during construction.

4.2.2 Baseline Measurement for Air quality and noise level

Dust Level Measurements

The highest daily average concentrations of 0.029 mg/m^3 for TSP, 0.018 mg/m^3 for PM_{10} and 0.012 mg/m^3 for $PM_{2.5}$ were measured at SP4 (Table 4-1). The noted higher air particulates at SP4 might be associated with wheel generated dust and tail piece emissions from vehicular movement along Moshi-KCMC road. However, none of the stations found with value above the assessment TBS limits and/or WHO guideline criteria for TSP, PM_{10} and $PM_{2.5}$ concentrations (Table 4-1).

Table 0-1 Average ambient Particulate Matter measured at four stations

Code	LOCATION		Particulate Matter		
	GPS Readings		TSP	PM_{10}	$PM_{2.5}$
	Latitudes	Longitudes	mg/m^3	mg/m^3	mg/m^3
SP1	-3.334725	37.337268	0.025	0.017	0.009
SP2	-3.334697	37.337165	0.019	0.013	0.007
SP3	-3.335028	37.337433	0.024	0.017	0.010
SP4	-3.334781	37.337664	0.029	0.018	0.012
SP5	-3.335098	37.337441	0.025	0.016	0.011
Environmental Management (Air Quality Standards), 2007			0.5	0.15	0.075
WHO/IFC (2007) and WB AQG 2006			0.23	0.05	0.025

Source: COLBA Consulting Field Measurements on January 2024

Ambient Pollutant Gases

The measured Sulphur dioxide (SO_2), Volatile Organic Compounds (VOCs), Ozone (O_3), Nitrogen dioxide (NO_2) and hydrogen sulphide (H_2S) concentrations were minimal and in conformity with their respective prescribed TBS and WHO/IFC limits at all stations (Table 4-2). Similarly, the recorded CO concentrations found complying with both TBS limit of 15 mg/m^3 and WHO/IFC guideline value of 30 mg/m^3 (Table 4-2). However, methane (CH_4) concentrations were very low with its impacts considered insignificant, taking into account that CH_4 has no limit specified in both the TBS standards and/or international guidelines. Generally, the ambient air quality in the area can generally be characterized as good most of the time, with no exceedance recorded against the provincial ambient air quality standards or WHO/IFC-wide objectives (Table 4-2).

Table 0-2 Average values of measured ambient pollutant gases

Code	LOCATION		Ambient Pollutant Gases						
	GPS Readings		CO	NO_2	SO_2	H_2S	O_3	CH_4	**V**OCs
	Latitudes	Longitudes	mg/m^3	mg/m^3	mg/m^3	mg/m^3	mg/m^3	mg/m^3	mg/m^3
SP1	-3.334725	37.337268	1.01	0.036	0.02	0.01	0.001	0.007	4.7
SP2	-3.334697	37.337165	1.66	0.045	0.03	0.01	0.001	0.005	4.6
SP3	-3.335028	37.337433	1.23	0.032	0.01	0.01	0.001	0.006	4.5
SP4	-3.334781	37.337664	2.86	0.049	0.05	0.01	0.001	0.010	4.6
SP5	-3.335098	37.337441	1.03	0.030	0.02	0.01	0.001	0.006	4.4
TBS Limits			15	0.12	0.5	-	-	-	6.0
WHO/IFC Guidelines			30	0.2	0.5	0.1	0.1	-	-

Source: COLBA Consulting Field Measurements on January 2024

Noise Measurements at the Identified Onsite Receptors

The day time average noise levels were ranging from 50.0 to 52.1 dBA during the daytime and 48.8 to 49.7 dBA during night-time (Table 4-3). The results suggested that the recorded noise levels are acoustically safe for people residing nearby the project site as the measured noise levels found to be lower, well below the TBS and WHO/IFC acceptable noise levels (Table 4-3).

Table 0-3 Average ambient Noise Levels measured at four stations

STATION CODE	LOCATION		Noise Levels in dBA	
	GPS Readings		Daytime	Nigt-time
	Latitudes	Longitudes	dBA	dBA
SP1	-3.334725	37.337268	52.1	49.7
SP2	-3.334697	37.337165	50.9	48.9
SP3	-3.335028	37.337433	51.3	49.0
SP4	-3.334781	37.337664	50.5	49.3
SP5	-3.335098	37.337441	50.0	48.8
TBS Limits			<55	<35
WHO/IFC/WB Guidelines			<60	<45

Source: COLBA Consulting Field Measurements on January 2024

Ground Vibrations

The recorded vibration levels were ranging from 0.011 to 0.016 mm/s PPV, with maximum value being recorded at SP3 (Table 4-3). The anticipated impact resulting from the measured vibrations is considered insignificant as the measured levels not exceeded 0.15 mm/sec PPV criteria established to evaluate the extent that can easily be detected by human, TBS and British Standard limits. In that regard, the measured ground vibration levels are lower and thus is not likely to impact negatively any sensitive receptors.

Table 4-3: Average vibrations measured in mm/s PPV at four measured stations

STATION CODE	LOCATION		LOCATION
	GPS Readings		GPS Readings
	Latitudes	Latitudes	(mm/s PPV)
SP1	-3.334725	37.337268	0.014
SP2	-3.334697	37.337165	0.011
SP3	-3.335028	37.337433	0.016
SP4	-3.334781	37.337664	0.013
SP5	-3.335098	37.337441	0.015
Human detection level			<0.15
TBS Limit			5
British Limit			0.3

Source: COLBA Consulting Field Measurements on January 2024

4.2.3 Baseline Measurement for Water quality test

To establish a baseline understanding of water quality, water samples were gathered from two existing boreholes: Sample One (S1) positioned approximately 50 metres east of the proposed project site at coordinates (-03.334570, 037.337890) and Sample Two (S2) located approximately 200 metres southeast of the project site at coordinates (-03.335350, 037.339760). These samples were collected to ascertain the prevailing water quality conditions before the project's implementation (Table 12 and Appendix 3). The baseline groundwater quality data will serve as a benchmark for monitoring the proposed project's potential impacts on the surrounding water resources.

Table 12: Water Quality Analysis Report for 2 Samples

SN	Parameters	Units	Sample recorded		TZS: 789: 2008
			1	2	
1	pH	Scale	6.96	6.95	6.5-8.6
2	Turbidity	NTU	0	0	25
3	Colour	Hazen^{o}	0	0	50
4	Salinity	%(ppt)	0.07	0.07	NA
5	Electric conductivity	µS/cm	143	138	2000
6	Total dissolved solids	mg/l	72.0	69.0	2000
7	Phosphate	mg/l	0.86	0.85	NA

8	Nitrate-Nitrogen	mg/l	0.80	0.70	10
9	Nitrite-Nitrogen	mg/l	0.0029	0.002	NA
10	Ammonia-Nitrogen	mg/l	0.123	0.130	0.5
11	Chloride	mg/l	26.0	24.0	800
12	Sulphate	mg/l	<1.0	<1.0	600
13	Fluoride	mg/l	0.0745	0.072	1.5
14	Bicarbonate Alkalinity	mg/l	38.0	37.0	NA
15	Sodium	mg/l	12.77	11.24	NA
16	Potassium	mg/l	1.226	1.026	NA
17	Carbonate Alkalinity	mg/l	0	0	NA
18	Total Alkalinity	mg/l	38.0	37.0	NA
19	Total Hardness	mg/l	34.0	31.0	500
20	Magnesium	mg/l	3.247	3.90	100
21	Calcium	mg/l	11.0	10.01	75
22	Iron	mg/l	<0.01	<0.01	1.0
23	Manganese	mg/l	<0.01	<0.01	0.5
24	Zinc	mg/l	<0.01	<0.01	5.0
25	Chromium	mg/l	<0.01	<0.01	0.05
26	Nickel	mg/l	<0.01	<0.01	NA
27	Copper	mg/l	<0.01	<0.01	0.05
28	Lead	mg/l	<0.01	<0.01	0.01
29	Cadmium	mg/l	<0.01	<0.01	0.05

Source: Ardhi University Laboratory analysis: June, 2023, NA=Not Analysed

The data presented in Tables 17 clearly indicates that all the assessed parameters in the water samples taken from two boreholes, specifically sample one (S1) and sample two (S2), which are currently utilised by staff and students at MoCU main Campus, meet the established limits according to the Tanzanian standard (TZS 789:2008).

4.3 Biological Environment

4.3.1 Flora and Fauna

The proposed site for project implementation boasts a diverse array of plant species, consisting of short grass, six *Tectona grandis* trees, one *Azadirachta indica* tree, one *Peltophorum pterocarpum* tree, eight *Senna siamea* trees, one Trichilia prieureana tree, and two *Delonix regia* trees. Upon conducting a site visit study, it was noted that none of the amphibians and reptiles present in the area are listed on the IUCN Red List of threatened species.

4.4 Socio-Economic and Cultural environment

4.4.1 Demographic Profile

As per the 2022 National Population and Housing census, Moshi Municipal recorded a population of 221,733, comprising 108,462 males and 113,271 females. The average household size stands at 3.4 persons per household. Notably, the Municipality has witnessed a notable population growth, escalating from 184,292 in 2012 to 221,733 in 2022 (Population and Housing Settlement Census 2022).

In Mfumuni ward, the population is reported at 4,029 individuals, with 1,944 males and 2,085 females, and an average household size of 3.6 persons per household (Population and Housing Settlement Census 2022). It is worth mentioning that MoCU's main Campus is situated on Ushirika street, which has a total population of 1,493 persons (Ushirika Executive Office, June 2023).

The implementation of the proposed project is anticipated to bring about a rise in the population of Ushirika Street and Mfumuni Ward overall. This population growth is expected to hinge on the demand for social services, food, and accommodation within Ushirika Street, thereby benefiting the existing local population.

4.4.2 Land Tenure and Land Use

The city of Moshi is home to both planned and unplanned neighbourhoods. At the time of this study, there were 18,200 dwellings in Moshi, with 9,300 being located in planned neighbourhoods and 8,900 in unplanned ones (Moshi Municipal Council Strategic Plan 2018/2019-2022/2023). Multiple land tenure systems exist in the project site. The most common way to acquire land is through inheritance (20%) or purchase (80%). All landowners on Ushirika Street have title deeds (Ushirika Street Executive Officer, June 2023).

The main campus of MoCU encompasses an area of 32.62 hectares and is legally owned by the Proponent. The campus houses administration blocks (A and B), student hostels, lecture halls, lecture rooms, a multi-purpose hall, cafeteria, commercial building, financial institution, conference hall, seminar rooms, a health centre, staff houses, a library building, a workshop, a garage, the Ushirika stadium, an open garden, and a milling machine (Table 13). The proposed project site is located within the main campus of MoCU and is bordered by Moshi Secondary School to the north, the Undergraduate Studies Hall to the east, Nyerere Hall to the south, and Sokoine Road and CPP to the west.

Table 13: Land Use Development in MoCU Main Campus

SN	Existing Land Use	Area (Acres)	Facility	Capacity
1.	Administration Zone	2.45	Administration block A (38 offices)	50 people
			Administration block B (50 offices)	79 people
			Garden	
2.	Academic zone	10.23	Multipurpose hall	600 students
			Lecture halls	Kahama hall -418 students
				Pius Msekwa hall – 187 students
			Theatre	255 students
			Lecture rooms	1,351 students
			Conference hall	800 students
			Seminar rooms	745 students
3.	Students hostel zone	4.56	15 halls	768 students
4.	Staff housing zone	18.69	180 houses	238 families
5.	Welfare zone	1.59	Health Centre	
			Cafeteria	300 students
			Staff canteen	
6.	Recreational zone	6.41	Ushirika stadium	1
7.	Estate zone	1.45	Workshop	1
			Garage	1
			Milling machine	1
			Store	1
8.	Commercial zone	3.69	Shops and stationery	17
			Food vendors	5
			Financial institution	1

SN	Existing Land Use	Area (Acres)	Facility	Capacity
9.	Road network	6.32	Feeder roads	
10.	Storm water Stream	0.62		

Source: MoCU, June 2023

4.4.3 Ethnicity and Family Structure

The Chagga and Pare people are the dominant ethnic groups in the municipality, accounting for 90% of the total population (Ushirika Street Executive Officer, June 2023). The Maasai, Meru, and Sambaa people make up the remaining 10%. These minority groups migrated to the area seeking business and employment opportunities. It's important to note that Ushirika Street is a diverse community with people from various ethnic backgrounds. Kiswahili is the primary language of communication and business.

Polygamy and monogamy are the two main forms of marriage in the municipality. Traditionally, men are considered the heads of households and are responsible for providing food and care for their families. However, there are also female-headed households due to various reasons, such as the death or divorce of the husband. The proposed project will create employment opportunities for people from the surrounding community, enabling them to better support their families.

4.5 Economic Activities and Income Generation Activities

4.5.1 Trade

Trade is the cornerstone of Moshi Municipality's economy. The primary forms of trade are retail and wholesale shops, the hospitality industry, supermarkets, and food markets. Most commercial activity takes place in the Central Business District (CBD), which encompasses the wards of Mawenzi, Kiusa, Bondeni, and a portion of Korongoni. These economic activities provide employment and income for over 50% of the municipality's population (Moshi Municipal Council Strategic Plan 2018/2019-2022/2023).

Petty traders cater to local communities by offering a variety of goods. Their services are primarily accessible at the ward and street levels. Small-scale entrepreneurs, such as petty traders, kiosk operators, fruit, vegetable, and grain vendors, as well as food stall owners, constitute a significant source of income for a substantial number of small-scale traders in Mfumuni Ward. Other livelihood opportunities are linked to the rapidly expanding use of motorcycles and scooters as a means of transportation.

Restaurants, canteens, barber shops, hair and beauty salons, stationery stores, mobile money kiosks, banks, pharmacies, fruit kiosks, shoemakers, and clothing stores are the primary entrepreneurial ventures at the MoCU main campus. These businesses are all privately run and cater to the university community. The proposed project will primarily benefit entrepreneurial activities and commercial establishments, particularly restaurants, canteens, fruit kiosks, and mobile money services, as construction workers rely heavily on the services provided by these vendors.

4.5.2 Agriculture

Agriculture, particularly horticulture, plays a vital role in supplementing the income of residents in Mfumuni Ward. People in the neighbourhood of the project site cultivate a wide range of food crops, including maize, beans, bananas, paddy, sweet potatoes, millet, sorghum, and cassava, alongside a variety of vegetables and fruits. Approximately 30% of the population in Mfumuni Ward engages in agricultural activities, primarily growing food crops on small-scale farms. The proposed project is anticipated to positively impact the surrounding community, particularly food vendors, vegetable growers, and sellers. This project will lead to direct and indirect benefits that have the potential to significantly enhance the lives of Mfumuni Ward residents. The anticipated benefits include:

i) Improved access to markets for agricultural products: During the project's implementation phase, there will be a surge in demand for goods and services due to the involvement of external personnel. These individuals will require accommodation, meals, transportation, and other essential services, leading to a boost in local businesses catering to these needs. Similarly, following the project's completion, a rise in student

enrolmentenrolment is anticipated, which will further stimulate demand for goods and services. This influx of students will necessitate additional housing, food options, transportation services, and other amenities to support their needs, thereby benefiting local businesses.

ii) Increased income for farmers: Enhanced access to markets is expected to translate into increased income for farmers, as they will be able to sell their crops at more favourable prices. This improved financial standing will have a ripple effect throughout the community.

iii) Reduced food insecurity: By boosting agricultural productivity and market access, the project aims to reduce food insecurity within the community, ensuring that everyone has access to sufficient and nutritious food.

4.5.3 Livestock Keeping

Despite the limited availability of grazing land, livestock rearing remains a significant economic activity in the region— ranked second after crop production. Households primarily engage in zero-grazing practices, raising animals such as pigs, chickens, goats, and cattle without relying on extensive pastures (Source: Moshi Municipal Council Strategic Plan 2018/2019-2022/2023). The anticipated positive direct and indirect impacts outlined in section 4.5.2 are expected to benefit livestock keepers in the project's vicinity. The project is likely to stimulate increased demand for livestock products, including meat, milk, and value-added animal products. This surge in demand will present favourable opportunities for livestock keepers to expand their operations and enhance their livelihoods.

4.5.4 Hospitality industry

The project's implementation will trigger a two-pronged surge in demand for hospitality services. Firstly, the influx of external personnel seeking employment during the construction phase will necessitate additional accommodation, meals, and other services, leading to a boost in local businesses catering to these needs. Secondly, the anticipated increase in student enrolmentenrolment, estimated at 500 per annum, will further stimulate demand for hospitality services. This influx of students will require additional housing, food options, transportation services, and other amenities to support their needs, thereby impacting positively on local businesses.

4.5.5 Employment

Unemployment is a significant concern in Mfumuni Ward and the surrounding communities. The majority of the local workforce, approximately 70%, finds employment in small-scale businesses such as shops, mobile money services, motorcyclists, and vendors, making them the primary sources of employment in the region (Mfumuni Ward Officials, June 2023). The implementation of the proposed project is poised to fundamentally alter the current dynamics of the formal and informal labour markets. The most evident transformation will be the creation of new employment opportunities associated with the project as alluded to in sections 1.7.3 and 2.6.1 of this report.

A fundamental shift in labour dynamics could potentially emerge as a result of individuals transitioning from lower-paying informal sector jobs to more secure and rewarding positions at the project site. This transition holds the potential to bring about lifelong changes in labour quality, such as the acquisition of new professional skills and exposure to advanced construction technologies that are scarce in the informal sector. These positive changes are likely to have a significant impact on the livelihoods of local individuals engaged in the project.

The project's potential to transform the labour landscape in Mfumuni Ward is expected to bring about several positive impacts on the livelihoods of local residents. The project is expected to create a substantial number of new employment opportunities, both during the construction phase and upon completion. The project will provide opportunities for local residents to acquire new skills and enhance their existing ones, increasing their employability and earning potential. The increase in employment opportunities and skills development is likely to translate into improved income levels and living standards for local residents. The overall positive impact on livelihoods is expected to contribute to the broader socio-economic development of Mfumuni Ward. The project's

potential to reshape labour dynamics and enhance livelihoods presents a significant opportunity for Mfumuni Ward to address the issue of unemployment and foster sustainable economic growth (Mfumuni Ward Officials, June 2023).

4.5.6 Labour Influx and Markets

The presence of educational institutions within Mfumuni Ward and the surrounding area has drawn a diverse population to the region. Consultations with local leaders revealed that the majority of labourers in the study area are residents of Mfumuni Ward, primarily from Ushirika and Mwereni streets. During the implementation phase of the proposed project, an additional influx of labourers is anticipated, both from within and beyond the municipality. This increased presence of contractors and labourers is expected to bring about positive economic benefits for local businesses.

Beside the direct economic gains, the influx of individuals can also contribute to the revitalization of local markets. Large-scale construction projects can significantly influence the types of businesses that operate in the surrounding area and the goods and services they offer. The increased demand for goods and services often exceeds the capacity of existing local businesses, leading to the emergence of new, larger-scale enterprises that can cater to these growing needs.

Furthermore, construction projects may require specialised goods and services that are not readily available from local businesses. This demand can attract new entrants into the market, including specialised service providers and suppliers of niche products. The influx of these specialised businesses can further enhance the diversity and sophistication of the local economy. In summary, large-scale construction projects can catalyse significant changes in the business landscape of the surrounding area, leading to the emergence of larger-scale businesses, specialised service providers, and a broader range of goods and services offered. These changes can contribute to the overall economic growth and diversification of the region.

4.5.7 Co-operatives

Moshi Municipality has 72 registered cooperative societies, categorised into three groups: Savings cooperative societies (SACCOS), Consumer cooperative, and multipurpose co-operative. These co-operatives have a total of 12,722 members, with 5,966 male members and 6,452 female members. These cooperatives aim to address unsustainable practices through ethical products and services (Moshi Municipal Council Strategic Plan 2018/2019-2022 /2023). MoCU main campus has a registered Consumer Cooperative Society for students, known as *Wanafunzi* Consumer Co-operative Society (WACCOS) that seeks to promote their professional careers in cooperative affairs. Mfumuni Ward manages groups of women and youth savings cooperative societies.

Although the proposed building will not directly address the performance of co-operatives, the HEET project is supporting complementary initiatives in curriculum development, review, and academic staff capacity building, all of which are linked to the utilisation of the building. These twin efforts in curriculum and staff development aim to enhance the competencies of both students and staff, empowering them to provide high-quality services to the industry, including co-operatives.

4.6 Social Infrastructure

4.6.1 Health Services

The Moshi Municipal Council has a comprehensive healthcare system with 55 health facilities, including hospitals, health centres, dispensaries, and clinics. These facilities provide both preventive and curative care. The majority of facilities are privately owned. Residents of Mfumuni Ward receive healthcare through a variety of facilities, including the Ushirika Health Centre, Mawenzi Hospital, KCMC Hospital, and private health centres and dispensaries. Most residents have health insurance through CHF or NHIF. The most common diseases in

Mfumuni Ward are Acute Respiratory Infection (ARI), Urinary tract infection, Peptic ulcer, intestinal worms, pneumonia, asthma, sickle cell, Diarrhoea, Hypertension, and diabetes mellitus. HIV/AIDS infection rates are low.

The Moshi Municipal Council has an established system for providing HIV/AIDS awareness training to the public. Similarly, MoCU has integrated HIV/AIDS awareness into its core operations, ensuring the continued provision of these services on a routine basis (e.g., to new and continuing students, staff, and contractors). In addition to this routine service provision, the HEET project is providing unique support to MoCU to further enhance its HIV/AIDS awareness services and ensure effective delivery and care to those affected.

To amplify HIV/AIDS awareness during the project execution phase, the contractor will install HIV/AIDS awareness posters at the project site and partner with the Health Center, MoCU Administration, and Local Government Authorities. This collaborative effort will maximise the reach and impact of the provided HIV/AIDS awareness training, ensuring that it resonates with a broader audience and leaves a lasting impression on the community.

4.6.2 Water supply and sanitation

The Moshi Urban Water Supply and Sanitation Authority (MUWSA) is responsible for providing water services in Moshi. The municipality's water supply is primarily sourced from springs, shallow wells, deep wells, and rainwater harvesting. MUWSA has the capacity to meet the water needs of both the project area community and the surrounding areas, including the anticipated growth in the number of students at MoCU. Sanitation facilities in the municipality are reasonably well distributed, with the majority of residents having access to toilets. MUWSA sewage lines adequately serve Mfumuni Ward, and approximately 80% of the population is connected to the sewer system.

Despite the low likelihood of the project posing substantial risks to water sources, stringent safeguards must be implemented to protect these resources and adhere to environmental regulations. Consequently, the contractor is obligated to: implement erosion control measures in areas susceptible to erosion; cover stockpiles of construction materials with tarps or plastic sheeting to minimise runoff; manage hazardous materials appropriately; train workers on the proper handling and disposal of hazardous materials, as well as the proper handling of construction materials, spill prevention, and erosion control measures. Additionally, the contractor is responsible for ensuring an adequate supply of temporary toilets for construction workers throughout the project implementation phase.

4.6.3 Education

The Moshi Municipal Council plays a crucial role in providing quality education to its residents, operating numerous schools at various levels, including pre-primary, primary, and secondary institutions. Secondary schools are strategically distributed across the municipality's wards, ensuring accessibility for students. The municipality employs a substantial number of qualified teachers, with diverse qualifications ranging from diplomas to master's degrees. Mfumuni Ward boasts two government-run primary schools and three privately owned secondary schools, catering to the educational needs of the local community. Additionally, a limited number of higher education institutions like MoCU and Tanzania Police School-Moshi (CCP) are also available, expanding educational opportunities.

The proposed building will further enhance the opportunities for higher education provision in the region. This outcome will be manifested through various entry points, including increased capacity to enrol the rising number of qualified students from lower levels. For MoCU, this enrolmentenrolment is projected to increase from 9,186 students in 2023 to 13,000 by 2038. The proposed building will provide the much-needed additional space for classrooms, laboratories, and other academic facilities. This will allow the university to accommodate the growing

number of students. The new facilities will also be equipped with state-of-the-art ICT technologies, which will enhance the quality of teaching and learning.

The project extends beyond providing new facilities; it also encompasses the development of innovative curricula and teaching methods. This endeavour is meticulously designed to align with the demands of the 21st-century workforce, equipping students with the necessary skills for success in a diverse range of fields. The new teaching approaches will be more interactive and engaging, embracing the integration of ICT technologies to foster a personalised learning experience for students. The project's impact extends beyond its immediate boundaries, promising to broaden access to higher education for qualified students and enhance the overall quality of education in the region. This will foster a more educated and skilled workforce, paving the way for positive economic outcomes.

4.6.4 Energy source and supply

The Municipality primarily relies on the National Hydroelectric Power Grid for its electricity needs. However, natural gas, diesel, gasoline, and kerosene are also used for both residential and commercial purposes, reflecting a pattern similar to other regions in Tanzania where charcoal remains the primary cooking fuel for the majority of the population. Within Mfumuni Ward, the vast majority of residents are connected to the National Hydroelectric Power Grid, which is managed by TANESCO. This electricity source powers lighting, appliances, and machinery across various facilities. At MoCU's main campus, all existing buildings, including theatres, lecture halls, lecture rooms, seminar rooms, the multipurpose hall, staff houses, student hostels, restaurant, administration blocks, financial institutions, workshops, the milling machine, and the commercial buildings are connected to the grid. Additionally, two standby generators with capacities of 45 kVA and 250 kVA provide backup power in case of grid disruptions.

Mirroring other regions in Tanzania regions, the main electricity provider is diligently addressing the rising electricity demand through capacity expansion and energy source diversification. Hydropower remains the dominant source, but natural gas, thermal power, and renewable energy are gaining ground. Despite these strides, the supply-demand gap persists, causing power outages. To overcome this shortfall, the project must prioritise energy conservation and new generation capacity. Strategies for achieving this goal are detailed in section 1.5.2. Therefore, future institutional development initiatives at MoCU should focus on sustained investments and technological advancements to exploit alternative energy sources, particularly solar power.

4.6.5 Waste generation and management

4.6.5.1 Solid waste management

The Moshi Municipal Council generates a significant amount of solid waste, totalling 236 tons per day. The waste is generated from various sources, including households, businesses, institutions, and industries. The Municipality is responsible for collecting and disposing of this waste at the Mtakuja dumpsite. Household waste accounts for the largest portion of solid waste generated in the Municipality, followed by commercial, institutional, and industrial waste. A small percentage of solid waste is recycled, while the remaining portion is either dumped in farm yards, disposed of in trash pits, or openly burned.

In Mfumuni Ward, household waste is collected weekly by municipal trucks and transported to the Mtakuja dumpsite. Institutions like MoCU use skip buckets to collect solid waste, which is then collected by municipal vehicles. Healthcare waste is incinerated at the Ushirika Health Centre. The proposed project will generate solid waste at each stage of development. The Proponent and contractor will ensure that approved solid waste collection facilities and points are available on-site. All solid waste will be collected, sorted, and transported to the approved dumpsite by a licensed solid waste handler.

4.6.5.2 Liquid waste generation

Liquid waste management in unplanned areas of Moshi Municipality is primarily handled through pit latrines, while planned settlements have a toilet coverage rate of 99.9%. However, these facilities are not sufficient to meet the growing demand for liquid waste management. Nine Waste Stabilization Ponds (WSPs) form the core of Moshi Municipality's sewerage services component, with a total volume of 143,664m3/day and a design capacity of 4,500m3/day. The sewerage network covers 60.16 km and includes pipes ranging from 100mm to 900mm in diameter. The coverage is approximately 18% of the total area and 32% of the population. Moshi Municipality's sewerage system is gravity-fed, making it suitable for connecting 80% of the land. The remaining areas require either pumping or the construction of additional WSPs. Currently, Majengo, Bondeni, Mawenzi, Kilimanjaro, Longuo, Rau, Mfumuni, Pasua, Njiro, Njoro, Soweto, Kiusa, and Kaloleni wards are connected to sewerage systems.

Mfumuni Ward utilises MUWSA's sewerage system, which conveys wastewater to the Njoro wastewater treatment ponds. While about 80% of the population, including MoCU, has access to sewerage services, the remaining 20% relies on septic tanks and soak pits. Considering the proposed project site's lack of connection to the existing sewerage network, new connections will need to be established upon project completion. Consequently, the contractor must provide mobile/temporary toilets for construction workers throughout the project implementation phase. Additionally, utmost care should be taken to minimise the environmental impact of construction activities.

4.6.6 Transport

Moshi Municipal Council boasts a robust road network spanning 288.04 kilometres, with 76.95 kilometres paved, 64.93 kilometres gravel-surfaced, and 146.16 kilometres earthen roads. Several roads have been recently constructed and maintained by TARURA, the Tanzania Roads Authority. The Municipality is integrated into the national/truck road network, enabling MoCU's main campus to connect to the rest of the country through the Dar es Salaam-Arusha Road, providing a national level of accessibility. Moshi Municipal is also accessible by air through the Kilimanjaro International Airport and by rail via the Tanga - Moshi Railway. Measuring 1.16 kilometres from Moshi Municipal Centre (Moshi Roundabout) along Sokoine Road, MoCU's main campus is easily.

accessible from Moshi Municipal via Sokoine Road to the west and Uru Road to the east. Both roads are well-paved, in excellent condition, and open throughout the year. MoCU's main campus also features several internal feeder roads that serve the MoCU community. Road transportation within the municipality primarily consists of motor vehicles, including minibuses and motorcycles. Preserving the integrity and usability of the existing road networks requires the Proponent and Contractors to strictly follow the precautionary measures and safety regulations specified in section 2.6.4.

4.6.7 Telecommunication

The Municipality offers a diverse range of telecommunication services to its residents, including those at the proposed project site. Mobile network operators Tigo, Vodacom, Airtel, Halotel, and TTCL provide comprehensive coverage, ensuring seamless connectivity for voice calls, text messages, and mobile data services. Additionally, residents have access to a variety of television and radio broadcasters, including ITV, TBC1/TBC FM, Clouds FM/TV, EATV/Radio, Azam TV, Wasafi TV, Star TV, and Radio Safina. Tanzania Telecommunication Company (TTCL) stands as the primary internet service provider for residents in the Municipality including MoCU's main campus (Moshi Municipal Council Strategic Plan 2018/2019-2022/2023).

Telecommunications play an increasingly crucial role in enriching the learning experience. For the current generation, acquiring knowledge and skills occurs across various platforms and media, making internet access indispensable. To further enhance access to diverse learning resources, the Proponent will continue to support HEET initiatives aimed at developing ICT infrastructure for virtual and online learning, while simultaneously expanding access to electronic literature and data

4.7 Predicted Impacts after the Project

Upon the implementation of the proposed project, several anticipated impacts are foreseen:

i) Increased Enrolmentenrolment in ICT Programs: Anticipated growth in enrolmentenrolment rates for ICT programs at MoCU.
ii) Improved Learning Facilities and Environment: Enhancement of the quality of learning facilities and the overall environment for ICT programs.
iii) Enhanced Employability of Graduates: Improved employability prospects for graduates from ICT programs, attributed to exposure to state-of-the-art ICT facilities aimed at elevating their educational quality.
iv) Quality-of-Service Delivery Improvement: The proposed project is expected to elevate the quality of service delivery at MoCU.
v) Facilities for Blended Learning: The construction of the proposed building will provide facilities conducive to blended learning, allowing MoCU to extend its reach to students dispersed throughout Tanzania.
vi) Potential Security and Social Challenges: The increased student population and their needs may pose potential security and social challenges on campus.
vii) Mitigation Measures for Social Risks: Mitigation measures will be essential to address potential social risks arising from the project's impact.
viii) Impact on Flora: During the construction phase, there will be the unavoidable removal of a few exotic trees as part of site clearance activities, affecting the local flora.

In summary, the implementation of the proposed project is expected to bring about positive changes in enrolmentenrolment, learning facilities, employability, and service delivery, but it also necessitates careful consideration of potential social and environmental impacts, with appropriate measures in place for mitigation.

4.8. Gender Based Violence

Gender issues permeate all aspects of women's and men's lives and experiences within society, encompassing their interactions, disparities in access to and utilisation of resources, the nature of their activities, and their responses to changes, interventions, and legal frameworks. Gender-based violence (GBV) constitutes a grave human rights violation and a significant threat to health and safety. Men and women can fall victim to various forms of physical, sexual, and psychological violence, including rape and sexual abuse, within their homes, workplaces, schools, or any other setting. During the consultation process for the proposed project at MoCU's main campus, a combination of random and purposive sampling techniques was employed to identify respondents for interviews on GBV-related matters.

A total of 28 respondents participated in the in-depth interviews and key informant interviews (KIIs) whereas 11 respondents were engaged in the Focus Group Discussions (FGDs). The sex-disaggregated distribution of the respondents was as follows: Twelve female (63.3%) and 16 male (36.7%) respondents were involved in the in-depth and KIIs while 12 female (42.9%) and 16 male (57.1%) participated in the FGDs.

To foster a comprehensive community engagement approach, representatives from various backgrounds were engaged, including the Director of Student Affairs, Ward Executive Officer, Street Executive Officer, two street representatives, Construction Safety Assistant, Health Care Worker, Police Gender Desk Officer, Municipal Community Development Officer, Municipal Social Welfare Officer, Municipal HIV/AIDS Control Coordinator, two entrepreneurs, seven university students, a representative from the non-governmental organisation *'Wasaidizi wa Sheria* Moshi Mjini,' and the HEET Project Team. The input gathered from various representatives provided the Consultant with insights into both actual and perceived experiences of GBV, which are discussed in detail in the following sections.

4.8.1 Knowledge of Gender-Based Violence (GBV), Girls, and Women's Issues

Every consulted party, comprising municipal council officials, ward leaders, governmental and non-governmental organisations, and institutions, unanimously affirmed the persistence of Gender-Based Violence (GBV) in their respective communities. Commonly recognized forms of GBV include sexual violence, physical violence, and emotional violence. Respondents acknowledged that the occurrence of GBV is attributable to diverse factors that vary from one area to another. These factors include family conflicts, cultural and moral decay in society, shortcomings in parental upbringing, globalisation issues, influence from peer groups, social conflicts, and drug addiction.

Stakeholders, particularly students, recognize the potential for Gender-Based Violence (GBV) within the MoCU community due to diverse interactions and culture. Both students and staff, as well as neighbours, have the capacity to either perpetrate or be impacted by GBV. The Proponent is cognizant of this reality and has implemented GBV reporting mechanisms alongside the preventive measures.

4.8.2 GBV Context, Help Seeking Behaviours' and Existing Support System

Discussions with various stakeholders, including the Director of Student Services, a gender specialist from the HEET project, and students, revealed that GBV cannot be completely eliminated within the institution or the surrounding communities. Potential forms of GBV at the institution include physical violence among students stemming from informal intimate relationships and child neglect resulting from unplanned pregnancies. Additionally, respondents acknowledged that the University has implemented prevention and mitigation measures against GBV. These measures include regular awareness-raising campaigns for students and staff, as well as the development of policies and guidelines on GBV.

Focus group discussions with students revealed that there are rumours of GBV practices among students. However, gathering concrete information about these practices was difficult due to a lack of awareness about reporting channels and a fear of stigmatisation as a GBV victim. Similarly, the Gender Desk Coordinator at the University level observed: "There is limited awareness among students about where to report GBV cases. Additionally, GBV cases are often treated as confidential, despite some progress in encouraging reporting. However, many students, particularly girls, still feel uncomfortable, hesitant, lack self-confidence, and are insecure about reporting GBV incidents."

Overall, GBV remains a concern at MoCU. Potential forms of GBV include physical violence from intimate relationships and child neglect. Reporting channels remain underutilised due to fear of stigmatisation and a lack of awareness. The current practice to sensitise victims and witnesses of GBV to report such incidents through the existing Gender Desk is a novel institutional intervention towards addressing GBV. However, it is vital to adopt more innovative and unique interventions targeting perpetrators of GBV. Thus, the Proponent must strive to: engage men and boys as allies in preventing GBV; promote positive masculinity and healthy relationships among male students.

To combat GBV effectively, the Proponent should undertake comprehensive campaigns that challenge harmful gender norms and stereotypes that perpetuate GBV. Collaborating with local NGOs and law enforcement agencies is crucial to establish a comprehensive GBV support network. Additionally, fostering a culture of resource and expertise sharing with community organisations can significantly enhance GBV prevention efforts. Engaging community leaders to raise awareness and address GBV within the surrounding communities is also essential.

4.8.3 Gender-Based Violence and Grievance Redress Mechanism (GBV&GRM)

The increasing number of reported GBV cases require an effective, robust and reliable reporting system. A study conducted to the stakeholders of the proposed project in Mfumuni ward, Kilimanjaro region revealed diverse GBV issues. These include physical violence, patriarchal system, rape incidents, emotional violence, and male neglect

of children and families. A significant number of these cases go unreported, they are often dealt with within the confines of homes. This is mainly due to cultural factors, with instances where men perpetrating harassment against women are not typically apprehended by the police.

The Proponent has taken a variety of measures to prevent and mitigate GBV, including raising awareness, developing a gender policy, and establishing a gender desk. Moreover, MoCU has put in place a GBV strategic action plan that supports government efforts to address GBV concerns. During the implementation of the proposed project, the Proponent and the Contractor will set a specific budget for gender issues, provide continuous GBV education, provide GBV referral systems, and empower girls, women, and children to talk about GBV matters.

The Proponent is committed to incorporating GBV measures into the proposed project to enhance the physical and emotional well-being of workers, foster positive relationships, and establish secure channels for reporting GBV (Table 14, Figure 2 and 3). Additionally, the Proponent will conduct a GBV risk management cycle throughout the project to assess whether GBV risks are low, medium, substantial, or high. This demonstrates the project's broader positive impact on the MoCU community.

Figure 2: Gender Based Violence Addressing Risks

Source: Field Visit, June 2023

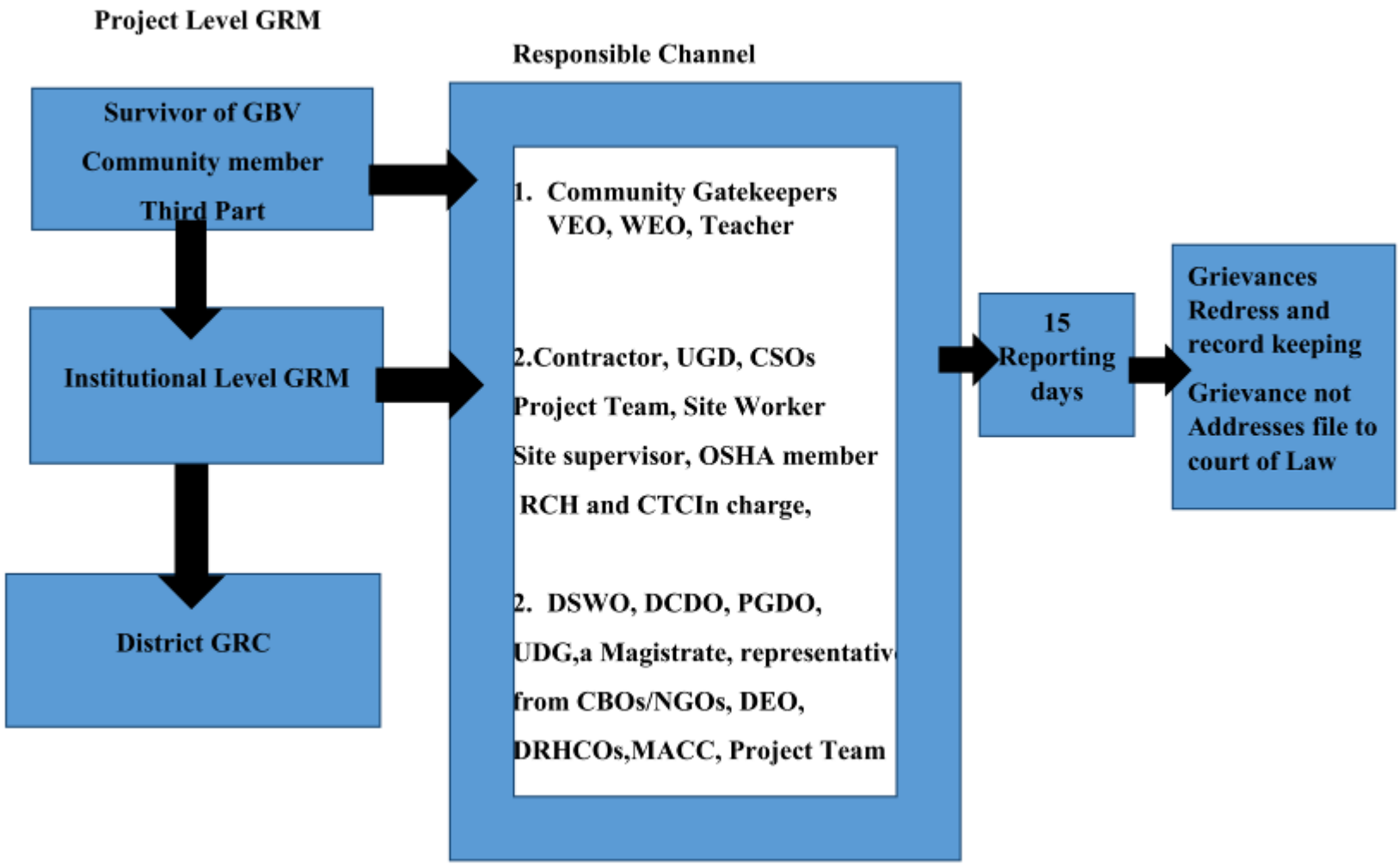


Figure 3: Grievance Redress Mechanism (GRM) at Community, Institutional to District Level

Source: Field Visit, June 2023

Table 14:Key Strategies to Address GBV, SEA and HIV/AIDS

S/N	Actor	Issue	Issues to be considered	Reason
1	University	Good relationship between Local Government Authorities (LGAs) and the University	To foster strong and enduring relationships between LGAs and University administration on various issues, including GBV, it is essential to actively involve community members, particularly females, throughout the project's construction phase. Through this collaborative approach, a comprehensive stakeholder engagement plan for empowering women and men must be developed, ensuring the project's smooth implementation.	Comprehensive planning and effective engagement ensure ownership and a systematic evaluation of critical success factors and facilitate a smooth implementation process.
		Enhancing safety and well-being	Incorporate an Early Child Development Corner (ECDC) to provide a dedicated and convenient space for breastfeeding mothers and young girls to facilitate their changing and nursing needs.	Creating conducive learning environments for girls and women enhances attendance rates and mitigates GBV risks
		Awareness creation on GBV through training and workshops to the university community.	Organize and deliver comprehensive awareness-raising sessions on GBV and HIV/AIDS issues during the construction phase and beyond, extending the impact beyond the project's completion.	Repetitive campaigns foster the retention of information and encourage long-lasting behavioural modifications.
		Develop a GBV Strategy/ Action plan including the accountability and Response Framework as part of the GBV and GRM	Identify the most impactful approaches for operationalizing the GBV Strategy and GRM and pinpoint the key stakeholders who will play a pivotal role in their effective execution.	Action plans with defined roles have a higher chance of success.

S/N	Actor	Issue	Issues to be considered	Reason
		Integration of GBV and GRM at all levels of project implementation.	Develop and execute customized GBV sensitization training programs for different stakeholder groups, considering their unique roles and responsibilities, and plan training sessions at appropriate intervals to maintain ongoing awareness and encourage behavioural modifications	Systematic and customized awareness-raising programs typically induce behavioural changes among specific groups.
2	LGA and District	GBV education and awareness-raising	Means to support awareness-raising efforts that reflect the needs, concerns, and priorities of the community	Initiatives based on genuine GBV concerns expressed by the community resonate more effectively and gain broader acceptance.
		Equal opportunities for all	Overcoming challenges facing women and girls to secure decent employment through targeted efforts, including advertising, encouragement, and a supportive work environment to promote their economic inclusion	The limitations of existing employment opportunities, compounded hindrances such as patriarchal societal structures and transportation constraints, hamper women's and girls' ability to engage in meaningful work.
3	Contractor	Enhancing safety and well-being	Fence the sites and separate working areas from eating /resting areas	Eating and resting areas should be maintained in a clean, hygienic, and undisturbed environment, free from contamination, noise pollution, and dust.
			Have separate, safe, and easily accessible facilities for women and men working on the site.	Females perceive a greater sense of safety and well-being when their privacy is respected and the threat of GBV or abuse is minimized.
			Locker rooms and latrines should be situated in distinct, well-illuminated areas and equipped with individual locking mechanisms for enhanced privacy and security.	To maintain privacy, safety, hygiene, and accessibility, all of which contribute to the overall well-being of individuals using the facilities.
			Provide condoms to use for those who fail to abstain from sex	To encourage and promote safe sexual practices among workers, leading to a

S/N	Actor	Issue	Issues to be considered	Reason
				healthier and more responsible sexual behaviour
		Sexual harassments, exploitation and abuse, HIV/AIDS	Awareness creation on GBV, sexual exploitation and abuse (SEA), HIV/AIDS	To create a safer, healthier, and more productive workplace for all.
			Development of a code of conduct that is gender responsive and discussing it with workers and surrounding communities.	To preventing GBV, promoting gender equality, and fostering a safe, respectful, and productive work environment.
			Strategically positions for signage that firmly establishes a zero-tolerance policy for GBV.	

To effectively address GBV, HIV/AIDS, and power dynamics, the following strategies must be explored:

i) Targeted Behavioural Change Communication: Focus on specific behaviours that contribute to GBV and HIV/AIDS, tailoring messages to different audiences.
ii) Appropriate Communication Channels: Use diverse communication channels to reach a wide range of individuals, including those with limited access to traditional media.
iii) Avoid Reinforcing Inequalities: Steer clear of stereotypes and messages that perpetuate gender inequality and social exclusion.
iv) Promote Informal Discussions: Encourage open discussions about GBV, HIV/AIDS, and power dynamics to foster understanding and change.
v) Engage Diverse Voices: Collaborate with experts on gender equality and social inclusion to ensure meaningful participation from women, men, and all ethnic groups.
vi) Train GBV and HIV/AIDS Experts: Equip trainers with comprehensive knowledge on safeguarding, leaving no one behind, and doing no harm principles to create a zero-tolerance GBV environment during training.
vii) Document Training Practices: Document the language used, methodology applied, and number of participants in training activities to ensure transparency and accountability.
viii) Anti-Sexual Harassment Policy: Implement a robust anti-sexual harassment policy, including protection against sextortion, and review and update the gender policy regularly.
ix) Adherence to Global Commitments: Align GBV prevention efforts with global, regional, and national commitments and institutional arrangements.
x) Incorporating these comprehensive strategies will equip the Proponent and collaborators with the tools and knowledge necessary to effectively address GBV, HIV/AIDS, and power dynamics, contributing to a more inclusive and equitable society.

Source: Field Visit on June 2023

CHAPTER FIVE

5.0 STAKEHOLDERS ENGAGEMENT

5. 1 Introduction

This chapter explores the concerns expressed by stakeholders during the Environmental and Social Impact Assessment (ESIA) process for the proposed project. Recognizing that stakeholders can have both positive and negative interests that influence the project's success, their active participation is essential. Therefore, investigating their concerns regarding the project was critical.

The ESIA study, conducted in June 2023, adhered to the Environmental Management Act of 2004, the EIA and Audit (Amendment) Regulation (2018), and the World Bank Environmental and Social Framework (2018). The primary goal of stakeholder consultation was to understand their concerns and opinions about the project. Additionally, the specific objectives included:

i) **Raising awareness**: Ensuring the community and key stakeholders are informed about the project.
ii) **Gathering information**: Consulting with stakeholders to acquire necessary information for completing the assessment.
iii) **Enhancing project design**: Reducing conflicts and implementation delays through stakeholder input.
iv) **Scoping the ESIA**: Collecting stakeholder feedback on the scope of the assessment, impact identification, potential cumulative impacts, and mitigation strategies.
v) **Addressing concerns**: Incorporating stakeholder questions and concerns into the EIA.
vi) **Promoting sustainability**: Contributing to the project's long-term sustainability.
vii) **Integrating stakeholder perspectives**: Ensuring stakeholder concerns are considered throughout the project's development and life cycle.

5.2 Stakeholders Identification and Analysis

This section outlines the stakeholder identification and engagement process for the MoCU project, adhering to key frameworks like the World Bank's Environmental and Social Safeguards (ESS) 2018 (specifically ESS10), the EIA and Audit Regulations (2005 and 2018 Amendment), and IFC PS1 (paragraphs 25-33). Public consultation followed an inclusive and culturally sensitive approach, involving information sharing, understanding stakeholder concerns, and building community relationships. This empowered stakeholders to grasp project risks, implications, and opportunities, fostering a clearer understanding of desired outcomes.

The public participation strategy aimed to inform stakeholders and gather feedback on anticipated project phases, allowing for comments and contributions. Identification of key stakeholders was based on their roles, relevance, and potential project influence. A preliminary Stakeholders Engagement Plan (SEP) was developed for the ESIA study, outlining relevant stakeholders and engagement techniques before fieldwork began. This SEP served as a foundation for future project stages, including considerations for gender issues. Stakeholders were identified as influencing or being impacted by the project, based on their roles and relevance. Recognizing ongoing stakeholder involvement, the team remains committed to maintaining planned engagements throughout the operational phase.

Major stakeholders were identified across various categories, including administrative and regulatory authorities, agencies, local communities, and other interested parties. These stakeholders spanned national and local levels, from government officials to community members. Stakeholder selection criteria were based on their roles and project relevance, with some choices guided by the nature of planned project activities. Classifying stakeholder levels facilitated developing appropriate planning and strategies for subsequent consultation meetings.

5.2.1 Stakeholders' involvement

To address specific issues emerging throughout project implementation, key stakeholders were categorised into relevant groups. Stakeholder engagement relied primarily on methods like interviews, focus groups, and group meetings. In-depth interviews and focus groups were tailored to the data needed and involved staff and key informants from government institutions, agencies, municipal/district levels, and NGOs. Consultation meetings were also held with Ward and Street leaders in project areas. These consultations collected data on perspectives, concerns, opinions, and recommendations regarding the project.

Table 15 summarise consulted stakeholders the concerns they raised are summarised in Appendix 4. Consultations ensured these groups were well-informed and their input was considered in project development. Discussions provided a platform for community members to voice their opinions on the proposed project.

Table 15: List of Stakeholders Consulted

SN.	Category of Stakeholder	Remark(s)
1.	Government Departments, Agencies and Authorities	● Ministry of Education, Science and Technology ● Fire and Rescue Force – Kilimanjaro Region ● Occupational, Health and Safety Authority (OSHA)-Northern zone ● Moshi Urban Water and Sanitation Authority (MUWSA) ● Pangani Basin Water Board (PBWB) ● Tanzania Building Agency (TBA)
2.	Moshi Municipal Council	● Moshi Municipal Council officials
3.	Mfumuni Ward	● Mfumuni Ward Officials
4.	Ushirika Street	● Ushirika Street Officials
5.	Moshi Co-operative University (MoCU) – Moshi Main Campus	● Project coordinator ● Students ● Clinical officer ● Entrepreneurs
6.	Adjacent land users	● Moshi Secondary school

Source: Field Visit, June 2023.

5.3 Issues and Concerns Raised by Stakeholders

Stakeholders shared their perspectives, concerns, and suggestions regarding the project aimed at enhancing education quality. They anticipate various benefits, including increased student enrolment and economic growth for the local community. However, concerns were raised about potential negative impacts, such as environmental degradation, public health risks, safety issues, and disruptions during construction. Mitigation measures proposed by stakeholders encompass construction scheduling, worker health awareness, environmental protection, building safety, water management, construction worker safety, fire safety, sustainable practices, waste management, social responsibility, and project efficiency. A detailed description of their views, concerns and recommendations are provided in appendix 4-7.

.

CHAPTER SIX

6.0 ANALYSIS OF IMPACTS AND IDENTIFICATION OF ALTERNATIVES

6.1 Introduction

This chapter highlights the potential environmental and social challenges that might arise during the project's lifecycle. This analysis draws upon information gathered from fieldwork, measurements, stakeholder consultations, interviews, and relevant project experiences. While the planned project is anticipated to yield positive environmental effects, it also carries potential negative consequences. The chapter provides a comprehensive overview of the key environmental and social implications expected during the project's mobilisation, construction, operation, and decommissioning phases. It consolidates critical information regarding potential impacts and ramifications of such impacts.

6.2 Mobilisation Phase

This phase encompasses activities such as recruiting labour, clearing the site, transporting construction materials, and fencing the construction area. These activities have the potential for the following impacts:

(i) **Vegetation Clearance:** is perceived to induce negative, short-term, and inconsequential impacts. While the vegetation on the site is common and of limited biological importance, some exotic species may be affected. The Proponent and Contractor will remove vegetation only when necessary. To effectively mitigate impacts the Contractor must minimise clearing and prioritise replanting native species.

(ii) **Dust Emission:** is perceived to be associated with negative, short-term, and high significant impact. Site preparation activities will generate dust on the site and surrounding roads. Dust will also be released during unloading and vehicle movements. The Contractor must adopt dust control measures, such as watering and dust suppressants to mitigate impacts.

(iii) **Occupational Health Hazards:** its impact is perceived to be negative, short-term, and of high significance. Workers involved in site clearance face risks like dust exposure, noise pollution, and injuries. The Contractor must implement safety protocols, provide training and personal protective equipment.

(iv) **Employment Opportunities:** its impacts are positive, short-term, and significant. Local residents can be employed in site preparation activities. Nearby food vendors and suppliers also will have access to income-generating opportunities. The Contractor should prioritise hiring local residents and promote local businesses.

6.3 Construction Phase

The construction phase brings a range of environmental and occupational health and safety concerns, detailed below:

(i) **Noise and Vibration:** Its impact is negative, short-term, and significant. Construction activities like excavation, drilling, and material processing will generate noise and vibration, impacting students, workers, and visitors. The contractor must implement noise reduction measures (e.g., mufflers, sound barriers) and schedule noisy activities during non-sensitive hours.

(ii) **Runoff:** Its impact is negative, short-term, and insignificant. Heavy rainfall can potentially cause runoff, posing a minor, short-term risk to improperly stored construction materials. However, the likelihood of significant runoff is minimal due to the presence of a concrete wall blocking flow from higher-elevation areas. To further mitigate this risk, the contractor will implement proper storage measures for construction materials and install drainage systems to control any potential runoff.

(iii) **Occupational Health & Safety:** Its impact is negative, short to medium-term, and of high significance. Construction activities involve handling hazardous materials, working at heights, lifting heavy loads/equipment, and exposure to dust and noise. This presents risks of injuries and illnesses for workers. The Contractor will strictly enforce safety protocols, provide training and personal protective equipment, and monitor working conditions. The Proponent or her agent (**Environmental and Social Experts under the HEET Project**) must undertake routine monitoring and evaluation (M&E) to assure compliance. Further details are provided in Table 24.

(iv) **Population Growth and Resource Strain:** The project estimates employing roughly 74 people during construction, including skilled and unskilled labour. This influx of workers may attract newcomers to the Moshi area. This population shift will inevitably increase demand for services, particularly food and accommodation. If not adequately managed, this could lead to food scarcity and shortage of accommodation. However, the project site is within an urban area with readily accessible food markets and hospitality industry. This existing infrastructure offers a strong foundation for managing the potential concerns. Table 16 summarises occupational Health and Safety Hazards During Construction.

Table 16 Occupational Health and Safety Hazards During Construction

Category	Description	Hazards/Risks
Physical hazards	Hazards associated with working at elevation, overhead works, and multi-story structures.	**Slips, Trips, and Falls** ● **Cause**: Inadequate workplace conditions, leading to sprains, strains, and fractures. ● **Mitigation**: Implement proper housekeeping, maintain clear pathways, and provide adequate footwear. **Ergonomics Hazards** ● **Cause**: Manual handling, lifting weights, and repetitive movements, potentially causing musculoskeletal disorders. ● **Mitigation**: Implement proper lifting techniques, utilise mechanical aids, and provide training on ergonomics. **Sharp and Moving Objects**: ● **Cause**: Injuries from sharp objects like thorns on oil palm fronds and fruit, or from moving equipment. ● **Mitigation**: Use protective clothing and footwear, implement safe work practices, and clearly mark hazards. **Over-Exposure to Noise and Vibration** ● **Cause**: Noise and vibration from hand-held equipment, leading to hearing loss and hand/arm problems. ● **Mitigation**: Implement noise reduction measures (e.g., mufflers, ear protection), schedule noisy activities appropriately, and monitor working conditions. **Extreme Weather Conditions** ● **Cause**: Exposure to extreme temperatures (hot or cold) and sun exposure, potentially causing hypothermia, hyperthermia, dehydration, and ultraviolet damage. ● **Mitigation**: Provide adequate shade and hydration, schedule work during cooler hours, and train workers on heat/cold stress prevention.
	Machinery and vehicles operations	**Vehicle and Machinery Roll-Overs** ● **Cause:** uncontrolled movement of vehicles or machinery can lead to roll-overs, resulting in personal injury, property damage, and asset loss. ● **Mitigation Measures**: Implement safe driving practices, conduct regular vehicle maintenance, and use appropriate safety equipment (e.g., roll bars). **Faulty or Unguarded Equipment and Machinery**

Category	Description	Hazards/Risks
		● **Cause:** Exposed moving parts and pinch points on machinery can cause injuries, entrapment, or death. ● **Mitigation Measures:** Implement proper guarding for moving parts, conduct regular equipment inspections and maintenance, and provide training on safe operation procedures. **Unplanned Equipment Activation** ● **Cause:** Entrapment can occur due to accidental equipment starting or activation. ● **Mitigation Measures:** Implement lockout/tagout procedures, ensure proper equipment deactivation before maintenance or repairs, and train personnel on safe work practices. **Vehicle Inspection and Repair Hazards** ● **Cause:** Injuries can occur during vehicle inspections or repairs, especially when lifts are not secured properly. ● **Mitigation Measures:** Ensure proper training for personnel on safe lifting procedures, utilise appropriate safety equipment (e.g., jack stands), and conduct thorough inspections of lifts.
	Confined Space Hazards	**Asphyxiation** ● **Cause**: oxygen deficiency or the presence of harmful gases can lead to asphyxiation. ● **Mitigation Measures**: Implement proper ventilation, monitor air quality, and ensure personnel use appropriate respiratory protection. **Entrapment and Enclosure** ● **Cause**: inadequate preparation or rescue attempts in confined spaces can lead to entrapment and injury or fatality. ● **Mitigation Measures**: implement confined space entry procedures, provide proper training for personnel, and utilise appropriate safety equipment (e.g., harnesses and lifelines).
	Risk of fire and explosion	**Explosions** ● **Cause**: accumulation of gas, dust, or fumes (e.g., residual petroleum fumes) can cause explosions. ● **Mitigation Measures:** control ignition sources, implement proper ventilation, and monitor hazardous gas levels.
Chemical hazards	Risk of dust inhalation	**Cause**: Construction activities like excavation, drilling, and material processing generate dust, which can be inhaled and cause respiratory problems.

Category	Description	Hazards/Risks
		Mitigation Measures **i. Dust Suppression** ● Regularly spray water on exposed soil, haul roads, and material storage areas. ● Use dust suppressants like chemical sprays or soil stabilisers. ● Enclose dust-generating activities, if feasible. **ii. Emission Control** ● Minimise vehicle idling and use low-emission construction equipment. ● Cover trucks transporting dusty materials. ● Maintain equipment in good working order to minimise exhaust emissions. **Personal Protection** ● Provide workers with appropriate respiratory protection like N95 masks. ● Train workers on dust hazards and safe work practices. ● Implement hygiene and sanitation measures to prevent dust inhalation. **iii. Community Protection** ● Notify nearby residents about construction activities and potential dust impacts. ● Install dust screens and barriers around construction sites, if feasible. ● Monitor dust levels and implement additional mitigation measures as needed. **iv. Continuous Improvement** ● Regularly review and update dust control plans based on monitoring data and changing conditions. ● Seek innovative solutions and technologies to further minimise dust generation.
	Risk of exhaust emissions	● **Cause**: Exhaust emissions from vehicles and machinery contain harmful pollutants like carbon monoxide, nitrogen oxides, particulate matter, and volatile organic compounds, contributing to air pollution and respiratory problems, including asthma, heart disease, and even cancer. ● **Mitigation measures**: adopt a multi-pronged approach combining efficient vehicles, emission control technologies to reduce emissions per unit of travel, capture and remove harmful pollutants, shift towards cleaner fuels, empower individuals and communities, and enforce stricter regulations against the pollution.
	Inhalation during preparation, mixing, and application	**Cause** During construction activities like preparation, mixing, and application of materials, workers are at risk of inhaling harmful

Category	Description	Hazards/Risks
		chemicals that can potentially lead to a range of health problems including respiratory irritation and inflammation, skin and eye irritation or even long-term health effects: **Mitigation measures** i. Choose alternatives with low Volatile organic compounds (VOCs) and low toxicity whenever possible. ii. Ensure proper ventilation in work areas to remove harmful airborne particles. iii. Equip workers with appropriate respirators based on the specific chemicals used. iv. Establish procedures for safe handling, storage, mixing, and disposal of chemicals. v. Educate workers about chemical exposure risks, safe work practices, and proper use of protective equipment.
Noise	Exposure to extremely high levels of noise	**Cause**: construction projects often involve operating heavy equipment and working near busy traffic, exposing workers to extremely high levels of noise. This noise can reach exceeding 85 decibels, exceeding safe limits and posing serious health risks including hearing loss, stress and fatigue, and communication difficulties. **Mitigation measures** ● Use noise-reducing equipment like mufflers and enclosures. ● Properly maintain machinery to minimise noise generation. ● Limit exposure time and schedule noisy activities strategically. ● Provide workers with appropriate ear protection like earplugs or earmuffs. ● Train workers on noise hazards, safe work practices, and proper use of personal protective equipment. ● Regularly monitor noise levels in work areas to ensure compliance with safety standards.
Health hazards	Exposure to bronchial and other respiratory tract diseases, HIV/AIDS, STDs and other communicable diseases	**Causes**: Construction works expose people within and nearby communities to air pollutants, including dust, fumes, and chemicals, from construction activities, vehicle exhaust, and other sexually transmitted and airborne diseases resulting from increased interactions. **Mitigation measures**: Combat air pollution, curb new communicable disease transmissions, and manage social

Category	Description	Hazards/Risks
		interaction through a multifaceted approach.
	● Exposure to infectious diseases, especially water borne and sanitation-related diseases.	**Causes** ● Consumption or contact with water contaminated with pathogens from faecal matter, sewage, or industrial waste can lead to waterborne diseases like cholera, typhoid fever, and dysentery. ● Poor sanitation facilities and practices, including limited access to toilets and safe waste disposal, contribute to the spread of faecal-oral diseases. ● Lack of proper handwashing and personal hygiene practices facilitates the transmission of infectious diseases. ● Increased flooding and extreme weather events can contaminate water sources and exacerbate the spread of waterborne diseases. **Mitigation** ● Ensure consistent supply of treated and tested water for drinking. ● Construct and maintain sanitation facilities like toilets and wastewater. ● Implement effective waste collection and disposal systems to prevent contamination.

Source: Fieldwork, June 2023 & EHS Guidelines

(v) **Solid waste**: Construction activities using materials like iron sheets, bars, electrical wires, and mesh will generate hazardous waste due to cutting operations creating sharp edges. Improper handling of this waste poses a significant and immediate risk of injury to workers.

Conversely, workers require sustenance, leading to the generation of low-volume solid waste like empty water bottles, office paper, and food scraps on-site. Inadequate waste management of this type can result in unpleasant odours and an unsightly environment.

Collaboration and proactive strategies will be employed to mitigate waste from cutting and low-volume solids. This includes worker education, exploring new technologies, and fostering collaboration across sectors to develop and implement effective waste management plans.

(vi) **Gender inequality and spread of diseases:** The proposed construction may unintentionally worsen social inequalities, potentially leading to: Unequal work distribution, discriminatory hiring practices, and unequal pay for women. Women may also have limited access to project-related career opportunities due to stereotypes about the physical demands of construction work.

The construction may also lead to increased vulnerability for young women. The presence of construction workers seeking employment might expose young women to heightened risks of exploitation and immoral behaviour, potentially as a means to secure work. This could further increase the spread of sexually transmitted diseases, including HIV/AIDS.

Effective intervention strategies are essential to mitigate gender inequality and empower young women. These strategies should focus on fair recruitment, capacity building for women (through education and awareness), and improved access to mental health and support services.

(vii) **Acquisition of Knowledge and skills**: The construction phase will offer several benefits, including: skill development where skilled workers will gain valuable experience through project work, potentially leading to a higher standard of living and contributing positively to regional economic development. This positive impact is considered regional, long-term, of high magnitude, and highly probable.

(viii) **Increased Economic activity:** The project will attract new small vendors and businesses, leading to additional revenue generation and indirect job creation. This will benefit individuals providing off-site services and enhance the overall flow of income in the area. This impact is considered positive, short-term, and highly significant.

(ix) **Increased Vehicle Traffic:** The increased vehicle traffic due to construction material transport may slightly impact traffic flow on the project site road and Sokoine Road, but is unlikely to significantly affect overall traffic congestion in the area. Most construction vehicles and equipment operate at low speeds and intermittently, further minimising potential accident risks. However, to ensure the safety of all road users, particularly students, implementing appropriate traffic management measures remains crucial.

6.4 Operation Phase

The proposed construction at MoCU's main campus is expected to have both positive and negative impacts during its operational phase.

6.4.1 Positive Impacts

(i) **Job Creation**: MoCU will directly hire personnel for construction and facility operations, creating jobs. Additionally, enrolmentenrolment growth will likely lead to further job opportunities.

(ii) **Enhanced Local Economy**: Increased demand for goods and services will benefit local businesses, particularly petty traders and service providers in the Moshi. This will contribute to economic and employment growth for the country.

(iii) **Improved Skills and Employability**: High-quality training will attract more students to ICT programs, offering exchange opportunities and enhancing graduate skills. This will lead to increased employability, particularly in East Africa where skilled professionals are scarce.

6.4.2 Negative Impacts

(i) **Increased Risk of HIV/AIDS and STIs:** The influx of students and non-students seeking opportunities may lead to risky sexual behaviours, potentially increasing the spread of HIV/AIDS and other STIs.

(ii) **Population Growth and Resource Strain:** Increased student enrolmentenrolment will lead to population growth, raising demand for basic necessities like food and water. This may strain resources and require careful management. Obviously the influx of new students will primarily impact MoCU.

(iii) **Security Concerns and Potential Conflicts:** The influx of people could raise security concerns and disrupt the social fabric of the community, potentially leading to moral issues and conflicts.

(iv) **Loss of properties**: Earthquakes, with their unpredictable nature, can unleash devastating consequences on both structures and lives. While the Moshi Municipality experiences a lower likelihood of high-intensity earthquakes compared to other regions, prioritising earthquake preparedness during the construction phase is crucial to minimising potential damage and ensuring the functionality of buildings.

6.4.3 Impact Classification

(i) **Employment and Economic Growth**: Positive, long-term, high significance.
(ii) **Skills and Employability**: Positive, long-term, high significance.
(iii) **HIV/AIDS and STIs**: Negative, long-term, significant.
(iv) **Population Growth and Resource Strain**: Negative, long-term, slight significance.
(v) **Security Concerns and Potential Conflicts**: Negative, long-term, slight significance.

6.5 Impacts during decommissioning phase

Decommissioning involves the safe and responsible removal of temporary structures, equipment, and materials once their purpose is served. If not well-planned, decommissioning may lead to irresponsible closure and unwanted environmental impact including.

(i) Loss of Aesthetic Value: If the Proponent chooses to abandon the site after closure, the attractiveness of the area could decline permanently. Additionally, leftover demolition waste can further undermine the visual appeal.

(ii) Dust and Noise Pollution: Dismantling the structure during closure can potentially generate solid waste, dust, and noise, impacting air quality and overall comfort. This impact is considered negative, short-term, and highly significant.

6.6 Summary of Identified Environmental and Social Impacts

The environmental impacts identified through expert opinions are outlined in Table 17.

Table 17 Summary and categorization of identified impacts

Phase	Key Activities	Identified Environmental and Social Impacts	Physical	Biological	Socio Economic/ Cultural
Mobilisation	Site clearance	Noise pollution	X		X
		Dust emission		X	X
		Occupational health hazards			X
		Vegetation clearance	X	X	
Construction	Employment of people for construction works and other supporting services	Potential for increase of social interaction which may lead to spread of HIV/AIDS, STDs			X
	Using local materials for construction activities	Degradation at point of sourcing construction materials	X	X	
	Improper relocation of construction materials	Loss of construction materials caused by rain runoff	X		X
	Generation of spoil materials from the construction activities	Pollution of water bodies and siltation impact	X	X	
	Generation of hazardous wastes (cut pieces of iron sheets, steel bar etc)	Injuries to construction workers due to improper disposal of waste			X
	Generation of domestic wastewater by construction workers	Pollution of water bodies		X	X
	Construction of the proposed buildings	Increased income, skills and knowledge for local workers			X
	Using heavy equipment in construction activities	Risk of noise and vibration impacts	X		X

	The project site is rapidly transforming as workers make significant progress on construction.	Workers may experience occupational health issues			X
	Movement of construction Machines and vehicles	Measures need to be implemented to mitigate potential air pollution from dust and gaseous emissions.		X	X
	Use of local materials for construction	The project will create new opportunities for local producers and suppliers of construction materials.			X
	The project site is receiving a continuous delivery of construction materials via trucks.	Impacts due to traffic congestion	X		X
	Transportation of construction materials from point source to project site using trucks	Dust emission and noise pollution around the project site	X		
Operation	Activities related to running and maintaining buildings once construction is complete	Enhanced income, employment opportunities and local business			X
	Admission of students	Increased number of students			X
	Improper backfilling and resurfacing	Soil erosion due to runoff	X		X
	Fire accident	Potential to loss due to fire accidents	X		X
	Liquid waste overflow	Pollution of surface water source due to mishandling of liquid waste	X		X
	Mishandling of solid wastes	soil pollution due to mishandling of solid Wastes	X		X
	Demolition of temporary structures	Loss of employment			X

Decommission Phase	Abandonment of infrastructure	Loss of aesthetics	X		X
	Demolition of structures	Loss of Aesthetics due to Haphazard Disposal of Demolition Waste	X	X	
	Demolition activities	Dust and noise pollution	X		X

6.7 ANALYSIS OF IMPACTS

The assessment of the consequences and likelihood (as outlined in Table 18) for the identified impacts was conducted based on the following criteria:

a) Nature of impacts (positive/negative)
b) Magnitude/significance i.e. depending on the severity
    i) Major (if severe)
    ii) Minor (if not severe)
    iii) Wide scale (if it affects large areas)
    iv) Local scale (if it affects a locality)
c) Sequence (i.e. depending on reach)
    i) Direct (if there is a direct impact)
    ii) Indirect (if there are indirect impacts)
d) Duration/time frame
    i) Long duration/time (if the impacts will persist for more than 5 years)
    ii) Medium duration/time (if the impacts will persist for 1-5 years)
    iii) Short duration (if the impacts will persist for a couple of months/weeks/days
e) Reversibility
    i) Reversible (if impacts can be mitigated)
    ii) Irreversible (if impact cannot be mitigated)

Table 18 Consequence Assessment According to Score/Scale

Consequence	**Magnitude + Scale + Duration**	**3-4**	**5-7**	**8-11**	**12-14**	**15 and above**
		Very Low	Low	Moderate	High	Very High
Likelihood	**Exposure + Probability**	**2-3**	**4-5**	**6-7**	**8-9**	**10 and above**
		Very Low	Low	Moderate	High	Very High

The significance of environmental impacts was evaluated through a Consequence and Likelihood matrix (Figure 4). Colour codes (white to black) represent impact levels, with corresponding implications outlined in Table 18-21. These guide mitigation measures and the Environmental Management Plan.

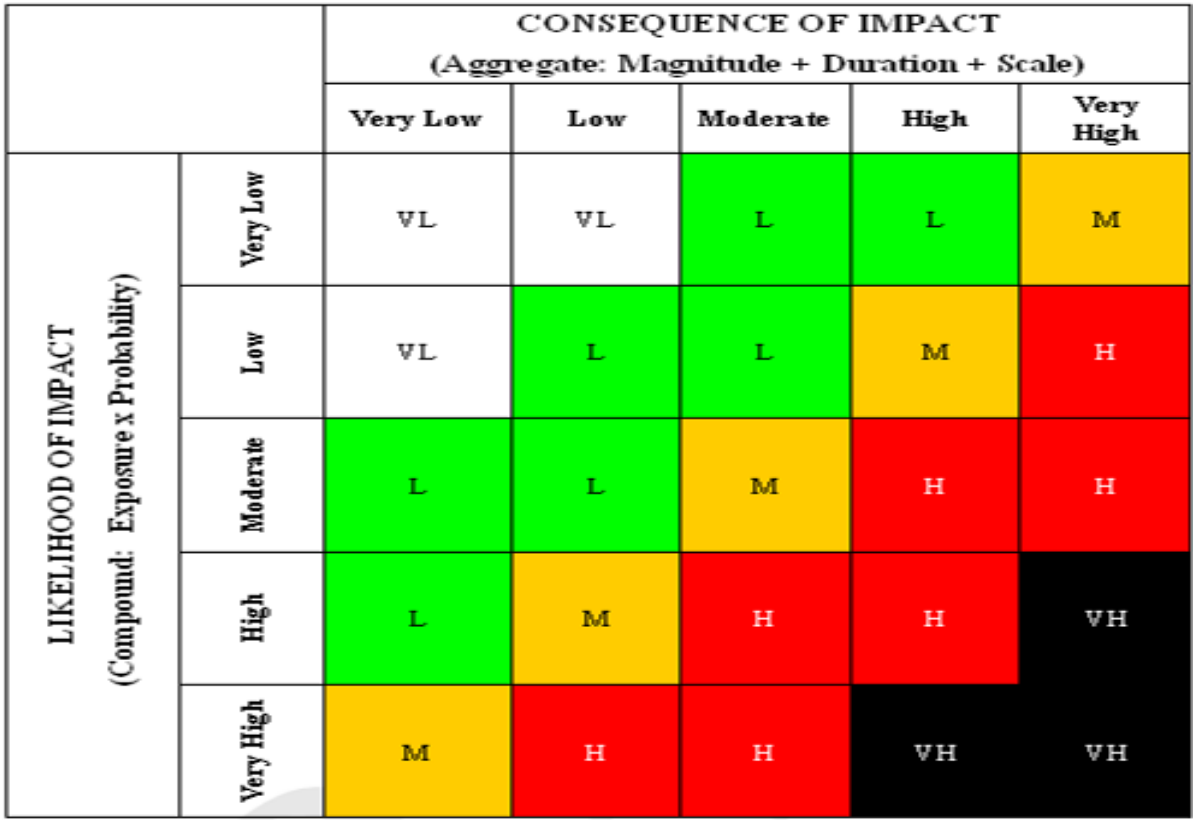


Figure 4: Significance Analysis from the Consequence Vs Probability Evaluation

Table 19 Methodology/criteria for impact analysis magnitude/significance

Criterion	Description	Possible Results		
		Term	Description	Score
Magnitude of the Impact	An indication of the severity of the impact, either positive or negative.	Very High	Extreme effect – where natural, cultural or social functions or processes permanently cease.	5
		High	Severe effect – where natural, cultural or social functions are altered to the extent that they temporarily cease.	4
		Moderate	Moderate effect – the affected environment is altered but natural, cultural or social functions continue, albeit in a modified way.	3
		Low	Minimal effect – affects the environment in such a way that natural, cultural or social functions and processes are not affected.	2
		Very Low	Minimal or negligible effect	1
		Unknown	Magnitude of the impact unknown.	0
Scale of the Impact	An indication of geographical extent of the impact	National	Affects the resources of the country	5
		Regional	Affects the resources of the region	4
		District	Affects the resources of the district	3
		Local	Affects the project area and surrounding villages	2
		Site – specific	Localised, confined within the licence area.	1
		Unknown	Extent of the impact unknown	0
Duration of the Impact	An indication of the duration or time over which the impact will be experienced.	Permanent	Will remain permanently	5
		Long term	Extends into the post- closure phase, but not permanently	4
		Medium term	During the operational life of the project	3
		Short term	Shorter than the operational life of the project	2
		Transient	Very short duration	1
		Unknown	Duration of the impact is unknown	0

Table 20 Methodology/criteria for analysis of probabilities

Criterion	Description	Possible Results			
		Term	Description		Score
			Discrete Event	Prolonged Exposure from a single activity or event	
Exposure to Impact	An indication of the frequency of the activity that may cause the impact, or the continuity of the exposure.	Very High	Daily or continuous	Exposure in perpetuity	5
		High	Weekly/once per week	Continuous exposure into closure or post-closure phases	4
		Moderate	Monthly/once per month	Continuous exposure during construction and operations phases	3
		Low	Bi-annually	Continuous exposure throughout one phase	2
		Very low	Annually or less frequently	Prolonged exposure yet finishes before end of a phase	1
		Unknown	Frequently of activity unknown	Continuity of exposure unknown	0
Probability of the Occurrence	An assessment of the degree of certainty associated with a potential impact	Highly likely	Very likely or certain to occur		5
		Likely	Likely to occur		4
		Possible	May possibly occur		3
		Unlikely	Unlikely to occur		2
		Highly Unlikely	Very unlikely to occur, or almost impossible		1
		Unknown	Probability of the occurrence unknown		0

Table 21 Summary of analysis of Identified Environmental Impacts

Phase	Key activities	Identified environmental Impacts	Analysis of environmental Impacts												Significance Rating
			Nature of impacts		Magnitude/significance				Sequence		Duration/term			reversibility		
			+ve	-ve	high	low	wide	local	direct	indirect	long	mid	short	reversible	irreversible	
Mobilisation	Site clearance	Noise pollution		X	X				X				X	X		-ve Moderate
		Dust emission		X	X				X				X	X		-ve Moderate
		Occupational health hazard		X	X				X				X	X		-ve Moderate
		Vegetation clearance		X	X					X	X			X		-ve Moderate
Construction	Change of Landscape of the area	Potential for improvement of scenery	X			X		X	X		X					+ve Moderate
	Employment opportunities for a large number of people in the project area	Potential for spread of HIV/AIDS and STDs		X	X		X		X		X			X		-ve Major
	The construction process will produce various spoil materials,	Pollution of water bodies and siltation impact		X		X		X	X		X			X		-ve major

Phase	Key activities	Identified environmental Impacts	Analysis of environmental Impacts												Significance Rating
			Nature of impacts		Magnitude/significance				Sequence		Duration/term			reversibility		
			+ve	- ve	high	low	wide	local	direct	indirect	long	mid	short	reversible	irreversible	
	Construction of the project	Increased income and improved skills for local workers.	X		X		X		X		X			X		+ve Moderate
	Employment of people for construction works and other supporting services	Increased risk of work-related health problems.		X	X			X	X				X	X		-ve Major
	Movement of Construction Machines and vehicles	Increased risk of air quality degradation due to dust and gaseous emissions.		X	X			X	X				X	X		-ve major
	Use of local materials for construction	Benefit to Local suppliers of Construction Materials	X		X		X		X			X		X		+ve Major

Phase	Key activities	Identified environmental Impacts	Analysis of environmental Impacts												
			Nature of impacts		Magnitude/significance				Sequence		Duration/term			reversibility		Significance Rating
			+ve	-ve	high	low	wide	local	direct	indirect	long	mid	short	reversible	irreversible	
	Movement of construction equipment	Increased risk of noise disturbance due to project activities.		X	X			X	X				X	X		-ve Major
	Trucks carrying construction materials meet at site	Impacts due to Traffic congestion		X		X		X	X				X	X		-ve major
	Employment during construction	Workplace Sexual harassment and violence against women & vulnerable groups		X	X				X			X		X		-ve Major
		Gender inequality in employment, unfair labour terms and exclusion from economic opportunities		X	X				X			X		X		-ve major

Phase	Key activities	Identified environmental Impacts	Analysis of environmental Impacts												Significance Rating
			Nature of impacts		Magnitude/significance				Sequence		Duration/term			reversibility		
			+ve	- ve	high	low	wide	local	direct	indirect	long	mid	short	reversible	irreversible	
Operation	Project buildings become operational.	Increased earnings, employment and local business growth.	X		X		X		X		X			X		+ve Major
	Improper solid waste handling	Bad Odour/ visual and clogging of storm water channel		X		X	X		X		X			X		-ve Moderate
	Fire accident	Potential to loss due to fire accidents		X	X			X	X				X		X	-ve major
	Poor management of wastewater	Pollution to receiving environment (water and soil)		X		X			x					x		-ve moderate
Decommission	Demolition of the structures	Loss of employment		X	X			X	X		X			X		-ve Moderate
	Abandonment of infrastructure	Loss of aesthetics value		X		X		X	X		X			X		-ve Moderate

Phase	Key activities	Identified environmental Impacts	Analysis of environmental Impacts													
			Nature of impacts		Magnitude/significance				Sequence		Duration/term			reversibility		Significance Rating
			+ve	-ve	high	low	wide	local	direct	indirect	long	mid	short	reversible	irreversible	
	Demolition of structures	Poor disposal of wastes		X	X			X	X		X			X		-ve Major
	Demolition activities	Dust and noise		X	X			X	X				X	X		-ve Major

6.8 Consideration of Project Alternatives

Evaluating different project options is crucial in the ESIA process because it provides developers and decision-makers with a comprehensive range of choices to select the optimal option. Table 22 summarises the project's alternative considerations.

Table 22 Summary of Considerations of Project Alternatives

S/N	Item	Alternative
1	Site	The University-owned site, located within the main campus and aligned with the land use master plan, faces no legal challenges or construction disputes, making relocation highly unlikely and unnecessary.
2	Power Supply	While TANESCO is a primary source of electricity for the main campus buildings, concerns about reliability necessitate two diesel generators (250 kVA and 45 kVA) as backup. However, due to their emissions, exploring solar power as an alternative is recommended.
3	Water source	MUWSA is the main water supplier for the campus. However, boreholes and rainwater harvesting offer alternative sources, which could be explored during project implementation.
4	Construction materials	The project will prioritise sourcing construction materials locally from authorised suppliers, including sand, timber, iron sheets, aggregates, reinforcement bars, steel window frames, and steel door plates.
5	Construction technology	Following a detailed evaluation of various technologies, including concrete frameworks, steel frames, and SIPs, the project recommends the use of SIPs due to their superior cost-effectiveness, environmental friendliness, and labour-saving capabilities.
6.	No-Project	The analysis indicates that this alternative is impractical due to two primary concerns. Firstly, projected revenue and other anticipated benefits for the local community are unlikely to materialise. Secondly, the availability of an academic building, which is essential for enhancing the quality of graduates, would not be achieved under this alternative.
7.	Solid waste management	Biodegradable materials will be collected and stored in specified places for temporary solid waste collection, awaiting delivery to permitted dump sites by Moshi Municipal trucks. This will improve solid waste segregation, encourage the reuse of other garbage, and attempt to reduce the amount of waste delivered to dump sites. Plastic waste, including plastic bottles, will be collected in a separate area before it is delivered to a recycling agent within Moshi.
8.	Liquid Waste management	The waste will be directed to the sewer pipe network which connects to the Municipal sewer network leading to the waste stabilization ponds situated in Njoro area for treatment.

9.	Hazardous waste management	Hazardous waste will be collected in a specific area designated for hazardous trash collection. The area will be paved and shaded to prevent soil contamination. Once the specified area is full, the registered agent will be called for proper disposal in line with country regulations and WB Standards.

CHAPTER SEVEN

7.0 MITIGATION MEASURES

This chapter has identified potential impacts and their significance. It provides a summary of mitigation measures for those impacts which are considered to be of moderately to highly significant (Table 23-24).

Table 23 Mitigation Measures for Environmental and Social Impacts

Project's Phase	Environmental and Social Impacts	Mitigation measures
MOBILIZATION/ CONSTRUCTION	Noise and vibration pollution	i. Regular maintenance of machines, truck engines, and equipment ii. Day time site mobilisation and construction works iii. Provision of noise protective gears to workers iv. Fencing the site with iron sheet before levelling and during construction
	Dust emission	i. Water spray application to high-dust emission areas ii. Covering cleared materials waiting for disposal schedule
	Occupational health hazards to workers	i. Covering stockpiles at the site ii. Covering trucks during the transportation of wastes from the site iii. Provision of safety gears to site crews iv. Establishing an emergency assembly point v. Conduct induction training to mobilisation crews vi. Adoption and implementation of the Health and Safety Management Plan (HSMP) by the Contractor vii. Conduct Point of Work Risk Assessment viii. The contractor is required to conduct on-the-job and safety training. ix. The contractor is required to provide insurance cover to all workers x. Undertake health and safety education (HSE) induction training to workers before the commencement of construction works xi. Provision of adequate PPE including reflective vests, helmets, and hazard cones xii. Provision of a well-stocked First Aid kit (administered by a trained first aider) at the site xiii. Adequate access and egress shall be maintained; a fire-fighting system will be established xiv. Effective safety and warning measures will be taken to reduce accidents. Safety signal devices and signage will be installed to ensure safety during construction xv. The contractor shall adhere to construction guidelines and directives issued by the Occupational Safety and Health Authority (OSHA)

Project's Phase	Environmental and Social Impacts	Mitigation measures
		xvi. Additional specific measures related to physical, chemical, health and noise hazards as recommended by EHS Guidelines and best practices shall be implemented xvii. The contractor shall employ a qualified health and safety officer at the site
	Generation of excess soil or spoil materials	i. Resurface and level debris in the course of compaction and construction of the foundation for the structures. ii. Ensure proper backfilling and resurfacing of the construction site. Light compaction will be necessary to stabilise the soil. Planting of grass on bare land to minimise soil erosion tendencies will be given a high priority.
	Health hazards	i. Collection of cut pieces of iron sheets, steel bars and the like into designated areas for temporary hazardous waste storage for disposal. ii. Preparation of waste management plan for hazardous waste (to be prepared by a contractor)
	Pollution due to mismanagement of domestic solid waste	i. Ensuring proper design of systems for collection, transportation and disposal of solid wastes ii. Ensuring availability of sufficient waste bins at appropriate locations iii. Design and construct solid waste collection chambers for collecting waste before transported to dump site, iv. Sorting of solid waste shall be done at source v. Construction of a temporary solid waste collection chamber at project site. vi. Contractor should prepare a waste management plan for domestic solid waste
	Water Pollution	i. Construction of temporary toilets and baths ii. Regular emptying of toilets iii. Contractor should prepare a waste management plan for domestic wastewater
	Gender inequality in Employment Opportunities	i. Implement Gender Action Plan (GAP) ii. Provide equal employment opportunities for both females and males and maintain employment records disaggregated by gender iii. Provide livelihood support to the vulnerable groups Conduct training on gender inclusiveness for constructor human personnel
	HIV/AIDS	i. Conduct awareness campaigns on HIV/AIDS to workers at the site. iv. Conduct sensitization campaigns to encourage voluntary counselling and testing for workers

Project's Phase	Environmental and Social Impacts	Mitigation measures
OPERATION PHASE	Revenue generation to Government	The contractor and all sub-contractors shall pay all applicable corporate taxes and charges to appropriate authorities and government agencies.
	Knowledge and skill increase to local labour	i. Enable skilled, semi-skilled, and unskilled labourers to share knowledge and skills in construction projects. ii. Contractor should offer on-the-job training for all employees, regardless of their skill level. iii. Contractors and sub-contractors will be encouraged to provide skills and training to local staff, both skilled and unskilled iv. Contractors should offer internships for engineering students
	Disrupted Traffic flow and public accidents	i. The contractor to prepare and implement a Traffic Management Plan (TMP) for the construction site. ii. The contractor should avoid delivering materials onsite during peak hours iii. The contractor should provide a safety programme and measures for drivers, workers, and local communities, including observation of speed limits iv. The contractor is responsible for installing and maintaining traffic signs, signals, and markings v. The contractor and project Proponent should establish support mechanisms for vulnerable groups. vi. The Proponent should ensure pedestrian interaction with construction vehicles, especially inside the MoCU main campus is minimised
	Reduction of Gender Gap	i. The Proponent must provide an enabling learning environment including the provision of necessary accommodations for women in washrooms vii. Develop, implement, and monitor a Gender Action Plan (GAP)
	Spreading of HIV/AIDS and other STIs	i. A safety, health and environment induction course shall be conducted to all students and workers, and set more emphasis on HIV/AIDS, ii. Support regularly HIV/AIDS counselling and testing iii. Identify hazard to health and potential cause by carrying out risk assessment on HIV/AIDS and other STIs ii.
	Gender-based Violence, Sexual Exploitation and Harassment	i. Strict implementation of the MoCU's policy on Gender and HIV/AIDS issues ii. Developing and implementing Code of Ethical Conduct for the MoCU employees, students operators and throughout the supply chain, including service providers and suppliers operating within the Campus; iii. Prepare strategic Action plan to address all issues related to GBV; Apply the necessary procedures (Grievance Redress Mechanism GRM) for receiving, resolving as well as reporting of Grievances to address all arising matter on GBV; and

Project's Phase	Environmental and Social Impacts	Mitigation measures
		iv. Conduct regular awareness and sensitization training on GBV to staff and students.
	Demand of basic needs due to population influx	i. Allow provision of basic need services by private vendors ii. Enrolment of students shall consider availability of basic needs in Campus, iii. The area will be connected with safe water from MUWSA iv. The sit will be connected with electrical power from TANESCO v. Toilets and washrooms for workers shall be constructed for use in all phases vi. The existing healthcare centre will be expanded and upgraded to meet the growing demand for health services. vii. To accommodate the higher enrolment, the University plans to build two new hostels.
	Security imbalance due to population influx	i. Develop and implement a risk management plan ii. Document site entry and exit procedures iii. Use fencing, video surveillance, as well as security personnel iv. Develop safe work procedures including protective gears equipment for workers.
	Conflicts to community around due to population influx	i. Admitted students will be inducted on how to behave in the campus ii. Maintain Good cooperation with the surrounding community
	Fire breaks out	i. Portable fire extinguishers shall be put in place in all strategic areas ii. Installation of Fire Fighting system incorporating water hydrants. iii. Conduct Routine checking for performance of firefighting equipment iv. Designate Fire assembly area in the project site v. Perform evacuation plan for known risk areas and designate fire escape routes vi. Disseminate warning information and instructions to the public through available warning systems vii. Develop simplified planning procedures for adhoc evacuations viii. Conduct induction training to workers to respond to fire emergencies

Project's Phase	Environmental and Social Impacts	Mitigation measures
	Pollution due to mishandling of domestic solid Wastes	i. Prepare the comprehensive waste management plan ii. Ensuring proper systems for collection, transportation and disposal of solid wastes iii. Ensuring availability of sufficient waste bins at appropriate locations iv. Design and construct waste collection chambers
	Pollution due to mishandling of domestic liquid Waste	i. Ensuring proper design and construction of sewer line system ii. Ensuring routine maintenance of sewer line system iii. Ensure frequency service of chambers to avoid overflow
	Soil Erosion due to Runoff Effects and Loosened Top Soil	i. Proper backfilling and resurfacing of the constructed area ii. Stabilise the soil by applying light compaction, iii. Planting of trees and grass on bare land at project site
	Occupational Health and Safety hazards to workers	i. Develop and implement Health, Safety and Environment Plan (HSEP) ii. Develop and implement the Emergency Response Plan (ERP) for unplanned events iii. Equip key personnel for health and safety who will comply with OSHA laws and regulation iv. Periodic HSE, emergency response, fire drills and first aid training for the employees v. Ensuring first aider trained personnel are available at project site vi. Offering various types of HSE training in collaboration with the OSHA vii. Zoning of heavy moving parts and machinery away from employees and public paths as much as possible viii. Generally, all the necessary health and safety measures will be implemented. For further details are provided in Table 31.
	Loss of property due to earthquake	i. MoCU to ensure preparedness after decommissioning in terms of evacuation procedures, communication protocols, first-aid response, and designated emergency shelters. ii. Users of the building should be regularly acquainted with the emergency plan, earthquake safety protocols, and proper response procedures while maintaining emergency equipment like fire extinguishers, first-aid kits, and communication devices.

Project's Phase	Environmental and Social Impacts	Mitigation measures
DECOMMISSIONING	Loss of aesthetic value due to abandonment of structures	Proponents may either demolish the structures or undertake major rehabilitation in an environmentally sound manner in order to restore the environment to its original appearance.
	Contamination and impairment of Environment	i. Use of environmentally friendly practices ii. Conduct regularly environmental training on waste management best practices and procedures iii. Abide with environment laws and directives
	Loss of Employment	i. Provide skills and retirement benefits to prepare workers for self-employment ii. Ensure that all employees are members of the Social Security schemes

Table 24 Management of occupational health and safety hazards during construction

Category	Description	Management Practices to Prevent/Control
Physical hazards	Moving equipment and traffic safety	● Development of a transportation management plan for road repairs that include measures to ensure work zone safety for construction workers and the travelling public, ● Establishment of work zones to separate workers on foot from traffic and equipment (e.g. routing of traffic to alternative roads, lane closure, diversion, protective barriers to shield workers and road users, signage, eliminate blind spots etc.) ● Speed controls in work zones ● Training of workers in safety issues related to their activities
	Elevated overhead works	● Barricading of the works area to prevent unauthorised access ● Hoisting and lifting equipment will be rated and properly maintained, and operators trained in their use ● Elevating platforms will be maintained and operated according to established safety procedures, including use of fall protection measures ● Working at height training and safety measures, equipment and personnel movement protocols
	Fall protection	● Implementation of a fall protection program e.g. training, use of fall protection equipment, measures, inspection, maintenance, rescue of fall-arrested workers ● Workers training of working at heights ● Installation of fixtures on bridge components to facilitate the use of fall protection systems ● Ensure availability and use of correct PPE for the fall protection
	Confined and restricted space entry	● Entry into all confined spaces will be restricted and subject to permitted supervision by properly trained persons ● Workers training and awareness creation

Category	Description	Management Practices to Prevent/Control
	Risk of fire and explosion	● Fire protection measures, including spill prevention ● Signage and markings ● Controlled access, surveillance and tight security controls in risky zones
Chemical hazards	Vehicle emissions	● Reduction of engine idling time in construction sites ● Maintenance of work vehicles and machinery to minimise air emissions ● Ventilation of indoor areas where vehicles or engines are operated, or use of exhaust extractor hose attachments to divert exhaust outside ● Provision of adequate ventilation in tunnels or other areas with limited natural air circulation ● Use of protective clothing when working with cutbacks (a mixture of asphalt and solvents for the repair of
Noise	Exposure to extremely high levels of noise	● Use of personal hearing protection by exposed personnel ● Implementation of work rotation programs to reduce cumulative exposure
Health hazards	Exposure to sexually transmitted and waterborne diseases	● VCT on HIV/AIDS, STDs, awareness campaigns ● Proper waste management and sanitation in all works areas ● Provide adequate sanitation facilities for workers

Source: Fieldwork, June 2023 & EHS Guidelines

CHAPTER EIGHT

8.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The Environmental and Social Management Plan (ESMP) presented in this chapter comprehensively addresses potential positive and negative impacts associated with the planned project at MoCU's main campus across various stages, as detailed in Table 25. The ESMP prioritises project feasibility and implementation through its five key components:

i) Description of each impact, categorised as positive or negative.
ii) Detailed mitigation and enhancement measures proposed for each impact.
iii) Clearly identified institutions responsible for implementing each measure.
iv) Cost estimates for each mitigation and enhancement measure, where possible.
v) Defined implementation timeframe for each measure, categorised by project stage (mobilisation, construction, operation, or decommissioning).

8.1 Impact Management Strategy

The Environmental and Social Management Plan (ESMP) specifies critical requirements for the MoCU main campus, the construction Contractor, and the Proponent. These requirements ensure compliance with essential environmental guidelines and the recommendations outlined in the Environmental and Social Impact Assessment (ESIA) study. Specifically, the ESMP mandates that the Contractor and/or Proponent of the proposed academic building must:

i) Possess an Environmental Policy statement that addresses contractual and regulatory requirements.
ii) Develop and implement procedures to address environmental aspects and risks related to construction.
iii) Implement and operate the ESMP effectively, including assigning structure and responsibilities, training staff, maintaining communication, documenting activities, exercising operational control, reporting regularly, and preparing for emergencies.
iv) Establish clear and precise organisational and technical procedures for ESMP implementation, ensuring controlled and responsible construction and operation activities with potentially positive environmental and social impacts.
v) Employ monitoring and measurement to identify and address environmental issues through corrective actions.
vi) Collect and store records, and conduct program audits that include management reviews of the ESMP, enabling continuous improvement and incorporation of best practices into the plan.

8.2 Implementation and Coordination

The implementation of the ESMP will observe the following:

a) ***Prior to construction:*** the ESMP will be provided to the Contractor for review and implementation under the supervision of the consultant's management.
b) ***During operation:*** the Environmental and Social specialists within the University Project Implementation Unit (UPIU) will spearhead the oversight of the ESMP. These specialists will work in tandem to ensure project implementation adheres to environmental and social safeguards.

The Environmental Specialist will focus on:

i) Managing the environmental and social impact assessment (ESIA);

ii) Advising on mitigation measures for potential negative environmental impacts;
iii) Monitoring compliance with environmental safeguards policies;
iv) Supporting climate change adaptation strategies, and;
v) Conducting safeguard reviews, preparing reports, and sharing lessons learned.

The Social Specialist will focus on:

i) Providing technical support on social safeguards, impacts, vulnerabilities, and identifying risk management strategies;
ii) Ensuring project implementation adheres to the Environmental and Social Management Framework (ESMF);
iii) Monitoring the compliance of HEET Project activities with social safeguards policies or ESF, as appropriate, and;
iv) Endeavouring to understand potential and latent conflicts and recommending appropriate redress mechanisms.

The two experts selected to supervise the ESMF possess extensive experience in both planning, monitoring and evaluating development projects of comparable scope. Furthermore, they have actively participated in all relevant capacity-building workshops organised by the MoEST and the World Bank since the inception of the HEET project.

i) MoCU will ultimately be responsible for enforcing mitigation and enhancement measures, complying with national standards and World Bank ESS1.
ii) The Proponent's Health, Safety, and Environment (HSE) Department will also assist to oversee construction and ensure application of E&S safeguards, including the ESMP.
iii) An Environmental Expert will assist the Resident Engineer and ensure ESMP aspects are integrated into construction documents and implemented effectively.
iv) The Proponent will bear the cost of installing mitigation measures, supported by environmental and social protection clauses in contracts and specifications.
v) MoCU will submit regular reports to the World Bank and NEMC, including environmental and social monitoring data.
vi) The World Bank and NEMC retain the right to audit the project and ensure mitigation measures are implemented.
vii) Both the Contractor and the Proponent will assign Environmentalists or HSE Officers to oversee ESMP execution and monitoring.
viii) The Contractor's Environmentalist/HSE Officer will translate and implement the ESMP provisions.
ix) The Proponent's Environmentalist will monitor the Contractor's implementation of the ESMP provisions.
x) Successful ESMP implementation requires the collaboration of various institutions, including NEMC, OSHA, TANESCO, MUWSA, PBWB, TBA, local governments, and neighbouring communities.
xi) Regulatory authorities like NEMC and OSHA may conduct inspections and audits to ensure compliance.

8.3 Review and Reporting Procedures

The Proponent will adhere to the following procedures in Environmental Monitoring and Reporting:

i) MoCU will submit semi-annual and annual progress reports, including environmental monitoring data, to NEMC and the World Bank.

ii) NEMC will conduct annual or bi-annual environmental evaluations based on the sensitivity of locations where project activities occur. These evaluations will assess the effectiveness of implemented environmental controls.
iii) A detailed monitoring (Table 26) outlines the characteristics, timing, frequency, and responsible parties for various monitoring activities.

Roles and Responsibilities of Stakeholder will be:

i) Key stakeholders involved in ESMP implementation and mitigation measures and follow-up include MoCU, local government, resident engineer, World Bank, and NEMC (Figure 5).
ii) The contractor is responsible for daily implementation and internal monitoring of all activities under their supervision.
iii) NEMC is responsible for ensuring compliance with the Environmental Impact Assessment and Audit Regulations (2005) during construction activities.
iv) The Proponent is financially liable for implementing mitigation measures.

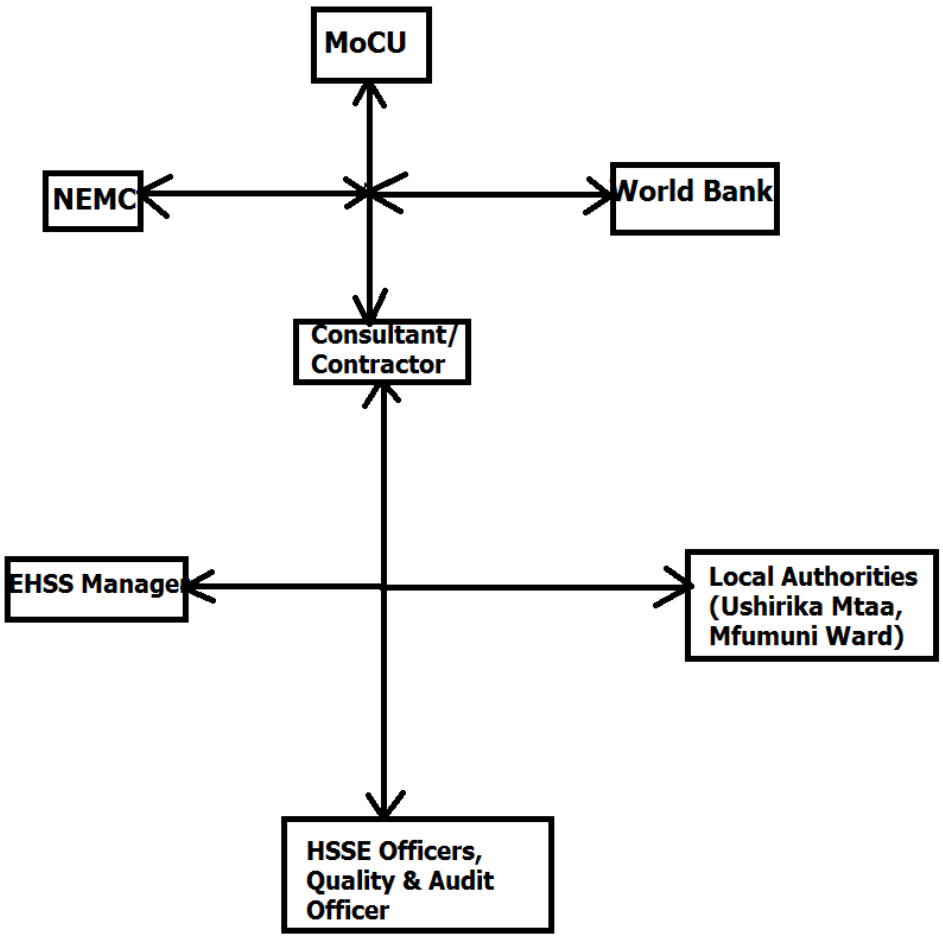


Figure 5: Proposed ESMP Reporting and Responsibilities

Source: Field Visit, June 2023

Table 25 ESMP for the Proposed project at MoCU main Campus

Identified Impacts			Mitigation and/or Enhancement Measures	Implementation	
Project Phase	Type	Description		Responsibility	Relative/Costs (TSH)
Mobilisation	+ve	Employment and income generation opportunities	**Prioritise local communities** i. Maximise local employment opportunities for residents around Ushirika and surrounding areas. ii. Give preference to individuals from the local community for skilled and unskilled labour positions. iii. Integrate local community involvement into project planning and implementation. **Local sourcing of labour** i. Seek to source semi-skilled and unskilled labour locally, giving priority to affected communities. ii. Include a contractual clause requiring the contractor to prioritise local residents for labour positions. **Inclusive and transparent recruitment** i. Establish and implement an inclusive, transparent, and gender-sensitive recruitment process. ii. Ensure fair and transparent selection procedures for all applicants. iii. Provide opportunities for all qualified individuals, regardless of gender or background. **Support local businesses** i. Encourage and permit small businesses that support the construction, such as cafes, food vendors, kiosks, tricycle and motorcycle operators. ii. Create opportunities for local businesses to provide goods and services to the project. iii. Promote economic development in the local community. **Gender equality in employment** i. Provide equal employment opportunities to both women and men, ensuring gender equality.	Contractor.	No cost

Identified Impacts			Mitigation and/or Enhancement Measures	Implementation	
Project Phase	Type	Description		Responsibility	Relative/Costs (TSH)
			ii. Combat any potential discrimination based on gender in the recruitment and employment process. iii. Promote diversity and inclusion in the workforce. **Employment for vulnerable groups** i. Consider vulnerable groups when creating employment opportunities, assigning tasks they are capable of performing. ii. Provide training and support to vulnerable groups to enhance their employability. iii. Ensure that employment opportunities are accessible to all members of the community. **Labour Recruitment and Management Plan (LRMP)** i. Develop and implement a comprehensive Labour Recruitment and Management Plan (LRMP). ii. The LRMP should outline clear procedures for recruitment, training, wages, benefits, and grievance redressal. iii. Monitor and evaluate the LRMP regularly to ensure its effectiveness.		
	-ve	Dust emission	i. Regularly apply dust suppressants, such as water, to excavated routes through sprinkling. ii. Confine dust-generating activities within designated working areas to minimise dust dispersion. iii. Cover fine materials like sand and gravel during haulage using tarpaulins or other suitable measures to prevent spillage and dust generation. iv. Compact excavated soils to minimise windblown dust. v. Provide and require workers to wear appropriate personal protective equipment (PPE) to protect themselves from dust exposure. vi. Ensure that haulage trucks have properly closing tailgates and use tarpaulins to cover transported materials, preventing dust clouds during transportation.	Contractor	1,000,000
		Occupational Health and	i. Implement regular water spraying to suppress dust generation in high-risk areas. ii. Ensure all trucks and machinery undergo routine engine maintenance to minimise emissions.	Contractor	1,000,000

Identified Impacts			Mitigation and/or Enhancement Measures	Implementation	
Project Phase	Type	Description		Responsibility	Relative/Costs (TSH)
	-ve	Safety Hazards to workers	iii. Cover all stockpiles on-site to prevent windblown dust dispersion. iv. Use covered trucks while transporting waste materials off-site to minimise dust spread. v. Equip site clearance crews with proper PPE including safety boots and uniforms. vi. Designate and clearly mark an emergency assembly point for rapid evacuation in case of an incident. vii. The contractor must employ a qualified health and safety officer permanently stationed on-site. viii. Provide comprehensive induction and training to all mobilisation crews on site safety procedures and protocols.		
	-ve	Vegetation clearance	**Precise Vegetation Clearing** i. Limit vegetation removal to the exact footprint needed for construction activities. ii. Minimise unnecessary clearing beyond the immediate construction zone. **Ground Clearance Optimization** i. Focus ground clearing efforts on the designated construction footprint. ii. Implement measures to minimise ground disturbance outside the footprint whenever possible. iii. Only clear ground when absolutely essential for construction progress. **Post-Construction Reforestation** i. Implement a comprehensive tree planting program to compensate for all vegetation removed during construction. ii. Ensure the replanting program aims to replace all tree species removed in similar numbers and densities. iii. Plant trees within the construction footprint and surrounding areas to restore the pre-construction vegetation cover.	Contractor, and, MoCU	1,000,000
	-ve		**Noise Level Control** i. Implement measures to limit noise levels within designated work areas throughout the construction process.	Contractor, sub-contractors	1,000,000

Identified Impacts			Mitigation and/or Enhancement Measures	Implementation	
Project Phase	Type	Description		Responsibility	Relative/Costs (TSH)
		Disturbances from noise emissions	ii. Enforce noise control regulations and adhere to established noise limits. **Daytime Activity Restrictions** i. Schedule activities generating excessive noise for daytime hours only. ii. Avoid noisy operations during night-time hours to minimise noise disturbance to surrounding communities. **Equipment Maintenance** i. Ensure proper maintenance of all construction equipment to minimise noise generation. ii. Replace worn-out equipment parts and maintain lubrication to reduce operational noise. iii. Regularly inspect and service noise emission devices on construction equipment. **Muffler Enforcement** i. Require the use of mufflers on all construction equipment in operation. ii. Regularly check and maintain mufflers for optimal noise reduction effectiveness. **Idling Restrictions** i. Prohibit unnecessary idling of construction equipment within noise-sensitive areas. ii. Encourage and enforce efficient equipment operation to minimise unnecessary engine noise.		
Sub-total I (once-off cost) during project preparation/mobilisation					**4,000,000**
Construction	+ve	Income increase to offsite service providers	The project Proponent/contractor will prioritise collaborating with small businesses that support the construction team's needs. Their procurement plan must incorporated Implementing Affirmative Action Measures in Procurement to Achieve Equal Opportunity and Gender Inclusion.	Contractor	No cost
	+ve	Benefit to local supplier of construction materials	i. Actively seek and acquire materials, equipment, and other resources from local suppliers and businesses. ii. Choose local vendors whenever feasible to contribute to the local economy and create jobs.	Contractor, MoCU	No cost

Identified Impacts			Mitigation and/or Enhancement Measures	Implementation	
Project Phase	Type	Description		Responsibility	Relative/Costs (TSH)
			iii. Develop long-term relationships with reliable local suppliers for smooth and efficient procurement. iv. Design and enforce procurement policies that ensure fair and equal access to opportunities for all businesses, regardless of size, ownership, or gender. v. Where appropriate, actively engage with minority-owned, women-owned, and other underrepresented businesses to increase their participation in the supply chain. vi. Offer training, resources, and mentorship programs to help diverse businesses grow and compete effectively. vii. Source materials and services only from reputable and legally compliant suppliers. viii. Ensure all suppliers possess the necessary licences and certifications to operate and provide the required goods and services. ix. Maintain clear documentation of procurement processes and supplier selection criteria.		
	+ve	Revenue generation to local government and agencies	i. Prioritise fulfilling all financial obligations related to charges, fees, taxes, and levies without delay. ii. Establish streamlined procedures for processing payments and managing financial records to avoid delays or errors. iii. Comply with all applicable tax and regulatory laws to maintain good standing and avoid penalties. iv. Develop and implement a robust system for efficient tax clearance procedures, minimising administrative burdens. v. Utilise digital tools and platforms to automate tax management tasks, improve accuracy, and enhance data accessibility. vi. Regularly review and refine tax clearance processes to ensure efficiency and effectiveness. vii. Maintain open and transparent communication with relevant authorities regarding tax clearance and monitoring activities.	Contractor, sub-contractors	No cost envisaged

Identified Impacts			Mitigation and/or Enhancement Measures	Implementation	
Project Phase	Type	Description		Responsibility	Relative/Costs (TSH)
			viii. Regularly release accessible reports and data on tax clearance and monitoring activities to promote transparency and accountability. ix. Establish mechanisms for public access to information on tax clearance and monitoring procedures, fostering trust and engagement.		
	+ve	Skills and knowledge transfer to local labour	Equip individuals with the necessary skills, both basic and specialised, to succeed in various construction trades. i. Provide on-the-job training opportunities for both skilled and unskilled individuals to enhance their capabilities and career prospects. ii. Prioritise the engagement of local contractors and subcontractors who possess the required qualifications and experience. iii. Maintain high construction quality standards by working with certified and qualified contractors who adhere to industry regulations. iv. Create opportunities for women and minority groups to gain valuable experience and skills in the field of civil engineering. v. Provide targeted capacity-building programs to address existing disparities and empower underrepresented groups to participate in the construction industry. vi. Promote a culture of continuous learning and development by encouraging construction staff to utilise Vocational Training Centres to upgrade their skills and knowledge. vii. Provide construction staff with the necessary skills and support to pursue opportunities in similar projects beyond the immediate project scope.	Contractor, sub-contractors	No cost
	-ve	Noise pollution due to movement of construction equipment	i. Ensure regular maintenance of machines and vehicles to ensure optimal performance and reduce noise and emissions. ii. Avoid the use of poorly maintained equipment, which can be significantly louder. iii. Limit construction activities during night time hours to maintain peace and quietness in surrounding neighbourhoods	Contractor, sub-contractors	1,000,000
	-ve	Air pollution due to dust	i. Regularly spraying water on unpaved surfaces used by construction equipment effectively suppresses dust generation.	Contractor, sub-contractors,	1,000,000

Identified Impacts			Mitigation and/or Enhancement Measures	Implementation	
Project Phase	Type	Description		Responsibility	Relative/Costs (TSH)
			ii. Covering all exposed construction materials during non-active hours (e.g., evenings and weekends) minimises dust dispersal from wind and other disturbances. iii. Installing fencing around the construction site, particularly with iron sheets, helps to reduce the impact of wind on dust movement and dispersion. iv. Regularly sweeping and cleaning paved surfaces and dust-prone areas further reduces dust accumulation and airborne particles. v. Utilise dust control products, such as dust suppressants or chemical agents, can be implemented in specific situations where additional dust mitigation is necessary.		
	-ve	Generation of spoil materials	i. Debris will be removed and the ground will be levelled and resurfaced to create a stable base for the foundation of the structures. ii. The excavated areas will be backfilled with appropriate materials to ensure proper compaction and prevent settling. iii. Controlled and light compaction of the soil will be implemented to enhance stability and prevent future erosion. iv. Planting grass on bare land will be a priority to minimise soil erosion and promote long-term stability. v.	Contractor/,	1,000,000
	-ve	Impacts associated with transportation of construction materials	i. Cover open-bed trucks with securely fastened tarpaulins to prevent materials from blowing away and creating dust or debris. ii. Implement a routine maintenance schedule for all construction trucks to ensure their engines are operating optimally iii. Use trucks with emission control technologies such as catalytic converters and particulate filters to further reduce the release of harmful pollutants. iv. Purchase fuel only from EWURA-certified suppliers to ensure compliant	Contractor/ Sub-contractor	1,500,000
	-ve	Occupational health and safety hazards	i. Adopt and actively implement a comprehensive Health and Safety Management Plan (HSMP) to ensure the safety and wellbeing of all workers throughout the project.	Contractor, sub-contractors	4,000,000

Identified Impacts			Mitigation and/or Enhancement Measures	Implementation	
Project Phase	Type	Description		Responsibility	Relative/Costs (TSH)
			ii. Prior to commencing any task or activity, a specific risk assessment will be conducted to identify potential hazards and implement corresponding mitigation measures. iii. Provide all workers with appropriate personal protective equipment (PPE) based on their specific tasks and the associated risks. iv. Maintain adequate access and egress routes throughout the construction site for safe movement of workers and emergency personnel. v. Establish a dedicated fire-fighting system to promptly respond to potential fire hazards. vi. Hazard cones will be strategically placed to clearly define restricted working areas and prevent unauthorised entry. vii. Well-stocked first aid kits will be readily available at all active work sites, accompanied by trained first aid personnel to provide immediate assistance in case of injuries. viii. Regular induction training courses on health, safety, security, and environment (HSSE) will be provided to all workers before the commencement of any construction activities. ix. The contractor will employ a qualified health and safety officer with the expertise to oversee the implementation of the HSMP, conduct regular site inspections, and provide ongoing safety training and awareness programs.		
	-ve	Health hazards due to mismanagement of Hazardous waste	i. All generated cut pieces of iron sheets, steel bars, and other similar materials classified as hazardous waste will be collected and stored in a designated and clearly marked temporary storage area.2. Collection by Authorised Dealers: ii. The contractor will develop and implement a comprehensive Waste Management Plan (WMP) outlining the procedures for handling, storing, and disposing of all types of waste generated during the construction project.4. Authorised Dealers and Compliance:	Contractor	2,000,000

Identified Impacts			Mitigation and/or Enhancement Measures	Implementation	
Project Phase	Type	Description		Responsibility	Relative/Costs (TSH)
			iii. The contractor will only partner with authorised dealers who possess the necessary licences and permits to handle and dispose of hazardous waste according to local and national regulations. iv. The WMP will clearly outline compliance requirements for all waste management activities, ensuring responsible and environmentally sound disposal practices. v. The contractor will regularly review and update the WMP to reflect changes in regulations, procedures, and operational needs.		
	-ve	Disrupted traffic flow and staff and student safety	i. Prepare and implement a Traffic Management Plan (TMP) for construction purposes. i. Avoid delivering materials onsite during peak hours (morning and evening). ii. Install clear and visible speed limit signs throughout the construction zone, specifically tailored to the safety of large trucks. iii. Ensure signs are placed in accordance with regulatory guidelines for spacing and visibility. iv. Where necessary use reflective signs and flashing lights for enhanced visibility during night time hours.	Contractor, sub-contractors, MoCU, Traffic Police	3,000,000
	-ve	Pollution due to mismanagement of domestic wastewater	i. Install movable toilets or construct of temporary toilets and baths to be used during construction. ii. Empty toilets promptly to avoid overflow. iii. Prepare a waste management plan for domestic wastewater.	Contractor	2,000,000
	-ve	Pollution due to mismanagement of domestic solid waste	i. Ensuring proper design of systems for collection, transportation and disposal of solid wastes. ii. Ensuring availability of sufficient waste bins at appropriate locations. iii. Design waste collection chambers for collecting waste before it is transported to the dump site. iv. Sort solid waste at source.	Contractor, sub-contractors	1,000,000

Identified Impacts			Mitigation and/or Enhancement Measures	Implementation	
Project Phase	Type	Description		Responsibility	Relative/Costs (TSH)
			v. Temporary solid waste collection chambers at project site shall be paved and roofed to limit contamination due to the rain water. vi. Prepare a waste management plan for domestic solid waste.		
	-ve	Exposure to HIV/AIDS and new transmission	i. Organise and conduct informative campaigns to raise awareness about the dangers of HIV/AIDS. ii. Use various communication channels such as workshops, seminars, community meetings, and media outreach to reach a broad audience. iii. Partner with local organisations and agencies dealing with HIV/AIDS control to leverage expertise and resources. iv. Design campaigns to be culturally sensitive and address specific demographics and populations at risk.	Contractor, sub-contractors, NGOs, MoCU	1,000,000
	-ve	Workplace sexual harassment and violence against women & vulnerable segments	Multi-Channel Outreach i. Implement a multi-pronged approach utilising workshop, seminars, community meetings, and media outreach to reach a broad and diverse audience. ii. Disseminate clear, accurate, and culturally sensitive information about HIV/AIDS risks and prevention methods. iii. Partner with local organisations and agencies specialising in HIV/AIDS control to leverage their expertise and resources for impactful outreach programs. Tailored Interventions i. Design campaigns that specifically address the needs and vulnerabilities of different demographics and populations at risk. ii. Adapt messages and communication styles to resonate with different cultural contexts and beliefs. iii. Promote individual responsibility and informed decision-making through comprehensive knowledge about HIV/AIDS prevention and risk reduction. Community Engagement i. Encourage community leaders, religious institutions, and other influential figures to actively participate in awareness and prevention efforts.	Contractor, sub-contractors, NGOs, Health facilities, Municipal councils (Social Welfare Depts.), Police, Community, MoCU (Gender Unit),	3,000,000

Identified Impacts			Mitigation and/or Enhancement Measures	Implementation	
Project Phase	Type	Description		Responsibility	Relative/Costs (TSH)
			ii. Foster a sense of community ownership and responsibility in addressing HIV/AIDS challenges. iii. Create a supportive and stigma-free environment to encourage open discussions, access to testing, and support for individuals living with HIV/AIDS.		
	-ve	Gender inequality in employment, fair labour terms and Exclusion from economic opportunities	**Implementation of the Gender Action Plan (GAP)** i. Job opportunities should be awarded based on qualifications and merit, ensuring a fair and equitable playing field for all genders. ii. Actively attract and recruit talent from diverse backgrounds and genders, fostering a representative and inclusive workforce. iii. Implement standardised and objective evaluation processes to remove any potential for gender bias in candidate selection. iv. Identify and prioritise vulnerable groups within the community for targeted livelihood support programs. v. Closely monitor the income levels of vulnerable groups during project implementation to assess the effectiveness of support measures. vi. Develop sustainable livelihood strategies that empower vulnerable groups to achieve long-term economic stability. vii. Establishing affirmative action involving the preparation of equal opportunity, gender-inclusive procurement plan. viii. Capacity-development opportunities (e.g. internships, training seminars) for women and minority employees for more effective engagement in the construction industry.	Contractor, sub-contractors, Municipal councils, Street *Officers,* MoCU (Gender Unit),	3,000,000
Sub-total II (once-off cost) during actual construction					***23,500,000***
Operation	+ve	Reduction of Gender Gap	i. Implement measures to encourage and facilitate enrolment of women and girls in educational programs, particularly at higher levels. ii. Enhance the learning environment by providing safe and supportive spaces, including accommodation for women, to promote their academic success. iii. Develop specific strategies and initiatives to promote gender equality.	MoCU (Human Resources Dept., Gender Unit)	Part of MoCU HR budget

Identified Impacts			Mitigation and/or Enhancement Measures	Implementation	
Project Phase	Type	Description		Responsibility	Relative/Costs (TSH)
			iv. Regularly assess the effectiveness of the GAP and make adjustments as needed to ensure its successful implementation. v. Align the GAP with the existing MoCU HIV/AIDS and Gender Policy to create a comprehensive and integrated approach to addressing gender inequalities.		
	+ve	Enhanced incomes to the surrounding petty traders	i. Sourcing materials, equipment and other resources locally ii. Permit shall be given to small businesses that support for service providers near project site to benefit for selling their goods iii. Procurement plan to incorporate affirmative action on local procurement, provision of equal opportunity, gender-inclusive procurement iv. Procurement from registered and licensed suppliers throughout the supply chain	HR Dept., Gender Unit, Procurement & Logistics Dept.	No cost
	+ve	Improved students' enrolment and capacity building	i. Develop and upgrade infrastructure and facilities to increase accessibility and capacity for MoCU programs. ii. Tailor program offerings to meet the evolving market demands and industry needs, ensuring graduates possess the relevant skills and knowledge for successful careers. iii. Implement robust maintenance plans to ensure the developed facilities are operational, safe, and conducive to learning. iv. Use ICT resources efficiently and effectively to maximise the use of facilities. v. Establish exchange programs with other institutes to provide students and staff with opportunities for cross-cultural learning and professional development. vi. Foster collaboration and partnerships through student and staff visits, joint research projects, and shared expertise, leading to knowledge exchange and innovation	MoCU Academic department	No cost
	-ve	Pollution due to mismanagement of domestic solid waste	i. Ensuring proper systems for collection, transportation and disposal of solid wastes. ii. Ensuring availability of sufficient waste bins at appropriate locations. iii. Design and construct waste collection chambers for collecting waste before transporting it to the dump site.	MoCU	2,000,000 per year

Identified Impacts			Mitigation and/or Enhancement Measures	Implementation	
Project Phase	Type	Description		Responsibility	Relative/Costs (TSH)
			iv. Paving, roofing, and banding will be applied to the temporary waste collection chamber.		
	-ve	Spread of HIV/AIDS and other STIs	i. Raising awareness on HIV/AIDS to workers, and visitors, ii. Support voluntary HIV counselling and testing.	NGOs dealt with HIV and MoCU	2,000,000
	-ve	Pollution due to mismanagement of domestic liquid waste	i. Sanitary facilities will be built to proper standards and connected to the MUWSA sewer system. ii. Ensuring routine maintenance of sanitary facilities. iii. Ensure frequency service of sewer network within MoCU main Campus to avoid issue of chamber clogging and reduce overflow of liquid waste.	MoCU	5,000,000 per year
	-ve	Occupational health and safety risks/hazards	i. Develop and implement Health, Safety and Environment Plan (HSEP). ii. Develop and implement the Emergency Response Plan (ERP) for unplanned events. iii. Employees will undergo periodic training on health, safety, and environment (HSE) protocols, including emergency response procedures, fire drills, and basic first aid techniques. iv. The Contractor shall ensure the presence of first-aid trained personnel on-site at all times. v. Offering various types of HSE training in collaboration with the OSHA vi. Implement a zoning plan that minimises the spatial proximity of heavy moving parts and machinery to employee work areas and public pathways.	MoCU	5,000,000
	-ve	Possibility of Fire outbreak	i. Portable fire extinguishers shall be put in place in all strategic areas. ii. Firefighting system incorporating water hydrants shall be installed in the building including a fire detection alarm system. iii. Routine checking for performance of firefighting equipment shall be done as recommended. iv. Fire assembly area shall be designated in the project area v. Fire escape routes shall be designed.	MoCU	4,000,000

Identified Impacts			Mitigation and/or Enhancement Measures	Implementation	
Project Phase	Type	Description		Responsibility	Relative/Costs (TSH)
			vi. All facilities used during electrical wiring must be approved by the responsible personnel. vii. All workers shall undergo mandatory induction training on established fire emergency response protocols.		
	-ve	Gender-based violence, sexual exploitation & harassment	i. Strict implementation of the MoCU's policy on Gender and HIV/AIDS issues. ii. Developing and implementing Code of Ethical Conduct for the MoCU employees, service providers and suppliers. iii. Implementation of the GAP and protection of women against all forms of sexual abuse, harassment and violence. iv. Development and dissemination of mechanisms to report, address and register incidents of violence and harassment. v. A transparent and accessible system/mechanism shall be established for victim support, reporting, and other forms of counselling, with the MoCU's Gender Unit conducting continuous gender-sensitive training for all relevant stakeholders	MoCU	5,000,000/year
Sub-total III (once-off costs) during the operation phase					**23,000,000**
Grand total (indicative)				**50,500,000**	

CHAPTER NINE

9.0 ENVIRONMENTAL MONITORING PLAN

The environmental and social monitoring plan (Table 26) revealed issues requiring mitigation. The plan outlines specific parameters for monitoring, associated costs, and responsible institutions. The project Proponent and contractor are responsible for implementing and funding these measures.

Table 26 Environmental and Social Monitoring Plan

Phase	POTENTIAL DIRECT IMPACT	Parameter to Monitor	Frequency	Monitoring Area	Measurement unit	Target Level/Standard	Responsibility	Estimated costs (Tsh)
MOBILIZATION	Dust emission due to site clearance	$PM_{2.5}$ and PM_{10}	Daily	Project area	$\mu g/m^3$	As per TZS 837 Parts 1, 2 and 3.	Contractor	1,000,000 per quarterly
	Noise pollution due to demolition	Noise level	Daily	Project area	dB(A)	As per TZS 837 Parts 1, 2 and 3	Contractor	1,000,000 quarterly
	Vegetation clearance	Number of trees before mobilisation and after	Mobilisation period	Project area	Number	Minimum vegetation clearance	Contractor	1,000,000
	Occupational Health hazards	Occupational status of environment	Daily	Project area		Zero injury	Contractor	1,000,000
CONSTRUCTION	Depletion or degradation at points of source of construction materials	Quantity of concrete mixer used	Daily	Construction site	m^3	No burrow pit formed	Contractor	4,000,000 paid once
	Noise due to Construction Equipment and Materials	noise level	Quarterly	Project area	dBA	As per TZS 932:2006	Contractor	1,000,000 annually
	Impacts associated with transportation of construction materials	$PM_{2.5}$ and PM_{10}	Daily	Using road	$\mu g/m^3$	Minimal	MoCU	1,500,000

Phase	POTENTIAL DIRECT IMPACT	Parameter to Monitor	Frequency	Monitoring Area	Measurement unit	Target Level/Standard	Responsibility	Estimated costs (Tsh)
	Impacts of dust from movement of construction equipment	Particulate matter in the air	Quarterly	Project area	µg/Nm^3 per hr	As per TZS 837 Parts 1, 2 and 3.	MoCU	1,000,000 annually
	Occupational Health and Safety of Construction Workers	Number of injuries	Daily	Project site	NA	Zero injuries	MoCU	4,000,000 annually
	Risk of HIV/STD transmission	Number of cases of reported	Quarterly	Project workers	Number	prevalence rate to be reduced	MoCU	2,000,000 annually
	Health hazards to workers due to poor management of hazardous waste	Quantity of hazardous waste generated and its management	Weekly	Construction site	Kg	No injury due to hazardous waste	MoCU	2,000,000 annually
	Pollution due to mismanagement of solid waste	Quantity of solid waste generation	Weekly	Project site	Kg	Zero pollution	MoCU	1,000,000 annually
	Gender inequality in employment opportunities	Gender balance in employment opportunities	Quarterly	Project site	Number	No gender imbalance	MoCU	No cost
	Pollution due to mismanagement of domestic wastewater	Water pH, -Faecal coliform -BOD -COD, Turbidity, Colour, Na	Quarterly	Borehole within MoCU main Campus	m^3	zero pollution	MoCU	2,000,000

Phase	POTENTIAL DIRECT IMPACT	Parameter to Monitor	Frequency	Monitoring Area	Measurement unit	Target Level/Standard	Responsibility	Estimated costs (Tsh)
OPERATION PHASE	Pollution of surface water source due to mismanagement of liquid waste	Water pH, -Faecal coliform -BOD -COD, Mg, K, Turbidity, colour, Na	Quarterly	Project area	mg/l	As per TZS 344:1989	MoCU	5,000,000 annually
	Fire break out and safety system	Number and state of firefighting equipment	Semi annually	Project buildings	Number	Enough fire extinguishers	MoCU	4,000,000 annually
	Gender based violence and harassment	Number of cases reported	Quarterly	Project area	Number	No gender-based violence and harassment	MoCU	5,000,000
	Soil erosion due to runoff effects	Tendency of soil erosion	Rainy season	Project site	-	No soil erosion	MoCU	4,000,000
	Spreading of HIV and other STIs in the District	New HIV diagnoses among staff	Thrice per year	Staff and Lessors	Number of cases	Minimised to zero	MoCU	2,000,000
	Pollution due to mishandling of solid Wastes	Quantity of solid waste	Weekly	Project area	Kg	No pollution	MoCU	2,000,000 annually
DECOMMISSIONING	Loss of Employment,	Payment of social security remittance for workers	Semi-annually for workers	Social Security schemes for workers	Number of workers registered with social security fund	Workers' remittances paid in time	MoCU	10,000,000

Phase	POTENTIAL DIRECT IMPACT	Parameter to Monitor	Frequency	Monitoring Area	Measurement unit	Target Level/Standard	Responsibility	Estimated costs (Tsh)
	Loss of Aesthetics	NA	During decommissioning	Project Area	NA	restored environment into its original appearance	MoCU	8,000,000
	Noise and dust from demolition activities	Particulate matter (PM_{10}, $PM_{2.5}$) and Sound level	Daily	Project area	ppm, mg/m^3, dBA	As per TZS 932:2006 and TZS 837 Parts 1, 2 and 3.	MoCU	5,000,000
TOTAL COST TSH							**67,500,000/=**	

CHAPTER TEN

10.0 COST BENEFIT ANALYSIS OF THE PROJECT

10.1 Introduction

The provided statement accurately describes the core concept of cost-benefit analysis (CBA). It assesses the pros and cons of a decision by considering both financial and non-financial impacts, including quantifiable metrics (revenue, cost savings) and qualitative factors (morale, satisfaction). Feasibility studies use cost-benefit analysis to assess a project's economic viability, helping the Proponent decide whether to proceed and if the chosen option is cost-effective, profitable, and sustainable. It also estimates the project's size. Costs may encompass capital investments, operations and maintenance, personnel, materials, research and development, missed opportunities, and environmental and social impacts. In the context of CBA benefits are broadly defined to include:

i) Better and more cost-effective service delivery;
ii) Accurate targeting of resources to avoid unnecessary costs;
iii) Generation of additional revenues, and;
iv) Provision of social benefits.

A diverse toolkit exists for evaluating a project's costs and benefits, encompassing: Life cycle costing, which analyses all expenses throughout a project's lifespan, from development to disposal; environmental valuation that assigns monetary value to environmental impacts, enabling comparisons with financial costs; social return on investment (SROI) that measures the social value created by a project, considering both economic and non-economic benefits, and; green building rating systems, which assess the sustainability performance of buildings, offering a framework for cost-benefit analysis.

Project evaluation needs to encompass both direct and indirect impacts where direct impacts refer to the immediate and intended consequences that result directly from its activities and outputs. These impacts are typically measurable and occur within a short timeframe, often during project implementation or shortly afterwards. In the context of the proposed construction project, direct impacts include increased student enrolment, measurable through enrolment records; expanded program offerings, quantifiable by the number of new programs introduced, and enhanced learning facilities, evaluated through assessments of physical infrastructure and resources.

Indirect impacts include economic growth, assessed through indicators like employment rates and tax revenue, increased incomes, monitored through surveys and income data analysis, and; improved health, measured through health indicators like and disease rates. Since direct measurement is inherently difficult, often, surrogate indicators are used to represent desired outcomes, for example, student satisfaction surveys may be employed to gauge the impact on learning. Measuring indirect impacts is even more complex because it requires careful control of other variables influencing the outcome.

Beyond the quantitative aspects of cost and benefit, the effectiveness of the proposed construction project hinges on its qualitative impacts, which have the potential to significantly impact stakeholders and determine the project's long-term success.

Key qualitative factors to be considered include:

i) **Job creation and income generation**: The project's capacity to generate employment opportunities and enhance local income levels.

ii) **Economic and business stimulation**: The potential to spur business growth and economic activity in the surrounding area.

iii) **Enhanced community well-being**: The project's contribution to improved access to amenities and overall quality of life for the community.

iv) **Enhanced reputation and prestige**: An institution with modern and well-equipped facilities is likely to gain a better reputation and attract high-quality students and faculty.

v) **Improved student outcomes**: Better facilities and more space will lead to improved student engagement, academic performance, and overall well-being.

vi) **Increased enrolment and demand**: Better facilities will attract more students, leading to increased enrolment and higher demand for education services. This can result in higher tuition revenue, which can be used to further improve the quality of education services.

vii) **Increased property value**: Increased teaching space and facilities can add significant value to the institution's property, making it a more attractive investment. Additionally, a well-maintained and aesthetically pleasing institution can positively impact the surrounding community's property values.

viii) **Improved instructor's morale and satisfaction**: Adequate space and resources can contribute to a more positive work environment for academic and support staff, leading to improved morale, job satisfaction, and ultimately, better learning outcomes.

To make informed decisions, it is crucial to conduct an objective comparative analysis of the potential benefits and costs of the project. The analysis of costs should encompass a wide range of cost elements, including:

i) **Increased construction costs**: Expanding teaching space and facilities requires significant investment;
ii) **Maintenance and operational costs**: Larger facilities require increased maintenance and operational costs, such as cleaning, utilities, and security. derations.
iii) **Noise pollution**: The potential for noise disruptions and their impact on community well-being.
iv) **Environmental degradation**: The project's potential to negatively impact air and water quality, as well as contribute to habitat loss.
v) **Aesthetic concerns**: The potential for the project to negatively impact the overall community image and well-being.
vi) **Long-term risks**: The potential for unforeseen challenges and risks that may emerge over time.

10.2 Benefits to Communities

The project will bring significant advantages to the communities in both immediate and long-term ways:

(a) **Direct benefits**: (i) Job creation: Local residents will be employed throughout various project phases, providing income and improving livelihoods; (ii) Booming business opportunities: The project's presence will stimulate the local economy, leading to the creation of new businesses and increased sales for existing ones. This will further enhance community revenue and contribute to overall growth.

(b) **Indirect benefits**: These benefits will result from enhanced national development. Through tax contributions, the project will indirectly support essential government initiatives, such as infrastructure development (roads), healthcare services, and educational programs, leading to improved quality of life for citizens.

10.3 Benefits to the Proponent

The Proponent will benefit directly from the business operation through increased student enrolment and income generation.

10.4 Benefits to the Government

The government stands to reap both immediate and long-term benefits from this project.

(a) Direct financial gains include:

i) **Increased tax revenue**: Investors operating businesses and services within the project area will contribute significantly to government coffers through taxes. This revenue could be used to fund vital public services, infrastructure development, and social programs.

ii) **Private sector investment**: The project's success will attract further investment from the private sector, fuelling economic growth and creating new employment opportunities.

(b) Indirect economic advantages:

i) **Economic stimulation**: The project's operations and activities will generate economic activity across various sectors, leading to increased GDP and national prosperity.

ii) **Enhanced reputation**: The government's successful execution of this project will solidify its reputation as a reliable and attractive partner for educational investments. This positive image will entice further investment from both local and foreign sources, promoting sustained market growth.

Overall, this project represents a significant opportunity for the government to achieve its economic objectives and enhance its standing within the national and international investment landscape.

10.5 Social Economic Cost Benefit Analysis

Investing in the proposed project will result in multifaceted social benefits that will extend beyond the project area and positively impact the entire nation.

10.5.1 Key Positive impacts

i) **Increased employment opportunities**: The project will create jobs for local residents, boosting incomes and reducing poverty levels. This enhanced economic empowerment will contribute to improved living standards and overall well-being.

ii) **Enhanced social services**: The project's success will enable the government to allocate resources towards improving social services such as healthcare, education, and infrastructure, benefiting the wider community.

10.5.2 Negative Impacts

While the impact analysis indicates minimal negative socio-economic effects, a key concern is the potential for increased HIV and STI transmission. This risk arises from two intertwined factors: influx of job seekers from surrounding areas, leading to a population increase, which can increase the risk of HIV and STI transmission if proper precautions are not taken, and; increased interaction that can provide opportunities for the spread of sexually transmitted diseases. However, it is important to note that this risk is not insurmountable. By implementing effective public health measures, the negative impacts can be mitigated and minimised. Despite the potential risk of increased HIV and STIs, the positive social benefits of this project far outweigh the potential costs. The project's contribution to poverty reduction, improved social services, and overall economic development will significantly enhance the lives of citizens and strengthen the nation's social fabric.

10.6 Environmental Cost Benefit Analysis

A comprehensive environmental cost-benefit analysis has confirmed the project's viability by demonstrating that its substantial financial and social benefits outweigh the potential negative environmental impacts.

10.6.1 Key findings:

- **Chapter Six**: The project's financial feasibility and significant social benefits are established.
- **Chapter Seven**: All identified environmental impacts are deemed mitigable through appropriate measures.
- **Mitigation Cost**: The estimated cost of TZS 67,500,000/= for environmental mitigation represents a minor fraction of the total capital investment (TZS 2,673,476,369/=), making it a financially justifiable expense.
- **ESIA Study**: The Environmental and Social Impact Assessment (ESIA) confirms the feasibility of mitigating environmental impacts and deems the cost reasonable compared to the overall project budget.

Additional measures can be implemented to address potential environmental concerns during the project's operational phase.

10.6.2 Conclusion

The project's implementation is recommended based on the following key considerations:

10.6.3 Significant financial and social benefits:

- Mitigable environmental impacts.
- Reasonable cost of environmental mitigation.
- Feasibility of additional environmental protection measures during operation.

By prioritising environmental protection and implementing effective mitigation strategies, the project can offer substantial benefits to the community while minimising its environmental footprint.

CHAPTER ELEVEN

11.0 DECOMMISSIONING

11.1 Decommissioning Plan

A decommissioning plan guarantees that environmental and social impacts are considered and aligned with legislative and policy requirements. The plan outlines the necessary actions for dismantling the proposed project components on the site upon completion of construction activities. In essence, this plan serves as a reference document, establishing a framework to safeguard against adverse effects on public health, safety, traffic, and the environment, as detailed in Table 27.

Table 27 Decommissioning and Closure plan

Activity	Closure Plan	Responsibility	Budget (Tsh)
Filling all excavation and trenches formed	i. Removing all concrete materials and metal pieces from every excavation. ii. Filling of trenches/excavation with soil from the designated borrow pit. iii. Compaction of soil accordingly to avoid possibility of soil erosion.	Environmental Managers and Closure Committees	6,000,000
Disassemble all equipment and demolish the structures	i. Dismantle electrical appliances such as air conditioners, generators, water pumps, and others. ii. Consult TANESCO to disconnect the supply of electricity meant to support construction activities. iii. Demolition of all unwanted concrete and metals. iv. Warning signs will be posted v. All demolition activities will be supervised by qualified engineers. vi. To ensure the proper execution of all closure activities, a Closure Committee	Environmental Managers and Closure Committees	8,000,000

Activity	Closure Plan	Responsibility	Budget (Tsh)
	will oversee the entire process. Throughout the closure phase, relevant stakeholders will be consulted for technical assistance, ensuring a smooth and successful transition.		
Personal Protective Equipment (PPE)	During the closure phase, all workers must use suitable personal protective equipment (PPE), which includes helmets, safety boots, dust masks, safety gloves, goggles, protective garments, and reflective safety vests	Environmental Managers and Closure Committees	2,000,000
Waste Management	i. All waste generated during the closure phase will be sorted for easy management ii. A review process will be implemented to adapt and revise the closure plan for waste dumps, considering the inevitable changes in institutional plans, schedules, community standards, and acknowledged best practices. iii. Debris may be used on the road to fill on feeder roads instead of dumping over land. iv. Metal materials will be collected and stored at the recommended area while waiting to be collected by authorised dealers for disposal. v. Any hazardous wastes (e.g. used batteries, tires and acids) discovered at the site during decommissioning will be	Environmental Managers and Closure Committees	5,000,000

Activity	Closure Plan	Responsibility	Budget (Tsh)
	thoroughly cleaned up and disposed of in compliance with regulations. Responsible dealers will be engaged for proper disposal. vi. The closure committee will make sure that no wastes will be disposed of in the water bodies.		
Restore the environment into its original appearance	Any created holes will be filled, and all debris, along with metal, will be removed and disposed of by an authorised contracted dealer. To restore the natural beauty of the site, disturbed areas will be landscaped and repopulated with indigenous trees, promoting ecological balance and biodiversity.	Environmental Managers and Closure Committees	5,000,000
Total Cost Tsh		**26,000,000**	

11.2 Project Removal Process

To ensure a smooth and responsible project termination, the Proponent will be responsible for executing all aspects of decommissioning. This involves, but is not limited to, managing engineering aspects, securing permits, and implementing mitigation measures associated with the process. During a dedicated monitoring phase, the Proponent will observe and address any defined environmental or social impacts arising from project removal, both during and after the process.

Project removal is scheduled to begin six months after completion. The Proponent will prepare a comprehensive inventory listing all components slated for removal and disposal. This will include structures earmarked for demolition or dismantling, outstanding debts to be settled, and the chosen disposal method. This information will form the basis for the final decommissioning plan, which requires approval from relevant authorities. Additionally, before demolition commences, the contractor must prepare preventive measures such as a rapid assessment, a construction waste management plan, and a demolition management plan.

11.2.1 Pre – removal monitoring and Permitting

Before dismantling commences, a thorough pre-removal monitoring process will be undertaken to assess the environmental and socio-economic conditions of the building and its surrounding area. This comprehensive evaluation aims to identify potential environmental and social liabilities in advance, allowing for proactive mitigation measures during project decommissioning. Key activities during this phase will include:

i) Environmental assessment to evaluate potential impacts on air, water, soil, flora, and fauna.
ii) Social assessment to identify potential impacts on local communities, employment, and cultural heritage.
iii) Asset inventory to compile a detailed list of all assets and facilities slated for removal or disposal.
iv) Decommissioning plan development to create a comprehensive plan outlining the entire decommissioning process, including timelines, responsibilities, and mitigation measures.
v) Obtaining necessary approvals and licences from relevant authorities such as the NEMC, CRB, and the Local Government Authority.

11.2.2 Interim Protective Action and Post removal activities

In cases where potential risks to human health and the social environment necessitate internal protective measures, the Proponent will actively integrate decommissioning considerations into the project design phase. This approach will proactively manage the dismantling process and lead to higher safety thresholds for the surrounding community. It will be vital to recognise potential impacts on public health and welfare as per the guidelines for implementing such safeguards. Furthermore, it will be essential to align these internal protective measures with post-removal activities, ensuring continued integrity monitoring for a minimum of one year after decommissioning. This long-term monitoring ensures the effectiveness of these safeguards and protects the well-being of the community.

11.2.3 Post – removal Activities

Key objectives of post-removal monitoring include assessing whether the actions taken during decommissioning are effectively preventing or minimising potential environmental and social impacts, identifying any unforeseen issues for prompt and appropriate corrective actions, and evaluating the long-term impacts for a comprehensive understanding of the project's long-term environmental and social consequences, enabling informed decision-making for future projects. Typical post-removal monitoring activities may include:

i) Regular testing of air, water, and soil quality, along with monitoring of flora and fauna populations;
ii) Assessing the socio-economic impacts on the community, such as potential changes in employment, cultural practices, or public health;
iii) Ensuring the stability and safety of the decommissioned site, preventing potential hazards or environmental threats, and;
iv) Regularly analysing collected data to assess progress, identify trends, and inform further actions.

CHAPTER TWELVE

12.0 SUMMARY AND CONCLUSIONS

12.1 Summary

The findings of the environmental and social impact assessment report can be summarised as follows:

(a) Overwhelming Community Support

i. Strong backing for the project exists across various administrative levels and community groups due to its anticipated socioeconomic benefits.
ii. Key stakeholders, including government agencies, local officials, and neighbouring residents, have expressed support and are expected to be involved throughout the project lifecycle.

(b) Manageable Environmental Impacts

i. The project's location being within an existing urban area minimises potential environmental impacts.
ii. Low species diversity and dominance of non-native flora characterise the site, reducing concerns regarding ecologically sensitive species or critical habitats.
iii. Design and construction will comply with national and international standards, including accessibility requirements for persons with disabilities and gender-responsive considerations.

(c) Socioeconomic Benefits Outweigh Negatives

i. The potential long-term economic and social advantages outweigh any manageable negative aspects associated with the project.
ii. No involuntary resettlement or compensation issues are expected due to the project's location being within MoCU's existing campus.

(d) Continued Stakeholder Involvement

Active participation of stakeholders throughout all phases of the project is anticipated, ensuring transparent and accountable decision-making.

The most significant positive impacts are:

(a) Economic Empowerment

i. Creation of employment opportunities, leading to increased income and improved living standards for individuals and families.
ii. Stimulation of the local economy through income generation for petty traders, material suppliers, service providers, and other businesses during the construction phase.
iii. Generation of revenue for local government and agencies, enabling them to invest in public services and infrastructure development.

(b) Skills Development and Knowledge Transfer

i. Opportunities for individuals to acquire new skills and knowledge through training programs and on-the-job experience.
ii. Transfer of knowledge and expertise from project stakeholders to the local community, contributing to long-term capacity development.

(c) Increased Access to Education

i. Reduction of the gender gap in enrolment, promoting equal access to education and empowering women.
ii. Enhanced access to quality education for students, contributing to improved educational outcomes and social mobility.

(d) Improved Infrastructure and Community Development

i. Potential for upgrading infrastructure and amenities surrounding the project, benefiting the entire community.
ii. Increased access to services and facilities, leading to improved quality of life for residents.

(e) Enhanced Public Health and Safety

Implementing the project has the potential to improve public health and safety by addressing existing issues and implementing preventative measures.

Overall, the project's positive impacts have the potential to significantly improve the lives of individuals and communities, contributing to sustainable economic growth and development.

The identified manageable negative impacts included the following:

(a) Nuisance from Noise and Vibrations

i. Disruption to daily activities and well-being due to excessive noise and vibrations during construction.
ii. Potential sleep disturbance and stress for residents and workers nearby.

(b) Air Emissions Impact

i. Deterioration of air quality due to dust and exhaust fumes generated during construction activities, posing respiratory health risks.
ii. Potential visibility reduction and negative aesthetic impacts.

(c) Occupational Health and Safety

i. Risks of injuries and accidents for workers involved in construction, operation, and maintenance activities.
ii. Importance of implementing robust safety protocols and training programs to mitigate negative impacts.

(d) Accidental Contamination

Potential for accidental spills or leaks contaminating surface and groundwater resources, leading to environmental degradation and health concerns implying a need for stringent pollution control measures and emergency response plans.

(e) HIV/AIDS Transmission

Increased risk of HIV transmission due to influx of migrant workers and potential for risky sexual behaviour underscoring the importance of promoting safe sex practices and providing access to health education and services.

(f) Workplace Sexual Harassment and Violence

Vulnerability of women and marginalized groups to sexual harassment and violence within the project environment and thus, a need for clear policies and procedures to address and prevent such incidents, promoting a safe and respectful workplace for all.

Addressing the concerns effectively requires:

i) **Comprehensive mitigation measures**: Implementing noise control techniques, dust suppression methods, and proper waste management practices.
ii) **Rigorous occupational health and safety standards**: Providing adequate training, protective equipment, and emergency response procedures.
iii) **Community engagement and awareness programs**: Educating stakeholders about potential impacts and promoting responsible behaviour.
iv) **Robust monitoring and reporting systems**: Regularly evaluating the effectiveness of mitigation measures and adapting them as needed.

Overall, the environmental and social impact assessment concludes that the project's positive impacts outweigh its potential negative consequences. With careful planning and implementation, the project can contribute significantly to the community's socioeconomic development while minimising its environmental footprint.

12.2 Conclusions

Based on the presented findings, the anticipated negative impacts of the project on both the biophysical and socio-economic environments are manageable and reversible, contingent upon the successful implementation of the proposed mitigation measures. This implies that the project poses minimal environmental, socio-economic, and cultural concerns that could hinder its execution and development. In fact, the project is expected to generate more positive than negative impacts in the long run.

This ESIA report recommends granting approval to the proposed project, with the following conditions:

i) **Implementation of ESMP**: The project Proponent must diligently implement the ESMP outlined in this report, alongside any additional measures stipulated by the National Environment Management Council (NEMC), the World Bank (WB) standard including World Bank Environment and Social Framework (ESF) and the project's Environmental and Social Management Framework (ESMF), and other relevant authorities.

ii) **Developing and implementing operational environmental and social management procedures**: Moshi Cooperative University is responsible for developing, implementing, and periodically reviewing comprehensive procedures throughout the project's lifecycle, encompassing other operations at the Campus.

REFERENCES

1. LHRC (2019). Human Rights Situation Report: January – June 2019. Accessed on 02/07/2019. Available at: https://www.humanrights.or.tz/assets/images/upload/files/Tanzania.
2. LHRC (2019): Human Rights Situation Report: January to June 2019. Accessed on 02/07/2019. Available at: https://www.humanrights.or.tz/assets/images/upload/files/Tanzania.
3. Tanzania Environmental Impacts Assessments Procedures and Guidelines (March 2002)
4. TDHS (2010). Gender-Based Violence and Female Genital Cutting. Accessed on 01/07/2021. Available athttps://www.dhsprogram.com/pubs/pdf/OF15/OF15.
5. TDHS (2010). Gender-Based Violence and Female Genital Cutting. Accessed on 01/07/2021. Available athttps://www.dhsprogram.com/pubs/pdf/OF15/OF15.
6. TDHS (2015-2016). Engaging communities to prevent violence against women and children in Tanzania. Accessed on 02/07/2021. Available athttps://en.unesco.org/news/engaging-communities-prevent-violence-against-women-and-children-tanzania.
7. TDHS (2015-2016). Engaging communities to prevent violence against women and children in Tanzania. Accessed on 02/07/2021. Available athttps://en.unesco.org/news/engaging-communities-prevent-violence-against-women-and-children-tanzania.
8. TDHS. (2010). Key Findings on Gender: Data from the 2010 Tanzania Demographic and Health Survey. Accessed on 01/07/2021. Available at: https://dhsprogram.com/pubs/pdf/SR183/SR183.
9. The Employment and Labour Relations Act, 2004-(Act No.6/04)
10. The Environmental Impact Assessment and Audit Regulations (URT, 2005)
11. The Environmental Management Act, Cap 191 R.E 2004
12. The Land Act No.4 of 1999
13. The Local Government (District Authorities) Act, Cap 287, R.E 2004.
14. The National Construction Industry Policy (URT, 2003)
15. The National Employment Policy (URT, 1997)
16. The National Environmental policy (1997)
17. The National Investment Promotion Policy (URT, 1996)
18. The National Land Policy (URT, 1995)
19. The National Water Policy (URT, 2002)

20. The Occupational Health and Safely Act, 2003 (Act No. 5/2003)
21. The Tanzania Development Vision, 2025
22. The Tanzania Investment Act, Cap 38 R.E 2002
23. The United Republic of Tanzania (URT) (1997). National Environmental Policy, Vice President's Office, Dar es Salaam
24. The United Republic of Tanzania (URT) (2001). The Land Regulations. Government Printers, Dar es Salaam
25. The United Republic of Tanzania (URT) (2004). Environmental Management Act (EMA). Government Printers, Dar es Salaam
26. The United Republic of Tanzania (URT) (2005). National Strategy for Growth and Reduction of Poverty (NSGRP), Vice President Office, Dar es Salaam April 2005.
27. The United Republic of Tanzania (URT) (2005)-Amended 2018. Environmental Impact Assessment and Audit Regulations G. N. No 339. Government Printers, Dar es Salaam
28. The United Republic of Tanzania (URT), (1999). The Land Act (No. 4 of 1999). Government Printers, Dar es Salaam.
29. The United Republic of Tanzania Population and Housing Censuses, 2012
30. The Workers Compensation Act, 2008 (Act No.20/08)
31. URT (2009). Violence Against Children in Tanzania Findings from a National Survey 2009. ACCESSED ON 02/07/2021. Available at: https://www.togetherforgirls.org/wp-content/uploads/2017/09/2009_Tanzania_Findings-from-a-Violence-Against-Children-Survey.
32. URT (2023). 2022 Population and Housing Census: Population Distribution by Administrative Areas. NBS and OSGSZ
33. URT. 1964. Antiquity Act No. 10 of 1964, "An Act to Provide for the Preservation and Protection of Sites and Articles of Paleontological, Archaeological, Historical or Natural Interest and for matters connected therewith and Incidental thereto". Dar es Salaam: Government Printer.
34. URT. 1979. Antiquities Amendment Act No. 22 of 1979. Government Printer: Dar es Salaam.
35. UTR (2017). Crime and Traffic Incidents Statistics Report January to December 2016. Accessed on 02/07/2021. Available at: https://www.nbs.go.tz/nbs/takwimu/trade/CrimeStats_Jan-Des2016English.pdf.
36. The 2nd Global Congress on Construction, Material and Structural Engineering IOP Conf. Series: Materials Science and Engineering 713 (2020) 012038 IOP Publishing doi:10.1088/1757-899X/713/1/012038 1. The on-site waste minimization practices for construction waste
37. Moshi Municipal Council Strategic Plan 2018/2019-2022/2023
38. Anjlee Agarwal & Andre Steele March 2016: On the Disability considerations for Infrastructure Programmes
39. Peter O. Akadiri, Ezekiel A. Chinyio and Paul O. Olomolaiye, May 2012: Design of a Sustainable Building

APPENDIXES

Appendix 1: Screening Letter from NEMC

THE UNITED REPUBLIC OF TANZANIA

VICE PRESIDENT'S OFFICE

NATIONAL ENVIRONMENT MANAGEMENT COUNCIL
(NEMC)

quote:

Ref: HF. 88/145/85/02 **Date:** 21/06/2023

Moshi Cooperative University (MoCU),
P.O. Box 474,
Moshi,
KILIMANJARO.

RE: SCREENING DECISION FOR THE PROPOSED CONSTRUCTION OF ONE ACADEMIC BUILDING OF 2 STOREY ON BLOCK "M" AT USHIRIKA MTAA, MFUMI WARD, MOSHI MUNICIPALITY IN KILIMANJARO REGION

Reference is made from the above heading.

2. The National Environment Management Council (NEMC) Northern Zone (NZ) office acknowledges receipt of Project Brief and Scoping Report for undertaking Environmental Impact Assessment (EIA) for the above mentioned project.

3. The Council has reviewed the submitted Project Brief and Scoping Report and found to be adequate thus can be used to guide Environmental Impact Assessment (EIA) study of the named project. Therefore, the Council is emphasizing you to undertake EIA study as required by the Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations, 2018 that is read as one with the Environmental Impact Assessment and Audit Regulation, 2005 which hereinafter referred to as the "Principal Regulations." In this regard you will be required to submit to NEMC –NZ Office EIA report accompanied by Non -Technical Summary both in Kiswahili and English for review process. In addition, the EIA study should adequately incorporate the following:

i. Location of the project (geographical coordinates for at least four corner points, physical map and description of the physical area that may be affected by the project operations);

iii. Consultation of all Key stakeholders including Regulatory Authorities/Agencies such as OSHA, Fire & Rescue Force and Respective Local Government Authorities as well as the neighboring communities are consulted and their views and concerns addressed and incorporated in the report;
iv. Clear explanation on the amount and type of wastes to be generated and its management mechanisms during all phases of the project implementation;
v. Clear description of management of dusts emanating from the project area during construction and site access roads;
vi. The EIA study should involve collection of baseline data on wastewater discharge, emissions of air, noise and vibrations and other bio – physical parameters;
vii. The site layout plan indicating the components of the facility and description of adjacent land use;
viii. Occupational health and safety issues;
ix. Compliance status of all applicable Legal and Policy frameworks and their respective requirements;
x. Detailed engineering and architectural designs as approved by the relevant authority;
xi. Appended land ownership documents indicating the size and its planned use,
xii. All other relevant permit / license /certificates for the proposed project;
xiii. Original signatures of the EIA experts and acknowledgement of all unregistered team members; and
xiv. The approved Terms of Reference (ToR).

4. The Council will inform you the dates for the site verification after effecting the review cost. Please note that, the review cost excludes transportation cost to the site and return to Arusha.

5. In case you need any clarification on this matter do not hesitate to contact us through the Telephone No. +255 655 232 382.

Lewis Nzali
For: Director General

Appendix 2: Copy of Title dead

TITLE No. 2444
REGISTERED 11-11-83
at 11.00 Land Form 33
Assistant Registrar of Titles

TANGANYIKA: STAMP DUTY ACT, 1972
IMPOUNDED
Under section 49, I required payment of
Shs. 100/= duty
Shs. 50/= penalty P.N. 60571.
11-11-1983 A.R.D. No. M/II/
Stamp Duties Officer PB/1.

THE UNITED REPUBLIC OF TANZANIA

CERTIFICATE OF OCCUPANCY

(Section 9 of the Land Ordinance)

The 28th day of October One thousand nine hundred andeighty-three.

TITLE No. 2444 LAND REGISTRY - MOSHI

THIS IS TO CERTIFY that CO-OPERATIVE COLLEGE MOSHI OF P.O. BOX 474, MOSHI.----------

(hereinafter called "the Occupier s") are entitled to a Right of Occupancy (hereinafter called "the Right") in and over the land described in the Schedule hereto (hereinafter called "the Land") ~~as joint tenants/as tenants in common in equal shares~~ for a term of Ninety-nine ----- years from the first day of July----- One thousand nine hundred and eighty-two according to the true intent and meaning of the Land Ordinance and subject to the provisions thereof and to any regulations made thereunder and to any enactment in substitution therefor or amendment thereof and to the following special conditions :-

1. The Occupier having paid rent up to the thirtieth day of June 1983, shall thereafter pay rent of shillings Nine thousand five hundred forty five (Shs.9,545/-) ---------- a year in advance on the first day of July in every year of the term without any deduction PROVIDED that the rent may be revised by the Minister for the time being responsible for Lands (hereinafter called "the Minister") on the first day of July in each of the years 1992, 2002, 2012, 2022, 2032, 2042, 2052, 2062 and 2072 ------ ---------- or within three years thereafter in each case.

2. The Occupier shall :-

(1) 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

(iii) Not erect or commence to erect on the land any building except in accordance with building plans and specifications which shall have been first approved by the Authority;

(iv) 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 Commissioner for Surveys and Mapping.

Approval of plans of any building by the Authority 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.(i) The Occupier shall not subdivide the land or assign, sublet or otherwise dispose of or deal with the whole or any part of it or of any building on it without the previous written consent of the Commissioner PROVIDED that the consent of the Commissioner shall not be necessary

~~to a single sub-letting of the whole of the land where the sub-lease contains conditions sufficient to ensure compliance with the conditions of the Right;~~

to a sub-letting of the whole of the land or of the whole or any part of any building on it where the sub-lease contains conditions sufficient to ensure compliance with the conditions of the Right.

(ii) Occupation or use of the whole or any part of the land or buildings on it by any person other than the Occupier or their employees or agents or contractors or members of the household shall be deemed a dealing with the land or buildings.

4. Except as hereinbefore provided the Commissioner shall have an absolute discretion to give or withhold consent under condition 3.

5. The Occupier shall pay to the Minister on demand made by the Commissioner on his behalf

6.

The existing buildings together with such other buildings to be erected on the land shall be solely for Educational purposes, Use Group 'K' Use Class (b), Use Group 'G' Use Class (a) and Use Group 'O' Use Class (a) as defined in the Town and Country Planning (Use Classes) Regulations, 1960.

7. The President may revoke the Right for good cause or in public interest.

S C H E D U L E

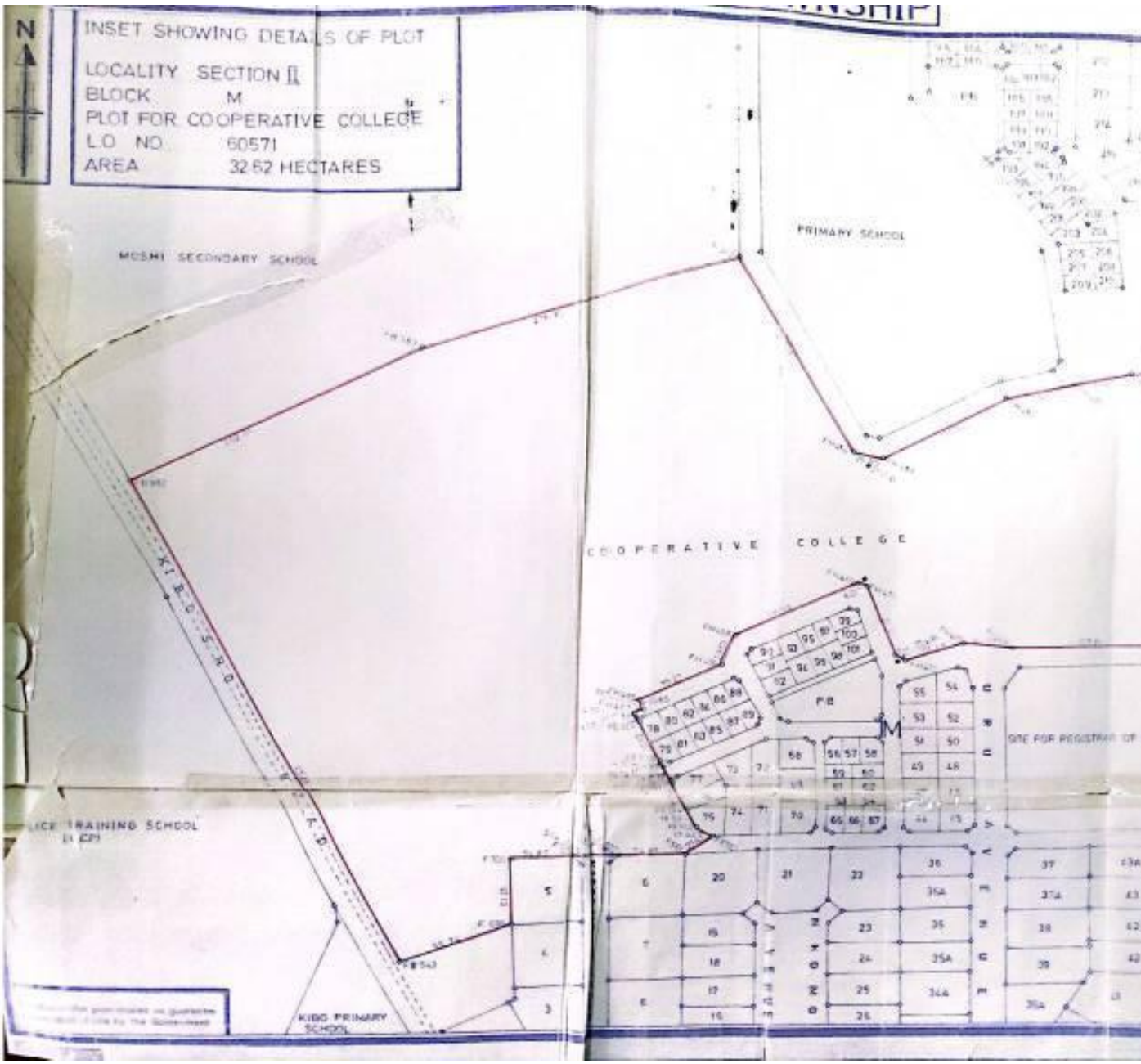
ALL that land known as Site for Co-operative College situate at Block 'M', Section II, Moshi Township containing thirty two decimal point six two (32.62) Hectares square feet shown for identification only edged on the plan attached to this Certificate and defined on the registered survey plan numbered 18660 deposited at the Office of the Commissioner for Surveys and Mapping at Dar es Salaam.

GIVEN under my hand and seal and by Order of the Minister the day and year first above written.

"Director of Land Development Services"
COMMISSIONER FOR LANDS

We, the within-named CO-OPERATIVE COLLEGE MOSHI hereby accept the terms and conditions contained in the foregoing Certificate of Occupancy.

SEALED with the COMMON SEAL of the said CO-OPERATIVE COLLEGE


INSET SHOWING DETAILS OF PLOT
LOCALITY SECTION II
BLOCK M
PLOT FOR CO-OPERATIVE COLLEGE
L.O. NO. 60571
AREA 32.62 HECTARES
N
MOSHI SECONDARY SCHOOL
PRIMARY SCHOOL
COOPERATIVE COLLEGE
KIBO PRIMARY SCHOOL

STAMP DUTY ACT, 1972

Section 22. I certify that the proper duty of Shs. 100/= and penalty Shs. 50/= have been paid by C.R.R. No. 055594 of 8-10-82 & 675320 of 22-11-83

22-11-1983

Stamp Duty Officer

Stamp Duty Shs. 450/= + 100/= Paid on Original Revenue Receipt No. 055594 of 8.10.82 & 22.11.83 675320

Asst. Registrar of Titles

NOTE

In this document every reference to "Commissioner for Lands" and "Commissioner of Survey and Mapping" should be read and construed as a reference to the "Director of Land Development Services" and "Director of Survey and Mapping" respectively.

TANGANYIKA STAMP DUTY ACT, 1972

Under Section 51, I certify that the proper duty of Shs. 100/= and penalty Shs. 50/= have been Paid by

G.R.R. No. 055594 of 8-10-82 & 675320 of 22-11-83

22-11-1983

Stamp Duty Officer

Stamp Duty Shs 490/= + 100/= Paid on Original Revenue Receipt No. 055594 of 8.10.82 & 22.11.83 675320

Asst. Registrar of Titles

LAND REGISTRY, MOSHI

CHANGE OF NAME

Filed Document No 44345

Date of registration 17/6/2016 time 9:40A

To MOSHI CO-OPERATIVE UNIVERSITY OF P.O. BOX 474, MOSHI.

NOTE —

To the Asst Registrar of Titles

document every reference to Commissioner for Lands and "Commissioner of Surveys and Mapping"

Appendix 3: Baseline data for Water quality

ARDHI UNIVERSITY
School of Engineering and Environmental Studies

TEL: +255 738 357 310
+255 738 357 311
+255 738 357 312

FAX: (255-022) – 277 5391

P. O. BOX 35176
DAR ES SALAAM
E-MAIL: aru@aru.ac.tz
WEBSITE: http://www.aru.ac.tz

ENVIRONMENTAL ENGINEERING LABORATORY

Water Analysis Results

Client: Colba Consulting Ltd
Date Received: 15 June 2023
Source: Water (Moshi Compus)

S/n	Parameter	Units	S1	S2	Tzs:789:2005 Standards
1	pH		6.96	6.95	6.5-8.6
2	Turbidity	NTU	0	0	25
3	Colour	Hazen°	0	0	50
4	Salinity	‰ (ppt)	0.07	0.07	na
5	Electric conductivity	µS/cm	143	138	2000
6	Total Dissolved solids	mg/l	72.0	69.0	2000
7	Phosphate	mg/l	0.86	0.85	na
8	Nitrate-Nitrogen	mg/l	0.80	0.70	10
9	Nitrite –Nitrogen	mg/l	0.0029	0.002	na
10	Ammonia-Nitrogen	mg/l	0.123	0.130	0.5
11	Chloride	mg/l	26.0	24.0	800
12	Sulphate	mg/l	<1.0	<1.0	600
13	Fluoride	mg/l	0.0745	0.072	1.5
14	Bicarbonate Alkalinity	mg/l	38.0.0	37.0	na
15	Iron	mg/l	<0.01	<0.01	1.0
16	Manganese	mg/l	<0.01	<0.01	0.5
17	Carbonate Alkalinity	mg/l	0	0	na
18	Total Alkalinity	mg/l	38.0	37.0	na
19	Total Hardness	mg/l	34.0	31.0	500
20	Magnesium	mg/l	3.247	3.90	100
21	Calcium	mg/l	11.0	10.01	75
22	Sodium	mg/l	12.77	11.24	na
23	Potassium	mg/l	1.226	1.026	na
24	Lead	mg/l	<0.01	<0.01	0.01
25	Copper	mg/l	<0.01	<0.01	0.05
26	Cadmium	mg/l	<0.01	<0.01	0.05

Appendix 4*:* Concerns and issues from MoCU main Campus

Department/Unit	Views, concerns, and recommendations	Response to concerns/issues
Moshi Cooperative University Project Implementation Unit (UPIU)	● **Accessibility:** The project design will incorporate facilities and infrastructure to enhance people with disabilities. ● **Construction Worker Oversight**: All contractors and construction workers must be registered with the MoCU Administration and familiar to the security guards. ● **Health & Safety Training**: The project coordinator will collaborate with the Health Centre, Local Government Authority, and the contractor to provide HIV/AIDS and STDs awareness training to construction workers, students and the community. ● **Construction Worker Restrictions**: Construction workers will be prohibited from being in the campus area outside of scheduled work activities. ● **Security & Safety Collaboration**: MoCU Administration will cooperate with Mfumuni Ward, Ushirika Street (security committee), and the Police station to ensure the safety and security of students, communities, and their properties. ● **Regulatory Compliance**: MoCU Administration will work with relevant regulatory bodies to obtain necessary permits and services, including water supply, and solid and liquid waste collection and disposal. ● **Community Engagement**: MoCU Administration is committed to fostering positive community relations and actively engaging in social corporate responsibility initiatives.	-Noted
MoCU Student	● Insufficient classroom space to accommodate the growing student body. ● Expanding access to educational opportunities for all students. ● Aligning programs with the current labour market demands by increasing the number of programs.	● The academic building will feature a state-of-the-art computer lab and spacious seminar rooms to enhance students' learning experience.
Student's Services Unit	● Adequate classrooms: Ensure sufficient classrooms to accommodate the student population, enabling ample lectures and seminars to cultivate students' knowledge and skills ● Optimised scheduling: Provide sufficient venues/classrooms to facilitate efficient lecture sessions and exam timetable planning by lecturers.	● The academic building will feature a state-of-the-art computer lab and spacious seminar rooms to enhance students' learning experience.

Department/Unit	Views, concerns, and recommendations	Response to concerns/issues
	● Enhanced ICT learning: Equip students with access to ICT learning facilities to support their academic development. ● Improved staff environment: Upgrade the workplace environment for MoCU staff to foster greater well-being and productivity. ● Construction logistics: Collaborate with university security guards to guide vehicles delivering construction materials, minimising congestion and disruption to ongoing academic activities.	● Abide by traffic management procedures.
MoCU Student Organization (MoCUSO)	• **Enrolment and Visibility**: The project will increase student enrolment in ICT programs and enhance the University's visibility. • **Fostering a Nurturing Environment**: The project will create a welcoming and supportive learning environment that facilitates students' success. • **ICT Access**: The project will provide greater access to hands-on ICT practical sessions for students, equipping them with valuable skills. • **Alleviate classroom overcrowding**: Provide adequate learning spaces to accommodate the student population, reducing classroom congestion. • **Streamline academic scheduling**: Facilitate efficient lecture session timetable planning and ensure timely completion of all sessions. • **Anticipated Noise Pollution**: Acknowledge the potential for noise pollution caused by construction activities, particularly blasting, in the project area.	• The building design prioritises ample space in classrooms, laboratories, and passageways, ensuring safe and efficient student movement. • The developed site-specific Environmental and Social Management Plan (ESMP) will outline comprehensive measures to minimise noise pollution and potential injuries.

MoCU Health Centre	• **Addressing Health Concerns**: The project should be concerned about the potential for increased HIV/AIDS and STDs in the area due to the influx of workers. • **Increased Healthcare Demand**: The project should anticipate a rise in the number of students and, consequently, healthcare clients at the health centre. • **Health Awareness and Education**: To mitigate health risks, HIV/AIDS, STDs, and drug use awareness training should be provided to construction workers, supplemented by visible information posters on-site. • **Accessibility for All**: The project design should prioritise accessibility features and infrastructure to cater to the needs of people with disabilities (PWDs). • **Minimising Disruption**: Construction activities should be restricted to daytime hours to minimise disturbance to the surrounding community. • **Reducing Noise Pollution**: Effective means should be adopted to minimise noise pollution.	• In light of the projected rise in student enrolment and potential surge in health demands, the Proponent will be exploring options for enhancing the effectiveness of healthcare service provision. This could include hiring more healthcare professionals and creating flexible scheduling options to guarantee sufficient staffing levels during periods of high demand. • Throughout the project lifecycle, a comprehensive training and awareness campaign will address HIV/AIDS, STDs, drug use, and other relevant health concerns. • The academic building will incorporate accessible features on the ground floor, including toilets and a lift, to accommodate people with disabilities. • Construction activities will be restricted to daytime hours, except in situations where stoppage could impact the overall quality of the construction. This will minimise disruption to the surrounding community and academic activities. • Contractors will be required to ensure that all machinery used during construction generates minimal noise pollution. This will contribute to a comfortable learning environment for students and a peaceful atmosphere for the surrounding community.

Department/Unit	Views, concerns, and recommendations	Response to concerns/issues
Commercial building	**Positive Impacts:** • **Enhanced Aesthetics**: The project will enhance the aesthetic value of the area, contributing to a more vibrant and attractive community. • **Increased Enrolment**: The project is anticipated to lead to a significant increase in student enrolment, boosting the University's reputation and attracting diverse students. • **Economic Growth**: The project will generate income for local entrepreneurs and the surrounding community through job creation and increased economic activity. **Negative Impacts:** • **Noise and Vibration**: Construction activities will generate noise and vibration, potentially causing disturbance to the surrounding community and impacting academic activities. • **Infrastructure Damage**: Excavation work may damage existing infrastructure, requiring careful planning and mitigation measures.	• Efforts will be made to maximise the positive impacts of the project, including enhancing the aesthetic value of the area, increasing student enrolment, and generating income for local entrepreneurs. • All construction machinery will utilise low-noise emission technology to ensure minimal disruption to the surrounding community and academic activities. • Construction activities will adhere to the traffic management procedures, minimising disruption to local traffic flow and ensuring the safety of pedestrians and motorists • All construction machines will be of low noise emission, Abide by traffic management procedures.

Source: Field Visit, June 2023

Appendix 5: Concerns from Government Departments and Agencies

SN	Name of MDAs	Issues, Concerns, Comments and Recommendations	Response to concerns/issues
1.	Ministry of Education, Science and Technology (MoEST)	• **Minimising Disruptive Noise**: Implement measures to reduce noise and other potential disturbances arising from construction activities, particularly those that may hinder ongoing academic activities. • **Controlling Noise Pollution**: Employ strategies to manage noise pollution generated by trucks, construction machinery, and equipment, ensuring minimal disruption to the surrounding community and a conducive learning environment. • **Dust and Emissions Control**: Implement dust suppression measures and control exhaust emissions from construction activities and equipment operation to protect air quality and public health. • **Water Source Protection**: Employ preventative measures to avoid pollution of water sources within the project area, safeguarding water quality and environmental health.	• All construction machinery will undergo regular servicing to ensure optimal performance and minimise noise emission. • Water spray will be applied twice daily to all areas prone to dust generation, mitigating dust pollution effectively. Additionally, regular servicing of all machinery will further contribute to reduced dust emissions. • All excavated soil materials will be collected and stored for potential reuse in landscaping or other project components, promoting sustainability and minimising waste. • Solid waste bins will be strategically place throughout the project site • All generated solid waste will be handled and disposed of properly, adhering to all relevant environmental regulations.

SN	Name of MDAs	Issues, Concerns, Comments and Recommendations	Response to concerns/issues
			• Implement measures to prevent soil erosion and sediments entering water sources; ensure responsible disposal of construction waste; develop and implement spill response plans to address potential leaks or spills of pollutants that could harm water quality; utilise water conservation techniques during construction; train construction workers on best practices for protecting water resources, and; encourage community participation in monitoring water quality and reporting any concerns.
2.	Tanzania Building Agency (TBA)	• Project Manager and/or Consultant: Tanzania Building Agency (TBA) should provide oversight and guidance throughout the project, ensuring it stays on track and meets all budget and deadline goals. This may involve managing the project team, coordinating activities, and resolving any issues that arise. • Architectural and Structural Review: TBA should review and approve all architectural and structural drawings for the proposed building, ensuring they comply with all relevant codes and standards. This includes the bill of quantity (BoQ), which details the materials and labour required for construction. • Construction Oversight: TBA should oversee the construction of the building, ensuring it is built according to the approved plans and specifications. This involves monitoring progress, inspecting the work, and addressing any quality or safety concerns. • Accessibility and Emergency Preparedness: TBA should ensure the proposed building has an accessible escape route for emergencies,	• All architectural and structural drawings will be submitted to- and approved by all relevant authorities before construction begins. • The proposed building will be constructed strictly according to the approved design, ensuring compliance with all specifications and regulations. • An emergency escape route will be incorporated into the building design, ensuring the safety of occupants in case of emergencies. • A thorough geotechnical assessment will be conducted prior to construction to evaluate soil conditions and ensure the site is suitable for the project.

SN	Name of MDAs	Issues, Concerns, Comments and Recommendations	Response to concerns/issues
		such as fire or natural disaster. This may involve installing ramps, accessible toilets, and clear signage. • Geotechnical Assessment: TBA should commission a geotechnical assessment of the proposed building site to ensure the soil conditions can support the structure. • Elevator Installation: TBA should ensure the proposed building has an elevator to provide access for all users, especially those with disabilities. • Modern Design and Technology: TBA should ensure the proposed building has an attractive and modern design that is compatible with current technology and environmental standards. This may involve incorporating energy-saving features, sustainable materials, and smart technology.	
3.	Pangani Basin Water Board (PBWB)	• **Secure Drilling and Water Use Permits**: The project Proponent must obtain both drilling and water use permits before commencing any construction activities that involve drilling or water usage. • **Conduct Geophysical Survey**: A comprehensive geophysical survey of the project area must be conducted prior to construction to assess the geological and hydrological conditions, including groundwater resources, for informed decision-making and potential impact mitigation.	• In an event drilling for ground water is envisaged, the Proponent shall submit an application detailing site maps, technical specifications and environmental impacts to the relevant authority. • A geotechnical report identifying potential water sources, determining the feasibility of borehole drilling, and assessing potential environmental impacts shall also be submitted.

SN	Name of MDAs	Issues, Concerns, Comments and Recommendations	Response to concerns/issues
4.	Moshi Urban Water and Sanitation Authority (MUWSA)	• **Adequacy of Water Supply**: The relevant authorities have confirmed their capacity to provide sufficient water supply to the project area, accommodating even the anticipated increase in population. • **Existing Sewerage System**: The project area is conveniently connected to the MUWSA sewerage system, facilitating efficient wastewater disposal. • **System Capacity Enhancement**: Although the existing sewerage system has the capacity to handle the projected increase in wastewater generation, the project Proponent/contractor should collaborate with MUWSA technicians to design and connect the proposed building to the system seamlessly. • **Durable Equipment and Materials**: All equipment and water pipes to be used for the water supply and sewerage system of the proposed building must be durable and comply with the Tanzania Bureau of Standards (TBS) specifications to ensure long-term functionality and reliability. • **Procurement Oversight**: The project Proponent must be responsible for supervising and inspecting the procurement of all equipment and water pipes for the water supply and sewerage systems of the proposed building. This will ensure compliance with standards and contribute to the overall success of the project.	• The University currently benefits from a connection to the MUWSA piped water and sewer system. The proposed academic building will be integrated into this existing infrastructure. • To ensure a smooth and compliant connection for the proposed academic building, the Proponent will consult with MUWSA before commencing any sewer service work. • Adhering to TBS regulations, the project Proponent will use PVC materials specifically recommended by the water supplier for optimal performance and durability.

SN	Name of MDAs	Issues, Concerns, Comments and Recommendations	Response to concerns/issues
5.	Fire and Rescue Force –Kilimanjaro Regional Office	• **Pre-Construction Approval**: All project designs and drawings must be submitted to the authority for approval before construction starts to ensure compliance with regulations and safety standards. • **Emergency Access:** Each classroom must have not less than two doors for emergencies, and all doors must have direct access to the outdoors to allow for swift evacuation in case of fire or other emergencies. • **Fire Detection and Alarm:** Smoke detectors and a fire alarm system must be installed throughout the facility to immediately alert occupants of a fire, allowing for timely evacuation and response. • **Fire Extinguishers:** Portable fire extinguishers must be readily available throughout the facility for immediate response to small fires. • **Emergency Exits and Stairs:** The project design must ensure an emergency exit door at each floor, open doors without locks, and two emergency staircases connected to the ground provide multiple escape routes for occupants in case of an emergency. • **Emergency Signs and Assembly Point**: Clear emergency signs must be installed throughout the facility, directing occupants to the designated assembly point.7.	• A complete set of drawings will be submitted to the fire department for review and approval before construction commences. • Both the computer lab and lecture hall will be equipped with two separate exits for efficient evacuation in case of emergencies. • Smoke detectors and a fire alarm system will be installed throughout the project site to provide prompt notification of a fire incident. • Portable fire extinguishers will be strategically located throughout the site, readily accessible for immediate response to small fires. Additionally, a fire hydrant system will be installed to provide a reliable water source for firefighting efforts. • Clearly marked and illuminated emergency exit routes will be displayed throughout the site, guiding occupants towards safe egress points. • A designated emergency assembly area will be established nearby the project site, allowing occupants to gather safely after evacuation. • Emergency contact details will be prominently displayed throughout the site, ensuring easy access to assistance in case of an incident

SN	Name of MDAs	Issues, Concerns, Comments and Recommendations	Response to concerns/issues
		• **Assembly Point:** The assembly point must be located in an open space, away from potential hazards. • **Fire Extinguishers in Parking Area:** The car parking area must have fire extinguishers readily available to address any potential fire hazards. • **Emergency Contact Information:** Emergency contact information must be displayed prominently throughout the facility, including at the assembly point	
6.	Occupational, Health and Safety Authority (OSHA)-Northern zone	• **OSHA Registration:** The project must be registered with the Occupational Safety and Health Administration (OSHA) to comply with safety regulations and receive guidance. • **Personal Protective Equipment (PPE):** Adequate PPEs appropriate for the specific tasks and hazards involved in construction activities must be provided to all workers. This includes items like safety helmets, gloves, goggles, boots, and high-visibility clothing. • **Project Drawing Approval:** Before construction begins, the project drawings must be submitted to OSHA for approval. This ensures that the project design adheres to safety regulations and minimises potential hazards. • **Safe and Clean Water:** Readily available safe and clean drinking water must be provided to all workers throughout the construction	• Construction drawings will be submitted to OSHA for review and approval prior to the start of any construction activities. • Clean and safe drinking water will be freely available to all project workers throughout the construction process. • The contractor will provide sufficient toilets on-site for worker use, maintaining appropriate hygiene standards. • A trained first-aider will be readily available on-site during all construction activities, prepared to respond to any medical emergencies.

SN	Name of MDAs	Issues, Concerns, Comments and Recommendations	Response to concerns/issues
		process. This is essential for hydration and preventing heat-related illnesses. • **Toilet Hygiene and Changing Rooms:** Separate and sufficient toilet facilities with proper hygiene standards must be provided for male and female workers. Changing rooms should also be available for workers to safely store personal belongings and change clothes. • **Trained First Aider and Health and Safety Representative:** Prior to construction commencing, a qualified first-aider and health and safety representative must be designated for the project. This individual should be trained in first aid, emergency • **Occupational Health and Safety Policy:** The project must have a clearly defined occupational health and safety policy that outlines the organisation's commitment to worker safety and well-being. This policy should be displayed prominently at a notice board where all workers can easily access it.	• A clearly defined occupational health and safety policy will be prominently displayed at the project site, demonstrating the organisation's commitment to worker safety and well-being. **Additional Considerations** • Regular safety training sessions will be provided to all workers to educate them on safe work practices and hazard recognition. • A safety inspection program will be implemented to identify and address potential hazards on the worksite. • Incident reporting and investigation procedures will be established to ensure that accidents and near misses are documented and corrective actions are taken to prevent future occurrences.

Source: Field Visit, June 2023

Appendix 6: Concerns from Moshi Municipal

Stakeholder	Issues, Concerns, Comments and Recommendations	Response to concerns/issues
Environmental Conservation and Natural Resource	• **Ventilation System:** The proposed building should have a good ventilation system to ensure proper air circulation and prevent the build-up of harmful contaminants.	• A thoughtfully designed ventilation system will be installed to maintain optimal indoor air quality, significantly impacting occupants' health and well-being.

Stakeholder	Issues, Concerns, Comments and Recommendations	Response to concerns/issues
	• **Vegetation Clearance**: Vegetation clearance should be minimised at the project site to minimise the environmental impact • **Tree Replacement:** Trees cleared onsite should be replaced to compensate for the ecological loss. • **Sewer System Capacity**: MUWSA should be consulted on the capacity of the sewer system before project implementation to ensure adequate infrastructure exists. • **Building Materials:** Building materials should be sourced from licensed suppliers/quarries to guarantee quality and adherence to ethical standards. • **Personal Protective Equipment (PPE):** PPEs should be provided to construction workers to protect them from potential hazards on-site. • **Sanitary Facilities:** Adequate and sanitary facilities for construction workers should be available on-site to ensure their health and well-being. • **Solid Waste Management:** Solid wastes generated on-site should be properly managed and disposed of in accordance with environmental regulations. • **Stormwater** Management: Storm water should be effectively managed on-site to prevent flooding, erosion, and water quality contamination. • **Occupational Health and Safety Signs**: Occupational health and safety signs and symbols should be clearly posted on-site to raise awareness and promote safe work practices.	• Minimising vegetation clearance will be the focus, only clearing absolutely necessary areas and subsequently replanting the cleared areas to preserve biodiversity and ecosystem balance. • Consultation with relevant authorities like MUWSA will be undertaken proactively to prevent potential issues with wastewater management and ensure project compliance with regulations. • Contractors will be encouraged to source materials from responsible suppliers, this will be vital when local materials are inadequate or significantly more expensive. This will ensure compliance with regulations, promote sustainable practices, and prevent issues related to substandard materials. • Providing adequate PPE like helmets, gloves, and safety glasses will be mandatory, ensuring worker safety and minimising the risk of accidents. • Clear and consistent safety signage will be mandatory, enabling workers to identify potential hazards and understand safety protocols. • Providing clean restrooms, washing facilities, and access to potable water will be compulsory, maintaining basic hygiene and preventing sanitation-related issues. • Contractors must implement a comprehensive waste management plan that includes segregation, collection, and disposal through authorised channels, protecting the environment and preventing pollution.

Stakeholder	Issues, Concerns, Comments and Recommendations	Response to concerns/issues
	• **Dust, Noise, and Vibration Control**: Dust, noise, and vibration generated during construction activities should be controlled to minimise their impact on workers and the surrounding community. • **Public Health Hazards**: All necessary measures should be taken to minimise or avoid potential public health hazards on-site.	• Contractors will be required to utilise appropriate storm water management systems like detention ponds and permeable pavements to mitigate potential environmental impacts. • Implementing dust suppression techniques, utilising noise-reducing equipment, and adhering to vibration control regulations will be mandatory for minimising environmental disturbances. • Contactors must adopt proper sanitation practices, implement safe handling of hazardous materials, and employ effective pest control measures, protecting public health and preventing the spread of diseases.

Stakeholder	Issues, Concerns, Comments and Recommendations	Response to concerns/issues
Community development and planning	• **Increased Student Enrolment**: The new building will accommodate a larger number of student body, addressing the current shortage of classrooms and allowing the university to expand its enrolment. • **Enhanced University Status**: The presence of modern new buildings will elevate the university's reputation, attracting more students and faculty, and enhancing its standing among academic institutions. • **Economic Benefits**: The project will generate income for entrepreneurs in the project area through business opportunities related to construction, supplies, and ongoing services. • **Increased STDs and Unplanned Pregnancies**: The influx of people seeking employment during construction may increase the risk of sexually transmitted diseases and unplanned pregnancies. • **Safety and Security**: To ensure a safe and secure environment, the Proponent and contractor should formally introduce construction workers to the institution and security guards. • **Project Completion and Payment**: The project must be completed on time as per the agreement between the contractor and MoCU. MoCU should also pay the contractor on time to ensure timely project completion.	• All positive impacts identified will be further enhanced through effective implementation and ongoing monitoring. • Induction training will be provided to construction workers, students, and community members to help them avoid risky sexual behaviours and promote responsible conduct. • The Project Coordinator and Contractor will collaborate to provide integrated training sessions on HIV/AIDS, STDs, and drug awareness for construction workers, students, and surrounding communities. • All construction workers will be issued identification badges to enhance security and accountability on-site. • The Proponent will be required to observe due payments as per the agreed contract, ensuring smooth project progress and financial stability. • A dedicated Social Specialist will monitor the conduct of all stakeholders involved in the project, including construction workers, students, and community members. This will be done in collaboration with other relevant stakeholders like the gender desk and a newly established moral ethics committee. • Regular meetings between the Proponent and contractor will be held to ensure open communication, exchange of information, and address any concerns or challenges that may arise during project implementation.

Stakeholder	Issues, Concerns, Comments and Recommendations	Response to concerns/issues
	• **Social Monitoring**: A social specialist should be nominated to monitor interactions between students, contractors, and construction workers and prevent negative social impacts. • **Communication**: Regular meetings between project coordinators and MoCU administration are essential to facilitate information sharing and feedback on project progress, ensuring effective communication and collaboration.	

Source: Field Visit, June 2023

Appendix 7: Concerns and issues from Street to Ward level

Ward/*Mtaa*	Views/Concerns/Issues	Response to concerns/issues
Mfumuni ward and Ushirika Street officials	**Positive impacts** • **Strong collaboration**: MoCU Management and Administration should cooperate closely with Street and ward offices, fostering a strong working relationship. • **Local employment opportunities**: Priority should be given to hiring residents of Mfumuni Ward for project-related jobs, boosting the local economy. • **Increased student enrolment**: The project is expected to lead to an increase in the number of students at MoCU, benefitting the education system and the local community. • **Increased government revenue**: The project will generate additional revenue for Street and Ward offices, enhancing their ability to provide essential services. • **Positive cultural shifts**: The project has the potential to contribute to positive changes in cultural behaviour within the community. **Potential negative impacts** • The project may lead to an increase in the local population, placing additional strain on resources and infrastructure. • The influx of workers and students could increase the risk of HIV/AIDS and sexually transmitted diseases (STDs) spreading within the community. • Construction activities may generate noise and vibration that could disturb nearby residents.	• MoCU Leadership will work closely with Street and Ward offices to guarantee project activities align with community needs and regulations. • The Proponent and Consultant will prioritise employment opportunities for Mfumuni Ward residents to promote local economic development and foster community engagement. • Noise and vibration generated during construction will be mitigated through appropriate measures to minimise disturbances and inconvenience for nearby residents. • The Proponent, Contractor, and local health centre will collaborate to provide comprehensive HIV/AIDS, STDs, and drug awareness training for all stakeholders, ensuring effective knowledge dissemination and addressing relevant concerns. • The contractor will strictly adhere to child labour laws and regulations, ensuring no children are employed in any project activities. • The Proponent and Consultant will: implement smart technologies to optimise resource use and improve infrastructure efficiency, and; educate the community on the challenges and solutions related to population growth and resource management • Hiring mature and experienced workers will be prioritised, contributing to a stable and productive work environment, reducing the potential for conflict and violence on-site. • The contractor will be accountable for completing the project on time and according to the agreed-upon schedule, ensuring timely delivery of the new building and minimising disruption to ongoing university operations.

Ward/*Mtaa*	Views/Concerns/Issues	Response to concerns/issues
Mfumuni Ward	• Local employment: Prioritise employment of residents from the surrounding community, especially young people, to maximise economic benefits and minimise social disruption. • Building damage: Conduct thorough pre-construction surveys and implement vibration mitigation measures to minimise the risk of damage to nearby structures, particularly during blasting activities. • Land clearance: Develop a comprehensive land clearance plan that minimises environmental impact and ensures responsible waste management. • Sexually transmitted diseases: Provide comprehensive sexual health education and awareness programs for students, construction workers, and the surrounding community to reduce the risk of sexually transmitted diseases. • Unwanted pregnancies: Implement sex education programs and promote access to family planning resources to reduce unwanted pregnancies, particularly among young girls. • Fire safety: Equip the building with appropriate firefighting equipment and ensure proper fire safety training for staff and residents. • Accessibility: Incorporate accessible design features throughout the project to ensure comfortable and safe access for people with disabilities.	• The project will maximise local economic benefits by prioritising the hiring of residents and sourcing materials and services from local businesses. • Replant native trees and vegetation in disturbed areas to restore ecological balance. • Create a safe and confidential environment for individuals to access sexual health information and services. • Implement sex education programs that focus on healthy relationships, decision-making skills, and responsible sexual behaviour, especially for young people. • Equip the building with fire alarms, sprinkler systems, and fire extinguishers to meet or exceed fire safety codes, and; conduct regular fire drills and training for staff and residents on emergency evacuation procedures. • Incorporate accessible design features throughout the project, including ramps, elevators, wider doorways, and accessible restrooms. • Schedule noisy construction activities for times that minimise disruption to residents and other sensitive activities. • Implement sustainable practices such as energy efficiency, water conservation, and waste reduction throughout project design, construction, and operation, and; integrate a gender lens into project planning and implementation to ensure equitable access to project benefits and opportunities for all genders.

Ward/*Mtaa*	Views/Concerns/Issues	Response to concerns/issues
	• Noise control: Use soundproofed technologies to minimise noise pollution during construction and operation. • Environmental and Gender Concerns: The project should be designed and implemented with environmental considerations and a gender lens, ensuring equitable outcomes for all genders.	
Neighbour – Moshi Secondary School	• **Fire safety**: Equip the building with appropriate firefighting equipment and ensure proper fire safety training for staff and residents. • **Accessibility**: integrate accessibility features throughout the project design to ensure equal access and participation for people with disabilities. • **Security**: enclose the project area with a secure fence to deter unauthorised access and • **Noise Control**: schedule construction activities to minimise disturbances during sensitive hours. • **Expert Collaboration**: seek expert advice from relevant regulatory bodies and incorporate their	• Equip the building with appropriate firefighting equipment, such as fire extinguishers, smoke detectors, and fire alarms. • Ensure proper fire safety training for staff and residents on the use of fire extinguishers, evacuation procedures, and fire safety protocols. • Integrate accessibility features throughout the project design, including ramps, lifts, accessible toilets, and braille signage. • Ensure that all entrances and exits are accessible to people with disabilities. • Enclose the project area with a secure fence and employ security personnel to deter unauthorised access. • Install security cameras and access control systems to monitor and restrict entry to the site.

Ward/*Mtaa*	Views/Concerns/Issues	Response to concerns/issues
	recommendations into project design and implementation.	• Implement robust security protocols for the storage and handling of sensitive materials. • Schedule construction activities to minimise disturbances during sensitive hours, such as night-time and weekends. • Use noise-reducing equipment and techniques, such as acoustic barriers and soundproofing materials. • Communicate construction schedules and noise mitigation strategies to nearby residents and businesses in advance. • Seek expert advice from relevant regulatory bodies, such as fire departments, building inspectors, and accessibility specialists. • Incorporate expert recommendations into project design and implementation to ensure compliance with regulations and best practices. • Maintain ongoing communication with experts throughout the project lifecycle to address any unforeseen challenges.

Source: Field Visit June, 2023