UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

SOKOINE UNIVERSITY OF AGRICULTURE

EDWARD MORINGE CAMPUS

ENVIRONMENTAL AND SOCIAL IMPACT STATEMENT FOR THE PROPOSED DEVELOPMENT OF ONE ACADEMIC BUILDING, 3 LABORATORIES, INNOVATION CENTER, EXTENSION OF 3 STOREY ACADEMIC BUILDING AND REHABILITATION OF 10 LECTURE THEATRES AND PASTURE LABORATORY WITHIN EDWARD MORINGE CAMPUS OF THE SOKOINE UNIVERSITY OF AGRICULTURE ON FARM NO 5 AT MAGADU WARD IN MOROGORO MUNICIPALITY, IN MOROGORO REGION

PROPONENT

SOKOINE UNIVERSITY OF AGRICULTURE

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EXECUTIVE SUMMARY

1. Introduction

Sokoine University of Agriculture (SUA), established in 1965 as an Agricultural College, has evolved into a leading public university specializing in agriculture, forestry, and veterinary sciences. Originally offering diploma training, it transitioned to a Faculty within the University of Dar es Salaam in 1970, expanding its scope to bachelor's degrees. The inclusion of forestry and veterinary science led to successive name changes, culminating in its current designation as SUA in 1984 in honor of the former Prime Minister, Edward Moringe Sokoine. Operating under its Charter and Rules, which were signed on 28th March 2007. The Charter and Rules were amended and published on 28th August 2020 as Government Notice No. 683.

Sokoine University of Agriculture's Edward Moringe Campus offers a robust academic environment with four prominent faculties (Agriculture, Veterinary Medicine, Forestry and Nature Conservation) providing 27 undergraduate programs and numerous postgraduate options in diverse disciplines related to agriculture, animal science, wildlife, forestry, and rural development. While the campus excels in academic offerings, its infrastructure faces the challenge of insufficient and outdated buildings. These limitations negatively impact the effectiveness of teaching, research, and inclusivity.

Addressing these infrastructure shortcomings necessitates a comprehensive renovation and modernization plan. This plan should aim to equip the campus with facilities that meet contemporary academic needs, support advanced research, and ensure accessibility for all users. Modernization efforts should focus on incorporating technologies, addressing space limitations, and improving the structural integrity of older buildings. By investing in its infrastructure, Edward Moringe Campus can solidify its position as a leading center for agricultural and environmental education and research in the region.

To address this, SUA, Edward Moringe Campus has received financial support from the World Bank (WB) for Higher Education for Economic Transformation (HEET) Project (P166415). The HEET project is supported by the Government of the United Republic of Tanzania (GoT) through the World Bank. The main Project Development Objective (PDO) is to strengthen the learning environments and labour market orientation of programs in priority disciplines and the management of the higher education system. Hence, an Environmental and Social Impact Assessment (ESIA) is thus deemed mandatory to identify, predict, and evaluate these impacts and develop mitigation measures for project sustainability.

This ESIA adheres to the Environmental Management Act of 2004 (Tanzania) and its regulations, mandating a full EIA study for projects of this nature. Additionally, the World Bank's Environmental and Social Framework (ESF), Safeguarding Policies, and Environmental and Social Standards (ESSs) as well as the project's Environmental and Social Management Framework (ESMF) provide guiding principles for addressing potential social and environmental risks associated with investment projects.

In particular, ESS1 stipulates requirements for Borrowers regarding impact identification, assessment, and mitigation measure development.

SUA has comprehensively prepared and submitted ESIA application documents to the National Environment Management Council (NEMC). These documents encompassed a Scoping Report and Terms of Reference (ToR), complying with the Environmental Management Act, 2004, its regulations, and the World Bank's ESF (ESMF, POM, ESCP, SEP, LMP). Following NEMC's project registration and allocation of Project Reference No.

EC/EIA/2023/4367. This ESIA has been undertaken based on the established guidelines and aims to ensure responsible and sustainable project implementation while minimizing any adverse environmental and social impacts.
In addition, the contractor is required to adhere to the Wage Order (2013) of the Labor Institution, ensuring payment in accordance with relevant labour laws to prevent conflicts during the construction phase. Draft contracts must be collaboratively prepared by the Contractor and the client, gaining approval from the WB and Labour Officer. Additionally, the contractor has been provided with the laws outlined in POM 2021 to prevent the involvement of child labour.

2. Project Description

The Edward Moringe Campus construction and rehabilitation project, funded by the World Bank through the Higher Education for Economic Transformation initiative (USD 5,972,130.29), will be completed within 18 months. Key construction elements at the SUA Edward Moringe Campus include a four-story Innovation Center (1100 m^2 per floor), a three-story academic building (1400 m^2 per floor), and three single/double-story laboratories (tissue culture, biosecurity, animal reproduction, and gross anatomy). Rehabilitation will focus on the administration block (including a lift for accessibility), engineering classrooms (transforming one into a lab), and refreshing offices and lecture rooms (roofing, ceilings, electrical systems, toilets, painting, doors, and windows). This comprehensive approach aims to enhance the campus's infrastructure and support its educational and research activities.

3. Project main activities

Activities under this proposed project will be implemented in four phases namely Mobilization construction, demobilization, and operation and maintenance phases.

The Contractor will also employ more skilled and unskilled workers. Skilled Labour will include engineers, technicians, foremen, etc. Contractor shall comply with all relevant laws as guided by the Constructor Registration Board (CRB); Engineers Registration Board (ERB) and Architect and Quantity Survey Registration Board (AQRB) as well as NEMC (EMA 2004, Environmental Impact Assessment and Audit 2015 with its amendment of 2018 and World Bank requirement (ESF, ESMF) as well as relevant international laws on construction, safety and climate change

4. Project Location

The proposed project site will be located at the Edward Moringe Campus of Sokoine University of Agriculture, which is located in Magadu ward, Morogoro Municipality, Morogoro Region. Edward Moringe Campus is situated 3 km South of Morogoro Municipality, and it shares boundaries with the Morogoro Mindu Dam on the southern side, Lugala village on the North – West side and Morogoro CBD on the North- Eastern side.

5. Legal Frameworks

There are a number of policies and legislations set out the legal and regulatory requirements which are relevant to the proposed project at SUA. Additionally, there are pertinent standards governing environmental management and protection, health and safety. Relevant policies and legislations pertaining to development of the project mainly environmental management in terms of quality, health and safety, pollution of ground and surface water, pollution of soil, land and land use control among others, were examined to ensure that the proposed development project meets and abides by these regulations.
The policies and legal frameworks include

i. Environmental Management Act No. 20 of (2004), Cap. 191
ii. The Water Supply and Sanitation Act No. 12 of 2009
iii. Land Act no 4 (1999)
iv. The Urban Planning Act (2007)
v. Occupation Health Safety (2003)
vi. Employment and Labour Relations Act No. 6 of 2004
vii. Engineers Registration Act and its Amendments 1997 and 2007
viii. The Contractors Registration Act (1997)
ix. The Architects and Quantity Surveyors Act (1997)
x. The HIV and AIDS (Prevention and Control) Act of 2008
xi. The Local Government Laws (Miscellaneous Amendments) Act (1999)
xii. The Tanzania 2025 Development Vision
xiii. Environmental Impact Assessment and Auditing (amendment) Regulations (2018)
xiv. The National Health Policy of 2008;
xv. The Tanzania 2025 Development Vision
xvi. The Employment and Labour Relations Act No. 6 of 2004

Also, the Environmental Impact Statement has assessed the general compliance with the following regulations and guidelines; The Tanzania Development Vision 2025, The Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations 2018, The Environmental Management (Air Quality Standards) Regulations, 2007, The Environmental Management (Soil Quality Standards) Regulations, 2007, The Environmental Management (Water Quality Standards) Regulations, 2007 and The Environmental Management (Standards for Controls of Noise and Vibration Pollution) Regulations, 2015

Furthermore, this ESIA study has complied with the World Bank Environmental and Social Framework which supports green, resilient, and inclusive development by strengthening protection for people and the environment and making important advances in areas such as Labour, inclusion and non-discrimination, gender, climate change, biodiversity, community health and safety, and stakeholders' engagement. The following are six (6) out of 10 Environmental and Social standards of the World Bank which are relevant to the project;

i. ESS1: Assessment and Management of Environmental and Social Risks and Impacts.
ii. ESS2: Labour and Working Conditions.
iii. ESS3: Resource Efficiency and Pollution Prevention and Management.
iv. ESS4: Community Health and Safety.
v. ESS8: Cultural Heritage.
vi. ESS10: Stakeholder Engagement and Information Disclosure

6. Baseline Information

The project site is within the area characterized by sandy clay loams and sandy clay soils, different natural vegetation i.e. (short and long grasses), tree species, and artificial tree species cover the surface land. No sensitive ecological sites are found near the proposed sites. The general area is characterized by flat alluvial plains with homogenous sedimentation pattern and the specific area has a largely flat topography and gentle slope. About three quarters of total land at SUA constitutes undeveloped land. This undeveloped land currently is used for farming activities and is suitable for construction of all kinds of development required in spatial expansion of SUA. Hence, the proposed establishment under HEET project will be done at the least developed area.

Additionally, the project site is very accessible to social services including road networks, water supply and electrical supply from TANESCO. Financial services like Mobile money and bank services are available at Edward Moringe Campus and surrounding communities so during construction and operation phase, the Labours who will be working at Solomon Mahlangu Campus will assess all services easily. Also, in Solomon Mahlangu Campus there is a hospital which will be used for health services during construction and operation phase.

7. Stakeholder Engagement

The SUA Edward Moringe Campus project prioritizes robust stakeholder engagement, adhering to Tanzanian EIA regulations, World Bank ESS10, and UNDP guidance. Public consultations effectively facilitated information sharing, identifying key concerns, and fostering community relationships. Stakeholder identification considered each group's relevance, influence, and potential impact from the project. This ESIA has undertaken extensive stakeholder consultations to ensure responsible development and minimize potential social impacts. Consultations involved all individuals or groups potentially affected by or affecting the project, positively or negatively.

A comprehensive Stakeholders Engagement Plan (SEP) outlines engagement strategy for both national and sub-national actors, with emphasis on the latter. The SEP details engagement activities required throughout project phases. Notably, the project embraces inclusivity by consulting with women, vulnerable groups, and people with special needs. Continuous engagement aims to gather diverse perspectives throughout the project lifespan. Additionally, grievance mechanisms address Gender-Based Violence (GBV), Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH).
Engagement occurred at multiple levels:

- **Zonal Level**: Occupational Safety and Health Authority (OSHA)
- **Regional Level:**
  - Sokoine University of Agriculture (Staff, Students, and Service Providers)
  - Morogoro Fire and Rescue Force
  - Wami/Ruvu Basin Water Bodies (WRBWB)
  - TANESCO (National electric utility)
  - Morogoro Municipal Council
- **Local Level**:
  - Ward Executive Officer (WEO) from Magadu ward
  - Street/Mtaa Executive Officers (MEO)
  - Community members from Magadu ward

8. Impact Assessment and Identification of Alternatives

The impact assessment conducted throughout the project lifecycle at SUA shows potential environmental effects across various project phases. For instance, during the mobilization phase, machinery movement may lead to soil compaction and disturbance, affecting vegetation and drainage. Construction noise, dust, and disruption could impact the surrounding communities along the project boundaries. Sediment runoff from excavation may harm aquatic ecosystems, while emissions might contribute to air pollution.

In the operation phase, water consumption for laboratories could strain local sources, impacting aquatic life and communities. Continued emissions into air and water could pose ongoing concerns. Closure demands proper waste disposal to prevent soil and water

contamination. Effective monitoring, waste management, and community involvement are essential for sustainable outcomes.

As part of the Environmental and Social Impact Assessment (ESIA) report, potential alternatives are explored to mitigate these impacts and promote responsible development.

An Outline Summary of Associated Impacts of the Proposed Project:

The Edward Moringe Campus project's assessment of environmental and socio-economic impacts adheres to a rigorous framework incorporating diverse elements:
Environmental Impacts:

- **World Bank Environmental Health and Safety Guidelines (EHSGs):** serve as the primary benchmark for evaluating potential environmental risks and impacts associated with project activities.
- **Climate Change Considerations:** incorporate the project's potential vulnerability to climate change effects and strategies for building resilience.
- **Habitat and Biodiversity Protection:** address potential threats to natural habitats, biodiversity, and ecosystem services, emphasizing protection, conservation, maintenance, and restoration.
- **Resource Utilization:** carefully assess the project's impact on living natural resources and prioritize sustainable resource management practices.
- **Physical Facility Design:** evaluate the environmental implications of facility design decisions to minimize negative impacts.

Socio-Economic Impacts:

- **Human Security:** investigate potential threats to human security through crime, violence, or social unrest triggered by project activities.
- **Access to Social Services:** assess potential for project-related disruptions to access to essential services like education, healthcare, and water supply, aiming to mitigate any adverse effects.
- **Child Labour:** ensure strict adherence to national and international regulations prohibiting child labour, with zero tolerance for any violations.
- **Gender Equity:** promote inclusivity and address potential risks of gender discrimination during project implementation and beyond.
- **Vulnerability and Disadvantage:** ensure equitable distribution of project benefits and actively avoid disproportionate negative impacts on vulnerable individuals or groups.

Impacts associated with the proposed project.

A. Physical environmental Impacts

Positive environmental impacts

i. Increase physical outlook of the new modern buildings and student's hostel
ii. Improved waste management from the existing that will be integrated into new facilities.
iii. Will improve safety in university environments such as walkways, road lights and assembly points.

Negative environmental impacts

i. Vegetation clearance
ii. Impact on climate change
iii. Generation of solid waste
iv. Generation of liquid waste (human sanitary waste)

v. Soil and water quality contamination
vi. Noise nuisance and Vibration
vii. Soil erosion
viii. Air pollutions (fugitive dust and exhaust emissions)
ix. Generation of hazardous waste

B. Impacts on Social Environment

Positive social impacts

i. Employment opportunities
ii. Increase income to community around project site
iii. Benefit to local suppliers of construction materials
iv. Increased human capital
v. Increase students' admission to university
vi. Increase of revenue to SUA
vii. Production of skilled labor force for nation development
viii. Increased commercial and social activities around project locations
ix. Increased revenues to local authorities

Negative social impacts

i. Population influx (labour influx)
ii. Increased risk of Gender Based Violence (GBV), Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH)
iii. Disruption of traffic Flow
iv. Occupational health and safety hazards to workers
v. Possible Spread of HIV/AIDS, COVID-19 and other infectious diseases.
vi. Child labour and forced labour
vii. Unplanned pregnancies
viii. Risk of construction materials vandalism
ix. Public health hazards due to wastes

9. Mitigation Measures

The SUA Edward Moringe Campus project prioritizes responsible development by implementing a comprehensive suite of mitigation measures addressing identified environmental and social impacts, as dictated by ESS1's mitigation hierarchy. These measures proactively tackle potential challenges and negative consequences associated with construction activities and subsequent campus modifications. Key strategies encompass environmental safeguards like noise and dust control, traffic management, local ecosystem protection, and waste management. Social safeguards include worker safety, accessibility enhancements, and gender-sensitive approaches interwoven into project planning. This multi-pronged approach ensures optimal project execution while minimizing potential social and environmental repercussions. Further details on specific impacts and corresponding mitigation measures are provided in Table 7.1 of Chapter 7.

10. Environmental and Social Management Plan (ESMP)

This report introduces impactful strategies designed to address the recognized adverse social and environmental effects. These strategies, alongside a comprehensive monitoring plan, are extensively outlined within the ESMP (Environmental and Social Management Plan). A significant number of these measures are in line with established engineering and social norms. The ESMP distinctly clarifies the roles and responsibilities of the key stakeholders

engaged. During the construction phase, the contractor and SUA will primarily oversee implementation. As the project advances, SUA will transition to a pivotal role in executing the mitigation actions. The estimated total cost for these environmental and social mitigation measures (ESMP) is approximately TZS **339,000,000.**

11. Environmental and Social Monitoring Plan (ESMoP)

The SUA Edward Moringe Campus construction and rehabilitation project adheres to a comprehensive environmental and social monitoring plan encompassing four key activities:

- **Baseline Monitoring**: Establishes pre-construction environmental and social conditions to measure project impacts against.
- **Impact Monitoring**: Tracks project-related environmental and social changes throughout construction and operation.
- **Compliance Monitoring**: Verifies adherence to regulatory requirements and mitigation measures outlined in the project's Environmental and Social Management Plan (ESMP).
- **Mitigation Monitoring**: Assesses the effectiveness of implemented mitigation measures and triggers corrective actions if necessary.

During construction, a dedicated Contractor's safeguard team comprised of environmental, social, and safety experts will oversee monitoring activities, with supervision from the Consultant's safeguard team. Upon project completion, monitoring responsibility will shift to SUA Edward Moringe Campus for sustained environmental and social performance. Independent oversight will be provided annually by OSHA and/or NEMC through Environmental, Health, and Safety (EHS) reviews. The estimated cost for implementing this comprehensive monitoring program is TZS 126,000,00

Cost Benefit Analysis

This project's Environmental Impact Statement (EIS) conducts a rigorous cost-benefit analysis, meticulously evaluating both its potential advantages and disadvantages. This integrated approach not only identifies and minimizes any environmental concerns the project might introduce, but also maximizes its positive social and economic contributions. While acknowledging the project's potential for financial and societal benefits, the EIS prioritizes environmental responsibility by ensuring that remediation costs represent a minimal fraction of the overall project budget. This commitment to minimizing environmental impact while maximizing beneficial outcomes underscores the project's dedication to responsible development.

12. Decommissioning

This is the final demise of the buildings and services use value. The decommissioning entails demolition of the structures and other appurtenances. However, with regard to this type of project no recent closure plan can prompt decommissioning as this project operation has a much longer life span.

13. Summary and Conclusion

14.1 Summary

SUA Edward Moringe Campus is embarking on a transformative development plan focused on establishing essential facilities and enhancing existing infrastructure. This strategic initiative, designed to bolster the university's academic standing and research capabilities, encompasses:

- **New Construction:**

- Academic Building: offering modern learning and research spaces with a focus on sustainability.
- Innovation Center: serving as a vibrant hub for technological advancement and entrepreneurial spirit.
- Specialized Laboratories: including Animal Reproduction and Biotechnology, Gross Anatomy, Tissue Culture, and Biosecurity, equipped with cutting-edge technology.
- College of Economics and Business Studies (CoEBS) Expansion: providing contemporary classrooms, lecture halls, and collaborative areas.

➢ **Renovation and Upgrading:**

- Lecture theatres within the administration building and School of Engineering.
- Creation of a Pasture Laboratory.
- Installation of a lift shaft at the administration building, enhancing accessibility.

This comprehensive plan embodies a commitment to both modernization and heritage preservation. New facilities embrace contemporary design principles and advanced technology, while renovations breathe new life into existing structures. At its core, the initiative aims to:

i. Enhance the learning environment for students and faculty.
ii. Foster innovation and research activities.
iii. Promote sustainable practices within the campus infrastructure.
iv. Ensure accessibility for all users.

Through this HEET Project execution, SUA reaffirms its dedication to academic excellence, pioneering endeavours, and responsible growth, solidifying its position as a leading educational and research institution in the region.

14.2 Conclusion

These outlined plans underscore Sokoine University of Agriculture's strong commitment to overall progress. The proposals for the academic Building, Innovation Center, laboratories, and the College of Economics and Business Studies (CoEBS) Academic Building reflect the university's aim to modernize its facilities, foster innovation, improve learning experiences, prioritize environmental care, and ensure sufficient resources for all.

These significant changes will position Sokoine University as a frontrunner in quality education and innovative ideas. The plans also emphasize inclusivity, gender equality, and safety on the Edward Moringe Campus in Morogoro. The proposed improvements to key structures like the Administration Block and Engineering lecture rooms highlight Sokoine University's active commitment to advancement.

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LIST OF ABBREVIATION

AIDS	Acquired Immune Deficiency Syndrome
ANC	Africa National Congress
BMP	Best Management Plan
BoQ	Bill of Quantity
CBD	Central Business District
CITES	Convention on International Trade and Endangered Species of Wild Fauna and Flora
CNG	Compressed natural gas
COEBS	College of Economics and Business Studies
CONAS	College of Natural and Applied Sciences
COVID	Corona Virus Disease
CRB	Contractors Registration Board
DCDO	District Community Development Officer
DED	District Executive Director
DLO	District Land Officer
DoE	Division of Environment
E&S	Environmental and Social
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental management Plan
ERB	Engineers Registration Board
ESF	Environment and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESS	Environmental Social Standards
FYDP	Five Year Development Programme
GBV	Gender Based Violation
GHG	Green House Gases
GOT	Government of Tanzania
GRM	Grievance redress mechanisms
HEET	Higher Education for Economic Transformation
HEI	Higher Education Institution
HIV	Human Immune Deficiency Virus
HSE	Health Safety and Environment
ILO	International Labour Organization
IUCN	International Union for Conservation of Nature
IUCN	International Union for Conservation of Nature
KPH	Kilometer Per Hour
LGA	Local Government Authority
MEO	Mtaa Executive officer
MoEST	Ministry of Education Science and Technology
MORUWASA	Morogoro Water Supply and Sanitation Authority
MSTHE	Ministry of Science Technology and Higher Education
NACP	National HIV/AIDS Control Programmes
NAFORMA	National Forest Resources Monitoring And. Assessment
NEMC	National Environment Management Council

NEP	National Environmental Policy
NESC	National Environmental Standards Compendium
NGO	Non-Governmental Organization
OHS	Occupation Health and Safety
OSHA	Occupation Safety and Health Authority
PAD	Project Appraisal Document
PDO	Project Development Objective
PIT	Project Implementation Team
PIU	Project Implementation Unit
PLHAS	People Living with HIV/AIDS
POM	Project Operational Manual
PPE	Personal Protective Equipments
SEA	Sexual Exploitation and Abuse
SEP	Stakeholders Engagement Plan
SH	Sexual Harassment
SMC	Solomon Mahlangu College
SM-CoSE	Solomon Mahlangu College of Science and Education
SOMAFCO	Solomon Mahlangu Freedom College
STD	Sexually Transmitted Diseases
SUA	Sokoine University of Agriculture
SUACSP	Sokoine University of Agriculture Corporate Strategic Plan
SUAHAB	Sokoine University of Agriculture Housing and Accommodation Bureau
SUASO	Sokoine University of Agriculture Student Organization
TAC	Technical Advisory Committee
TANESCO	Tanzania Electricity Supply Company
TBS	Tanzania Bureau of Standards
TCU	Tanzania Commission for Universities
ToR	Terms of Reference
UASB	Up-flow anaerobic sludge blanket
UDSM	University of Dar es Salaam
UN	United Nation
UNFCCC	United Nations Framework Convention on Climatic Change
URT	United Republic of Tanzania
VAT	Value Added Tax
VPO-DoE	Vice President ‘s Office – Division of Environment
WEO	Ward Executive Officer

CHAPTER 1: BACKGROUND INFORMATION

1.1 Introduction

Sokoine University of Agriculture (SUA), Tanzania's foremost institution for agricultural education and research, boasts a rich history dating back to its establishment in 1965. Initially established as a diploma-granting Agricultural College, SUA's journey has seen it evolve into a full-fledged university in 1984, honoring the legacy of Prime Minister Edward Moringe Sokoine. Today, SUA's main campus in Morogoro houses four prominent faculties: Agriculture, Veterinary Medicine, Forestry, and Nature Conservation. These faculties offer 27 undergraduate programs, encompassing diverse disciplines like agriculture, veterinary medicine, wildlife management, and forestry. Moreover, SUA strengthens its academic offerings through graduate programs, including master's and PhD degrees.

SUA's ongoing growth and commitment to academic excellence necessitate continuous improvement to its infrastructure. Aging facilities and increasing student and faculty populations pose challenges to maintaining a quality learning environment. To address these needs, SUA has embarked on a comprehensive rehabilitation and construction project. This initiative targets the expansion of the College of Economics and Business Studies (CoEBS) building, construction of new facilities, and renovation of existing structures. Ultimately, this project aims to modernize the campus and ensure its ability to deliver high-quality education in the dynamic academic landscape.

Financial support for this project has been secured through the World Bank's Higher Education for Economic Transformation (HEET) Project (P166415), co-funded by the Government of Tanzania. The HEET project's primary objective is to strengthen learning environments and enhance the labor market orientation of programs in priority disciplines, while also improving the management of Tanzania's higher education system. This objective is pursued through eight strategic focus areas:

- Construction and rehabilitation of physical infrastructure
- Increasing enrolment capacity in priority disciplines
- Upgrading learning resources and equipment
- Promoting applied research and innovation capacity
- Building functional linkages with the private sector/industry
- Strengthening use of digital technology
- Promoting self-generated income
- Building capacity of academic staff and university leadership

SUA, leveraging the HEET project, plans to address its infrastructure needs by focusing on three strategic areas:

- **Increasing Enrolment Capacity**: Construction of an academic building and expansion of the CoEBS building will allow for increased student intake in priority disciplines.
- **Promoting Applied Research and Innovation**: Development of an Innovation Center and three specialized laboratories (Animal Reproduction and Biotechnology, Gross Anatomy, Tissue Culture) will enhance research capabilities and foster innovation.
- **Biosecurity and Security**: Construction of a Biosecurity building and enclosure fence will ensure the safe handling and containment of research materials, adhering to biosecurity standards and protecting valuable assets.

The project encompasses not only new construction but also the renovation of existing facilities. This includes upgrades to 10 lecture theatres, establishment of a Pasture Laboratory,

and installation of a lift shaft at the administration building. All construction and renovation activities will be undertaken within SUA's premises on Farm NO. 5 (Mafiga farm).
As mandated by the World Bank Environmental and Social Framework with Environmental and Social Standards (ESS1- ESS 10) and Tanzania's Environmental Management (EIA and Audit) (Amendment) Regulations, 2018, an Environmental and Social Impact Assessment (ESIA) is required prior to project implementation. To comply with this regulation, SUA consulted Earth Environmental Experts of P.O.Box 35413 Dar es Salaam to conduct ESIA study, so as to assess the potential environmental and social impacts associated with the proposed project and develop mitigation strategies as necessary.

1.2 Project Rationale

Tanzania's education sector has witnessed encouraging progress in recent years, with primary enrolment climbing by 24.5% from 2015 to 2019. This success, however, creates a subsequent demand for quality higher education opportunities. By 2030, student demand is projected to surge, necessitating expansion and quality improvement within the tertiary education system. While advancements have been made, critical challenges remain. The system struggles to absorb graduates from basic education, prompting an urgent need for increased investment in infrastructure, facilities, and quality assurance across key disciplines like engineering, medical sciences, agriculture, and natural resource management. Tanzania's higher education landscape also faces the challenge of gender disparity, with only 35% of students being female, as identified by the Higher Education for Economic Transformation (HEET) project's Environmental and Social Management Framework. To address this and other critical issues, the World Bank launched the HEET project in 2021.
The 2021 HEET Project Appraisal Document (PAD) outlines further concerns within the higher education system:

- **Gender inequality**: While the university-level gender parity index has improved, disparities persist at lower levels, hindering upward mobility for women.
- **Skills mismatch**: Graduate unemployment points towards a disconnect between educational programs and employer needs.
- **Demand-driven imbalances**: Fields like engineering, agribusiness, and tourism require more students to address industry demands.
- **Low program quality**: Many academic programs lack the rigor necessary to prepare graduates for current and future job market requirements.
- **Faculty limitations**: A shortage of well-trained lecturers and prevalence of traditional teaching methods hinder optimal knowledge transmission.
- **Technological shortcomings**: Limited access to and utilization of modern technologies impede efficient delivery of training.
- **Resilience challenges**: The pandemic highlights the need for robust university contingency plans.

Addressing these challenges will require a strategic approach that integrates education, skills training, and technology to nurture Tanzania's productive sectors and cater to the burgeoning youth population entering the labor market. Thus, the planned expansion of facilities at SUA stems from the critical shortage of modern and adequate infrastructure. This shortage has adversely impacted both staff and students: staff face challenges in effectively fulfilling their

roles, while students' performance and enrolment are hindered by insufficient laboratories, an absent innovation center, and limited academic buildings.
Through this project, SUA aims to improve the learning environment by:

- **Increasing student enrolment:** By addressing infrastructure constraints, SUA anticipates accommodating a larger student body and catering to their educational needs more effectively. This is expected to contribute to improved academic performance across genders and backgrounds, although the exact enrolment increase will be determined and communicated upon finalizing project specifics.
- **Enhancing research and innovation:** The construction of an innovation center will foster technological advancement and entrepreneurial spirit within the university community, thereby propelling SUA's research and innovation capacity.

Recognizing the potential environmental and social impacts associated with construction activities, the project commissioned an Environmental and Social Impact Assessment (ESIA). This comprehensive analysis identified and assessed both positive and negative impacts, leading to the development of mitigation measures to address potential negative consequences and enhance positive outcomes. The ESIA report, along with the associated Environmental and Social Management Plan (ESMP) and Environmental Monitoring Plan (EMP), will guide the project's implementation in a responsible and sustainable manner.

1.3 Objectives of the SUA (Edward Moringe Campus) HEET Project

1.3.1 Main Objective

According to the HEET's Project Appraisal Document (PAD) of 2021, the construction and rehabilitation project at SUA's Edward Moringe Campus aims to modernize its infrastructure for enhanced educational and research needs, ensuring inclusivity for individuals with special needs and while considering gender disparities.

1.3.2 Specific Objectives

This comprehensive effort involves building advanced facilities including;

(i) Constructing an innovation center (4 stories), an academic building (3 stories), three laboratories (single-story tissue culture laboratory, single-story animal reproduction and biotechnology laboratory, double-story gross anatomy laboratory);
(ii) Expanding the academic class space within the College of Education and Business Studies;
(iii) Renovating existing areas, such as the administration block, engineering classrooms, and offices;
(iv) To enable the expansion and provision of modern research, technology, and innovation education in SUA.

1.4 Objectives of ESIA

The objective of conducting the Environmental and Social Impact Assessment (ESIA) for the Edward Moringe Campus is to thoroughly assess the potential environmental and social implications of the project's key facilities. The specific objective of conducting the Environment and Social Impact Assessment study with respect to the project was following;

i. To carry out environmental screening and scooping study to identify social and environmental risks and impacts in the project site and nearby environment.
ii. To identify, analyse and assess environmental and social risks and impacts of the proposed construction project.

iii. To describe the pertinent regulations and standards governing, environmental quality, health and safety, protection of sensitive areas, protections of endangered species and land use control at international, national regional and local levels.
iv. To recommend cost-effective measures for minimizing or eliminating adverse impacts of the proposed design, construction, operation, and maintenance of the project; and
v. To prepare Environmental and Social Management Plan, including and Health and Safety Management for design, construction, operation, and maintenance phases of the Project

1.5 Methodology

The ESIA being a multidisciplinary field involved a team of experts, the key ones being EIA Expert (Team Leader), Environmental Engineer, Civil Engineer, Air quality, pressure noise level expert, HSE specialist and Sociologist.

The ESIA study for the project was carried out in accordance with the Terms of Reference that were provided by SUA as client. The study was undertaken between April and May 2023 and included the following methodology.

1.5.1 Document review

The document review conducted as part of the Environmental and Social Impact Assessment (ESIA) process involved examination of various relevant documents to complement the data gathered during scoping and ESIA activities. These encompassed reports addressing ecological, economic, financial, and social aspects relevant to both the project site and the broader Morogoro Municipality.

By analyzing documents such as environmental regulations, socio-economic profiles, strategic plans, and population statistics, the consultant aimed to establish a comprehensive understanding of the project's context and potential impacts.

Additionally, essential documents from the World Bank, including the Project Operation Manual (POM), Project Appraisal Document (PAD), and Environmental and Social Management Framework (ESMF), were carefully reviewed to ensure alignment with international best practices.

1.5.2 Site visits

The main objective of the site visit was to gather information relevant for the study. Field studies involved walking on the project site to assess the existing situation of the proposed site and the nearby surroundings. The ESIA study team visited and did the physical assessment on the proposed site and their core impact areas. The fieldwork was carried out in April 2023. Activities carried out during field studies included:

i. Interviews and consultation with stakeholders,
ii. Indoor Mtaa consultation meetings,
iii. Appraisal of environmental conditions of the project site and areas that might be impacted by the project (hydrology, flora, fauna), and
iv. Appraisal of land use and assessment of other relevant socio-economic parameters.

During the field visits, consultation with relevant stakeholders was also conducted. Particular attention was paid to the impact on the livelihood of the people living within or in the immediate vicinity of the proposed project.

1.5.3 Stakeholder Consultations

The process of identifying and engaging stakeholders adhered to the Environmental Impact Assessment (EIA) and Audit Regulations of 2005, as amended in 2018, along with compliance with the World Bank Environmental and Social Standards (ESS10). The stakeholder engagement approach included the preparation and disclosure of a Stakeholders Engagement Plan (SEP) guided by the World Bank Environmental and Social Framework (ESF) and Project Environmental and Social Management Framework (ESMF). Public consultation was a pivotal component, involving the dissemination of project information, knowledge sharing, and active solicitation of insights from key stakeholders. This process aimed to comprehend stakeholders' concerns while fostering meaningful relationships within the community.

The ESIA team visited Morogoro Municipality where the projects will take place and later on went to neighboring community of Mindu ward. Stakeholders' interviews were conducted in order to collect baseline data and issues of concerns. The EIA study applied different participatory methods to involve all the relevant stakeholders. Public meetings dominated the discussion.

One to one interview with government Agencies such as TANESCO, OSHA, MORUWASA, Wami/Ruvu Basin Water bodies, Morogoro Municipal Council, Student at Edward Moringe Campus, SUA staff's Local community around Edward Moringe Campus where Construction will take place. Consultation with Local community leaders of Magadu was conducted with special focused group example Boda-boda, Mama-ntilie and service providers around Edward Moringe Campus in order to gather information about this coming construction and rehabilitation project.

The key objective was to

i. Inform the different stakeholders about the project;
ii. Provide an opportunity for the stakeholders to discuss their opinions and concerns
iii. Manage their expectations and misconceptions regarding the project;
iv. Verify the significance of environmental, social and health impacts identified;
v. Disseminate concepts of the Project activities with a view to provoking Project interest amongst the stakeholders;
vi. Inform the process of developing appropriate mitigation measures.

The stakeholders pointed out a number of issues and concerns, all these were taken on board with ESIA team. Details of stakeholders consulted names and signatures as well as contacts were recorded and attached in appendices part of this report

1.5.4 Baseline Data and Information

Baseline data measurement is a crucial step in the Environmental Impact Assessment (EIA) process which is undertaken after defining the project's scope. It involves gathering primary and secondary data to evaluate environmental and social conditions around the project site. Primary data is collected through direct measurements, observations, and semi-structured interviews with relevant parties, while secondary data is sourced from various information repositories like district profiles.

Baseline measurements encompass air quality, noise, and vibration levels, providing essential insights into the current state of the environment before construction activities commence. Air quality assessments monitor pollutant concentrations, such as particulate matter and nitrogen oxides, while noise measurements quantify existing sound levels, including construction or transportation-related noises. Vibration measurements assess ground vibrations from natural factors and human activities, establishing a reference point for monitoring potential impacts from construction activities.

1.5.5 Impact Identification

The proposed development at Edward Moringe Campus potentially leading to various environmental and social impacts. These impacts are identified through an assessment of interactions between project activities and the surrounding environment, considering factors such as construction activities, increased vehicular traffic, and changes to land use patterns. Potential impacts include air quality degradation due to construction emissions, noise pollution from machinery and increased activity, water quality deterioration from runoff and pollution, and temporary disruptions to social cohesion within the campus community. Through this comprehensive identification process, stakeholders gain insight into the potential consequences of the project, facilitating informed decision-making and the development of appropriate mitigation measures.

1.5.6 Impact Evaluation

The evaluation of potential impacts associated with the proposed development at Edward Moringe Campus considers the extent, duration, magnitude, and significance of each identified impact. Assessing air quality impacts reveals a moderate extent with high magnitude due to construction emissions, requiring short-term mitigation measures. Noise impacts are characterized by a low extent but moderate magnitude, necessitating long-term management strategies. Water quality impacts are determined to be of high extent, magnitude, and significance, demanding stringent long-term mitigation efforts. Social cohesion impacts, while low in extent and magnitude, require attention to maintain community harmony during the project's implementation and beyond.

1.6 Structure of the report

To clearly highlight and understand environmental and social issues that will occur due to project implementation, operation and decommissioning process, the ESIA project report is presented in accordance with the format given in Section 18 (1 and 2) of the Environmental Impact Assessment and Audit Regulations, 2005. This report is structured in the following style:

- **Executive summary**: summary of entire ESIA report
- **Chapter one**: outlines the development and structure of the ESIA report including the Project background, objectives, Impact Assessment scope and the report structure.
- **Chapter two**: provides a concise description of the Project and its geographical and temporal context. It includes a site description, an overview of the Project Facility design and details of Project inputs and outputs.
- **Chapter three**: analyses policy, legal and institutional framework in which the ESIA study has been conducted was discussed in this Chapter. National regulations are

summarized along with relevant international agreements, as well as applicable international best practice guidelines and standards.

- **Chapter four**: summarizes the available baseline data on the biological resources, physical environment, socio-economic conditions and receptors within the Project Study Area. It is based on both primary and secondary data sources and will consider changes in the baseline condition without the development in place.
- **Chapter five**: summarizes comments and concerns received from stakeholders and how these comments have been addressed.
- **Chapter six**: summarizes the predicted impacts of the Project, proposed mitigation/enhancement measures, and analysis of alternatives.
- **Chapter seven**: presents ESMP and draws together the possible mitigation measures; define the specific actions required, institutional roles and responsibilities for implementation
- **Chapter eight**: presents a monitoring program and estimates the costs of the measures.
- **Chapter nine**: describes the cost-benefit analysis to determine whether a project will deliver net economic benefits to society.
- **Chapter ten**: describes potential environmental and social impacts that need to be considered during the decommissioning phase
- **Chapter eleven**: summarizes conclusions that are made based on the assessment as well as outline any further recommendations
- **References**
- **Appendices**

CHAPTER 2: PROJECT DESCRIPTION

2.1 Location and Accessibility

2.1.1 Project location

The proposed projects shall be located at the Edward Moringe Campus of Sokoine University of Agriculture, which is located in Magadu ward, Morogoro Municipality, Morogoro Region. Edward Moringe Campus is situated 3 km South of Morogoro Municipality, and it shares boundaries with the Mindu Dam on the southern side, Lugala village on the Northern side and Morogoro CBD on the North- Eastern side.

2.1.2 Accessibility

SUA Edward Moringe Campus is accessible through SUA road about 3km from Morogoro CBD.

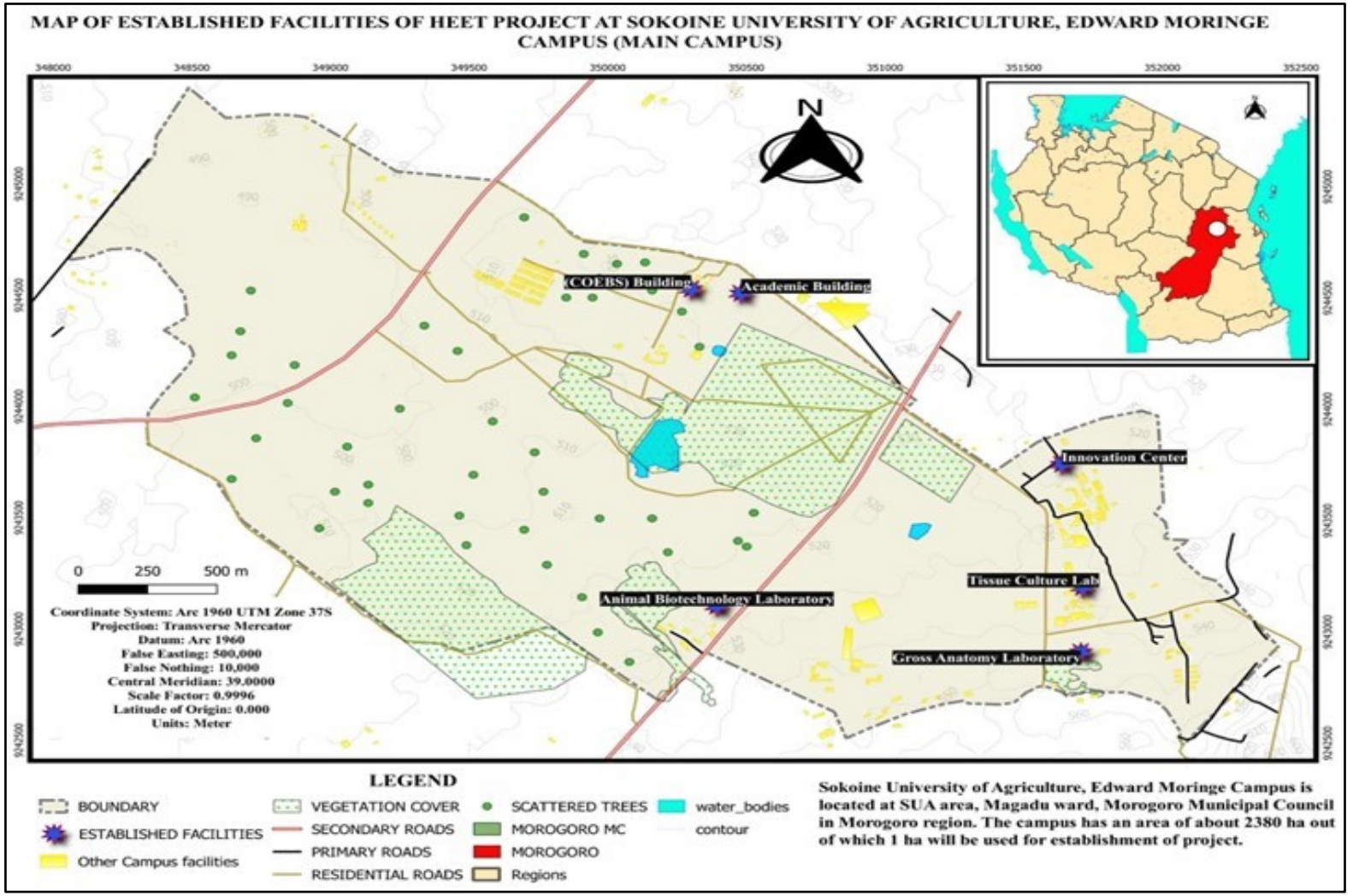

Figure 2:1: Location of the proposed project at SUA- Edward Moringe Campus

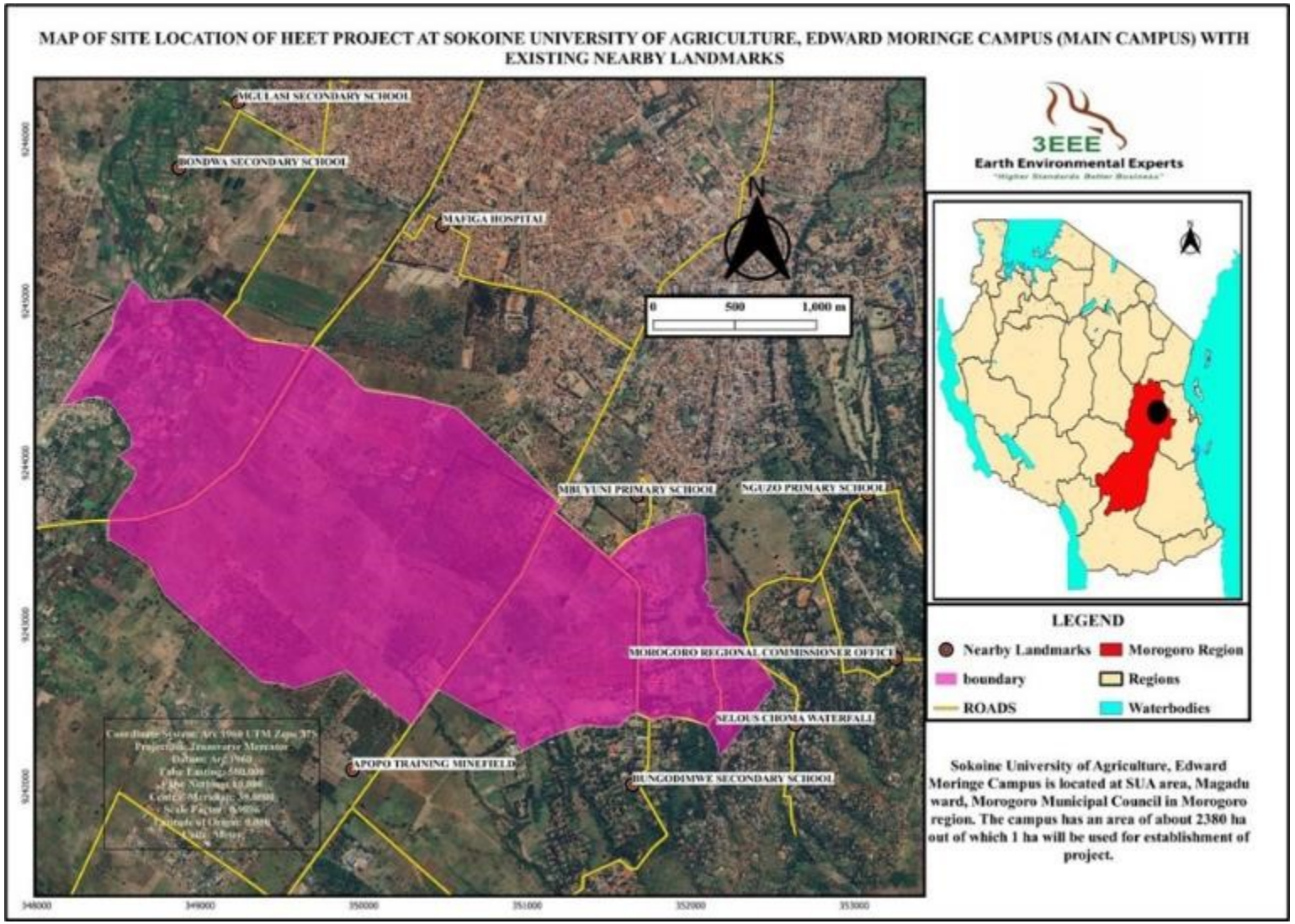

Figure 2:2: Map of proposed project site at Edward Moringe Campus with Existing Landmarks

2.2 Land Ownership

The project will utilize a portion of SUA's land, specifically 10,000 square meters out of their total landholding of 2380 hectares. This means that there will not be a need to acquire additional land beyond SUA existing property. As a result, concerns related to resettlement and compensation are not applicable, as the project will exclusively occupy land owned by SUA.

However, it is important to note that the chosen project site does not align with the current land use, which is designated for agricultural and pastoral purposes according to SUA master plan and title deed. Nevertheless, there is a notification letter from the regulatory authority proposing a potential change in land use for institutional purposes.

2.3 Project Site Description and Features

The current Sokoine University of Agriculture (SUA) Land Use Plan categorizes the campus into 11 zones dedicated to various functions, including estate management, livestock development, experimental farms, student accommodation, educational facilities, sports fields, mixed farming, agroforestry, teaching spaces, staff housing, and personal farms. The proposed Land Use Plan outlines ten key components: forestry and beekeeping, irrigation and horticulture farming, trade and shopping areas, hostel and recreation centers, research facilities, academic spaces, staff housing, additional student hostels, and research and training livestock farming. Each component's allocated land area falls within the existing SUA boundaries.

The proposed site features suitable soil conditions for various land uses, including farming, livestock rearing, and gardening. Both planted and natural vegetation surround the university, providing year-round greenery. According to the Tanzania Meteorological Agency, the area falls within a low-risk earthquake zone, prompting proper construction practices to ensure structural integrity and avoid potential future damage. The university area occupies gently sloping land with diverse plant life and natural vegetation. Existing trees within both developed and undeveloped zones contribute significantly to the overall landscape quality. This established greenery should be considered during building design to enhance the aesthetic appeal of both structures and the spaces between them. Moreover, these landscape elements positively influence the site's microclimate and visual aesthetics.

Agriculture, particularly food crop production, serves as the primary livelihood and income source for most residents in the surrounding Magadu Ward. Although some families raise domestic animals such as goats and poultry, cultivation of crops like maize, bananas, and vegetables remains the most dependable economic activity.

The project site enjoys excellent access to social services through a well-developed road network. Financial services like mobile money and bank services are readily available both within the Edward Moringe Campus and its neighbouring communities. During construction and operation phases, workers will have convenient access to these services. Additionally, the campus houses a hospital that can cater to potential healthcare needs during these phases.

2.4 Adjacent development

The proposed project site within the Sokoine University of Agriculture (SUA) campus currently lacks permanent structures. Existing facilities, including lecture rooms, offices, hostels, and canteens, are located in close proximity but outside the project boundaries. However, essential infrastructure elements like storm water drainage systems and paved and unpaved car parking areas are present within existing facilities. During construction, no extensive demolition is planned. The only anticipated demolitions involve minor modifications

to the College of Education and Business Studies' academic building for an extension and the installation of a lift in the administration building.

An environmental assessment revealed that the project site does not constitute a pristine habitat conducive to the thriving or existence of any species of conservation concern listed by the IUCN or CITES. Additionally, no sensitive ecological receptors or cultural or archaeological objects were identified within the project area during the feasibility study.

2.5 Project design considerations

The project's design philosophy centers around selecting environmentally friendly, durable, and vandalism-resistant construction materials that require minimal maintenance. This approach blends modern architectural principles with local government policies and guidelines from institutions like the Contractor Registration Board (CRB) and the Tanzania Commission of Universities (TCU) Architectural Metric Handbook. The goal is to create visually appealing, functional, and sustainable structures that meet the highest standards. This approach extends to all aspects of the project, including the rehabilitation, extension, and construction of various facilities at Edward Moringe Campus.

a) Ventilation

The design will cater for natural ventilation with features that encourage natural air circulation (including use of permanent air vents above all doors and windows);

b) Lighting

General lighting for public areas such as staircases, corridors, carparks, and staff circulation areas will be provided with LED luminaries for energy-saving purposes and supplied with solar PV (photovoltaics). All luminaries in all potentially wet areas and exterior installation shall be minimum. Lighting for the garden, landscape, lift lobbies, restaurants and general Offices will take into consideration both functional and aesthetic aspects. Lighting System for function room, corridor, Offices, and other front of house area will be designed in collaboration with the specialist and interior designer.

c) Sanitation

The number of toilets and washing hand basins will be selected according to the number of students and workers who will be using these facilities.

d) Waste Water Management

Wastewater will be treated in Wastewater stabilization ponds located at Edward Moringe Campus. The proposed new buildings will exert pressure on the existing treatment facilities. Once completed, the proposed new buildings will use the existing ponds for discharge of wastewater. So, the existing ponds are required to be managed well.

e) Sustainable Resource Use

The design of the buildings will incorporate landscaped gardens which will be planted with suitable species of trees/shrubs and grass to prevent ecological deterioration and improve aesthetic value of the site. Part of the excavated soil will be used for landscaping therefore reducing the amount of soil to be transported away from the site;

f) Solid Waste Management

The campus management will be required to contract a waste handler for proper collection and disposal.

g) Climate change risk mitigation and adaptation

The construction of new facilities attribute to increased climate change risks through vegetation clearance, pavement installation, stormwater management, and laboratory emissions. The clearing of vegetation disrupts the local climate balance, impacting temperatures and humidity. Pavements lead to localized temperature rises, creating an urban heat island effect. Poor stormwater management can cause flooding and erosion. Emissions from activities like laboratories contribute to greenhouse gases, exacerbating global warming.

To address these risks, the project design incorporates proactive measures. The use of energy-efficient materials, advanced stormwater management systems, and sustainable construction practices across the facilities helps mitigate climate-related challenges. Furthermore, by considering emissions from laboratories, minimizing vegetation clearing, and focusing on efficient wastewater management, the project takes a comprehensive approach to adapt to climate change risks. These strategies collectively enhance the facilities' resilience, ensuring they remain functional, efficient, and environmentally responsible in the face of evolving climate conditions.

h) Safety

The design prioritizes safety by adhering to relevant building codes and standards. Fire safety measures, emergency exits, and fire suppression systems are incorporated into the facilities. Structural integrity is ensured to withstand potential earthquakes or other hazards, reducing risks to occupants.

i) Disaster Preparedness

The project design takes into account disaster preparedness by incorporating disaster-resistant construction techniques and materials. The facilities are designed to be resilient to natural disasters such as earthquakes, floods, and storms. Emergency response plans shall be developed to guide actions in case of unforeseen events.

j) Inclusivity

The design of the SUA, Edward Moringe Campus facilities is characterized by a commitment to inclusivity and accessibility, with a particular focus on accommodating individuals with disabilities. An exemplary feature of this project is the installation of lifts in both the newly constructed buildings and the rehabilitated administration building. These lifts play a pivotal role in ensuring that individuals with mobility challenges, such as those who rely on wheelchairs or face difficulties with stairs, can access different levels of the facilities with ease.

Moreover, the project upholds the principles of universal design, wherein every aspect is meticulously considered to be accessible and user-friendly for everyone, regardless of their abilities. This encompasses wider doorways, accessible entrances, restroom facilities, well-designed pathways, braille signage, audio alerts, visual contrasts, and adjustable workstations. By embracing these universal design principles, the SUA facilities not only comply with accessibility standards but also foster an environment where all members of the community can fully engage, participate, and benefit from the educational and research opportunities offered by the university, reflecting a commendable dedication to inclusivity, equity, and social responsibility.

2.6 Project Components and Description

The proposed project encompasses both construction and rehabilitation work. Construction activities will involve the development of various facilities including academic building which will be of 4 storeys and each floor will be of 1400 m^2, A four storey Innovation Center with each floor offering 1,100 m^2, a single storey Animal reproduction and biotechnology laboratory building approximately 300 m^2 floor, a two (2) storey Gross anatomy laboratory building (vertical extension) approximately 450 m^2 each, one storey Tissue culture Lab building approximately 430 m^2 and one storey Biosecurity building approximately 220 m^2 and horizontal extension of three storey academic building at College of Economics and Business Studies (CoEBS) (ground plus two floors) each with 1200 square meters.

Rehabilitation works will include 10 lecture theatres (4 behind the administration building and 6 within the school of engineering) pasture lab and installation of lift shaft at administration buildings to enhance accessibility.

2.6.1 Academic Building

This building will be of 4-storey. The ground floor will consist of two (2) Lecture theatres with a capacity of at least 500 students each, Multi-disability Resource Center, Toilets, Ramp, stairs. The first floor will consist one lecture theatre (collapsible) with a capacity of at least 500 students and toilets. Second floor will consist two (2) lecture theatres with flexible dividers at the middle with a capacity of at least 500 students and toilets. Third floor and fourth floors will consist one computer laboratory with a capacity of at least 200 computers, One Video Conference facility with a capacity of at least 200 people, 18 Staff Offices (Senior staff), Office space – pool office (Junior staff),Tea Room/Kitchen and Toilets. Additionally, the building will consist of parking space while the capacity of parking space will be determined after completion of structural and architectural drawings.

The proposed site for the academic building is situated in proximity to the newly constructed hostels on the eastern side of the campus. The current ground cover comprises grasses and a variety of tree species, including *Acacia*, *Heracleum mantegazianum, Azadirachta indica, Pterocarpus officinalis, Styphnolobium japonicum, and Moringa oleifera.*

2.6.2 Laboratory Buildings

This will involve construction of different three laboratories which are animal reproduction and biotechnology laboratory, gross anatomy laboratory and tissue culture laboratory. Additionally, a perimeter fence will be installed around the tissue culture laboratory to enhance security and prevent unauthorized access. This laboratory will be used by all students at SUA including PhD, Master and undergraduate.

2.6.2.1 Animal Reproduction and Biotechnology Laboratory

This single-story structure, with an estimated net floor area of 300 m^2, laboratory will mainly be used for production of animal embryos and animal artificial insemination. Technology that will be used will be both in vivo and in vitro. Associated project component that will be constructed will include paddocks building. The proposed site is located nearby existing Animal Research Unit/SUA cattle farm (southern project site) along the road to Mzinga.

The proposed site currently contains grasses, herbs (Impatiens capensis), and trees (*Adansonia digitata, Pistacia atlantica*).

6.2.2.2 Gross Anatomy Laboratory

This double-story building offers an expanded space for dissection and practical studies, with an estimated net floor area of 450 m². This laboratory located within college of veterinary medicine and biomedical science. The constructed building will be interconnected with the existing gross anatomy laboratory,

The proposed site, currently devoid of vegetation, minimizes environmental impact and facilitates easier integration with existing facilities.

6.2.2.3 Tissue Culture Laboratory and Biosecurity Building

This complex comprises two single-story buildings. One storey Tissue Culture Laboratory with an estimated net floor area of 450 m² dedicated to advanced tissue culture techniques for postgraduate and undergraduate plant science research and practical training. One storey Biosecurity building approximately 220 m2. net floor area, ensuring safe handling and containment of potentially hazardous biological materials. Additionally, there will be installation of fence around tissue culture laboratory to enhance security and prevent unauthorized access

The proposed site, located near the existing African Seed Health Center building, SUA lecture theater, and APOPO (south-eastern project site), features grasses (*Acorus calamus, Poa trivialis*) and trees (*Trichilia dregeana, Tabernaemontana elagans, Brachychiton ruperstris*).

Both laboratories fall under the Department of Crop Science and Horticulture, College of Agriculture.

2.6.3 Innovation Center

This building will be of 4-storey. The ground floor will consist of ICT Innovation space, toilets, Common store, two (2) engineering hub spaces. The first floor will consist Six (6) offices, Seminar room, Boardroom, Tea room. Second floor will consist Nine (9) offices, two (2) seminar rooms, boardroom, Tea room. Third floor will consist Server room, studio room, multimedia room (Tv&Radio), four (4) offices, one (1) PhD room.

- **ICT Innovation Space**: Dedicated area for students and researchers to explore and develop innovations in information and communication technologies.
- **Common Store**: Centralized storage facility for equipment and materials.
- **Engineering Hub Space**: Collaborative workspace for engineering students and faculty to engage in project-based learning and research.
- **Offices**: Administrative offices dedicated to the center's operations.
- **Seminar Room**: Fully equipped space for academic presentations, workshops, and conferences.
- **Boardroom**: Dedicated space for executive meetings and decision-making.
- **Server Room**: Secure facility for housing and maintaining vital IT infrastructure.
- **Studio Room**: Multifunctional space for audio and video production activities.
- **Multimedia Room (TV and Radio)**: Dedicated space for broadcasting and media production activities.

- **PhD Room**: Quiet study space specifically designed for PhD students.
- **Tearoom**: Relaxing common area for informal interactions and social gatherings.

Additionally, the building will consist of parking space while the capacity of parking space will be determined after completion of structural and architectural drawings.

The proposed site for the Innovation Center is strategically located adjacent to the existing SUA new laboratory on the western side and the Bioprocess and Post-Harvesting Engineering building on the southern side. The current ground cover comprises grasses (Acorus calamus, Poa trivialis) and trees (Azadirachta indica).

2.6.4 Academic building at College of Economics and Business Studies (CoEBS)

This will deal with horizontal extension of an existing three storey Academic building located at College of Economics and Business Studies (CoEBS) (ground plus two floors) each with 1200 sqm each floor comprising of Well-designed classrooms with a capacity for at least 200 students, office spaces for efficient department operations, restroom facilities for student and faculty convenience, storage spaces for essential materials and equipment. Conference rooms for collaborative discussions and meetings, accommodating up to 25 participants. Seminar room for academic seminars, workshops, and presentations accommodating up to 50 participants.

The proposed site, currently covered by grasses and surrounded by a variety of trees (*Acacia, Albizia lebbeck, Albizia saman)*.

2.6.5 Administration Building

The Rehabilitation of Edward Moringe Campus Administration building encompasses various improvements, one of which is the installation of a lift. This building serves as a hub for offices and is also home to the Sokoine University of Agriculture television station on the third floor. The primary objective behind adding the lift is to enhance accessibility and support individuals with special needs, enabling them to navigate the building more conveniently. This proactive step is designed to create a more inclusive environment that caters to diverse mobility requirements and ensures that everyone can freely access all levels of the building without limitations. This enhancement aligns with Sokoine University of Agriculture's commitment to fostering a welcoming and accommodating space for all occupants.

2.6.6 Engineering Lecture Rooms

The Rehabilitation project for Engineering lecture rooms encompasses the renovation of Engineering 1-5 classes and the conversion of Engineering 6 classes into a laboratory, alongside the renovation of Engineers' offices in the Tractor's area. This strategic initiative aims to modernize learning spaces, foster hands-on learning experiences, enhance collaboration, and meet the evolving needs of students and faculty within the engineering department. By improving infrastructure, encouraging interaction, and supporting growth, the project reflects Sokoine University's commitment to delivering an enriched and forward-looking educational experience.

2.6.7 Offices and Lecture Rooms.

The Rehabilitation project for offices and lecture rooms is a comprehensive effort. It involves fixing the Main Office building's roofs in the Animal Science, Aquaculture, and Range Sciences Department, improving MLT 1-10 lecture rooms, and upgrading buildings in the Forestry department. These enhancements aim to make everything work better and provide improved spaces for teachers and students. By doing so, Sokoine University is emphasizing its commitment to delivering an improved learning experience and maintaining an environment that supports growth and excellence

2.6.8: Other Support Facilities and Services

The project will continue to use the existing wastewater stabilization ponds (WSP). The new facilities will be connected to the existing Wastewater Stabilization Ponds and the specific number of toilets to be built in each building will be determined after completion of the design phase. However, it is important to note that the existing WSP has the capacity to accommodate the additional facilities without any adverse impact on its operational efficiency. This ensures a sustainable and efficient wastewater management system for the proposed development.

2.7 Project Technology

The construction technology to be used in the project will employ light mechanization and high labor inputs. Locally available equipment's, construction materials and labor will be used, which will be provided by a locally registered contractor. Light earth moving equipments will be used at the initial stages especially in the excavation, removal, and transportation of soils. Transportation of building materials and waste debris into the site will also involve sizeable trucks.

Concrete mixing and mobile elevator equipment will be installed during the construction. Other equipment will include dump trucks and an assortment of hand tools. As such dust and noise will arise from the operations of the equipment and are likely to be issues of concern.

This requires the contractor to undertake the use of appropriate technology that will reduce the impact of both noise and dust at the construction site.

The project will employ a considerable number of workers at various stages of construction. This will include manual laborer, technicians, foremen and supervisors and a host of professional involved in various fields. Minimal staff will remain during the. A registered contractor and several subcontractors will undertake the construction process. All the construction process will be under the close supervision of the project engineer, county building inspectors and the project architect.

2.8 Description of main project activities

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

2.8.1 Mobilization/Preconstruction/Planning Phase

Planning phase for the project started in April 2023. Activities during mobilization phase will include;

a) Topographical Survey

In the SUA project planning phase, a topographical survey will be conducted to define property boundaries and assess ground elevations accurately. This survey involves mapping

natural and man-made features and is crucial for informed decisions on site layout, infrastructure placement, and environmental considerations. It ensures compliance with property boundaries and aids in identifying and addressing potential environmental and social impacts in the ESIA report.

b) Geotechnical Soil Analysis

The geotechnical investigation for this project is a critical phase that entails drilling into the ground to assess the soil profile and underlying geological formations. This process is essential for understanding the site's geological characteristics, including soil types, composition, and stability, which are pivotal in designing a structurally sound and safe construction. While the geotechnical survey is currently underway, its findings will be detailed in the appendix of the final Environmental and Social Impact Assessment (ESIA) report once the investigation is completed. This comprehensive data will inform engineering decisions, foundation design, and environmental considerations, ensuring that the construction aligns with safety standards and environmental responsibility.

c) Architectural and Structural Designs

Architectural design emphasizes the visual appeal and functional layout of the SUA project, while structural design ensures the building's safety. These aspects are integral to the ongoing SUA project. Approved drawings will be incorporated into the Environmental and Social Impact Assessment (ESIA) report. This inclusion will provide stakeholders with a comprehensive understanding of both the project's visual aesthetics and structural integrity, enabling well-informed decision-making prior to the commencement of construction.

d) Acquisition of Various Permits/ Certificates.

The acquisition of various permits and certificates for construction projects based on ESIA studies at SUA involves obtaining an Environmental Impact Assessment (EIA) certificate, a building permit, a land use permit, a water resource use permit, a waste management permit, occupational health and safety certificates.

2.8.2 Construction phase

The proponent (SUA) will contract a private construction company to construct the university facilities at Edward Moringe Campus project site. The contractor will be responsible for sourcing of materials, labor recruitment and actual construction and rehabilitation work. Construction and rehabilitation phase will include the following structures

i. Construction of new 4 – storey academic building
ii. Construction of new laboratory buildings (animal Reproduction and Biotechnology Laboratory, Gross Anatomy Laboratory, tissue Culture Laboratory and Biosecurity building including fence for provide security, containment, and controlled access.
iii. Extension of 3- storey academic building at the college of Economics and Business Studies (CoEBS).
iv. Construction of new Innovation Center building
v. Rehabilitation of existing Administration Block, Engineering lecture rooms and rehabilitation of offices and lecture rooms.

Construction work is labor intensive and requires skilled and unskilled manpower consisting of management, technical personnel and laborers. Skilled labor may include engineers, technicians, foremen, etc. The Contractor shall comply with the Employment and Labor

Relation Act No. 6 of 2004 and develop a recruitment and termination strategy to ensure the right skills required by the project can be sourced locally and give equal opportunities for all.

The contractor shall also comply with the Labor Institution Wage Order (2013) by paying there as per guiding labor laws in order to avoid unnecessary conflicts during the construction stage. Draft contracts shall be prepared by the Contractor, client and approved by WB and Labor Officer. Also to avoid child labor these laws as provided in POM 2021 were provided to the contractor;

- United Nations Framework Convention on Climate Change (1992)
- Relevant International Labor Organization (ILO) Conventions ratified by Tanzania including:
    - C138 Minimum Age Convention of 1973;
    - C182 Worst Forms of Child Labor Convention of 1999;

2.8.2.2 Description of the Project's Construction Activities

Construction activities will take 18 months after completion of the design stage. Approximated 100 people will be employed to work at the site when construction activities begin and most of them will be community living near project site. The construction activities will encompass various tasks, including site preparation, transportation of building materials, establishment of a workers' camp, erection of buildings, and installation of service infrastructure like access roads and parking facilities. Additionally, the project will involve the construction of drainage systems and utility networks to ensure efficient operation.

a) Site Preparation

Activities under site preparation will include land clearing, grading and excavation, construction of auxiliary structures such as access roads etc., leveling and earth marking. The vegetation cover including grass, and few trees on the site will be cleared. The proponent shall ensure as many indigenous trees as possible are used for re-vegetation as well as conserving the trees along the plot boundary.

b) Construction of the Worker Camp

The project contractor will build a workers' camp at the project site which will be used to provide residence for workers as well as act as project administration offices, storage facilities for different building materials and equipment, workshop for servicing the vehicles and construction machinery. A number of factors will be considered when selecting the camp site. The factors shall include topography of the site, accessibility of project site and availability of water and wastewater system.

Toilets as well as bathrooms shall be constructed on the site for use by the workforce. The ground shall be covered with aggregate stone to minimize dust and prevent mud when it rains. Retention bunds shall be constructed around fuel and oil storage areas and all drainage and effluents from the workers' camp shall be treated before being discharged into the drainage system.

c) Construction of Buildings

Main activities of the proposed project during construction of academic facilities will include but not limited to the following:

- **Excavation and Foundation Works**

Excavation of trenches and topsoil will be carried out using hand tools/local tools. Most of the soil will be utilized in backfilling to the foundation as well as general landscaping of the project site.

The depth of a building's foundation is typically determined after the completion of the design phase, during the detailed engineering and construction planning stage. This determination relies on factors such as site-specific soil assessments, structural calculations, and local regulatory requirements. Engineers, in collaboration with geotechnical experts, analyze the finalized design to ascertain the precise foundation depth needed to ensure structural stability and compliance with safety standards. This determination is a critical step that occurs after the design is complete and serves as a foundation for the construction phase.

The foundation will be built using stones, concrete, cement and steel bars. This process will generate some noise, smoke and dust especially from the operating machinery and cement respectively. However, workers will be sensitized on the use of personal protective equipment and management of air pollution from construction machinery.

- **Masonry, Concrete Work and Related Activities**

The project activities will involve a lot of masonry work and related activities including stone and crushing, mixing by use of both manual and mechanical means. These activities are known to be labour intensive and a source of air pollutants.

- **Structural Steel Works**

The building will be reinforced with structural steel for stability. Structural steel works will involve steel cutting, welding, and erection.

- **Electrical Work**

Electrical work during construction of the premises will include installation of electrical gadgets, devices and appliances including electrical cables, lighting apparatus, sockets etc. In addition, there will be other activities involving the use of electricity such as welding and metal cutting. All the electrical works will be carried out by a licensed electrician to the satisfaction of the Tanzania Electrical Supply Company (TANESCO).

- **Civil Works**

The mechanical work shall be done by qualified technicians under the supervision of the Project Mechanical Engineer and shall follow the set standards. The works will include the following:

i. Plumbing and drainage Service ducts accessible from all floor levels
ii. Soil vent pipes (SVP) provided on doors and windows
iii. Storm drains pipes
iv. Inspection chamber covers and framing
v. Underground foul and waste drainpipes

➢ **Construction Equipment**

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

- Bull Dozers for clearing the site, removal of topsoil and vegetation materials, and pushing out stumps.
- Graders for grading and levelling land for buildings and access road formation.

- Tippers/lorries for transporting construction materials.
- Light machinery like pedestrian rollers for access road compaction.
- Front end loader for loading materials onto tippers and lorries.
- Several light equipment-like shovels, picks.
- Concrete mixers.
- Compactor.
- Wheelbarrow; and
- Hammers and bolt and nut fasteners, hand saw, electric and gas welders, electric saws and grinders, load roller, trucks, hand drills and drill bits, wire cutters, trucks, wheel loader, forklift, excavator etc.

➢ **Construction Materials**

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

Other materials such as cement, concrete block, paints, timber, roofing materials, windows, doors and other joinery, tilt and roller doors, wallboard and plasterboard, light fittings, fuel and oil, electricity, water, ceramic tiles, steel, pipes, adhesives, copper wires, gas (acetylene and oxygen), cardboard will also be outsourced for the project.

Local quarries will be inspected and aggregates which will be used will be tested and certified. Care shall be taken not to use admixtures containing calcium or chlorides, as these will increase the risk of reinforcement corrosion. Plasticizers will be considered, as increased workability is advantageous when working with complex shaped structures and structural forms.

Whoever contractor that will be awarded the construction bid will adhere to Health, safety and Environmental (HSE) standards as per construction regulations. SUA will have the Key personnel who will be responsible for checking the HSE Standard operation procedures (SOP) to comply with the legal requirement.

➢ **Sourcing of Materials**

The materials for construction will be derived from authorized areas whereby only licensed people will be allowed to collect materials. The authorized quarries include Mvomero quarry for sand, and Lugoba quarry for Gravel. The Contractor is not responsible to extract construction materials rather than purchasing only to licensed suppliers. Types, sources, and quantity of project requirements during the construction phase are shown in Table 2.8 whilst the quantities of materials will be indicated in the Bill of Quantities (BOQ).

- **Transportation of Materials**

Materials (Sand and gravel) from quarries will be transported by trucks to the construction site. Water will be moved by water bowsers and pipes from Mzinga River while Electricity will be supplied by TANESCO. Other materials like cement, timber, aluminum sheets, steel tress, and reinforcement bars will be transported by trucks to the construction site from authorized local vendors/suppliers**.** The contractor will be responsible for the transportation of all construction materials and equipment from point of sourcing to the site mainly by using well established road network from Morogoro CBD to Edward Moringe Campus through University Road (SUA road). The transportation of materials shall take into account the Environmental and Social Standards (ESS4): Community health and safety.

- **Storage of Materials**

Some of the materials from borrow sites will be used directly after delivery and as such no piling up is expected. Other materials like aggregates and sand will be stored at the specific designated area with all safety hazards pre-cautions prior to be used. Cement and reinforcement bars will be stored in special storage rooms. Timber will be used directly and consequently there will be no stockpiling of timber at the project site area.

Types, Amounts and Treatment/Disposal of Wastes

Types, amounts and treatment/disposal of wastes during the construction phase are shown in Table 2.1

Table 2.3: Types, amounts and treatment/disposal of wastes during the construction phase

Waste	Types	Amount	Treatment/ Disposal
Solid Waste (Degradable)	Vegetation (Trees, Grass) and Remaining Timber	An estimated 250 m^3 of biomass	Source of energy for coking for resident's neighbour to project site
	Food Remains, Cardboard and Paper	25 kg/day (based on generation rate of 0.25 kg/day/ person for 100 people)	To be collected in the large skip bucket at site then to be composed and used as manure
Solid Waste (Non-Degradable)	Demolition Waste and Topsoil	50-65 m^3	Backfilling materials in cut sections
Liquid Waste	Sewage	1.8 m^3/day (based on 100 people, water consumption rate of 40L/capita/day and wastewater discharge factor of 80%, 50% of the workers shall use the Site Toilet)	All liquid waste should be discharged to the water stabilization ponds located at Edward Moringe Campus for treatment before discharged to the environment

Source: *Consultant Analysis, 2023*

2.8.3 Rehabilitation Phase

Rehabilitation, in the context of the development project at Edward Moringe Campus, Sokoine University of Agriculture, is a critical phase aimed at revitalizing and improving the existing infrastructure. This phase focuses on renewing and upgrading various components of the campus, including the administration block, engineering classes, offices, lecture rooms, and more. The overarching goal of rehabilitation is to enhance the functionality, safety, and overall usability of these facilities, ensuring they align with modern standards and accommodate the diverse needs of students, faculty, and staff. Within this context, several key activities are undertaken to achieve these objectives effectively.

2.8.3.1 Description of the Project's activities during Rehabilitation activities

a) Site Assessment and Evaluation

Before any rehabilitation work begins, a comprehensive site assessment and evaluation are conducted. This involves a detailed inspection of the administration block, engineering classes, offices, and lecture rooms. The purpose is to identify structural issues, safety concerns, and areas that require repair or renovation. This initial step provides the necessary information to develop a clear plan for the rehabilitation project.

b) Lift Installation

One of the key priorities is to enhance accessibility. The installation of a lift in the administration block is a crucial component of this effort. This lift will provide individuals with special needs, such as those with mobility challenges or disabilities, with easier access to different levels of the building, ensuring that they can fully participate in educational and administrative activities.

c) Roof Repairs

Roofing plays a critical role in protecting the building from weather elements. Roof repairs involve identifying and addressing issues like leaks, damaged roofing materials, and structural weaknesses. Proper roof maintenance ensures that the building remains structurally sound and prevents water damage that can lead to further deterioration.

d) Ceiling Replacements

The condition of ceilings in offices and lecture rooms greatly affects the indoor environment. Damaged or outdated ceilings can compromise aesthetics and functionality. Replacing them with modern materials not only improves the overall appearance of the spaces but can also enhance acoustics, lighting, and insulation, creating a more comfortable and productive atmosphere.

e) Electrical System Re-installation

Upgrading the electrical systems is essential for safety and efficiency. Outdated systems may not meet current safety codes or energy standards. Reinstallation involves rewiring, replacing electrical panels, and ensuring that all electrical components are up to date.

This ensures reliable power distribution, reduces the risk of electrical hazards, and improves energy efficiency.

f) Student Toilet Upgrades

Hygienic and well-maintained restroom facilities are vital for the comfort and well-being of students and staff. Upgrades may involve refurbishing toilets, sinks, and fixtures, as well as

improving ventilation and plumbing systems. These improvements contribute to a healthier and more pleasant environment for campus users.

g) Painting

Painting the interior and exterior of the buildings serves both aesthetic and protective purposes. It rejuvenates the appearance of the structures and protects them from environmental wear and tear. Properly applied paint can also help seal surfaces, preventing moisture infiltration and preserving the integrity of the building materials.

d) Replacement of Doors and Windows

Doors and windows play a critical role in building security, insulation, and energy efficiency. Replacing old or damaged doors and windows with modern, energy-efficient models enhances the overall building performance. It can also improve natural lighting and ventilation within the spaces.

e) Classroom Conversion

Transforming an engineering class into a laboratory involves outfitting the space with specialized equipment, utilities, and safety features. This conversion enables the facility to support research and practical activities, creating a more versatile and functional learning environment.

f) Quality Control and Testing

Throughout the rehabilitation process, rigorous quality control measures are implemented. This involves continuous inspection and testing to ensure that all work meets the required construction standards and specifications. Quality control helps identify and rectify any issues promptly, ensuring the longevity and safety of the rehabilitated facilities.

2.8.3.2 OHS During construction and Rehabilitation phase

SUA with support from the supervision consultant will ensure regular training to permanent and temporary workers (including community workers) on occupational health and safety awareness together with information relevant to health risk including Cholera, HIV/AIDS, and COVID-19. During the construction period, the contractor shall provide, equip and maintain adequate personal protective equipment, first-aid stations and safety sign boards. Appropriate protective gear including, but not limited to helmets, heavy-duty gloves, safety vests and boots, shall be provided to site workers and visitors.

Training related to traffic hazard management will be provided to students, especially through SUASO Leaders so that each student will not be affected by traffic during construction. The speed limits for vehicles shall not exceed the default speed limit (not exceeding 50 km/h), except within a speed zone in which a higher speed is permitted. The speed limit in the shared zone that should not exceed 10 km/h. Signals that a driver shall not turn right or left, or stop or suddenly decrease speed, without giving warning of his or her intentions. Contractors shall make sure that all of these issues are well known to their employed drivers to prevent unnecessary complications and accidents during project execution. However, the entrance and exit points have been provided. The entry point at SUA main gate will be properly used to avoid interference with normal university routine.

2.8.4 Demobilization Phase

After completion of all construction and rehabilitation activities, the contractor has to demobilize and leave the site clean and neat for the operation phase. Contractor ‘s

demobilization phase will involve clearing of all site activities in terms of tying up of all site facilities and removal of all construction equipments. Disposal of any remaining unwanted material and waste will also be carried out during this demobilization phase. After the demobilization, the contractor will hand over the works to the project Proponent for the operation and maintenance phase.

2.8.4.1 Products and by-products from Construction, Rehabilitation and Demobilization Phase

This section addresses the expectations regarding the production of different products, by-products, and wastes throughout both the construction, rehabilitation and demobilization stages of the project. Detailed information about the attributes of these products and by-products is provided herein.

- **Products**

During the construction, rehabilitation, and demobilization phases of the project outlined in the ESIA report, several noteworthy products and outcomes emerge. In the construction phase, these include the development of key facilities such as the Innovation Center, academic building, and specialized laboratories, expanding SUA's infrastructure to cater to diverse educational and research needs. Simultaneously, the rehabilitation phase focuses on enhancing the existing campus, with specific improvements in the administration block and engineering classes. Notable upgrades encompass accessibility enhancements through the installation of a lift, structural improvements like roof repairs and ceiling replacements, electrical system modernization, and the rejuvenation of offices, lecture rooms, and student facilities. Furthermore, during the demobilization phase, efficient dismantling and removal of temporary structures and the responsible management of by-products, such as recyclable materials and waste, are vital products of the project. Collectively, these phases and their associated products align with SUA's commitment to providing a modern, inclusive, and sustainable campus environment to support its academic and research missions.

- **By-products**

By-products generated during the project are materials or items that are produced as a result of construction or other project activities but are not part of the project's main objectives. Proper management of these by-products is essential to minimize waste, reduce environmental impact, and, in some cases, realize cost savings. Here's an explanation of the by-products and how they will be disposed of:

i. Soil

Soil can become a by-product during construction when excavation and earth-moving activities generate excess soil. Proper management involves retaining usable soil for potential future use within the project area to reduce the need for importing new soil, promoting cost-effectiveness and environmental responsibility. However, any soil deemed unsuitable for project purposes, often due to quality issues or contamination, will be transported to designated dumping sites or landfills for proper disposal, ensuring compliance with environmental regulations and minimizing environmental and health risks. Effective soil management during construction is essential for safety, waste reduction, and adherence to environmental standards.

ii. Excess Sand, Ballast, and Stockpiles

Excess construction materials like sand, ballast, and stockpiles, which accumulate during the project, are not wasted but rather stored for future use. The contractor will transport these materials to a suitable yard, allowing for their potential reuse in upcoming projects or renovations. This sustainable approach minimizes the demand for new materials, aligning with eco-friendly construction practices and optimizing resource utilization.

iii. Construction and Rehabilitation Debris

Construction and rehabilitation debris at SUA encompass materials such as broken concrete, bricks, wood, cement bags and various other building materials that are generated during demolition, renovation, or construction activities within the campus. These materials may result from the removal of old structures, damaged components, or the installation of new infrastructure. An essential aspect of managing this debris is to recognize its potential for recycling or repurposing. For instance, concrete rubble from demolished structures can often be crushed and reused as aggregate for new construction projects, reducing the demand for new raw materials. Similarly, bricks and wood can be salvaged, refurbished, or repurposed, contributing to sustainability goals and minimizing waste generation during the construction and rehabilitation phases at SUA.

iv. Unused Construction and Rehabilitation Materials

During the rehabilitation phase at SUA, surplus construction materials that remain unused at the end of the project, which may include bricks, tiles, insulation, or piping, should be properly managed. This includes storing them for potential future use in rehabilitation or construction projects within the SUA campus, donation to charitable organizations, or sale to minimize waste and maximize cost-effectiveness.

Additionally, as part of the rehabilitation activities, ceiling and painting renovations may generate materials like old ceiling panels and unused paint, which should also be managed efficiently. Furthermore, toilet rehabilitation may involve the replacement of fixtures and plumbing components, resulting in by-products like old toilets and plumbing fixtures. Proper management of these surplus materials during the rehabilitation phase at SUA is essential to promote sustainability, reduce unnecessary waste, and ensure the effective reuse or disposal of these items.

v. Temporary Structures and Facilities

Temporary structures like construction trailers, portable offices, and temporary fencing are typically used during the construction phase and need to be disassembled and removed. These materials can often be repurposed or recycled.

In summary, the proper disposal of by-products generated during the project reflects a commitment to environmental responsibility and resource efficiency. Reusing, repurposing, or disposing of these materials in an environmentally friendly manner not only minimizes waste but also contributes to the overall sustainability and cost-effectiveness of the project.

2.8.4.2 Types and treatment/disposal of Wastes

The demobilization of the temporary structures will result mainly in solid wastes such as timber, iron sheets and rubble from demolitions. Timber and iron sheets will be sold to people in the nearby communities for reuse while the rubble will be used in reinstating nearby roads or being disposed in a dump site.

2.8.5 Operational and Maintenance Phase

The actual usage of the new university buildings, rehabilitated buildings and their ancillary facilities is expected to commence immediately after the construction works. The completed project will be directly managed by Sokoine University of Agriculture. During this time SUA will carry out routine maintenance and regular rehabilitation

2.8.5.1 Description of the Project's Activities During Operational and Maintenance Phase

i. Laboratory Utilization and Research

Specialized laboratories, including the Gross Anatomy Laboratory, Tissue Culture Laboratory, and Animal Reproduction and Biotechnology Laboratory, will be actively utilized for conducting experiments, in-depth research, and hands-on learning experiences. Faculty members, researchers, and students will work collaboratively to push the boundaries of scientific understanding, resulting in new discoveries and innovative solutions that contribute to various fields.

ii. Innovation Center Activities:

The innovation center will play a pivotal role as a central hub for hosting diverse activities such as workshops, seminars, and interdisciplinary collaborations. This space will foster a culture of creativity and critical thinking, encouraging participants – including students, researchers, and experts from different industries – to brainstorm, problem-solve, and exchange knowledge. Such interactions will lead to the development of practical solutions and innovative ideas that address complex challenges.

iii. Academic Engagement:

Within the academic buildings, a dynamic learning environment will flourish through engaging lectures, discussions, and academic activities. Students will actively participate in classes, engaging in debates and presenting their projects. This active participation not only enhances their understanding of subjects but also nurtures important skills such as communication, critical thinking, and teamwork, setting the stage for their future success.

iv. Energy Efficiency Measures

The commitment to energy efficiency will be evident through ongoing practices. By closely monitoring energy consumption and ensuring the effective functioning of energy systems, resources will be used optimally. Regular assessments will provide valuable insights into energy usage patterns, enabling necessary adjustments to promote even greater energy conservation across the campus.

v. Waste Management

Waste management during the operation phase of university facilities is crucial for maintaining a clean and sustainable environment on campus. Effective waste management practices not only reduce the environmental impact of the university but also promote a culture of sustainability among students, staff, and the surrounding community. Here are some key aspects to consider depending on the type of waste generated.

vi. Environmental Monitoring

Environment monitoring will be maintained to assess and manage the impact of operations. This monitoring encompasses various aspects, including tracking energy usage, waste generation, and water consumption. Insights gained from regular assessments will guide

refinements in practices, ensuring that the university remains aligned with its sustainability goals.

vii. Cleaning

The proponent will be responsible for regular washing and cleaning of the pavements and communal areas. Individual tenants will be responsible for washing and cleaning their own premises/ residences. Cleaning operations will involve the use of substantial amounts of water, disinfectants, and detergents.

viii. General Repairs and Maintenance

During the operational phase of the project, regular maintenance and repairs will be conducted on the buildings and associated facilities. This includes repairing walls, floors, electrical gadgets, and equipment, as well as addressing issues with refrigeration equipment, leaking water pipes, and conducting painting and material replacements. This commitment to consistent maintenance ensures a conducive and safe environment within the campus, promoting a positive and secure atmosphere for learning and work. Routine checks, necessary repairs, and proactive measures will be implemented to ensure the smooth operation of all elements.

2.8.5.2 Laboratory Chemicals and Handling During Operation

i. Tissue Culture Laboratory

In the Tissue Culture Laboratory, various chemicals play a pivotal role in supporting cell culture and research activities. These chemicals include culture media (such as Dulbecco's Modified Eagle Medium and RPMI 1640), antibiotics (e.g., penicillin and streptomycin), growth factors, cytokines, and reagents essential for cell culture maintenance. To ensure the integrity of cell cultures and prevent contamination, stringent aseptic techniques are paramount. Researchers must work within laminar flow hoods, wear sterile gloves, lab coats, and face masks when handling these chemicals. Proper labeling of containers with chemical names, concentrations, and dates is crucial. Used media and contaminated materials should be disposed of as hazardous waste following established protocols.

ii. Biosecurity Building

The Biosecurity Building is anticipated to use a range of chemicals, including disinfectants (such as chlorine-based solutions), decontamination agents, and antiseptics. These chemicals are fundamental for maintaining a secure environment. It is imperative to store these chemicals securely in designated areas with limited access. Personnel working in this laboratory should wear appropriate personal protective equipment (PPE), including gloves, goggles, and lab coats. Chemical handling and decontamination procedures should take place in specialized containment areas. Clear and well-documented protocols for emergency response to chemical spills or releases, including the use of emergency showers and eyewash stations, should be established.

iii. Animal Reproduction and Biotechnology Laboratory

Within the Animal Reproduction and Biotechnology Laboratory, a range of chemicals is expected to be used. These may include cryoprotectants like dimethyl sulfoxide (DMSO) and glycerol, hormones (e.g., gonadotropins, prostaglandins), and various components of cell culture media. Ensuring the safety of laboratory personnel and the integrity of research materials, such as gametes and embryos, is paramount. Proper handling of cryogenic materials

involves the use of protective clothing, including face shields and cryogenic gloves. Researchers must adhere to precise dosage and handling instructions for hormones and reagents. Moreover, maintaining a sterile environment is critical for biotechnology research.

iv. Gross Anatomy Laboratory

In the Gross Anatomy Laboratory, the primary focus is on anatomical studies involving cadaveric specimens and histological examinations. Chemicals commonly used may include formaldehyde (or other fixatives) for preserving cadaveric specimens and histological staining agents like hematoxylin and eosin (H&E stains). Handling formaldehyde requires strict adherence to safety measures, including adequate ventilation and the use of PPE, such as lab coats, gloves, and respiratory protection when necessary. Chemical storage should be done in designated areas with proper ventilation, ensuring separation from incompatible substances. Disposal of formaldehyde-contaminated materials should follow established guidelines for hazardous waste disposal.

For all laboratories, access to safety data sheets (SDS) for each chemical is essential, as these sheets provide detailed information on chemical properties, hazards, and safe handling procedures. Regular safety training and inspections, along with well-documented emergency response plans, are integral to ensure compliance with safety protocols and mitigate potential risks associated with chemical handling within these laboratory settings.

2.8.5.3 Waste Management during Operation Phase

a) Solid Waste Management

During the operation phase of university facilities, a key aspect of solid waste management is promoting sustainable practices among occupants. This involves implementing effective recycling programs, minimizing packaging waste, and encouraging responsible waste disposal. Regular waste collection and disposal routines must be established to ensure proper waste management. Specialized laboratories should maintain waste segregation protocols to safely dispose of non-hazardous laboratory materials. Offices within these buildings should also prioritize recycling and waste reduction.

During an operation, it's important to provide sanitary pads to menstruating patients, ensuring their comfort and hygiene. These pads can be disposable or reusable, placed correctly, and changed as needed. Maintaining privacy, dignity, and infection control is crucial, and post-operative care should include monitoring and assistance if necessary.

b) Liquid Waste Management

Efficient liquid waste during the operation phase will be managed through the septic and soak away pit, MORUWASA sewerage system and existing university wastewater stabilization ponds within the university facilities. This includes capturing and treating wastewater from sinks, drainage systems, and restroom facilities. Sustainable buildings, such as academic buildings and the Innovation Center, should continue to recycle non-potable water and minimize wastewater. Laboratories need to ensure that liquid waste generated during experiments is treated and disposed of according to environmental regulations. Also waste water from laboratories will be managed through construction of clay chambers that will absorb chemicals before discharging final effluents to the wastewater management system.

The proximity of Mzinga river, situated just 8.1 kilometers from the project site, accentuates the need for stringent measures to prevent any potential contamination of the river and protect the surrounding environment. To achieve this, strict compliance with environmental

regulations and responsible waste disposal practices are imperative to safeguard the water quality of the Mzinga river.

Concurrently, the management of wastewater stabilization ponds (WSP) is rigorously executed to prevent contamination of nearby water sources, notably Mzinga river. Effective oversight involves regular monitoring, maintenance, and adherence to environmental regulations to ensure these ponds efficiently treat wastewater and meet stringent discharge standards. Proper maintenance procedures, including sludge removal and structural integrity checks, are vital, along with ongoing training for personnel responsible for wastewater management. Additionally, the establishment of emergency response plans to address accidental spills or system failures is crucial to prevent any adverse environmental impacts.

c) Stormwater Management

During the operation phase, the sustainable design features academic buildings, the Innovation Center, and other facilities should continue to be maintained. This involves ongoing care for rainwater harvesting systems and the upkeep of permeable surfaces to control and reuse stormwater effectively. Specialized laboratories should regularly inspect and maintain proper drainage and containment measures to prevent potential contamination of stormwater by laboratory chemicals. Routine checks of drainage systems in office and academic buildings are crucial to ensure that stormwater runoff is managed efficiently.

d) Hazardous Waste Management

Hazardous waste management during the operation phase, especially in specialized laboratories within the university facilities, is critical. Strict protocols for the handling, storage, and disposal of hazardous materials must be consistently followed, adhering to relevant regulations. This includes proper labeling of hazardous waste containers and regular training for laboratory personnel on safe handling practices. Continuous monitoring and oversight are essential to maintain compliance with hazardous waste regulations. Disposal of hazardous wastes will be conducted by certified dealers.

2.8.5.4 OHS During Operation Phase

Occupational health and safety considerations during the operation of the constructed and rehabilitated facilities at Sokoine University of Agriculture (SUA) are paramount. As detailed in the project's design and emergency response plans, proactive measures are in place to address various potential emergency situations. These measures include the allocation of emergency assembly points and the development of comprehensive emergency procedures to prevent and mitigate the consequences of incidents. The project places a strong emphasis on addressing Occupational Health and Safety (OHS) hazards inherent in daily operations. These hazards encompass risks such as disease outbreaks, fire, explosion, and security concerns. To mitigate these risks, the facilities will be equipped with essential safety measures, including powder foam fire extinguishers, fire hose reels, and fire detectors strategically placed throughout the site. Regular servicing of these safety features ensures their effectiveness in safeguarding the well-being of SUA's staff, students, and visitors during the operational phase of the newly constructed and rehabilitated facilities, reinforcing a commitment to a safe and secure learning and working environment.

2.8.6 Decommissioning Phase

This is the final demise of the building, and its services use value. The decommissioning entails demolition of the structures and other appurtenances. However, decommissioning of the project is not anticipated to be done in the near future.

2.8.6.1 Activities During Decommissioning Phase

i. Demolition Works

Upon decommissioning, the project components including buildings, pavements, drainage systems electrical systems, and perimeter fence will be demolished, and a lot of solid waste will be produced. Some of the waste will be reused for other construction works or if not reusable, will be disposed of appropriately by a licensed waste disposal contractor.

ii. Dismantling of Equipment and Fixtures

All equipment including electrical equipments and finishing fixtures partitions will be dismantled and removed from the site during decommissioning of the project. Priority will be given to reusing this equipments in other projects. This will be achieved through resale of the equipment to other building owners or contractors.

iii. Site Restoration

Once all the waste resulting from demolition and dismantling works is removed from the site, the site will be restored through refilling of the topsoil and revegetation using indigenous plant species. This will be done after acquiring demolition permit from relevant authority and experts

2.9 Gender Analysis and Mainstreaming

The constitution of Tanzania of 1977, The pursuit of Ujamaa and Self-Reliance Act No.15 as amended in 1984 clearly stipulates equal rights for both men and women and prohibits any form of discrimination based on gender, colour, tribe, religion or station in life. Tanzania has signed and ratified both international and Regional Instruments such as the Elimination of All Forms of Discrimination against Women in 1987; the African Charter on Human and Peoples' Rights on the Rights on Women in Africa in 2005. Currently, Tanzania has achieved gender parity at primary school enrolment rates, this can be attributed by free education policy introduced through the Circular 5 of 2015 which implements the Education and Training Policy of 2014. This circular responded to strategies of eliminating discrimination based on gender.

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

2.10 Project Boundaries

Identification of project boundaries where the study is undertaken is an important component of the environmental and social assessment study. There are three types of boundaries that are considered in this project: institutional, temporal and spatial boundaries.

2.10.1 Spatial Boundaries

Spatial boundaries relate to a consideration of the extent to which the proposed project will affect the surrounding environment and to the way the environment is likely to impact on the

project activities. Thus, spatial boundaries were considered in terms of the core impact area, the immediate impact area and area of influence. The core impact area constitutes the area that will be immediately and directly be affected by the actions undertaken during the project implementation; this includes all the areas covering the project and area where other associated infrastructure (e.g., transmission lines and storage facility) will be constructed.

The immediate impact area will comprise of areas outside the core zone where human or natural activities are likely to affect directly on or be impacted by the activities taking place in the core area. In the proposed project, the immediate impact area will include the existing settlements around SUA.

The area of influence refers to the greater area that is not subject to direct contact with the project but is directly or indirectly affected by or affecting the project. This includes activities taking place outside of the geographical core area and area of immediate impact but will still have influence on the project or vice versa.

2.10.2 Institutional Boundaries

Institutional boundaries refer to those institutions and sectorial boundaries in which the project lies or is mandated. These can be determined from political boundaries, Acts, regulations and institutional mandates and administrative structures. The proposed development is about the construction of new SUA buildings. Many institutions and administrative units in Tanzania are of interest:

- President Office,
- Regional Administration and Local Government (PORALG)
- Morogoro Municipal Council
- Ministry of Education, Science and Technology (MoEST)
- Tanzania Commission of Universities (TCU)
- Fire and Rescue Force
- Occupational Safety and Health Authority (OSHA)
- MORUWASA
- TANESCO
- Wami/ Ruvu Basin Water Board (WRBWB)
- Magadu ward office
- Magadu ward Community

These institutions will have been consulted in this EIA process, as they are key stakeholders with vested interest in the development at SUA for environment and economic prosperity of the local people and Tanzanians in general.

2.10.3 Temporal Boundaries

Temporal boundaries refer to the lifespan and reversibility of impacts. For example, the impact of construction work for the affordable housing project may be short-lived, but the presence of these buildings in the selected site may have implications that stretch far into the future until decommissioning is undertaken. Also, temporal boundaries extend into the past if there are unresolved land acquisition issues, but For SUA project there is no acquisition of land because the project will utilize the SUA land which is already set for the project. In addition, consideration needs to be given to what happens when the project ends, where there is a need for site restoration and decommissioning of the water supply system.

Therefore, some of the impacts that may occur during construction and rehabilitation activities, e.g., noise caused by bulldozers will disappear as soon as the construction phase is completed. The construction period will last for eighteen months while the operational phase is designed for more years (approximately 100 people) unless unforeseen events occur.

2.11 Project Budget and Life Span

The project has been granted a substantial budget of TZS **15,085,595,138.00** generously provided by the World Bank through the Ministry of Education, Science, and Technology as part of the Higher Education for Economic Transformation initiative. The construction and rehabilitation works are planned to be complete within 18 months' timeframe.

The anticipated project lifespan extends significantly into the distant future, emphasizing a long-term perspective. This foresight is integral to engineering design, where structures are meticulously planned to remain operational and effective for an extended duration. Engineers prioritize resilience and sustainability, ensuring that the facilities can withstand the tests of time while considering adaptability to evolving needs. Provisions for ongoing maintenance and upkeep further underscore the commitment to enduring and functional infrastructure.

CHAPTER 3: POLICY ADMINISTRATIVE AND LEGAL FRAMEWORK

3.1 Environmental management regulation in Tanzania

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

3.2 Policies relevant to the project

Table 3.1: ***Policies relevant to the project***

	POLICIES	DESCRIPTION	COMPLIANCES
1.	**The national environment policy for mainland (NEP 2021)**	The National Environment Policy (NEP, 2021) was adopted following the review of the NEP (1997) which identified the six environmental challenges namely land degradation, lack of accessible good quality water for rural and urban inhabitants, loss of wildlife habitats and biodiversity, deterioration of aquatic systems, deforestation and environmental pollution.	SUA will ensure adherence of the policy.
2.	**The National Land Policy (2019)**	The aim of a National Land Policy is to promote and ensure a secure land tenure system, to encourage the optimal use of land resources, and to facilitate broad.	Edward Moringe Campus possesses a certificate of occupancy and diligently fulfills its land rent obligations.
3.	**The Construction Industry Policy (2003)**	This policy aims to support sustainable development, include the promotion and application of cost effective and innovative technologies and practices.	This project is in-line with this policy as ultra-modern technology shall be used during construction and its operation.
4.	**The National Gender Policy (2002)**	The key objective of this policy is to provide guidelines that will ensure that gender sensitive plans	This project shall ensure that women will be adequately

		and strategies are developed in all sectors and institutions.	involved at all levels of project implementation.
5.	**The Energy Policy (2015)**	Te Energy Policy recognizes energy as a critical aspect for the national economic development. The overall policy objective is to provide an input to support the national economic development process	This ESIA study is in line with the policy requirement and will ensure compliances.
6.	**National Women and Gender Development Poli cy (2000)**	This policy aims to improve opportunities for women and men to play their full roles in society, recognizing specific gender requirements. The policy aims to minimize shortcomings related to the limited participation of women in most economic development activities	This project will respond to the policy by ensuring equity during development and operation phases.
7.	**The National Water Policy (URT, 2002)**	The overall objective of the policy is to develop a comprehensive framework for sustainable management of the national water resources. Policy directs concerted efforts in the protection of water sources and catchments. The policy also advocates the conservation, wise-use and minimization of water uses.	The proposed project shall be designed to ensure that pollution of water sources is avoided or minimized during the construction and operation phases.
8.	**The National Health Policy (URT, 2008)**	the main objectives of this policy is to ensure that health services are available and accessible to all people wherever they are in the country, whether in urban and rural areas.	SUA will assure safe environment during project implementation as well as to implement all safety measures.
9.	**Education Training Policy (2014)**	The education training policy, 2014 stressed that for improvement of the quality of education in Tanzania.	SUA through HEET will increase learning environment such as increase hostel, teaching facilities

			and learning infrastructure which in the end will increase enrolment of the students.
11.	**National Research and Development Policy (2010)**	The policy echoes the need to embrace science and technology in development. Thus, in aspiring to achieve the objectives of this policy, the government recognizes the weak links between research and development and continued low transition of youths into science and technology disciplines.	The proposed project is in line with this policy as it constructs new buildings and rehabilitates some existing buildings that will be used to facilitate teaching, research, technology and innovation.
12	**National Employment Policy (2008)**	The aim of this policy is to promote employment mainly of Tanzania Nationals.	Contractor shall promote this policy by employing majority of Tanzania and priority will be to near by society.
13.	**The National Occupational Health and safety Policy (2010)**	The National health and safety promote safe and healthy working conditions and safeguards physical, mental and social wellbeing of workers and employees	The proponent will comply with this policy by ensuring that occupation and health procedures are being adhered
14	**National Policy on HIV/AIDS (2001)**	Objectives of the policy are to strengthen the role of all the public and private, ensure that all stake holders are actively involved.	SUA will ensure adherence of the policy

3.3 Legal Framework

Table 3.2: Legal issue related with the project

	LEGAL ISSUE	**DESCRIPTION**	**COMPLIANCES**
1.	**Environmental Management Act (EMA), 2004**	This ensures obligation to undertake EIA by the project Proponent at his/her own cost prior to commencement or financing of a project or undertaking.	This EIA is being prepared in compliance with the above legal provisions.

2.	**The Land Act, 1999, CAP 113 R.E. 2019**	The Land Act, among other things, determines the ownership of the land where the project will be implemented.	The project complies with all the procedures that require land development.
3.	**The Urban Planning Act (2007)**	The Urban Planning Act (2007) serves as a crucial framework for ensuring orderly and sustainable land development in urban areas, with provisions aimed at preserving and enhancing amenities, granting consent for land development.	The proponent will ensure compliance with the land use plan by adhering to the designated use groups and classes outlined in the regulations.
4.	**Water Resources Management Act of 2009**	Its main objective is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled.	.This proactive step underscores the university's unwavering commitment to compliance with legal regulations and responsible water resource management.
5.	**The Water Supply and Sanitation Act No 12 of 2009**	provides for sustainable management and adequate operation and transparent regulation of water supply and sanitation services	This law is in line with this project because the project will increase the water demand during construction and Operation phase
6.	**Occupational Health and Safety Act (2003)**	acceptable working environment to workers in order to safeguard their health	The project complies with all the procedures that requires project development
7.	**The Water Supply and Sanitation Act No. 12 of 2009**	This is legislation that; provides for establishment of water supply and sanitation authorities as well as community owned water supply organizations; and provides for appointment for service providers	. The project complies with all the procedures that require water supply and sanitation act development.

8.	**Engineers Registration Act and its Amendments 1997 and 2007**	Regulate the engineering practice in Tanzania by registering engineers and monitoring their conduct. Laws require any foreigner engineer to register with ERB before practicing in the country	The project complies with all the procedures that require land development.
9.	**The Contractors Registration (Amendment) Act 2008**	Contractors Registration Act requires contractors to be registered by the Contractors Board (CRB) before engaging in the practice.	The project complies with all the procedures that require project development
10.	**The Architects and Quantity Surveyors Act (2010)**	It is responsible for ensuring compliance with professional standards and practices among Architects, Quantity Surveyors	SUA construction and rehabilitation activities, the Act is highly relevant as it signifies a commitment to professionalism and adherence to the law
11.	**Public Health Act 2009**	Act provides for the promotion, preservation and maintenance of public health with the view to ensuring the provision of comprehensive, functional, and sustainable public health services	The project complies with all the procedures that require health services to be observed for the project development.
12.	**Fire and Rescue Act (2015)**	The Act obliges the owners and managers of the structures to set aside places with free means of escape and install fire alarm and detection systems, fire hydrants or such other escape and rescue modalities in the event of fire.	The project complies with all the procedures that require fire and rescue department to be consulted for the project developme nt.
13.	**Employment and Labor Relations Act (No.6), 2004**	The Act makes provision for core labor rights, to establish basic employment standards, the framework for collective bargaining,	SUA will ensure that it operates within the requirements of this legislation and will comply with stipulated conditions of the Employment and Labor Relations Act, 2004.

		prevention and settlement of disputes.	
14.	**Workers Compensation Act (No.20), 2008**	The Act focuses on the provision for adequate and equitable compensation and rehabilitation for employees who suffer occupational injuries or contract occupational diseases arisi ng out of, and in the course of their employment, and in the case of death to their dependents	SUA will ensure that the contractor operates within the requirements of this legislation and complies with stipulated conditions of the Workers Compensation Act, 2004.
15.	**Prevention and Control of HIV/AIDS Act (No.28), 2008**	The act among others provides details to promote public awareness on the cause, mode of transmission, consequences, prevention and controls of HIV and AIDS.	The project complies with all the procedures that require HIV&AIDS education to be consulted for the project development.
16.	**Standard Act of 2009**	The Standards Act has established the National Environmental Standards Compendium (NESC) which is a collection of various standards prepared at different times and recognized by EMA 2004	The project complies with all the procedures that require the environmental department to be consulted for the project development
17.	**Universities Act No. 7 of 2005**	Provides for establish ment of the Tanzania Commission for Univers ities (TCU) to provide the procedure for accredi tation of institutions of higher learning and other related matters	The project complies with all the procedures of the universities act to be consulted for the project development
18.	**Roads Act No. 13 of 2007**	Prohibition of certain classes of traffic, and set out maximum weight, speed and dimensions of vehicles	The proposed project shall utilize the current public roads and therefore obliged to observe the requirement of this Act

19.	**Local Government (Urban Authorities) Act, Cap. 288 R.E 2009]**	This Act establishes urban authorities for the purposes of local government, to provide for the functions of those authorities and for other matters connected with or incidental to those authorities.	SUA shall observe these and other relevant provisions in this Act
20.	**Child Act, 2010**	The Act sets the minimum age for admission of a child to employment	The project proponent (SUA) shall ensure adherence to the Act.
21.	**Persons with Disability Act, 2010**	The basic principles of this Act are to respect for human dignity, individual's freedom to make their own choices and independence of persons with disabilities, non-discrimination, full and effective participation and inclusion of persons with disabilities in all aspects of society, equality of opportunity, accessibility, equality	The project proponent shall fulfill this legal requirement in all project phases, from design, construction and operation

3.4 Relevant Plans and Guidelines

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

Table 3.3. : Relevant plans and Guideline

	PLANS/GUIDELINES	DESCRIPTION	COMPLIANCES
1.		• The Tanzania Vision 2025 aims at achieving a	SUA project will contribute to the attainment of the 2025

	The Tanzania Development Vision 2025	high-quality livelihood for its people attain good governance through the rule of law and develop a strong and competitive economy. • Specific targets include A high quality livelihood characterized by sustainable and shared growth (equity), and freedom from abject poverty in a democratic environment. • Specifically, the Vision aims at: food self-sufficiency and security, universal primary education and extension of tertiary education, gender equality, universal access to primary health care,	Vision through provision of adequate skilled labor force for implementing various development plans.
2.	**Third National Five-Year Development Plan (FYDP III; 2021/22 – 2025/26**	The main objective of the Third Plan is to contribute to the realization of the National Development Vision 2025 goals. These goals include Tanzania becoming a middle-income country status and continue with transformation of becoming an industrial country with a high human development or a high standard of living.	The proposed project supports this development plan by increasing academic, research and innovation opportunities in various geographical areas of Tanzania including Morogoro region where the proposed project will be implemented.
3.	**National Plan of Action to End Violence against Women and Children (NPA-VAWC) 2017/18-2021/22**	The plan aims to dramatically lower rates of teenage pregnancy, reduce the practice of female genital mutilation/cutting (FGM/C), and drastically reduce child marriage throughout the country gency of women and girls.	To put the plan in action, SUA should with relevant government officials, social welfare officers, religious leaders, and police officers during implementation of the proposed project to end existing Violence against Women and Children.

3.5 National Regulations

Table3.4: National Regulations

	REGULATIONS	DESCRIPTION	COMPLIANCES
1.	**Environmental Impact Assessment and Audit (Amendment) Regulations (2018)**	The regulations provide the basis for undertaking Environmental Impact Assessment (EIA) and Environmental Audits for various development projects with significant environmental impacts in the country.	The regulation is relevant to the SUA project and therefore project registration or EIA study is mandatory and should be carried out in accordance with the guidelines stipulated in the Fourth Schedule to the Regulations.
2.	**Environmental Management (Registration and Practicing of Environmental Experts) Regulations, 2021**	Section 83 of the EMA (2004) stipulates that the Environmental Impact Assessment shall be conducted by experts or firms of experts whose names and qualifications are registered by NEMC. The NEMC maintains a registry of EA and EIA experts.	This study has been carried out by Lead expert registered by NEMC in assistance with other key and non-key experts.
3.	**Environmental Management (Fee and charges) (Amendment) Regulations, 2021**	Annual fees are important for this project in order to enable the Council to review monitoring and audits to ensure the environmental obligation stipulated in the ESIA report.	SUA shall adhere to these regulations by paying the required fees timely to the Council
4.	**The Urban Planning and Space Standards Regulation (2018)**	The Urban Planning Space Standards provides guidance on space utilization in order to achieve harmony and sustainable development	The HEET project at SUA has taken into consideration the requirements of urban planning space standards in inception and design of buildings.

5.	**Environmental Management (Air Quality Standards) Regulations, 2007**	The objective of this standard is to set baseline parameters for air quality and emissions within acceptable standards	During project site implementation the regulations will be complied with to ensure dust emissions from the project are within acceptable limits.
6.	**Environmental Management (Soil Quality Standards) Regulations, 2007**	The objective of this standard was to set limits for soil contaminants in agriculture and habitat	The proposed project will have to abide by this regulation by discouraging haphazard disposal of waste to the environment
7.	**Environmental Management (Water Quality Standards) Regulations, 2007**	The objective of this standard is to enforce minimum water quality standards prescribed by the NEMC. By limiting the amount of discharge of pollutant in the level that receiving water can accommodate.	The project will take into account all acceptable practices and regulations.
8.	**The Environmental Management (Standards for Control of Noise and Vibration Pollution) Regulations, 2015**	The provisions of these regulations will guide us in ensuring that noise and vibration levels do not exceed the maximum thresholds specified	The project will take into account all acceptable practices and regulations.
9.	**Environmental Management (Solid Waste Management) Regulations, 2009**	The regulation states that every person living in Tanzania shall have a stake and a duty to safeguard the environment from the adverse effects of solid wastes.	SUA shall ensure compliance with all these requirements during the implementation of the project in all phases
10.	**Environmental Management (Hazardous Waste Control and Management) Regulations, 2019**	The Regulations require every person living in Tanzania to have a stake and a duty to safeguard the	SUA shall ensure the adherence to the regulations and comply

		environment from the adverse effects of hazardous wastes and inform the relevant authority on any activity and phenomenon resulting from hazardous waste	
11.	**Fire and Rescue Force (Safety Inspections & Certificates) amendment Regulations, 2014**	Regulation cover all aspect of fire safety so as all building design and draw should be verified by fire department and will be monitored during implementation.	SUA shall ensure compliance with all these requirements during the implementation of the project
12.	**Environmental Management (Control and Management of Electrical and Electronic Equipment Waste) Regulations, 2021**	The Regulations apply to all categories of electrical and electronic equipment wastes with respect to generation, collection, storage, transportation, importation, exportation, distribution, selling, purchasing, recycling, refurbishing, assembling, dismantling and disposal of electrical and electronic equipment waste or components, and their movement into or outside Mainland Tanzania	SUA shall ensure compliance with all these requirements during the implementation of the project.

3.6 World Bank Environmental and Social Management Framework (ESF)

The World Bank Environmental and Social management framework Investment Project Financing sets out the requirements that the Bank must follow regarding projects it supports through Investment Project Financing. The Environmental and Social Standards define what is expected of Borrowers in terms of identifying, evaluating, and mitigating environmental and social risks, impacts, and measures in connection with projects that the Bank supports through Investment Project Financing. In that context, the World Bank has set out the E&S standards that must be complied with in the implementation of any project. These standards among others aim to

i. Support borrowers in achieving good international practice relating to environmental and social sustainability,
ii. Assist borrowers in fulfilling their national and international environmental and social obligations
iii. enhance non-discrimination, transparency, participation, accountability and governance
iv. Enhance the sustainable development outcomes of projects through ongoing stakeholder engagement.

This section shows how the 10 Environmental and Social Standards of the World Bank are taken on board on ensuring that all HEET projects to be implemented at SUA are environmentally and socially sensitive.

Table 3.5 : *World Bank Environmental and Social Standard applicable to HEET project at Edward Moringe Campus (SUA-EMC)*

Environmental and Social Standards (ESS)	**Objectives**	**Applicability**	**Requirements**
ESS1: Assessment and Management of Environmental and Social Risks and Impacts	○ Identify project E&S risks and impacts ○ Improve performance through an Environmental and Social Management System (ESMS) ○ Engagement with Affected Communities, other stakeholders through project cycle, includes communication, grievance mechanisms. ○ Adopt mitigation hierarchy ○ Anticipate, avoid ○ Minimize ○ Compensate or offset	YES	The standard focuses on helping project beneficiaries to manage and reduce both environmental and social risks and to enhance positive impacts of the project. The project at SUA-EMC will use this requirement to strengthen the environmental and social framework for the assessment, development, and implementation of World Bank-financed projects where appropriate.
ESS2: Labor and Working Conditions	○ Fair treatment, non-discrimination, equal opportunity ○ Good worker – management relationship ○ Comply with national employment and labor laws ○ Protect workers, in particular vulnerable categories ○ Promote safety and health	YES	The standard focuses on the adoption of standard labor practices that take into account the acceptable working conditions for the people to be employed in the execution of the project activities. The borrower must develop and implement labor management policies. The guideline includes SUA-EMC to ensure that no child under fourteen years is involved as an employee in any kind of work during the project implementation. Additionally, it

Environmental and Social Standards (ESS)	Objectives	Applicability	Requirements
	○ Avoid use of forced labor or child labor		demands equal opportunity, non-discrimination, and fair terms and conditions of employment, as well as worker groups. Provisions relating to forced labor and child labor. Requirements on occupational health and safety, in keeping with the World Bank Group's Environmental, Health, and Safety Guidelines (EHSG).
ESS3: Resource Efficiency and Pollution Prevention and Management	○ Avoid, minimize, and reduce project-related pollution ○ More sustainable use of resources, including energy and water ○ Reduced project-related Greenhouse Gas (GHG) emissions	YES	The standard aims at enhancing effective use of resources and control of pollution. It further requires an estimate of gross greenhouse gas emissions resulting from projects (unless minor), where technically and financially feasible. Requirements on management of wastes, chemical and hazardous materials, and contains provisions to address historical pollution. ESS3 refers to national law and Good International Industry Practice, in the first instance the World Bank Groups' EHSGs.
ESS4: Community Health and Safety	○ To anticipate and avoid adverse impacts on the health and safety of the Affected Community ○ To safeguard personnel and property in accordance with relevant human rights principles.	YES	The standard aims at protecting local communities against any health risks and ensuring their safety against project activities. It requires infrastructure to take into account safety and climate change and apply the concept of universal access which is technically and financially feasible. It necessitates additional traffic and road safety measures, such as road safety

Environmental and Social Standards (ESS)	Objectives	Applicability	Requirements
			monitoring and assessments. It urges dealing with hazards brought on by effects on regulating and providing ecosystem service. Measures to reduce the risk of water-related diseases, both communicable and non-communicable. Requirements to assess risks associated with security personnel, and review and report unlawful and abusive acts to relevant authorities. The project operators should ensure HIV&AIDS education is provided to the people related on the project to avoid high transmission of the disease.
ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	○ Improve or restore livelihoods and standards of living ○ Improve living conditions among displaced persons ○ Adequate housing ○ Security of tenure	NO	This standard is not applicable in this proposed project because land is legally owned by SUA (Appendix 2)
ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources		NO	This standard is not applicable in this project because there is not any requirement related to ESS6.
ESS7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities		NO	This standard is not applicable in this project because there is not any requirement related to ESS7.

Environmental and Social Standards (ESS)	Objectives	Applicability	Requirements
ESS8: Cultural Heritage	○ Protect culture heritage from adverse environmental and social impact associated with the project. ○ The project involves demolishing and excavation of the soil or causes changes in physical environment therefore the culture can happen in chances finding.	YES	This standard is applicable in this project because the project involves demolishing and excavation of the soil therefore chance finds of physical cultural resources is likely.
ESS9: Financial Intermediaries (FIs)		NO	This standard is not applicable in this project because there is no requirement related to ESS9.
ESS10: Stakeholder Engagement and Information Disclosure	○ Ensuring understanding ○ Building relationships ○ Ensuring Compliance ○ Engaging vulnerable groups ○ Managing stakeholder expectations	YES	The standard aims at making stakeholders part of the project through continuous sharing of information and updates. The standard calls for stakeholder engagement throughout the project life cycle, and preparation and implementation of a Stakeholder Engagement Plan (SEP). It requires early identification of stakeholders, both project-affected parties and other interested parties, and clarification on how effective engagement takes place. Stakeholder engagement from the project area was conducted in a manner proportionate to the nature, scale, risks and

Environmental and Social Standards (ESS)	Objectives	Applicability	Requirements
			impacts of the project, and appropriate to stakeholders' interests.

3.7 World Bank Group ESHS Guidelines

The World Bank Groups Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice (GIIP). EHS Guidelines are applied as required by their respective policies and standards. These industry sector EHS guidelines are designed to be used together with the General EHS Guidelines document, which provides guidance to users on common EHS issues potentially applicable to all industry sectors. Specific guidelines which will be used are Environmental, Health, and Safety (EHS) Guidelines: Environmental Waste Management. As stipulated earlier the guidelines will be used together with the Environmental, Health, and Safety General Guidelines.

The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. Application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets, with an appropriate timetable for achieving them. The applicability of the EHS Guidelines will be tailored to the hazards and risks established for the project in accordance with the proposed project activities. The circumstances that skilled and experienced professionals may find when evaluating the range of pollution prevention and control techniques available to a project may include, but are not limited to, varying levels of environmental degradation and environmental assimilative capacity as well as varying levels of technical feasibility. The applicability of specific technical recommendations will be based on the professional opinion of qualified and experienced people. This study will fully consider the WB guidelines to manage the project risks and impacts.

3.8 Institutional Framework for the Management of Environment

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

Table 3 6: Key Institutions to the ESIA process

Level	Institution	Role and responsibility
National Level	Vice President's Office (Division of Environment)	• Authorization of ESIA certificate. .
	Vice President's Office (NEMC)	• Coordination of ESIA process. • Approval of ToR and Review of ESIA report. • Issuing an Environmental Certificate

Level	Institution	Role and responsibility
		• Conducting environmental Audit during operation of project;
	Ministry of Education, Science and Technology (MoEST)	• Issuing policies guidance • Providing regal framework • Project monitoring • Capacity building to project implementers.
	Tanzania Commission for Universities (TCU)	• Provide regulation which set standard for academic building and learning.
	Occupation Safety and Health Authority OSHA	• Approval of building plans for the proposed project with regard health and safety. • Monitoring and Audit Health and Safety of workers in working premises.
Project Funding Institutions	World Bank	• Project financing • Provide regulation and standard for environmental management. • Provide second line of monitoring compliance and commitments made in the ESMPs through supervision.
Project Proponent	Sokoine University of Agriculture SUA	• Project investment and project cycle implementation, monitoring, and auditing; Conducting ESIA study and follow-up on ESIA certificate. • Paying of applicable taxes and charges. • Project operation and decommissioning.
Regional Level	Fire and Rescue Force	• Review and Approval of building design for the proposed project. • To run prevention and preparedness programs to prevent emergencies
Local Governments Authorities	Morogoro Municipal Council	• Oversee and advice on implementation of national policies at Municipal level. • Oversee generation development plan. • Oversee enforcement of laws and regulations.

Level	Institution	Role and responsibility
and Communities		• Advice on implementation of development projects and activities at Municipal level
	Ward Offices (Mindu ward)	• Project monitoring (as watchdogs for the environment, ensure the well-being of residents) and participate in project activities. • To extend administrative assistance and advice on the implementation of the project. • Managing the community's relation
	Local communities, NGOs, CSOs and FBOs	• Project monitoring (as watchdogs) • Aids and advice on the implementation of the project. • Part of the project beneficiaries through employment opportunities, income generation and CSR projects.
Institutional level /SUA	**UPIU-SUA**	**Environmental Safeguard specialist** Responsibilities will be; • Monitor compliances of contractor on environmental and health standard and implementation of ESMP and provide regular report to MoEST and Word Bank. • Review and approve the contractor's site-specific ESMP (C-ESMP) • Ensure contractor's compliance of the C-ESMP **Social safeguard specialist** Responsibilities will be; • Advise HEI on social approaches, policies, and technical issues including social safeguard issues during the preparation and implementation of the HEET project activities. • Review and approve the contractor's site-specific ESMP (C-ESMP) • Ensure contractor's compliance of the C-ESMP • Ensure that the HEI have a well-established mechanism for complaints submission and there are project-level grievance redress mechanisms and can use the WB's Grievance Redress Service. • Monitor compliances of contractor on social standard and implementation of ESMP and provide regular report to MoEST and Word Bank.

Level	Institution	Role and responsibility
		• Communicate and provide feedback of ESIA implantation on various stakeholder and community surrounding.
	ESIA Consultant	ESIA consultant, responsibilities will be; • Work with the PIU to understand the requirements of the environmental and social assessment; • Conduct initial site visits with the PIU to understand the sub-project setting and site-specific requirements; • Prepare the ESIAs and ESMPs based on the procedures described in the ESMF including carrying out an alignment walk, alternatives analysis and baselines studies, identifying the E&S risks and impacts, developing mitigation measures and monitoring plans incorporating EHS requirements; • Cost all the mitigation and management measures proposed in the ESMPs and SSEMPs • Propose a capacity building plan for the implementation of the sub-projects for all actors involved with cost estimates and schedule; vi. Carry out public consultations; vii. Conduct trainings as needed; • Assist the PIU in preparing documentation to obtain certification from NEMC for the ESIAs and ESMPs.
	Contractor	**Environmental safeguard expert** Responsibilities will be, • Prepare and draft environmental compliances implementation reports; • Managing environment aspects at the worksites; • Participating in the definition of the no working-areas; • Recommending solutions for specific environmental problem; • Facilitating the creation of a liaison group with the stakeholders at the project site and shall monitor the compliance of ESMP;

Level	Institution	Role and responsibility
		• He/She will be required to liaise with SUA Safeguard specialist on the level of compliance with the ESMP achieved by the contractor regularly for the duration of the contract. • Preparing environmental and social progress or "audits" reports on the implementation status of measures and management of site works; • Controlling and supervising the implementation of the ESMP **Social safeguard specialist** Responsibilities will be • Managing social aspects at the worksites including grievances; • Participating in the definition of the no working-areas; • Recommending solutions for specific social problem; • Facilitating the creation of a liaison group with the stakeholders at the project site and shall monitor the compliance of ESMP **Health and safety officer** • Prepare and draft Health and safety compliances of ESIA at site. • Protection equipment and provide training on safe practices. • Maintain clean work areas and provide anti-slip measures. • Ensure proper grounding, insulation, and follow lockout/tagout procedures. • Train workers in proper lifting techniques and provide mechanical aids. • Use proper PPE, follow containment procedures, and provide ventilation. • Provide appropriate respiratory protection, control dust, and ensure ventilation.
	Design Consultant	**Responsibilities of Design Consultant;** i. Prepare, review and approve the code of conduct of contractor.

Level	Institution	Role and responsibility
		ii. The project Consultant will be responsible for design review and supervision of the construction phase of the proposed project. iii. The Consultant shall ensure compliance of ESIA and C-ESMP. iv. The Consultant shall have a Project Environmental, Health and Safety Site Officer (EHSSO) and Project Social Site Officer (SSO) who will be the focal point for all environmental, health and safety and social matters. **Responsibilities of Environmental Officer;** • Monitor Environmental compliances of contractor on environmental standard as per approved C-ESMP • Preparing environmental and or "audits" reports on the implementation status of measures and management of site works; • Controlling and supervising the implementation of the ESMP **Responsibilities of Health and safety Officer;** • Monitor Health and Safety compliances standard of contractor as per approved C-ESMP • Review and approve reports on the implementation status of C-ESMP of contractor at site. • Controlling and supervising the implementation of the ESMP **Responsibilities of Social Safeguard officer;** • Monitor social compliances standard of contractor as per approved C-ESMP • Review and approve reports on the implementation status of C-ESMP of contractor at site. • Controlling and supervising the implementation of the ESMP

CHAPTER 4: BASELINE ENVIROMENTAL AND SOCIAL CONDITIONS

4.1 Introduction

Baseline environmental data is important to understand the physical, biological, and socio-economic and cultural characteristics of the project's environment. Baseline environmental survey is conducted to assess the present status of the physical environment (Topography, climate setting, temperature, hydrology, geology, soil characteristics); Biological environment (fauna and flora, biodiversity, vegetation, protected areas, etc.) Human and Socio-economic environment (land use and planning, demographics, energy, employment, culture and tradition, livelihood, transportation, health care, education, infrastructure, and population of the project area of influence.

4.2 Components and Parameters for Baseline Environment Study

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

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

4.3 The Physical Environment

4.3.1 Temperature

Morogoro Municipality experiences an average daily temperature of 30 °C (degrees centigrade) with a daily range of about 5 °C. The highest temperature occurs in November and December, during which the mean maximum temperature is about 33 °C. The minimum temperature is in June and August when the temperatures go down to about 16°C. During data collection the average temperature at Edward Moringe Campus ranged between 24°C to 27°C during the day and night.

4.3.2 Rainfall

The trend of rainfall reveals a similar influence of altitude on rainfall. Rainfall is higher in areas of high altitude and tends to be low at low altitude areas. Areas on the leeward receive relatively lower rainfall than those on the positive side.

The total average annual rainfall in Morogoro ranges between 821mm to 1,505mm. Long rains occur between March and May and short rains occur between October and December each year. The long rainy season lasts for roughly 120 days between March and June every year. The rain is usually heavy and spreads throughout the Municipality. This is also the main crop planting season for all crops, but especially so for the seasonal crops such as maize, paddy and beans. The short rainy season lasts for about 60 days between October and December each year. The rains are not evenly distributed, and they are not very reliable. They are most suitable for short-term crops such as pulses. (Morogoro Region Profile, 2018).

4.3.3 Humidity and Wind

During the field visit to Morogoro Municipal Council, several areas within the municipality experienced relatively cool conditions, with wind speeds averaging less than 10 kilometers per hour (KPH). The wind predominantly blows from the east to the west. In the eastern sector of the project site, wind conditions occasionally reach a maximum speed of approximately 9 KPH. The majority of Morogoro Municipal Council witnesses' gentle winds, generally below 10

KPH. These weather observations have implications for local agriculture and environmental conditions within Morogoro Municipal. The average relative humidity is around 66%, but it can decrease significantly to as low as 37%.

4.3.4 Topography and Drainage

Sokoine University of Agriculture lies on the slopes of the Uluguru Mountains, at an altitude of about 500 - 600 meters above sea level.

The topography of Morogoro Municipality's is surrounded by the Eastern Arc Mountains, notably the Uluguru Mountains. These mountains play a significant role in creating the area's steep slopes and drainage patterns. The peaks of these mountains are lush and green, indicating an untouched forest ecosystem. Meanwhile, the fertile slopes boast pleasant weather and are utilized for agriculture and human habitation. This distinctive topography also impacts the landscape's features, soil characteristics, and depth. The steep slopes are marked by rocky outcrops and shallow soils, in contrast to the flat flood plains. A clear description of this section would be aided by a Digital Elevation Model (DEM).

4.3.5 Soils and Geology

The geology of Morogoro Municipality comprises four major rock/lithology types. These include hornblende-pyroxene granulites, muscovite-biotite gneiss and migmatites, colluvium and alluvium. The hornblende-pyroxene granulites are the dominant rock types and occupy a major part of the Uluguru Mountains and foothills. The dominant minerals in these rocks are calcium rich plagioclase, hypersthene (Mg,Fe)SiO3) and diopside (Ca,MgSi2O6). The muscovite-biotite gneisses and migmatites are dominant in the Mindu-Lugala hills and a bigger part of the Tungi Mkonowamara peneplains. They are of a high metamorphic grade containing equal amounts of potassium-feldspars (microcline) and sodium-rich plagioclase (oligoclase). Quartz is present in high amounts. Colluvial materials of diverse mineralogical composition dominate most of the piedmont slopes and peneplains. Alluvial materials are dominant in the river terraces and flood plains.

Soils in the region vary according to the topographical and ecological zones. In the mountainous and hilly areas, the common type of soils found are mainly oxisols, which are generally low in nitrogen and phosphorus. Valley and lowlands are generally characterized by alluvial soils, which are fertile in nature. Sandy and clay soils are common in woodlands and grasslands. Soil condition in the region favors production of various crops like maize, paddy, beans, cassava, species, sweet and Irish potatoes, amaranths, vegetables, sugarcane, simsim, cocoa, cotton, cashew nuts, etc.

4.3.6 Hydrology

Morogoro municipality is a part of the Ngerengere catchment, which originates from the Uluguru Mountains and is located in the middle of the Wami–Ruvu basin. The Ngerengere River is fed by four tributaries, namely Mgeta river, Mlali river, Mzinga river and Lukumeni river, which also originate from the Uluguru Mountains. The major surface water source in the municipality is the Mindu dam, which receives water from three major river tributaries originating from Kasanga hill. Many activities such as irrigation, Fishing and domestic use are undertaken by the people surrounding SUA areas depending on the river Mzinga.

During high rainfall season, floods occur and destruct people settlements. This flood also leads to the destruction of infrastructures like road across the river, Destruction of the physical appearance of the Mzinga river due to human activities like cultivation and fishing which are done depending on Mzinga river result to siltation within river and hence result to the flooding

and also can poison river due to the chemical fertilizers washed from agriculture activities near Mzinga river. Monitoring of water quality along Mzinga river is required to be conducted during construction and operation phase in order to determine the quality of water for human activities and for aquatic organisms.

4.4 Baseline Environment

4.4.1 Methodology for baseline data on air quality, noise and vibrations

The measured six 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 (SO2), Nitrogen dioxide (NO2), Carbon monoxide (CO), Hydrogen Sulphide (H2S) and Volatile Organic Compounds (VOCs); (iii) ambient noise, and (iv) ground vibrations.

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

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

The average daily concentration of PM10 ranged from 10-12.5 µg/m³ and 5.4-6.9 µg/m³ for PM2.5 at six measured stations established for Edward Moringe Campus (see appendix 3). However, none of the measured PM10 and PM2.5 values was found to be above the prescribed TBS limit and WB Group guidelines criteria.

4.4.1.2 Ambient Gaseous Pollutants levels

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

The measured Sulphur dioxide (SO_2), Volatile Organic Compounds (VOCs), and Nitrogen dioxide (NO_2) concentrations were minimal and in conformity with their respective prescribed

TBS and WB limits. Similarly, the recorded CO concentrations were found to comply with both TBS limit of 15 mg/m^3 and WB guideline value of 30 mg/m^3. However, Hydrogen sulphide (H2S) concentrations were very low with its impacts considered insignificant, taking into account that H_2S has no limit specified in WB 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 WB-wide objectives. (Observe appendix 4)

4.4.1.3 Noise Levels

Baseline noise data were recorded at the six established station during the daytime (Lday) in accordance with 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 hours noise values at the established station. The averaged Lday values were calculated and compared with their respective local standards and international guidelines.

The recorded noise levels ranged from 35.5 dBA to 48.1 dBA (Appendix 5). These measured levels are acoustically safe for people residing near the project site as the recorded noise levels are found to be well outside the WBG General EHS Guidelines level of 55 and TBS limit of 52 dB(A) prescribed for institutional areas.

4.4.1.4 Ground Vibration

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

The highest recorded vibration level of 0.03 mm/sec PPV recorded at AQMS4 station is considered insignificant as the measured levels do not exceed 0.15 mm/sec PPV criteria established to evaluate the extent that can easily be detected by human, TBS and British Standard limits. In that regard, the measured ground vibration levels are very minimal and thus are not likely to negatively impact any sensitive receptors. (Observe Appendix 6)

4.5 Biological Environment

The biological environment includes living things such as plants and animals, and non-living things such as rocks, soil and water. The biological and ecological investigations were conducted with emphasis on terrestrial flora and fauna biodiversity. Fauna biodiversity focused on large mammals, small and medium sized mammals, birds and reptiles (reptiles and

amphibians) within and around the project areas. Flora biodiversity emphasizes trees, shrubs, herbs, sedges and grasses.

A baseline survey of the project site was carried out for the purpose of investigating the flora and fauna status in the project area. This report focused on the process that shaped the landscape through the movement of water and wind (climate) and through extreme disturbances generated by drought, flood and human activities such as settlement pattern, agricultural practices and bush fire.

4.5.1 Flora

The proposed project site is located in a typical urban setting environment. Generally, the project area is developed and currently occupied by education and commercial infrastructures. There are few scattered exotic vegetation covers within the project site. Indigenous vegetation has long been cleared off to pave way for human developments. This suggests that there will be less damage of the native/ natural vegetation type during construction phase. It is expected that during construction there will be very minimal or no clearance of vegetation. Because all operations will be confined to the premises already utilized by existing buildings, and no expansion beyond the current project area boundaries is intended, this accounts for the absence of any need for vegetation clearance during the construction activities except for academic building project site which will involve the clearing of trees planted on the area.

Dominant tree species such as mango trees (*Mangifera indica ssp),* *Eucalyptus ssp*, *Heracleum mantegazianum*, *Azadirachta indica,* *Pterocarpus officinalis*, *Styphnolobium japonicum*, (*Impatiens capensis*), and trees such as *Adansonia digitata,* *Pistacia atlantica*, *Moringa oleifera*, *Acorus calamus,* *Poa trivialis,* (*Trichilia dregeana,* *Tabernaemontana elagans,* *Brachychiton ruperstris,* *Albizia lebbeck,* *Albizia saman* and short grasses will be cleared off from the site to allow construction activities to be commenced if the project will occupy large area. The consultation with the local community and the inventory of the trees species available onsite both revealed that, there are no vegetation species that are of conservation interests to stop implementation of the project, thus, withdrawing the project because of conservation purposes is less viable. The contractor is advised to confine all its activities only in the specified area for facility location.

4.5.2 Fauna

The field survey revealed that there were different mammals' species around the proposed project area across various taxonomic categories. These included Vervet Monkey (*Chlorocebus pygerythrus,* Blue Monkeys *(Cercopithecus mitis)* and Uluguru Bushbaby (*Paragalago orinus*)

Also, seven different birds were observed during biodiversity study on the project area which are Lilac-breasted roller (*Coracias caudatus*), Long tailed fiscal (*Lanius cabanis*), Southern Cordounbleau (*Uraeginthus angolensis*), Common Bulbul (*Pycnonotus barbatus*), Black winged Bishop (*Euplectes hordeaceus),* Sparrow- Weaver (*Plosepasser mahali*) and Lasser Striped Swallow (*Cecropis abyssinica*)

There were four reptiles that were recorded during the survey. These included (Bearded pygmy Chameleon (*Rieppeleon brevicaudatus*), Common Dwarf Gecko *(Lygodactylus capensis*), African striped Skink (*Trachylepis striata*) and Painted Dwarf Gecko (*Lygodactlus picturatus*)

Five amphibian species were also recorded during the survey. These included Shovel-nosed Frog (*Hemisus marmoratus*), *Artholeptides yakusini,* Grey Foam-nest Tree Frog *(chiromantis*

xeramplelina), Spackle-lipped Mabuya (*Trachylepis maculilabris*), Rough-scaled Plated Lizard (*Broadleysaurus major*).

4.5.3 Unique and Endangered species

There are neither unique nor endangered species of concern that were observed during site assessment.

4.6 Existing Infrastructures and Social issues at SUA

4.6.1 Health Services

There is SUA hospital within Edward Moringe Campus that offers essential healthcare services to students and staff. It provides consultations, diagnostic tests, and minor procedures. The hospital prioritizes addressing gender-based violence issues through counseling and awareness programs. Its convenient campus location promotes regular health check-ups and interventions. For specialized care, individuals can access Morogoro regional hospital nearby. This referral center offers advanced treatments and surgeries.

The hospital complies with students' hand to hand in terms of their health issues and the community, the university health center is also concern with different health issues caused by gender violence issues (GBV) that may occur, some of the issues like early pregnancy and rape of young girls within the university and the community around the university community. The hospital at Edward Moringe campus is highly committed to ensure that such issues gender-based violence cases are solved by providing health care and consultation to the community around and the students through seminars and health workshops.

4.6.1.1 Common Diseases at SUA campus

a) Outpatients (2022)

In 2022, a significant number of people sought medical care at SUA Hospital as outpatients. These individuals presented with a variety of health concerns. Notably, 13,806 patients visited the hospital for outpatient services. The most prevalent health issues included upper respiratory tract infections, affecting 2,072 patients, followed closely by hypertension with 1,581 cases. Urinary tract infections were also a common problem, accounting for 1,134 visits. Additionally, there were cases with symptoms that didn't lead to a specific diagnosis, as well as instances of malaria, skin conditions, and various gastrointestinal problems. Among the patients, children under the age of five, especially girls, were significantly affected by these health conditions.

b) Inpatients (2022)

Within the same year, SUA Hospital admitted 3,190 patients for inpatient care. The leading causes for hospitalization included hypertension with 188 cases, upper respiratory tract infections with 151 admissions, and diabetes mellitus affecting 102 individuals. Urinary tract infections led to 72 admissions, while malaria required hospitalization for 62 patients. Acute diarrhea, lasting less than 14 days, was the reason for 41 admissions, and there were 26 cases of pneumonia, encompassing both severe and non-severe forms. Other cardiovascular diseases, bronchial asthma, and anemia contributed to the remaining admissions, with 22, 20, and 19 patients, respectively. The high incidence of hypertension underscores its prevalence in the region, potentially due to its endemic nature.

c) COVID-19 Vaccination (2021-2023)

In response to the global COVID-19 pandemic, SUA Hospital actively participated in vaccination efforts. Between 2021 and 2023, a total of 5,022 individuals attended COVID-19 vaccination services at the hospital. This included 5,000 vaccinations throughout this period, with an additional 22 individuals receiving vaccinations from May to July 2023. These vaccination efforts played a crucial role in protecting the community from the virus and were part of the broader global response to the pandemic. SUA Hospital adapted to the challenges posed by COVID-19, implementing measures such as handwashing stations, sanitizers, and innovative management strategies to combat the ongoing threat of the corona virus.

4.6.2 Gender Issues at SUA

In the Tanzanian society, gender inequity is a major problem. To ensure proper handling of gender issues, SUA has the Centre for Gender Studies. This Centre is the ultimate destination and hub for gender based academic, research, debates and discussions. The Center for Gender Studies (CGS) was established in the College of Social Sciences and Humanities (CSSH) following the university wide restructuring processes. The center aims at creating an intellectual locus for gender focused research, teaching and academic debates related to gender equality. The center also organizes and coordinates gender debates of both national and international interests as well as linking up with national and international gender affiliate people, institutions and organizations in order to strengthen the capacity of students and researchers to respond to the gender related challenges in development issues.

Despite of these interventions still there is gender inequality and inequity in the academic staff cadre, with majority of those in senior ranks being males. Gender issues are also prevalent to SUA students. Majority of female students at Sokoine University of Agriculture do not involve themselves in vying for various leadership positions during the SUA general election. This is so due to lack of confidence as they believe that the male students are more superior, but also due to discouragement from their friends since it is believed that many positions in the SUA student government are held by male students and females go as various minor appointees. SUA Gender policy is currently being revised in-order to pro-actively promote gender equity and mainstreaming by admitting talented students without gender bias

Taking affirmative action to increase the number of students among the disadvantaged groups in all priority programs, ensuring gender balance, equality and equity in University's policies, programs and regulations relating to teaching, research, consultancy and public services, ensuring equality, diversity and equity in student enrolment, staff recruitment and development, and Advancing equality in the governance and management structure.

4.6.3 Sports, Games, and Recreation

All sports and games facilities are coordinated by the Department of Sports and Games. The sports grounds are used for various sports and games including football, netball, volleyball, basketball, tennis, cricket and athletics. The University also has an open gym. These sports facilities provide a conducive social environment for students and staff. All students and staff are encouraged to participate in various sports and recreational activities to boost their talents and physical fitness. The university also supports students' participation in interinstitutional games if and when resources are available. Through the Corporate Strategic Plan, SUA intends to improve the standards of the facilities and associated services to match increasing demands and importance. South of the Main Campus, there is a track up the Uluguru Mountains leading to an excellent view and scenery of the Morogoro Municipality and the surrounding environments.

4.6.4 Security

SUA has an Auxiliary Police Department located in Edward Moringe campus and its sub-office at Solomon Mahlangu Campus. This Department in collaboration with the Tanzania Police Force is responsible for the maintenance of peace, order and the safety of people and property.

4.7. Social Cultural Environment

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

4.7.1 Population

Per 2022 Population and Housing Census report, Morogoro Municipality had a population of 3,197,104. It is indicated further in the NBS report that the annual growth rate of Morogoro Municipal Council's population in 2022 was at 3.7% compared to the 2012 population census. The proposed SUA project is envisaged to increase the total current population within and around SUA campus. Based on population census of 2022, Magadu ward had a total population of 5,989 in ratio of 49% be a Male and 51% Female.

4.7.2 Ethnic Groups

Originally, the primary inhabitants of the area were predominantly from the Luguru tribe. However, the demographic makeup of the current population is becoming more diverse due to the influx of individuals from various regions within Tanzania, as well as from outside the country, including workers, businessmen, and those seeking opportunities. Nevertheless, the local Council recognizes three main ethnic groups: Waluguru, Wapogoro, and Wakutu. Among these, the Waluguru form the majority and occupy the largest portion of the district's territory, spanning all wards. The Wapogoro, on the other hand, inhabit specific parts of the Municipal wards. Additionally, the Municipal is home to various other ethnic groups such as the Wazaramo, Wakwere, Wachaga, Wasukuma, Wanyakyusa, and Maasai.

4.7.3 Education

4.7.3.1 Primary school

Primary school education is a basic right of every Tanzanian child of school age going (7-13). Data from Morogoro Social Economic Profile (2020) indicated that there was a slight increase in the number of private primary schools in the region in four years from 2016 to 2019.The number of primary schools increased from 880 in 2016 to 904 in 2019 (2.7 percent increase). Morogoro

Around the university environment theirs an existing primary school known as SUA primary school which the university is very concerned with the academic and social wellbeing, SUA primary school ensure there is equal enrollment of boys and girls so as to promote gender balance between a boy and a girl child in the community. The university also is engaged to promote indolence's education to both girls and boys through seminar education via their primary teacher but also their primary teachers are concerned to go against gender-based violence (GBV) especially to inferior groups of students such hand caped students and girl who are subjected for early marriage and the hand caped student are subjects as unwanted in the society.

4.7.3.2 Secondary Education

In Morogoro Municipal there are a number of secondary schools where the students get their secondary education. Inside the campus environment there is secondary school known as SUA secondary where the nearby community students are studying there. Another student from SUA community gets secondary education from other schools located at Morogoro CBD such as Morogoro secondary

4.7.3.3 Universities and Colleges

Morogoro Municipal is home to several notable universities and colleges, including Sokoine University of Agriculture, Muslim University of Morogoro, St. Joseph University College, and Jordan University College. . The municipality also houses renowned institutions such as Ardhi Institute Morogoro, Morogoro Teachers College, and LITI (Livestock Training Institute).

4.7.4 Water and Sanitation

At Sokoine University of Agriculture (SUA), water consumption is closely tied to campus activities and population growth, including domestic use, gardening, healthcare, construction, and more. The university relies on water from the Mzinga River, regulated by the Wami/Ruvu Basin Water Board. To address increasing water demands, SUA should consider upgrading its internal water supply system to minimize wastage. Furthermore, due to population growth and development, the university may need to explore alternative water sources like stormwater harvesting to manage costs effectively.

In terms of sanitation, it is vital to ensure that as the population grows, there are sufficient and clean restroom facilities and waste disposal systems on campus. Maintaining and expanding sanitation infrastructure is crucial for the health and well-being of the campus community and compliance with environmental regulations. A comprehensive approach that combines water supply and sanitation planning is essential to creating a safe and sustainable campus environment at SUA.

4.7.5 Religion

SUA is a non-religious institution, nevertheless, it has provided land and facilities to allow students and staff to participate in various religious activities. Facilities and services are available to various Christian and Muslim staff, students and members of the surrounding communities on all the Campuses. There is a Chaplain for the Catholics, Protestants, Seventh Day Adventists, Assemblies of God and Pentecostals. The Muslims have an Imam/Executive Officer appointed by the Sokoine University of Agriculture Muslim Community Trust (SUAMCT). Additionally, the Muslim Students Association of Sokoine University of Agriculture (MSASUA), which is affiliated to SUAMCT caters for the interests of Muslim Students.

4.7.6 Energy and Power Supply

The Sokoine University of Agriculture gets its supply of electricity from the TANESCO National Power Supply Grid. It has however been experiencing frequent power cuts which disrupts University activities both academic and administrative. In order to alleviate this problem, standby generators have been procured and installed to supply electricity to some buildings, which is an expensive exercise. Since the problem of power cuts is a nation-wide issue, the University should look for more economic and reliable sources of power supply; such as installation of Solar Power Panels to some of the buildings especially new structures.

In addition, the University should continue with efforts to rehabilitate faulty generator(s). During consultation with TANESCO, SUA is recommended for a direct high tension 33 KVA supply and at least 2x1000 KVA Transformers for each of the Campuses in order to prevent power outage problem at university.

4.7.7 Transport

SUA, Edward Moringe Campus has buses for shuttling students between campuses. These buses are also used for excursions and field tours. Campus can be accessed through the SUA main campus tarmac road, 3km from the Center of Morogoro Municipality. There are also other paved roads within the University that enable accessibility from other zones of the campus to another.

Students can easily transport from Campus to Morogoro CBD using readily available public transport known as daladala, Bajaji, bodaboda, and taxis.

4.8 Economic Activities

This Section describes the economy of Morogoro Region. The economic indicators used include Gross Domestic Product (GDP), Per Capita Gross Domestic Product and main source of income for the residents.

The non-income poverty indicators cover demographic characteristics, health, and education status, access to drinking water, food security and housing condition.

4.8.1 Agriculture

About 65% of the workforce of the Municipality are engaged in urban agriculture and 30% keep livestock (NETWAS et al, 2018).

Most people engaged in agriculture are smallholder farmers who grow a wide variety of annual and perennial crops such as paddy, maize, sorghum, beans, cowpeas, sunflower, sweet potato, yams etc. In addition to that, farmers also grow wide varieties of fruits and vegetables such as tomatoes, onion, amaranth, banana, watermelon etc. Cash crops including cotton, sunflower, simsim, cocoa, sisal, cashew nuts, coffee**.**

The peri-urban agriculture is carried out in Kihonda Ward, where cultivation of permanent crops (e.g., oranges, coconut) and livestock keeping is carried out. The large-scale farms are cultivated in Mzinga Ward where rice is grown during wet seasons and vegetables during dry seasons by using traditional irrigation. Cultivation of banana, oranges and upland or lowland rice are grown in Bigwa and Kingolwira Wards. The cultivation of rice and vegetables is also carried out in Mwembesongo, Kihonda, Kichangani, and Mazimbu Wards. There are sisal farms owned by institutions like the prison department and Tungi Sisal Estate. The Sokoine University of Agriculture is another institution that owns a farm for growing horticultural crops, pastures, and livestock grazing.

4.8.2 Livestock Keeping

The Morogoro Municipality had the lowest percent of households involved in livestock keeping. The urban nature of the municipality has made livestock keeping not a big economic activity. Also, the shortage of grazing land and by laws introduced by municipalities in the country have prevented massive livestock keeping in the area. However, cattle, goat, sheep, pigs and poultry are some of the livestock kept under zero grazing in the Morogoro Municipality and Magadu ward as well.

During the ESIA study, it was observed there are a number of families residing in Magadu ward engaged in livestock farming. According to the data available, only a few households keep livestock and many of them practice indoor livestock keeping or zero grazing. In recent

years, the number of livestock, especially dairy cattle, has increased. However, free grazing is a serious problem for cattle keepers.

4.8.3 Natural Resource

The natural resources sector is comprised of various sub-sectors including forestry, hunting, tourism, fisheries, beekeeping, wildlife, and mining. The sector is very important through its contribution to the social and economic development of the region. Apart from economic gains, the sector also plays an important role in the maintenance of climate stability, conservation of water sources and soil fertility, controlling land erosion, and as a source of wood fuel, industrial materials, and non-wood products such as honey and bee-wax (Source: Morogoro Social Economic Profile, 2020).

4.8.3.1 Forestry

Forestry plays an important role in economic growth and environmental conservation through maintaining ecological balance; protecting soils from erosion and conserving water and wildlife. In addition, forests are sources of domestic energy, industrial raw materials and provide useful non-wood products, mainly honey and bee wax. In addition, forest products such as timber, poles and charcoal earn revenue to the region through permits and taxes, and facilitate economic growth of people engaged on those activities.

4.8.3.2 Beekeeping

Beekeeping is one of the economic activities in Morogoro Municipality. Natural forests and forests plantations available in most parts of the Municipality have great potential for beekeeping. Morogoro Municipality has a potential area suitable for beekeeping involving both the agricultural and forestlands. Apart from the catchments forest reserves, beekeeping activities can be carried out all over the remaining. Due to the beekeeping observed during site visit at Edward Moringe project site, it indicates that Morogoro municipal is good place which beekeeping can be used as a source of income.

4.8.3.3 Mining

Existing and new quarries and borrow pits will be used for stone and gravel extraction. Currently, no specific sites have been identified yet, except that there are sources that are used for the construction activities materials. These sites include borrow pits at Mvomero (in Morogoro) and Lugoba in Pwani region that are currently being used by the contractor for the as a source of construction materials in Morogoro Municipal

Existing borrow pits at the Mvomero and Lugoba route will be used as a main source of sand and gravel. New borrow pits (e.g., stone, gravel exploitation) may have to be established where existing borrow pit material is not suitable or enough. Prior to commencement of use of the borrow pits and quarries an environmental and social management plan shall be prepared and a rehabilitation plan shall also be prepared and implemented after completion of construction works. As good environmental practices, it is proposed that existing borrow pits and quarries should be managed well.

4.8.3 Tourism

No major tourist attractions are recorded in the area and therefore tourism-related activities not reported at Edward Moringe Camps. But Morogoro Municipal has Uluguru Mountain which people can easily make a tour and enjoy the natural beauty of Morogoro Municipal.

4.9 Economic Infrastructure

4.9.1 Road Network

The project site is served by a tarmac road from Morogoro town to Edward Moringe Campus as indicated in plate 4.3. This has ensured the highest level of accessibility to the project site. There will, however, be improved with acceleration and deceleration lanes to separate express and local traffic to and from the premises.

4.9.2 Telecommunications Facilities

Morogoro Municipal is best served in terms of communication facilities. The telephone companies currently giving communication services include Tanzania Telecommunication Cooperation Limited (TTCL), Vodacom, Airtel, Tigo, Zantel and National Optical Fibre Network. Other services such as Fax, Television, Internet services and Radio Broadcasts are also available in Morogoro Municipal.

4.9.3 Financial Institutions

Morogoro Municipal has a mix of financial institutions, like NMB Bank, NBC Bank, CRDB Bank, Exim Bank, and Tanzania Postal Bank (TPB), as well as a local one called Morogoro Community Bank (MCB). These banks offer a wide range of financial services for people, businesses, and entrepreneurs in the area.

The Municipal is also keeping up with modern trends by using mobile money platforms such as Tigo pesa, Halo pesa, Mpesa, and Airtel money. This makes it easier for everyone to access financial services, helping the financial services in Morogoro Municipal to improve and grow. Apart from banks, there are also financial cooperatives called Savings and Credit Cooperatives (SACCOs) that help people save, borrow, and invest. This comprehensive strategy supports the development of financial services in Morogoro Municipal, making sure that everyone can benefit.

CHAPTER 5: STAKEHOLDER ENGAGEMENT PLAN

5.1 Introduction

Active engagement with local communities is paramount for the proposed project's success. This collaboration fosters smooth interaction between project proponents and community members, while minimizing and mitigating potential environmental and social risks associated with project activities. The overarching goal of the consultation process is twofold. Firstly, the dissemination of project information is important in ensuring local communities are well-informed about the project, its objectives, and potential impacts. Secondly, the incorporation of local perspectives is integral in integrating community views into the design of mitigation measures and the environmental management plan.

The SUA-EMC project prioritizes stakeholder engagement, recognizing its importance in achieving environmental and social sustainability. This approach aligns with the World Bank's Environmental and Social Framework (ESF), specifically Environmental and Social Standard (ESS) 10, which emphasizes open communication and information sharing as essential for responsible project development. Furthermore, the project adheres to Tanzanian regulations established by the Environmental Management Act (Cap 191) and the Environmental Management (EIA and Audit) (Amendment) Regulations, 2018, both of which mandate public involvement in environmental assessments.

Building on these principles, a comprehensive stakeholder engagement plan was developed early in the project's life cycle. This plan included diverse communication channels to inform local communities, key stakeholders, and leaders about the project's objectives, implementation technologies, and potential impacts. Consultative meetings, key informant interviews, email communication, public meetings, and telephone calls facilitated information dissemination and two-way dialogue.

During consultations, stakeholders were briefed on the project's details, including:

- **Objectives**: Providing clarity on the project's aims and intended outcomes.
- **Technologies**: Describing the methodologies and approaches to be employed.
- **Potential impacts**: Identifying and discussing potential environmental and social consequences.
- **Grievance mechanisms**: Establishing clear channels for stakeholders to voice concerns and seek redress.

Stakeholders were encouraged to ask questions and seek clarification on any aspect of the project to ensure transparency and understanding. This open dialogue is instrumental in identifying and mitigating potential concerns, promoting social acceptance, and ultimately contributing to successful project implementation.

5.2 Stakeholder Identification and Analysis

The ESIA study for the Sokoine University of Agriculture (SUA) project adopted a rigorous approach to stakeholder identification. This process aimed to identify all individuals, groups, and institutions potentially affected by the project, able to influence its direction, or holding interest in its success. Utilizing a continuous and comprehensive approach, the study generated an exhaustive list of stakeholders categorized as follows:

i. **Public Institutions:**
   - Regulatory and oversight bodies: Tanzania National Electric Supply Company (TANESCO), Wami/Ruvu Basin Water Board (WRBWB), MORUWASA, Morogoro

Municipal Council (MMC), Tanzania Commission for Universities (TCU), Occupation and Safety Authority (OSHA), Fire and Rescue Army

- Educational institutions: SUA Students (including vulnerable and disabled students) and student organizations (SUASO)
- Academic and administrative staff: Represented through relevant faculty and staff associations.
- **Project-Affected Communities:**
- Local residents of Magadu ward affected by construction activities.
- **Local Government Authorities:**
- Magadu ward government officials
- **Service Providers:**
- Businesses and individuals providing goods and services to the SUA community, both within and outside the university.

This inclusive approach ensures that all potentially affected stakeholders, from government agencies and directly impacted communities to service providers and university personnel, are identified and engaged throughout the project lifecycle. These fosters open communication, facilitates informed decision-making, and promotes project success with due consideration for diverse perspectives and legitimate interests.

5.3 Objectives of Stakeholder Engagement

The Sokoine University of Agriculture (SUA) Higher Education for Economic Transformation (HEET) project prioritizes responsible stakeholder engagement through a robust Stakeholder Engagement Plan (SEP). This plan emphasizes the following key objectives:

1. **Transparent Information Dissemination:**
   - Proactively provide relevant, timely, and accessible information about the project in understandable formats to all stakeholders.
   - Ensure early and comprehensive information disclosure through diverse channels.

2. **Meaningful Stakeholder Consultation**:
   - Actively solicit stakeholder opinions, concerns, preferences, and perceptions regarding project planning, implementation, and potential impacts.
   - Facilitate dialogue on proposed management and mitigation measures to minimize negative impacts and maximize benefits.

3. **Effective Grievance Redress**:
   - Establish structured, reliable, and responsive mechanisms for all stakeholders to address concerns and grievances with the project.

These objectives align with SUA's commitment to international best practices for stakeholder engagement, ensuring the process is:

- **Consistent and thorough**: Employing consistent methods and reaching all relevant stakeholders.
- **Coordinated**: Integrating engagement into the broader ESIA process and project decision-making.
- **Culturally suitable**: Recognizing and respecting diverse stakeholder needs and preferences.
- **Manipulative-free**: Conducting engagement with openness and integrity.

Furthermore, the SEP acknowledges and adheres to:

- **Tanzanian national environmental policy and legislation:** Complying with all relevant legal requirements.

- **World Bank Environmental and Social Policy**: Aligning with international standards for responsible social and environmental practices.

This comprehensive plan serves as a roadmap for open dialogue, addressing stakeholder concerns throughout the project lifecycle, and demonstrating SUA's dedication to inclusive and responsible project development.

5.4 Stakeholders Engagement and Disclosure Methodologies

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

5.4.1 Semi-Structured Interviews with Key Informants

Semi structured interviews were conducted with key informants at the Street/Mtaa, district and regional levels. At a municipal level semi structured interviews were conducted with Municipal Executive officer and functional departmental staffs namely District Executive Director (DED), Municipal environmental Officer, Community development officer and land officer, Wami/Ruvu Basin Water Bodies Engineers (WRBWB engineers), Municipal Structural Engineers, Fire and Rescue Force- Municipal office and all other related Departments at Municipal level

At the street level semi structured interviews were conducted with Street/Mtaa chairperson, Street/Mtaa Executive officer (MEO), Ward Executive officer (WEO) and other nearby communities. These interviews enabled the consultant to have in-depth information on social economic, political and cultural conditions of the people in the proposed project area. The knowledge gained from the interviews helped the consultant to make evaluation of the social economic and cultural impacts.

5.4.2 Indoor Street/Mtaa Consultation Meetings

In Street/Mtaa, with the proposed project, the consultant made an indoor meeting with the Street/Mtaa council members and Street influential persons. Subjects of discussion included the Street/Mtaa social, economic, political and cultural aspects including lifestyles of the community people and main ethnic groups of the community around the project site.

5.4.3 Public Street/Mtaa Consultation Meetings

Before conducting meeting, letters were sent to the selected Street/Mtaa in Magadu ward where the proposed project is going to take place. These letters were sent prior to the commencement of the study. The main aim of the Street stakeholder consultation meetings was to inform the stakeholders about the proposed project and incorporate their views in the design of the mitigation measures. The specific aim of the consultation process was to reduce problems of institutional coordination, provide precise information about the project to the communities, obtained main concerns and perception of the stakeholder regarding the projects and obtaining opinions and suggestion directly from the affected communities on their preferred mitigation measures.

The public stakeholder consultation Street/Mtaa meetings were also intended to collect information regarding source of livelihood, living standards and views and perceptions of the communities regarding the proposed projects.

5.4.4 Disclosure

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

Table 5.7: Methodology for Stakeholder engagement

S/N	Stakeholders Group	Language Used	Communication Means
1	Government Institutions and Agencies (TCU, OSHA, TANESCO, MORUWASA, WRBWB, FIRE)	Kiswahili & English	Phone and Email Meetings Roundtable discussions
2	Local government (Morogoro Municipal Council, Magadu ward)	Kiswahili	Community Meeting Roundtable discussions
3	SUA students and persons with disabilities	Kiswahili & English	Roundtable discussions
4	SUA Staff (Administrative and Academic staff, and Service provider)	Kiswahili & English	Phone and Email Meetings Roundtable discussions
5	Vulnerable Groups (women, youth and elders)	Kiswahili	Community Meeting Roundtable discussions
6	Others (NGOs, CBOs, and private sector etc.)	Kiswahili and English	Phone and Email Meetings Roundtable discussions

5.5 Stakeholder Concerns

Generally, all stakeholders consulted had no objections regarding the proposed project and appeared to be content with its objectives leading to its initiation. They all urged the proponent to abide by the relevant rules and regulations guiding her project operations. All raised issues from consulted stakeholders are pointed and noted as explained on Table 5.2 below.

Table 5.8: Details of Stakeholders concerns (Source; Consultation with stakeholders in April 2023)

Level	Stakeholder	Stakeholder Views and Concerns	Responses
National level	**Tanzania Commission of Universities (TCU)**	. o Accommodation and business opportunities will increase. o Construction of buildings will increase the market supply of building materials. o SUA project will increase enrollment for students and academic performance.	The contractor should adhere to OSHA stipulated standards to make sure noise level and dust are controlled at workplace and neighboring communities.
Regional level	**TANESCO**	o The project should consider the use of renewable sources of energy. o The project should consult TANESCO at the earliest stage possible in order to request for extension of services to the new buildings and an additional supply of electricity, if needed. o It is recommended for utility University to use automation of power systems. The use of power system automation reduces numbers of activities and means of energy loss.	The Contractor should adhere to details of the architect designs.
	Occupation Safety and Health Authority (OSHA)	. o There should be trained First Aiders at all project phases, as well as First Aid Kits with all necessary facilities and First Aider should renew the certificate after every 1 year as per OSHA requirement. o The proponent should conduct Risk Assessment before construction and prepare a Risk Assessment report. o All workers should be provided with sufficient Personal Protective Equipment (PPEs) during all project phases.	The report has stipulated all the recommendations which will assist to take care of all the Occupation Health and Safety Concerns which may arise as a result of the project.
	Wami/Ruvu Basin Water (WRBWB)	.	

Level	Stakeholder	Stakeholder Views and Concerns	Responses
		○ SUA has water use permits from Wami/Ruvu basin Water Board, so they required to renew water permits which are already expired and apply for water permit for the sources which do not have permit. ○ They are required to have a good effluent treatment plant at Edward Moringe Campus to prevent overflow which causes environmental pollution. ○ SUA conducting Irrigation Agriculture, so it is better to Check the Chemicals like pesticides and Fertilizer used if they pollute environments or not.	The report has included details of how SUA will enhance water availability for the project.
	Fire and Rescue Force	○ The proponent can consult the Fire and Rescue Force office for the best choice of registered fire dealers. ○ There should be detection, alarm and lighting systems, emergences exist as well as portable fire extinguishers in all buildings ○ All architectural drawings should be submitted to the Fire and Rescue Force office to be reviewed, signed and approved.	The Contractor should adhere to details of the architect designs.
Local level	**Morogoro Municipal Council**	○ Wider stakeholder consultations and community involvement with regard to land issues should be done before construction. ○ Employment priorities must be given to the local community around Sokoine University of Agriculture. ○ Contractors should avoid Child Labour during the implementation of the Project.	Preparation of the ESIA report itself is an indication of how committed the Client is to follow all the prescribed laws and regulations when implementing this project.
	Morogoro Municipal Council Environmental Management Officer	○ All materials must be sourced from the designated areas and Municipal fees for transportation of materials from one place to another should be paid. ○ Management of solid waste is still a problem though the project design considered it.	The report has recommended that the Contractor should with all environmental

Level	Stakeholder	Stakeholder Views and Concerns	Responses
		○ During operation the proponent should ensure adequate handling and disposal of all hazardous wastes such as chemicals from laboratories.	regulations and comply with them.
	Morogoro Municipal Council Land Officer	○ The department is well informed about this proposed project, and they are familiar with the title deed. ○ They have to share their master plan with the Municipal Planning Authority. ○ They required preparing the site Layout before starting the project.	The certificate of occupancy is obtained and appended in this report. All recommendations have to be taken into consideration.
	Morogoro Municipal Council Community Development Department	○ Community development had to be involved from the initial stage of the project development. ○ Each department should know that community development is a crosscutting issue that should be shared with the department too.. ○ Education must be provided about HIV/AIDS and Covid-19.	The importance of this project to community is identified in this report.
	Morogoro Municipal Council Municipal Structural Engineers	○ Materials should be stored in a good, designed space to prevent blocking of the roads. ○ Cars must have a permit to pass through the road during transportation of materials to the construction site. ○ The office of Regional Engineer must be involved at the early stages of the project for further advice..	The report has made recommendations on how construction materials should be transported and stored at the project site.
	Edward Moringe Campus Students	○ Chairs and shelves in the rooms do not equal the number of students living in them. ○ There must be enough chairs in the rooms according as per number of students. ○ There is a water problem on the university Campus, so this new project must consider installment of enough water facilities in order to increase water availability at university.	The ESIA report has outlined the benefits of the project.
	Edward Moringe Campus	○ Internet sources and cables should be included in the designing of the buildings both in classes, and workshops/studios. ○ Microphones should be installed in classes.	The ESIA report has outlined the benefits of the project.

Level	Stakeholder	Stakeholder Views and Concerns	Responses
	(Administrative and Academic Staff)	○ Noise pollution should be controlled in order not to interfere with smooth learning process.	
	Edward Moringe Students, SUASO Representatives and Services Providers	○ Most of the university infrastructures are not friendly to people living with disabilities. ○ Privacy should be considered in both rooms and toilets in the new buildings. ○ Sewage systems should be observed and rehabilitated..	This has to be taken into consideration.
	Ward Executive Officer (WEO) and Magadu Community	○ Employment should be given to the local people surrounding the project site. ○ Construction activities will increase unplanned and early pregnancy cases, especially to School and local girls because their lusts they tend to date project workers. The contractor is advised to take precautions and strictly enforce his employees.. ○ The contractor should extract construction materials in an environmentally friendly way.	This has to be taken into consideration.

5.6 Response to Stakeholder Concerns

During stakeholder consultation, different stakeholders according to their point of view raised various issues. The main issues and concerns raised will be mitigated as shown in table 5.10 below:

Table 5.9: Shows response to stakeholder concerns (Consultant Primary information on April 2023)

Concerns	Responses to Concerns
Noise Pollution During Construction Phase	o Workers will be provided with noise protective gear and insist on the use of gear at all times. o The contractor will ensure that all working machines and trucks delivering construction materials are well inspected and serviced properly to reduce noise levels. o Site shall be fenced with well-approved material like iron sheets in order to reduce the speed of noise.
Air Pollution During Construction Phase	o The location of construction material loading points should be done at planned points where dust emission will not affect the community. o Contractor/proponent will procure ready to use concrete mix which will help to reduce dust emission from mixing materials. o In the case of present stockpiles, the proponent will cover all stockpiles during non-loading hours.
Pollution of Environment Due to Solid and Liquid Waste Mismanagement	o No waste shall be discharged in the open environment. o Good solid waste management policies will be adhered to. This will guide all workers to protect the environment and for hazardous and non-hazardous only authorized collection agencies shall be engaged. o Induction training on solid waste separation and sorting at source will be conducted for workers to enable them to separate recycled waste from non-recyclable waste, therefore, reducing the amount of waste collected for disposal. o A temporary solid waste collection chamber shall be constructed within the project premises for to manage solid waste.
Management of Waste Materials Associated from Construction Activities and Operation Activities	o The debris from demolition will either be transported by a licensed waste transporter for dumping at an approved site or the debris will be used as base material for new construction work. o Other waste materials shall be used for filling in any open pit and/or to plant appropriate tree species to prevent soil erosion.
Presence of Social Services Especially During Construction Phase	o Safe drinking water shall be available from MORUWASA, and the proponent/contractor will provide extra water storage facilities which will be used in case of water shortages. o The area will be connected with an electrical power grid and services from TANESCO, where infrastructure is at the site will be connected. Also, a generator will be used in case of power outages from TANESCO. o Temporary toilets should be available during the construction phase.
Pollution of The Environment Due to Solid and	o The proponent shall construct a septic tank, soak away pit, and wastewater stabilization pond for wastewater management and emptying will be done once the facility is full.

Concerns	Responses to Concerns
Liquid Waste Mismanagement	o Maintenance schedule for sanitary facilities shall be given and followed. o Storm water channels will be constructed to manage rainwater. o Proper solid waste management will be in place to protect the environment. o Induction training on solid waste separation and sorting at source will be conducted for workers which will help in recycling other waste material, hence reducing the amount of waste generated. o Temporary solid waste collection points will be designed within the project premises before being transported to designated/approved dumping areas.
Safety of Workers During the Construction Phase	o Induction training to workers on health and safety and the appreciation of safety gear will be done. o An emergency preparedness plan will be prepared and adhered to it. o The proponent should have a health and safety policy and implement it in order to reduce injuries/accidents at work. o All personnel will be provided with appropriate protective gear. o All works shall be planned and conducted in accordance with relevant OSHA guidelines. o Medical checkups for the new employees will be done and first aid kits shall be provided in an area where it will be easily visible and accessible.
High Possibility of Disease Spread Especially Epidemic Diseases	o Good hygienic procedures shall be insisted on by all project staff and community members. o Education shall be given on how to fight against epidemic diseases. o The proponent will ensure that first aid and trained first aiders are in place for the proposed project.
Security Issues	o During the construction phase, the proponents will ensure that the whole area is fenced and only workers and permitted visitors will have access to enter the proposed project premises. o Security personnel from recognized security companies will be employed to provide service for 24 hours during construction phase. o Lighting bulbs will be installed and used to produce sufficient light during night hours.

5.7. Stakeholders Engagement Plan (SEP)

Effective stakeholder engagement improves the environmental and social sustainability of projects, enhances project acceptance, and makes a significant contribution to successful project design and implementation. This proposed project has engaged stakeholders as per SEP developed for HEET project.

The engagement plan will be reviewed and updated throughout the project implementation. During this process, the focus and scope of the SEP may change to reflect the varying stages of project implementation and to encompass any changes in project design and lessons learnt from previous phases of the Project.

CHAPTER 6: IMPACTS ASSESSMENT AND PROJECT ALTERNATIVES

6.1 Introduction

Chapter 6 identifies and analyzes the environmental and social impacts associated with the proposed SUA Edward Moringe Campus project. Based on this analysis, this chapter prioritizes and proposes mitigation measures for adverse impacts and enhancement measures for potential benefits. The assessment of environmental, social and economic impacts in this report is conducted to help determine the acceptability of the project, and to make sure that adverse impacts are properly addressed and mitigated accordingly. The assessment process during mobilization, construction, demobilization, operation and decommissioning phase involves looking at:

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

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

i. Adhering to the Environmental Health and Safety Guidelines (EHSGs) outlined by the WB; Evaluating risks concerning community safety
ii. Addressing issues linked to climate change
iii. Considering any potential threats to the preservation, conservation, maintenance, and restoration of natural habitats and biodiversity; and
iv. Examining the impacts on ecosystem services and the utilization of living natural resources.

The assessment of social risks and impacts involved;

i. Identifying potential threats to human security, such as crime or violence;
ii. Analyzing risks that could disproportionately affect specific individuals or groups due to their unique circumstances, making them more disadvantaged or vulnerable and
iii. evaluating negative economic and social consequences related to the involuntary acquisition of land or restrictions on land use.

6.1.1 Nature of Impacts

ESIAs differentiate between impacts based on their overall effect: those contributing positive or advantageous outcomes to the environment or socio-economic aspects are classified as positive impacts, while those inducing negative or adverse consequences are categorized as negative impacts.

6.1.2 Duration of Impacts

The timeframe over which an impact manifests or persists, defining the duration of positive or negative project-related consequences. This scale typically categorizes impacts as short-term, medium-term, long-term, or permanent.

6.2 Environmental Impact Rating Scale

To facilitate fair and consistent comparisons across ESIA studies, a standardized approach was implemented for assessing the significance of identified impacts. This framework evaluates "impact significance," defined as the impact's importance within the broader context of the affected system, based on specific criteria:

- **Severity**: Technical magnitude or importance of the impact.
- **Spatial Scale**: Geographic extent or area affected by the impact.
- **Temporal Scale**: Duration or timeframe of the impact.
- **Degree of Certainty**: Confidence in the predicted impact occurrence.
- **Likelihood**: Probability or risk of the impact materializing.

This initial assessment analyses the overall effect within the surrounding environment. However, to account for broader societal, cultural, historical, economic, political, and ecological considerations, the severity or benefit of an impact is initially rated within a specific field of expertise. Subsequently, its significance is evaluated on a larger scale. This two-step process utilizes separate rating scales, one for severity and another for environmental significance.

6.2.1 Severity/Benefit

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

Table 6.10: Severity rating scale

Negative Impacts	Positive Impacts
Very severe An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated. For example, change in topography.	**Very Beneficial** A permanent and very substantial benefit to the affected system(s) or party (ies), with no alternative to achieve this benefit. For example, the creation of a large number of long-term jobs.
Severe Long-term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming or some combination of these.	**Beneficial** A long-term impact and substantial benefit to the affected system(s) or party(ies). Alternative ways of achieving this benefit would be difficult, expensive or time consuming, or some combination of these. For example, an increase in the local economy.
Moderately severe Medium- to long-term impact on the affected system(s) or party (ies) that could be mitigated. For example, constructing a	**Moderately beneficial** A medium- to long-term impact of real benefit to the affected system(s) or party (ies). Other ways of optimizing are equally difficult, expensive and time consuming (or

Negative Impacts	Positive Impacts
narrow road with an area with low conservation value.	a combination of these), as achieving them in this way.
Slight Medium- to short term impacts on the affected system(s) or party(ies). Mitigation is very easy, cheap, less time consuming or not necessary.	**Slightly beneficial** A short- to medium-term impact and negligible benefit to the affected system(s) or party (ies). Other ways of optimizing the beneficial effects are easier, cheaper and quicker, or some combination of these.
No effect The system(s) or party(ies) is not affected by the proposed development.	**Don't know/Can't know** In certain cases, it may not be possible to determine the severity of the impact.

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

6.2.2 Spatial scale

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

Table 6.11: Spatial scale

Individual	Individuals in the area that could be affected
Households	Households in the area could be affected
Localized	A few hectares in extent (from the site). The specific area to which this scale refers is defined for the impact to which it refers.
Study Area	Includes the entire project area.
District	Includes areas around the project includes Mindu Ward within Morogoro Municipal Council.
Regional	The impacts will be of such a nature that it may affect the Morogoro Region.
National	The impacts will be of such a nature that it may affect the entire Tanzania.
International	The impact would affect resources and processes outside the borders of Tanzania.

6.2.3 Temporal scale

The temporal scale defines the times over which the impacts would continue to occur.

Table 6 12: Temporal scale

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

- **Phase-** During which phase of the construction is the impact likely to occur. The phases included Mobilization, Construction, Demobilization and Operation.
- **Reversibility of the impact-** Every impact was checked if its effect can be reversed or not. Letter R was used to denote reversible impacts while IR was used to denote Irreversible impacts
- **Cumulative Impacts-** These are impacts that cause changes to the environment that are caused by an action in combination with other past, present and future human actions.
- **Residual Impacts-** These are impacts that remain after mitigation measures have been applied

6.2.4 Criteria and Significance Rating

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

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

Table 6.13: Significance of an Impacts

Significance	Explanation
High	These impacts will usually result in long-term effects on the natural and/or social environment that will only be mitigated over very long periods of time. At times, this is not possible, and it is up to the

	government to decide if this is acceptable when considering the benefits of the Project.
Moderate	These impacts will usually result in medium to long term effects on the natural and/or social environment. These impacts do exist but are not substantial, and usually result in moderately severe effects or moderately beneficial effects. The emphasis for moderate impact is on signifying that the impact has been reduced to a level that is as low and reasonably practicable
Minor	These impacts will usually result in medium to short term effects on the natural and/or social environment. The environmental and/or social conditions will be affected, but the impact is small enough that it is unlikely to be a concern to the government, communities and organizations.
Negligible	There are no primary or secondary effects at all that are significant to scientists or the public. Also, this means that the existing environmental and social conditions will not be affected, or the effect is not detectable. A negligible impact is likely to be of no concern to the government, communities and organizations.

6.3 Impact Identification

6.3.1 Positive Social Impacts

6.3.1.1 Employment Opportunities

Both direct and indirect forms of employment shall arise from the project initiation. Direct employment will be mainly through skilled and unskilled labours whose workforce shall be needed to construct Edward Moringe Campus buildings and ancillary infrastructures. Employment opportunities will benefit the community economically and socially. In the economic perspective it employs abundant unskilled and skilled labour who will be used during construction and will benefit economically.

Additionally, the project will provide indirect employment to the local people by selling food and other services to the construction workforce. The utilization of local workmanship will take place for the activities that do not require a high specialization. This impact is considered to be direct, positive, short term and of moderate significance.

6.3.1.2 Increased Income to Surrounding Community

There is an expectation that the majority of unskilled labour will be employed from residents of Magadu ward. This will increase the income for local people who might have the opportunity to be employed by the contractor. The highly skilled labour such as project leader, engineers etc are most likely to come from outside Morogoro they will need to rent houses and therefore increase income to the community most likely Morogoro CBD

However, some of the surrounding community' especially women will also get opportunity to sell food and items to the construction workforce, thus increase income at the household level. This impact is considered to be direct, positive, short term and of high significance.

6.3.1.3 Benefit to local suppliers of construction materials

Construction of the University buildings and ancillary infrastructures has considered the use of local laborers and local available materials. This is economically and socially viable hence increase the efforts to improve the standards of living for local suppliers. This impact is considered to be direct, positive, short term and of low significance.

6.3.1.4 Increased Human Capital

During the construction and rehabilitation phases of the project, the influx of individuals from different areas seeking employment in the project is anticipated to result in an increase in human capital. This phenomenon is viewed as a direct, positive, and short-term impact, possessing moderate significance. As these individuals engage with the project, they are likely to acquire new skills, knowledge, and experiences, which could, in turn, contribute to enhanced workforce capabilities and potentially foster economic development in the region. The cultivation of increased human capital is a valuable aspect of the project's social and economic dimensions, underlining its potential to empower and elevate the local labor force while supporting broader community development objectives.

6.3.2 Negative social Impacts

6.3.2.1 Population Influx (Labor Influx)

In many cases, labour influx is compounded by an influx of the other people (followers) who follow the incoming workforce with the aim of selling them goods and services, or in pursuit of job or business opportunities. The influx of workers and followers can lead to adverse social and environmental impacts on local communities. Such adverse impacts may include increase demand and competition for local social and health services as well as goods and services, which can lead to price hikes and crowding out of local consumers, increased volume of traffic and higher risk of accidents, increase in accommodation demand at the project site, increase demands on the ecosystem and natural resources, social conflicts within and between communities, increased risk of communicable diseases and increased rates of illicit behavior and crime. These impacts need to be well mitigated. This impact is considered to be negative of short-term duration with high significance.

6.3.2.2 Increased risk of GBV, SEA and SH

In the context of a university construction project, the potential for gender-based violence and sexual harassment from male workers separated from their spouses poses direct and significant short-term negative impacts on female students and other workers, compromising their safety, hindering academic performance, and contributing to mental health issues, which can disrupt classes and damage the university's reputation. Furthermore, the health consequences, such as unwanted pregnancies and sexually transmitted infections, including HIV, highlight the urgent need for comprehensive measures to protect the well-being of all individuals on campus during construction activities and foster a safe and inclusive university environment for everyone involved.

6.3.2.3 Occupational Health and Safety Hazards to Workers

During construction of facilities at SUA, it is expected that construction workers are likely to have accidental injuries and hazards as a result of handling hazardous waste. Engineering and construction activities include metal grinding and cutting, concrete work, steel erection and welding among others. Construction workers will be exposed to the risk of accidents and

injuries. At times such injuries maybe from accidental falls from high elevation, injury due to the nature of occupational activities, operation or movement of machines and equipment, injuries from hand tools and construction equipment and also cuts from sharp edges of steel sheets. Furthermore, during construction phase workers are also likely to be exposed to health hazard from building materials. It is therefore recommended that before the construction commences, there is need for the materials to be well inspected according to the occupational health and safety standards

At workplace there are several issues on occupational health and safety has to be comply with which include the following;

i) **Ergonomic hazards** (Long standing hours, long working hours, working in confined space and lighting hazards)
ii) **Biological hazards:** Physical risk factors to which workers are exposed on project site during construction include noise from vehicle, extreme air temperatures (hot and cold) during the season with extreme temperature characteristics of the project area. Risk factors include contact with bacteria, viruses, fungi which the construction workers come into contact with due to diversity of people. The impact is considered to be negative of short-term duration with high significance.

Table 6.14: Source of the harmful effects on health and community safety

Type of Harmful Effect	Sources of the Threat
Accident risk	• During excavation work • Movements and operations of heavy equipment • Access to danger zones • Transport, handling and storage of the materials • Concrete batching and mixing plant
Indirect health risk	• Environmental pollution • Contamination of water or/and food

6.3.2.4 Possible Spread of HIV/AIDS and COVID-19 Diseases

The main health risk associated with the project relates to the HIV/AIDS epidemic. Considering the socio-economic as well as geographical characteristics of the project area, there exist a number of factors (including poverty) that either may influence high infection rate or detect efforts to combat the epidemic. For example, the problem of low or irregular incomes among young women aged 15-45 years is the HIV/AIDS risk factor, which can influence high infection rate in the project area. It is expected that the project will increase interaction between people in the cause of social relaxation. However, recently the country experiencing COVID-19 pandemic requires great attention with proper preventive measures to be in place especially in all congested areas. It should be noted that during construction phase the contractor employs different workers from different areas hence increasing the potential for infectious diseases especially to students at the university during construction.

6.3.2.5 Disruption of Traffic Flows

According to the project location and accessibility, University Road (SUA road) will mainly be used for the entire construction and rehabilitation period at Edward Moringe Campus. During construction there will be frequent movement of vehicles and trucks from the project site. This could result in disruption of movement of traffic along the access road and if no measures are taken it could result into accidents. This impact is considered to be direct, negative, short term and of medium significance.

6.3.2.6 Child Labour and Forced Labour

Child labour, forced labour and human trafficking are results of many factors, including poverty, social norms, lack of decent work opportunities for adults and adolescents, migration and emergencies. These factors are not only the cause but also a consequence of social inequities reinforced by discrimination. The project Proponent, Contractor, consultant engineer and other stakeholder need critical attention to abide with employment Act No.6. (2004)

6.3.2.7 Unplanned Pregnancies

Unplanned pregnancies are the global problem as well as Tanzania in particular but occur most often poorer and marginalized communities. Early pregnancies remain the major contributors to maternal and child mortality whilst complications relating to pregnancy and childbirth are the leading cause of death for girls aged 15-18. Adolescent pregnancy can also have negative and social economic effects on girls, their families and community such as drop out of schools, limiting opportunities for future employment, perpetuating poverty cycle, etc. Nevertheless, the proposed project will cause high social interactions both during construction and mostly during operation phase. Contractor and his employees who are mostly men will highly interact with local community at Magadu Ward, the state may cause sexual interaction and sexual infidelity and unplanned pregnancies with other women, outside their wedding locks and promiscuity in general.

6.3.2.8 Food Insecurity and inflation of prices on other social services

The influx of workers during the selection and design stage is expected to create pressure on existing food sources, leading to shortages. Both community members and street councils predict that the project's development will attract a significant population seeking income-generating opportunities, thereby increasing the demand for goods and services, particularly food. This surge in demand is likely to result in chaos and inflation of prices on various essential services, including food. The impact can be categorized as indirect, cumulative, short term and reversible (once the construction phase is completed, the influx of workers is likely to decrease, alleviating pressure on food sources and stabilizing prices).

6.3.2.9 Public Health Hazards due to Waste

Workers working on site during development phase definitely will generate some waste in solid and liquid from including human wastes. This might result in sanitary related diseases such as cholera, dysentery and alike. Depending on the number of construction workers and the seasons when work will be done the impacts might become significant. Likewise, mismanaged solid wastes such as plastic bottles, food remains, used packaging material (e.g., cement bags) and like might end up into drainage system and interfere the usual flow of storm

water. This might also create untidy conditions in Edward Moringe if waste management is not followed well. The impact is considered negative, short term and moderate significance.

6.3.2.10 Risk of Construction Materials Vandalism

Generally, construction projects experience vandalism and theft of construction materials mainly by locals in conjunction with construction technicians. For the proposed project these acts of vandalism may take a number of forms including cements, blocks, fuels, theft from trucks storage tanks, theft of valuable spare parts and other accessories leading to an increase in the construction costs and state of trepidation to Contractor. Vandalism and theft acts will totally jeopardize the proposed project and subsequently cause directly great loss to the Proponent and Contractor.

6.3.3 Negative Environmental Impacts

6.3.3.1 Air Pollutions (Fugitive Dust and Exhaust Emissions)

The proposed construction activities will involve trench and foundation excavation, transportation construction materials, as well as handling of cement bags. This is likely to generate dust in and around construction sites. Exhaust emissions from trucks, machinery and construction equipment are likely to generate mixture of toxic gases such as carbon monoxide (CO), nitrogen oxides (NOx), Oxides of Sulphur (SOx), Hydrocarbons (HC) and suspended particulate matter. Dust and exhaust emission may create nuisance and in extreme cases may lead into adverse health impacts. This impact is considered to be direct, negative, long term and of high significance.

6.3.3.2 Soil Erosion

Clearance of vegetation due to construction activities will leave considerable soil surface to be exposed and can be easily eroded by runoff. Movement of heavy equipment to the site may lead into soil compaction and soil erosion. This impact is considered to be direct, negative, long term and of high significance.

6.3.3.3 Vegetation Clearing

Construction work will involve vegetation clearing to prepare the ground for civil works and installations. However, as a large part of the land is occupied with university structures and ancillary facilities, then overall loss of vegetation from land clearing will be limited. This will also affect avifauna that uses those tree species for nesting sites. However, during site clearance, any vegetation that is not properly disposed of can block drains and water ways, and also spread invasive species causing environmental degradation. This can also bring about health risks by creating pools of stagnant water, encouraging vector populations. Site clearance can also lead to soil erosion, especially during the rainy season. This impact is considered to be direct, negative, short term and of low significance.

6.3.3.4 Generation of Solid Wastes

It is obvious that the proposed project construction activities will be associated with production of solid wastes. These wastes streams are likely to be generated from fabrication and domestic activities of the workers at the construction site. The type of wood, excess soil materials, cement bags, piece of bricks, plastic materials (bottles and bags), broken pipes, piece of metals and paint containers. This impact is considered to be direct, negative, short term and of high significance.

6.3.3.5 Generation of Liquid Waste (Human Sanitary Waste)

The contractors' workforce to be involved for construction of SUA buildings and ancillary facilities will generate liquid waste consisting of grey water, urine and fecal matters. If not properly managed, the anticipated liquid waste from construction workers can significantly impair aesthetic value of the proposed site and cause threat to public health. This impact is considered to be direct, negative, short term and of high significance.

6.3.3.6 Generation of Hazardous Waste

Repair and maintenance activities of construction machinery and equipment will produce significant quantity of hazardous waste including used oil filters, scrap metals, waste oils, and grease and used batteries. However, construction of structures will result in generation of hazardous wastes including sharp objects (e.g., broken nails) and waste containers used for material packaging. Improper handling of the generated hazardous waste can lead to soil contamination, underground water pollution and public health threats.

6.3.3.7 Noise Pollution and Vibration

Noise is considered as an interference to and imposition upon comfort, health and quality of life. Construction activities are expected to produce point source noise, which is defined as noise that remains in one place for an extended period of time. For example, noise will be generated from the concrete mixer, trucks, bulldozer or motor grader working in project site. Noise from a point source spreads spherically over distance, and travels in all directions equally from the source. The significant noise is expected from operation of noise creating equipments like grader machinery, bulldozer and concrete mixture. The impact is considered to be direct, negative, short-term and of low significance.

6.3.3.8 Impacts on Climate Change

The clearance of vegetation and the presence of construction vehicles and machinery can lead to increased greenhouse gas emissions, transforming an area from a carbon sink to a carbon source and exacerbating climate change effects. Degraded soils may struggle to support carbon-absorbing vegetation, potentially contributing to higher temperatures in the region. This underscores the complex relationship between construction, environmental shifts, and climate change consequences.

6.3.3.9 Soil and Water Quality Contamination

Project related excavation could lead to soil and ground water quality degradation. Contaminated soil or ground water in the path of the project could be disturbed but excavation resulting in a potential transfer of the contamination of the surface waters. The excavated area, if linear could act as conduit to extend ground water contamination to new areas. Spills of hazardous materials in excavated areas during construction could introduce contaminants to ground water. The machines on site may contain moving parts which will require continuous oiling to minimize the usual corrosion. The possibilities of such oils spilling and contaminating the soil and water on site are real. Likewise moving vehicles on site may require oil change. However, the impact will be small scale and local. Appropriate handling of materials prone to contamination and waste management are likely to reduce the impact. It is expected that the impact will be mild, local, and will occur mostly during the construction stage (short term). With the mitigation measure in place, the residual impacts are none too

insignificant. This impact is considered to be negative of short-term duration with high significance.

6.3.3.10 Land Degradation from Extraction of Building Materials

Most of the building materials such as hard core/ aggregates, rough stone and sand required for construction of the proposed project will be obtained from quarries and sand harvesters who extract such materials from natural resources banks such as rivers and land. Since substantial quantities of these materials will be required for construction of the development, the availability and sustainability of such resources at the extraction sites will be negatively affected as they are not renewable in the short term. In addition, the sites from which the materials will be extracted may be significantly affected in several ways including landscape changes, displacement of animals and vegetation, poor visual quality and opening of depressions on the surface leading to several human and animal health impacts. This impact is considered to be negative of long-term duration with high significance.

6.4 Possible potential Impacts during Rehabilitation Activities

6.4.1 Positive social Impacts

6.4.1.1 Enhanced Accessibility:

The installation of a lift in the administration building and new buildings will significantly enhance accessibility for individuals with disabilities. This feature will enable smooth movement within the buildings, ensuring that everyone can access various floors without hindrance. As a result, the college will create a more inclusive and equitable environment, where students, staff, and visitors with mobility challenges can fully participate in all activities, fostering a sense of belonging and equal opportunity.

6.4.1.2 Improved Learning Environment

The expansion of academic classrooms in College of Education and Business studies through horizontal extension will have a direct positive impact on the quality of the learning environment. With reduced overcrowding, students will experience improved comfort and better sightlines in classrooms. This alteration fosters more effective communication between instructors and students, creating an atmosphere conducive to focused learning, interaction, and academic growth.

6.4.1.3 Job Creation

The rehabilitation project is expected to generate employment opportunities, providing a positive economic impact on the local community. The various stages of the project, including rehabilitation and renovation, will require a workforce that includes construction workers, contractors, maintenance personnel, and related professionals. This infusion of jobs contributes to income generation and economic development in the area.

6.4.2 Negative social Impacts

6.4.2.1 Disruption to Academic Activities

The proposed rehabilitation work has the potential to disrupt the normal flow of academic activities within the campus. Noise, construction traffic, and restricted access to certain areas may hinder students' ability to focus and faculty's capacity to conduct classes effectively. Minimizing the impact on educational operations during rehabilitation works becomes paramount to ensure that the academic environment remains conducive.

Mitigation Measures

i. Schedule Rehabilitation activities during off-peak academic periods, such as holidays or breaks, to minimize disruption.
ii. Provide advanced notice of rehabilitation schedules to students and faculty, along with alternative study spaces and temporary classrooms.
iii. Set up temporary classrooms to accommodate academic activities during construction period which will help maintain continuing in education
iv. Implement noise and dust control measures, such as using barriers and enclosing construction areas to create more conducive environment for learning

6.4.2.2 Occupational Health and Safety Hazards to Workers

During rehabilitation work, occupational health and safety risks are significant concerns. Working at heights without proper safeguards can result in severe falls and injuries. Slippery or cluttered surfaces can lead to slips, trips, and falls, causing various degrees of harm. Exposure to live electrical systems poses the risk of electrocution and fires. Handling heavy materials without proper techniques can result in strains and musculoskeletal injuries. The presence of hazardous substances, such as asbestos, can lead to respiratory problems and long-term health issues. Excessive noise and vibration can cause hearing loss and physical discomfort. In confined spaces, lack of proper ventilation and precautions can lead to suffocation or toxic gas exposure. Ensuring proper training, equipment, and adherence to safety protocols is essential to mitigate these risks and protect the well-being of workers.

6.4.3 Negative environmental Impacts

6.4.3.1 Generation of solid waste

Renovation and rehabilitation activities often lead to the generation of significant amounts of construction waste. Without proper waste management strategies, this waste could burden landfills and contribute to environmental degradation. By implementing effective waste separation, recycling programs, and responsible disposal methods, the negative environmental impact of waste generation can be mitigated, aligning with sustainability goals**.**

6.4.3.2 Dust and noise pollution

Rehabilitation activities typically produce noise and airborne dust particles, which could pose a challenge to maintaining a comfortable and healthy campus atmosphere. The elevated noise levels might interfere with lectures and study sessions, while dust particles could impact indoor air quality and create an undesirable environment.

6.5 Possible Potential Impacts during Demobilization Phase

6.5.1 Positive Environmental Impacts

6.5.1.1 Restored Clean Site

It is anticipated that soon after completion of construction works for proposed SUA building and other facilities, the Contractor will be required to remove all unwanted and left-over materials from the site. Similarly, all loose soil found within excavated areas either within or along the project site will be backfilled and properly compacted to allow uninterrupted use of land by the general public. This impact is direct, positive, long term and of medium significance.

6.5.1.2 Vegetation Regeneration

Proper backfilling of the excavated areas within and along the project site will allow vegetation growth and thus contribute to improve scenic beauty of the surrounding hence it will support regeneration of planted vegetation which had been uprooted during project construction stage. This impact is direct, positive, long term and of medium significance

6.5.2 Negative Social Impacts

6.5.2.1 Loss of income generating opportunities by local people

The local people who will be benefiting from the project during construction phase through selling their commodities and services to the construction workers will lose the created potential market during previous phase. This situation will result in loss of household income to Magadu ward communities. This impact is direct, positive, long term and of high significance.

6.5.2.2 Loss of Temporary Employment

Labourers who will be employed during the construction phase will lose their job after decommissioning of the project phase. Some labours may change job and be employed to work on industries that will emerge, and some may leave the place for other jobs in other areas. In most cases most laborers employed during construction phase are semi-skilled laborers that move to seek similar jobs in other areas. This impact is rated as moderate with widespread impact occurring over a short period of time.

6.6 Possible Potential Impacts during Operational Phase

6.6.1 Positive social impacts

6.6.1.1 Increase students' admission to university

The proposed project will provide adequate academic facilities to SUA, these will increase admission of students from high schools and other colleges. The increase in student admissions at SUA after proposed project will have both environmental and social implications. In environmental terms, the construction of new buildings may lead to changes in local ecosystems and resource utilization. Socially, the influx of students will enhance access to higher education, benefiting the country access to higher education will be enhanced for the benefit of the country. Also, the proposed project components will provide adequate and conducive space for meetings, training, seminars, workshops etc. This impact is high, national and will be medium term.

6.6.1.2 Increase of revenue to SUA

After completing the project SUA will increase students' enrolment, which in return will increase revenues through university fees. This will increase the University financial capability for running the university. It will also be one of the Government sources of income. This impact is high, extensive and long term. The project will also provide employment opportunities for many people skilled and unskilled.

6.6.1.3 Job creation

Jobs to be created during the operational phase of the project can be divided into two (2) categories: direct and indirect jobs. Direct jobs are those related to employment as casual

laborers and skilled manpower, operational services, teaching, Indirect jobs are those created by the positive impacts of the institution to economic sectors. These include cleanliness, stationery, catering and commercial activities. In addition, indirect jobs will include agriculture, livestock, and the energy and water sector. This impact is high, extensive and long term

6.6.1.4 Production of skilled labor force for nation development

The proposed SUA project will contribute to FYDP II through generation of skilled labor to support industrialization and increasing youth participation in business such as agriculture, fisheries, Agro-processing, agribusiness, renewable energy utilization and trade thereby reducing unemployment in the country. Thus, contributing to the Tanzania economy through generation of quality graduates that are relevant to the labor market requirements.

6.6.1.5 Increased commercial and social activities around project locations

Construction of the proposed project components is anticipated to attract more businesses to the area due to increased demand for various services and goods. The University will also cause growth of the existing businesses around the project location. This impact is high, local and will be medium term.

6.6.1.6 Increased revenues to local authorities

The project will result to increase in revenue for government. Various governmental regulatory authorities, including the National Environmental Management Committee (NEMC), Morogoro Municipal Council, Morogoro Water Supply and Sanitation Authority (MORUWASA), Tanzania Electricity Supply Company (TANESCO), FIRE and Rescue Force, and OSHA, will benefit from the collected funds. The cumulative effect of sustained revenue generation will result in a long-term positive impact on the region.

6.6.2 Negative social impacts

6.6.2.1 Risks due to Fire Hazards

Buildings are very prone to fire hazards because of different types of combustible materials and machines which are used and installed, respectively. Electrical fault is by large the main culprit in fire accidents in buildings in Tanzania. The components of fires are fuel (combustible substance), heat and oxygen. Unless all three are present fire will not occur. Fire can lead to following impacts; loss of lives, Serious Injuries and loss of properties etc. This impact is direct, negative, short term and of high significance.

6.6.2.2 Creation of Occupational Health and Safety Risks

Occupational exposures may be most likely related to electrocution and other minor hazards related to manual handling, fall and trips. Moreover, community health and safety issues associated with the operation of the offices are generally negligible for well-designed and managed facilities. These may include potential public exposure to fire and explosions. This impact is direct, negative, short term and of less significance.

6.6.2.3 Creation of Public Health Risks

Sold and liquid Wastes generated from daily operations especially office papers and trash, empty water bottles, leakages from sanitary facilities like septic tanks, overflow storm water with oil contamination if not well managed may pose detrimental impacts hence public health

risk. The pollution impact that may result from poor disposal of solid waste is considered negative, long term and of high significance.

6.6.2.4 Disruption of Traffic Flows

During Operation, motor bikes and cars of students and lecturers will add pressure on traffic especially in the areas around the university entrances. Thus, there is a risk of traffic congestion and increased traffic safety in this area. The university will need to work with local government specifically road management authority to install additional signboards near the entrances of the University and/or coordinate and manage traffic if necessary.

6.6.2.5 Increased risk of GBV, SEA and SH

During the operational phase of Edward Moringe Campus facilities gender-based violence (GBV) poses potential risks, including workplace harassment and unequal treatment among staff, students, and service providers. This could result in adverse long-term impacts such as a negative campus culture, decreased engagement, and limitations on personal and professional growth. Addressing GBV requires proactive measures, including awareness campaigns, robust policies, and an inclusive environment, to ensure the safety, well-being, and success of the campus community.

6.6.2.6 Health Hazards due to Social Interaction among Workers and Visitors

With the anticipated considerable number of workers and visitors, the social interaction among them may not be avoided and will be of high significance. Considering the nature with which HIV/AIDS is contracted and spread, this makes a significant contribution to the pandemic. The beneficiaries of some of the activities within the facilities especially youth and women are the most venerable group to that social interaction due to their social economic background. Other public health hazards could occur due to high congestion of people into the buildings where diseases like TB, COVID-19, eye disease, upper respiratory tract infections and many may occur. This impact is direct, negative, long term and of low significance.

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6.6.2.7 Increased Water Demand

As the number of students joining the campus increases, there is a corresponding uptick in the demand for clean water to cater to the needs of the expanding student and staff population. Alongside this, the laboratories also significantly contribute to water consumption. This is primarily due to factors such as evaporation and potential leaks, which lead to a noticeable loss of water. In order to offset these losses, a continuous inflow of water is introduced to replenish the diminishing water levels. However, it's important to acknowledge that a portion of the water that evaporates contains certain chemicals. Regrettably, these chemicals contribute to the emission of harmful gases, which in turn has a negative impact on the environment. This complex interplay between increasing water demand, laboratory activities, and the potential release of harmful substances underscores the importance of responsible water management and environmental considerations within the campus setting.

6.6.2.8 Increase Energy Consumption

One notable negative impact during the operation of the proposed facilities is the significant increase in energy consumption. This surge in energy demand is particularly evident in the

laboratory operations, which involve energy-intensive processes such as equipment operation, climate control, and lighting. With a substantial number of occupants expected to utilize these spaces, the overall demand for energy resources is anticipated to escalate. This heightened energy consumption, if not effectively managed, can contribute to a greater carbon footprint and strain on existing energy infrastructure. It's imperative to address this negative impact by implementing comprehensive energy-saving measures and efficiency strategies to minimize the environmental consequences associated with increased energy consumption during the operation of these diverse facilities

6.6.3 Negative environmental Impacts

6.6.3.1 Generation of Solid Waste

The quantities of solid wastes to be generated from the Offices and other buildings will be high which will include the waste papers, boxes, foils, food leftovers, plastic bottles and bags, voucher materials and others which if all together are not managed properly will degrade the environment and cause pollution around the project area and extend beyond the site through denudation processes such as wind and water. This impact is direct, negative, long term and of medium significance.

6.6.3.2 Generation of Liquid waste

In the upcoming facilities at Edward Moringe Campus, the primary sources of liquid waste are expected to include rainwater runoff, waste from sanitation systems, and water used in the laboratories. As a result of these combined sources, the impact of this liquid waste is projected to have a negative aspect. This negative effect is anticipated to persist over a longer period, indicating a lasting presence. However, in terms of significance, this impact is expected to be relatively low, suggesting that while it might continue for a while, its overall importance is not likely to be very high. It's essential to be mindful of this and put in place plans to manage and reduce this impact as we proceed with the development of the new facilities.

6.6.3.3 Storm water generation and overflow

The proposed Expansion project at SUA will generate a lot of storm water due to presence of pavements, concrete surfaces and buildings. Parking spaces and building roofs are the main contributors of storm water generation at the proposed site. The structures will tend to compromise the infiltration capacity of the land surface and hence rendering water free to the environment. The storm water generated might have impacts on structures downstream as well as being a factor for soil erosion and poor water quality. This impact is direct, negative, long term and of low significance.

6.6.3.4 Impacts on Surface water quality

During operation of the university facilities there will be no significant changes in the quality of surface water because there will be little or no spill of oil or storm water to the environment. However, it is anticipated that there could be flooding impacts that might result from blockage of storm water drainage system especially when the system is not cleared for long time.

Also, Concerns have been raised about potential water pollution from laboratories that can affect the biological activities within Wastewater Stabilization Ponds lead to the pollution, emphasizing the need for careful containment and monitoring of hazardous liquid waste from

laboratory before being disposed into WSP. This impact is direct, negative, short term and of high significance.

6.7 Potential Impacts during Decommissioning Phase

The project will be designed, built and maintained to operate efficiently for several decades. The decommissioning of the project is not expected in the near future. Decommissioning may involve excavation and other activities that will lead to temporarily increase in noise and vibrations as well as air pollution due to dust emission. The deconstruction of the building and dismantling of sewerage and drainage systems, uninstallation of electrical system will also result in the creation of both hazardous and non-hazardous waste which needs to be handled according to waste management regulations.

The earth moving works during topsoil replacement will lead to significant deterioration of the environment within the site and the surrounding areas. This will be as a result of the noise and vibration that will be experienced by machines and the workforce being utilized. Dust will also be emitted, affecting the surrounding environment. People working on the proposed project will inevitably be laid off or replaced in other Government institutions, but decommissioning works create short term jobs.

The decommissioning works will involve occupational health and safety risks similar to those of the construction phase. However, in case of decommissioning the following impacts may be happen

6.7.1 Negative Environmental Impacts

6.7.1.1 Air pollution due to dust and exhaust emission

As noted above the demolition process will entail breaking of building using sledgehammer and jack hammers, which utilize compressed air and lowering of materials from high to low levels. The exercise will inevitably generate dust into the atmosphere. Furthermore, the land levelling and grading while reinstating the area close to its nature condition will also generate dust to the atmosphere as well as transportation of debris and other unwanted materials from the site. Dust generated will impair local atmospheric conditions.

Additionally, trucks and earth moving equipment will be used for demolition works that will emit fumes which are unwanted atmospheric pollutants. Atmospheric pollutants from engines of vehicles/ machinery include SO_2, NO_X, CO_2 and particulate matters. Main impact is impairment of local air quality, the extent of which will be dependent on quantities emitted, duration and prevailing atmospheric conditions. However, for demolition works the equipment to be involved will be fewer compared to construction period

The impact receptors are likely to include site workers and nearby communities as well as people/community centers along the route where the spoil will be disposed. The like hood for public health concern for onsite activities is minimal due to the distance to the nearby settlement. The impact is considered negative, short term and of low moderate significance.

6.7.1.2 Noise Pollution from Demolishing Works

The demolition process will entail removal of buildings using crowbars and hummers, breaking of facilities will use sledgehammers and jack hammers, which utilize compressed air and lowering of materials from high to low levels. The exercise will inevitably result in a generation of noise. The aspect of which might create hazard condition for the receptors (both

nearby communities and workers within the project site). This is considered to be negative, short term and of negligible significance.

6.7.1.3 Water pollution from Stockpiling and hydrocarbons

The debris resulting from the demolition will be required to be transported for disposal at an approved site or used as base materials for new construction work. Unplanned disposal of demolished waste may cause contamination or impaired quality of receiving body, especially land and water resources.

Also, if servicing and maintenance of vehicles and machines takes place at the demolition site there will be fuel and lubricants involved. This will create the opportunity for accidental spills of hydrocarbons and contaminants could be washed into the environment. Furthermore, the hydrocarbons that might remain at the site if not handled properly might leak or spill on site and thus contaminate the site and eventually could be washed by rainwater to the nearby water bodies. The impact is considered to be negative irreversible, short-term duration and of moderate significance.

6.7.1.4 Loss of Aesthetics due to Abandoned Project Facilities

In closure of the project, the proponent may decide to demolish the facilities including all structures. Loss of aesthetic may result from the demolished waste remaining on site for a long time to the extent of becoming an eyesore. This impact is considered to be negative of short-term duration with high significance.

6.7.2 Negative Social Impacts

6.7.2.1 Traffic accidents

The demolition activities as indicated in previous sections will involve transportation of demolition materials from the site to the disposal sites away from the source. Traffic accidents involving both the workers and the general public can be expected to occur if precautions are not taken. Drivers might cause accidents to children in the residential areas along the route. The impact is indirect (offsite), negative, short term and of high significance.

6.7.2.2 Occupational Health and Safety Hazards to workers

The demolition works and reinstating the site closure to its natural condition will definitely results into various occupation health and safety hazards which if precautions are not taken might result into long term health effects, injuries, fatal and loss of life as well as damage the properties. Some of hazards are obvious which require some management issues like excessive noise level from machinery, excessive dust emission from earth works. Injuries to construction workers may result from moving equipments.

According to OHS Act of 2003 causes of accidents in construction sites includes but not limited to poor site layout, poor erection and improper use of scaffolds, falling objects from high level such as poles, improper method of lifting, sharp edges, improper use of Personal Protective Equipments (PPE), inadequate provision of PPE, falling through uncovered opening especially at upper floor levels and carelessness of workers. This impact is considered to be negative, short term and of high significance.

6.7.2.3 Loss of Employment due to Closure of the Project

If for whatever reason the project is closed down, the people employed permanently will secure the same jobs in other Government institutions whilst those temporarily employed will lose their jobs. This will have a significant impact on these people and their families. Other groups of people who are dependent on the project, such as suppliers of various services, will lose their vital market. This impact is then considered to be negative of short-term duration with high significance.

6.8 Impact Analysis

The impacts were further rated on a scale of "–3" to "+3" through "0" in the following manner:

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

Table 6:15: *Impact analysis*

S/N	Identified Impacts	Description of Impact	Spatial Scale	Temporal Scale	Reversibility	Cumulative Impact	Residual Impact	Significance
Mobilization and Construction Phase								
a. Social Impacts								
1	Job Creation and employment opportunities	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	+2 (Moderate positive impact)
2	Increased Income to Surrounding Community	The impact is direct and inducive	Local	Short-term	Reversible	Yes	No	+3 (High positive impact)
3	Benefit to local suppliers of construction materials	The impact is direct and inducive	Local	Short-term	Reversible	Yes	No	+1 (Minor positive impact)
4	Increased Human Capital	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	+2 (Moderate positive impact)
5	Population Influx (Labor Influx)	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-3 (High negative impact)
6	Increased risk of GBV, SEA and SH	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-2 (Moderate negative impact)

S/N	Identified Impacts	Description of Impact	Spatial Scale	Temporal Scale	Reversibility	Cumulative Impact	Residual Impact	Significance
7	Occupational Safety and Health impacts	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-2 (Moderate negative impact)
8	Possible Spread of HIV/AIDS and COVID-19 Diseases	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-2 (Moderate negative impact)
9	Disruption of Traffic Flows	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-2 (Moderate negative impact)
10	Child Labour and Forced Labour	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-2 (Moderate negative impact)
11	Unplanned Pregnancies	The impact is direct, indirectly, and inducive	Local	Short-term	Irreversible	Yes	No	-2 (Moderate negative impact)
12	Food Insecurity and inflation of prices on other social services	The impact is direct, indirectly, and inducive	Local	Short-term to long-term	Reversible	Yes	No	-2 (Moderate negative impact)
13	Public Health Hazards due to Waste	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-2 (Moderate negative impact)

S/N	Identified Impacts	Description of Impact	Spatial Scale	Temporal Scale	Reversibility	Cumulative Impact	Residual Impact	Significance
14	Risk of Construction Materials Vandalism	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-1 (Minor negative impact)
b. Environmental Impacts								
15	Air Pollutions (Fugitive Dust and Exhaust Emissions)	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-2 (Moderate negative impact)
16	Soil Erosion	The impact is direct, indirectly, and inducive	Local	Short-term to long-term	Reversible	Yes	No	-3 (High negative impact)
17	Vegetation Clearing	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-1 (Minor negative impact)
18	Generation of Solid Wastes	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-2 (Moderate negative impact)
19	Generation of Liquid Waste (Human Sanitary Waste)	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-2 (Moderate negative impact)

S/N	Identified Impacts	Description of Impact	Spatial Scale	Temporal Scale	Reversibility	Cumulative Impact	Residual Impact	Significance
20	Generation of Hazardous Waste	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-2 (Moderate negative impact)
21	Noise Pollution and Vibration	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-2 (Moderate negative impact)
22	Impacts on Climate Change	The impact is direct, indirectly, and inducive	Local	Short-term to long-term	Reversible	Yes	No	-3 (High negative impact)
23	Soil and Water Quality Contamination	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-2 (Moderate negative impact)
24	Land Degradation from Extraction of Building Materials	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-2 (Moderate negative impact)
Rehabilitation Phase								
a. Social Impacts								
1	Enhanced Accessibility	The impact is direct, indirectly, and inducive	Local	Long-term	Reversible	Yes	No	+1 (Minor positive impact)

S/N	Identified Impacts	Description of Impact	Spatial Scale	Temporal Scale	Reversibility	Cumulative Impact	Residual Impact	Significance
2	Improved Learning Environment	The impact is direct, indirectly, and inductive	Local	Long-term	Reversible	Yes	No	+1 (Minor positive impact)
3	Job Creation	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	+2 (Moderate positive impact)
4	Disruption to Academic Activities	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-2 (Moderate negative impact)
5	Occupational Health and Safety Hazards to Workers	The impact is direct, indirectly, and inducive	Local	Short-term to long-term	Reversible	Yes	No	-2 (Moderate negative impact)
b. **Environmental Impacts**								
6	Generation of solid waste	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-2 (Moderate negative impact)
7	Dust and noise pollution	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-2 (Moderate negative impact)
Demobilisation Phase								
a. Social Impacts								

S/N	Identified Impacts	Description of Impact	Spatial Scale	Temporal Scale	Reversibility	Cumulative Impact	Residual Impact	Significance
1	Loss of income generating opportunities by local people	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-3 (High negative impact)
2	Loss of Temporary Employment	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-2 (Moderate negative impact)
b. Environmental Impacts								
3	Restored Clean Site	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	+1 (Minor positive impact)
4	Vegetation Regeneration	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	+1 (Minor positive impact)
Operational and Maintenance Phase								
a. Social Impacts								
1	Increase students' admission to university	The impact is direct, indirectly, and inducive	National	Long-term	Reversible	Yes	Yes	+3 (High positive impact)
2	Increase of revenue to SUA	The impact is direct, indirectly, and inducive	Regional	Long-term	Reversible	Yes	Yes	+2 (Moderate positive impact)

S/N	Identified Impacts	Description of Impact	Spatial Scale	Temporal Scale	Reversibility	Cumulative Impact	Residual Impact	Significance
3	Job creation	The impact is direct, indirectly, and inducive	Regional	Long-term	Reversible	Yes	Yes	+3 (High positive impact)
4	Production of skilled labor force for nation development	The impact is direct, indirectly, and inducive	National	Long-term	Reversible	Yes	Yes	+1 (Minor positive impact)
5	Increased commercial and social activities around project locations	The impact is direct, indirectly, and inducive	Regional	Short-term	Reversible	Yes	No	+2 (Moderate positive impact)
6	Increased revenues to local authorities	The impact is direct, indirectly, and inducive	National	Long-term	Reversible	Yes	Yes	+2 (Moderate positive impact)
7	Risks due to Fire Hazards	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-3 (High negative impact)
8	Creation of Occupational Health and Safety Risks	The impact is direct, indirectly, and inducive	Local	Long-term	Reversible	Yes	No	-2 (Moderate negative impact)
9	Creation of Public Health Risks	The impact is direct, indirectly, and inducive	Local	Long-term	Reversible	Yes	No	-2 (Moderate negative impact)

S/N	Identified Impacts	Description of Impact	Spatial Scale	Temporal Scale	Reversibility	Cumulative Impact	Residual Impact	Significance
10	Disruption of traffic flow	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-2 (Moderate negative impact)
11	Increased risk of GBV, SEA and SH	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-2 (Moderate negative impact)
12	Health Hazards due to Social Interaction among Workers and Visitors	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-2 (Moderate negative impact)
13	Increased Water Demand	The impact is direct, indirectly, and inducive	Local	Long term	Reversible	Yes	No	-1 (Minor negative impact)
14	Increase Energy Consumption	The impact is direct, indirectly, and inducive	Local	Long term	Reversible	Yes	No	-1 (Minor negative impact)
b. Environmental Impacts								
15	Generation of Solid Waste	The impact is direct, indirectly, and inducive	Local	Long term	Reversible	Yes	No	-2 (Moderate negative impact)

S/N	Identified Impacts	Description of Impact	Spatial Scale	Temporal Scale	Reversibility	Cumulative Impact	Residual Impact	Significance
16	Generation of Liquid waste	The impact is direct, indirectly, and inducive	Local	Long term	Reversible	Yes	No	-2 (Moderate negative impact)
17	Storm water generation and overflow	The impact is direct, indirectly, and inducive	Local	Long term	Reversible	Yes	No	-1 (Minor negative impact)
18	Impacts on Surface water quality	The impact is direct, indirectly, and inducive	Local	Long term	Reversible	Yes	No	-1 (Minor negative impact)
Decommissioning Phase								
a. Social Impacts								
1	Traffic accidents	The impact is indirectly and inducive	Local	Short-term	Reversible	Yes	No	-3 (High negative impact)
2	Occupational Health and Safety Hazards to workers	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	Yes	No	-3 (High negative impact)
3	Loss of Employment due to Closure of the Project	The impact is direct, indirectly, and inductive.	Local	Short-term	Reversible	No	No	-3 (High negative impact)
b. Environmental Impacts								

S/N	Identified Impacts	Description of Impact	Spatial Scale	Temporal Scale	Reversibility	Cumulative Impact	Residual Impact	Significance
4	Air pollution due to dust and exhaust emission	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	No	No	-2 (Moderate negative impact)
5	Noise Pollution from Demolishing Works	The impact is direct, indirectly, and inducive	Local	Short-term	Reversible	No	No	-2 (Moderate negative impact)
6	Water pollution from Stockpiling and hydrocarbons	The impact is direct, indirectly, and inducive	Local	Short-term	Irreversible	No	No	-2 (Moderate negative impact)
7	Loss of Aesthetics due to Abandoned Project Facilities	The impact is direct, indirectly, and inducive	Local	Short-term	Irreversible	No	No	-2 (Moderate negative impact)

6.9 Analysis of Project Alternatives

In this Environmental and Social Impact Assessment study, identifying and analyzing project alternatives is essential. This involves evaluating various implementation options, assessing their advantages and disadvantages, and conducting environmental assessments to determine the most suitable alternative that aligns with project objectives and minimizes adverse impacts. Additionally, the "no project" alternative is considered to understand potential outcomes in the absence of the proposed project, ensuring a comprehensive evaluation of all possibilities. The analysis of alternatives is a crucial step in responsible and sustainable project planning.

6.9.1 No project alternative

The no project alternative entails retaining the current status quo (No construction of the proposed buildings structures at SUA Campus). Adopting the No Project alternative, this option would mean avoiding the predicted impacts of the project implementation and missing the predicted positive impacts of the project. The HEET project at SUA is designed to revitalize and expand the capacity of the University to contribute to key areas for innovation, economic development and labor market relevance. The proposed modern infrastructure is expected to enable effective teaching and research and produce graduates who could become a catalytic force for the new industrial based economy of Tanzania.

Based on the enormous benefit of the proposed project at national level, the No project alternative was abandoned. It is clear that identified impacts associated with project implementation are mostly temporary, shorter, and are manageable at the University level.

6.9.1 Alternative Site

As presented in Chapter 2 of this report, the proposed buildings will be located within the Edward Moringe Campus. The option of utilizing an alternative site out of the campus was considered but over-weighted by the existing land at the university due to the following advantages over other;

i) The site is within SUA campus (No need to buy a new piece of land);
ii) The site is located on a favorable piece of land; large area with a clear view
iii) The site is well served with road network, and it is easily accessible to public transport; and
iv) Availability of water and electricity mains supply.

Even within the campus, several locations were considered against provision/availability of services such as waste management, water and power supply; location with respect to location of other structures and environmental protection. The following are the advantages of the selected sites over any other location within the campus;

i. Comprehensive waste management for solid and liquid waste, both on-site and off-site, is feasible in the selected corridor.
ii. Accessibility to water and energy is ensured through the presence of a water source from the Mzinga river and availability of electricity from the national grid (TANESCO) at the Edward Moringe Campus project site.
iii. There is no demolition of other infrastructures at Edward Moringe Campus project sites because at all sites where the construction will take place there is no existence of other buildings, but existing buildings are near the project site and not within the project sites.

iv. Site selection considered areas with less vegetation cover to minimize the need for vegetation clearance during construction.
v. In addition to these factors, rehabilitation work within the campus will enhance specific classes, without involving demolition except for minor work in academic building within College of Education and Business studies and administration buildings, both of which are within the campus premises.

Conclusion: The chosen project site is not consistent with the existing land use, which is designated for agricultural and pastoral purposes according to the SUA master plan and title deed. However, it's important to note that there is a notification letter from the regulatory authority proposing a change in land use for institutional purposes. This discrepancy highlights the necessity for a thorough assessment to ensure the project's objectives can be realized while aligning with potential changes in land use regulations and harmonizing with the existing landscape.

6.9.2 Design Alternatives

The suggested layout for the university, as outlined in the proposed project development, is strongly recommended to optimize the university operational efficiency. The primary guiding principle in the university design adheres to the guidelines specified in the Public Investment Management Operational Manual.

Additionally, each university comprises distinct functional units, each with its unique design and purpose. Consequently, the entire university cannot have a singular design that can be universally applied or omitted. Unlike a straightforward acquisition like a firefighting truck, the concept of a design alternative does not translate effectively to the overall university setting. Therefore, considering a design change for the entire university is not a feasible option.

6.9.3 Technology Alternatives

In the realm of construction activities for the Edward Moringe Campus, the project emphasizes the endorsement of environmentally responsive and user-friendly technologies for both internal and external stakeholders. This commitment extends to engaging local contractors and consultancies, as well as incorporating suitable local technologies and building materials. While external contractors may be involved when deemed appropriate, the focus is on fostering a connection with the local environment. The distinctive nature of the proposed University programs revolves around innovative learning outcomes, program delivery emphasizing practical training and skill development.
Addressing potential changes in technology during the implementation of the Edward Moringe Campus project, it aligns with the multi-unit concept, where each unit inherently possesses its own design and technology. Consequently, a universal change in technology for the entire system is not preferred rather adjustments may be made at the level of individual units. This perspective is an integral part of the technology alternative proposed for the Edward Moringe Campus within the broader context of the Environmental and Social Impact Statement for the development of academic and Student hostels and the remodeling of warehouses at the Campus

6.9.4 Alternative Energy Sources

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

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

Conclusions: an evaluation of the three alternatives based on capital costs, availability of adequate supply, reliability, and environmental protection revealed that at least three options could be used together. Therefore, it is planned to connect the proposed infrastructure to electricity from the National grid as a basic power supply.

However, during operation various machines and laboratory equipment may be highlighted that require high-voltage electricity for their operation. These sophisticated instruments encompass a range of scientific and research tools, such as electron microscopes (including Transmission Electron Microscopes and Scanning Electron Microscopes), particle accelerators, high-voltage testing equipment, X-ray generators, mass spectrometers, and high-voltage power supplies which could not be supplied by solar energy These machines serve diverse research and analytical purposes across multiple disciplines. Standby generators will also be provided, especially for the laboratories.

6.9.5 Water supply Alternative

Alternative one: Water Supply (surface water) from Mzinga river

Edward Moringe Campus opted to use the water from Mzinga river because is the main source of water at the campus because the university obtain water from their own sources located at Mzinga river and they have water use permit from regulatory authority and they pay for that permits

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

Morogoro Water Supply and Sanitation Authority (MORUWASA) is the leading water supplier at Mindu Ward. MORUWASA water supply network is near the proposed site, and therefore can guarantee reliable, clean and safe water supply to the proposed Solomon Mahlangu Campus. This water can be used during construction and can be safe to use for other domestic and office activities.

Alternative three: Rainwater Harvesting

The project considered rainwater-harvesting potential as an alternative source of water. It is proposed to harvest rainwater from both roof and land catchment. It will entail the design of a rainwater harvesting system and underground water storage tanks. Although this may demand more investment (capital), its operation costs are relatively low. Rainwater harvesting is one of the best ways to reduce surface runoff and soil erosion.

Conclusion: The University opted to use a combination of three water sources namely, water from university sources from Mzinga river, water supply from MORUWASA, and rainwater harvesting. MORUWASA water, although relatively expensive, is of the most reliable quality. Therefore, MORUWASA water will be used for domestic purposes and in the running of laboratory. MORUWASA water will be complemented by rainwater, which will be used for cleaning and gardens maintenance.

CHAPTER 7: ENVIROMENTAL AND SOCIAL MANAGEMENT PLAN

7.1 Impact Management plan

The EIA guidelines define an Environmental and Social Management Plan (ESMP) as a report or document prepared by the proponent after conduction of ESIA study to present the case for the assessment of their proposal as part of environmental and social impact assessment process. The ESMP as presented in this chapter contains recommendations and cost estimates for mitigation measures designed to address the negative impacts of the proposed project. The ESMP provides a general outlay of the environmental and social aspects, potential impacts, mitigation measures, performance indicators, monitoring means and frequency, responsibility for monitoring and associated cost estimates

The responsibility for the incorporation of mitigation measures for the project implementation lies with the Supervising Engineer, who must ensure that the contractor implements all specified mitigation measures. In order for the contractor to carry out environmental management activities during construction, the contractor should draw up an environmental management plan of his/her own to show how she/he will address the mitigation measures during the construction period. The Supervising Engineer is responsible for assessing the contractor's environmental management plan

The methodology utilized to formulate the Environmental and Social Management Plan (ESMP) encompasses a multi-step process. This involves identifying potential impacts, crafting targeted mitigation measures, evaluating their feasibility and costs, considering long-term benefits, and validating the approach through peer reviews and expert consultations.

The objectives of the ESMP are;

i. To bring the project into compliance with applicable national environmental and social legal requirements social policies and procedures and
ii. To outline the mitigation/ enhancing monitoring consultative and institutional measures required to prevent, minimize, mitigate or compensate for adverse environmental and social impacts or to enhance the project beneficial impacts

Various potential adverse environmental impacts associated with the proposed project have been identified, and an ESMP was developed to guide in mitigating the negative impacts. However, the implementation of some of the ESMP actions will require a response beyond the project level. The project implementation agency, the contractor, and the project engineer are required to identify the actions and coordinate the various stakeholders appropriately.

It is upon the project proponent (SUA) and the contractor to ensure that the proposals are adhered to. Table 7.1 below shows the anticipated impacts, proposed mitigation measures, the institutions responsible, period within the project life cycle when the action is to be undertaken, and the estimated possible cost of the action. Although the cost of ESMP implementation has been provided, future dynamics during project operation and decommissioning were a limiting factor and could not be well envisioned at this point in time. Therefore, measures have been proposed to capture the realistic costs during project operation and decommissioning phases

7.2 Implementation of the Management Plan

The environmental and social mitigation measures incorporated in the detailed engineering design shall be handed over to the contractor during the construction period. The Contractor shall take stock of the contents of the Environmental and Social Management Plan of the

Project. The contractor shall implement the ESMP during the construction period under close supervision of SUA Management.
During implementation, the SUA Estate department, Environmental specialist and social and gender specialist shall be responsible for:

- Relocation of utility services and people is implemented and completed before the commencement of any construction works;
- Ensuring that SUA staffs and students are aware of the project implementation schedules, especially where construction might affect normal routine;
- Ensuring that the implementation of the ESMP is part of the Contractor's contractual obligations. SUA procurement entity will supervise the tendering process for all service providers;
- Ensuring that the ESMP is implemented, and approval conditions are observed during the mobilization, construction and operation of the project.

During the Operation Phase, SUA Management will manage the building and implement the ESMP. When the project reaches a stage of decommissioning, the SUA shall prepare a decommissioning plan that will include environmental and social issues highlighted in the ESMP. Estimated Cost for implementing the mitigation measures are indicated in **Table 7.1** which makes a total cost of TZS **198,000,000**. The environmental and social costs estimates were developed based on the measured items in the contractual bill of quantities and experience of the Consultant on the projects of similar nature

The following costs present one side of the safeguard's mitigation costs related to the proposed project and are estimated to cover the entire project construction period of 18 months from Mobilization, Construction, Demobilization and Operation phases

Table 7.16: Proposed Environmental Social Management Plan (ESMP for planning phase, construction phase, demobilization phase and operation phase.

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
IMPACTS FROM PLANNING AND DESIGN PHASE				
POSITIVE IMPACTS				
1	Creation of employment	• Provide employment opportunities to locals, unemployed yet willing to work hard. This will ensure that local people benefit from the project. • Employment should be on equal opportunities for both gender • Work with LGAs to make sure that the employment information reaches a wide range of surrounding communities	SUA /LGA	N/A
NEGATIVE IMPACTS				
1	Increased pressure on social services	• Limit the number of unskilled workers recruited from outside the direct vicinity as far as possible. • Explore alternative sources of domestic water, such as rainwater harvesting. • Link to mandated structures to support improvement of social and infrastructural services at the project site and communities surrounding project area.	SUA/ LGA	6,000,000
IMPACTS DURING CONSTRUCTION PHASE OF THE PROJECT				
POSITIVE IMPACTS				

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
1	Creation of employment	• Provide employment opportunities to locals, unemployed yet willing to work hard. This will ensure that local people benefit from the project. • Employment should be on equal opportunities for both gender • Work with LGAs to make sure that the employment information reaches a wide range of surrounding communities	Contractor/ LGA	N/A
2	Increased Income to community around project site	• Ensure monitoring of labor standards among contractors, sub-contractors, workers and service providers • Qualified local vendors/ entrepreneurs should be given priorities to supply different goods and services to the project • Encourage women to participate in food vending business	Contractor	N/A
NEGATIVE IMPACTS				
1	Air pollution (Fugitive Dust and Exhaust Emission)	• The contractor shall apply water spraying in dusty areas during the undertaking of construction works to minimize dust emission • The contractor shall provide dust protection masks to the construction workers • The contractor shall avoid as much as possible stockpiling of dusty construction materials or loose soils • The contractor shall ensure that appropriate construction machines are used for construction work	Contractor	14,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
2	Noise pollution and Vibration	• Noise levels along perimeters of the project shall be monitored and recorded periodically to ensure that activities at the site are not exceeding standards • Workers will be provided with personal protective equipment's (PPE) such as earmuffs/ plugs during construction and especially workers working in noisy areas • Vehicles and equipment will be maintained and serviced as required to ensure they do not generate excessive noise	Contractor	14,000,000
3	Soil Erosion	• The contractor shall implement erosion control measures as an on-going exercise • During construction, the contractor protects all areas susceptible to erosion by installing necessary temporary and permanent drainage works as soon as possible and by taking any other measures necessary to prevent storm water from concentrating in streams and scouring slopes, banks, etc. • Any tunnels or erosion channels developed during the construction or maintenance period shall be backfilled and compacted and the areas restored to a proper condition. • Areas where construction activities have been completed and where no further disturbance would take place are rehabilitated through re-vegetation;	Contractor	12,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		• Ground clearance is minimized and if possible concentrated only to the specific foundation areas, and only when it is necessary		
4	Increased risk of GBV, SEA and sexual harassment	• Creation of partnership with local offices of the Ministry of community development, gender, women and special groups, NGOs and community women groups to report workers misconduct and complaints /reports on gender-based violence, sexual exploitation and abuse and sexual harassment. • Regular training for workers on required lawful conducts in the project communities. • Gender based equal opportunities in all project phases • All gender-based employment must consider labor act (18+ years and above) • The Consultant Engineer with Proponent shall strictly make sure the contractor adheres to Employment and Labor Relations Act No. 6 (2004) of United Republic of Tanzania)	Contractor/SUA	14,000,000
5	Generation of Liquid Waste (Human Sanitary Waste	• Contractor shall construct new sanitation facilities to use during construction • All generated liquid wastes should be discharged at wastewater stabilization ponds located at Solomon Mahlangu Campus and those ponds required to be managed well • The local government authorities shall ensure that sewage is appropriately treated before it is finally	Contractor	16,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		discharged into water bodies or open land, and that it does not increase the risk of infections or ecological disturbance and environmental degradation		
6	Generation of Solid Wastes	• Waste management on site shall be strictly controlled and monitored. Only approved waste disposal methods shall be allowed as prescribed in The Environmental Management Act, 2004, Part IX (a). This section gives mandate the local government authority to choose the best method of solid waste disposal for their areas of jurisdiction in consideration to climatic conditions, economic ability, interest of the community, environmental, hygienic and social benefits; and availability of tipping sites. • All solid waste shall be disposed offsite at an approved dumping site located at Morogoro Municipality • Inert construction rubble and waste materials shall be disposed of at an approved site. • Ensure that site personnel are instructed in the proper disposal of all waste. • Ensure that all facilities are maintained in a neat and tidy condition and the site shall be kept free of litter. Measures shall be taken to reduce the potential for litter and negligent behavior with regard to the disposal of all refuse. • At all places of work provide litter bins, containers and refuse collection facilities for later disposal. • Solid waste may be temporarily stored on site in a designated area prior to collection and disposal.	Contractor	16,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		• Waste storage facility shall be covered, tip- proof, weatherproof and scavenger proof. The waste storage area shall be fenced off to prevent wind-blown litter		
7	Generation of hazardous Waste	• Separate all hazardous wastes from domestic waste during collection and transportation • All vehicle and equipment mechanical repair activities shall be conducted on proper designated space within the project site or at a nearby garage • All generated hazardous during construction of structures shall be temporarily stored at designated area at the site and then to be removed from site by a registered hazardous waste dealer. • Replaced oil and brake fluid to be properly handled in a designated area with primary and secondary containments prior to be disposed by an authorized dealer • All storage containers will be properly sealed and monitored to avoid any possible Oil spillage and the use of oil kit	Contractor	8, 000,000
8	Soil and Water Quality Contamination	• All machinery must be carefully observed not to leak oils on the ground • Maintenance of vehicles and machinery must be carried out in designated areas where oils are completely prevented from reaching the ground.	Contractor	8,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		• Designated areas for maintenance should be covered to avoid storms from carrying away oils into the soil or nearby surface run off. • Wastewater from maintenance of vehicles and machineries should be properly disposed • Good industrial hygiene practices shall be maintained. • Establishment of primary and secondary containments for waste oil storage before final disposal.		
9	Population Influx (Labor Influx)	• Establish transparent recruitment procedures to avoid loafers in form of job seekers • Establish a recruitment policy that gives priority to local residents for less specialized service • Recruitment procedures to be shared with the local authorities for further dissemination • Opportunities for sub suppliers and sub-contractors should be awarded to local firms which in turn employ local labor • Conduct public health campaigns addressing issues of behavioral change, water and sanitation, communicable and non-communicable disease, HIV/AIDS	Contractor SUA	10,000,000
10	Vegetation clearing	• Confining the construction activities within the proposed project site could minimize the problem. • The Contractor shall avoid unnecessary clearing of vegetation beyond the proposed project construction area	Contractor Project Implementation Team	10,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		• All cleared and compacted areas should be scarified and planted with natural vegetation to stabilize the soil • The Contractor shall always ensure that the excavated areas are reinstated whenever possible • Only indigenous plant species should be used for re-vegetation		
11	Child labor, and forced labors	• Employment must consider labor act (18+ Years and above) • Prohibit Students to engage in any contractor's activities • Spread awareness among parents and surrounding communities • Strict laws in place to prevent child, forced labors and human trafficking • The Consultant Engineer with Proponent shall strictly make sure the Contractor adheres to Employment and Labor Relations Act No. 6 (2004) of United Republic of Tanzania	Contractor Project Implementation Team/ LGAs	6,000,000
12	Risk of Construction Materials vandalism	• Sokoine University shall collaborate with prospective communities in creating community sense of ownership • Security guards shall be present all the time for safety of all properties within the construction site.	Contractor Project Implementation Team	16,000,000
13	Unplanned Pregnancies	• Contractor shall put in place onsite rules and regulations that strictly prohibit laborers engaging on sexual relations with teenagers	Contractor	4, 000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		• Contractor and client should conduct awareness campaigns to primary school students in Solomon Mahlangu Campus on reproductive health. • Contractor shall provide counseling services on physical and psychological health and education • Contractor shall put in place site specific Grievance Redness Mechanism for GBV and SEA actions occurred in working area or around the local community		
14	Public Health Hazards due to Wastes	• The contractor shall regularly conduct community consultations and engagement meetings with surrounding community so as to raise health and safety awareness to the people • Establishment of temporarily and comprehensive sanitary facilities such as toilets, bathrooms during construction phase • Sorting of solid waste shall be implemented, and they should be stored in well labeled designated containers to avoid surface water contamination to nearby water sources through storm water overflow • Ensures hygienic environment on site to avoid the outbreak of diseases such as cholera, dysentery etc.	-Contractor SUA	8,000,000
15	Creation of occupational health and safety risks to	• The Contractor to have a qualified health and safety officer onsite during construction phase, • Implementing good house-keeping practices, such as the sorting and placing loose construction materials or	Contractor	12,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
	workers	demolition debris in established areas away from foot paths • Cleaning up excessive waste debris and liquid spills regularly • Training and use of temporary fall prevention devices, such as rails or other barriers able to support a heavy load, when working at heights • Training and use of personal fall arrest systems, such as full body harnesses and energy absorbing lanyards able to support heavy loads as well as fall rescue procedures to deal with workers whose fall has been successfully arrested. • Use of control zones and safety monitoring systems to warn workers of their proximity to fall hazard zones, as well as securing, marking, and labeling covers for openings in floors, roofs, or walking surfaces • Maintaining clear traffic ways to avoid driving of heavy equipment over loose scrap • Use of temporary fall protection measures in scaffolds and out edges of elevated work surfaces, such as handrails and toe boards to prevent materials from being dislodged • Wearing appropriate PPE, such as safety glasses with side shields, face shields, hard hats, and safety shoes • Institute good site practices including prevent public access to the construction site by securing equipment and demarcate excavate, using warning signs with appropriate text (local language) and graphic displays;		

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		• Ensuring the visibility of personnel through their use of high visibility vests when working in or walking through heavy equipment operating areas • Using inspected and well-maintained lifting devices that are appropriate for the load, such as cranes, and securing loads when lifting them to higher job-site elevations. • Awareness campaigns /Education on HIV and STDs shall be provided to workers; • A well-stocked First Aid kit (administered by medical personnel) shall be maintained at the construction site. The medical personnel shall also be responsible for primary treatment of ailments and other minor medical cases as well as providing health education to the workforce; • Emergency contact details in the event of an accident shall be provided; • Training all contractor staff in emergency planning and management; and • Developing a detailed health and safety plan and training all contractor staff on the plan. • Planning work site layout to minimize the need for manual transfer of heavy loads • Implementing administrative controls into work processes, such as job rotations and rest or stretch breaks		
16	Disruption of Traffic Flow	• Only qualified drivers with appropriate driving license shall be engaged • Induction course shall be done to all drivers prior	Contractor	10,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		starting driving • Drivers shall be sensitized to maintainingspeed limits for main roads and on accessroads/internal driveways. • Provision of road and safety signs shall be done on site and surrounding areas that are tobe followed by drivers and public in collaboration with local authority		
17	Possible Spread of HIV/AIDS, COVID-19 and Other Infectious Diseases	• HIV/AIDS testing shall be conducted, and counseling services provided by the contractor • Workers will be sensitized to the spread of HIV/AIDS and STDs and to the usage of condoms and other protective measures. • Establishment and implementation of HIV/AIDS awareness, control and prevention programs • Workers and the nearby community will be encouraged to use sanitizer and masks for protection against COVID19 infections • The contractor shall put in place sign boards in all visible corners for raising awareness on prevention of HIV/AIDS and STIs • The contractor shall adopt and implement the COVID 19 contingency plan developed by Morogoro Municipal council	Contractor SUA project Implementation Team	10, 000,000
18	Impact on Climate change	• Equipment must be kept in good working order, and it is forbidden to utilize any equipment that produces an excessive amount of black smoke.	Contractor	6,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		• Implement energy-efficient technologies and practices in the design and operation of the academic building, Student hostel, and cafeteria to minimize carbon emissions • Incorporate renewable energy sources such as solar, wind, or biomass to meet a portion of the energy needs, reducing dependence on fossil fuels and lowering greenhouse gas emissions. • Develop and implement climate change adaptation strategies to address potential climate-related challenges that may arise in the future, ensuring the long-term resilience of the campus. • Raise awareness among students, staff, and the local community about the project's climate impact and the importance of adopting sustainable practices in their daily lives. • Turn off engines to reduce idling. • Green spaces shall be maximized in project areas.		
IMPACTS FROM REHABILITATION PHASE				
POSITIVE IMPACTS				
1	Enhanced Accessibility	• Install tactile markers on the floor to guide those with visual impairments toward the lift entrance. • Design elevator controls to be easily reachable and operable for individuals using wheelchairs or mobility aids.		NA

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		• Assign support personnel to assist individuals with disabilities in efficiently using the lift, addressing their specific needs.		
2	Improved Learning Environment	• The developer shall ensure periodic maintenance of all facilities in order to have sustainable projects. • Developer should create awareness amongst the users and operators of the facilities as required	SUA	5,000,000
NEGATIVE IMPACTS				
1	Noise and Dust pollution	• Employ dust suppression methods, such as wetting down construction areas and using dust screens, to minimize airborne particles. • Enforce noise limits in accordance with local regulations and utilize sound barriers to reduce noise propagation. • Regularly clean construction areas to prevent the accumulation of dust, ensuring a healthier indoor environment.	Contractor	10,000,000
2	Disruption to Academic Activities	• Schedule Rehabilitation activities during off-peak academic periods, such as holidays or breaks, to minimize disruption. • Provide advanced notice of rehabilitation schedules to students and faculty, along with alternative study spaces and temporary classrooms.	SUA	N/A

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		• Set up temporary classrooms to accommodate academic activities during construction period which will help maintain continuing in education • Implement noise and dust control measures, such as using barriers and enclosing construction areas to create more conducive environment for learning.		
3	Generation of solid waste	• Develop a comprehensive waste management plan that prioritizes waste reduction, reuse, and recycling. • Set up dedicated waste collection points for different types of waste, ensuring proper separation of recyclables and hazardous materials. • Ensure that contractors adhere to waste disposal regulations and dispose of waste responsibly at authorized facilities.	Contractor	4,000,000
4	Occupational Health and Safety Hazards to Workers	• Use proper fall protection equipment and provide training on safe practices. • Maintain clean work areas and provide anti-slip measures. • Ensure proper grounding, insulation, and follow lockout/tagout procedures. • Train workers in proper lifting techniques and provide mechanical aids.	Contractor	6,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		• Use proper PPE, follow containment procedures, and provide ventilation. • Provide appropriate respiratory protection, control dust, and ensure ventilation		
IMPACTS FROM DEMOBILIZATION PHASE				
Co	**NEGATIVE IMPACTS**			
1	Loss of employment	• Informing workers, the project duration when employing them • Educating the labor force on the need to save part of their wages. • Paying severance benefit to all laid off workers according to the provision of the labor laws	Contractor /Project manger	N/A
2	Dust and noise pollution from demolishing works	• Employ dust control technologies such as water spraying systems to minimize the release of dust particles during demolition activities. This will help maintain better air quality. • Implement noise reduction strategies, including the use of sound barriers, noise-dampening equipment, and scheduling noisy activities during specific times to minimize disruption to nearby residents.	Contractor/Project manger	8,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		• Provide workers with personal protective equipment (PPE) such as masks and ear protection to mitigate health risks associated with dust inhalation and prolonged exposure to high noise levels. • Conduct awareness programs for local residents, informing them about the demolition schedule, potential impacts, and measures being taken to mitigate dust and noise pollution. This foster understanding and cooperation • Establish a monitoring system to regularly assess air quality and noise levels. Implement a reporting mechanism to promptly address any deviations from acceptable standards, allowing for quick corrective actions. • Explore and utilize demolition methods that generate less dust and noise, such as mechanical methods that are more controlled and produce fewer airborne particles.		
3	Loss of business opportunities	• Encourage collaboration among local businesses to create a network that can collectively address challenges and explore new business opportunities. This can foster resilience and community support. • Facilitate the establishment of support services for construction workers, such as designated areas for purchasing food from local entrepreneurs. This ensures that some business activities can continue despite the temporary disruptions. • Informing local traders of the project duration in time	Contractor Project manger	N/A

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		• Paying for all materials that were obtained on loan in time • Incorporate youth who will participate for the project to attend training for the project; • Outsourcing some services for non-core activities for the college		
IMPACTS FROM OPERATION PHASE				
POSITIVE IMPACTS				
1	Provision of modern and adequate and affordable student academic facilities at SUA	• Sourcing funds for maintenance so that the university facilities should be in good condition and be in operation for a long time • Providing equal enrolment opportunities for male and female students.	SUA	4,000,000
2	Creation of employment	• Employing more people from the communities surrounding the project area and other areas within the country for both unskilled and skilled jobs • Giving equal employment opportunities for both men and women	SUA	N/A

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
3	Increase in performance of students academically as most students will easily access campus facilities	• Sourcing funds for maintenance so that the academic building and Student hostel should be in good condition and be in operation for a long time	SUA	10,000,000
4	Improved access to social service by the local community	• Providing extra social services that can be accessed by the communities	SUA	6,000,000
5	Increase in economic activities	• Sourcing funds for operation and maintenance cost for the students' academic and Student hostels to be in operation for a long time. • Traders from the project area to be given the opportunity to supply food stuffs for student meals.	SUA	8,000,000
6	Increase in revenue by government through taxes	• Remitting taxes to TRA from wages and service contracts in time	SUA	4,000,000
NEGATIVE IMPACTS				
1	Creation of public safety hazard due to falling of long buildings	• Regular maintenance of university buildings • Stabilize and secure structural bricks wall against leaning and bulging outwards/Inwards by using concrete columns.	SUA	5, 000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		• Establishment of proper storm water drainage system to prevent soil erosion along the buildings		
2	Occupational Health and Safety Hazards to Workers during maintenance of the university buildings	• Skilled contractor shall be hired during routing building maintenance • Provision of appropriate safety gears to protect construction workers from injuries caused by falling of objects e.g., Head injuries, etc	Contractor/ SUA	4,000,000
3	Surface Drainage	• Rainwater harvesting gutters and storage tanks should be installed to reduce the amount of rainfall reaching the surface. • Semi permeable materials should be used for construction of pavements. • After completion of construction, the proponent should embark on comprehensive landscaping to increase softscape cover on the plot.	SUA	6,000,000
4	Fire	• Hire a competent and properly authorized electrical contractor to do the wiring and other electrical works. • Install fire alarm system for entire project • Install smoke detectors in kitchens. • Installation of firefighting equipment following country Fire requirements. • Conduct regular firefighting drills within the site.	Proponent	8,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		• Develop and adapt an (fire) emergency response plan for the project during and occupation stage.		
5	Liquid Waste	• Construction of the wastewater system for disposal at sewerage. • The design of the internal sewerage system should consider the estimate discharges from individual sources and the cumulative discharge of the entire project i.e., it should have the capacity to consistently handle the loads even during peak volumes. • All drainpipes passing under buildings, driveways or parking should be of heavy-duty PVC pipe tube encased in concrete surround. All manholes on driveways and parking areas should have heavy- duty covers set and double sealed airtight; as approved by specialists	Proponent	10,000,000
6	Increase in Energy Demand	• Put off all lights immediately when not in use or are not needed and use energy-conserving electric lamps for general lighting. • Make use of alternative sources of energy such as solar power. Solar panels proposed in the project should be fully utilized	SUA	10,000,000
7	Increase in water demand	• Install water conserving taps that turn- off automatically when water is not in use. • Encourage water reuse/recycling during occupation phases.	SUA	8,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		• Roof catchments of building blocks should be provided with rainwater harvesting systems (gutters, down pipes and water storage facilities) to enhance collection and storage of the resulting run-off. Such water can be used in watering flower gardens, general cleaning etc • Provide notices and information signs to sensitize on means and needs to conserve water resource i.e., Keep/Leave the Tap Closed etc.		
IMPACTS FROM DECOMISSIONING PHASE				
NEGATIVE IMPACTS				
1	Air pollution due to dust and exhaust emission	• Employ dust control technologies such as water spraying systems to minimize the release of dust particles during demolition activities. This will help maintain better air quality. • Provide workers with personal protective equipment (PPE) such as masks and ear protection to mitigate health risks associated with dust inhalation and prolonged exposure to high noise levels. • Conduct awareness programs for local residents, informing them about the demolition schedule, potential impacts, and measures being taken to mitigate dust pollution. • Establish a monitoring system to regularly assess air quality.	Contractor	5,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		• Implement a reporting mechanism to promptly address any deviations from acceptable standards, allowing for quick corrective actions. • Explore and utilize demolition methods that generate less dust, such as mechanical methods that are more controlled and produce fewer airborne particles		
2	Noise pollution from demolishing works	• Personal protective Equipments (PPE) shall be properly selected, used and maintained to minimize noise • Standard operating procedures will be developed and strictly observed • Light machinery shall be used during demolition activities to reduce noise. while operators/ workers in various sections with significant noise levels shall be provided with PPE for noise protection		4,000,000
3	Water pollution from Stockpiling and hydrocarbons	• All excavated unwanted materials will be stockpiled away from drainage features. • Prior instructions to contractor on handling of hazardous waste such as oils, lubricants and gasoline during decommissioning process will be provided. • A site waste management plan shall be prepared by the contractor prior to commencement of the works. This will include designation of appropriate waste storage areas,	Contractor	4,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		collection and removal schedule, and a system for supervision and monitoring • All refueling for vehicles will be done on dedicated area that has been provided with concrete structure to retain any leaks • Emergency response measures will be put on site in case of accidental oil spill that will include having absorbent materials and sand kits		
4	Traffic accidents	• Develop a comprehensive traffic management plan that includes designated routes for transporting demolition materials. Ensure coordination with local authorities to minimize disruption and avoid congested residential areas. • Schedule transportation of demolition materials during off-peak hours to minimize the impact on regular traffic flow. This can help reduce the likelihood of accidents and mitigate congestion • Employ escort vehicles to accompany transportation trucks, providing advance notice to other road users. Clearly mark the vehicles carrying demolition materials with appropriate signage to alert drivers and pedestrians • Conduct public awareness campaigns to inform residents along the transport route about the decommissioning activities. Provide information on alternative routes and the timing of material transportation to minimize inconvenience	Contractor	4,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		• Ensure that workers involved in transportation activities are adequately trained in safety protocols. Emphasize the importance of adhering to traffic regulations and maintaining vigilance during transportation. • Develop a robust emergency response plan in case of accidents. This includes training personnel on immediate response measures, establishing communication protocols with local emergency services, and providing necessary equipment for rapid intervention. • Implement a system for regular monitoring of transportation activities, with mechanisms for reporting any incidents or near misses. This allows for proactive identification of potential issues and prompt corrective action		
5	Occupational Health and Safety Hazards to workers	• Comprehensive Decommissioning Plan shall be established to guide prior to undertake any activities • Workers at the site should use appropriate protective gear such as boots, respiratory masks etc. • The contractor shall insist on their workers to use the gears properly • Fatal accidents shall be reported to OSHA within 24hrs of occurrence so as to prevent further recurrences by doing investigation • All respective government authorities should be involved prior to decommissioning activities		6,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
6	Loss of Aesthetics due to Abandoned Project Facilities	• The contractor shall ensure that demolished waste is removed from the site and properly disposed of in the designated location. • The site will be rehabilitated to its original state, whereby will be handed over to the project proponent who is the owner of the plot. Before handling over, the proponent will conduct internal environmental audit and thereport will be submitted to NEMC for approval		4,000,000
7	Loss of Employment due to Closure of the Project	• Transfer of permanent employees to other Government institutions • Provision of training that can make temporary workers competent for jobs elsewhere shall be provided. • Ensuring that Social Security contributions are remitted to the applicable fund at the right time • Create a severance package in the event of abrupt closure of the facility • Adapt a project – completion policy: identifying key issues to be considered. • Assist with re-employment and job seeking of the involved workforce. • Compensate and suitably recommend the workers to help in seeking opportunities elsewhere. • Offer advice and counselling on issues such as financial matters potential dust area within the project area		6,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
TOTAL				**339,000,000**

7.3 Disaster Risk Management plan

7.3. 1 Disaster risks at SUA and level of management

Sokoine University of Agriculture is vulnerable to a range of disaster risks, which pose risks to the students, teachers and other staff. SUA is vulnerable to fire outbreaks, diseases outbreak, traffic accident, robbery, ICT appliance damage and data loss, and chemical explosion. Other disaster risks include; terrorist attack, ammunition accident, earthquake, and tsunami. The current level of disaster risk preparedness and management for Sokoine university of Agriculture is moderate because equipment (Measures) is in place but not enough to accommodate the whole university campus (Table 7.2).

Table 7.17: Disaster risk and management level

Disaster risk	Standard practice	Management level	Remarks
Fire Outbreak	Fire fighting	• Fire extinguisher • Fire hose reel • Fire alarms • Smoke detector	Average preparedness
	Assembly points	Present	Average preparedness
	Emergency exit	Present	Average preparedness
	Escape route	Absent	Poor preparedness
Disease Outbreak	Dispensary	Present	Good preparedness
	First aid kits	Present	Average preparedness
	Ambulance	Present	Good preparedness
Traffic Accidents	Traffic signs	-Zebra -speed limit	Average preparedness
	Car parking	Present	Average preparedness
Robbery	Security guards	Present	Good preparedness
	Fence	Present	Average preparedness
	Identification card	Present	Average preparedness
ICT appliance damage and data	Generators	Present	Average preparedness

7.3.2 Disaster Risk Management plan

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

7.3.3 Assumption made in the plan

The disaster risk management plan takes into account the following assumptions;

i. SUA will continue to be exposed to the impact of those Disaster risks identified and as well as others that may develop in the future because of climate variability, climate change and proposed future expansion in infrastructure.
ii. The possibility arises that an emergency or disaster may occur at any time.
iii. A major disaster or emergency can cause numerous losses of life and injuries, property damage, and disruption of normal life support.
iv. External services and resources may be necessary if an emergency exceeds the university capability.
v. Departments and agencies from the local government, state, and national levels may provide help to protect lives and property.
vi. SUA will follow all state and local regulations for safety plan and procedure review and inspection.

7.3.4 Health and Safety Management plan

The Health Safety Management Plan (HSMP) helps in implementation, maintaining and continually improving the Health and Safety management system in accordance with the requirements of Occupational Health and Safety Assessment Series (OHSAS) standards. It is therefore important that this is reflected in the university operations and responsibilities of every level of management within an organization. This plan shall help to implement the Safety and Health direction of construction of studios, classrooms, laboratories, workshops and lecture theater buildings. It clearly states the requirements of donors, legislation, suppliers, management and employees in Safety and Health management.

a) Responsibilities

i. **SUA Management:** The management is committed to the principle of safe working and desires that on no account should any person ever be exposed to risk. This responsibilities will be implemented by SUA implementation team including Health and safety officer, Environmental specialist and Social and gender specialist. And prepare regular report.
ii. **Supervisors:** It is the responsibility of the Supervisors to review and ensure awareness of emergency procedures among all the personnel.
iii. **Employees:** It is also the responsibility of all employees to continually familiarize themselves with the assembly procedures for their relevant areas of work.
iv. **General:** Any information being relayed about an emergency shall be clear and precise giving the exact location, the nature of the emergency and the seriousness of the emergency and contact numbers and names.

v. **Contractor :** Contractor shall nominate Health and safety officer who will be responsible for oversee health and safety during construction process.

b) Training

Suitable training will be provided to all personnel during various stages of the project and when new work force is added.

c) Awareness

Necessary posters and boards announcing action in case of an emergency will be put up at prominent places, and at all assembly areas.

d) Emergency plan

All actions will be coordinated with the overall emergency plan operated by the Supervisor. The General Manager is overall responsible for coordinating all emergency procedures along with the Health & Safety Manager. All emergency telephone numbers and contact names shall be posted at strategic points on site.
Subsequent actions as listed below will be taken as in instruction from the Supervisor.

i. Stop all work and report to the nearest evacuation area/ assembly area and await further instructions.
ii. Stop all equipment and vehicles.
iii. Contact the Health & Safety Manager and relay message to the Supervisor and General Manager.
iv. Ensure all personnel are aware of the emergency.

e) Assembly Point

In an emergency all personnel are to proceed in an orderly manner to the nearest safe assembly point.

f) Head Count

The Supervisor shall take a head count and check all employee's area at the assembly point. He /She shall also inform the General Manager of the result of the head count.

g) Rescue Team

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

h) Fire Fighting

In case of a fire, after the alarm has been sounded, all efforts will be made to put off the fire by use of fire extinguishers, fire hydrants, hoses etc. until more professional help come.
Fire extinguishers will be available on site at strategic locations near stores, laydown area, and electrical distribution cabinets.

i) All Clear

Normal work will be resumed only after a clear signal is received from the Supervisor.

CHAPTER 8: ENVIRONMENTAL AND SOCIAL MONITORING PLAN

8.1 Introduction

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

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

To ensure that mitigation measures are properly done, monitoring is essential. Table 7.1 provides details of the attributes to be monitored, frequency, institutional responsibility and estimated costs. These costs are only approximations and therefore indicative. Costs that are to be covered by the developer are to be included in the project cost.

8.2 Health and Safety Monitoring

This shall involve careful observation of health and safety regulations and guidelines. Detailed HS plan has been included in the appendix.

8.2.1 Construction phase:

- The safeguard personnel of the contractor shall monitor availability and use of safety gears including helmets, coats, shoes, gloves and dust masks to protect them from exposure to various products, etc.;
- The contractor shall hire a health specialist to monitor measures in place for prevention of the transmission of communicative diseases between the local community and construction workers. Monitoring may include conduction of voluntary HIV/AIDS testing and checking availability of free condoms at the construction site.
- Monitor availability of adequate First Aid facilities and a trained first Aider on site.

8.2.2 During the operation phase;

- SUA shall monitor availability and adequacy of safety equipment such as fire alarms and fire extinguishers provision in all buildings;
- Monitor functioning of constructed sanitation facilities, and waste management facilities; and Monitoring safety environment in the laboratories (safe use of chemicals, use of protective gears while in the lab, storage of chemicals and so forth).

8.3 Cumulative impact monitoring

This development over time will result in a variety of changes. The most evident of these changes may be:

- This development will see a significant change in the land cover and landscape of the area; and
- The general culture of the area would change. A more likely result is a formal urban setting with the associated physical infrastructure and amenities.
- SUA shall monitor landscape and cultural changes with time, in order to device management mechanism.

8.4 Monitoring of key environmental and social parameters

Monitoring of all key environmental and social parameters that could potentially lead to an impact will be required to analyze the impacts of construction and operation on the environment. Therefore, self-monitoring and reporting techniques will be adopted to carry out monitoring. SUA Management shall be responsible for monitoring residual impacts. The EIA has proposed monitoring techniques, monitoring frequency and methodology of selected parameters. Monitoring costs have also been provided.

An outline of the monitoring programs proposed for the construction and operation phases is presented in Table 8.1. The monitoring process will enable SUA to understand how environmental performance will change over time and facilitate improvements to the Environmental and social management system.

8.5 Monitoring Responsibility

The Ministry of Education, Science and Technology has established a dedicated Project Implementing Unit (PIU) consisting of its own personnel for the implementation of all supported subprojects under HEET. The PIU shall hire an independent firm which has a Supervision Engineer, Environmental Specialist, Social Specialist, Occupational Health and Safety Specialist to monitor and review on site implementation of the Environmental and Social measure. The overall activities of PIU will be supervision of implementation, monitoring and reporting, review of project implementation reports and reporting to MoEST

The monitoring of environmental and social parameters during the construction phase shall be carried out by the Contractor's safeguard team. (i.e., Environmental, social and safety experts), under the supervision of the Consultant's safeguard team. They will conduct mitigation monitoring as part of the regular works inspections. The contractor shall appoint an Environmental, Social, Health and Safety Officer to oversee the E&S aspects. The EHS officer of the contractor will participate in the joint site inspections with the PIU and Environmental Supervision Engineer/consultant; A monthly Environmental and Social Compliance Report will be produced following each inspection and will incorporate any actions identified during inspections and site meetings. The inspection report will summarize the status of the site's compliance and include photographic records if appropriate.

The responsibility for mitigation and monitoring during the operation phase will lie with the SUA Estate Department. SUA shall be responsible for producing reports on environmental and social compliance during operation, as part of their annual progress reports and annual EHS monitoring/Audit reports. Depending on the implementation status and sensitivity of any emerging issues, OSHA and /or NEMC will perform annual EHS reviews in which environmental concerns raised will be reviewed alongside project implementation.

Table 8.18: Proposed Environmental and Social Monitoring Plan (ESMoP) for mobilization/planning phase, construction phase, operation phase and decommissioning Phase

Significance Impacts	Parameter to be monitored	Monitoring Frequency	Sampling Area	Measurement unit	Measurement methods	Target level/standards	Responsible institution	Estimated cost (TZS) per annum
MOBILIZATION AND CONSTRUCTION PHASE								
Noise Pollution	Noise level	Quarterly	Project site	dBA	Noise Detectors/Sound Meters	75dbA daytime	Contractor Consultant	10,000,000
Vegetation Clearance	Presence of Natural/exotic vegetation.	Before and during construction phase	Project site	Land area cleared.	Physical observation	No widespread destruction of vegetation around the project areas	Contractor Proponent	4,000,000
Population Influx	Number of new job seekers	Monthly	Project site and project Area	Number of cases	Recording	Zero Impact	Contractor	4,000,000
Employment and Gender Based Violence	Number of cases reported	Daily	Project site	Number of cases	Reports/ Documents Review/Observations	Zero cases	Contractor Proponent	6,000,000

Significance Impacts	Parameter to be monitored	Monitoring Frequency	Sampling Area	Measurement unit	Measurement methods	Target level/standards	Responsible institution	Estimated cost (TZS) per annum
(GBV)	Number of workers trained on GBV and SEA							
Child labor and forced labor	Number of incidences recorded	Daily	Project site/surrounding community	Number. of cases	Reports/ Documents Review/Observations	Zero cases	Contractor	3,000,000
Unplanned Pregnancies	Number of incidences recorded and reported	Daily	Project site/ surrounding community and SUA students	Number. of cases	Reports/ Documents Review/Observations	Zero cases	Contractor	4,000,000
Air pollution due to dust emission from transportation activities and earth works	Particulate matter (PM10, PM2.5)	Daily	Established monitoring stations	mg/m³	Dust Track Aerosol Particulate Monitor	PM10 < 0.05 PM2.5 < 0.025	Contractor	5,000,000

Significance Impacts	Parameter to be monitored	Monitoring Frequency	Sampling Area	Measurement unit	Measurement methods	Target level/standards	Responsible institution	Estimated cost (TZS) per annum
Air pollution from exhaust emission during transportation and machinery operating on site	SO_2, CO_2, NOx, CH_4	Daily	Established monitoring stations	mg/Nm³	Portable detector tubes	$SO_2 < 0.5$ $CO_2 < 500$, NOx < 0.2 $CH_4 < 20$	Contractor	6,000,000
Water pollution due to domestic activities	BOD, Total Coliform (TC)	Daily	Nearby water bodies	Mg/l, Counts	Laboratory Analysis	BOD<30, TC<100 counts	Contractor Proponent	4,000,000
Public health hazards due to poor management of Solid waste	Solid Waste/Litter	Weekly Inspection	Project area and surrounding environments	None	Recordings/ Site inspection & observations	Zero Impact	Contractor	4,000,000

Significance Impacts	Parameter to be monitored	Monitoring Frequency	Sampling Area	Measurement unit	Measurement methods	Target level/standards	Responsible institution	Estimated cost (TZS) per annum
Soil Erosion	Number of Trees Planted and Landscape	Quarterly	Project site	None	Site Inspection	Zero Impact	Contractor	4,000,000
Traffic Accidents	Number of Accidents reported	Daily	Project Site	Number of cases	Recording/ Inspection/ Observation/	No Accident	Contractor Proponent	4,000,000
Food Scarcity and price increase	Number of households with food insecurity	Monthly	Project site and surrounding community/ward	Number of cases	Reports and Survey	No significant cases related to food Scarcity	LGA and SUA	
Occupational Health and safety hazards	PPEs, Trainings, Safety Procedures	Daily	Project site	Number of cases	Recordings/ Inspections Observation and Interviews	No significant cases related to health and safety risks ISO 45001	Contractor Proponent	4,000,000

Significance Impacts	Parameter to be monitored	Monitoring Frequency	Sampling Area	Measurement unit	Measurement methods	Target level/standards	Responsible institution	Estimated cost (TZS) per annum
HIV/AIDS Infections	Number of infected persons	Quarterly	Project site	Number of cases	Affected People	No new cases of HIV / AIDS and STI 's infections	Contractor	2,000,000
Employment Opportunities	Number of local employments	Monthly	Project Site	Number of local employments	Employed people	100% of unskilled laborers from surrounding community	Contractor /LGAs	3,000,000
Risk of Construction Materials vandalism	Presence of Security Guards	Daily	Project Site	The number of security personnel onsite	Site Inspection	No significant cases related to vandalism	Contractor	N/A
Waste generation	Solid waste	Weekly	Project site	Kg of waste	Weight	Zero adverse impact and adequate volume of solid waste is reused or recycled/ TZS 1117:2009	Contractor	5,000,000
	Liquid waste			Liters of waste	Volume			

Significance Impacts	Parameter to be monitored	Monitoring Frequency	Sampling Area	Measurement unit	Measurement methods	Target level/standards	Responsible institution	Estimated cost (TZS) per annum
OPERATION PHASE								
Air Pollution	Ambient air quality (PM10 and PM 2.5)	Quarterly	Project site	mg/m^3	Dust Track Aerosol Particulate Monitor	PM10 < 0.05 PM2.5 < 0.025	Contractor Contractor	8,000,000
	Concentrations of gaseous pollutants including SO_2, CO_2, NOx, CH_4			mg/Nm^3	Portable detector tubes	SO_2 < 0.5 CO_2 < 500, NOx < 0.2 CH_4 < 20		
Waste Generation	Solid waste	Weekly	Project site	Kg of waste	Weight	Zero adverse impact and adequate volume of solid waste is reused or recycled/ TZS 1117:2009	Contractor	3,000,000
	Liquid waste			Litres of waste	Volume			

Significance Impacts	Parameter to be monitored	Monitoring Frequency	Sampling Area	Measurement unit	Measurement methods	Target level/standards	Responsible institution	Estimated cost (TZS) per annum
Land and Water contamination		Quarterly	Project site and vicinity	Number of Cases	Laboratory analysis	Zero Cases	SUA	2,000,000
Traffic Flow/ accidents	Number of Accidents/ incidents	Monthly	Project area	Number of accident and incident	Review of accident & incident records /	Zero accidents/incidents	SUA	2,000,000
Population Influx	The proportion of the local population in the overall project	Monthly	Project site and project Area	Number of cases	Recording	Number of local employees and Number of admitted Students	SUA	3,000,000
Noise pollution	Noise levels	Annually	Project Site	dBA	Noise Detectors/Sound Meters	Daytime <75dBA	Proponent	3,000,000

Significance Impacts	Parameter to be monitored	Monitoring Frequency	Sampling Area	Measurement unit	Measurement methods	Target level/standards	Responsible institution	Estimated cost (TZS) per annum
Occupational Health and Safety Hazards	Number of incidences	Monthly	Project Site	N/A	Number of PPEs distributed Documents review, visual, interview	No significant cases related to health and safety risks ISO 45001	Proponent	2,000,000
Fire Hazards	Measures in place e.g. fire alarms, fire detectors, firefighting equipments	Monthly	Project Site	N/A	Inspection/observation, document review	Zero accident	Proponent	4,000,000
DECOMMISSIONING PHASE								

Significance Impacts	Parameter to be monitored	Monitoring Frequency	Sampling Area	Measurement unit	Measurement methods	Target level/standards	Responsible institution	Estimated cost (TZS) per annum
Noise Pollution	Noise level	Quarterly	Project site	dBA	Noise Detectors/Sound Meters	Daytime noise levels < 60 dB • Night-time noise levels < 50 dB	Contractor	5,000,000
Air pollution due to dust emission	Particulate matter (PM10, PM2.5)	Daily	Established monitoring stations	mg/m^3	Dust Track Aerosol Particulate Monitor	PM10 < 0.05 PM2.5 < 0.025	Contractor	8,000,000
Waste Generation	Solid waste	Weekly	Project site	Kg of waste	Weight	Zero adverse impact and adequate volume of solid waste is reused or recycled/ TZS 1117:2009	Contractor	6,000,000
	Liquid waste			Liters of waste	Volume			
Water Pollution	Physical and Chemical parameters	Monthly	Nearby water bodies	Mg/l	Laboratory analysis	Applicable standard limits	Contractor	5.000.000

Significance Impacts	Parameter to be monitored	Monitoring Frequency	Sampling Area	Measurement unit	Measurement methods	Target level/standards	Responsible institution	Estimated cost (TZS) per annum
Occupation Health and Safety risk	Number of incidences	Monthly	Project Site	N/A	Number of PPEs distributed Documents review, visual, interview	No significant cases related to health and safety risks ISO 45001	Proponent	4,000,000
TOTCOST								**126,000,000**

CHAPTER 10: COST BENEFIT ANALYSIS OF THE PROJECT

10.1. Introduction

This chapter presents the cost benefit analysis (CBA) of the proposed new building structures (academic building innovation center and Laboratories) to be built at Sokoine University of Agriculture, Edward Moringe Campus together with existing facilities to be rehabilitated. The estimation of cost benefit analysis reflects more than 100 years of the project design period. The details are not disclosed since they are still confidential in accordance with the Tanzania Procurement Act that prevents a detailed cost benefits analysis to be undertaken before tendering process. For that case, presented costs in this section are indicative and elementary qualitative description of the costs and benefits. The total operation cost considers the indicative costs for implementation of mitigation measures as well as the cost of monitoring. However, the total cost of the project will be stated later as project tendering is still in process.

10.2. Benefits related to the project

Benefits from the proposed new building project at the university can be classified as direct benefits and indirect benefits to the university, neighbor and the government. However, primary benefits of this project are further classified as direct benefits and indirect benefits. Building construction projects may generate negative benefits though; they are usually minimal compared to the positive benefits. Some of those impacts are non- quantifiable thus cannot be used in the benefit-cost analysis estimations. Generally, the benefits of the project are experienced in all phases from mobilization, construction, operation to decommissioning phase. To mention few, employment opportunities and public benefits will occur during both the construction and the operation phases. Several benefits are associated with the proposed development both at local and national level in terms of revenue generation and the multiplier effects associated with linkages with local and national economy.

Direct benefits: The proposed project will create many job opportunities, good aesthetic view, good environments for students in their studies, entrepreneurial opportunities to the surrounding community as well as increase the number of skilled laborers due to increase in the enrolment and presence of conducive environment for self-studies. Most of the non-quantifiable impacts are directly benefits to the project receptors.

Indirect Benefits: Indirect benefits from the proposed project mainly include an increase in government revenue through different sectors like; TANESCO, MORUWASA, TRA etc. cultural interactions, infrastructural development, and economic growth. But since the construction project requires inputs from other sectors to produce this output, and the other sectors subsequently require inputs themselves, there will be multiple rounds of interaction among the sectors resulting in additional output from each sector of the economy.

10.2.1 Benefits to SUA

The proposed project has positive impacts to SUA since its benefit is a lifetime process throughout the project life span. The completion of these projects will be one of the pooling factors for the increased number of students' enrolments thus in monetary cost its value has potential to increase annually. SUA financial capacity and sustainability are going to improve by far. Further, the improved financial standing is not only going to promote enrolment but also good governance and the efficient running of the University. Teaching, Research and Public Service and its envisioned center of excellence in knowledge and dissemination to a wide spectrum of beneficiaries at national and regional levels are ones among the benefits.

The project will also have several intangible benefits to SUA which include improving the university's image.

10.2. 2 Benefit to the Neighborhood

The proposed construction of new buildings is meant to increase the capacity of SUA in infrastructure. This improvement may lead to an increase in staff requirements, that is technical, administrators and academicians. During and after construction phase the project is going to provide additional employment opportunities for people surrounding SUA campus related to operation and maintenance. However, non-skilled laborers will benefit from the daily wages. University will also create business opportunities in the vicinity of the campus. Business opportunities will be supporting government initiatives to create employment opportunities for Tanzanians as advocated by the current Government. Notwithstanding that now salaries are yet to be specified, it is envisaged that from employment, workers will get incomes, which will improve the quality of their lives and perhaps improve their lifestyles. However, employment opportunities and income from salaries provided will extend beyond the workers and benefit many other people including dependents.

Moreover, employment opportunities and the benefits therein will depend on whether suitably qualified local personnel that can take up positions are available. Capacity building therefore is a prerequisite for these benefits to be realized. Alongside capacity building, there shall be a need for putting in place deliberate policies that would compel developers in the real estate economic sector to employ local labor with the requisite skills and experience. In addition, the project will also have following economic and social benefits:

i. Utilization of locally available resources;
ii. Revenue to the Government will increase through payment of the various taxes (indirect and direct).
iii. Boosting the infrastructure and economy of the country and Morogoro Municipality in particular Mindu ward in which the project is located.

10.2.3 Benefit to the Government

The project will benefit the government in different aspects. These include budget saving due to the relatively decrease in SUA financial dependence on the government. It is anticipated that during the operation phase the project will improve SUA financial capacity and sustainability resulting from project earnings. For that case, the government will have the opportunity to use the share of the budget which was supposed to go to SUA for other government development plans. Further the ability of SUA in contributing towards the realization of National Policies such as Education Reforms through expansion of enrolment of students into various degree programs is going to increase. The increase in the number of enrolments means an increase in the financial capacity of the institution.
However, the government will benefit from the increased number of experts in priority discipline with different disciplines that will be graduating from SUA. This will create the potential of the government to use internal resources (home country experts) in different future projects rather than contracting foreign experts.

10.3 Costs related to the Project

The estimated costs for implementing enhancement measures, impact management as well as monitoring process as outlined in Chapters 7 and 8 is about TZS **339,000,000** and **126,000,000** per annum. The estimated costs for mitigation do not include the environmental costs, which could not be accurately calculated. Since some of the impacts will only to be realized during construction phase, the costs for these will also be short term, especially if mitigation

measures are fully implemented. The construction costs for all the projects are detailed in Bills of Quantities.

10.4 Project cost benefit analysis

The comprehensive Benefit-Cost Ratio (BCR) analysis presented in this chapter underscores the significant economic viability of the proposed project to construct new buildings structures and rehabilitation of existing facilities at Edward Moringe Campus. Although precise numerical values are not disclosed due to confidentiality and the qualitative nature of some benefits, the internal BCR analysis conducted with available data consistently reveals that the project is anticipated to yield substantially more benefits than its total costs. This finding affirms the project's financial and social feasibility, with its potential positive impacts extending to the university, the surrounding community, and the government. Furthermore, the project demonstrates a commitment to responsible resource management and environmental impact mitigation. Encouraged by these results, the project proponent is well-positioned to advance its development, aligning with national development objectives and the overarching goal of enhancing higher education in Tanzania while fostering economic growth and sustainability.

CHAPTER 11: DECOMMISSIONING PLAN

11.1 Introduction

Decommissioning forms the end part of the project life cycle. Environmental Impact Assessment regulation (URT, 2005 and its Amendments of 2018 direct developers to address the implications of the decommissioning process as part of the ESIA process.

The proposed project is not expected to end in the near future due to its nature and inelasticity. However, if decommissioning becomes inevitable due to any causative factors, then the closure Plan must be abided. During decommissioning of the project, various disturbances that will have been caused in the area need to be addressed quickly and efficiently in order to minimize the possible impacts that could continue to happen even after closer of the project

It is also important that all remediation plans suggested being conducted by taking into consideration the needs for sustainable development of the project area. In order to achieve these consultations with various stakeholders during preparation of Closure Plan (CP) will be undertaken. It is the requirement of the Environmental Impact Assessment and Audit Regulations, 2005, as amended 2018 that the proponent prepares the closure plan in order to indicate how impacts will be dealt with, including cost of mitigation measures. The Closure Committee of these university facilities involving local and district levels will be established by the proprietor through consultations with relevant authorities

It is the closure committee that will review from time to time the implementation of the Plan and set priorities for the future use of various infrastructures. The choice of whether the project site should be demolished or renovated or the project site should be replanned for other development projects or used by locals for other purposes and other closure priorities will be decided by the closure committee.

11.2 Preliminary Decommissioning and Closure Plan

The closure committee will be chaired by the council director in collaboration with local leaders including WEO and MEO. Members of the committee will be selected through consultations with the local authorities and relevant government institutions i.e., NEMC, TANESCO, OSHA, and Fire and Rescue offices. This is the set up and implementation procedure of the closure plan that will be followed as part of the ESMP. The Preliminary Decommissioning and Closure Plan objectives are set as follows:

i. The closure plan must limit the potential adverse effects of the closed projects site on the receiving environment and that the quality of life of the surrounding communities is not compromised after operation of the university buildings
ii. The rehabilitation of the area in its natural appearance and closure plan complies with current regulatory requirements and must facilitate the attainment of site relinquishment after demolition of successful implementation of the closure measure stipulated in the plan
iii. The decommissioning and rehabilitation are carried out in a planned sequential manner consistent with basic practice.
iv. That as far as is practicable the post project operation landform is safe stable non erodible, and it's integrated into the surrounding environment.
v. Prevent or minimize adverse long term social and environmental impacts of the post project site
vi. Create a self-sustaining ecosystem or ultimate land use based on an agreed set of objectives.
vii. Enable all stakeholders to have their interests considered during project closure
viii. Ensure the process of closure occurs in an orderly cost effective and timely manner

ix. Ensure that the cost of closure is adequately represented in proponent's budgets
x. Ensure clear accountability and sufficient resources for the implementation of the closure plan
xi. Establish appropriate indicators for evaluating success of closure process. The achievement from this process will justify relinquishment of the project license

The Proponent will participate in rehabilitation for disturbed and impacted areas depending on their location, the type of impact and the proposed end land use. The closure plan identifies those actions that will be undertaken upon completion of the project activities and subsequent decommissioning of the site. This includes the removal of structures; the disturbed landscape and vegetation will be restored to make it compatible with future use.

The Proprietor understands the importance for planning for decommissioning and closure early to ensure that the final landforms are properly designed and able to function as ecological systems in the long term and reach a point where the project proponent has met agreed completion criteria to the satisfaction of the Government and surrounding community.
Project decommissioning has five phases:

i) Pre-removal monitoring;
ii) Permitting;
iii) Interim protective measures;
iv) Project removal and associated protective actions
v) Post-removal activities, including monitoring of environment and socio-economic activities.

The first three phases will occur prior to removal of the Project (i.e., within the first three months). The fourth phase of the project removal and associated protective actions will take place six months after closing business. The fifth phase will begin after total removal and due to nature of the project (medium scale, with relatively moderate impacts) removal and continue for at least three months. The description that follows outlines the activities that will occur in each phase:

i. Pre-removal monitoring:

Pre-removal monitoring includes the environmental and socio-economic status of the project site and the surroundings. This monitoring is essential to identify if there is any environmental or social liability which needs to be settled before the permit for closure is given. This period will also be used to invent all assets and facilities that need to be disposed of and to prepare a final decommissioning plan for approval by NEMC.

ii. Permitting:

The proponent shall obtain all permits required to undertake removal of the Project. This basically will include NEMC, Morogoro Municipal Council etc.

iii. Interim Protective Actions:

This will take care of any interim protective measure that needs to be implemented to protect human health and the environment, if any.

iv. Project Removal:

As noted above, the removal of the project will be completed within three months.

v. Post-Removal Activities:

Post-Project removal monitoring will continue for three months. The Proponent shall remove the Laboratory equipment, rubbles from demolition and ancillary structures safely and in a

manner that minimizes environmental impacts e.g., dust pollution, disposal of any hazardous material, providing protective gear to decommissioning personnel etc; satisfies its obligations under the EMA Cap 191 and World Bank ESF; restores the site to a condition suitable for other use; and pays all dues (government, suppliers etc)

CHAPTER 12: SUMMARY AND CONCLUSION

12.1 Summary

Environmental and Social Impact Assessment (ESIA) for the proposed construction project at SUA was conducted to evaluate the potential environmental and social consequences of the proposed project. The assessment considered various aspects such as land use, air quality, noise, water resources, biodiversity, cultural heritage, and community well-being.

During the ESIA process, a comprehensive analysis of the project's potential impacts was undertaken. It was found that the construction, rehabilitation and operation of the developed facilities would have both positive and negative effects on the environment and local communities.

On the positive side, the project would provide additional facilities for students and faculty, enhancing the educational experience and academic programs at the university. The construction and rehabilitation phase would generate employment opportunities and stimulate the local economy. The new buildings would also contribute to the development of infrastructure in the area.

However, the ESIA identified several potential negative impacts that need to be addressed and mitigated. These included land disturbance and habitat fragmentation during the construction phase, increased traffic congestion, noise pollution, and potential impacts on the local water resources. The assessment also considered the potential disruption to the surrounding community, including noise and dust from construction and rehabilitation activities.

To mitigate these potential negative impacts, several measures and recommendations were proposed. These included proper waste management practices, dust and noise control measures during construction, and the implementation of water conservation strategies. The assessment also emphasized the importance of engaging with local communities and stakeholders throughout the project's lifecycle, ensuring their concerns are addressed and their input is considered.

12.2 Conclusion

It is evident that the proposed project is associated with both positive and negative impacts during construction, rehabilitation and operation phases of the project. The following recommendations are made to enhance the viability of the project: The project shall be continued as planned as it is economically and socially viable, Morogoro Municipal Council and SUA, Edward Moringe campus shall oversee activities of the Contractor in implementation the developed impact mitigation measures described in the ESIA report, The proposed mitigation and enhancement measures (the ESMP) should be implemented in order to minimize and/or avoid the identified adverse environmental and social impacts of the proposed project. The ESMP should be provided as part of the Contractor ‘s contract, The EMP should also be implemented to track the effectiveness of mitigation and enhancement measures and hence further improvement of the mitigation plan. Monitoring will be used as a means of ensuring compliance with national or international standards.

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APPENDICES

Appendix 1: Approved Terms of Reference

THE UNITED REPUBLIC OF TANZANIA

VICE PRESIDENT'S OFFICE

NATIONAL ENVIRONMENT MANAGEMENT COUNCIL
(NEMC)

In reply please quote:
Ref: HK.145/88/22/01 **Date:** 23/05/2023

SOKOINE UNIVERSITY OF AGRICULTURE (SUA),
P.O. BOX 3000,
MOROGORO.
Email: sokoineuniversity942@gmail.com
Phone: +255712818080

Re: **APPROVED TERMS OF REFERENCE AND SCOPING REPORT FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT OF THE PROPOSED CONSTRUCTION OF EXPANSION FOR UNIVERSITY FACILITIES SUCH AS; 3 ACADEMIC BUILDINGS AND 3 LABORATORIES AT SOKOINE UNIVERSITY OF AGRICULTURE, EDWARD MORINGE CAMPUS (MAIN CAMPUS), SUA AREA, MAGADU WARD, MOROGORO MUNICIPAL COUNCIL IN MOROGORO REGION**

Reference is made to the above heading

2. The Council acknowledges receipt of your scoping report and Terms of Reference attached for undertaking Environmental and Social Impact Assessment (EIA) study for the above project, which was registered and assigned application reference number **EC/EIA/2023/4367**. Please quote this number for all future correspondences regarding this project.

3. The scoping report and Terms of Reference were found to be generally adequate and therefore, can be used to guide the Environmental and Social Impact Assessment (EIA) study for the named project. Kindly be reminded that the report should conform to the EIA and Audit Regulations, 2005 as amended in 2018.

4. In addition, the Environmental Impact Statement (EIS) should adequately incorporate the following: -

i. The project title should be rephrased to accommodate the main activity that will be implemented on the ground. Other supporting project components should be discussed in chapter 2 of the EIS;
ii. Detailed description of all project components including but not limited to nature, designs, size and capacity;
iii. Detailed description of all project activities and waste that will be generated and their management;

iv. The project development and rehabilitation works should be separately and clearly discussed in the ESIA report.

v. The geotechnical and hydrological studies are mandatory requirement with regards to construction of vertical buildings. The results/data should guide the project development and be appended in the ESIA report;

vi. Clearly describe the decommissioning plan of the project;

vii. Copies of all relevant documents/certificates concerning the proposed project as required by law should be attached in the EIS;

viii. All project facilities whose designs/ architectural drawings/site layout plan are by law subject to approval by a regulatory authority should be attached within the ESIA report; and

ix. Describe all issues pertaining to occupational health and safety issues in each project phase.

4. In this regard, you will be required to submit to the Council 10 copies of the Environmental Impact Statement accompanied by a Non-Technical Executive Summary in Kiswahili and English versions. Upon submission of the EIS you will be required to pay to the Council the review cost as indicated in the Proforma invoice which has been generated by the system that exclude transport cost to the site.

5. Should you need any further additional information or clarification on this matter, please do not hesitate to contact us through mobile no. +255 754 779 510 or email address: nemcmorogoro@nemc.or.tz.

6. We look forward to your continued cooperation.

A.S. Kibola
For: Director General

Cc: Earth Environmental Experts Ltd;
Kibo Commercial Complex; Bagamoyo Road
Dar es salaam
Tel: +255 686 619 906
Email. Cassian901@Gmail.Com

Appendix 2: Certificate of Occupancy

TANGANYIKA

The land Registration Ordinance (Cap. 334 of the Laws)

CERTIFICATE OF TITLE TO RIGHT OF OCCUPANCY ~~LEASEHOLD LAND~~

(ISSUED UNDER SECTION 38)

This is to certify that the annexed copy of Certificate of Occupancy dated

the 18th day of March 19...1990

is registered in the Land Registry under Title No. 36424.

Copies of the subsisting entries in the register are within

Dated the 18th day of May 2004...

Rehema Ntimizi
Sen.Asst. *Registrar of Title*

Title No. 36424. Description of registered land.

All that land known as farm No.5 (Mafiga farm) Morogoro Municipality containing two thousand three hundred eighty (2380) hactres shown for identification only edged on the plan attached to this Certificate and defined on the registered Survey plan numbered 21070 deposited at the Office of the Director of Surveys and Mapping at Dar es Salaam.

GP Dsm—Tanzania

4

Registered ..... at .....m

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Asst. Registrar of Titles

Registered ..... at .....m

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Asst. Registrar of Titles

Registered ..... at .....m

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UNITED REPUBLIC OF TANZANIA

MINISTRY OF LANDS AND HUMAN SETTLEMENTS DEVELOPMENT

Telegrams: "LANDS"
Telephone: 2121241-9
In reply please quote: LRT/36424/12

LAND REGISTRY
P. O. Box 1191,
DAR ES SALAAM.

Date: 18 May 2004

To: Vice Chancellor
Sokoine Uni. of Agriculture
Box 3000, Morogoro

TITLE NO: 36424 LAND OFFICE NO: .....

PLOT NO: ..... Issued under sec. 38 of Cap 334

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

REGISTRAR OF TITLES

Copy to: Commissioner for Lands
Your LD File No: ..... refers

21/5/2004

REGISTERED 23-3-40
Land Form 33.
12.00 NOON

Senior Asst. Registrar

L.O.NO. 108293

MG/L.D.NO. 26

TANGANYIKA STAMP DUTY ACT.
Stamp Duty Shs. 44,340/= Paid
and Revenue Receipt No. T/564400
16-11-89 Issued.
Stamp Duty Officer

THE UNITED REPUBLIC OF TANZANIA

THE LAND ORDINANCE (SECTION 9 (1))

CERTIFICATE OF OCCUPANCY 36424

The 15th day of March One thousand nine hundred and ninety.

THIS IS TO CERFY that M/S SOKOINE UNIVERSITY OF AGRICULTURE of P.O.BOX 3000, MOROGORO.

(hereinafter called "the Occupier") is entitled to a Right of Occupancy (hereinafter called "the Right") in and over the land described in the Schedule hereto (hereinafter called "the land") a term of ninety nine years from the first day of October One thousand nine hundred and eight nine 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, 1990, shall thereafter pay rent of shillings eight hundred ninety thousand six hundred sixty five (--- Shs.890,665/=) 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 2,000, 2010, 2020, 2030, 2040, 2050, 2060, 2070 and 2080 oe within five years thereafter in each case.

2. The land shall be used only for agricultural and pastoral pruposes.

3. The Occupier shall:-

(a) demarcate the boundaries of the land to the satisfaction of the Morogoro Municipal Council (hereinafter called "the Authority") and thereafter so maintain such demarcation that the boundaries are always easily identificable ;

(b) do everthing necessary to protect the soil and preserve soil fertility and prevent soil erosion on the land and cultivate the land so as not to cause soil erosion outside its boundaries and do all things which may be required by the Director of Agriculture to achieve such objects;

Certified True Copy
Assistant Registrar of Titles
Date 18/5/2004

(c) 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 expenses as assessed by the Director for Surveys and Mapping.

4. The Occupier shall not subdivide the land or assig sublet or otherwise dispose of it or of any part of it with the previous written consent of the Director for Lands. Any person other than the Occuper working or occupying the land otherwise thn in the capacity of a servant or contractor of the Occupier shall be deemed to be a sub-tenant for the purposes of this condition.

5. The said Right of Occupancy confers no water right.

6. The President may revoke the Right for good cause.

S C H E D U L E

ALL that land known as farm No.5 (Mafiga farm) Morogoro municipality containing two thousand three hundred eighty (2380) hactres shown foridentification only edged red on the plan attached to this Certificate and defined on registered survey plan numbered 21070 deposited at the Office of the Director of 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.

Certified True Copy
Assistant Registrar of Titles
Date 13/5/2004

COMMISSIONER
LAND DEVELOPMENT SERVICES
COMMISSIONER FOR LANDS

The within-named SOKOINE UNIVERSITY OF AGRICULTURE hereby accept the terms and conditions contained in the foregoing Certificate of Occupancy;

SEALED WITH THE COMMON SEAL of the said SOKOINE UNIVERSITY OF AGRICULTURE and DELIVERED in the presence of Us this 1st day of March 1990.

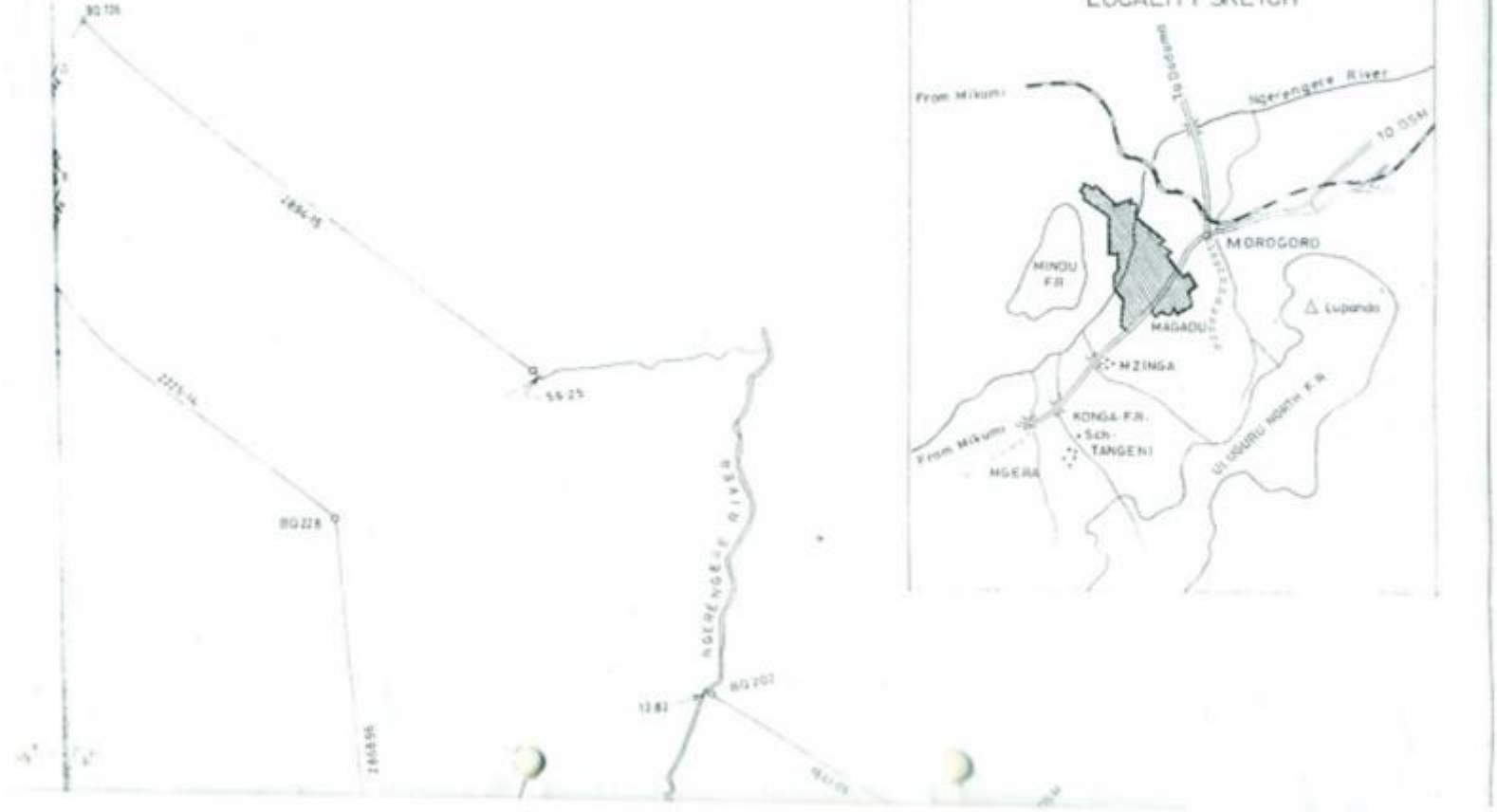
(Signature) .....
VICE CHANCELLOR
(Postal Address) SOKOINE UNIVERSITY OF AGRICULTURE
P.O. BOX 3000
MOROGORO
(Qualification) .....

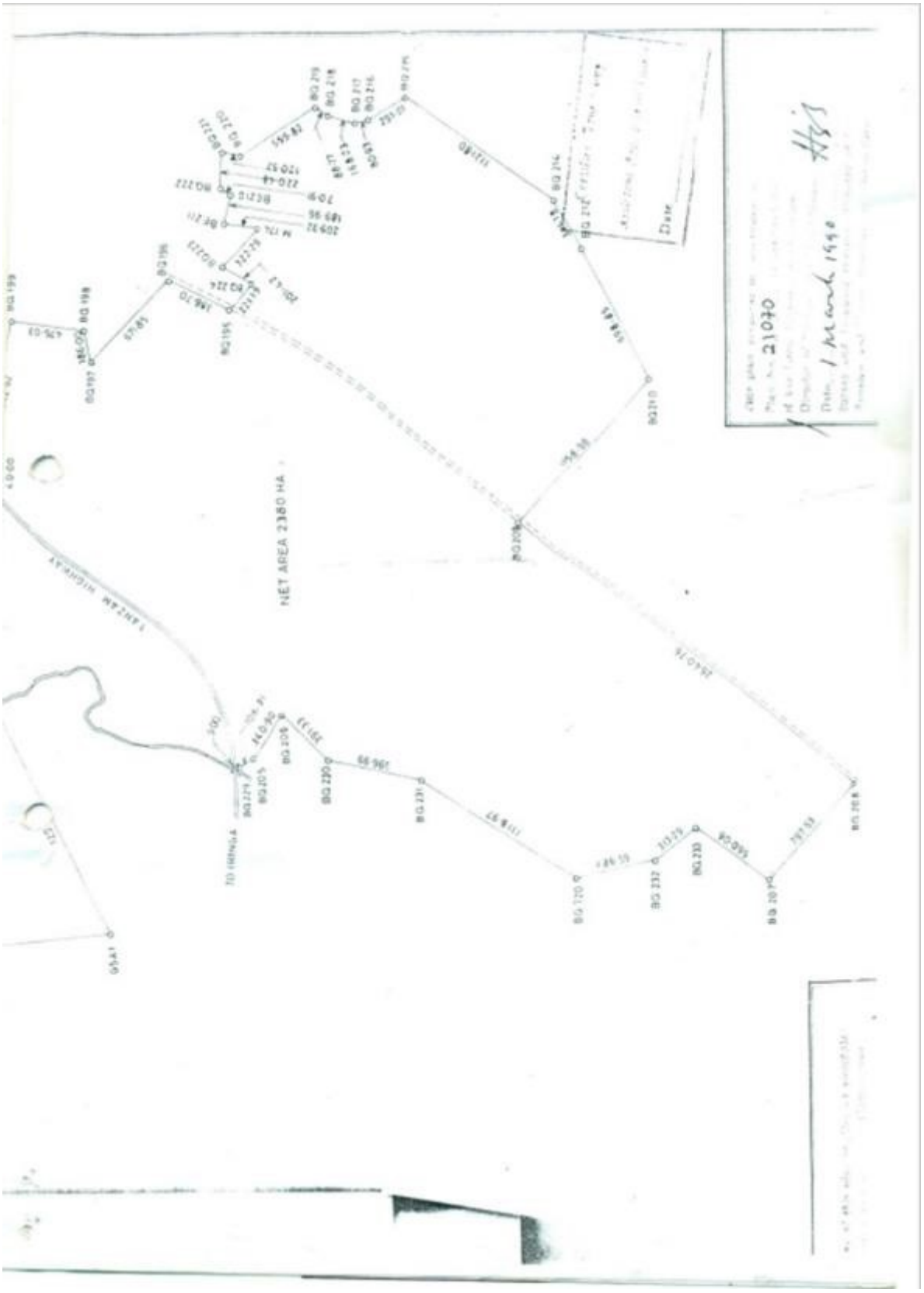
(Signature) .....
REGISTRAR
(Postal Addres) SOKOINE UNIVERSITY OF AGRICULTURE
P. O. Box 3000
(Qualification) MOROGORO

Certified True Copy
Assistant Commissioner of Lands
Date 18/5/2004

TANGANYIKA STAMP DUTY ACT.
Stamp Duty Shs. 500/= Paid
on Receipt No. 19522835
of 7-11-2003
Stamp Duty Office

MOROGORO MUNICIPALITY




NET AREA 2380 HA
21070
1 March 1990

Appendix 3: Average Ambient Dust Level Measured at Proposed Sites for Construction

Code & Coordinate	Location Name	PM2.5 ($\mu g/m^3$)	PM10 ($\mu g/m^3$)
AQMS1 (-6.84269 & 37.65783)	Innovation center building	6.9	12.5
AQMS2 (-6.834937 & 37.647889)	Academic building	6.0	11
AQMS3 (-6.847394 & 37.659066)	Tissue Culture Laboratory and Bio security	6.1	11
AQMS4 (-6.85024 & 37.65863)	Gross Anatomy Laboratory	5.5	10
AQMS5 (-6.848332 & 37.647291)	Animal Biotechnology Laboratory	6.1	11
AQMS6 (-6.835434 & 37.645901)	College of Economics and Business (COEBS) Academic Building	5.4	10
TBS Limits		**75**	**150**
WB Group Guidelines		**25**	**50**

Sampling date: April 2023 **Source: Field Measurement**

Appendix 4: Ambient Pollutant Gas Level Measured at Proposed Sites for Construction At Edward Moringe Campus

Coordinate	Location	CO mg/m^3	NO_2 mg/m^3	SO_2 mg/m^3	H_2S mg/m^3	VOCs mg/m^3
AQMS1 (-6.84269 & 37.65783)	Innovation center building	<0.1	<0.01	0.01	<0.01	0.007
AQMS2 (-6.834937 & 37.647889)	Academic building	<0.1	<0.01	<0.01	<0.01	0.008
AQMS3 (-6.847394 & 37.659066)	Tissue Culture Laboratory and Bio security	<0.1	<0.01	<0.01	<0.01	0.008
AQMS4 (-6.85024 & 37.65863)	Gross Anatomy Laboratory	<0.1	<0.01	<0.01	<0.01	0.008
AQMS5 (-6.848332 & 37.647291)	Animal Biotechnology Laboratory	<0.1	<0.01	<0.01	<0.01	0.007
AQMS6 (-6.835434 & 37.645901)	Academic Building At (COEBS)	<0.1	<0.01	<0.01	<0.01	0.007
TBS Limits		**15**	**0.12**	**0.5**	**-**	**6.0**
WB Group Guidelines		**30**	**0.2**	**0.5**	**20**	**-**

Sampling date: April 2023 **Source: Field Measurement**

Appendix 5: Average Noise Level Measured at Proposed Sites for Construction

Coordinate	Location	Average Noise Level in dBA
AQMS1 (-6.84269 & 37.65783)	Innovation center building	48.1
AQMS2 (-6.834937 & 37.647889)	Academic building	37.9
AQMS3 (-6.847394 & 37.659066)	Tissue Culture Laboratory and Bio security	35.5
AQMS4 (-6.85024 & 37.65863)	Gross Anatomy Laboratory	35.7
AQMS5 (-6.848332 & 37.647291)	Animal Biotechnology Laboratory	40.1
AQMS6 (-6.835434 & 37.645901)	Academic Building At (COEBS)	37.5
TBS Limits		**52**
WB Group Guidelines		**55**

Sampling date: April 2023

Appendix 6: Average Noise Level Measured at Proposed Sites for Construction

Coordinate	Location	(mm/s PPV)
AQMS1 (-6.84269 & 37.65783)	Innovation center building	0.02
AQMS2 (-6.834937 & 37.647889)	Academic building	0.01
AQMS3 (-6.847394 & 37.659066)	Tissue Culture Laboratory and Bio security	0.01
AQMS4 (-6.85024 & 37.65863)	Gross Anatomy Laboratory	0.03
AQMS5 (-6.848332 & 37.647291)	Animal Biotechnology Laboratory	0.01
AQMS6 (-6.835434 & 37.645901)	Academic Building At (COEBS)	0.01
Human detection level		<0.15
British limit		<0.3
TBS Limit		<5

Sampling date: April 2023 **Source: Field Measurement**

Appendix 7: **Details of Stakeholders Concerns (Source; Consultation With Stakeholders in April 2023)**

Level	Stakeholder	Stakeholder Views and Concerns	Responses
National level	**Tanzania Commission of Universities (TCU)**	○ . ○ Construction and rehabilitation of buildings will increase pressure on available water supply by MORUWASA. ○ There will be an increased supply of quality and affordable student accommodation and an increase in business opportunities. ○ Construction of buildings will increase the market supply of building materials. ○ SUA project will increase enrollment for students and academic performance.	The contractor should adhere to OSHA stipulated standards to make sure noise level and dust are controlled at workplace and neighboring communities.
Regional level	**TANESCO**	○ The project should consider the use of renewable sources of energy. ○ The project should consult TANESCO at the earliest stage possible in order to request for extension of services to the new buildings and an additional supply of electricity, if needed. ○ It is recommended for utility University to use automation of power systems. The use of power system automation reduces numbers of activities, staffs and failure can be observed timely to effect action timely and this means that, makes quick fault detection, isolation, service restoration and therefore better services to consumers.	The Contractor should adhere to details of the architect designs.
	Occupation Safety and Health Authority (OSHA)	○ The proponent should make sure the project is registered under the Workplace Information Management System (WIMS) before pre-construction and construction phases. ○ There should be trained First Aiders at all project phases, as well as First Aid Kits with all necessary facilities and First Aider should renew the certificate after every 1 year as per OSHA requirement. ○ The proponent should conduct Risk Assessment before construction and prepare a Risk Assessment report. ○ There should be trained Health and Safety Officer representatives at all project phases.	The report has stipulated all the recommendations which will assist to take care of all the Occupation Health and Safety Concerns which may arise as a result of the project.

Level	Stakeholder	Stakeholder Views and Concerns	Responses
		○ Safety awareness should be conducted including Safety training and safety signs. ○ Medical examinations should be done to all workers before construction and operation phases as well as during operation phase. ○ The proponent should ensure there is sufficient water supply system, adequate sanitation facilities and changing (both male and female) at the workplace during construction as well as operation phase. ○ All workers should be provided with sufficient Personal Protective Equipment (PPEs) during all project phases. ○ Portable Toilets recommended to be available at project site during construction phase. ○ Changing rooms must be available at a project site.	
	Wami/Ruvu Basin Water (WRBWB)	○ They were positive about the SUA Construction project, but their concern was more effort to be on the conservation of water sources and their catchment areas. ○ There are people conducting agriculture activities inside the 500m and some settlements have been established inside the catchment area. ○ They are required to follow environmental compliance during implementation of the project. ○ SUA has water use permits from Wami/Ruvu basin Water Board, so they required to renew water permits which are already expired and apply for water permit for the sources which do not have permit. ○ They are required to have a good effluent treatment plant at Edward Moringe Campus to prevent overflow which causes environmental pollution. ○ SUA conducting Irrigation Agriculture, so it is better to Check the Chemicals like pesticides and Fertilizer used if they pollute environments or not.	The report has included details of how SUA will enhance water availability for the project.
	Fire and Rescue Force	○ The proponent should provide fire drilling to all workers and students at least twice per year. ○ The proponent can consult the Fire and Rescue Force office for the best	The Contractor should adhere to details of the architect designs.

Level	Stakeholder	Stakeholder Views and Concerns	Responses
		choice of registered fire dealers. o Emergency exits must be available in new buildings. o There should be detection, alarm and lighting systems as well as portable fire extinguishers in all buildings. o All architectural drawings should be submitted to the Fire and Rescue Force office to be reviewed, signed and approved.	
Local level	**Morogoro Municipal Council**	o Wider stakeholder consultations and community involvement with regard to land issues should be done before construction. o Employment priorities must be given to the local community around Sokoine University of Agriculture. o Contractors should avoid Child Labour during the implementation of the Project.	Preparation of the ESIA report itself is an indication of how committed the Client is to follow all the prescribed laws and regulations when implementing this project.
	Morogoro Municipal Council Environmental Management Officer	o All materials must be sourced from the designated areas and Municipal fees for transportation of materials from one place to another should be paid. o Management of solid waste is still a problem though the project design considered it. o Environmental education should be properly provided to local residents and staff for management and sustainability. o During operation the proponent should ensure adequate handling and disposal of all hazardous wastes such as chemicals from laboratories. o The solid waste contractor should be registered and authorized in the particular Municipal as per EMA 2004 and its amendment of 2018. o The proponent should know where all waste is disposed by the contractor.	The report has recommended that the Contractor should with all environmental regulations and comply with them.

Level	Stakeholder	Stakeholder Views and Concerns	Responses
	Morogoro Municipal Council Land Officer	○ The department is well informed about this proposed project, and they are familiar with the title deed. ○ Good enough, land is 100% owned by Sokoine University of Agriculture and customary title deed has provided hence no social conflict is expected from local community. ○ They are required to pay land rent. ○ They have to share their master plan with the Municipal Planning Authority. ○ They required to prepare the site Layout before starting the project. ○ Town planners and Engineers should be part and parcel of the project. ○ SUA administration shall be responsible for supervising all construction activities to make sure no activity is conducted offsite. ○ Education on proper land use plan should be given to all communities and to instruct them not to offer lands illegally to investors without prior permission.	The certificate of occupancy is obtained and appended in this report. All recommendations have to be taken into consideration.
	Morogoro Municipal Council Community Development Department	○ Community development had to be involved from the initial stage of the project development. ○ Each department should know that community development is a crosscutting issue that should be shared with the department too. ○ DCDO has to be involved at early stages of the project to have better community participation. ○ Education must be provided about HIV/AIDS and Covid-19. ○ Contractor should consider Gender Balance during Employment.	The importance of this project to community are identified in this report.
	Morogoro Municipal Council Municipal Structural Engineers	○ Materials should be stored in a good, designed space to prevent blocking of the roads. ○ Cars must have a permit to pass through the road during transportation of materials to the construction site. ○ The office of Regional Engineer must be involved at the early stages of the project for further advice. ○ Induction should be given to the people at the construction site before starting operation.	The report has made recommendations on how construction materials should be transported and stored at the project site.

Level	Stakeholder	Stakeholder Views and Concerns	Responses
		○ Environmental and Safety issues should be taken into consideration.	
	Edward Moringe Campus Students	○ Chairs and shelves in the rooms do not equal the number of students living in them. ○ There must be enough chairs in the rooms according as per number of students. ○ There is a water problem on the university Campus, so this new project must consider installment of enough water facilities in order to increase water availability at university. ○ Projectors should be installed in the rooms to allow smooth and on-time learning. ○ Constructions of new playground and worship centers should be taken on board,	The ESIA report has outlined the benefits of the project.
	Edward Moringe Campus (Administrative and Academic Staff)	○ Internet sources and cables should be included in the designing of the buildings both in classes, and workshops/studios. ○ Microphones should be installed in classes. ○ Noise pollution should be controlled in order not to interfere with smooth learning process.	The ESIA report has outlined the benefits of the project.
	Edward Moringe Students, SUASO Representatives and Services Providers	○ Most of the university infrastructures are not friendly to people living with disabilities. ○ Privacy should be considered in both rooms and toilets in the new buildings. ○ Sewage systems should be observed and rehabilitated. ○ Rooms should be big enough and well ventilated.	This has to be taken into consideration.
	Ward Executive Officer (WEO) and Magadu Community	○ Employment should be given to the local people surrounding the project site. ○ Construction activities will increase unplanned and early pregnancy cases, especially to School and local girls because their lusts they tend to	This has to be taken into consideration.

Level	Stakeholder	Stakeholder Views and Concerns	Responses
		date project workers. The contractor is advised to take precautions and strictly enforce his employees. o Construction of academic facilities at Edward Moringe Campus will improve education status within the SUA and district at large. o Local suppliers to be given priority during construction stage. o The contractor should purchase, transport and store construction materials in an environmentally friendly way. o Public servants should demonstrate the value of the project by providing quality services to the community. o The contractor should extract construction materials in an environmentally friendly way. o They should consider the safety of their workers	