THE ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR THE PROPOSED CONSTRUCTION OF ACADEMIC BLOCK AND SCIENCE LABORATORY AT THE UNIVERSITY OF DODOMA, PLOT No 4, NG'HONG'ONHA MTAA, NG'HONG'ONHA WARD, DODOMA CITY, DODOMA REGION

PROPONENT:

THE UNIVERSITY OF DODOMA
P.O. BOX 259
DODOMA.

MARCH 2024

EXECUTIVE SUMMARY

Introduction

The University of Dodoma (UDOM) is a Public (Government of Tanzania) Higher learning Institution under the Ministry of Education, Science and Technology (MoEST). The President of the United Republic of Tanzania formally established it in March 2007 following the signing of the Charter. UDOM is located about 12 Km Southeast of Dodoma City Centre, covering about 3,953.67 hectares. The University of Dodoma offers various programmes under the colleges of Earth Sciences and Engineering, Natural and Mathematical Sciences, Informatics and Virtual Education, Humanities and Social Sciences, Business Studies and Economics, and Education; Schools of Law, Medicine and Dentistry, and Nursing and Public Health; and Institutes of Development Studies and Confucius.

Being the largest University in the region, the University of Dodoma (UDOM) attracts the largest number of students in Tanzania. This is partly due to the diversity and potential of its programmes but also to account for the urge for human development and transformation processes in Tanzania and regionally. In recent years, however, UDOM's capacity to admit students and offer quality education in areas of Science, Technology, Engineering, and Mathematics (STEM), has been hampered by inadequate infrastructure in terms of buildings, ICT, and human resources as well as teaching, learning and research facilities.

The Government of the United Republic of Tanzania through the Ministry of Education, Science and Technology (MoEST) has received funds from the World Bank under Higher Education for Economic Transformation (HEET) project. HEET is a 5-year project that aims to promote higher education as a catalytic force in the new Tanzanian economy. The project is designed to revitalize and expand the capacity of 22 institutions to contribute to key areas for innovation, economic development, and labour market relevance.

The project invests in the necessary infrastructure for modern and effective teaching and research, while also providing training for university staff to help them reach their full potential. UDOM is one of the universities which has benefited from the Higher Education for Economic Transformation (HEET) project. The University is intending to use the HEET funds to improve its learning environments through the construction of academic block comprising of lecture and seminar rooms and science laboratory in the College of

Earth Sciences and Engineering (CoESE) and College of Natural and Mathematical Sciences (CNMS) respectively.

The proposed project site is located on the premises of the University of Dodoma in Ng'hong'onha Mtaa, Ng'hong'onha ward of Dodoma City in the Dodoma Region. The proposed site is legally owned by UDOM, with a title deed No. 23980-DLR. It is situated approximately 12 km southeast of Dodoma City Centre and can be accessed via a tarmac road that branches off at Ihumwa ward. The land includes various infrastructures that have been utilized by the University to support its core activities of teaching, research, and consultancy. Upon completion, the university is expected to accommodate a total of 3,640 students. The project life span is expected to be 99 years, with total investment costs estimated at Tanzania Shillings Twenty-Three billion (TZS 23,000,000,000).

As a prerequisite to the construction of new buildings, the project will involve site excavation activities and vegetation clearance on the site. Buildings construction and associated activities will inevitably have adverse environmental, social and economic impacts, which need to be identified and mitigation measures put in place for ensuring sustainability of the project. The Environmental Management Act of 2004 of Tanzania requires project developers to carry out an Environmental and Social Impact assessment (ESIA) prior to project implementation. In accordance with the categories identified in the Third Schedule to Environmental Management Act, Cap 191 and First Schedule to Environmental Impact Assessment and Audit (Amendment) Regulations, 2018, the nature of this project is subject to full EIA study.

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

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

Project descriptions

The proposed project upon completion will enable the realization of the increased capacity of approximately 3,640 students and offer quality education in areas of Science, Technology, Engineering, and Mathematics (STEM). The project advances in phases starting from the planning phase to the pre-construction phase, followed by construction then the operation phase and finally the decommissioning phase. The development of the land includes the construction of academic block in the CoESE, science laboratory in the CNMS and associated infrastructures.

Project Location

The proposed project site is accessible by Dodoma-Morogoro Road, about 12 km from the City Centre, which branches off at Ihumwa ward to UDOM premises and then using internal access roads established within the campus. The general area is characterized by undulating terrains with sparsely gentle hills with lower flat lands and plateau-like features in some areas.

Main Project Activities

The development of the proposed project will involve various phases, including the design (planning) phase, construction phase, operation phase and decommissioning phase. The planning phase will involve surveying the proposed sites for construction of the facilities at UDOM in Nghongh'onha Mtaa, Nghongh'onha ward of Dodoma City in Dodoma Region. A survey, in this case, refers to land investigations, drilling, measurements and pre-works examination of the site. The 18 months of the actual construction phase of the project will involve standard construction activities such as construction management, site preparation and levelling, excavation, compaction, setting the foundation, installation of electrical, water and wastewater infrastructure, erection of superstructures, etc.

Legal and Institutional Framework

Tanzania is committed to attaining sustainable development goal. Some of the Tanzanian legal and institutional framework that have a close bearing to this project were applied.

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

i) World Bank's Environmental and Social Framework (ESF);

ii) World Bank relevant Environmental and Social Standards (ESSs). This ESIA has applied 6 relevant standards out of 10 ESSs, which are:
    - ESS1- Assessment and Management of Environmental and Social Risks and Impacts;
    - ESS2 - Labour and Working Conditions;
    - ESS3 - Resource Efficiency and Pollution Prevention and Management;
    - ESS4 - Community Health and Safety;
    - ESS8 – Cultural Heritage and
    - ESS10 - Stakeholder Engagement and Information Disclosure.

Baseline Information

The proposed project site consists of native scattered vegetation i.e., *Commiphora* and *Euphorbia spp.* and sparse shrubs, with some existing buildings and associated infrastructures located approximately 750m away. Limited wildlife (reptiles, mongoose, baboons, antelope, butterflies, millipedes and grasshoppers and dwelling macroinvertebrates) remains due to urbanization.

The soils of the area comprised of sandy silty mixtures with minor clay deposits. The underlying geology is predominantly granitic basement complex with no observed groundwater or flooding issues. Seismic activity is generally low but built structures will adhere to earthquake standards.

Stakeholder Engagement and Public Consultations

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

Public consultation entailed sharing information and knowledge about the project, seeking to understand key stakeholders' concerns and building relationships with the community. Stakeholders' identification considered all aspects of stakeholders that may be affected or have interest to project activities whether positively or negatively and/or based on their roles in implementation of the project.

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

The project involved various stakeholders considering gender, vulnerable people as well as people with special needs. They were consulted to get their views throughout the project life. In addition, a mechanism was put in place to address grievances, Gender based Violence (GBV), Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH).

The main stakeholders consulted included relevant Ministries/Departments/Agencies, i.e., Ministry of Education, Science and Technology (MoEST), VPO, Ministry of Agriculture, Tanzania Building Agency (TBA), Occupational Safety and Health Authority (OSHA), The Energy and Water Utilities Regulatory Authority (EWURA), The Tanzania Electric Supply Company Limited (TANESCO), DUWASA, TARURA, TSF, Wami-Ruvu Basin Authority, Local Government Authorities (Dodoma City Council, Ng'hong'onha and Iyumbu wards) and project-affected people such as UDOM community members.

Stakeholders' consultation revealed that the proposed project will have positive impacts that might stimulate economic and social development through the expected employment opportunities. Nevertheless, stakeholders also raised several issues and concerns on waste management, impaired air quality (dust and pollutant gases), noise, oil spills and efficiency of water utilization.

Assessment of Environmental and Socio-Economic Impacts

(a) The assessed environmental risks and impacts were based on:
   (i) World Bank Environmental Health and Safety Guidelines (EHSGs);
   (ii) Effects related to climate change;
   (iii) Effects of any material threat to the protection, conservation, maintenance and restoration of natural habitats and biodiversity;
   (iv) Effects related to ecosystem services and the use of living natural resources; and
   (v) those related to the design of the physical facilities.

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

Impacts associated with the proposed project.

A: Impacts on the physical Environment

Positive environmental impacts

i. Improved amenities/ landscaping; and
ii. Increase waste management facility in the area.

Negative environmental impacts

i. Loss of biodiversity;
ii. Change of habitat;
iii. Loss of ecosystems services;
iv. Acceleration of soil erosion;
v. Generation of liquid waste;
vi. Generation of solid waste;
vii. Generation of Hazardous waste;
viii. Increased runoff/storm water;
ix. Land pollution;
x. Ground water pollution;
xi. Impaired air quality;
xii. Increased noise level
xiii. Generation of vibrations;
xiv. Visual impact; and
xv. Increase pressure on natural resources.

B. Impacts on Social Environment

Positive social impacts

i. Increased enrolment of students;
ii. Creation of employment opportunities;
iii. Increased income generation opportunities;
iv. Improved quality of life;
v. Increased skills and impart knowledge to local communities;
vi. Increase of academic facilities

Negative social impacts

i. Increased pressure on social services;
ii. Increased traffic flow;
iii. Increased risks of road accidents;
iv. Increase in level of crimes;
v. Change in social values and ethics;
vi. Increase in conflicts;
vii. Price inflation of goods and services;
viii. Occupation health, safety and security risks;
ix. Community health and safety risks;
x. Child labour;
xi. Increased incidence of GBV/SEA/SH;
xii. Increased risks of communicable diseases such as STDs, COVID etc.;

C. Economic Impacts

Positive impacts

i. Increased Revenues to local authorities;
ii. Increased commercial and social activities around project locations;
iii. Increased Income to local suppliers and service providers; and
iv. Increased land values.

D. Mitigation measures

The design of the mitigation measures for the identified Environmental and Social impacts applied the mitigation hierarchy suggested in the ESS1 which are:

a) Anticipate and avoid risks and impacts;
b) Where avoidance is not possible, minimize or reduce risks and impacts to acceptable levels;
c) Once risks and impacts have been minimized or reduced, mitigate; and
d) Where significant residual impacts remain, compensate for or offset them, where technically and financially feasible.

Most of the mitigation measures put forward are essential for good environmental, social and safety practices that shall be adhered to during all the project phases.

Negative Social Impacts

i. 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;
ii. Institute traffic management and safety programme including, training and testing of heavy vehicles operators and drivers, enforcement of speed limits, maximum loading restrictions and compliance with all Tanzania transportation law and standards;
iii. Provide more avenues for service providers e.g. cafeteria and restaurants
iv. Strengthen security services
v. Conduct awareness campaigns /Education on HIV, COVID-19 and STDs;
vi. Prepare a GBV Action Plan;
vii. Conduct regular monitoring of project implementation.

Negative Environmental Impacts

i. Ensure proper and timely services and maintenance of tools, machines and equipment;
ii. Restrict number of vehicles to site and avoid vehicles idling;
iii. Ensure the stockpiled construction material are covered to minimize wind impact;
iv. Ensure bare land with loose soil is wetted, revegetated or paved;
v. Ensure loads with friable material during transportation are covered;
vi. Ensure the proposed project design accommodate the native vegetation;
vii. Ensure proper waste management; and
viii. Ensure sustainable use of natural resources.

Environmental and Social Impact Management Plan

The options to minimize or prevent the identified adverse social and environmental impacts as well as a monitoring plan have been suggested in this report and are contained in the ESMP. It defines the roles and responsibilities of different actors in the plan. Most of the proposed mitigations are based on environmental, social and safety best practices. The associated environmental costs for carrying out the environmental management plan amount to TSH 155,000,000 (about 67,000 USD).

Environmental and Social Monitoring Plan (ESMoP)

Environmental and Social Monitoring Plan will be implemented in all project phases. The monitoring of environmental and social parameters during the construction phase shall be carried out by the Contractor's Environmental and Social Safeguard team, under the supervision of the UPIU's Environmental and Social Safeguard team. The estimated annual costs for carrying out the proposed environmental monitoring programme amount to TSH 10,000,000 (about 4, 400 USD).

Decommissioning

A preliminary decommissioning plan has been developed. Should the decommissioning become inevitable the plan provides general description of decommissioning methods considered feasible for the proposed project. The plan is intended to demonstrate that the methods considered are practical and that they protect the health and safety of the public and decommissioning personnel. Project decommissioning has five phases:

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

Conclusions and Recommendations

The project has gained overall acceptance within the community, district, regional, and national levels, primarily due to its potential socio-economic benefits. The projected long-term environmental and socioeconomic advantages outweigh any potential negative impacts, which can be effectively managed to acceptable levels.

Based on the information provided, it can be concluded that the proposed project activities, ranging from design and construction to the operational stage, will have manageable and reversible negative impacts on both the biophysical and socio-economic environments. The key to minimizing these concerns lies in the effective implementation of the proposed mitigation measures. UDOM holds the responsibility for ensuring the

overall implementation of the Environmental and Social Management Plan (ESMP) and Environmental and Social Monitoring Plan (ESMoP) outlined in this report.

This Environmental and Social Impact Assessment (ESIA) report recommends that the proposed project can proceed, provided that the proponent adheres to the ESMP as specified in the report, along with any additional conditions imposed by regulatory bodies such as the National Environment Management Council (NEMC), World Bank ESF and ESSs, and other relevant authorities.

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We are grateful to the HEET project for providing us with the opportunity to conduct this Environmental Impact Statement (EIS) for the proposed construction of lecture/seminar rooms and laboratory complex at the University of Dodoma, Plot No 4, Ngh'ong'onha Mtaa, Ngh'ongh'onha Ward, Dodoma City, Dodoma Region. This project will enhance the quality of education and research at UDOM and contribute to the economic transformation of the country.

Thank you all.

ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
BMH	Benjamini Mkapa Hospital
CEMO	City Environmental Management Officer
CHSS	College of Humanities and Social Sciences
CIVE	College of Informatics and Virtual Education
CNMS	College of Natural and Mathematical Sciences
CoESE	College of Earth Sciences and Engineering
COVID-19	Corona Virus Disease-2019
DUWASA	Dodoma Urban Water Supply and Sanitation
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
ESF	Environmental and Social Framework
ESIA	Environment Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESS	Environmental and Social Standards
EWURA	Energy and Water Utilities Regulatory Authority
GBV	Gender-Based Violence
GM	Grievance Mechanism
HEET	Higher Education for Economic Transformation
HIV	Human Immune Virus
ICT	Information Communication Technology
IFC	International Finance Corporation
IFIs	International Financial Institution
ITCZ	Inter-Tropical Convergence Zone
IUCN	International Union for Conservation
MEO	Mtaa Executive Officer
MoEST	Ministry of Education, Science and Technology
NEMC	National Environmental Management Council
OHS	Occupational Health and Safety
OSHA	Occupational Safety and Health Authority

PM	Particulate Matter
STEM	Science, Technology, Engineering and Mathematics
STIs	Sexual Transmitted Infections
TANESCO	Tanzania National Electric Supply Company
TANROAD	Tanzania National Road Agency
TBA	Tanzania Building Agency
TEV	Total Economic Value Framework
THTU	Tanzania Higher Learning Institution Trade Union
UDOM	University of Dodoma
URT	United Republic of Tanzania
WB	World Bank
WHO	Word Heath Organization

CHAPTER ONE

1. INTRODUCTION

1.1 Background to the Project

The University of Dodoma (UDOM) is a Public (Government of Tanzania) Higher learning Institution under the Ministry of Education, Science and Technology (MoEST). The President of the United Republic of Tanzania formally established it in March 2007 following the signing of the Charter. UDOM is located about 12 Km Southeast of Dodoma City Centre. The University of Dodoma offers various programmes under the colleges of Earth Sciences and Engineering, Natural and Mathematical Sciences, Informatics and Virtual Education, Humanities and Social Sciences, Business Studies and Economics, and Education; Schools of Law, Medicine and Dentistry, and Nursing and Public Health; and Institutes of Development Studies and Confucius.

Being the largest University in the region, the University of Dodoma (UDOM) attracts the largest number of students in Tanzania. This is partly due to the diversity and potential of its programmes but also to account for the urge for human development and transformation processes in Tanzania and regionally. In recent years, however, UDOM's capacity to admit students and offer quality education in areas of Science, Technology, Engineering, and Mathematics (STEM), has been hampered by inadequate infrastructure in terms of buildings, ICT, and human resources as well as teaching, learning and research facilities.

The Government of the United Republic of Tanzania through the Ministry of Education, Science and Technology (MoEST) has received funds from the World Bank under Higher Education for Economic Transformation (HEET) project. HEET is a 5-year project that aims to promote higher education as a catalytic force in the new Tanzanian economy. The project is designed to revitalize and expand the capacity of 22 institutions to contribute to key areas for innovation, economic development, and labour market relevance. UDOM is intending to use the HEET funds to improve its learning environments through the construction of academic block comprising of lecture and seminar rooms, and science laboratory in the College of Earth Sciences and Engineering (CoESE) and College of Natural and Mathematical Sciences (CNMS), respectively. All the proposed buildings will occupy a total area of about 2,1847 hectares designated for

academic purposes. The proposed construction project is designed to accommodate approximately 3,640 students upon completion.

The construction of these structures must abide to the Environmental Management Act of 2004 of Tanzania which requires the project developers to carry out Environmental and Social Impact Assessment prior to project implementation. Likewise, the World Bank's Environmental and Social Standards requires the borrower to identify, assess and manage potential environmental and social impacts and risks associated with the project. In view of the above, UDOM has carried out this environmental and social impact assessment (ESIA) for the proposed academic block and science laboratory in the project areas. Therefore, Environmental Management Act, Cap 191, the Environmental Impact Assessment and Audit (Amendment) Regulations, 2018, and the World Bank Environment and Social Framework (ESF) as well as the HEET project's Environmental and Social Management Framework (ESMF) were observed in the study.

1.2 Project Rationale

Tanzania has achieved remarkable progress in expanding access to basic education since 2015. The primary enrolment rose by 24.5% from 2015 to 2018, reaching over 10 million pupils in 2019. The secondary enrolment also increased in 2013/14, with more students moving on to post-primary education. However, the Tanzanian education system faces challenges in absorbing the growing number of graduates from basic education into the higher education sector. Moreover, the higher education sector in Tanzania faces persistent challenges, such as a mismatch between university skills and industry needs, low enrolment and completion rates in STEM fields, inadequate infrastructure, weak academia-private sector linkages, and limited research capacity. Urgent needs include expanding investment in infrastructure and facilities, and establishing quality assurance systems in fields such as engineering, medical sciences, agriculture, energy, and natural resource management. Addressing gender issues is also a concern, as women and girls encounter barriers to access and complete higher education. According to the HEET's Environmental and Social Management Framework (ESMF) of 2021, only 35% of the higher education students in Tanzania are female. To address these issues, the World Bank has launched the Higher Education for Economic Transformation (HEET) project. The project aims to improve the quality, relevance, and equity of higher education in Tanzania. It supports the development of academic programs, research centres, and partnerships in priority

areas. It also provides scholarships, grants, and loans to students and institutions. The project is expected to benefit over 100,000 students and 3,000 faculty members by 2028.

The HEET project aims to align higher education programs and curricula with the country's economic priorities. It seeks to develop workforce skills, increase access to quality STEM and business education programs, improve teaching quality, and enhance learning resources. Additionally, the project aims to foster stronger collaboration between universities and industries through university-industry partnerships. By addressing the gaps in Tanzania's higher education system, the HEET project aims to support the country's economic growth and transformation.

The project recognizes the vital role of higher education in driving innovation, economic development, and social inclusion. As the number of graduates from basic education continues to rise, there is an urgent need to accommodate these students in higher education programs. To facilitate this, the HEET project will invest in infrastructure, facilities, and quality assurance systems in fields such as engineering, medical sciences, agriculture, energy, and natural resource management. These strategic investments aim to support Tanzania's ongoing process of rapid economic transformation.

Furthermore, the Government of Tanzania is leveraging the HEET project to enhance the operational capacities of public universities. This empowerment will enable universities to better contribute to and support the country's economic goals through their missions, objectives, and core values. Ultimately, the HEET project aims to ensure that higher education institutions in Tanzania are responsive to the changing economic needs of the country and continue to fuel sustainable economic growth.

1.3 Objectives of the UDOM HEET project

1.3.1 Main Objective

According to the HEET's Project Appraisal Document (PAD) of 2021, the main objective of the project is to strengthen the learning environment and labour market alignment of priority programs at beneficiary higher education institutions and improve the management of the higher education system.

1.3.2 Specific Objectives

In addressing the overall objective of the project, UDOM who is also the beneficiary of the HEET project had the following specific objectives:

- To construct and equip (i) CoESE academic block which comprise lecture and seminar rooms, (ii) CNMS science laboratory;
- To review and develop curricula to match with current and future labour market demand;
- To train 16 staff with a breakdown of 10 at PhD level and 6 at Master's Degree level;
- To strengthen ICT application in UDOM business process (teaching, administration and management); and
- To strengthen collaboration between UDOM and industry and R&Ds for fostering research, technology and innovation.

1.4 Objectives of the ESIA Study

The overall objective of carrying out this ESIA was to identify, predict and assess both positive and negative environmental and social impacts associated with the project and propose mitigation measures to minimise the negative impacts and enhance the positive ones. The assessment used data and information on the physical, biological, and socio-economic environment to predict both negative and positive impacts of the project. The Environmental Management (EIA and Audit) (Amendment) Regulations of 2018 and World Bank Environmental and Social Standards (ESS1) provides the general objectives for carrying ESIA, among others a list comprises the following; -

- To ensure that environmental considerations are explicitly addressed and incorporated into the development decision making process;
- To anticipate and avoid, minimise or offset the adverse significant biophysical, social and relevant effects of developmental proposal;
- To protect the productivity and capacity of natural systems and ecological processes which maintain their functions;
- To promote development that is sustainable and optimises resources use and management opportunities;

- To establish and assess impacts that are likely to affect the environment before a decision is made to authorise the project;
- Propose mitigation and socio-management procedures aimed at managing the proposed mitigation of the identified potential impacts and that will form part of the overall ESMP and ESMoP for the project operations; and
- To enable information exchange, notification and consultations between stakeholders.

UDOM undertook this Environmental and Social Impact Assessment to address the above objectives.

1.5 Methodology of the ESIA Study

The ESIA study applied different participatory methods to involve all the concerned stakeholders. The methodology used in this study is commensurate with the Environmental Management Act, Cap 191 and the Environment Impact Assessment and Audit (Amendment) Regulations, 2018). The study was undertaken based on checklists complimented by the Consultants' experience and through discussion with UDOM staff, local government officials and communities in the vicinity of the project site. ESIA study was done both as a desktop study and field work. It involved the review of literature/documents including Environmental and Social Management Framework (ESMF) report, UDOM project background reports, socio-economic profiles and field studies at the project site to gather information and data on various aspects of the project. The environmental assessment required consultations with a number of stakeholders, including responsible government agencies, Local Government Authorities), etc. The study adopted the following approach:

1.5.1 ESIA Team

A multi-disciplinary team of experienced scientists and environmental and social professionals was assembled to carry out the required resource assessment, generation of baseline data, determination of potential impacts and recommendation of mitigation measures. An interactive approach was adopted among the environmental team members and other project professionals.

The team utilized the checklist for data gathering, analysis, and presentation. The team members conducted the reconnaissance investigations to determine the critical elements for analysis and the issues highlighted for the design and planning process. Team meetings were held to discuss the progress of investigations and analyses and facilitate data integration toward an understanding of the systems at work in both the natural and built environment. Baseline data for the study area were collected using a combination of:

- Site Reconnaissance
- Analysis of Maps and Plans
- Review of Reports and background documents
- Checklists
- Field Studies
- Public Consultations

1.5.2 Communication with Stakeholders

Identification of stakeholders

The stakeholders were identified based on the role and relevance of an organization, group or individual to the proposed project. Broad consultations were conducted involving different institutions and other key stakeholders including the following;

- University of Dodoma Management (UDOM);
- Ministry of Education, Science and Technology;
- Dodoma City;
- Dodoma Urban Water Supply Authority (DUWASA);
- University of Dodoma Students community;
- Ng'hong'onha Mtaa and Ward Leaders;
- The neighboring communities to UDOM (Makulu, Iyumbu, Ntyuka, Ng'hong'onha);
- UDOM students' organisations (UDOSSO);
- UDOM academic student organisations (UDOMASA);
- Tanzania Higher Learning Institutions Trade Union -UDOM Branch (THTU - UDOM);
- Dodoma regional commissioner's office;
- Dodoma District commissioner's office;

- University students;
- Ministry of Education Science and Technology;
- Tanzania Commission of Universities;
- Dodoma city Council (Health officer, Municipal urban planning and environment, Trade officer, Land officer);
- Occupational Safety and Health Authority (OSHA);
- Tanzania Electrical Supply Company (TANESCO);
- Fire and Rescue Force – Dodoma Office; and
- None state actors working in Dodoma city, Makulu, Iyumbu, Ntyuka, Ng'hong'onha;

The concern of each group have been addressed in this ESIA report.

Involvement of stakeholders

The ESIA study team, in collaboration with UDOM officials visited the proposed area for the proposed project and later on visited neighbouring community. Physical observations and stakeholders' interviews were conducted in order to collect baseline data and issues of concerns. The ESIA study applied different participatory methods to involve all the relevant stakeholders. Public meeting dominated at local level i.e. *Mtaa*, one-to-one interviews with individuals based upon a list of general topics or questions and partly based on an open discussion, were conducted. Focused group discussions were also used to gather stakeholder's views and concerns.

In establishing the views of the public concerning the proposed project, the consultants provided introduction letter addressed to each stakeholder, briefing the project, need for ESIA and asking the stakeholder to freely raise their concerns to the Consultant. During the public meetings the consultants introduced the project and elaborated to the stakeholders the project objectives and purpose and envisaged project activities so as to give a good understanding for stakeholders to be able to air their views.

Identification of stakeholders' concerns

The stakeholders pointed out a number of issues and concerns. An issue raised by an individual or a group of people was cross-checked by discussing it over with other groups (triangulation).

Key issues raised by each stakeholder group were summarized and further analysed. Details of stakeholders consulted, names and signatures of people consulted and record of main issues raised are integrated in Chapter 5 and Appendix 4 of this report accordingly.

1.5.3 Physical Environment

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

Climate, soils and topography,

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

Hydrology and drainage

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

Noise levels and air quality

Spot measurements were done on site to determine the current noise levels, ambient pollutant gases and dust at the project site based on the nature of the proposed project. Sound level meter device was used to record noise at the project site as prescribed in ISO 19961:2003 and ISO 3095:2001. Both ambient pollutant gases, and dust as particulate matter was measured at site in terms of PM_{10} & $PM_{2.5}$ by using Dust and Pollutant gases Monitors, that measures dust particles of different dimensions (microns of 10, 5.0, 2.5, <1.0, 0.3 and >10). The equipment complied with the EMC Directives.

1.5.4 Biological Environment

The status of the flora and fauna of the study area was determined by a review of literature relevant to the area and field investigations. The vegetative communities were identified and classified into community types. Identification was carried out of dominant tree species. The vegetation was identified and described for their property. Information on fauna was gathered

from existing literature on reported species as well as observations in the field. Observations were made particularly to assess the presence of birds in the general area. Information also was obtained from locals in the area about the presence of any significant specie.

1.5.5 Socio-economic Environment

To determine the cultural and social factors associated with the construction and operation of the proposed project, members of the communities in the general vicinity of the project were interviewed and a review of economic and social literature was conducted. Further, rapid field appraisal techniques in conjunction with desk research were employed to investigations of the socio-economic considerations within the project area. These were undertaken to ascertain information to satisfy the following factors as outlined in the terms of reference provided:

- Population and settlement characteristics
- Land uses and livelihoods
- Community structure, employment and income
- Developments underway
- Infrastructure in place
- Water supply and other utilities
- Waste management practices
- Recreational activities
- Energy supply
- Public health and safety
- Access to and delivery of health, education and social services

1.5.6 Review of project documents and literature

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

1.5.7 Policy, Legal and Institutional Arrangement

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

1.6 Report structure

The report is presented in accordance to 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
- Table of Contents
- Acknowledgement
- List of Acronyms
- Introduction
- Project description
- Policy, administrative and legal framework
- Baseline/ Existing conditions
- Stakeholders Analysis
- Assessment of Impacts and Identification of Alternatives
- Environmental and Social Mitigation Measures
- Environmental and Social Management Plan
- Environmental and Social Monitoring Plan
- Resource Evaluation / Cost Benefit Analysis
- Decommissioning and Closure
- Summary and Conclusions
- References
- Appendices

CHAPTER TWO

2.0 PROJECT DESCRIPTION

2.1 Project Location and Accessibility

The proposed project site is specifically located at at Ng'hong'onha Mtaa, Ng'hong'onha ward in Dodoma. It lies at coordinates A (-6.23014, 35.80986) and B (-6.22158, 35.82000) (UTM, Arc 1960), about 12 km southeast of Dodoma City Centre (Figures 2.1). The site is bordered with several infrastructures, used by UDOM to meet her core business of teaching, research, and consultancy.

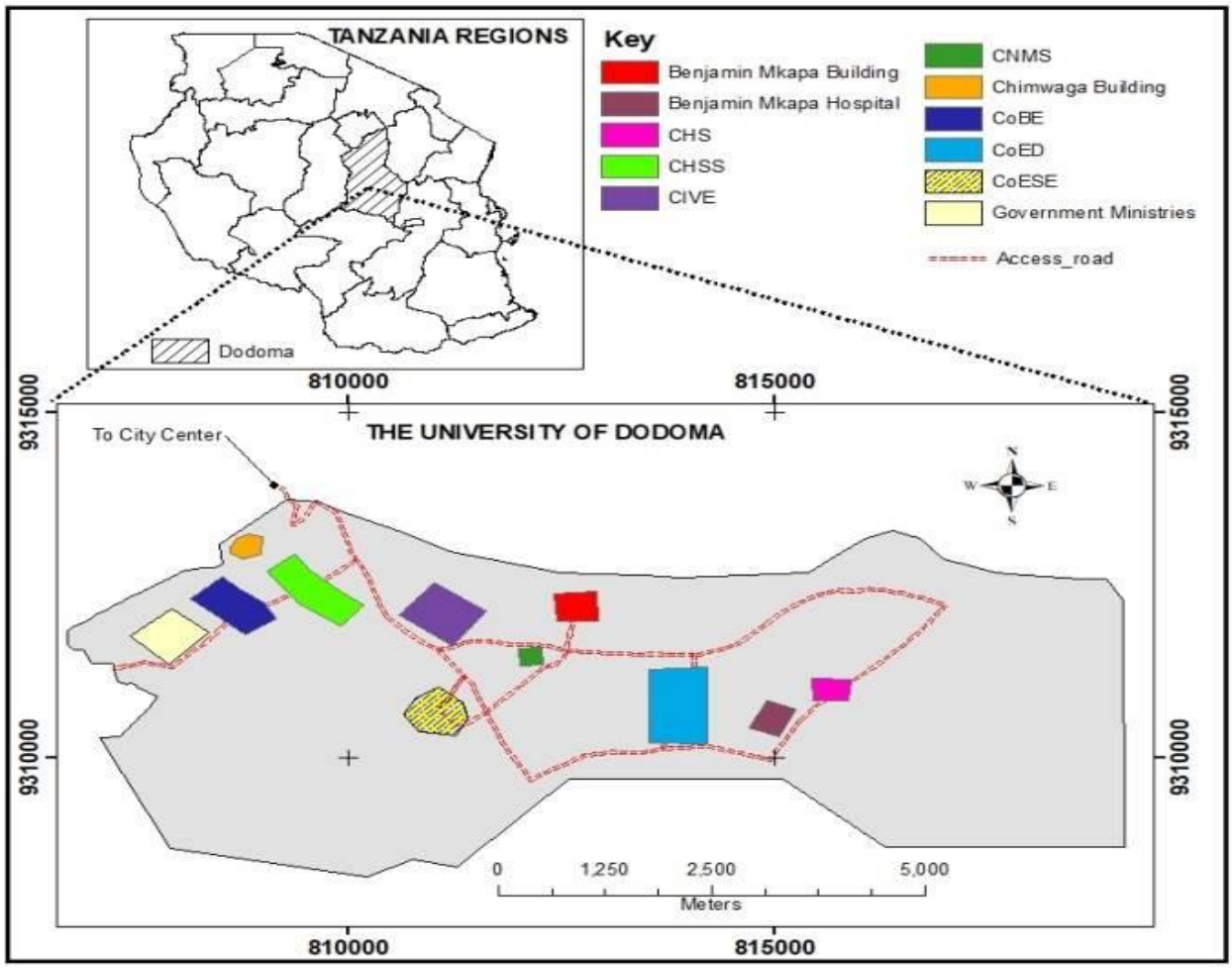


Figure 2.1: Location and layout of UDOM

The proposed project site can be accessed via Kikuyu-Makulu-UDOM roads or Dodoma-Morogoro Road, about 12 km from the City Centre, which branches off at Ihumwa ward to UDOM premises and then using internal access roads established within the campus.

2.2 Site Description and Features

The project site at CoESE stands on abroad upland plateau with an altitude ranging between1240-1266m above sea level while that of CNMS range between 1200-1240m above sea level. Physiographical and topographically, the proposed construction site for CoESE and CNMS falls in the flat central zone of Dodoma lies between latitude -6.23014andlongitude 35.80986 and latitude -6.22158 and longitude 35.82000 respectively.

The soils of the area comprised of sandy silty mixtures with minor clay deposits. The underlying geology is predominantly granitic basement complex with no observed groundwater or flooding issues.

Floristically the project site consists of native scattered vegetation i.e., *Commiphora* and *Euphorbia spp.* and sparse shrubs, with some existing buildings and associated infrastructures located approximately 750m away. Limited wildlife (reptiles, mongoose, baboons, antelope, butterflies, millipedes and grasshoppers and dwelling macroinvertebrates) remains due to urbanization.

The vegetation of the area gives the indication for habitat for fauna and based on the urban nature of the area there was no indication for large wild animal. The common urban birds are observed in the area while small reptiles, some amphibians, insects and other invertebrates are present in the area with some vegetation cover. However, there are no any flora and/or fauna species with significance conservation status (i.e. threated or endangered as per IUCN guidelines/CITES List) was identified.

2.3 Land Ownership

UDOM is the registered owner of the proposed site, with a total area of 2.1847 hactares at Ng'hong'onha Mtaa in Ng'hong'onha ward. The site use is designed for Institutional purposes, Use Group "K" Use Class (b) as defined in the Town and Country Planning (Development and zoning) (Capital development area) Regulations, 1979. Hence the development in the area is

compatible with the designed land use of the title. Likewise, the nearby areas are mainly covered by academic institutions.

2.4 Adjacent development

The project site borders with CoESE laboratory, CRDB and NMB Banks, and Existing CNMS laboratory and beyond is College of Informatics and Virtue education and Benjamin Mkapa building.

2.5 Project Design

Buildings are constantly subject to several climatic and environmental elements (wind, sunlight, temperature, rain, earthquakes, and other factors). During the preparatory phase of the project, UDOM engaged experts in assessing and understanding risk and integrating risk management in development planning of the proposed project as per Environmental and Social Standards (ESS1: Assessment and Management of Environmental and Social Risks and Impacts). Several studies were conducted during the preparatory phase of the project, as part of Risk Hazard Assessment (RHA). The studies include geotechnical investigation, topographical surveys and environmental and social impacts assessment. Furthermore, with inputs from these studies, the project design took into consideration aspects of climate change risks, disaster risk management, gender, and occupation health and safety.

2.5.1 Climate Change risks mitigation and adaptation in the Project Design

To mitigate and adapt the climate change risks (e.g. heat, drought, floods, water scarcity, etc.), the design of the proposed project shall accommodate the infrastructures to enhance low energy use, rainwater harvesting, storm water management systems, adequate natural ventilation and lighting, and maintaining a significant green space, as described hereunder.

- ***Open space:*** In the open spaces, native plants have been recommended to add the benefit of being useful for storm water treatment and infiltration, which is in the central part of the site. Open spaces are planned to maximize the tree canopy cover and shade provided by trees in the area and more provision of ecosystem services.

- ***Greenery walkways:*** The design maximizes pedestrian movement and minimizes motorized transport within the site to reduce air emissions (greenhouse gasses (GHGs)) and maximizing Carbon sequestration. Walkways are provided to restrict free movement that causes vegetation destruction in the site and reducing land cover important for carbon sequestration. Trees are proposed to be planted along the vehicular access road and footpaths to improve landscape and reduce effects of sun radiation during the day.

- ***Green areas:*** Green areas are distributed in every zone/ block to allow cross fresh air into the buildings. Due to the topographical nature and natural vegetation cover, green belt and conservation zone intend to preserve the ecosystem and control land degradation and enhance mountainous scenery. Native and artificial trees and grasses will reduce soil erosion in all areas prone to soil erosion.

- **The building with low energy use**; Provisions for adequate openings for cross ventilation, that will ensure easy flow of clean air and reduce energy use (thus reducing emissions); provisions for motion sensors in public areas, to enable auto switch ON/OFF of lights; installation of *presence sensors* in offices, class rooms; proper orientation to reduce indoor discomfort and capture natural air as much as possible and minimization of the sun effects (installation of fans; and provisions for solar lights along the pathways for sun shading); maximizing the potential of utilization of renewable energy options such as solar and wind; Utilization of biogas from the wastewater treatment plant for cooking; buildings to be oriented and constructed to take advantage of natural lighting and cross ventilation as a means of minimizing energy consumption during operation.
- **The buildings with low footprint.** This increases green spaces; and accommodation of rainwater harvesting, storm water and waste management systems and embracing water-efficient processes.

2.5.2 Disaster risk management

The proposed project shall have provisions for fire prevention and firefighting facilities. Also, the building shall have provisions for solid waste and liquid waste management for diseases prevention. In addition, two possible access roads shall be used to ensure easy walkability and vehicular access to and from the building to avoid car accidents. The roads shall be safely

connected to the parking area huge enough to accommodate cars. UDOM campus shall have an emergency management plan that assigns the responsibilities for various emergency tasks, specifically to WHO does, WHAT, WHEN AND HOW.

2.5.3 Gender inclusivity

The proposed project shall be developed to be smart and friendly to gender, including considerations of persons with special needs (e.g. physical, learning impairment, emotional and behavioural). These include provisions of lamps, toilets, etc.

2.5.4 Occupational health and safety (OHS)

UDOM will protect workers throughout the project lifetime as per Environmental and Social Standards, ESS2 (Labor Working Conditions) and ESS4 (Community Health and Safety).

2.6 Project Components and Description

The proposed CoESE academic block will be of three storeys consisting lecture and seminar rooms. CNMS science laboratory building will be of three storeys consisting of four laboratories of Biology, Chemistry, Physics and Mathematics. The building will have pantry, sanitary areas and circular ramp for people with physical disabilities together with mothers nursing rooms.

2.7 The Project Activities

2.7.1 Site Preparation and Mobilization

2.7.1.1 Site Preparation

The proponent and the contractor will ensure that all necessary permits are in place to allow the work(s) to take place. Necessary safety measures will be put in place by the contractor, furthermore, securing the construction site will be done by putting iron sheets around the project site. Also, the contractor will establish a temporary site office for construction activities. The office will also include material store and pit latrines for both genders. At this stage the contractor will liaise with all utility agencies/companies owning infrastructures within Dodoma city to identify their location to avoid impact to the infrastructures and interruption of services to the public served.

2.7.1.2 Mobilization for construction works

The mobilization phase will mainly involve deployment of required tools and machinery for the construction work and recruitment of the construction crew for the work. Also, the phase will involve deployment of construction materials and their transportations from the point sources to site, however, most materials will be brought time to time as required. About 180 workers covering 30 skilled and 150 non-skilled labourers from within and outside the project area will be required for the project; however, they might be required at different stage of project development depending on their area of specialization/work. A Contractor will be responsible for this phase with supervision from the proponent project management team.

2.7.2 Construction Phase

Some of the present vegetation at site will be cleared to pave a way for development of the proposed CoESE academic block and CNMS science laboratory project. The first step, the contractor will involve site preparation/setting, excavating site to the required level. These will happen after clearance and accumulation of overburden materials and their eventual transportation to the disposal site. Under second step, the works will involve the building erections/construction up to completion.

Some of the overburdens/top-soils to be generated from excavations will be used for backfilling and resurfacing of the area. Once civil works is done mechanical and electrical works will finalise the buildings. Landscaping of the area and pavements lying will be among of the final step of the construction phase.

The project will use local available building materials. The construction materials such as sand, stone, gravel and clay are expected to be obtained from authorized quarries in Dodoma. However, concrete mix company will be contracted to supply concrete and thus other earth materials will be required in small quantities. Building materials such as cement, tiles, pavement, sanitary ware and steel mostly will be procured from various hardware in Dodoma and if not available an option of sourcing from Dar es Salaam will be sought.

The contractor will be responsible for transportation of all construction materials and equipment from point source to the site mainly by using the Kikuyu-Makulu-UDOM roads or Dodoma-

Morogoro Road, which branches off at Ihumwa ward to UDOM thento the site. Most of the construction material such as cement, steel, wood, sand, stones and aggregates etc. will be brought from places whenever possible near the project site.

2.7.3 Operation Phase

The building will be used mainly for academic purposes for teaching and research, and practical in the laboratories. Chemicals will be used occasional especially in the chemistry laboratory whereas, organic matter involving both flora and fauna will be used in the biological laboratories. Other associated activities are related to utilities as covered below.

2.7.3.1 Utilities

Water supply

Water will be required for academic and laboratory works and general usage for cleaning and in sanitary areas. The area is served with the water supply system from Dodoma Urban Water Supply and Sanitation Authority (DUWASA). The DUWASA Management confirmed to the consultant team that there is immediate plan to upgrade the water supply infrastructures of the area to ensure a steady supply of the service. The academic and laboratory buildings' design includes a full set of facilities to harvest rainwater, whereby pipes and a well-built storage tank will be installed.

Electricity

The proposed project will be served with TANESCO Main - grid. The TANESCO Office in Dodoma confirmed to the ESIA team that the Company will be able to service the building with its power need. Further, a full set of solar power system will be installed and that will control the use of excessive power from the national power grid.

2.7.3.2 Solid waste management

Construction related wastes such as debris/spoil materials, lumber, plastic remains, cans, tins, grass, and plastic packaging wastes like Cardboard boxes, wooden drums and empty cement bags will be generated. Also, domestic wastes such as food remains, plastic bottles, paper and related wastes will be generated due to presence of construction workers at site.

The contractor will designate an area for waste collection where wastes will be placed according to its nature. Further Municipal approved waste contractor will be engaged for waste removal.

During operation various kind of wastes will be generated mostly from seminar and lecture rooms, laboratory and pantry areas. These will include papers wastes, packaging materials, plastics, and organic wastes (food wastes). The potential for hazardous waste generation exists from the laboratories the aspect of which is covered under subsequent sections.

UDOM will provide waste bins in strategic areas for collection of wastes at source and centralized waste collection point within the premises for collection by contracted agent. Collection point will be designed at one of the corners close to the gate for easy collection of the same without major nuisance during collection to other users of the area. A municipal approved contractor will be engaged for waste collection and disposal.

2.7.3.3 Liquid waste management

During construction, a pit latrine toilet will be established to serve construction crew. Supporting sanitary facilities will be provided to include water for required hygiene for users.

There is a centralised sewer system at UDOM. Thus, the project will use of the existing UDOM sewerage network system by connecting the generated liquid wastes to the waste stabilization ponds.

During operation also, there will be wastewater from Laboratory operation. This will have separate management system from the sewage system. UDOM will design a wastewater retention structures for the laboratory effluent. Two on series retention ponds will be designed for dilution of the effluent before final discharge to the open environment. The effluent on the retention ponds will be monitored to ensure it is safe for final disposal.

2.7.3.4 Hazardous materials/waste management

The main type of hazardous waste to be involved at site during construction include hydrocarbons such as used oil and diesel for running diesel powered machines at site. Also, there will be remaining paint containers. A proper temporary storage room will be constructed with bund wall to contain leakage or spillage in case of incident. After accumulation of large

amount of used oil or at the end of construction during demobilization the oils and other type of hazardous wastes will be handled over to the authorised agent to handle such kind of wastes.

During operation there is potential for generation of hazardous wastes to include expired chemicals if due care is not taken. Chemicals in liquid or solid form might expire and require proper handling and disposal to avoid human health risks and environmental pollution. UDOM laboratory team will establish a system for management of chemicals to include ordering only the amount required for a short period of time to avoid accumulation and expiring. The system will also include First in First Out (FIFO) to ensure old chemicals is consumed first and hence to reduces chances for expire of chemical before usage. In case there will be expiring of chemicals, they will be stockpiled properly as per its nature and shall engage certified agent for disposal.

2.7.3.5 Security, health and safety

During construction, as noted earlier, the construction site will be secured by enclosure with single point of controlled entry and exit for public safety and security purpose. The site will have 24 hours and 7 days security guards for safety and security purpose. All occupational health and safety issues as per requirement of the OHS Act, 2003 shall be adhered by the contractor.

2.8 Capital investment

The project total investment cost is estimated at Tanzania Shillings Twenty-Three Billion only (TZS. 23,000,000,000.00) which is equivalent to USD. 10,834,098.97.

CHAPTER THREE

3.0 POLICY, LEGAL AND INSTITUTION FRAMEWORK

3.1 Introduction

In Tanzania there are several policies, legal and administrative structures that govern execution of environmental and social impact assessment (ESIAs). The administrative aspects require that all the new projects that are likely to affect the environment should have an environmental impact assessment done and submitted to the National Environment Management council (NEMC). Similarly, the World Bank funded projects required to have ESIA approval before its execution. The objective being to evaluate the environmental and social risks and impacts of the proposed development on the environment and to provide appropriate mitigation measures.

In developing the CoESE academic block and CNMS science laboratory project in the area, various environmental and social issues may arise at any phase of the project development i.e. from site selection, mobilization to decommissioning phases. These issues need to be addressed so that the envisaged construction and operations do not impair the integrity of the environment and ensure that they are in line with policies and legal regime operating in Tanzania as well as World Bank safeguards policies. This chapter list down relevant policies and legislations pertaining to the planning and implementation of the proposed project; -

3.2 Relevance Policies

The following are relevant sectoral and cross–sectoral policies which provide directives on how the project should be operated in relation to concerned environmental and socio-economic settings. UDOM will need to observe these policies in the course of designing and implementing the proposed project activities.

3.2.1 The National Environmental Policy (2021)

The National Environment Policy for mainland (NEP 2021) is the main policy document addressing environmental management issues in Tanzania mainland. The policy covers sectors that include land and human settlements; forestry; water and sanitation; health; transport; energy; industry; wetlands; agriculture; livestock; fisheries; wildlife; tourism; and mining. The National Environmental Policy, 2021 has relative policy statements to other sectoral and cross-sectoral policies upon which the Tanzanian environmental laws are

premised. Thus, all economic and development activities are implemented in accordance with the policy.

The policy requires EIA to be mandatory for all development projects likely to have significant environmental impacts. The establishment of the proposed project will take on board all relevant measures to ensure that the projects is implemented in an economically sustainable manner whilst safeguarding environmental and social issues for the benefit of the present and future generations.

3.2.2 The National Land Policy (2019)

The National Land Policy states that, "the overall 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 - based social and economic development without upsetting or endangering the ecological balance of the environment". The project will be required to ensure protection of existing cultural heritage and conservation of ecological and socially sensitive areas. The proposed building project is located within the area planned for institutions and as such it is compatible with the land use in the project area as required by the National Land Policy. In the context of this project, UDOM in collaboration with the financier (World Bank and the Ministry of Education, Science and Technology will ensure proper disposal of wastes, especially within the project sites. Implementation of the project will ensure that provisions of the Policy are adhered to.

3.2.3 The National Construction Policy (2003)

This policy promotes among other things, application of cost effective and innovative technologies and practices to support socio-economic development including utilities and ensure application of practices, technologies and products which are not harmful to both the environment and human health. This study is undertaken to ensure that the proponent uses technologies and products not harmful to both the environmental and human health by providing feasible alternatives and appropriate mitigation measures.

3.2.4 The National Gender Policy (2002)

The key objective of this policy is to provide guidelines that will ensure that gender sensitive plans and strategies are developed in all sectors and institutions. While the policy aims at

establishing strategies to eradicate poverty, it is relevant to the project as it puts emphasis on gender quality and equal opportunity of both men and women to participate in development undertakings and to value the role-played by each member of society. It also requires that women and men are given equal employment opportunities in the project, whenever possible. This project shall ensure that women will be adequately involved at all levels of project planning to implementation.

3.2.5 The National Energy Policy (2015)

The policy outlines measures to adopt clean technology and minimize energy losses. The policy states that energy is a prerequisite for the proper function of nearly all sectors of the economy. It is an essential service whose availability and quality can determine the success or failure of development endeavours. The policy seeks to promote energy efficiency in all economic sectors. UDOM will promote the objectives of this policy from design perspective of the building to minimize energy uses. Further UDOM shall explore the use of clean energy during the project implementation.

3.2.6 The National Water Policy (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 minimisation of water uses. The proposed project shall be designed in such a way that water use is kept to the minimum by, for example, installation plumbing fixtures such as faucets and flushing cisterns, which minimises use of water. It will also ensure that pollution of water sources is avoided or minimized during the construction and operation phases.

3.2.7 The National Health Policy (2008)

One of the main objectives of this policy is to ensure that health services are available and accessible to all people wherever they are in the country, whether in urban and rural areas. The policy encourages safe basic hygienic practices in workplaces, promote sound use of water, promotes construction of latrines and their use, encourage maintenance of clean

environment; working environment which are conducive to satisfactory work performance. The proponent shall observe this policy during the project implementation.

3.2.8 The Urban Planning and Space Standards Policy (2012)

The policy prove to increase clarity, remove textual errors, and improve readability ides guidance for continuing delivery of a high-quality pedestrian and other people friendly public realm within the city centers to support the economic, social, cultural and environmental attractiveness of the city centers to businesses, residents and visitors. The policy explains more as the management of space is a key foundation of the asset management strategy. Also, the provision of appropriate space is becoming even more important as institutions increasingly competing in urban areas. Therefore, the proposed project will be constructed in the existing UDOM master plan for proper utilization of project area during its implementation.

3.2.9 The Tanzania Education and Training Policy (2014)

Tanzania aims at improving the quality of education. This is through the collaboration with all education stakeholders to modernize the curricula at all levels and make sure that it meets requirements. This project is in-line with this policy as will modernize education training and put in place the state-of-the-art equipment for training. In addition, the university fees/costs will be affordable to all people.

3.2.10 The National Mineral Policy (2009)

The National Mineral Policy also addresses that the mining activities should be undertaken in a sustainable manner. Reclamation of lands after mining activities is recommended. As far as this project is concerned, mining activities is directed to quarrying activities for obtaining stones and aggregates. Fine and coarse aggregates for the proposed project will be strictly purchased from authorised vendors.

3.2.11 The National Employment Policy (2008)

The aim of this policy is to promote employment mainly of Tanzania Nationals. Relevant sections of this policy are (i) 10, which lays down strategies for promoting employment to Tanzanians and section 10.1 is particularly focusing on industry and trade sectors (ii) 10.6 which deals with employment of special groups i.e. women, youth, persons with disabilities and (iii) 10.8 which deals with the tendencies of private sectors to employ expatriates even

where there are equally competent nationals. The proponent and contractor shall promote this policy by employing majority of Tanzanian with relevant qualifications, and the priority should be to the community around, and special groups as stated by the policy especially during development phase.

3.2.12 The National Women and Gender Development Policy (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. It focuses on using available resources to increase incomes, eradicate poverty and improve living standards. The policy also recognizes and emphasises creating awareness of how environmental degradation increases poor women's burden. This project will respond to the policy by ensuring equal opportunities in employment during development and operation phases.

3.2.13 The National Policy on HIV/AIDS (2001)

The policy provides a framework for leadership and coordination of the National multi-sectoral response to the HIV/AIDS epidemic. One of the objectives of the policy is to strengthen the role of all the sectors, public, private, NGOs, faith groups, CBOs and other specific groups to ensure that all stake holders are actively involved in HIV/AIDS work and to provide a framework for coordination and collaboration. The policy recognizes that HIV infection shall not be grounds for discrimination in relation to education, employment, health and any other social services. Pre-employment HIV screening shall not be required. For persons already employed, HIV/AIDS screening, whether direct or indirect, shall not be required. HIV infection alone does not limit fitness to work or provide grounds for termination. HIV/AIDS patients shall be entitled to the social welfare benefits like other patients among the employees. HIV/AIDS information and education targeting the behaviour and attitudes of employees and employers alike shall be part of HIV/AIDS intervention in the workplace. Establishment of the proposed project might result into social interactions among workforce and local community therefore UDOM will ensure adherence of the policy.

3.2.14 The National Research and Development Policy (2010)

Tanzania recognizes the power of science and technology in national development. The policy echoes the need to embrace science and technology in development. Thus, in aspiring to achieve the objectives of this policy, government recognizes the weak links between research and development and continued low transition of youths into science and technology disciplines. Low transition into science and technology disciplines is partly as a result of weaknesses of science teaching foundation, which is partly attributed to inadequate numbers of qualified science teachers. The proposed project is in line with this policy as it construct new buildings that will be used to facilitate teaching, research, technology and innovation.

3.2.15 The National Occupational Health and safety Policy (2010)

The National health and safety promote safe and health working conditions and safeguarding physical, mental and social wellbeing of workers and employees across all sectors and work places. The proponent will comply with this policy by ensuring that occupation and health procedures are being adhered in every stage of project cycle legally.

3.3 Legal framework

In addition to the above policies, there are a number of legal and regulatory frameworks that the proposed project must comply with and which this study has taken into consideration. The Environmental Management Act (No. 20), 2004 is the principal legislation governing all environmental management issues in the country. Within each sector, there are sectoral legislations that deal with specific issues pertaining to the environment. Some of the relevant legislation and regulations that are relevant in the management of the environment include the following:-

3.3.1 The Environmental Management Act, Cap 191

The Environmental Management Act (2004) introduces a concept of right of Tanzanians to clean, safe and healthy environment and right of Tanzanians to access various segment of environment for recreational, educational, health, spiritual, cultural and economic purposes (Section 4 (1) and (2)). The Act imposes an obligation on developers to;-

- Comply with license conditions including the EIA certificate (S.201). The act requires the developer to conduct an EIA prior to the commencement of the project

to determine whether the project may/or is likely to have, or will have a significant impact on the environment.

- As land user and occupier to protect, improve and nourish the land and using it in an environmentally sustainable manner, (S. 72)
- Abstain from discharging any hazardous substances, chemicals, oils or their mixture into waters or into any segment of the environment (S.110)
- Comply with environmental quality standards (S.141)
- Control, manage and dispose in a sound manner waste including litter, liquid, gaseous and hazardous wastes (Part IX).

By conducting this study, the proponent complies with the requirement of the Act and will further comply to various sections noted above through this report and eventual its implementation.

3.3.2 The Land Act, Cap. 113 R.E., 2019

The basic principles of the Land Act 1999 are adopted from Land Policy 1995. The Act contains provisions of critical environmental importance. One of important fundamental principles of the Land Act is "*to ensure that land is used productively and that any such use complies with the principles of sustainable development*". The project activities will be conducted in consent with this principle in order to preserve the environmental integrity of the area. Further, the Acts seek to control land use and clarify issues pertaining to ownership of land and land-based resources, transactions on land and land administration. Since the site is legally owned by UDOM the issue of land ownership conflicts does not arise, thus this is not discussed further. Further, on land use the proposed project site is designated for Institutional purposes, Use Group "K" Use Class (b) as defined in the Town and Country Planning (Development and zoning) (Capital development area) Regulations, 1979.

3.3.3 The Urban Planning Act (2007)

The Act provides for the orderly and sustainable development of land in urban areas, to preserve and improve amenities; to provide for the grant of consent to develop land and powers of control over the use of land and to provide for other related matters. Section 29-(1) of the law states that "*Notwithstanding the provisions of any other written law to the contrary, no person shall develop any land within a planning area without planning consent*

granted by the planning authority or otherwise than in accordance with planning consent and any conditions specified therein". Since the proposed project is implemented in urban area therefore, the proponent shall comply with the requirement of the Act.

3.3.4 The Occupational Health and Safety Act No. 5 of 2003

This Act makes provisions for the safety, health and welfare of persons at workplaces. Also provides for the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with activities of persons at work. It specifically requires the employer to ensure the safety of workers by providing safety gear at workplace. This Act is relevant to the developer in view of the expected construction works with many associated risks. The proponent shall ensure the contractor for construction register the workplace to Occupational Safety and Health Authority during construction phase and shall further consult the authority on occupational health and safety issues to ensure it is in line with the requirement of the Act.

3.3.5 The Engineers Registration (Amendment) Act of 2007

This Act establishes an Engineering Registration Board (ERB) which regulates the conduct of engineers, to provide for their registration and for related matters. The Act provides restriction that no person other than a registered engineer shall engage in professional engineering work or services which includes professional service consultation, planning, designing or responsible supervision of construction or operation in connection with any public or privately owned public utilities, buildings, machines, equipment, processes works or projects where public interest and welfare, or the safeguarding of life, public health or property is concerned or involved, and that requires application of engineering principles and data. The proponent and contractor shall therefore observe the provisions of the Act when executing its activities.

3.3.6 The Contractors Registration (Amendment) Act, 2008

The Contractors Registration Act requires contractors to be registered by the Contractors Board (CRB) before engaging in practice. Only registered contractors shall be involved in the implementation of the proposed project. The proponent shall comply with the law requirements during the recruitment of contractors for UDOM project implementation.

3.3.7 The Architects and Quantity Surveyors Act (2010)

The Act requires architects and quantity surveyors (QS) to be registered with the Board before practicing. Only registered architects and quantity surveyors shall be involved in the implementation of the proposed project.

3.3.8 The Public Health Act, 2009

The 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 to the general public and to provide for other related matters.

This Act is relevant to the project especially through Section 66 of the Act state that: *(1) A block or premises shall not be erected without first submitting the plans, sections and specifications of the block site for scrutiny on compliance with public health requirements and approval from the Authority.* The project proponent shall comply with the articles of this Act.

3.3.9 The Fire and Rescue Act, No. 14 of 2007

The Act provides for the better organization, administration, discipline and operation of fire and rescue brigade services. The Act gives mandated to Tanzania Fire and Rescue Force to enhance community safety, quality of life and confidence by minimizing the impact of hazards and emergency incidents on the people, environment and economy of Tanzania. The Force manages fire emergencies in Tanzania's major cities and towns and responds to rescues, hazardous materials incidents and possible terrorist activities across the country. The Force work with other government agencies to minimize the impact of bushfires, storms, floods, landslides, building collapses, motor vehicle accidents and other emergencies. It is the obligation of the project owner to register the project with fire and submit drawings for fire safety scrutiny and approval before starting construction. The project proponent shall comply with all provisions of the Act.

3.3.10 The Employment and Labour Relations Act, No.6 of 2004

The Act prohibits forced labour and discrimination of any kind in the workplace. It provides employment standards such as contracts with employees, hours of work, remuneration, leave, unfair termination of employment and other incidents of termination. The Act makes provision for core labour rights, to establish basic employment standards, framework for

collective bargaining, prevention and settlement of disputes and other related matters. The Act strictly prohibit child labour, it provides that no person shall employ a child under the age of fourteen years, it further provides that a child under eighteen years of age shall not be employed in any worksite including this construction site. The Act prohibits discrimination, being direct or indirect in any employment policy or practice on any of the following grounds: colour, nationality, tribe or place of origin, race, national extraction, social origin, political opinion nor religion, sex, gender, pregnancy, marital status, or family responsibility, disability, HIV/AIDS, age or situation of life. It is an offence for this provision to be contravened by any employer. The proposed project will follow this Act requirements in matters related to labour and employment, during its implementation.

In the Employment and Labour Relations Act, Section 7(1) provides details on conditions of a good and reliable employment environment. Furthermore, sections 11-91 make provision for wage determination that stipulates a minimum term and condition of employment as shall be the employment standard. Section 11(2) and 14(1) provide detail on employment contractual conditions, while sections 19(1), (2), (3) and (5) state the working duration and overtime conditions. Moreover, section 31 provides information on employment leave and sections 32(1), (2) and (3), provide information on sick and maternity leave.

UDOM shall ensure that it operates within the requirements of this legislation and comply with stipulated conditions of the Employment and Labour Relations Act, 2004 for ensuring that employee are motivated in discharging their duties for maximum productivity.

3.3.11 The Workers Compensation Act (No.20), 2008

The Act provides for the employment accident and occupational disease benefit. The employment injury schemes provide medical care and cash benefits to workers, who are injured on the job or develop occupational diseases. Eligibility is provided on a no-fault basis and may be coupled with restriction on workers legal right to sue for damages. In operating its activities, proponent, and the contractor shall observe the provisions of this Act.

3.3.12 The Prevention and Control of HIV/AIDS Act (No.28), 2008

The Act calls for prevention, treatment, care, support and control of HIV and AIDS for promotion of public health in general. It also calls for appropriate treatment, care and support by using available resources to people living with or at risk of HIV and AIDS and to

provide for related matters. Apparently, for the project the risk of population living in or nearby project area contacting HIV/AIDS during construction and operation phases is high and thus, the Act provides legal guidance to the cause. Of particular importance to this project is found in part II, section 6 (1), titled Roles of Sectors, which states that: *"every ministry, department, agency, local government authority, parastatal organization, institution whether public or private, shall design and implement gender and disability responsive HIV & AIDS plans in its respective area, and such plans will be mainstreamed and implemented within the activities of such sector."* UDOM and contractor shall adhere to the requirements of the Act.

3.3.13 The Universities Act No. 7 of 2005

The Act provides for establishment of the Tanzania Commission for Universities (TCU) to provide the procedure for accreditation of institutions of higher learning and other related matters. Among other functions, the TCU accredits higher education institutions; coordinates admissions into state institutions of higher education; examines and accredits academic programmes submitted to it by institutions of higher education; make regulations in respect of admission of persons seeking to enrol in institutions of higher education; and, make visitations and inspection of higher learning institutions for ensuring compliance with relevant regulatory instruments. The proposed project shall be regulated by the Tanzania Commission for Universities (TCU) for ensuring that quality education is offered, which meets the needs of all the stakeholders in line with this Act.

3.3.14 The Water Resource Management Act, No. 11 of 2009

The Act is a principal legislation dealing with the protection of water resources and control of water extraction for different uses. According to section 39 (1) of this act, "*owner or occupier of land on which any activity or process is or was performed or undertaken, or any other situation exists which causes has caused or is likely to cause pollution of a water source, shall take all reasonable measures to prevent any such pollution from occurring, continuing or recurring*". In general, the Water Resource Management Act provides the legal basis among others for:

(i) Water resources management at National and Basin levels.

(ii) The administration to legalize, grant, modify and diminish water rights to the use of water by those entrusted with responsibilities for water resources management.

(iii) To protect water rights for all legitimate water users, hence monitoring the quality and quantity of water sources.

(iv) Water use conflict management.

(v) Water pollution control and other related issues like water supply and any related infrastructure construction

The proponent by undertaking this study complies with the requirements of the Act.

3.3.15 The Water Supply and Sanitation Act No. 5 of 2019

The Act states obligations of water supply and sanitation authorities to provide watersupply and sanitation services, indicates their functions, powers and duties. Consequently, it gives responsibilities for provision of adequate and reliable water supply and sanitation services in urban areas to Urban Water Supply and Sanitation Authorities (WSSA). With respect to their responsibilities to ensure adequate and reliable service provision, the Act gives power to WSSA to enter any land for the purpose of laying water pipe network and charge fees to facilitate financial obligation necessary for operation and maintenance of the water supply and sanitation networks. The proponent shall use clean to water from Dodoma Urban Water Supply and Sanitation Authority.

The Roads Act No. 13 of 2007

The Roads Act governs the deviation, widening, construction or realignment of a road or access road, as well as describing the compensation details for people that need to be resettled. Section 35 describes owner to be given power concerning the decision of creating an access road in line with laid conditions.

Section 39 and regulation 42 detail the prohibition of certain classes of traffic, and sets out maximum weight, speed and dimensions of vehicles. Section 40 provides the chance for appeal to the proponent if not given consent for the proposed access road construction. Furthermore, the Act provides for road safety through creating road signs and bumps to avoid any occurrence of accidents, and the authority that has jurisdiction for carrying out road undertakings. The proposed project shall utilise the current public roads and therefore obliged to observe the requirement of this Act.

3.3.16 The 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.

Section 55 of the Act enumerates basic functions of the urban authorities. The functions that are relevant to proposed project are:

- To provide for the prevention and abatement of public nuisances or of nuisances, which may be injurious to the public health or to the good order of the area of the authority;
- To regulate any trade or business, which may be noxious, injurious to the public health or a source of public danger, or which otherwise it is in the public interest expedient to regulate, and to provide for the issue of licenses or permits to facilitate the regulation of any such trade or business, and for the imposition of fees in respect of such licenses

Section 80 of the Act empowers the urban authorities to set by-laws. The proponent shall observe these and other relevant provisions in this Act.

3.3.17 The Local Government Law (Miscellaneous Amendment) Act, 2006

The Act established the local governments and urban authorities with mandates to spearhead developments in districts and urban centres (for cities and municipalities) respectively. By this law, the authorities have mandates to formulate bylaws to enhance environmental management within their district/urban authorities. Thus, the proponent shall observe the bylaws set by Dodoma City Council.

3.3.18 The 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 between men and women with disabilities and recognition of their rights and needs, and provide a basic standard of living and social protection. The project proponent shall fulfil this legal requirement in all project phases, from design, construction and operation.

3.3.19 The Child Act, 2010

The Act sets the minimum age for admission of a child to employment at 14 (Sec. 77.2). The Act prohibits the engagement of children below 18 in hazardous work, posing a danger to health, safety or morals and in "night work" taking place between 8 pm and 6 am (Sec. 82.2). The Law of the Child (Child Employment) Regulations (G.N. No. 196, 2012), which is used to implement the Law of the Child Act (Act No. 21, 2009), contains list of all hazardous activities in which a child shall not be allowed to work, even on a voluntary basis. Section 82 of the Act also protects children from sexual exploitation. A child shall be protected from sexual exploitation and use in prostitution, inducement or coercion to engage in sexual activity and exposure to obscene materials. The project proponent shall ensure adherence of the Act.

3.4 Relevant National Plans and Strategies

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:

3.4.1 The Tanzania Development Vision 2025

The Tanzania Vision 2025 aims at achieving a high-quality livelihood for its people attain good governance through the rule of law and develop a strong and competitive economy. Specific targets include:

1. 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, 75% reduction in infant and maternal mortality rates, universal access to safe water, increased life expectancy, absence of abject poverty, a well-educated and learning society.
2. Good governance and the rule of law moral and cultural uprightness, adherence to the rule of law, elimination of corruption.
3. A strong and competitive economy capable of producing sustainable growth and shared benefits a diversified and semi-industrialized economy, macro-economic stability, a growth rate of 8% per annum, adequate level of physical infrastructure, an active and competitive player in regional and global markets.

UDOM is one of the important projects to enable Tanzania achieve its Development Vision objectives notably eradicating poverty. UDOM project will contribute to the attainment of the 2025 Vision through provision of adequate skilled labour force for implementing various development plans.

3.4.2 The Third National Five-Year Development Plan (FYDP III; 2021/22 – 2025/26)

The Plan is a continuation of Government's efforts in achieving the goals set in the National Development Vision 2025 enduring exertion to further improve the standard of living for all Tanzanians. The main objective of the Third Plan is to contribute to realisation 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. Upon reaching its vision, which have the following attributes: peace, stability and unity; good governance; an educated and learning society; and a strong economy that can withstand competition and benefit many people. The FYDP III, therefore, will seek to enable the country to more effectively use her geographical opportunities and resources for production and economic growth, while, ensuring that the outcomes benefit all citizens in line with the Vision's goals of a high quality of life. FYDP III will continue to implement the projects and programmes aimed at opening up economic opportunities, build an industrial economy, strengthen competitiveness in domestic, regional and global markets as well as strengthen human development including the education sector. The proposed project supports this development plan by increasing academic, research and innovation opportunities in various geographical areas of Tanzania including Dodoma region where the proposed project will be constructed.

3.4.3 The National Plan of Action to End Violence Against Women and Children (NPA-VAWC) 2017/18-2021/22

From a situation analysis of this plan, violence is a daily reality for large numbers of women and children in Tanzania. The NPA-VAWC recognizes that reducing violence has positive implications for inclusive growth and has ambitious targets that could positively impact the agency of women and girls. 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. The plan incorporates strategies to help local authorities and police, service providers, and communities better provide prevention and response services that have the greatest potential for reducing violence against women and

children. To put the plan in action, UDOM 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

3.5.1 The Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations (2018)

Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations of 2018 provide rules relative to the procedures for and carrying out of environmental impact studies and environmental audits as provided for under the Environmental Management Act (2004). They prohibit the carrying out of projects without an environmental impact assessment required under the Environmental Management Act and define the contents and form of an environmental impact assessment.

The regulations cemented the requirements of undertaking EIA study for new project and Audits for ongoing projects, likewise annual monitoring to ensure efficacy of the performance. Further it provides procedure to be followed while undertaking EIA.

As noted under EMA Cap 191 above, this detailed ESIA study is undertaken in accordance to the procedures set forth by the EIA and EA regulations. Moreover, annual monitoring and audit shall be undertaken as required.

3.5.2 The 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 maintain a registry of EA and EIA experts. These regulations also set the code of practice of the experts for which the Environmental Impact Assessment experts for this project subscribe. This study has been carried out by the registered expert by NEMC.

3.5.3 The Environmental Management (Fee and charges) (Amendment) Regulations, 2021

The Regulations specify the amount of environmental fees for various operating projects and other fees for assessment. Of particular importance to this project is annual fees to enable the Council to undertake to monitor and audits to ensure the environmental obligation stipulated

in the EIA report is adhered to during all project phases. Thus, UDOM shall adhere to these regulations by paying the required fees timely to the Council.

3.5.4 The 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. It enforces minimum air quality standards for the purpose of adopting environmentally friendly technologies to ensure protection of human health and environment pollution sources.

The standard prohibits emissions above the prescribed limits unless the emitter obtains permission to be exempted or obtain air pollutant emission permit. Fugitive dust emissions represent the most likely issue requiring avoidance or mitigation during the mobilisation and construction phase. The limit for dust emissions in terms of the Second Schedule to the Regulations is 250mg/Nm^3 (mean over a 24 hour period). The proposed project shall have to abide to Environmental Management (Air Quality Standards) Regulations 2007, and the current assessment is within the required standards. During project implementation the regulations shall be complied to prescribed air quality limits.

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

The objective of this standard was to set limits for soil contaminants in agriculture and habitat. It enforces minimum soil quality standard to maintain, restore and enhance the sustainable productivity of the soil.

The standards prohibit discharge onto soil any material which will interfere with its natural quality or be polluted unless the person obtains permission to be exempted or obtain soil pollutant discharge permit. Contaminants of heavy metals in habitat and agricultural soils shall comply with parameters and upper limits specified in the standards.

Elevated levels of heavy metals may occur naturally within the soils surrounding. However, any proposed expansion projects will be designed to avoid the release of contaminants, with elevated levels of heavy metals, to the environment. The proposed project shall have to abide to this regulation by discouraging haphazard disposal of wastes to the soil.

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

The objective of this Regulations is to enforce acceptable water quality standard. It ensures all discharges of pollutants take account the ability of the receiving waters to accommodate contaminants without detriment to the uses specified for the waters concerned, so as to protect human health and conservation of the environment.

The Regulations prohibit discharges above the prescribed limits unless the emitter obtains permission to be exempted or obtain water pollutant emission permit. The regulation recognizes the requirement to obtain a water user permit as detailed Water Resources Management Act, 2009 and attaches additional conditions to securing the permit which requires an EIA statement of the permit application to be submitted to NEMC.

These Regulations also include effluent standards (First Schedule – Permissible Limits for Municipal and Industrial Effluents), drinking water standards, specific effluent standards for particular industries and distances from pollution sources to water sources of which the proposed project must adhere to specifically when managing discharges from the project activities including research training and undertakings. UDOM shall ensure the adherence to the Regulations at all stages of proposed project implementation.

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

The regulation prohibits generation of any unreasonable, unnecessary or unusual loud noise that annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and of the environment. It prescribes the permissible noise levels from different facilities. According to Regulation 8 Part V, the owner of the machinery or the occupier of the facility or premises has a duty to control noise. Second schedule of the regulation stipulate the tolerance limits for environmental vibration. The provisions of these regulations will guide in ensuring that noise and vibration levels do not exceed the maximum thresholds specified. UDOM shall ensure the adherence to the Regulations at all stages of proposed project implementation.

3.5.8 The 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 environment from the adverse effects of hazardous wastes and inform the relevant authority on any activity and phenomenon resulting from hazardous waste. Further the regulations require a generator of hazardous waste to be responsible for the sound management and disposal of such waste. UDOM shall ensure the adherence to the regulations and comply.

3.5.9 The Environmental Management (Solid Waste Management) Regulations, 2009

The regulation state that every person living in Tanzania shall have a stake and a duty to safeguard the environment from the adverse effects of solid wastes and to inform the relevant authority on any activity and phenomenon resulting from solid waste that is likely to adversely affect the public health and environment. Further, the regulation requires the occupier of any premises to be obliged to use appropriate solid wastes management standards. Also, regulations require the occupier to comply with such days and approximate times for collection of waste specified by the local government authority having jurisdiction over the premises. Thus, UDOM shall ensure compliance with all these requirements during the implementation of the project in all phases.

3.5.10 The Fire and Rescue Force (Safety Inspections & Certificates) amendment Regulations, 2014

The Regulations cover many aspects, such as administration, responsibilities and powers of the Fire and Rescue Force, its activities, fire and rescue operations, the welfare of its staff, the Minister's power, and the property groups' classification determine the levy. These regulations require fire safety inspections to be conducted and the certificate renewed annually. Failure to renew it within one month incurs a penalty of 25 percent of the fee. Thus, UDOM shall ensure compliance with all these requirements during the implementation of the project.

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

The Regulations apply to all categories of electrical and electronic equipment wastes with respect to generation, collection, storage, transportation, importation, exportation,

distribution, selling, purchasing, recycling, refurbishing, assembling, dismantling and disposal of electrical and electronic equipment waste or components, and their movement into or outside Mainland Tanzania. The amount of waste electrical and electronic equipment (widely known as WEEE or e-waste) generated every year in Tanzania is increasing rapidly.

Waste from electrical and electronic equipment includes a large range of devices such as computers, printers, fridges and mobile phones at the end of their life. This type of waste contains a complex mixture of materials, some of which are hazardous. These can cause major environmental and health problems if the discarded devices are not managed properly. These regulations require the separate collection and proper treatment of WEEE and sets targets for their collection as well as for their recovery and recycling. Thus, UDOM shall ensure compliance with all these requirements during the implementation of the project.

3.6 World Bank environmental and social framework

The World Bank Environmental and Social Framework (ESF) is a set of standards and guidelines established by the World Bank Group to help ensure that the projects it funds are environmentally and socially sustainable. The World Bank's ESF covers a wide range of environmental and social issues, including biodiversity conservation, climate change, involuntary resettlement, indigenous peoples, labor and working conditions, pollution prevention, and community health and safety. It provides detailed guidance on how to assess and manage these issues within the context of World Bank-funded projects.

3.6.1 Objective of the Environmental and Social Framework

The proposed project will be developed and implemented according to the requirements of the World Bank Environmental and Social Framework (ESF). The ESF sets out the World Bank’s commitment to sustainable development. The ESF protects people and the environment from potential adverse impacts that could arise from Bank-financed projects and promotes sustainable development. The ESF enables the World Bank and Borrowers to better manage environmental and social risks of projects and to improve development outcomes. The ESF also places more emphasis on building Borrower governments’ own capacity to deal with environmental and social issues.

The ESF offers broad and systematic coverage of environmental and social risks. It makes important advances in areas such as climate change; labour standards; transparency; non-

discrimination; social inclusion; public participation; and accountability - including expanded roles of grievance redress mechanisms. The ESF codifies best practice in development policies. It brings the World Bank's environmental and social protections into closer harmony with those of other development institutions; and encourages Client countries to use, and improve, their own national environment and social policies, when these policies are materially consistent with the ESF and supported by adequate implementation capacity. The ESF provides an incentive for countries to develop and build their own environmental and social policies and capacity.

3.6.2 World Bank Environmental and Social Standards

The World Bank Environmental and Social Policy for Investment Project Financing sets out the requirements that the Bank must follow regarding projects it supports through Investment Project Financing. The Environmental and Social Standards set out the requirements for Borrowers role the identification and assessment of environmental and social risks and impacts and mitigation measures associated with projects supported by the Bank through Investment Project Financing. The standards are expected to:

- support Borrowers in achieving good international practice relating to environmental and social sustainability;
- assist Borrowers in fulfilling their national and international environmental and social obligations;
- enhance non-discrimination, transparency, participation, accountability and governance; and
- enhance the sustainable development outcomes of projects through ongoing stakeholder engagement.

The proposed project will apply the ESF and Table 3.1 describes the application of the ESSs to the project.

Table 3.1: Application of World Bank's ESSs to the proposed project

ESSs	Yes/No	Application
ESS 1: Assessment and Management of Environmental and Social Risks and Impacts	Yes	The site-specific environmental and social impacts will be managed through this report. The report has been prepared to recommend E&S measures to be incorporated into designs and implementation of the proposed project
ESS 2: Labour and Working Conditions	Yes	Workers will be contracted for the construction works and operation of the project. In order, to ensure fair treatment of workers, the project will ensure that terms and conditions of

		employment (hours, rest periods, annual leave, non-discrimination, equal opportunities and workers organizations) are aligned with the requirements of Tanzania law and ESS2. To protect workers appropriate Occupational Health and Safety (OHS) shall be applied to avoid the risk of ill health, accidents and injuries. The proponent will set labor management procedures with roles and responsibilities for monitoring primary suppliers. If child labor or forced labour cases are identified, the proponent will require the primary supplier to take appropriate steps to remedy them. Where remedy is not possible, the proponent will, within a reasonable period, shift the project's primary suppliers to suppliers that can demonstrate that they are meeting the relevant requirements of this ESS.
ESS 3: Resource Efficiency and Pollution Prevention and Management	Yes	The project activities will involve construction works which will generate dust, pollutant gases, noise, vibrations, erosion, wastes (solid and liquid) that will be properly managed via ESMP and EMoP. More or less similar impacts are likely to be experienced during operation phases and will be managed by the same tools as well as operation and maintenance plans.
ESS 4: Community Health and Safety	Yes	The project will not have substantial risk to community health and safety. Only localized negative impacts (like dust emissions, pollutant gases, vibration, noise pollution etc.) to sensitive receptors will need to be managed. Also, community safety especially is an issue of concern due to the influx of the project workers, and later on participants of the project, which might lead to GBV/ SEA/SH, as well as transmission of HIV/AIDs and other communicable diseases. Guidance on HIV/AIDs, COVID-19, GBV/SEA/SH and HEET project GRM shall be followed.
ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	No	This ESS is not relevant to the proposed project as the site is legally owned by UDOM.
ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	No	The project is not located inside or near protected areas and sensitive habitats. In case the project will purchase natural resources commodities such as timber, it will be important to establish the source area and to have a mechanism in place to ensure that the Primary Suppliers are not significantly impacting sensitive ecosystem or degrading natural habitats.
ESS 7: Indigenous People/ Sub- Saharan African Historically Underserved Traditional Local Communities	No	This standard is not considered relevant as the project will mainly be implemented in areas where communities that meet the requirements of ESS7 are generally not available in the area.
ESS 8: Cultural Heritage	YES	This ESS is relevant as excavations for construction of new

		buildings may have impacts on physical cultural resources through “chance finds”.
ESS 9: Financial Intermediaries	No	This ESS is not relevant to the project.
ESS 10: Stakeholder Engagement and Information Disclosure	Yes	The proponent will provide stakeholders with timely, relevant, understandable and accessible information, and consult with them in a culturally appropriate manner, which is free of manipulation, interference, coercion, discrimination and intimidation. As part of ESIA study stakeholder engagement has been done in line with the requirement of the ESS10.

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

This Environmental and Social Standard is applicable to this project due to its potential adverse social and environmental risks and impacts on site and in the areas of influence. These include impacts on natural environment such as air, water, land, human health and safety. Thus, UDOM shall analyze project activities and associated environmental and social risks and impacts during construction and operation phase. The project has prepared an Environmental and Social Impact Assessment (ESIA). Therefore, the project components have been screened to determine potential adverse impacts and mitigation measures for their planned activities.

3.6.2.2 Labor and Working Conditions (ESS2)

The standard recognizes the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. ESS2 is applicable to the project given that the project will employ/engage both skilled and non-skilled workers, including through contractors/subcontractors, and primary suppliers, to undertake various activities. In order to comply with the provisions of ESS2, UDOM will take worker safety seriously by laying out internal controls and procedures that will protect workers employed or engaged in relation to the project from occupational hazards during all relevant project phases. All works will be done in compliance with relevant environmental and health and safety standards to minimize impact on workers as well as the local area and citizens. The ESIA contains robust procedures for worker safety, requiring plans for accident prevention as well for health and safety of workers and communities, which are also part of contracts for civil works.

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

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

UDOM shall ensure that workplace sexual harassment of any nature by workers directly hired, or project workers engaged through contracts/subcontracts companies shall be prohibited.

3.6.2.3 Resource Efficiency and Pollution Prevention and Management (ESS3)

The ESS3 sets out the requirements to address resource efficiency and pollution prevention and management throughout the project lifecycle. In order to ensure efficient use of resources, UDOM projects will source construction materials from government authorized sources and water from DUWASA throughout the project implementation. Moreover, the project will utilize the pollution prevention and emergency response plan drafted as part of the ESIA to mitigate any potential source of pollution from the planned activities. The risks identified for strengthening the system for complying with ESS1 are applicable to ESS3.

3.6.2.4 Community Health and Safety (ESS4)

The ESS4 requires beneficiary to avoid or minimize safety and health risks and impacts of the project, with particular attention to people who, because of their particular circumstances, may be vulnerable. Implementation of project components has the health and safety risks and impacts on project-affected communities. These risks and impacts could include increased rates of crime, and social conflict and violence, increases in traffic accidents, increased pressure on local accommodation and rents, increased transmission of HIV/STDS, as well as increases in gender-based violence. The project will ensure compliance with national Health and safety laws and regulations as well as the COVID-19 situation. UDOM shall work closely with Mtaa leaders to communicate to local communities' related health and safety risks and preventive measures for accidents associated transportation of materials and other human health issues including covering

mitigation measures to GBV/SEA/SH risks and prevention of HIV and AIDS during construction.

All works will be done in compliance with relevant environmental and health and safety standards to minimize impact on workers and the local area. During the project's operational phase, waste will be disposed as per waste management regulations.

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

3.6.4.5 Stakeholder Engagement and Information Disclosure (ESS10)

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

3.7 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 is Environmental, Health, and Safety (EHS) Guidelines: Environmental Waste Management. As stipulated earlier the guidelines will be used together with the Environmental, Health, and Safety General Guidelines.

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

3.8 Relevant International Agreements, Conventions and Treaties

Tanzania is party or acceded to several international agreements and conventions relating to the environment. Agreements of potential relevance for the proposed development are mentioned below.

- The Convention on Biological Diversity (CBD) (1992)
- The United Nations Framework Convention on Climate Change (1992)
- The Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal, 1989
- ILO Convention: C182 Worst Forms of Child Labour Convention, 1999
- ILO Convention: C148 Working Environment (Air Pollution, Noise and Vibration) Convention**,** 1977

3.9 Institutional framework

The Tanzania ESIA practice gives different functions and responsibilities to all parties involved in the ESIA process of any proposed development undertaking to which ESIA is obligatory. The EMA, Cap 191, gives NEMC a mandate to undertake enforcement, compliance, review and monitoring of EIAs and a role in facilitating public participation in environmental decision-making, generally supervising and coordinating all matters relating to the environment.

3.9.1 Key Institution in the proposed project implantation

The Table 3.2 present the list of key institutions of potential relevance to the proposed project with their respective roles and responsibilities.

Table 3.2: Lists key Institutions relevant to the ESIA Process

Level	Institution	Role and Responsibility
National level	Vice President's Office (Division of Environment,)	• Coordinate various environment management activities in Tanzania • Advise the Government on legislative and other measures for the management of the environment • Advise the Government on international environmental agreements • Monitor and assess activities, being carried out by relevant agencies in order to ensure that the environment is not degraded • Prepare and issue a report on the state of the environment in Tanzania; • Coordinate the implementation of the National Environmental Policy
	Vice President's Office - NEMC	• Carry on environmental audit and environmental monitoring • Carry out surveys which will assist in the proper management and conservation of the environment • Undertake and co-ordinate research, investigation and surveys in conservation and management • Review and recommend for approval of environment impact statements • Enforce and ensure compliance of the national environmental quality standards • Initiate and evolve procedures and safeguards for the prevention of accidents which may cause environmental degradation and evolve remedial measures where accidents occur; • Undertake in co-operation with relevant key stakeholders' environmental education and public awareness;
	Ministry of Education Science and Technology	• Issuing policy guidance • Providing legal frameworks • Issuing licenses, provisions of certificates of compliances • Enforcement of laws and regulations • Project monitoring.
	Ministry of Lands, Housing and Human Settlements Development	➢ Issuing rights of occupancy, • Overseeing land use planning and issues relating to compensation and physical and economic resettlement (if any)
	Ministry of Water Basin Water Offices	➢ Responsible for issuing water use permits, ➢ Enforcing laws and regulation of water quality and utilization, as well as permitted discharge levels. ➢ Co-operate between sectors at the local level. ➢ Resolve conflicts between water users.

	Tanzania Commission for Universities (TCU)	• Mandate to recognise, approve, register and accredit Universities • Conduct regular and impromptu periodic evaluation of universities, their systems and programmes • Advise the government and the general public on matters related to higher education in Tanzania as well as international issues pertaining to higher education, including advice on program and policy formulation and other best practices. • Providing support to universities in terms of coordinating the admission of students, offering training and other sensitisation interventions in key areas like quality assurance, university leadership and management, fund raising and resources mobilisation, entrepreneurial skills and gender mainstreaming.
	Occupation Safety and Health Authority OSHA	• Approval of building plans for the proposed project • Monitoring Health and Safety of workers in working premises
Project Funding Institutions	World Bank	• Project financing • Ensure the project is carried out to the highest environmental standards strictly in accordance with the ESIA and the mitigation measures set out in the ESMF. • Provide second line of monitoring compliance and commitments made in the ESMPs through supervision.
Project Proponent	UDOM	• Project implementation including mitigation measures. • Ensure environmental compliance by the Sector Ministry. • Review and approve the contractor's site-specific ESMP (C-ESMP) • Ensure contractor's compliance of the C-ESMP • Regular monitoring and reporting on the progress on the implementation of the ESMP. • Liaise with the DoE and the NEMC on matters involving the environment and all matters with respect to which cooperation or shared responsibility is desirable or required. • Oversee the preparation of and implementation of all ESIA"s required for investments.
Regional level	Dodoma Regional Secretariat Office	• Responsible for environmental coordination of all advice on environmental management in the region and liaises with the Director and the Director General on implementation and enforcement of the Environment Act. • A Regional Environment Management Expert appointed by the Minister responsible for Regional Administration heads the secretariat. • The Regional Environment Management Expert is responsible for advising the local authorities on matters relating to the implementation and enforcement of the Environment Act. The Expert links the region with the Director of Environment and Director General. • Advice on implementation of development projects and activities at Regional level.
District level	Dodoma City Council	• Oversee and advice on implementation of national policies at district level • Oversee enforcement of laws & regulations • Advice on implementation of development projects and activities at district level

Ward Level	Nghónghónha	• Oversee general development plans for the Ward. • Provide information on local situation and Extension services • Technical support & advice • Project Monitoring
Street (*mtaa*) level	Nghónghónha	• Information on local social, economic and environnemental situation • View on socio-economic and cultural value of the sites and on proposed plant operations • Rendering assistance and advice on the implementation of the project • Project Monitoring (watchdog for the environment, ensure wellbeing of residents and participate in project activities.

3.9.2 Key Players in Proposed Project Implementation

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

i) Funding Institutions
ii) UDOM
iii) National Environmental Management Council (NEMC)
iv) Contractor;

3.9.2 .1 Funding Institutions (GoT and World Bank)

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

3.9.2 .2 Institutional Capacity to implement E&S

The responsibility of UDOM is to ensure that the implementation process of the ESMP and Mitigation measures are in line with the relevant national policies and legislations and World Bank Environmental and Social Standards (ESSs). UDOM has the Project Iimplementation Unit (PIU) responsible for supervising and monitoring the project construction activities and implementation of E&S issues. The management of all project activities during operation is under the UPIU, in collaboration with other departments and units, depending on the nature of the activity. In general, the UPIU falls under the management of UDOM, executing day-to-day activities in the project. The UPIU is guided by management meetings chaired by the Deputy Vice-Chancellor. The management meetings provide support and guidance and oversee the progress of the UPIU. Further, the UPIU has designated the Environmental and

Social Safeguard Specialists responsible for supervision and monitoring the implementation of E&S and the day-to-day activities of the project. The responsibilities of the UPIU member are as highlighted hereunder.

Environmental Specialist:

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

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

Social and Community Engagement Specialist:

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

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

Health and Safety Specialist:

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

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

Site Engineer:

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

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

3.9.2 .3 The Contractor

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

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

i) Drafting environmental and social aspects during project implementation;

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

3.9.2 .4 The Consultant

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

CHAPTER FOUR

4.0 ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS

4.1 Introduction

This chapter provides a description of relevant environmental, economic and social characteristics of the project core area (site specific), and areas in the immediate vicinity of the project which is Ng'hong'onha Mtaa as well as broad description of the area of influence i.e. Ng'hong'onha Mtaa, Dodoma City Council for the proposed project. The Consultant relied on secondary data and information found in literature covering the project area and observation at the site. The level of details in the various sections depends on the interactions between the project activities and the particular environmental or socio-economic aspect.

4.2 Physical Characteristics

4.2.1 Administration

Administratively, Dodoma Urban Districtis one of the seven districts of Dodoma region with 41 wards. The University of Dodoma, where the project will be implemented, is located in Ngh'ongh'onha Ward, which consists of two administrative villages.

4.2.2 Current Condition of the Project Sites

that the proposed project site is dominated by mainly loose shrub land that is singly interrupted by a presence of a single one-story building of Administration Block. Likewise, the proposed site at CNMS is dominated by loose shrub land that is singly interrupted by a presence of a single one-storey building where current learning activities for the college are hosted. The closest distance from the existing building to the site in both sites is approximately 750-800m is 750 m. In addition, both proposed sites are not in any logical and close proximity to any ecological sensitive areas and/or water bodies.

4.2.3 Climate

Rainfall

The annual rain distribution ranges between 550mm – 600mm, raining between December and April each year. The climate of all the proposed project areas is identical to the overall climate of Dodoma City. The area has a dry savannah climate, characterized by a spell of long dry season lasting between late April and early December and a short single wet season lasting from late December to early April.

Temperature and Evapotranspiration

The maximum temperature is 30.5 °C, which occurs around October, while the minimum is 13.5 °C, which falls around July yearly with an average of 26.5 °C. The region has an average annual evapotranspiration value of 2,000 mm/yr. This is about four-fold the yearly average rainfall, leaving groundwater as the only candidate source of water in the region.

Relative humidity

During the dry season, typically from June to September, relative humidity levels in Dodoma tend to be lower, often ranging from 40% to 60%. This is due to the reduced rainfall and drier atmospheric conditions characteristic of this time of year. In the wetter months, particularly during the rainy seasons from March to May and October to December, the relative humidity can be slightly higher, ranging from around 50% to 70%. The presence of rainfall and increased moisture in the air during these periods contribute to the higher humidity levels.

Winds

In general, the wind speeds in Dodoma range from around 5 to 16 km/hour. It is worth noting that wind speeds can vary significantly depending on localized weather patterns, such as the presence of storms or the influence of nearby geographical features.

4.2.4 Topography, Soils and Geology

The project site at CoESE stands on a broad upland plateau with an altitude ranging between 1240-1266 m above sea level, while that of CNMS ranges between 1200-1240 m above sea level.

The project site lies within Tanzanian Craton, mostly dominated by intrusive Basement Complex rocks, mainly granites. In addition, basic and ultrabasic intrusive rocks occur as younger dykes, penetrating the granite. The most common granitic rocks are grey, no schistose, and rarely porphyritic granites. Furthermore, partially digested basic rocks are often observed in the granite and granitic gneiss, a minor type of granitic rock recognized in the area.

Sandy soils are prevalent in Dodoma. There is a notable proportion of Loamy, Clayey, and alluvial Lateritic soils, mostly in the natural drainage in the region. A large part of soils would

be classified as sandy mixes with a trace of clay, which is found between 1.0 – 10.0 m deep and dominated by granitic rock.

4.2.5 Project Site Facilities

Wastewater Infrastructure

The University of Dodoma has a well-established structure of a sewage system connected to water stabilization ponds (WSP) located at the College of Education. In both project sites, there is the possibility of connecting wastewater to the existing sewage system.

Water System

The project area is well supplied by DUWASA water systems. The project area also contains various water wells owned and controlled by the University of Dodoma.

Electrical Infrastructure

The project site is well covered with TANESCO overhead electrical transmission lines connecting each college to the power supply. Moreover, the project area contains various standby generators to curb challenges that may arise as a result of a power cut.

Vegetation Cover

The vegetation on the UDOM campus is typical and similar to the vegetation cover found in most of the Dodoma region, which is a naturally occurring *Commiphora spp* - Euphorbia scrubland. There are a few places with emergent trees, primarily Euphorbia candelabra. Generally, Dodoma city is characterized by woodlands dominated by economically important leguminous tree and shrub species. The tree species include *Baobab, Acacia, Brachystegia, Albizia, Commiphora, Combretum spp., Albizia spp., Dalbergia spps, Combretum spp*., and *Pericopsis angelonensis*. The natural vegetation in the project area has been largely replaced by human activities, mainly livestock grazing. Due to unreliable rainfall, the project area has sparse vegetation.

The natural vegetation in the vicinity of the two sites consists mainly of bush thicket mixed with annual herbs and grasses. The vegetation on the UDOM campus is typical and similar to the vegetation cover found in most of the Dodoma region, which is a naturally occurring *Commiphora spp* - Euphorbia shrubland. There are a few places with emergent trees, primarily Euphorbia candelabra. The area surrounding the Main Plot was dense bushland with scattered marginal agricultural land. Nearby hills and rocky outcrops host several thicket species, mainly herbs and shrubs. Furthermore, exotic (non-indigenous) trees and shrubs are found in the

developed areas around the university buildings. These areas are dominated by *Bougainvillea spp*. and *Sena siamea*.

The University of Dodoma is part of an urbanized ecological system in Dodoma city, which does not have significant aquatic or semi-aquatic ecosystems. The review of primary and secondary literature, as well as a thorough on-site assessment, have indicated that the area to be covered by the proposed project does not include protected areas or pose any imminent dangers.

4.3 Conservation Areas

The proposed project is implemented in areas that do not have forest reserves, national parks, or any other form of conservation areas as defined in the National Wildlife Policy.

4.3.1 Fauna

The project areas and their vicinity are poorly endowed with wildlife resources. In each college, the proposed project areas currently have no wildlife resources of conservation interest. Decades ago, it was reported that the Dodoma area had an abundance of wildlife. However, due to urbanization and the expansion of rural areas with extensive land clearing for farming and settlements, no natural wildlife habitats remain intact in the area. Currently, small animals such as reptiles, monkeys, birds, mongooses, and possibly small antelopes are occasionally sighted. During the consultation, various parties reported that there were no significant wildlife populations in the study area. Invertebrates in the area include common types such as butterflies, millipedes, grasshoppers, etc. The expected or known wildlife in the area includes birds, but none of them are listed as rare, threatened, or endangered.

4.3.2 Rare and Endangered Species

Based on the available information, there are no known rare or endangered species around the proposed project area and within the site vicinity, as categorized by the IUCN (International Union for Conservation of Nature).

4.3.3 Geology and Hydrology at the site

The project site is located within the Tanzanian Craton, which is predominantly composed of intrusive Basement Complex rocks, particularly granites (Geotechnical survey report, 2022). Additionally, basic and ultrabasic intrusive rocks may occur as younger dykes that penetrate the granite. The most common granitic rocks in the area are gray, non-schistose, and rarely porphyritic granites. Close to the older basic rocks, there is evidence of

contamination, indicated by the enrichment of dark minerals and the presence of streaks and bands of dark schists. Furthermore, partially digested inclusions of basic rocks are often observed within the granite. Another minor type of granitic rock recognized in the area is referred to as "granitic gneiss." During the geotechnical survey conducted at the site, no groundwater was observed. Additionally, there were no indications of flooding or erosion. However, it is recommended to improve the drainage system to prevent rainwater overflow during the rainy season and avoid potential floods.

4.3.4 Seismic Activities

The Dodoma city lies in a region where the eastern branch of the East African Rift System dies out into the craton. The area is characterized by low to moderate magnitude seismic activity with a few large earthquakes of up to magnitude 6.2, capable of introducing small to medium damages to building infrastructures. UDOM falls in an area with ground vibrations amplification of up to 5 times than at the source for any earthquake activities that reach the Dodoma area, built infrastructures at UDOM are at lower risk of collapsing (Lupogo, 2013). However, during the implementation of proposed projects, the buildings must be built to a higher standard of construction with strict earthquake-based building codes.

Project sites are located in the area where the threat of earthquake is minimal (PGA 0.2 m/s2 -0.8m/s2(Geotechnical survey report, 2022). However due to the climate changes and some other activities we should regularly assess the seismic activities of the area. There are no faults or any features that indicate that seismic activities have been taking place. From Seismic Map indicates that the project site is in the zone of lowest earthquake threats. This information together with the importance of the infrastructures at the site is better to consider an earthquake loading in the designs.

4.3.5 Air Quality, Noise and Vibration Levels

Ambient Gases

Air quality study was conducted with a view to establish the baseline status with respect to ambient gases for the proposed project area. Multi-gas monitor type “MX6 IBrid” was used to detect the levels of ambient gases. All the measured parameters were found to be below their respective TBS and/or WHO limits. The summary of ambient gases baseline data (i.e., O2, CO_2, CO, NO_2, SO2, O_3, CH_4 and H_2S), are presented in Annex 1.

Noise Levels

Noise study was also conducted with a view to establish the baseline status with respect to noise levels for the proposed project area. The measurements were undertaken using a digital sound level meter Sper Scientific type 850069, which was placed at 1.5 meters above the ground. The noise qualities in all measured stations were found to be within the TBS and WHO limits specified for institutional areas (Table 4.1).

Table 4.1: Noise levels Measured at site.

SITE NAME	STATION POINTS COORDINATE (ARC 1960)	The average noise level in dBA
CNMS	POINT A Latitude. 6^0 13' 17.7" S Longitude.35^0 49' 12.0" E	43
	POINT B Latitude. 6^0 13' 13.3" S Longitude.35^0 49' 10.3E	40
	POINT C Latitude. 6^0 13' 15.1" S Longitude.35^0 49' 14.1" E	41
	POINT D Latitude. 6^0 13' 19.1" S Longitude.35^0 49' 8.1" E	42
	POINT E Latitude. 6^0 13' 22.1" S Longitude.35^0 49' 12.2" E	44
	POINT F Latitude. 6^0 13' 18.1" S Longitude.35^0 49' 15.0" E	42
CoESE	POINT A Latitude. 6^0 13' 48.5" S Longitude.35^0 48' 35.5" E	45
	POINT B Latitude. 6^0 13' 42.7" S Longitude.35^0 48' 32.9E	43
	POINT C Latitude. 6^0 13' 49.0" S Longitude.35^0 48' 30.2" E	42
	POINT D Latitude. 6^0 13' 53.7" S Longitude.35^0 48' 37,5" E	47
	POINT E Latitude. 6^0 13' 52.1" S Longitude.35^0 48' 42.2" E	49
	POINT F Latitude. 6^0 13' 46.8" S Longitude.35^0 48' 40.1" E	48
WHO guideline		60
TBS LIMITS		55

(Source: Site visit results on 14th February 2024)

Dust Level as Particulate Matter in terms of PM10 and PM2.5

Ambient air quality study was conducted with a view to establish the baseline status with respect to dust as particulate matter in terms of PM_{10} and $PM_{2.5}$ for the proposed project area. Micro dust pro Casella (type 712) was used to detect the levels of PM_{10} and $PM_{2.5}$. With exception of $PM_{2.5}$, the measured PM_{10} levels were found be less than 150µg/m^3 and 50µg/m^3 limits prescribed by both TBS limits and WHO guidelines, respectively (Table 4.2).

Table 4.2: Particulate matter levels measured at the site

SITE NAME	STATION POINTS COORDINATE (ARC 1960)	Particulate Matter (PM10) µg/m^3 in a 24Hour Period	Particulate Matter (PM2.5) µg/m^3 in a 24Hour Period
CNMS	POINT A Latitude. 6^0 13' 17.7" S Longitude.35^0 49' 12.0" E	35	29.0
	POINT B Latitude. 6^0 13' 13.3" S Longitude.35^0 49' 10.3E	21	20.8
	POINT C Latitude. 6^0 13' 15.1" S Longitude.35^0 49' 14.1" E	25	22.0
	POINT D Latitude. 6^0 13' 19.1" S Longitude.35^0 49' 8.1" E	35	26.8
	POINT E Latitude. 6^0 13' 22.1" S Longitude.35^0 49' 12.2" E	20	18.9
	POINT F Latitude. 6^0 13' 18.1" S Longitude.35^0 49' 15.0" E	25	22.5
CoESE	POINT A Latitude. 6^0 13' 48.5" S Longitude.35^0 48' 35.5" E	36	26.0
	POINT B Latitude. 6^0 13' 42.7" S Longitude.35^0 48' 32.9E	20	18.8
	POINT C Latitude. 6^0 13' 49.0" S Longitude.35^0 48' 30.2" E	23	21.0
	POINT D Latitude. 6^0 13' 53.7" S Longitude.35^0 48' 37,5" E	34	26.5
	POINT E	25	20.4

SITE NAME	STATION POINTS COORDINATE (ARC 1960)	Particulate Matter (PM10) µg/m^3 in a 24Hour Period	Particulate Matter (PM2.5) µg/m^3 in a 24Hour Period
	Latitude. 6^0 13’ 52.1” S Longitude.35^0 48’ 42.2” E		
	POINT F Latitude. 6^0 13’ 46.8” S Longitude.35^0 48’ 40.1” E	32	25.2
TBS STANDARD LIMIT		150	75
WHO STANDARD		50	25

(Source: Site visit results on14th February 2022)

Vibration Levels

Ground vibrations were monitored at as part of ESIA study using vibrometer branded PCE-HAV 100” data logger, which is designed to measure ground vibrations according to European standard EN14253:2003. The recorded levels were compared with both British Standard of 0.3mm/s PPV, TBS limit of 5mm/s PPV and 0.15 mm/s PPV (Peak Particle Velocity), the levels that human beings and/or animals can detect or may experience stress resulted to vibrations. The highest recorded average ground vibration level was 0.001 mm/s PPV (Table 4.3). However, the anticipated impact resulting from the measured vibrations is considered less-than significant as the levels did not exceed the 0.15 mm/sec PPV criteria established to evaluate the extent that can easily be detected by human.

Table 4.3: Vibration level recorded at the site

SITE NAME	STATION POINTS- COORDINATE (ARC 1960)	Vibration level measured (mm/s PPV)
CNMS	POINT A Latitude. 6^0 13’ 17.7” S Longitude.35^0 49’ 12.0” E	0.0083
	POINT B Latitude. 6^0 13’ 13.3” S Longitude.35^0 49’ 10.3E	0.0091
	POINT C Latitude. 6^0 13’ 15.1” S Longitude.35^0 49’ 14.1” E	0.0102
	POINT D Latitude. 6^0 13’ 19.1” S Longitude.35^0 49’ 8.1” E	0.0095
	POINT E Latitude. 6^0 13’ 22.1” S Longitude.35^0 49’ 12.2” E	0.0103

SITE NAME	STATION POINTS- COORDINATE (ARC 1960)	Vibration level measured (mm/s PPV)
	POINT F Latitude. 6^0 13’ 18.1” S Longitude.35^0 49’ 15.0” E	0.009
CoESE	POINT A Latitude. 6^0 13’ 48.5” S Longitude.35^0 48’ 35.5” E	0.010
	POINT B Latitude. 6^0 13’ 42.7” S Longitude.35^0 48’ 32.9E	0.0054
	POINT C Latitude. 6^0 13’ 49.0” S Longitude.35^0 48’ 30.2” E	0.0086
	POINT D Latitude. 6^0 13’ 53.7” S Longitude.35^0 48’ 37,5” E	0.0049
	POINT E Latitude. 6^0 13’ 52.1” S Longitude.35^0 48’ 42.2” E	0.0079
	POINT F Latitude. 6^0 13’ 46.8” S Longitude.35^0 48’ 40.1” E	0.0086
TBS STANDARD LIMIT		5
Human Detection level		0.15

(**Source: Site visit results on 14th February 2022)**

4.4 Socio-Economic Environment

4.4.1 General Population Characteristics

Available records show that UDOM community has a total population of about 48,000 people which slightly varies according to the calendar of the University. The maximum population is attained when the University is fully operational, and the least is when she is off with no teaching activities around. The surrounding neighbourhoods of Dodoma have a further population of 42,000.

4.4.2 Economic activities within UDOM and surrounding communities

About75%ofpeoplein and around the UDOM community are formally employed and earn a monthly salary. The rest, 25%, are involved i n agriculture, animal husbandry or engaged in different business activities most of which are bore customers from the University. The

nature of businesses is characteristically petty to medium scale and includes retail shops, carpentry, and food vendors. Other activities include small and medium industries and construction work, mechanics. The main industrial products are associated with wine, mattresses, furniture, and mineral water. Others include processing of honey, wax and herbs from the neighbouring areas.

Business and Trade

Small-scale businesses are common in areas surrounding UDOM where vendors exchange goods in formal settings. Farmers also fit opportunities to sell their farm produce in the well-developed market at small business centres surrounding the project area. Charcoal and firewood selling is also very common as these items mostly supply needed cooking energy. Informal petroleum products are sold in small business centres surrounding UDOM. In the evening, local bars and food points in small business centers surrounding UDOM are saturated with many people. Otherwise, bulk supplies of items for the majority of the people are sought from Dodoma city and occasionally other smaller centres surrounding the area.

Agriculture

Before the establishment of UDOM at its current premises, portions of the land acquired for UDOM were used for crop production in a fashion similar to the cropping that now takes place outside the UDOM lands. In 2007, UDOM compensated all affected households and the affected people moved and relinquished their rights to use the land. UDOM is now the legal owner and custodian of the land as per appended title deed (Appendix 3).

Limited agricultural activities are practised around the proposed the project area. This is primarily because the area is designated, as academic and residential. Farming is mostly conducted in far areas from UDOM and is defined by the sparsely observed rains between November to April. Millet, groundnuts, sunflowers, vegetables and grapes are some of the crops that are limitedly grown in the villages/streets found in peripherals of the project area.

Livestock Keeping

Limited livestock-keeping activities are practiced in the neighbouring areas to the University. This is primarily because the area is designated, as an urban Centre and pastoralists have learned that the area is not safe for their animals and there are hardly any fodder and water sources for the animals to benefit from. However, a few individuals in areas surrounding UDOM still manage to keep cattle, sheep, goats, donkeys, and poultry.

Forestry

No forestry or conservation activities are practiced in the area and the area is notably degraded from fuel wood collection and charcoal burning activities. The vegetation of the area is defined as savanna dominated by Acacia species, a few standing bushes and grassland. Succulent plants like Euphorbia and Cactus species are also common.

Beekeeping activities

Limited beekeeping activities practiced in and around UDOM premises. However, well-developed beekeeping activities are practiced at neighbouring village of Muungano.

Fishery

No fisheries activities were reported in the area. Potential for fisheries development would also be difficult due to the semi-aridity nature of the area and lack of reliable freshwater supplies that would last year-round. All rivers are networks are seasonal which would mean no fishery activities are possible at certain months of the year.

Mineral resources

Gravel making mostly by artisans is being practiced in areas surrounding UDOM premises specifically in nearby neighbourhoods of Makulu and Ng'hong'onha areas. Stone cuttings and carvings is also practised in Ntyuka wards that directly border the proposed project area.

Tourism

No major tourism attractions recorded in the area and therefore tourism related activities not reported. In recent years however, some people have been touring UDOM campus for its beauty and as a national symbol to many. Thus, there are tourism opportunity in the future.

4.4.3 Infrastructure and Roads

Road transportation

UDOM area is accessible by Dodoma-Morogoro Road. The roads are maintained at the National level by TANROAD and are passable throughout the year. In addition, several roads within the university campus are maintained by the University, these roads also

connect to the project area and are accessible throughout the year. The total length of the road network within UDOM is approximately 12.74 km.

Air Services

The area is not directly accessible by air. The nearest airstrip is found in Dodoma city and one would need to proceed by road through Tamukaleli Ward. The Government is constructing a bigger airstrip in the Kitelela-Msalato-Mpamaa area. Upon its completion, it is expected to contribute positively to the transportation of people and materials from Dodoma to other parts of Tanzania.

Water

DUWASA has been supplying about 33% of the water requirement to the UDOM community. Otherwise, the area is hydrologically stressed, and supplied by seasonal river networks during rain months. Fresh water supplies are met through privately owned boreholes and the water is available for 50 to 500 Tsh per 20 Litres bucket depending on availability and season. UDOM also has its boreholes, and it is expected that more boreholes will be drilled in the future. Local people also access water from shallow dug wells that would dry out at the peak of dry seasons from August to October. Local people mostly consume water of unknown quality, as water from these wells is not tested.

Health Status

Health records show that many people die from malaria and AIDS, and the UDOM area is prone to cholera, typhoid, diarrhoea and dysentery outbreaks, especially during the rainy season. The UDOM area has a Referral Hospital named Benjamini Mkapa Hospital (BMH), apart from this there are dispensaries at the College of Humanity and Social Sciences (CHSS) as well as in the College of Informatics and Virtual Education (CIVE). The available health facilities play a significant role in serving the university and the surrounding community.

Energy

The main source of energy in the UDOM campus is electricity. UDOM is connected to electricity from the grid that has been taped for use in Dodoma City. The project sites are well covered by TANESCO electric network and there is no shortage of power to be a

supplier to the project areas should needs arise. In addition, there are standby generators on campuses to address the issue related to a power cut in the project area.

4.5 Solid Waste Management

In the UDOM environment, it was noted that solid waste management from the buildings and surrounding areas is the responsibility of the UDOM management. UDOM use various methods such as soil separation, waste for recycling and storage in enclosed containers to avoid being blown away. UDOM used an approved contractor named O.L Supplies Company to collect the solid waste regularly for disposal as per the Municipal Council Procedures and Environmental Management (Solid Waste Management) as per Regulations (2009). Generally, UDOM generates an average of 1334.62 kg/day, which makes 487.14 tons per year.

CHAPTER FIVE

5.0 STAKEHOLDER ENGAGEMENT AND GRIEVANCES MECHANISMS

5.1 Introduction

The World Bank's Environmental and Social Framework (ESF) includes the Environmental and Social Standard (ESS) 10, "Stakeholder Engagement and Information Disclosure", which recognizes "the importance of open and transparent engagement between the Borrower and project stakeholders as an essential element of good international practice". ESS10 emphasizes that effective stakeholder engagement can significantly improve the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation. Accordingly, the Environmental Management Act cap 191 and Environmental Management (EIA and Audit) (Amendment) Regulations, 2018, both documents provided procedures for the involvement of stakeholders and the public in the environmental assessment process. For this project a plan for public involvement was developed early in the process. Informing the local people, leaders and key stakeholders about the proposed project through consultative meetings, key informant interviews, email communication, public meeting and telephone calls. During the consultation process, the stakeholders were briefed about the proposed project including its objectives, technologies of implementation and possible impacts associated with implementation of the project. In addition they were informed to report any grievances through University grievances desk. Stakeholders were then given time to ask relevant questions regarding the proposed project to enable the consultants clarify on any issues that they may not have understood properly.

5.2 Objectives of the Consultation Process

The involvement of the local population is essential to the success of the project(s) in order to ensure smooth collaboration between project proponent and local communities and to minimize and mitigate environmental and social risks related to the proposed project activities. The overall objective of the consultation process is to disseminate project information and to incorporate the views in the design of the mitigation measures and environmental management plan. It is done to ensure the quality, comprehensiveness and effectiveness of the impact assessment to ensure that various groups' views are adequately taken into consideration in the decision-making process so as to avoid conflict at a later stage. Consultation with the stakeholders was aimed at positively conveying information about the proposed project development, clear up misunderstandings, allow a better

understanding of relevant issues and how they will be dealt with, and identify and deal with areas which are controversial so as to clarify matters and make adjustments accordingly, while the project is still in its design stage. The objectives of stakeholders consultation are as follows:

- Define potential project stakeholders and suggest their possible project roles.
- Disseminate comprehensive information about the project to enable stakeholders to identify their concerns, needs, and recommendations.
- Listen to their comments, ideas and concerns and record the same for follow up.
- Document stakeholder feedback and enhance the ESIA accordingly
- Identify the most effective outreach channels that support continuous dialogue with the community
- Avoid any misconceptions about the project and properly manage expectations.
- Analyse gaps identified from the issues.

As a result, the key principles of effective engagement that guide stakeholder consultations include:

- Ensuring that all interactions are free of intimidation or coercion.
- Providing meaningful information in a format and language that is understandable and tailored to the needs of the target stakeholder group(s).
- Being inclusive in the representation of views, i.e., including different ages, and genders, and incorporating vulnerable and/or minority groups.
- Respecting local traditions in the decision-making processes.
- Information should be easily accessible for stakeholders and be culturally appropriate; to allow the effective participation of those identified as minorities, disadvantaged or vulnerable groups.
- Ensure that appropriate project information on environmental and social risks and impacts is disclosed to stakeholders in a timely, understandable, accessible, and appropriate manner and format.

5.3 The Stakeholders Identified

The key stakeholders interviewed during consultation are people who have a role in the project, or could be affected by the project directly or indirectly, or who are interested in the project. These include relevant Ministries/Departments/Agencies, Ministry of construction, Occupational Safety and Health Authority (OSHA), The Tanzania Electric Supply Company Limited (TANESCO), Local Government Authorities (Dodoma District

Council, Ng'hong'onha Ward, Ng'hong'onha Mtaa), etc. were pre-determined based on the nature of the project, while others and affected groups at the proposed project site and area of influence unfolded as consultations went along. Stakeholders are primarily found at local levels and range from government authorities to local community members. Stakeholders identified to be relevant to this project include:

- Project Proponent: The University of Dodoma
- Ministry of Education, Science and Technology (MoEST)
- Ministry of Construction (Tanzania)
- Occupational Safety and Health Authority (OSHA)
- Tanzania Electric Supply Company (TANESCO)
- Dodoma Urban Water Supply and Sanitation Authority (DUWASA)
- Local Government Authorities are responsible for overseeing developments in their areas of jurisdiction i.e.
    - Dodoma District Council
    - Ng'hong'onha Ward.
    - Ng'hong'onha Mtaa

5.4 Stakeholders and Public Concerns

The study has identified main concerns and issues raised by the different stakeholders. Generally, stakeholders view the proposed project as important project for economic development of the area and national at large as the laboratory provide students with various opportunities to learn and experiment, which plays a crucial role in the ongoing intellectual development of students at any academic level. They added that science labs give students the time, space, and resources to explore and experiment. Summary of the issues are covered here-under, detailed stakeholders' issues and concerns are presented as table 5.1.

Table 5.3 Stakeholders' Views and Concerns

Stakeholders	Stakeholders' Views and Concerns	Responses
Vice President's Office	• There should be proper waste management of waste produced during construction activities. • The proposed buildings should be ecologically friendly. • There should be provision of education regarding infectious and sexually transmitted diseases such as HIV due to	• Tree removal will not be undertaken unless absolutely • Protection of native vegetation and water resources incorporated into ESMP (section

Stakeholders	Stakeholders' Views and Concerns	Responses
	interactions of people and workers from different places during construction activities. • Species of ecological importance should be protected on construction sites. • Only cut down vegetation within the areas of construction and leave the rest of the trees standing. • Bore pits should be managed well after construction by refilling with waste soil • Dust during excavation should be managed by watering the surface soil. • Oil spillage during construction activities should be managed by conducting all activities likely to cause oil spillage in special containment area. • Energy uses should be minimized and should maximize the use of renewable energy sources by installation and use of solar power sources. • There should be warning signs in all areas that pose risks to workers and community members using special warning tapes. • The proposed construction should comply with NEMC guidelines by following all operational guidelines and standards.	8.1.2.3/4 and 8.3.1.5).necessary (section 8.1.2.3/4).
	• There should be proper waste management during construction activities and the operation of the proposed premises. • The proposed buildings should be ecologically friendly. • Provision of education regarding infectious and sexually transmitted diseases such as Covid 19 and HIV due to interactions of people and workers from different places during construction activities. • Species of ecological importance should be protected in the construction sites • Only cut down vegetation within the areas of construction and leave the rest of the trees standing	• ESIA was conducted, including all stakeholders consulted (Chapter 5). • Impacts and appropriate mitigation measures are outlined in ESIA and ESMP (Chapters 7, 8 and 9). • OHS aspects were addressed and environmental management and monitoring were provided (Section

Stakeholders	Stakeholders' Views and Concerns	Responses
	• Bore pits should be covered after construction • Dust during excavation and construction activities should be managed • Oil spillage during construction activities should properly be managed • Energy uses should be minimized and should maximize the use of renewable energy source • The proposed construction activities should comply with NEMC guidelines and the national environmental policy • The design of proposed infrastructures, including buildings and roads should consider the following aspects i. Climate change ii. Energy consumption iii. Iv. People with special needs	8.2.3 and Chapters 8 and 9). • Protection of native vegetation and water resources incorporated into ESMP (section 8.1.2.3/4 and 8.3.1.5).
Secretariat-Dodoma Regional Commissioners' Office and Regional Environmental Office	• The trees should be removed only where buildings and structures will be established • Placement of wastewater system in the proposed project premises • Trees should be planted along the proposed road to be constructed • Consideration of soil erosion throughout the project cycle • Employment opportunities should be available to local people and not only to people coming from other areas. This may reduce unnecessary conflicts and increase project acceptance • Air, noise, and dust pollution should be controlled/mitigated • Vibration and disturbances should be managed • Materials for construction example gravel and sand should be taken from authorised places • HIV/AIDS and other infectious diseases including Covid 19 education should be given to all people who will participate in the proposed project.	• Management and monitoring of all potential impacts outlined in ESIA (Chapters 7, 8 and 9). • Stakeholder consultations were conducted as part of the project and EIA (Chapter 5).

Stakeholders	Stakeholders' Views and Concerns	Responses
	• Bore pits should be covered with soil after construction activities are concluded	
Dodoma City Council-Environmental office	• Employment opportunities should be given to the local people • Health and safety consideration example availability of PPEs and other safety gear should be assured all the time • Mitigation strategies toward Covid-19 should strongly be implemented • There should be proper worker rotation to avoid overcrowding • There should be strategies to control HIV/AIDS and other sexually transmitted diseases • There should be proper waste management programmes • There should be fencing for the area under construction • Availability of hygiene facilities should be assured all the time	• Chapter 6 presents the potential environmental and social impacts, including 6.2 Positive Impacts during Pre-Construction and Construction, and 6.4 Positive Impacts during Operation. • Chapter 7 includes all the mitigation measures that should be adhered to limit the negative impacts previously presented in Chapter 6.
Occupational Safety and Health Authority (OSHA)	• Registration of the project with OSHA should be done • Provision of safety gear and personal preventive equipment during construction and at the workplace should be fully observed as per regulations and guidelines • The risk assessment report should be prepared, submitted to OSHA and regularly updated • Health and Safety reports should be prepared, submitted to OSHA and regularly updated • Abide by all national health and safety policies and guidelines • The presence of first aid facilities during construction activities should fully be observed • Presence of health and safety representatives during construction activities and trained first aid staffers all	• EIAwas conducted, including all stakeholders consulted (Chapter 5). • Impacts and appropriate mitigation measures are outlined in ESIA and ESMP (Chapters 7, 8 and 9). • OHS aspects were addressed and environmental management and monitoring were provided (Chapters 8 and 9). • Protection of native vegetation and water resources incorporated into ESMP (Chapter 8

Stakeholders	Stakeholders' Views and Concerns	Responses
	the time	and 9).
Tanzania Forest Services Agency (TFS)	• After construction, there should be re-plantation of trees and other vegetation. • Species of ecological importance should be protected.	• Tree removal will not be undertaken unless absolutely necessary (Chapter 7). • Protection of native vegetation and water resources incorporated into ESMP (Chapter 7, 8 and 9).
Tanzania Rural and Urban Roads Agency (TARURA)	• Raw materials for road construction such as gravel and sand should be taken from authorised places only. • Land ownership should be considered. • Water table consideration. • Water direction must be considered. • The proposed road should have access for pedestrians(2m) • Trees must be planted in appropriate manner along the road reserve areas usually 1metre away from the road. • The roads leading to the proposed building should be built with the proper drainage system. • The total area for road construction should be 30 meters which will include drainage canals, tree plantation, pedestrians, road lights and the roads.	• Tree removal will not be undertaken unless absolutely necessary and the planting of native tree species will be maximized as much as possible (Chapter 7).
Dodoma Urban Water Supply and Sanitation Authority (DUWASA)	• The project sites and buildings should be connected to and whenever possible be located close to wastewater infrastructures. • Avoid placing infrastructures on water pipes or water channels this could lead to an increase in wastewater and blockage of water pipes. • The location of the construction should support wastewater treatment infrastructures. • The amount of wastewater produced should be known, to determine the design	• Management and monitoring of all potential impacts outlined in EIA (Chapters 6, 9 and 10). • Stakeholder consultations were conducted as part of the project and EIA (Chapter 5).

Stakeholders	Stakeholders' Views and Concerns	Responses
	of the wastewater treatment system. • Attainment of permits from ERB and CRB • The proposed laboratories should be designed in a way that wastewater should be treated before their discharges and should be monitored frequently. • DUWASA will ensure water reaches the site area as per the requirements	
Wami-Ruvu Basin Water Board – Dodoma (WRBWB)	• The project that is to be established is important and should be implemented. • Conservation of water resources both ground and surface water sources. • The buildings and roads should be constructed away from water channels since the surrounding communities depend on them as water supply systems. • Availability of reliable water sources during construction like boreholes. • Establishment of a well-designed wastewater treatment system that will help to treat wastewater produced during construction. • Instalment of gutters for rainwater harvesting, due to water scarcity. • The sand and gravel mining process during construction should be done carefully to protect the environment	• Liquid and sanitary waste will be managed responsibly to ensure no contamination or pollution of the natural environment and has been designed with the specific environmental context of the project site, particularly considering the hydrology and hydrogeological context (Chapter 7)
Dodoma City Council-Land Office	• The proposed area of construction should be having relevant land-permits • There should be land-use planning adherence plans. • Land pollution should be controlled on construction sites. • Wastes produced during construction should be well managed	• All development will adhere to planning standards and local guidelines and regulations (Chapter 3).
Agricultural Office-Dodoma Urban District	• Employment opportunities should be prioritized for local people whenever possible. • There should be a proper ratio of sand and cement mixing during construction.	• Stakeholder consultations ensured that the surrounding community are well briefed on the

Stakeholders	Stakeholders' Views and Concerns	Responses
	• There should be proper adherence to quality assurance and standards as required by procedures and regulations.	project and its potential impacts (Chapter 5). • Environmental impacts and mitigation are presented extensively in the ESIA (Chapters 6 and 7).
Ng'hong'onha Mtaa Executive Office	• Workers for the proposed construction sites must have experience in construction activities to prevent poor and/or below-standard construction • The health of people in communities and in nearby areas to the construction sites should be given priority by making sure that noise threshold level limits are not exceeded during construction. • Employment opportunities should be prioritized for local people. • There should be warning signs around construction sites.	• Stakeholder consultations ensured that the surrounding community are well briefed on the project and its potential impacts (Chapter 5). • Environmental impacts and mitigation are presented extensively in the ESIA (Chapters 6 and 7).
Iyumbu Street Executive Office	• Whenever possible project activities should involve local communities at all levels • Job opportunities that do not necessarily call for higher and specialised skills should be given to local communities • Ensure strategies are put in place to limit environmental pollution, particularly water (both surface and underground that is mostly used in Dodoma)	• Management and monitoring of all potential impacts outlined in ESIA (Chapters 7, 8 and 9). • Stakeholder consultations were conducted as part of the project and EIA

CHAPTER SIX

6.0 ASSESSMENT OF PROJECT IMPACTS AND IDENTIFICATION OF ALTERNATIVES

6.1 Introduction

In previous chapters descriptions of both the project and the environment where the project will have footprint have been covered. Based on the project activities and areas covered the impacts of the project on the environment and social components as well as on human health are identified. Thus, this chapter presents the identification of potential impacts and their analysis to determine significance level. Treatment of the impacts is covered in the subsequent chapters of the report.

6.2 Impact assessment and predication methodology

The team members conducted literature reviews of available information related to the site conditions and with respect to similar project operations prior to visiting the site. The team spent the time on site gathering information through field studies. The combined site visit by all specialists assisted in integration of ideas and findings between the specialists. The role of each specialist was to collect sufficient data to assess the environmental impacts. In order to achieve this, the ESIA team assessed the environment as it existed at project area and secondary data from published and unpublished sources.

6.2.1 Environmental impact rating scale

To ensure a direct comparison between various ESIA team studies, a standard assessment methodology was used to assess the significance (the importance of the impact in the overall context of the affected system) of the identified impacts. The criteria that were considered in the determination of the impact significance are:

Significance Testing Criteria

The significance of impacts was tested using the following criteria:

i. **Magnitude and Likelihood:** Magnitude and likelihood of the impact and its spatial and temporal extent.
ii. **Recovery Potential:** Likely degree of recovery of the affected environment.
iii. **Environmental Value:** Value of the affected environment.
iv. **Public Concern:** Level of public concern.

v. **Extensiveness Over Space and Time (Magnitude):** Extensiveness over space and time.

vi. **Intensity and Proportionality:** Intensiveness in concentration or in proportion to assimilative capacity.

vii. **Compliance and Adversity:** Exceedance of environmental standards or thresholds, and the Level of compliance with environmental policies, land use plans, sustainability strategy.

viii. **Ecological Sensitivity:** Level of adversity and seriousness in affecting ecologically sensitive areas.

Impact Rating Scale

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

(i) +3: High positive impacts

(ii) +2: Moderate positive impacts

(iii) +1: Minor positive impact

(iv) 0: No impacts

(v) -1: Minor negative impact

(vi) -2: Moderate negative impacts

(vii) -3: High negative impacts

Focus on Significant Impacts and Mitigation Measures

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

Impact Rating Criteria

Seven criteria were used to determine the significance of the impacts:

(i) **Spatial Scale:**

- International (I): Trans-boundary
- National (N): Within country
- Regional (R): Within Region
- Local (L): On and adjacent to the site

(ii) **Temporal Scale:**

- Short-Term (ST): During construction

- Medium-Term (MT): Life of the project
- Long –Term (LT): Residual impacts beyond the life of the project

(iii) **Phase:**

- During which phase of the project implementation is the impact likely to occur. The phases include Mobilization, Construction, Operation and Decommissioning.

(iv) **Reversibility:**

- Every impact was checked if its effect can be reversed or not.
    - R: Denotes reversible impacts.
    - IR: Denotes Irreversible impacts.
    - PR: Denotes Partially reversible.

(v) **Nature of Impacts:**

- Direct
- Indirect
- Continuous

(vi) **Cumulative Impacts:**

- Impacts that cause changes to the environment that are caused by an action in combination with other past, present, and future human actions.

(vii) **Residual Impacts:**

- Long-term impacts that go beyond the lifetime of the project.

6.3 Mobilization / Construction phase

6.3.1 Loss of biodiversity/vegetation cover

Vegetation has a great effect on the general and localized environment and normally can modify micro-climate. Usually, the flora creates a good environment for habitats and thus the two may go together more often than not. Site preparation to give a way for construction works to commence is usually associated with removal of existing vegetation covers and topsoil. In consequence, de-vegetation may result to negative effects on the flora and fauna. The site earmarked for development of the proposed building is within the area designated for Institution building use and nearby developments are academic institutions. The vegetation on the proposed project site is typical and similar to the vegetation cover found in most of the Dodoma region, which is a naturally occurring *Commiphora spp* - Euphorbia scrubland. There are a few places with emergent trees, primarily Euphorbia candelabra. Generally, Dodoma city is characterized by woodlands dominated by economically important

leguminous tree and shrub species. *The impact is negative, short term and of low significance.*

6.3.2 Accelerated soil erosion

As noted earlier the site will be cleared for the project development and thus without due care agents of erosion might act it and cause soil erosion. Accelerated soil erosion might also occur due to earth work to be involved at the site(s) such as excavation of the area. Leaving these excavated or nude areas nude might cause soil erosion if rain and moving water act on these areas. This might become quite significant during rainy season. Soil erosion might propagate beyond the source point to affect other nearby areas. However, the site earmarked for the project is almost flat which is unlikely to cause significant erosion. *The impact is negative, short term and of low significance.*

6.3.3 Impaired air quality due vehicular movements

As noted in previous section the construction will further involve earth work at site. These activities inevitable will cause generation of dust and pollutant gases into atmosphere. Likewise, dust and pollutant gases will emanate from moving vehicles with construction materials such as sands and gravel for construction works, and especially when the moving vehicles with materials are not covered. Dust and pollutant gases generated will impair local atmospheric condition. The impact receptors are likely to include site workers and nearby community as well as people/community centres along the route. Bearing that the scale of construction will be small, the material to be brought at site will also be in small quantity, and the involved civil work will be minimal and localised. *The impact is considered negative, cumulative, short term and of minor significance.*

6.3.4 Public Health Hazards due to generated noise levels and vibration

The amount of disturbance/annoyance felt by people from the noise created is mainly subjective and related to a wide range of human behavioral and social factors. The context in which the noise is heard is also important, as this can affect its relative acceptability. Noise at a particular level is generally more disturbing at night, when people are trying to sleep, than during the daytime. New noise sources introduced to the area are also likely to be abit disturbing to people than the same level of noise introduced into a noisy area. Noise is also more disturbing when people are engaged in complex tasks that require concentration like education.

Noise is measured in decibels and is considered to be a nuisance when the combined expected maximum noise level exceeds 60dB (A); the relevant noise is at least 1.0dB above the prevailing noise level and the contribution to the increased noise level of the new or altered development is at least 1.0dB (A). The Environmental Management (Quality Standards for Control of Noise and Vibration Pollution) Regulations (2015) stipulates maximum permissible day time noise levels of 60 dBA for residential and institutional/small scale production and commerce. Likewise, the stipulated WHO/IFC guidelines require noise emission levels in the working areas should be less than 60dBA.

During the mobilization stage of the project, noise and vibration associated with equipment working on site will be generated, which will affect the nearby receptors and also the working personnel. Noise and vibration generation will essentially result from the operation of the plant and equipment involved on the construction site, namely excavators, concrete mixers and lorries. Vibration might become significant when huge compactors are used on site. Vibration related impacts could be development of cracks on walls and buildings neighbouring the site. Based on the site condition the public receptors are not quite close to experience excessive noise from normal construction activities of lower scale. Noise might become an issue to the site workers, the aspect of which is fully covered under the occupational health and safety hazards section *The impact is considered negative, cumulative, short term and low significance.*

6.3.5 Land degradation at source of construction materials

Conventional constructions materials such as aggregates and sand will be obtained from existing borrow pits within Dodoma Region. Most borrow pits in in the country shows signs of rampant and haphazard exploitation methods and depletion with no plans for restoration of any of these sites. Other areas had to be closed down due to rampant and haphazard exploitation methods that posed pollution risks to the environment. In some instances, sand is extracted from riverbeds. Most of these areas are declared by the government as a danger zones and exploitation is prohibited.

Pollution risks include sediment overload to water bodies during rain season and contamination by oils from trucks, excavators and loaders while also the activity exacerbate degradation. The project proponent shall not encourage suppliers of these materials to use closed down burrow pit or sand extracted from river bed. Hence, environmental impacts

associated with extraction of materials for construction works is a matter of indirect and cumulative effect because it will be contributing to a problem that has other root causes. *The Impact is considered Secondary or indirect, negative impacts, cumulative, long-term and of moderate significance.*

6.3.6 Public Health Hazards due to generated solid wastes

Main sources of construction waste will be from site preparation, earth moving works, and domestic waste from construction crew. Also, large amounts of solid waste will be generated during construction of the project. These will include metal cuttings, rejected materials, excavated materials, used paper bags, empty cartons, empty paint and solvent containers, broken glass among others. Solid wastes if not well managed and disposed off at unapproved site would negatively impact the site and surrounding environment. *The impact is considered negative, short term and of moderate significance.*

6.3.7 Public Health Hazards due to generated Liquid Wastes

Workers working on site during development phase definitely will generate some wastes in solid and liquid form including human wastes. Unmanaged site wastes might result into sanitary related diseases such as cholera, dysentery and alike. Depending on the number of construction workers and the season when work will be done the impact might become significance. *The impact is considered negative, short term and of minor significance.*

6.3.8 Occupational Health and Safety Hazards

When human and machinery are involved at work always there are potential occupational health and safety hazards. Some of the hazards are obvious which require some management; issues like exposure to excessive noise levels from the machinery, excessive dust emission from earth works. Injuries to construction workers may result from moving equipment. According to the National 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 Equipment (PPE); inadequate provisions of PPE; falling through uncovered openings especially at upper floor levels and carelessness of workers. *The impact is considered negative, short term and of high significance.*

6.3.9 Pressure on social resources

Increased of population due construction activities will have potential effects on social services such as healthcare, education, transportation, water supply, waste management, and other relevant services. *The impact on capacity of existing social service infrastructure, and the ability of the infrastructure to adapt and meet the growing demand is considered negative, short term and of moderate significance.*

6.3.10 Pressure on natural resources

During the construction phase of a project, there can be several pressures on natural resources. The pressure on natural resources resulting from various project phases can have significant environmental and socioeconomic consequences. *The impact is considered negative, short term and of minor significance.*

6.3.11 Contamination of land and groundwater resources

The machines on site during construction may contain moving parts, which may require continuous oiling to minimize the usual corrosion or wear and tear. Likewise, moving vehicles on construction sites may require oil and other lubricants change. Possibilities of such oils spilling and contaminating the soil and water within the construction sites are possible. However, no maintenance will be carried out at the project site, all contractor vehicles will be services at the proper designated garages designed for this purpose which can substantially contain these dangers. *The impact is predicted to be negative, short-term duration and of low significance.*

6.3.12 Increased incidence of transmitted diseases including HIV/AIDs and STDs

During construction a number of workers about 180 will be involved at site. Some workers will come from other places apart from Shangani. This will result into social interactions and intermingling. In this case social interactions cannot be avoided which can result into spread of HIV/AIDs and other STDs. As noted in the background GBV there are early pregnancies cases, child neglect cases without appropriate measures there is likelihood for HIV/AIDs and STDs spread. *The impact is considered negative, short term and of moderate significance.*

6.3.13 Potential risk and hazards associated with labour interaction/behaviours.

There is a possibility of the project to attract people during construction and implementation phases. Presence of the construction crews could potentially create a source of social challenges as a result of interaction of local people with project workers. The influx of

people may result into social conflict between foreign workers and locals; use of alcohol and substance abuse among workers leading to anti-social behavior; pressure on existing infrastructure; increase of health risks (i.e., spread of diseases such as HIV/AIDS) and feel of unrest for local women as a result of workers moving to the area, as due to the nature of the project, it is not expected that there will be large workforce required for the project. Estimated that 180 people will be required during the construction phase. Also, the presence of construction workforce will be temporary and therefore the demographic effects are not expected to cause significant long-term impacts. Once construction is completed, many foreign workers and contractors will leave the project area. *The impact is predicted to be negative, short term but of low significance.*

6.3.14 Potential risks and hazards associated with child labour

Due to high prevalence of child labour and forced labour in Tanzania there could potentially be impacts associated with lack of work contracts, long hours with no pay and children working at supplier's sites. Given the relatively small scale of the project with small number of expected work force there will be less risk associated with child labour and forced labour within supply chain. During operation phase, the majority of contracts will be expected to be permanent and therefore easier to regularly monitor labour performance. *The impact is predicted to be negative, long term but of minor significance.*

6.3.15 Potential GBV/SEA/SH related incidences

The GBV/SEA/SH are acknowledged as a social issue in Dodoma City Council. The GRM committee has been formed at UDOM and meets regularly to solve the emerging GBV cases. The proposed project is expected to employ about 180 construction workers at one time from local communities and outside the community. There will be no campsite and this will lead the workers to be hosted in the nearby facilities. The presence of workers increases the risk of SEA/SH (GBV) towards members of the community in particular female students who may be present at the project site. Such risks are known to occur on construction projects.

Some potential GBV/SEA/SH related incidences during construction phase include: denial of resources, opportunities or services; physical assault; requests for sexual favors'; psychological and physical abuse; exploitation of vulnerable position, differential power or trust for sexual purposes; actual or threatened physical intrusion; unwanted sexual advances; and sexual physical contact. Gender discrimination may limit women's access to resources,

opportunities, and public services necessary to improve the standard of living for themselves and their families. As a result, the livelihoods of women affected by the project may be disproportionately impacted if not managed appropriately. *The impact is predicted to be negative, short term but of minor significance.*

6.4 Operation Phase

6.4.1 Public health hazards from generated general solid wastes

The operations of the proposed project have potential of generating solid wastes though in small amount and mainly laboratory/seminar/lecture rooms related wastes and domestic type of solid wastes. Waste might emanate from the laboratory/seminar/lecture rooms use and presence of people for prolonged hours at the area to include paper wastes, organic wastes from remains of food, packaging wastes, and plastic bottles. Laboratory wastes might include organic waste in terms of plant parts, dead small animals like insects, rats for experimental purpose. If these are not handled and disposed properly may bring eyesore and attract vermin and vectors that causes disease. These wastes when left or dumped in drainage may block the normal water flow and thus creating conducive environment for disease causing organisms such as mosquito while also might accelerate floods during rainy season. However, the amount of generated waste will be small due to small, envisaged number of workers to be full time station at site. *The impact is predicted negative, long term and of moderate significance.*

6.4.2 Public health hazards from generated liquid wastes

During operation phase of the proposed project there are many factors for consideration related with management of liquid waste which if not well considered could lead to detrimental effects particularly to public health and pollution of water. Design for associated infrastructures such as sewage system and removal of waste are important for the planned structures so as to maintain the sanitation, hygiene and aesthetics. If not properly disposed of, waste may become a focal point for the spreading of diseases. This is not only in the close vicinity of the building area but also at considerable distances since bacterial, viral, and parasitically may migrate to far areas. Inadequacy in the design and management of waste will result into health hazards to public and workers, reduce aesthetic of the area and can severely degrade ground and reduce the land/property value. *The impact is predicted to be negative, long term and of moderate significance.*

6.4.3 Public health hazards from generated hazardous wastes

During operation of the proposed project there will be waste generated which cannot be mixed with normal wastes especially those of chemical nature both in liquid and solid form. Improper management of the waste might pose risks to the public that could be exposed to the chemicals. Likewise, untreated chemical waste might pollute the surface and subsurface water. Solid waste in form of expired chemicals cannot be guaranteed hence its management need to be considered accordingly without which might pose public health risks. *The impact is predicted to be negative, long term and of moderate significance.*

6.4.4 Hazards from storm water and increased runoffs

The proposed project expected to create storm water and increased runoffs issues in the area in terms of volume and rate of flow. Without proper consideration this might exacerbate the situation at site and to the nearby residents. However, the earmarked area is small and located outside the building footprint area. *The impact is predicted to be negative, long term and of minor significance.*

6.4.6 Occupational health and safety hazards

The operation activities might be involved with complex chemical reactions that might generate fumes in the atmosphere. Some of the fumes might be unfriendly to the human health especially to the personnel's involved with the chemicals. These fumes require management at source to avoid the impact of air pollution and its resultant effects. Without proper management the fumes might cause serious effect even fatal to the workers and personnel involved depending on the nature of the fumes. Other occupational health and safety issues include the ergonomic hazards, fire hazards etc which need to be considered for the workers. *The impact is considered negative, long term and of moderate significance.*

6.5 Potential positive impacts of the project

Below are anticipated positive impacts of the project;

6.5.1 Creation of employment opportunities

During mobilization and construction of the proposed project, there will be employment opportunities for both professionals and unskilled workers. Several workers including casual labourers, masons, carpenters, joiners, plumbers, electricians and engineers are expected to work on the project from the start of the project to the end. Semi-skilled, unskilled labourers and formal employees are expected to obtain gainful employment during the period of

construction. With labour intensive construction technologies, the project will provide employment for youths and provide support to the Government of Tanzania initiatives on creation of jobs though on short term. The creation of employment opportunities is beneficial both from the economic and social point of view. *The impact is considered positive, short term and of moderate significance.*

6.5.2 Benefit to local producers and suppliers of goods and services

The development of the project at various phases will require supplier and produces of the services and products. Some of services include design of the building and provision of associated drawings, consultancy services like this study have started to be realised even before construction starts. Supply of materials for construction from local sources is also a positive aspect of the project, as it will reduce the cost of the project from procuring far from the site while benefitting local producer and suppliers. The materials include gravel, sands, cement, colour paints, nails, iron sheet and alike. *This impact is considered positive, cumulative short term and of moderately significance.*

6.5.3 Visual impact/ increased aesthetic value of the project area

The construction of the proposed project will bring about negative visual impact and positive aesthetic value in the area. Thus, its presence will cause visual difference with the current development though will beautify the area. Thus, the surrounding area has already been modified to suit to human ecology thus development of this structure in the existing human environment will bring more appealing features and thus enhance the visual features of the area. *The impact is considered negative and/or positive, long term and of high significance.*

Table 6.4: Summary of Potential Environmental and Socio-economic Impacts

A:	**MOBILIZATION PHASE**							
Phase	**Identified Impacts**	**Description of Impact**	**Spatial Scale**	**Temporal Scale**	**Reversibility**	**Cumulative Impact**	**Residual Impact**	**Significance**
Mobilization Phase	Job Creation and Increased Income to Local Communities	Employment impact is moderate, localized, and short-term. It is direct as employed people will benefit directly and indirectly through supplying goods and services. The	Local	Short-term	Reversible	Yes	No	+1 Minor positive impact

		impact is also inducive and cumulative.						
	Depletion of natural resources /Exploitation of borrow pits/quarries	The impact is direct, indirect, cumulative, and inducive.	Local	Long-term	Partially reversible	Yes	Yes	-2 Moderate negative impact
	Land and ground water pollution	The impact is direct, indirect, inducive, and cumulative.	Local	Long-term	Reversible	Yes	Yes	-2 Moderate negative impact
	Public health hazards from generated Solid wastes	The impact is direct and indirect.	Local	Short-term	Reversible	Yes	No	-1 Minor negative impact
	Impaired air quality	The impact is direct, indirect, cumulative, and inducive.	Local	Short-term	Reversible	Yes	No	-1 Minor negative impact
	Public health hazards from generated Liquid wastes	The impact is direct and indirect	Local	Short-term	Reversible	Yes	No	-1 Minor negative impact
	Generation of noise and vibrations	The impact is direct	Local	Short-term	Reversible	Yes	No	-1 Minor negative impact
B:	**CONSTRUCTION PHASE**							
Phase	**Identified Impacts**	**Description of Impact**	**Spatial Scale**	**Temporal Scale**	**Reversibility**	**Cumulative Impact**	**Residual Impact**	**Significance**
Construction Phase	Jobs creation	The impact is direct, indirect, induced, and cumulative.	Local	Medium-term	Reversible	Yes	No	+2 Moderate positive impact
	Income to local suppliers and service providers	The impact is indirect, induced, and cumulative.	Local	Medium-term	Reversible	Yes	No	+2 Moderate positive impact
	Impacts on Knowledge	The impact is direct, indirect, induced, and cumulative.	Local	Medium-term	Reversible	Yes	Yes	+1 Minor positive impact
	Occupational Safety and Health impacts	The impact is direct, indirect, inducive, and cumulative.	Local	Short-term	Reversible	Yes	No	-2 Moderate negative impact
	Increased accidents	The impact is direct, indirect, induced, and cumulative.	Local	Short-term	Reversible	Yes	No	-1 Minor negative impact
	Increased GBV/SEA/SH related incidences	The impact is direct, indirect, induced, and	Local	Medium-term	Partially reversible	Yes	No	-2 Moderate negative impact

		cumulative.						
	Gender discrimination	The impact is direct, indirect, and cumulative.	Local	Medium-term	Reversible	Yes	No	-1 Minor negative impact
	Child labour	The impact is direct, indirect, induced, and cumulative.	Local	Short-term	Reversible	Yes	No	-2 Moderate negative impact
	Impaired air quality	The impact is direct, indirect, induced, and cumulative.	Local	Short-term	Reversible	Yes	No	-1 Minor negative impact
	Generated Noise level and vibrations	The impact is direct	Local	Short-term	Reversible	Yes	No	-1 Minor negative impact
	Pressure on social services	The impact is direct, inducive, and cumulative.	Local	Long-term	Reversible	Yes	Yes	-1 Minor negative impact
	Public health hazards from generated solid wastes	The impact is direct, inducive, and cumulative.	Local	Short-term	Reversible	Yes	No	-1 Minor negative impact
	Public health hazards from generated liquid wastes	The impact is direct, inducive, and cumulative.	Local	Short-term	Reversible	Yes	No	-1 Minor negative impact
	Erosion of Exposed Surfaces	The impact is direct, indirect, inducive, and cumulative.	Local	Short-term	Reversible	Yes	No	-1 Minor negative impact
	Landscape and visual impacts	The impact is direct, inducive, and cumulative.	Local	Short-term	Reversible	Yes	No	-1 Minor negative impact
	Loss of vegetation/habitat	The impact is direct, indirect, inducive, and cumulative.	Local	Short-term	Reversible	Yes	No	-1 Minor negative impact
	Pressure on natural resources	The impact is direct, indirect, inducive, and cumulative.	Local	Long-term	Reversible	Yes	Yes	-1 Minor negative impact
	Land and ground water pollution	The impact is direct, indirect, inducive, and cumulative.	Local	Long-term	Reversible	Yes	Yes	-1 Minor negative impact
C:	**OPERATION PHASE**							
Phase	**Identified Impacts**	**Description of Impact**	**Spatial Scale**	**Temporal Scale**	**Reversibility**	**Cumulative Impact**	**Residual Impact**	**Significance**
Operation Phase	Increased admission of students	The impact is direct, indirect, continuous, inducive, and cumulative.	Regional	Long-term	Reversible	Yes	Yes	+3 High positive impact
	Increase of	The impact	Regional	Long-	Reversible	Yes	Yes	+2

	revenue to academic institutions	is direct, indirect, inducive, and cumulative.		term				Moderate positive impact
	Job creation	The impact is direct, indirect, inducive, and cumulative.	Regional	Long-term	Reversible	Yes	Yes	+2 Moderate positive impact
	Increased commercial and social activities around project locations	The impact is direct, indirect, continuous, inducive, and cumulative.	Regional	Long-term	Reversible	Yes	Yes	+2 Moderate positive impact
	Production of skilled labor force	The impact is direct, indirect, inducive, continuous, and cumulative.	National	Long-term	Reversible	Yes	Yes	+3 High positive impact
	Public health hazards from generated Solid wastes	The impact is direct, inducive, and cumulative.	Local	Short-term	Reversible	Yes	No	-2 Moderate negative impact
	Public health hazards from generated Liquid wastes	The impact is direct, inducive, and cumulative.	Local	Short-term	Reversible	Yes	No	-2 Moderate negative impact
	Increased incidences of diseases and ill health	The impact is direct, indirect, inducive, and cumulative.	Local	Long-term	Reversible	Yes	No	-2 Moderate negative impact
	Increased pressure on social services and utilities	The impact is direct, indirect, inducive, and cumulative.	Local	Long-term	Reversible	Yes	No	-2 Moderate negative impact
	Land and ground water pollution	The impact is direct, indirect, inducive, and cumulative.	Local	Long-term	Reversible	Yes	Yes	-1 Minor negative impact
	Stormwater generation and increased runoff	The impact is direct, indirect, inducive, and cumulative.	Local	Long-term	Reversible	Yes	No	-2 Moderate negative impact
	Health and safety risks/hazar	The impact is direct, indirect,	Local	Long-term	Reversible	Yes	No	-2 Moderate negative

	ds	inducive, and cumulative.						impact
D:	**DECOMMISSIONING PHASE**							
Phase	**Identified Impacts**	**Description of Impact**	**Spatial Scale**	**Temporal Scale**	**Reversibility**	**Cumulative Impact**	**Residual Impact**	**Significance**
Decommissioning Phase	Loss of employment and revenues	The impact is direct, indirect and inducive	Local	Short-term	Reversible	No	No	-1 Minor negative impact
	Loss of aesthetic value	The impact is direct, indirect, inducive, and cumulative.	Local	Short-term	Reversible	No	No	-1 Minor negative impact
	Dust, pollutant gases and noise pollution from demolishing works	The impact is direct, indirect, inducive, and cumulative.	Local	Short-term	Reversible	No	No	-1 Minor negative impact
	Loss of revenue to institutions and the government	The impact is direct, indirect, inducive, and cumulative.	Regional	Short-term	Reversible	No	No	-2 Moderate negative impact

6.6 Consideration of Alternatives

The discussion and analysis of alternatives in Environmental and Social Impact Assessment considers other practicable strategies that will promote the elimination of negative environmental impacts identified. This section is critical in consideration of the ideal development with minimal environmental disturbance.

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

proponent as means of reducing environmental effects. They are discussed in further detail below:

6.6.1 No Project Alternative

The no project alternative considers retaining the current status quo without constructing the proposed academic block and science laboratory. This option would avoid any environmental or social impacts arising from the construction and operation of the new facilities. However, choosing the no project alternative would fail to achieve several important national development objectives and priorities:

- The HEET project aims to revitalize and expand UDOM's capacity in key STEM areas crucial for Tanzania's transition to an industrialized, knowledge-based economy. The no project scenario would not address this critical need.
- Construction of the new facilities is expected to enhance the quality of teaching, learning and research at UDOM by providing modern infrastructure tailored to STEM subjects. This opportunity would be forgone.
- Once operational, the facilities are designed to accommodate increased student enrolment in line with government policy of expanding STEM education. The no project option would prohibit UDOM from achieving this important goal.
- Construction will generate local employment opportunities. Long-term operation of the facilities will stimulate additional job creation and economic growth. These socio-economic benefits would not materialize under the no project alternative.
- The Government of Tanzania and financing partners have committed significant resources to this project based on its anticipated returns. Not implementing the project as planned would represent the loss of these investments.
- Failure to improve UDOM's infrastructure could discourage further investment and expansion of higher education capacity in Tanzania.

The "no project" alternative is not recommended due to the significant economic, developmental, and strategic objectives of the proposed facilities project at both local and national levels, while minimizing short-term environmental and social disturbances. With effective mitigation measures incorporated, any impacts from project implementation are expected to be manageable. On balance, the benefits of the proposed project far outweigh a no project scenario.

6.6.2 Alternative site location

The proposed sites are located within the existing UDOM campus, allowing for synergies with other academic facilities and infrastructure already present. Developing an alternative out of UDOM site would lose these integration benefits, furthermore:

- Services and utilities like water, electricity, ICT networks, waste management systems are readily available at the proposed site locations, avoiding the need for additional investments to establish independent systems at a new site.
- Students and staff are already accustomed to the UDOM areas, enhancing accessibility. An alternative remote site could create transportation challenges.
- Safety and security measures are already established at selected site. Developing in a new site outside UDOM may require additional security infrastructure and present uncontrolled access issues.
- The UDOM master plan envisages future expansion and development in the proposed areas. Selecting an alternative site risks inconsistency in long-term land use planning.
- Due to its ownership of the land, UDOM faces minimal procedural delays and costs in obtaining approvals to develop on the proposed sites. Securing rights to an alternative plot could introduce delays and uncertainties.
- Disturbance impacts during construction would primarily affect only the UDOM community rather than nearby public areas by developing on the proposed site.

Considering the above factors that enhance technical, operational, economic and planning advantages of the proposed site over alternative site away from UDOM sites, an alternative site does not present a reasonable project alternative.

6.6.3 Water Supply Alternatives

Reliable access to suitable quality water is critical to supporting the water demands of the proposed academic and laboratory facilities. The project proponent therefore evaluated three main alternatives for securing water supply:

Alternative 1: Piped Water Supply from DUWASA

DUWASA operates the municipal water network within UDOM. Connecting to this existing infrastructure for use would provide a clean, regulated supply without requiring establishment of independent sources. However, reliance on a single utility poses risks if the network experiences disruptions.

Alternative 2: Drilling of Boreholes

Drilling boreholes could ensure a locally controlled source. However, upfront drilling and treatment system costs are involved. Seasonal yield and quality variations may also occur without robust investigation and monitoring. However, this option will impact nearby boreholes due excessive abstraction.

Alternative 3: Rainwater Harvesting

Capturing rainwater offers a supplemental local source reducing overall demand on municipal supply. A storage and collection system would need designing and constructing. Quantity harvested depends on unpredictable rainfall patterns.

Conclusion: Based on analysis of the three alternatives the most preferred one is Alternative 1" which will be supplemented by alternative 3.

6.6.4 Liquid Waste Management Alternatives

Five alternatives were considered for managing liquid waste from the proposed academic block and science laboratory buildings at UDOM:

Alternative 1: Use of existing stabilization ponds

The university currently uses stabilization ponds to treat liquid waste on campus. Being constructed closely to this wastewater facility, the project design will consider the connection of generated liquid wastes to the existing UDOM *stabilization ponds.* This will minimize cost for constructing new or other liquid wastes management facilities.

Alternative 2: Up-flow anaerobic sludge blanket (UASB)

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

Alternative 3: Constructed wetland

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

Alternative 4: Septic tank and soak away pits

Individual septic tanks connected to underground soak away pits would be a low-cost option but require regular emptying and pose contamination risks if not properly managed and maintained. Space is also required for multiple soak pits.

In conclusion, given the space limitations and benefits of connecting to existing sewer infrastructure, Alternative 1 is recommended as the most feasible and sustainable liquid waste management alternative for the proposed project.

6.6.5 Solid Waste Management Alternatives

The proposed construction of academic blocks and science laboratories at CoESE and CNMS colleges of the University of Dodoma is expected to generate a considerable amount of solid waste on a daily basis. Proper management of this waste will be critical to minimize negative environmental and health impacts. The University has identified two primary alternatives for managing the solid waste - landfilling and an integrated waste management approach.

Alternative 1: Landfilling

Landfilling large volumes of mixed, untreated waste results in the loss of valuable resources that could otherwise be recovered through reuse, recycling and recovery (3Rs). It also poses environmental and social risks at the disposal site through pollution of air, soil and water resources from leachate and methane emissions over time. Regular transportation of waste also implies ongoing operational costs and carbon emissions from vehicle movements. As solid waste management is not a revenue-generating activity, such an approach would become a financial burden on the university's budget requiring allocation of funds on an indefinite basis.

Alternative 2: Integrated into existing waste management.

Anintegrated waste management approach is proposed as a more viable long-term solution that addresses waste in a holistic manner from generation to final disposal. The key elements include source reduction and segregation of waste, maximizing reuse and recycling wherever possible. Organic waste would be converted to compost for use on campus. Non-recyclable fractions could be used to generate energy through waste-to-energy technologies like biogas. Residual waste after extraction of resources would be temporarily stored on-site before infrequent transportation off-site, minimizing transportation needs and costs.

By adopting the principles of reduce, reuse and recover resources, Alternative 2 offers significant environmental and financial benefits compared to landfilling. It supports the waste management hierarchy and a circular economy model in a sustainable manner suited to the university context. With proper implementation, this integrated approach can holistically address the waste challenges posed by the new development in an environmentally sound and cost-effective way.

6.6.6 Energy Alternatives

The University of Dodoma (UDOM) considered various energy alternatives for powering the proposed infrastructure developments for the proposed project. Reliable access to energy is critical for running educational facilities and conducting laboratory experiments. The main alternatives assessed were:

Alternative 1: National grid electricity:

Electricity supply from Tanzania's national grid (TANESCO) is unreliable due to dependence on hydropower which fluctuates with rainfall patterns. Outages are common. However, grid connection provides the largest power capacity at the lowest cost.

Alternative 2: Diesel generators:

Diesel generator option can be employed as backup during power blackout. However, diesel has significant environmental drawbacks as a fossil fuel that emits greenhouse gases, especially over prolonged usage. Close to 100% fuel utilization also raises operating costs.

Alternative 3: Solar photovoltaic power:

Solar energy harnesses abundant local solar resources with zero emissions. Solar panels could provide lighting and supplementary power. But solar capacity alone may be insufficient to meet the high energy demands of laboratories requiring extensive equipment operation. Installation and maintenance costs are also higher than conventional grid electricity initially.

Based on these options, Alternative 1 is the preferred option and this can be supplemented by solar power and/or standby generator.

CHAPTER SEVEN

7.0 MITIGATION MEASURES

7.1 Introduction

The impacts which are most likely to affect the environment and human health in the execution of the proposed project have been identified and analyzed in Chapter 6. Based on the analysis and hence classification of the most significant environmental and social impacts, this chapter proposes the mitigation measures for the negative impacts and enhancement measures of those positive ones. The mitigation measures aim at offsetting the impacts or reducing the severity of the impacts to a minimal level that becomes also insignificant. The standards upon which the mitigation measures are targeted, the responsible entity and the associated mitigation costs are presented as part of the Environmental and Social Management Plan in Chapter 8. Below are the mitigation and enhancement measures: -

7.2 Mobilization phase/ construction phase

7.2.1 Loss of biodiversity/vegetation cover/habitat

The following shall be done;-

- Clearance will be restricted to areas with physical structures and supporting facilities only;
- The project design will accomodate the existing native trees;
- After construction UDOM shall plant ornamental trees and other vegetation as part of beautification of the area.

7.2.2 Accelerated soil erosion

To mitigate the impact, the following shall be done; -

- Major civil and/or earth work shall be done during dry season when there is no run off to act on the nude site. This will also simplify the machinery work other than working in wet environment with machines. Should there be a need to carry out construction works during wet season, the contractor's employed shall take appropriate mitigation measures to prevent accelerated soil erosion;

- The contractor shall ensure that backfilling is done adequately, compacted, and the site restored. The backfilling operation will be performed in such a manner to prevent soil erosion.

7.2.3 Air Pollution due to Dust Emission

The following measures shall be applied; -

- All trucks carrying the fine earth materials will be enclosed during transportation to the construction site to prevent dust generation along the route. Trucks used for that purpose will be fitted with tailgates that close properly and with tarpaulins to cover the materials.
- Measures to suppress dust shall be applied to prevent wheel generated dust and wind impact on bare loose soil.
- Washing of Trucks each morning to remove mud on mudguard and tires to reduce dust on routes
- Watering on dry excavated areas to reduce fugitive dust
- Speed limits will be instituted to drivers and especially in routes passing in community centers areas.
- Ensure proper dropping height for dust related materials should be managed.
- Covering stockpile that have potential to generate fugitive dust at site

7.2.4 Air pollution due to exhaust/tailpiece emission

The following measures shall be applied; -

- Equipment maintenance to be undertaken in accordance with manufacturer's instructions and at the specified maintenance interval to reduce exhaust emission;
- Equipment operators will be trained in and will follow equipment operational procedure.
- Load limit shall be specified to type of vehicle to avoiding overloading that causes excessive exhaust emission.
- Timely maintenance of the trucks through regular inspection on the need for maintenance.

7.2.5 Noise pollution and vibration

The following shall be done;-

- Construction activities will be restricted to daytime hours only.

- Vehicles and machines will be maintained and serviced as required to ensure they do not generate excessive noise. Among others vehicles shall have properly functioning exhaust mufflers.
- Low noise compactor shall be opted;
- Enforced vehicle load restrictions to avoid excess noise emissions from engine overloading.
- Speed limits will be instituted to drivers and especially in routes passing in community areas.
- Drivers should switch off the vehicles to avoid idling generated noise;
- Training to drivers on safe driving habits that also control noise levels shall be done.

7.2.6 Land degradation at source of construction materials

The contractor will source construction materials such as sand, ballast and hard core from authorized quarry and sand mining firms/sites, whose projects have undergone satisfactory environmental assessment and received appropriate approval. Since such firms are expected to apply acceptable environmental performance standards, the negative impacts of their activities at the extraction sites are considerably well mitigated. If there are no registered quarry site the materials shall be sourced from the area designated by local authority for sourcing such materials. The contractor will be encouraged to make use of premix concrete suppliers for those major construction works requiring concrete.

7.2.7 Land and groundwater pollution from construction wastes

To mitigate the impacts of wastes an efficient collection and disposal system based on the principles of reduction, re-use and recycling of materials, shall be instituted at the project site. A site waste management plan shall be prepared by the contractor that will be followed. This will include designation of appropriate waste storage areas, collection and removal schedule, and a system for supervision and monitoring. Introduction of waste disposal bins, warning notices, “DOs & DONTs” etc posted at strategic points of the project site will be done. No, on site burial or open burning of solid waste shall be permitted at the project site. The contractor will make use of the existing solid waste disposal and collection system of the City Council i.e. collected by City council truck or by City authorised Agent. Further, the construction site will be fenced and all wastes will be handled within the fenced area before collection.

7.2.8 Public Health Hazards due to Liquid Wastes

To manage sewage at construction site temporary pit latrines will be established for the workers to include for both male and female latrines and used as per OSHA requirement.

7.2.10 Occupational health and safety hazards

To mitigate this impact, UDOM and contractor shall comply with relevant Tanzania (OHS Act, 2003) on health and safety requirements including the provision of Personal Protective Equipment's (PPE), reasonable working hours and good working conditions and facilities. Specifically; -

- Accidents will be minimized through proper maintenance of the machines, protecting or guarding the cutting edges, and awareness of the people including workers on the dangers and make them understand how to protect themselves and others.
- The supervisors shall ensure that safety procedure and measures are in place and are enforced (implemented) including appropriate safety gears (PPEs) e.g. eyeglasses and dust masks will be ensured in order to reduce risks associated with dust.
- The contractor shall provide adequate training to workers on the OHS of the construction works.
- Approved working hours shall be observed in order to avoid careless mishandling due to fatigue.
- Medical checks pre & post-employment as well as mandatory once a year checks shall be done
- Undertake site specific risk assessment and developing mechanism to avoid or reduce the risks. This shall be done per each new work to be undertaken and a safety procedure shall be developed and implemented by dedicated project HSE officer.

7.2.11 Traffic accidents along the main and access roads

The following shall be done; -

- Only qualified drivers with appropriate driving license shall be engaged.
- Induction course shall be done to all drivers prior starting driving
- Drivers shall be sensitized on maintaining speed limits for main roads and on access roads.
- Promoting safe drive with specified hours for long drive to avoid fatigue
- Provision of road and safety signs at site or access roads shall be done.

7.2.12 Contamination of land and groundwater from accidental spills and leakages of hydrocarbons

It shall be ensured that re-fueling and services for vehicles will be done off site. Spill control measures such as storage and handling of hydrocarbons such as oil shall be done to include storage on impervious areas (such as concrete surfaces with bund wall). Heavy equipment will be checked for lubricant leaks before starting the work, and workers will be trained on proper storage of hydrocarbons. Emergency response measures shall be put on site in case of accidental oil spill that will include having absorbent materials, sand kits at site, and alike.

7.2.13 Public Health Hazards due to HIV/AIDs and STDs spread

UDOM and Contactor will devote time in raising awareness of the dangers of the HIV/AIDS within the project premises. Although basic knowledge of HIV/AIDS is high among Tanzanians, knowledge of self-protection measures and behaviour change will be provided and a preference will be given to those who are vulnerable and to empower women for they compose one of the most vulnerable groups. When the need arises UDOM and Contractor will seek for professional assistance from local organizations working in the field of public health and control of HIV/AIDS for instituting a health education and disease control programme at the workplace.

7.2.14 Increased local population due to labour influx

To avoid increasing influx of people, semi-skilled and unskilled labour required by the project will be sourced locally to provide communities with employment and the opportunity to earn income during the construction phase. Local communities will be given prior information through local government offices on available employment opportunities and required qualifications. A special clause that requires local peoples to be employed as labourers during construction will be included in the contract. This will minimise the influx of people within the project area.

7.2.15 Potential risks and hazards associated with child labour.

To prevent the exploitation of the child labour, UDOM and Contractor will comply with the provisions in the Employment and Labour Relation Act,2004 and the ILO Convention No. 182. UDOM will develop transparent human resources policies and procedures for recruitment process, working conditions, terms of employment wages, worker-employer relations, non-discrimination policy, monitoring, roles and responsibilities. UDOM expects

its contractors to adhere to the principles set forth in the Contract which will cover inter alia, standards related to Labour and prohibition of Child Labour. Employment of child labour (children below the age of 18), pregnant women and elder citizens in hard labour and dangerous activities will be prohibited.

7.2.16 GBV/SEA/SH related incidences

UDOM will emphases to all contractor to provide equal employment opportunities between men and women depending on required qualifications at all level. During construction local employment shall be optimized by allocating jobs fairly (consider gender, marginalized groups), involve community leaders/ committees to identify suitable/able people for the jobs, review to avoid bias or favouritism observing national/and international labour standards. UDOM and Contractor will conduct mandatory and periodic training for workers on required lawful conduct in host community and legal consequences for failure to comply with laws on gender-based violence (GBV). UDOM will roll out its grievance redress mechanism (GRM) of the proposed project for communities living in the project's area and areas of Influence and collecting information about GBV and associated social ills on a monthly basis with a view to resolving it with the project contractor. UDOM will identify and create a partnership with a local NGO to report workers' misconduct and complaints/reports on GBV or harassment through the GRM. Further, awareness on GBV issues to the workforce shall be provided in collaboration with the Local NGOs and/or GBV committees in the area.

7.3 Operation phase

7.3.1 Public health hazards from solid wastes

As noted in section 2.8.3.2, UDOM will establish a system for waste management. The system will include having disposal bin located in strategic areas of the site for collection at source. Further, centralized waste collection point will be established to handle increased quantity of waste and for collection. It will be designed at one of the corners close to the gate for easy collection of the same without major nuisance during collection. Only authorised waste collection agency by the City Council will be allowed for collection of the waste. The City authorised agents are responsible for collection and disposal to the authorised disposal site.

7.3.2 Public health hazards from liquid wastes

The proposed project will use existing UDOM sewerage waste system to manage the generated liquid waste on site.

7.3.3 Public health hazards from hazardous wastes

UDOM will design a wastewater retention structures for the laboratory effluent. Two on series retention ponds will be designed for dilution of the effluent before final discharge to the open environment. The effluent on the retention ponds will be monitored to ensure it is safe for final disposal.

7.3.4 Fire Hazards

The architecture of the proposed project shall ensure the building has easy mechanism of evacuation in the eventuality of a fire and other emergencies. The design of the building will provide ample space for exiting the building and the corridors will be of sufficient widths and dimensions to enable easy and speedy evacuation. Provision will be made under the plumbing installation, for fire-fighting system. Further, the following shall be done; -

- UDOM shall install firefighting system to include fire detectors, portable fire extinguishers for emergency, fire hydrant and water reserve tank that can also be used in case of fire.
- Staffs will be trained on how to operate the firefighting equipment.
- Drawings shall be submitted to fire department for scrutiny and guidance on fire safety designs and shall adhere to the requirement(s).

7.3.5 Occupational health and safety hazards

The final designs of the CNMS science laboratory building shall adhere to the required standards considering the nature of operations. Some of the key aspects to be considered include the ventilation of the chemistry, biology, physical and mathematic laboratories, location of the gas to be involved in the process, storage room of chemicals requirements. Further, in order to mitigate the potential impacts due to laboratory fumes from complex chemical reactions the chemistry laboratory shall be equipped with fume hood built-in with scrubber which is acid and organic resistant to withstand the acid and organic fumes from the chemistry laboratory operations. Also, before operations of the laboratory building baseline risk assessment should be done in line with OHS Act of 2003 to identify OHS risks and hazards and thereafter to formulate the mitigation measures to be implemented during the operation.

7.4 Social economic impacts

7.4.1 Creation of Employment Opportunities

It is expected that during construction phase of the project, a good number of people will be employed. Offering local people, the opportunity for employment during the construction or of providing services such as supplying construction materials etc, will provide an additional income-generating opportunity to locals of the area. Where skilled labour is concerned, this will almost certainly be the case when there will be limited or no local skilled labour. This impact could be enhanced if the contractor constructing the building is both encouraged to and committed to hiring local labour, particularly when only semi-skilled or unskilled labour is required. This could be made clear during the tendering process for construction of the building. One way of promoting this would be for the Contractor to train local people to acquire the skills needed by these contractors to carry out the work.

7.4.2 Benefit to local producers and suppliers of goods and services

The project will procure most construction materials from local sources. The use of locally available materials and labour for the proposed development will contribute towards growth of the economy by contributing to the income and hence poverty reduction as well as contributing to gross domestic product. The consumption of these materials, fuel oil and others will attract taxes including VAT which will be payable to the government hence increasing government revenue. Some of the project services have been already contracted to Tanzanian suppliers and contractors.

CHAPTER EIGHT

8.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

8.1 Introduction

This Environmental and Social Management Plan (ESMP) addresses all the negative project impacts mentioned in chapter seven of this ESIA for the proposed construction activities at Ng'hong'onha Mtaa, Ng'hong'onha Ward, Dodoma city council, Dodoma City. The ESMP covers the construction, operation and decommissioning phases of the project and identifies the key environmental issues across the project and provides strategies and plans for mitigating and/or managing them effectively.

The environmental and social management plan involves risk management strategies that should be undertaken by the proponent UDOM and the project manager to mitigate or manage environmental and social risks and impacts on the affected communities. It further provides an estimate of the mitigation and management costs, in local currency, the Tanzania shillings (TZS). These mitigation and management measures are approaches to monitor, control, reclaim and restore the environment to its appropriate state. ESMPs for projects thus provide logical frameworks within which the identified issues of environmental and social concerns can be mitigated and or managed, monitored and evaluated.

The ESMP, outlined in Table 8.1 addresses the potential negative impacts and mitigation and management measures as well as defines the implementation and supervisory institutions which can help to determine the effectiveness of mitigation/management actions to minimize detrimental effects on the natural and social environment due to the proposed project. The Environmental and Social Management is to be undertaken within the framework of an Environmental Management System compliant to the Tanzania Environmental and Audit Regulation of 2005 and its amendment of 2018 as well as the World Bank Environmental and Social Framework (ESF) and its associated environmental and social standards (ESSs)

Table 8.5: Environmental andSocial Management Plan

Receptor / EHS Aspect	Impacts	Mitigation Measures	Residual Impacts	Responsibility		Est. Cost (Tshs)
				Implementation	Supervision	
Pre-Construction and Construction Phase						
Dust and Particulate Matter	Increased dust dispersion due to movement of construction traffic and operation of machinery, excavation, drilling and road construction works.	• Spray water on the access road to avoid dust dispersion, if necessary. • Ensure that all trucks transporting loose material are covered with tarps to minimize loss and dispersion during transportation. • Maintain and store piles of loose material and soil suitably to minimize dust dispersion. • Limit truck speed • Routine maintenance of trucks to ensure compliance with emissions standards. • Select transportation routes that would minimize impacts on sensitive receptors. • Provide dust protection masks to workers	**Minor**	Contractor	UDOM	5,000,000
Gaseous Emission	Gaseous emissions from engines of machines and equipment and emissions from volatile hazardous materials, such as	• Ensure vehicle emissions comply with the relevant national/international standards. • Ensure routine maintenance of trucks and construction machinery to minimize unnecessary emissions from poorly maintained engine systems. • Select transportation routes that circumvent (stay away from)	**Insignificant**	Contractor	UDOM	3,000,000

Receptor / EHS Aspect	Impacts	Mitigation Measures	Residual Impacts	Responsibility		Est. Cost (Tshs)
				Implementation	Supervision	
	oils, paints, etc	sensitive receptors to maximize the distance between the emission source and the sensitive receptors.				
Noise and Vibrations	Noise and vibrations will be generated by vehicular movement, aggregate processing, excavation works as well as the presence of workers	• Schedule noisy activities during regular daytime hours. • Install noise control devices on construction equipment if noise levels exceed the applicable standards. • Instruct the workforce to avoid unnecessary noise. • Prove all relevant PPE to workers including ear protection. • If necessary, limit working time for labourers working in high-noise environments and operate a rotation schedule to limit exposure to unsafe noise levels. • All trucks should be maintained regularly to ensure the least noise generation.	**Insignificant**	Contractor	UDOM	3,000,000
Soil Erosion	Soils may be susceptible to erosion due to vegetation clearing, excavation and other construction operations	• Limit vegetation clearance as much as possible • Stabilise highly vulnerable soils mechanically to reduce erosion potential. • Re-grading of slopes and re-vegetation of exposed areas with native plant species chosen appropriately for the function of stabilizing soils (i.e. with extensive shallow root structure) • Remove the good topsoil (O-horizon) and store it separately from	**Insignificant**	Contractor	UDOM	8,000,000

Receptor / EHS Aspect	Impacts	Mitigation Measures	Residual Impacts	Responsibility		Est. Cost (Tshs)
				Implementation	Supervision	
		other excavated soils to be used in replanting and restoration. • Keep deeper soil layers separate from the O horizon layer.				
Land Contamination	Land could be contaminated by the spillage of hydrocarbons, hydraulic fluids as well as paints and chemical cleaning agents.	• Installation of oil separators and secondary containment at fuel storage sites • Store hazardous materials in properly designed and clearly marked storage facilities. • All transportation of hazardous materials to and from the site shall be undertaken by an appropriate and qualified agent using vehicles that are equipped for function.	**Insignificant**	Contractor	UDOM	10,000,000
Water Pollution	Underground water sources are susceptible to pollution via accidental spills of hazardous chemicals, effluent from cleaning of cement trucks as well as from domestic sewage from the construction force.	• Secondary containment to collect diffuse and accidental spills. • Storage and handling of fuels and construction fluids should be kept well away from the rivers. • In the case of groundwater emergence during excavation, immediately report to the Responsible Authority	**Minor**	Contractor	UDOM	3,000,000
Solid, Liquid and	Construction will generate several waste streams	• The contractor will arrange for safe storage, transportation and disposal of all hazardous waste generated during the construction phase by engaging a certified contractor or local authority to	**Minor**	Contractor	UDOM	10,000,000

Receptor / EHS Aspect	Impacts	Mitigation Measures	Residual Impacts	Responsibility		Est. Cost (Tshs)
				Implementation	Supervision	
Hazardous Waste	including: **Non-Hazardous Solid Waste:** paper, wood, garbage **Hazardous Solid Waste:** machine oils/fuels, hydraulic fluids, paints, paint thinners, etc. **Liquid Waste:** domestic wastewater, effluents from cleaning and maintenance of machines and equipment	collect, transport and dispose of all hazardous waste generated at the project site according to the relevant national and international standards for hazardous waste management. • The Contractor shall identify and sort all waste streams. • Waste management shall be based on a hierarchy that considers prevention, recycling and reuse, treatment and disposal to increase resource efficiency and decrease the generation of waste in the first place. • Under the supervision of the contractor, solid waste generated during construction shall be properly treated and safely disposed of only in clearly marked waste disposal sites with an appropriate lining material to prevent land contamination. • All refuelling of heavy equipment and machinery shall be undertaken by a competent and qualified individual, with appropriate safeguards and protection measures to prevent any spillage or contamination by chemical wastes or maintenance oils, lubricants, etc. • All employees working with hazardous materials should be trained in hazard identification, safe operating procedures, appropriate materials handling procedures, safe work practices, basic emergency procedures, and (if applicable) Special hazards unique to their jobs. • The contractor should engage a qualified wastewater management entity which will be responsible for the regular evacuation of				

Receptor / EHS Aspect	Impacts	Mitigation Measures	Residual Impacts	Responsibility		Est. Cost (Tshs)
				Implementation	Supervision	
		septic tanks during the construction phase. This will ensure that the tanks do not overflow and contaminate or pollute the environment.				
Vegetation Clearing	Clearance of vegetation may be necessary during construction, especially in the transmission line wayleaves.	• Train workers on environmental conservation • Vegetation clearance should be minimised as much as possible and should only take place when absolutely necessary. • Cleared areas will be re-vegetated with indigenous plant species • Cutting old, mature trees should be considered as the last option when all other avenues have been attempted. • Replanting of native vegetation should be undertaken during the rainy seasons to ensure high germination rates and revegetation success.	**Insignificant**	Contractor	UDOM	8,000,000
Wildlife Disturbance	Disturbance to surrounding wildlife is inevitable during the construction phase and will occur due to noise, vibrations and dust levels and will particularly affect nocturnal	• Schedule noisy activities for daytime hours • Instruct the workforce to avoid unnecessary noise • Routine maintenance of the equipment to avoid unnecessary noise. • Ensure the presence of appropriate 'escape routes' for any animal that inadvertently finds itself within the project construction sites	**Insignificant**	Contractor	UDOM	5,000,000

Receptor / EHS Aspect	Impacts	Mitigation Measures	Residual Impacts	Responsibility		Est. Cost (Tshs)
				Implementation	Supervision	
	species.					
Occupational Health and Safety	Construction activity will involve OHS risks, particularly from falls, injuries, dust, and noise as well as improper training in machinery operation and materials handling	The Contractor shall adopt an Occupational Health and Safety Plan and job hazard analysis during the construction phase. The plan will include measures to protect workers from infection, and all national health regulations will be followed. According to IFIs EHS Guidelines and OHSA standards the main mitigations measures to prevent common construction hazards are: • The main contractor should submit a Job Hazard Analysis for all activities on site. An OHS plan/ Manual for risk management specific to the site and the foreseen activities, and following the risk control hierarchy. • All workers, especially those working in hazardous jobs, should be physically fit for the job. Evidence of their physical fitness should be carried out by specialized labs/centres every six months. Records of workers' physical fitness should be maintained. • Workers should be trained to identify and evaluate fall hazards and be fully aware of how to control exposure to such risks as well as know how to use fall protection equipment and PPE properly. • Workers must comply with IFIs EHS Guidelines and OHSA's general rule for the safe use of ladders and stairways • The contractual agreement with the contractor should include rigid commitments to apply the OHSP that should be prepared in full compliance with the IFIs EHS and national requirements. • The health and safety risk to the workers should be covered with appropriate insurance schemes. In addition, the Insurance should	**Minor**	Contractor	UDOM	10,000,000

Receptor / EHS Aspect	Impacts	Mitigation Measures	Residual Impacts	Responsibility		Est. Cost (Tshs)
				Implementation	Supervision	
		be covering work-related accidents (injuries and fatalities). • The contractor also will be obliged to maintain daily attendance sheets to verify the attendance of workers in case of accidents and provide the injured persons with proper health insurance to prevent Heavy Construction Equipment risk, workers should follow all construction safety guidelines necessary to eliminate the exposure to such injuries and accidents • Rigid obligations and penalties will be added to the contractor/subcontractors' ToR to warrantee no child labour occurs in the project. • A sufficient number of OHS supervisors should be assigned to minimize the breaching of OHS requirements. • A daily toolbox should be given to workers to share any information about OHS. • A worker's complaint system must be made available to workers on site. • Fencing the work site, to protect the workers on the site and those around it. • Institute speed limits and traffic controls for project vehicles and equipment • Training workers on how to operate machines/equipment • Provision of all workers with requisite protective gear • Presence of a construction engineer supervisor • Provision of the on-site toilet, clean drinking water, and washing water for worker • Provision of signage reminding use of PPE at appropriate locations in the project construction area including ancillary work				

Receptor / EHS Aspect	Impacts	Mitigation Measures	Residual Impacts	Responsibility		Est. Cost (Tshs)
				Implementation	Supervision	
		sites. • Presence and implementation of emergency preparedness plan at the site • Training of workers on safety and health at the site • Contractor to ensure the provision of mosquito nets for all workers on-site during night hours. • Control contagious diseases (e.g. Cholera) through proper sanitation and awareness • Control occupational hazards related to: o Physical hazards (noise, vibrations, high temperature) o Chemical hazards o Mechanical hazards (moving equipment) o Electrical/ explosion hazards o Ergonomic injuries (poor working postures, heavy loads etc				
Community Health and Safety	Noise and Vibration, Temporary Labor Influx, Traffic Safety, Fire	• The contractor should prepare and implement a Community Health and Safety Management Plan including but not limited to: • Information related to community health and safety to be shared regularly and systematically. • The contractor should submit a Job Hazard Analysis for all activities on site. An OHS plan/Manual for risk management specific to the site and the foreseen activities, and following the risk control hierarchy, should be submitted, • Development and implementation of a Traffic Management Plan (including routes and alternative routes, truck movements, transport of workers, and short-term closure of roads	**Minor**	Contractor	UDOM	3,000,000

Receptor / EHS Aspect	Impacts	Mitigation Measures	Residual Impacts	Responsibility		Est. Cost (Tshs)
				Implementation	Supervision	
		• The construction site is to be fenced and guarded to prevent any unauthorized access to the site. • In case of transporting heavy equipment, the nearby population should be notified in advance. • Develop and implement a well-communicated and accessible grievance mechanism for community members to address any complaints, • The mitigation measures identified under the sections on noise, air quality, waste management and traffic deviation, will all minimize the potential negative impacts on communities. • Provide adequate health care to protect workers and their families to avoid adding additional pressure on the existing health facilities. • Support to communities in the provision of communal sanitation and waste management facilities • Together with the communities, identify measures for reducing the effects of floods (e.g., installation of proper drainage points along the access road) • Conduct preventive health campaigns for the communities with a particular focus on water and sanitation-related diseases • Dissemination of traffic management plans in the project area, through campaigns in schools and communities				

Receptor / EHS Aspect	Impacts	Mitigation Measures	Residual Impacts	Responsibility		Est. Cost (Tshs)
				Implementation	Supervision	
Temporary Labor Influx	There is a risk that the incoming workforce may exploit the natural resources of the area such as administrative burden, pressure on accommodation, food, risk of communicable diseases, health care and medication and potable source of water.	• To minimize impacts pertaining to labour influx the following should be thoroughly implemented: • Ensure adequate information-sharing and collaboration with the local authorities. • UDOM shall take responsibility for the handling of grievances triggered by the workers in the community. • Joint efforts on community policing with UDOM setting up its security system. • Contractors to provide for their workforce, including health care, water and sanitation, housing, etc. • UDOM shall have a defined stakeholder engagement plan • Establish transparent recruitment procedures to avoid camp followers in form of jobseekers. • Priority for recruitment to be given to residents for less specialised services. • 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 labour. • Conduct public health campaigns to surrounding communities addressing issues of behavioural change, water and sanitation,	**Minor**	Contractor	UDOM	3,000,000

Receptor / EHS Aspect	Impacts	Mitigation Measures	Residual Impacts	Responsibility		Est. Cost (Tshs)
				Implementation	Supervision	
		Malaria, HIV/AIDS, etc. • Develop and implement procedures to avoid or minimize the transmission and spread of COVID-19 that may be associated with the influx of temporary or permanent contract-related labour. • A code of conduct for workers shall be developed, all workers should be trained on it. All types of inappropriate behaviour of workers should be identified, and the importance of adhering to the code of conduct is emphasized. • All workers shall be trained on the Code of Conduct • Code of conduct induction is to be done every 2 weeks for the recurrent workers and the newcomers before starting work. • Apply penalties to workers violating the code of conduct. • Apply the full requirements related to operating the grievance mechanism including anonymous channels. • Reduce labour influx by tapping into the local workforce. • Train workers on environmental conservation • Regulate access to the project site via security measures. • Workers shall be prohibited from collecting firewood, cutting, or pruning any trees or branches without the authorization of the supervising engineer.				

Receptor / EHS Aspect	Impacts	Mitigation Measures	Residual Impacts	Responsibility		Est. Cost (Tshs)
				Implementation	Supervision	
Gender-Based Violence/ Discrimination	Construction activity may bring about gender-based discrimination	• Ensure that the Code of Conduct and corresponding training concerning the commitment of labour towards the community and the different behaviour that should be avoided emphasizes zero tolerance of gender-based violence (GBV) i.e. sexual harassment, sexual exploitation and sexual abuse, • Apply penalties to workers violating the Code of Conduct, • The contractor to prepare an awareness session/training on GBV issues for workers, • The contractor to ensure all available capacity-building training is accessible to both male and female workers, • Implement all facets of the established grievance mechanism, ensuring anonymous channels are available. • Conduct ongoing consultations with women and girls only that are understandable and culturally appropriate. • Establish a grievance mechanism that is sensitive to gender by assigning a female SWO in case of GBV incidents, • Apply the full requirements related to operating the grievance mechanism including an anonymous channel. Ensure a grievance mechanism that is survivor centred. • UDOM shall ensure positive discrimination in job allocation to construction workers whereby women are given responsibility for tasks that are well-suited to the individual woman's	**Minor**	Contractor	UDOM	N/A

Receptor / EHS Aspect	Impacts	Mitigation Measures	Residual Impacts	Responsibility		Est. Cost (Tshs)
				Implementation	Supervision	
		capacities, based on their potential. • The workplace environment including the ergonomics of tools and equipment should be gender friendly. • Involve the ward office during the hiring of the labour force with an explicit focus on increasing the participation of women in the workforce.				
Child Labor	There is a risk that this common practice is used in the project	• Supervisors and Health and Safety officers shall be hired by the contractors to oversee work sites and they will be largely responsible for the community and their safety around the construction site and to prevent the entry of unregulated child labour and monitor the construction site. Ensure an efficient grievance mechanism is put in place. • The contractor/ subcontractor, primary suppliers, and service provisions; so, will be obliged to maintain daily attendance sheets to verify the attendance of workers to prohibit any kind of hiring of minors in the project. • UDOM must ensure zero underage employment at the construction site and employment of young people must adhere to the Employment and Labour Relations Act: 2004. • Adherence to the legal age for employment in accordance with national and international laws and regulations	**Minor**	Contractor	UDOM	N/A

Receptor / EHS Aspect	Impacts	Mitigation Measures	Residual Impacts	Responsibility		Est. Cost (Tshs)
				Implementation	Supervision	
Public Infrastructure and services	Pressure on health services	• Provide adequate health care to protect workers and their families to avoid adding additional pressure on the existing health facilities • Support to communities in the provision of communal sanitation and waste management facilities • Conduct preventive health campaigns for the communities with a particular focus on water and sanitation-related diseases	**Minor**	Contractor	UDOM	N/A
Road Traffic and Transportation	The increased traffic volume combined with nuisances such as dust and noise	• Institute speed limits and traffic controls for project vehicles and equipment • Dust control measures especially in sections close to schools and health centres • Conduct a traffic assessment study and develop and implement a traffic plan, including safety measures, • Signage should be installed on the access roads • Assigning a traffic man to arrange traffic in the vicinity of the sub-project site • Ensure vehicle safety and regular maintenance.	**Minor**	Contractor	UDOM	N/A

Receptor / EHS Aspect	Impacts	Mitigation Measures	Residual Impacts	Responsibility		Est. Cost (Tshs)
				Implementation	Supervision	
		• Review any complaints related to traffic and accidents • The speed limit should be monitored, particularly, in the vicinity of sensitive receptors located close to the route (if any).				
Security Threats	Construction projects may attract opportunistic thieves and criminals	• Support local security systems to strengthen community policing and crime-handling measures. • Cooperate with Police Post Available at Chimwaga area within UDOM premises. • Institute strict control measures for a project property • Ensure that the conduct of security personnel complies with good international practice. • Establish a grievance mechanism for addressing security-related grievances	**Insignificant**	Contractor	UDOM	3,000,000
During Operation Phase						
Dust and Particulate Matter	Little to no dust is expected to be generated during the operation phase but may occasionally occur from maintenance and	• Spray water on the access road to avoid dust dispersion, if necessary. • Chose an appropriate downwind location for maintenance and repair work during operation that would generate dust. • Provide appropriate PPE for staff undergoing maintenance or	**Minor**	UDOM	UDOM	5,000,000

Receptor / EHS Aspect	Impacts	Mitigation Measures	Residual Impacts	Responsibility		Est. Cost (Tshs)
				Implementation	Supervision	
	repair activities.	repair activities that are expected to generate a substantial amount of dust.				
Gaseous Emissions	GHG emissions will be generated by vehicular movement in and around UDOM	• Utilize as much of the centre's energy needs as possible with 'clean' renewable energy and limit the use of fossil-fuel-based energy and equipment. • Incentivize potential visitors to carpool or provide energy-efficient hybrid shuttles for visitors.	**Insignificant**	UDOM	UDOM	5,000,000
Noise and Vibration	Noise and vibrations during operations are considered insignificant. The only sources of noise will be the wind turbines and the presence of students and staff on the premises.	• Implement noise reduction procedures for nighttime e.g. no outdoor sports past 10 pm, etc.	**Insignificant**	UDOM	UDOM	3,000,000
Land Contamination	Land contamination may occur during operation from improper handling of generated waste streams or accidental	• The contractor or UDOM shall work hand in hand with private refuse handlers and the Dodoma city council to facilitate waste handling and disposal from the site. Solid waste will be collected, transported and disposed of at suitably approved dumpsites. • All solid waste should be properly separated and sorted to encourage recycling and reuse where possible.	**Insignificant**	UDOM	UDOM	10,000,000

Receptor / EHS Aspect	Impacts	Mitigation Measures	Residual Impacts	Responsibility		Est. Cost (Tshs)
				Implementation	Supervision	
	spillage of hazardous materials such as fuels, oils and chemical agents.	• Provision of large, secure dustbins near the site gate as the central collection point for all solid waste generated on campus. • Waste receptacles will be placed at strategic points throughout the facility to discourage littering. • Ensure that any hazardous wastes are handled separately from common domestic and institutional solid waste.				
Water Pollution	During operation, water pollution may occur from accidental spillage of hazardous chemicals, improper management of effluents, wastewater and stormwater.	• Provision of secondary containment on-site to collect diffuse and accidental spills of fuels and other hydrocarbons. • Storage and handling of fuels and construction fluids are to be managed by a qualified person and stored well away from any natural water courses. • Well-designed stormwater collection system for the facility as a whole and rainwater harvesting system on all buildings. • Ensure proper waste management on-site, at all times, including separation and sorting of solid waste as well as separate protocols for the management of hazardous waste under the responsibility of qualified personnel or institutions. • Ensure regular maintenance and cleaning of sanitation facilities on-site. • The proponent shall ensure that the wastewater system capacity is appropriate for the number of users on-site at any given period and make modifications to the capacity of the system as necessary to	**Insignificant**	UDOM	Dodoma City Council Authority	10,000,000

Receptor / EHS Aspect	Impacts	Mitigation Measures	Residual Impacts	Responsibility		Est. Cost (Tshs)
				Implementation	Supervision	
		safely handle the volume of wastewater generated. This will assure the efficiency of the system and minimise or eliminate incidences of untreated sewer spills to the environment • Install an independent stormwater drainage system to the site area to minimize flooding and erosion potential as well as ensure no contaminants enter the stormwater before discharging to the waterways. • Install rainwater harvesting systems on all buildings. This will increase the water efficiency of the centre by providing a sustainable source of non-potable water for use in gardens and washing cars, etc. Additionally, this will reduce the volume of water infiltrating the ground (soil and rocks) and reduce the possibility of flooding.				
Waste Generation	Operations will generate several waste streams including: **Non-Hazardous Solid Domestic Waste:** paper, wood, garbage, **Hazardous Solid Waste:** containers of machine oils/fuels, hydraulic fluids, paints, paint thinners,	• Waste management shall be based on a hierarchy that considers prevention, recycling and reuse, treatment and disposal to increase resource efficiency and decrease the generation of waste in the first place. • The proponent shall ensure the provision of appropriate, clearly marked waste disposal receptacles with separate containers for hazardous and non-hazardous wastes. • The proponent shall provide basic training to all staff and employees regarding the identification of potentially hazardous waste materials and their appropriate management. • All employees working with hazardous materials should be trained	**Insignificant**	UDOM	Dodoma City Council Authority	10,000,000

Receptor / EHS Aspect	Impacts	Mitigation Measures	Residual Impacts	Responsibility		Est. Cost (Tshs)
				Implementation	Supervision	
	Liquid Waste: domestic wastewater, effluents from cleaning and maintenance of machines, equipment and systems	in hazard identification, safe operating procedures, appropriate materials handling procedures, safe work practices, basic emergency procedures, and (if applicable) Special hazards unique to their jobs. • The proponent shall ensure that all waste streams generated on-site should be appropriately sorted and pre-treated, if necessary, in compliance with local and international standards before transportation off-site. • The proponent shall engage a competent and qualified refuse company or the local municipality for the handling, transportation, and disposal of hazardous solid wastes. • All refuelling of heavy equipment and machine maintenance shall be undertaken by a competent and qualified individual, in a designated area with appropriate safeguards and protection measures in place.				
Establishment of Invasive Plant Species	In the construction phase, soils will be disturbed setting the foundation for the establishment of existing, non-native invasive plant species during operation.	• Limit soil disturbance and vegetation clearing where possible. • Ensure proper cleaning of machines and equipment brought to the project site to minimize the possibility of invasive plant seeds or other parts which could potentially propagate invasive species. • Mechanical removal of invasive plant species during routine vegetation maintenance. • Apply chemical herbicides to the severely infested area where necessary.	**Insignificant**	UDOM	UDOM	3,000,000

Receptor / EHS Aspect	Impacts	Mitigation Measures	Residual Impacts	Responsibility		Est. Cost (Tshs)
				Implementation	Supervision	
		• Restore disturbed areas immediately after construction and maintenance works by broadcasting seeds of native plant species that are appropriate for the area. • Avoid importation of exotic trees and soil from other places (e.g., for restoration or as ornamentals)				
Habitat Degradation	Terrestrial habitat degradation will occur due to the construction of new buildings However, the project area is not a unique habitat and wildlife are expected to easily find suitable habitats outside the project area.	• Ensure the provision of appropriately-sized 'escape routes' for small terrestrial animals in the site perimeter fence • Ensure that all visitors and staff abide by a set of rules and practices that limit the attraction of animals to the campus (e.g. rules on food storage, food waste management, etc.)	**Insignificant**	UDOM	UDOM	N/A
Health and Safety Impacts	**Fire Risk** Fire risks are inherent in all buildings and Tanzania policy dictates all residences must be equipped with firefighting preparedness	• Fire management training to staff members Fire extinguishers shall be stationed at each strategic area • Water hydrants shall be installed. • All the electrical connections shall be designed by a registered engineer.	**Insignificant**	UDOM	UDOM	5,000,000

Receptor / EHS Aspect	Impacts	Mitigation Measures	Residual Impacts	Responsibility		Est. Cost (Tshs)
				Implementation	Supervision	
	plan and devices.					
Health and Safety Impacts	**Security Threats** During operation, opportunistic thieves may be attracted to the area given the commercial activities that will take place at UDOM	• Support local security systems to strengthen community policing and crime-handling measures • Cooperate with Police Post available at Chimwaga Area within UDOM premises • Institute strict control measures for entering the project property • Ensure that the conduct of security personnel complies with good international practice • Establish a grievance mechanism for addressing security-related grievances	**Insignificant**	UDOM	UDOM	3,000,000
Population influx	The project will offer opportunities like education and employment opportunities hence attracting the movement of people in the area or nearby villages and streets. This would lead to a breakdown of the social fabric of the surrounding	• Establish transparent recruitment procedures to avoid camp followers in form of job seekers. • Priority for recruitment to be given to residents for less specialised services • 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 labour • Conduct student and public health campaigns addressing issues of behavioural change, water and sanitation, Malaria, HIV/AIDS, etc.	**Minor**	UDOM	UDOM	4,000,000

Receptor / EHS Aspect	Impacts	Mitigation Measures	Residual Impacts	Responsibility		Est. Cost (Tshs)
				Implementation	Supervision	
	communities and exacerbate infectious diseases.					
Accident due to increased traffic	Disruption of local and regional traffic, raising the intensity of the road	• Conduct a traffic assessment study and develop and implement a traffic plan, including safety measures, • Assigning a traffic man to arrange traffic in the vicinity of the project site • Review any complaints related to traffic and accidents • The speed limit should be monitored, particularly, in the vicinity of sensitive receptors located close to the route (if any). • Coordination with local authorities to monitor traffic on the road.	**Insignificant**	UDOM	TANROADS	1,000,000
During Decommissioning						
Dust and Particulate Matter	Dust will be generated during the decommissioning phase from vehicular movement, demolition works and loose/friable materials	• Spray water on the access road to avoid dust dispersion as necessary. • Securely cover all trucks hauling debris material such as bricks, sand and pieces of cement with tarpaulins during transportation to avoid dispersion to the air. • Set and enforce speed limits for hauling trucks to minimize the dispersion of loose materials to the environment.	**Minor**	Contractor	UDOM	4,000,000

Receptor / EHS Aspect	Impacts	Mitigation Measures	Residual Impacts	Responsibility		Est. Cost (Tshs)
				Implementation	Supervision	
	transportation	• Store and sort piles of materials and soil suitably in a sheltered location away from strong gusts of wind and cover if necessary to minimize dispersion.				
Gaseous Emissions	Gaseous emissions such as NO_x and SO_2 will be generated from the exhaust pipes of construction machinery	• Ensure vehicle emissions comply with the relevant national/international standards. • Ensure routine maintenance of trucks and construction machinery to minimize unnecessary emissions from poorly maintained engine systems. • Select transportation routes that circumvent (stay away from) sensitive receptors to maximize the distance between the emission source and the sensitive receptors.	**Insignificant**	Contractor	UDOM	3,000,000
Noise and Vibrations	Noise and vibrations will be generated by demolition works and the operation of heavy and light machineries such as bulldozers and jackhammers.	• Schedule noisy activities to appropriate daytime hours only. • Install noise control devices in construction equipment if noise levels exceed the applicable guidelines. • Instruct the workforce to avoid unnecessary noise. • Provide ear protection equipment to workers. • Limit working time to those workers operating in high-noise environments. • Use properly maintained truck to keep their noise at minimum.	**Insignificant**	Contractor	UDOM	5,000,000
Solid, Liquid & Hazardo	Decommissioning will generate several waste	• The contractor will arrange for safe storage, transportation and disposal of all hazardous waste generated during the construction	**Minor**	Contractor	UDOM	10,000,000

Receptor / EHS Aspect	Impacts	Mitigation Measures	Residual Impacts	Responsibility		Est. Cost (Tshs)
				Implementation	Supervision	
us Waste	streams including: **Non-Hazardous Solid Waste**: scrap steel, wood, cardboard, as well as debris such as bricks and concrete. **Hazardous Solid Waste:** containers of machine oils/fuels, hydraulic fluids, paints, paint thinners. **Liquid Waste**: domestic wastewater, effluents from cleaning	phase by engaging a certified contractor or local authority to collect, transport and dispose of all hazardous waste generated at the project site according to the relevant national and international standards for hazardous waste management. • The Contractor shall identify and sort all waste streams. • Waste management shall be based on a hierarchy that considers prevention, recycling and reuse, treatment, and disposal to increase resource efficiency and decrease the generation of waste in the first place. • Under the supervision of the contractor, solid waste generated during decommissioning shall be properly treated and safely disposed of only in clearly marked waste disposal sites with an appropriate lining material to prevent land contamination. • All refuelling of heavy equipment and machinery shall be undertaken by a competent and qualified individual, with appropriate safeguards and protection measures to prevent any spillage or contamination by chemical wastes or maintenance oils, lubricants, etc. • All employees working with hazardous materials should be trained in hazard identification, safe operating procedures, appropriate materials handling procedures, safe work practices, basic emergency procedures, and (if applicable) Special hazards unique to their jobs.				

CHAPTER NINE

9.0 ENVIRONMENTAL AND SOCIAL MONITORING PLAN (ESMoP)

9.1 Introduction

This section outlines the monitoring and reporting program to be implemented during the construction, operation and decommissioning phases of the project. The monitoring and reporting program has been developed based on the full project design parameters, the potential impacts identified and presented in chapter seven, and relevant legislation, standards and guidelines described in chapter three.

The principal purpose of the monitoring and reporting program is to provide information necessary to determine the project's operational and environmental performance in and around the project area. Regular monitoring ensures the efficacy of the mitigation measures, as well as compliance with standards, guidelines and permit conditions imposed by NEMC.
The monitoring and reporting program has been designed to:

- Comply with applicable Tanzanian legislation, standards, and guidelines.
- Adhere to good international industry practices relating to environmental monitoring.
- Allow periodic reassessment of the project's impacts (and subsequent review of mitigation and management measures).

Environmental and social impact monitoring will be carried out to ensure that construction activities comply and adhere to environmental requirements. The following monitoring plan is associated with the management plan described in chapter eight. This stand-alone Environmental and Social Monitoring Plan is the core monitoring tool to be used by the proponent, which also provides an estimate of the mitigation and management costs in local currency i.e., Tanzania shillings (TZS).

This will serve as a reference document for planning, implementation, monitoring and reporting. Both UDOM and the supervising consultant will have competent staff in the field of Environmental and Social Management to ensure commitment to the report implemented. Monitoring will involve measurements, observations, evaluations, assessment and reporting on the following variables during the implementation phases of the proposed project. The following list provides a non-exhaustive compendium of parameters to be monitored:

- Accidents during construction and operation of major infrastructures.
- Socio-economic impacts of the project (e.g. on employment, health, rural electrification, etc).
- Impact on ecosystems, e.g., fauna mortality and damage to vegetation.
- Environmental impacts and materials sourcing (e.g. impacts on hydrology,

- Impact on physical cultural resources.
- Site waste management.
- Measures for mitigation of air quality.
- Measures for the protection of water quality.
- Measures for control of noise levels.
- Measures for control of land degradation.
- Measures for Occupational Safety and Health

Monitoring activities associated with the aforementioned issues should be documented and reported regularly to key stakeholders throughout the lifetime of the project and ensure that sufficient resources are allocated for effective management and monitoring implementation. Where appropriate, external contractors or parties may be engaged for the provision of additional support in implementing the monitoring and reporting program.

Table 9.6:Environmental and Social Monitoring Plan

Pre-Construction and Construction Phase							
Air Quality	**Gaseous and Dust Emissions**	• Ambient air quality (PM_{10}) • Concentrations of gaseous pollutants including SO_2, CO and NO_x • The concentration of Lead in air • Evidence of covering trucks hauling loose/friable materials. • Frequency of water spraying on roads and stockpiles • Number of complaints related to air quality	Contractor	Quarterly	On-site	• PM_{10} < 0.1 in µg/Nm^3 • SO_2< 0.5mg/Nm^3 for 10 mins • CO < 150 g/Nm^3 for less than 15 mins. • NO_x< 150 g/Nm^3 for 24 hours • Pb < 1.5 g/Nm^3 for 24 hours Conforming to EC directive 89/336/EEC and ISO 12103-1)	5,000,000
	Noise & Vibrations	• The noise level during construction • Evidence of hearing protection use by workers	Contractor	Quarterly	On-site	In compliance with WB and TBS standards: • Daytime noise levels < 60 dB • Night-time noise levels < 50 dB	5,000,000

Soil	**Soil Erosion**	• Number of Trees Planted • Landscape	Contractor	Quarterly	On-site	• Site inspection. • Maximize tree planting on riverbanks	1,000,000
	Land Contamination	• Amount and type of waste generated, sorted, recycled/reused, treated and disposed • Number of dust bins • Signs of spillage of hazardous materials • Testing in case of accidental spills of hazardous	Contractor	Monthly	On-Site	• Site inspection with photo documentation • Zero hazardous wastes stored on-site	1,000,000
Water	**Water Pollution**	• The pH of sewage and effluent • The concentration of Pb in wastewater • Sulphate (SO_4) concentration • Type and amount of waste generated, sorted, recycled/reused, treated and disposed.	Contractor	Quarterly	On-site	**Physical Components** Below 30 mg/L of BOD5 at 20°C using TZS 861 (Part 3):2006 Five-Day BOD method. Below 60mg/L of COD using TZA 861(Part 4): 2006 Dichromate Digestion Method 100mg/L TSS using TZA 861(Part	20,000,000

		• Number, location and status of waste disposal sites • Number and status of toilet facilities • Wastewater quality parameters • Quality of secondary containment structures • Evidence of labelling hazardous waste • Evidence of pollution spill contingency plan				1):2006 Gravimetric Method Below 0.2mg/L Dichloromethane using GCECF (ISO10301:1997) Determination of Highly volatile halogenated hydrocarbons using the Gas Chromatograph method **Inorganic Components** Below 0.1mg/L Pb using TZS 861(Part 7):2006 Flame Atomic Absorption Spectrometry Below 500mg/L SO_4 using APHA Standard Methods: 4110 B. Ion Chromatography with chemical suppression of eluant conductivity **Organic Components** Below 0.5mg/: of Alkyl benzene sulfonate (ABS)	

						using ISO 7875-1:1996 (Part 1) Determination of surfactants by measuring the methylene blue index (MBAS) Below 10mg/L of Fatty matter and hydrocarbons using APHA Standard methods 5520	
Water	**Groundwater Emergence**	• Groundwater Emergence during Excavation	Contractor & Immediately to responsible Authority	Daily	On-Site	• Target Zero	N/A
Flora and Fauna	**Wildlife Disturbance**	• Noise Levels during construction	Contractor	Quarterly	On-site	• Noise levels below 60 dB during daytime • Noise levels below 50 dB during night-time	5,000,000
	Vegetation Clearing	• Land area cleared. • Land area re-vegetated	Contractor	Quarterly	On-site	• Land area cleared. • The proportion of land area re-vegetated with native plant species	1,000,000

Waste Management	**Domestic Solid Waste Generation**	• Waste segregation • Disposal receipts	Contractor	Daily	On-site	• Site inspections • Maintaining a record of the type, quantity, and disposal location of hazardous and non-hazardous waste. • Weekly disposal of solid waste via the certified private contractor or local municipality.	1,000,000
Labour Force	**Occupational Health and Safety**	• Emergency Preparedness Plan • Presence of specialist Environmental Engineer • Qualifications to operate machinery/equipment. • Provision of easily accessible First-Aid Kit	Contractor	Monthly	On-site	• Condition of a perimeter fence around the construction area • Number of Trained Personnel in safety procedures • Inspection of	5,000,000

		• Personal Protection Equipment (PPE) • Presence of Safety Officer • Evidence of OHS Plan • Number of workers trained in safety procedures. • The proportion of workers using PPE • The structural integrity of worker accommodations and sanitary facilities • Workers' access to health services • The malaria prevalence rate in the workforce • HIV/AIDS prevalence rate in the workforce • Incident statistics (Total recorded injuries, fatalities, lost time injuries, restricted work cases, medical treatment cases, first-aid cases,				Workers' OHS training records • Availability of PPE on site • Target Zero workplace accidents	

		near miss reports.					
Community	**Community Health and Safety**	• Number of accidents/ injuries • The number of complaints raised by the local community. • Disclosure activities including points of sharing information are in place • Disclosed information through the project information documents • Available emergency responders in case of accidents. • Number of complaints raised about various CHS items including GBV and traffic • Site visit reports	Contractor	Monthly	On-site	• Grievance log • Random site inspection • Reviewing community consultation reports • Interview with community members • Data related to COVID 19 • Monitoring labour influx impacts	4,000,000
Temporary Labor Influx	**Local Government and Administration**	• Availability of the code of conduct • Total number of trained	Contractor	Monthly	On-site	• Lists of workers trained	15,000,000

	Population and Demographics **The Environment and Natural Resources**	workers on the code of conduct • Signed code of conduct • Penalties and disciplinary action being taken against workers who violate the code of conduct. • Complaints raised due to Labour influx. • Documentation of corrective measures adopted. • Recruitment Plan • The public health campaign plan				• Disciplinary actions taken • Review Grievance log • Site observation • Review Worker code of conduct • Engagement with women minutes of meetings • Maximize the number of local employees. • Monitor the total number of employees • Engage in the public health campaign plan	
Community & working conditions	**Gender-Based Violence/Discrimination**	• The proportion of women employed on the project • The monitoring of	Contractor	Quarterly	On and Off-site	• Periodic reports • Review	1,000,000

		workers' compliance to the Code of Conduct when interacting with the surrounding communities to avoid behaviours such as GBV. • Engagement activities carried out with women • Complaints raised related to the GBV • Documentation of corrective measures adopted • The proportion of unskilled workforce receiving training and skills enhancement				Grievance log • Site observation • Review Worker code of conduct Target zero gender discrimination • The target numberof female employees.	
Community	**Child Labor**	• Record of workers • Labour registry • Grievance log	Contractor	Monthly	On-site	• Site inspection with photo documentation • Monthly reports • Review Grievance log • Review Labour registry and IDs	N/A

Public Infrastructure and services	**Pressure on Health Services**	• Dispensary uses on-site. • Grievance log	Contractor	Monthly	On-site	• Monitor the current and a maximum capacity of the on-site medical dispensary	N/A
	Damage to Water Pipeline	• Emergency Maintenance Plan • Grievance log • Documentation of affected infrastructure and corrective procedures taken	Contractor	Monthly	On and Off-site	• Periodic reports • Review documentation of affected infrastructure and corrective procedures taken • Review Grievance log	1,000,000
Community	**Road Traffic and Transportation**	• Traffic Management Plan • Dust Management Covers • Truck Speeds • Evidence of Traffic and Transportation Safety Plan • Traffic Incident Rate (worker, community, livestock) • Number of drivers	Contractor	Monthly	On and Off-site	• Site inspection with photo documentation • Monthly reports and grievance log • Review Grievance log • Review Accidents log (if applicable)	2,000,000

		trained and hold valid licenses • Evidence of signage, warnings and controls					
Landscape	**Visual Landscape**	• Number of Trees Planted • The land area is exposed to vegetation clearing. • Quality of landscaping at restored sites. • Plant species used for re-vegetation • Number and location of spoil heaps • Cleanliness of construction site	Contractor	Annually	On-site	• Maximize the number of trees planted. • Minimize exposed soils from vegetation clearance. • Monitor number, and location and cover the status of spoil heaps during construction	1,000,000
Community	**Security Threats**	• Presence of Security Guards • Compliance with voluntary principles on security and human rights • Evidence of training of security personnel in the	Contractor	Annually	On-site	• The number of security personnel on-site. • The number of personnel on-site trained in the use of force and firearms.	N/A

		use of force and firearms • Number of security-related grievances raised by the communities and workers				• Target zero criminal activity on-site. • Record number of security incidences and security-related grievances by workers and community members	
Operation Phase							
Air Quality	**Gaseous and Dust Emissions**	• Ambient air quality (PM10) • Concentrations of gaseous pollutants including SO_2, CO and NO_x • The concentration of Lead in air • Evidence of covering trucks hauling loose/friable materials.	UDOM	Quarterly	On-site	• PM_{10} < 0.1 in µg/Nm^3 • SO_2< 0.5mg/Nm^3 for 10 mins • CO < 150 g/Nm^3 for less than 15 mins. • NO_x< 150 g/Nm^3 for 24 hours • Pb < 1.5 g/Nm^3 for 24 hours (Conforming to EC directive 89/336/EEC and ISO 12103-1)	5,000,000

	Noise & Vibrations	• The ambient noise level in dB during regular operations.	UDOM	Quarterly	On-site	In compliance with WB and TBS standards: • Daytime noise levels < 60 dB • Night-time noise levels < 50 dB	5,000,000
Soil	**Land Contamination**	• Amount and type of waste generated, sorted, recycled/reused, treated and disposed • Number of dust bins	UDOM	Monthly	On-Site	• Site inspection • Zero hazardous wastes stored on-site	1,000,000
	Water Pollution	• The pH of sewage and effluent • The concentration of Pb in wastewater • Sulphate (SO_4) concentration • Fatty matter and hydrocarbon concentrations • Dichloromethane Amount • Type and amount of waste generated,	ATC	Quarterly	Off-site	**Physical Components** -Below 60mg/L of COD using TZA 861(Part 4): 2006 Dichromate Digestion Method Below 100mg/L TSS using TZA 861(Part 1):2006 Gravimetric Method -Below 0.2mg/L Dichloromethane using GCECF (ISO10301:1997) -Determination of Highly volatile halogenated	20,000,000

		sorted, recycled/reused, treated and disposed • Number, location and status of waste disposal sites • Number and status of toilet facilities • Wastewater quality parameters • Quality of secondary containment structures • Evidence of labelling hazardous waste Evidence of pollution spill contingency plan				hydrocarbons using Gas Chromatograph method **Inorganic Components** Below 0.1mg/L Pb using TZS 861(Part 7):2006 Flame Atomic Absorption Spectrometry Below 500mg/L SO4 using APHA Standard Methods: 4110 B. Ion Chromatography with chemical suppression of eluant conductivity **Organic Components** Below 0.5mg/: of Alkyl benzene sulfonate (ABS) using ISO 7875-1:1996 (Part 1) Below 10mg/L of Fatty matter and hydrocarbons using APHA Standard methods 5520	
Flora & Fauna	**Establishment of Invasive Plant Species**	• Land area cleared during construction.	UDOM	Monthly	On-site	• Site inspection of invasive plants with photo	N/A

		• The proportion of land area revegetated. • Number of trees planted. • Land area coverage with invasive plant species.				documentation. • Maintain records of position, coverage and treatment of land areas with invasive plants.	
Waste Generation	**Sewage and Effluents**	• BOD Level • COD LeveL • The pH of sewage and effluent • The concentration of Pb in wastewater • Sulphate (SO_4) concentration • Fatty matter and hydrocarbon concentration • Type and amount of waste generated, sorted, recycled/reused, treated and disposed. • Number, location and status of waste disposal sites	UDOM	Monthly	On-site	**Physical Components** Below 30 mg/L of BOD5 at 20°C using TZS 861 (Part 3):2006 Five-Day BOD method 100mg/L TSS using TZA 861(Part 1):2006 Gravimetric Method pH range of 6.5-8.5 using TZS 861(Part2):2006 – Electrometric Method ***Inorganic Components*** Below 0.1mg/L Pb using TZS 861(Part 7):2006 Flame Atomic Absorption Spectrometry Below 500mg/L SO_4	20,000,000

		• Number and status of toilet facilities • Wastewater quality parameters • Quality of secondary containment structures • Evidence of labelling hazardous waste • Evidence of pollution spill contingency plan				using APHA Standard Methods: 4110 B. Ion Chromatography with chemical suppression of eluant conductivity ***Organic Components*** Below 0.5mg/l of Alkyl benzene sulfonate (ABS) using ISO 7875-1:1996 (Part 1) Determination of surfactants by measuring the methylene blue index (MBAS) Below 10mg/L of Fatty matter and hydrocarbons using APHA Standard methods 5520	
Waste Generation	**Solid Waste Generation**	• Amount and types of solid waste generated • The total amount of solid waste on-site. • Frequency of solid waste transportation and disposal	UDOM	Bi-weekly	On-site	• Site inspections with photographic evidence • Maintaining a record of type, quantity, and disposal location of solid and liquid waste	N/A

						generation	
Health & Safety	**Fire Risk**	◆ Emergency preparedness plan ◆ Presence of fire standpipe system ◆ Installation of the water reservoir tank of 100,000litres ◆ Presence of emergency fire water pumps ◆ Presence of hose reels ◆ Presence of portable fire extinguishers ◆ Installation of fire detection and alarming system around the building ◆ Presence of emergency response plan ◆ Presence of a logbook for recording fire incidents and fire drill ◆ Availability of emergency assembly point	UDOM	Quarterly	On-site	• Fire system • Water reservoir tank • Assembly area with sign • Clear warning signs (Warning-No Smoking, No Naked Lights, Danger) • CO_2 and sand fire extinguishers	5,000,000

		◆ Installation of emergency lighting and exit sign ◆ Employee fire safety training ◆ Fire safety certificate					
Health & Safety	**Security Threats**	◆ The number of Security personnel on-site. ◆ Compliance with Voluntary Principles on Security and Human Rights ◆ Evidence of training of security personnel in the use of force and arms ◆ Number of security-related grievances raised by the communities and workers	UDOM	Weekly	On-site	◆ Zero incidences of crime and criminal activity on site.	N/A
Community	**Population influx**	• Recruitment plan • Student and public health campaigns on HIV/AIDS and STDs • The proportion of the local population in the	UDOM	Quarterly	On-site	Number of local employees	10,000,000

		overall project • The proportion of women employees in the overall project • Evidence of written contracts • Number of worker grievance • Age of workers • Quality of workers' accommodation • The proportion of the unskilled workforce that have had their skills upgraded					
	Traffic Flow	• Traffic Management Plan • Evidence of Traffic and Transportation Safety Plan • Traffic Incident Rate • Evidence of signage, warnings and controls • Grievance log	UDOM	Biannually	Off-site	• Reports and grievance log • Review Grievance log • Review Accidents log (if applicable)	5,000,000

		• Number of road accidents • Number of complaints related to traffic and road accidents					
Decommissioning Phase							
Air Quality	**Dust, particulate matter and gaseous emission**	• Ambient air quality (PM10) • Concentrations of gaseous pollutants including SO_2, CO and NO_x • The concentration of Lead in the air • Evidence of covering trucks hauling loose/friable materials. • Frequency of water spraying on roads and stockpiles	UDOM	Monthly	On-site	• PM_{10} < 0.1 in µg/Nm^3 • SO_2< 0.5mg/Nm^3 for 10 mins • CO < 150 g/Nm^3 for less than 15 mins. • NO_x< 150 g/Nm^3 for 24 hours • Pb < 1.5 g/Nm^3 for 24 hours (Conforming to EC directive 89/336/EEC and ISO 12103-1)	5,000,000
Air Quality	**Noise and Vibrations**	-Ambient noise levels during regular operation of UDOM	Contractor	Monthly	On-site	In compliance with WB and TBS standards: • Daytime noise levels < 60 dB	5,000,000

						• Night-time noise levels < 50 dB	
Waste Generation	**Solid, Liquid & Hazardous Waste**	• Storage conditions of hazardous materials • Disposal at designated sites for solid hazardous waste	Contractor	Weekly	On-site	• Site inspections • Maintaining a record of type, quantity, and disposal location of solid and liquid waste generation	N/A

CHAPTER TEN

10.0 COST-BENEFIT ANALYSIS

10.1 Introduction

This chapter evaluates the impacts of developing the project on the economic environment of the surrounding area of the project sites, including nearby Street as well as on the local and regional governmental and institutional stakeholders of the project. In addition, the chapter presents an analysis of the social and environmental costs and benefits of the proposed project at CoESE and CNMS colleges in compliance with EIA regulations of the United Republic of Tanzania. Specifically, regulation 18(2) (xii) of the Environmental Impact Assessment and Audit Regulations, 2005 demands an assessment of resource evaluation or cost-benefit analysis (CBA) for any project undergoing EIA and the associated Environmental Impact Statement (EIS).

CBA is a process and analytical tool that is used to assess the worth of a project by evaluating the costs involved in project development and comparing them to the expected benefits from the project operation. CBA accounts for both direct and indirect costs and benefits. Economic impacts can be both positive and negative. The former often involves increased economic activity in the local area due to the project such as increased employment opportunities, increase revenue for local merchants, service providers, raw material suppliers, etc. Negative economic impacts may include loss of livelihoods, pressure on local services such as healthcare centers and all environmental and social externalities such as reduced ecosystem services due to the removal of trees and greenhouse gas emissions (GHG).

10.2 Methodology

There is no standard methodology framework suggested by NEMC for cost-benefit analysis despite the legal regulation required for EIA in Tanzania as such, the consultants developed and implemented the following methodology to assess the costs and benefits of the proposed construction activities.

The primary goal of the CBA is to assess the financial, social and environmental costs and benefits of the proposed project activities throughout all phases of the project from construction to decommissioning and on all stakeholders. Where possible and appropriate, quantification and monetization of all costs and benefits should be done to enable quantitative analysis. However, due to the difficulty and resource-intensive nature of quantifying intangible and indirect social and environmental variables, and considering the

very small-scale of the proposed project, a hybrid quantitative-qualitative analysis was developed and applied.

The methodology utilizes the two existing frameworks of ecosystem services first proposed by the Millennium Ecosystem Assessment (2007) and the Total Economic Framework (TEV) developed by Brander et al. (2010). The ecosystem services framework presents the direct and indirect ecosystem processes and functions that benefit both nature and humanity while the TEV delineates and accounts for the subjective values ascribed by individuals and groups to adequately include social values in the assessment of costs and benefits.

These two frameworks as well as the conventional financial/monetary CBA were combined to synthesize a comprehensive valuation of the impacts of the project.

The procedures for assessing the costs and benefits of the project were as follows:

- Detailed and comprehensive understanding of all project components, design, technologies, material use, and construction practices were studied as part of the development of the EIA process.
- Identification and grouping of all stakeholders according to categories of local, regional, and national scale stakeholders.
- Identification and quantification of all potential social, economic, and environmental impacts expected from the project, assessed for their impact significance in the ESIA and contextualized within the cost-benefit for each stakeholder category (Table 10.1)
- A brief description of the economic context of Tanzania is offered followed by a summary of the economic environment of the Dodoma City and Dodoma city Council is presented to put the socio-economic impacts within the real-world context.
- Following, an assessment of the project financials is offered in terms of capital costs, operating costs and assessed against expected revenue using the internal rate of return (IRR).
- The socio-economic (health, education, employment, and income opportunities etc.) and the ecological impacts (habitats, flora and fauna, hydrology, etc.) expected to arise from the project is analyzed using the ecosystem services-TEV hybrid framework.

- Finally, an assessment of total costs and benefits to the proponent, the local community and the environment is presented and includes both monetary and qualitatively assessed impacts. All impacts within this assessment represent residual impacts after the implementation of the outlined mitigation measures as well as the management and monitoring plans proposed with this ESIA.

10.3 Desired Project Outcomes

The desired outcome of the CBA for the project is to provide a net positive effect on the local economic environment while the proponent (UDOM) maintains a positive financial balance sheet over the lifetime of the project all the while safeguarding the ecosystem services provided by the natural environment.

10.4 Evaluation of Project Viability

10.4.1 Project Stakeholders

Stakeholders for the HEET project are identified and described in Chapter Five. Several types of stakeholders were identified and consulted during the development of the ESIA, including local, regional, and national stakeholders. All stakeholders were identified on the following basis:

- They are directly or indirectly affected by the project development (e.g. members of the communities living near the project site).
- Individuals, groups or corporate entities that can affect the project and have some say in operational decision-making (e.g. financing bodies such as the World Bank).
- Individuals or groups who require immediate attention from the project in relation to social, environmental, economic and financial matters.

All stakeholders were organized according to levels starting from the project proponent to local and district-level stakeholders, followed by the national stakeholders. The costs and benefits relating to each stakeholder is outlined in the Table 10.1 below.

Table 10.7 Cost and Benefits of Stakeholders

Levels	Stakeholders	Cost to Stakeholders	Benefit to Stakeholders
National Level	National-level stakeholders include several government ministries that are involved in the proposed project by providing required licenses, permits, authorization and approval for several key stages of	• Increased workload for some governmental departments,	Social: • Increased education and specialised engineers and scientists Environmental:

	the project and include: • Vice President's Office – Division of Environment • National Environment Management Council (NEMC) • Occupational Safety and Health Authority (OSHA) • Ministry of Energy • Ministry of Lands, Housing and Human Settlements Development • Ministry of Water and Irrigation • Ministry of Labour and Employment • TANESCO • TANROADS	particularly NEMC.	• Enhanced environmental and social safeguards and guideline Financial: • Foreign investment • Taxes and permits received from the proposed project. • Enhanced economic activity via commercial transactions at UDOM.
District Level	District-level stakeholders include all institutions and regulatory boards/offices which are associated with mitigating environmental and social impacts and include: • Dodoma City Administrative Secretary Office • Dodoma City Council, Executive Director Office • Ng'hong'onha Ward	• Increased workload for some district-level governmental units through the processing of permits and approvals.	Social: • Employment Opportunities • Enhanced education and training facilities within their district Environmental • Collaboration with proponents in the implementation of international best practices in environmental management.
Local Level	• Local traders such as small-scale vendors and unofficial suppliers. • Local materials suppliers	• Increased traffic on local roads • Lower air quality (during construction and decommissioning) • Restricted access to project site (loss of	Social: • Increased employment opportunities. • Increased business opportunities during construction for providing food and beverage services to the workforce. • Increased skilled labour • Enhanced access to education and quality training providing human capacity development • Reduction in poverty

		livelihood • Increased restriction on unapproved water abstraction.	• Enhanced infrastructure (road, water, wastewater, and electricity).
Financier	World Bank	• Resource allocation for reviewing EIA and associated project documentation. • Investment cost under HEET-Project	Social: • Enhanced global reputation as financier of environmentally responsible projects and contribution to decreased global warming via support of renewable energy projects. Financial: • Financial interest on project funding.
Project Proponent	The project proponent for project is University of Dodoma (UDOM)	• Design, implementation, and management of project components. • Operational costs • Government taxes • Cost of environmental and social management and monitoring plans.	Social: • Enhanced reputation as a state-of-the-art technical and educational training institution. • Increasing the human capacity and technical skills of Tanzanian in terms of science and technology Environmental: • Contributing to safe environmental management and monitoring • Providing clean energy generation Financial: • Revenue from tuition (training and educational programs). • Revenue from research and consultancy

10.4.1 Assessment of Costs and Benefits

Financial Analysis

Where possible, the financial analysis should be conducted within a quantitative paradigm in which monetary values of the financial costs and benefits are assessed alongside the environmental and social costs. However, environmental, and social costs may be difficult to

quantify and monetize accurately. As such, where quantification to a reasonably accurate level is not possible, a qualitative methodology was applied.

Monetary Financial Analysis

This section outlines the financial and economic impacts that are quantified and directly related to the proposed project development and operation (Table 10.2). The aim is to gauge the financial input versus the projected benefits arising from the proponent's perspective as well as from the wider local, district and national perspectives.

Table 10.8 Summary of Project Costs

N	Cost Type	Amount	
1	Total Project Cost	23,000,000,000 (Tshs)	
2	Projected Cost of Construction and Infrastructure	18,400,000,000 (Tshs)	
OPEX Breakdown		**Operational Cost (Million TZS)**	**Revenue (Million TZS)**
3	Fees for 3,640 students	-	200
5	Teaching staff (20 Staff members)	100	-
6	Salaries for supporting staff (20 Staff)	90	-
7	Staff housing	20	40
8	Student Housing	20	70
9	O&M of workshops etc	20	-
10	Housing for short course students	10	40
12	Short term courses	10	90
13	Practical training for students (placement in industries)	10	-

Summary of Project Finances

The project has a total projected cost of 23,000,000,000 Tshs which predominately will be spent (up to 80%) on the construction of the training and research Centre, around 18,400,000,000 Tshs. The operational costs that will run on an annual basis for running the Centre are 280,000,000 Tshs, and the projected revenue resulting from the OPEX is around 440,000,000 Tshs.

10.5 Assessment of Costs and Benefits of the proposed project

This section offers the overall results of the cost-benefit analysis by incorporating the monetary costs and benefits as well as the qualitative assessment of the environmental costs and benefits of the project that are expected to remain after mitigation measures are enforced. Table 10.4 summarizes;

Table 10.9 Qualitative costs and benefits of the Project

Costs/Benefits	Costs/Benefits Bearer			Justifications
	Prop	Com	Env	
Capital and operating costs	-	+		**Tangible costs** to the proponent (excluding government taxes): • Construction costs of 18, 400,000,000 Tshs • Operating costs of 280,000,000 Tshs The above breakdown provides the high-level figures for the project development and operation, with the CAPEX covered by the HEET funding while the OPEX will be covered by the revenues attained by UDOM. A considerable portion of the project costs will be spent on construction, specifically subcontractors and laborers. This is expected to have a positive effect on the local community as job opportunities arise and more money is spent on the region's development.
Temporary land users' loss of access		-		**Intangible cost** to the community: During construction of the proposed project in the respective sites. No community members will be affected by the restricted access and no individual's livelihoods are endangered by the project and the resulting access restrictions. (No livelihood activities in the project sites i.e CoESE and CNMS.
Air Quality Deterioration		-	-	**Intangible cost** to the community and the environment: Air quality in the local area will deteriorate temporarily during the 24-month construction phase and the short decommissioning phase at the end of the proposed project lifespan. The air quality will be affected by dust, particulate matter and gaseous emissions from construction machinery and the requisite earthworks for building foundations
Increased local employment opportunities	+	+		**The intangible benefit** to the community and the proponent: During construction, most (90%) of the labor force will be recruited from the local communities except for specialized and highly-skilled jobs. This will directly provide employment opportunities to local people who have few opportunities and very basic household incomes based on small-scale agriculture. Additionally, this will benefit the proponent as UDOM will have access to a conveniently located workforce with nearby residences.

Enhanced access to education and training facilities		+		**The intangible benefit** to the community: As part of the UDOM core of objective i.e. research, teaching and consultancy the implementation of the proposed project will inspire the local community and other Tanzania citizens, especially youth to participate in training and events specifically related to science, ICT and technology
Increased community income		+		**The intangible benefit** to the community: The presence of staff and students will provide opportunities for locals to sell their goods and services during operation.
Increased revenue to local vendors/material suppliers		+		**The intangible benefit** to the community: The presence of a significant workforce (180 workers) during the construction phase will provide ample opportunities for local vendors and entrepreneurs to sell their goods and services to an enlarged market. Moreover, most construction materials will be sourced locally which represents an increase in income to those local material suppliers. Finally, ancillary services such as waste management, plumbing contractors, landscaping services, etc. will increase due to the existence of the project, providing additional revenue opportunities for small local enterprises.
Increased government returns	-	+		**The intangible benefit** to the community: The existence of a private institution like UDOM will increase government returns through real estate taxes, permit and licensing fees as well as other direct and indirect financial benefits to the gentrification of the area.

Legend: Prop = Proponent (UDOM) ; Com = Community and surrounding Streets *; Env = Environment ; - = negative effect ; + = positive effect*

10.5.1 Summary and Conclusions on Cost-Benefits of the proposed project

The cost-benefit analysis shows that the implementation of the project at UDOM will yield significant benefits to the proponent and the surrounding communities via enhancement of livelihoods, provision of economic opportunities and education and enhanced infrastructure. Moreover, the associated and ancillary services will lead to the start of gentrification in this underdeveloped area providing further economic activity in the future via the presence of staff and students with expendable incomes. This generation of economic activity will improve government returns indirectly and directly via real estate tax, fees for permits and licensing and other administrative regulatory processes.

Provided mitigation measures are enforced, negative effects on the surrounding communities will be minimal and temporary, only occurring during the 18-month construction phase and the decommissioning phase at the end of the project's lifespan. The socio-economic benefits to the community outweigh the costs from the perspective of the entire lifespan of the project.

Although some negative impacts on the environment and ecosystem services are expected, particularly on the surrounding environment, this cost will be minimized via the implementation of mitigation measures and the provision of adequate environmental management. Positive environmental impacts of the project include the conservation, protection, and environmental management.

Despite some environmental and social costs that were noted, the implementation of mitigation measures for the project as well as management and monitoring plans presented in this ESIA lead to a net benefit to all stakeholders of the project.

CHAPTER ELEVEN

11.0 DECOMMISSIONING AND CLOSURE

11.1 Introduction

This is a preliminary decommissioning plan. This plan establishes feasible decommissioning schemes that can be accomplished without undue risk to the health and safety of the public and decommissioning personnel, without adverse effects on the environment, and within established guides and limits of the appropriate regulatory agencies. This preliminary plan will serve to ensure that the decommissioning and ultimate dispositions of the project are considered during the initial design and construction of the building. The preliminary plan will remain a "living document," and revisions will be made throughout the operating life of the building. It must be reviewed periodically and revised to reflect any changes in the construction or operation that might affect decommissioning. Prior to the initiation of actual decommissioning activities for the project, a detailed final disposition plan will be prepared.

The final plan should be based on the preliminary plan and revisions, and will define specific work activities including safety evaluations of planned decommissioning methods, new technology, and the project status that will result from the decommissioning program. In addition, this plan must contain sufficient information to obtain any approvals needed from the appropriate regulatory agencies to proceed with decommissioning activities.

11.2 Aim of the Preliminary Plan

The preliminary plan serves to establish decommissioning as an important consideration from the inception of the project, during design and throughout the operation of the proposed project. The plan has the following purposes:

a) The primary purpose of the preliminary plan is to ensure that the proposed project designers are cognizant of decommissioning during the initial design of the project. Thus, where design choices that would enhance decommissioning are available for types of materials and system components, and location of components, these choices shall be made.
b) Another purpose of the preliminary plan is to identity the ultimate decommissioning options and final project status. These options would be evaluated and narrowed to the decommissioning method of choice as the end of the project life is approached.
c) The final purpose of the preliminary plan is to demonstrate to regulatory agencies that important aspects of decommissioning are considered as early as possible during

the initial design of the project. The plan serves as the starting point to demonstrate that areas such as decommissioning methods, costs, schedules, and operating impact on decommissioning will be reviewed and refined throughout the operating life of the proposed project.

11.3 Content of the Preliminary

The preliminary plan provides a general description of decommissioning methods considered feasible for the project. The description is intended to demonstrate that the methods considered are practical and that they protect the health and safety of the public and decommissioning personnel. Design personnel should study the proposed decommissioning methods and take steps to ensure that the design incorporates features that will facilitate decommissioning. Considerations include:

a) An estimate of manpower, materials, and costs anticipated to support decommissioning.
b) A description of the anticipated final disposition and status of the project equipment and site.
c) A discussion demonstrating that adequate financing will be programmed for decommissioning.
d) Identification of records that should be maintained during construction and operation which might facilitate decommissioning, including a set of "as built" drawings.

11.4 Project Decommissioning Methodology and Schedule

UDOM shall fund and implement all aspects of Project decommissioning, including but not limited to, all engineering, environmental assessment, permitting, construction, and mitigation activities associated with the removal of the structures, in accordance with this plan and mitigation of Project removal impacts on site. The project proponent shall monitor environmental impacts during and after project removal to respond to defined events during the monitoring phase.

1. Decommissioning will involve, but not limited to the specified list, because some issues or problems may surface during subsequent monitoring and audits:

    a) The buildings will continuously be rehabilitated and renovated. While doing that there will be solid wastes which will be disposed of according to the ESMP.

b) Moreover, during decommissioning the buildings will be demolished accordingly to suit the new activity while doing that the rubble will be disposed off according to the directions of the Dodoma City Council's directives.

2. Since the lab building activity is an ongoing concern the Employees will not be terminated from their employments rather will be relocated to the other area of works.
3. On decommissioning the proponent will search for experts' opinions to convert the entire area into another or other uses. Could be expanding the laboratory building to serve more students than the current design capacity of the project or could be used for other communal use.
4. The restoration or convention plan for the entire premises will be made by proponent (with expertise from environmentalists and economists) and then forwarded to NEMC for approval.
5. Also, proponent Management shall obtain all permits required to undertake decommissioning of the Project. This basically will include Pension Fund, City Council etc.

Should there be no feasible option for conversion to other use of the building then the project structures will be required to be totally removed. Project removal will begin six months after closure and continue for twelve months. Within the six months from closure, proponent will carry inventory for all components that need to be removed and / or disposed of. This inventory will include building structures, equipment etc. to be demolished/dismantled. Also, mode of disposal will have to be finalized. This information will assist in the preparation of the final decommissioning plan, for approval by NEMC. After the approval of the decommissioning plan the metal parts will be removed first within the first three months (this is important to ensure that they are not vandalized). The second three months of the decommissioning will be used to remove concrete structures and foundations. Debris will be used as road fills for rural roads. All disturbed areas will be landscaped and re-vegetated using indigenous trees.

Project decommissioning has five phases: (1) pre-removal monitoring; (2) permitting; (3) interim protective measures; (4) Project removal and associated protective actions; and (5) 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:

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

2) **Permitting:** Proponent shall obtain all permits required to undertake removal of the Project. This basically will include NEMC, Dodoma City Council etc.

3) **Interim Protective Actions:** This will take care of any interim protective measure that needs to be implemented to protect human health and environment, if any.

4) **Project Removal:** As noted above, the removal of the project will be completed within three months.

5) **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 TWELVE

SUMMARY AND CONCLUSION

The ESIA study has scrutinized the environmental and social implications of the proposed Construction of Three Storey CoESE academic block and CNMS Science Laboratory Building at Ng'hong'onha Mtaa, Ng'hong'onha Ward in Dodoma City Council, Dodoma Region, Tanzania. The study was conducted to comply with the Environmental Management Act (2004) and was done in accordance with the EIA and Audit (amendment) Regulations, 2018 as well as World Bank Environment and Social Framework (ESF) and the project's Environmental and Social Management Framework (ESMF) respectively. Stakeholder consultations were conducted during the study to encompass central and local government authorities, communities in the project neighborhoods and interested parties. Standard methodology for impact identification was used including checklist, matrix and professional judgement.

Based on the findings, it is evident that development of the proposed three storey laboratory building will greatly contribute towards provision of quality education by UDOM to students for country socio-economic development. The Environmental and Social Impact Assessment study for the proposed project indicates that, the potential negative impacts can be easily mitigated without any major effect to the environment. However, some important resources/receptors may be affected negatively affected such as flora, fauna, the soil and water resources and air as well as local community. The impacts associated with these mostly vary from low to moderate significance and can be mitigated as shown in the Environmental and Social Management plan.

The project will be implemented within the area designated for educational purposes and fully owned by UDOM and thus no land compensation or resettlement for the project will be involved. The area is isolated from human settlements and thus with minimal impacts to social aspects. Many people of the area are likely to benefit from the project compared to those who will be affected negatively. The benefit in terms of provision of competent personnel and professionals in the labour market to address socioeconomic challenges for economic growth of the country.

The study concludes that a number of environmental impacts have been identified and assessed; none of these are considered to be that severe after mitigations to prevent the further planning, design and construction of the proposed project in the area. Thus, the

project development in the area can be considered suitable subject to the implementation of the mitigation measures as indicated in the Environmental and Social Management Plan.

REFERENCES

URT (United Republic of Tanzania). 1997. National Environmental Policy. Dar es Salaam, Tanzania.

URT, (1997). The Land Policy of 1995. Government Printers, Dar es Salaam.

URT, 1997: The Engineers Registration Act (& its amendment of 2007)

URT, 2002. The National Water Policy. Dar es Salaam, Tanzania.

URT, 2020: Dodoma City Council Social Economic Profile

URT, 2003. The National Construction Policy. Dar es Salaam, Tanzania.

URT, 2003: The Construction Industry Policy

URT, 2003: The Occupational Health and Safety Act No. 5 of 2003

URT, 2004. Environmental Management Act (EMA), Cap 191, (No. 20 of 2004). Dar es Salaam, Tanzania.

URT, 2004: The Employment and Labour Relations Act

URT, 2005. The Environment Impact Assessment and Audit Regulations, 2005 (Gn No.349/2005).

URT, 2007: The Fire and Rescue Force Act

URT, 2008: The Contractors Registration (Amendment) Act

URT, 2008: The National Employment Policy

URT, 2008: The National Health Policy

URT, 2008: The Workers Compensation Act

URT, 2009. The Child Act

URT, 2010. The Persons with Disability Act

URT, 2015: The environmental Management (quality standards of control of noise and vibration pollution) Regulation

URT, 2015: The National Energy Policy

URT, 2018: The Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations.

URT, 2019: The Land Act

URT, 2019: The Local Government (Urban Authorities) Act

URT, 2021: Environmental and Social Management Framework (ESMF) for Higher Education for Economic Transformation project (HEET), Dodoma.

URT, The Urban Planning Act No. 8 of 2007

URT. (United Republic of Tanzania). 1996b. The National Land Policy. Ministry of Lands and Human Settlements Development. Dar es Salaam, Tanzania.

URT. (United Republic of Tanzania). 2005. The Environmental Impact Assessment and Audit Regulations, 2005 (Gn No. 349/2005). United Republic of Tanzania.

URT., (2000). The National Women and Gender Development Policy of 2000. Government Printers, Dar es Salaam.

URT., (2001). The National Policy on HIV/AIDS of 2001. Government Printers, Dar es Salaam.

URT., (2005). The Environment Impact Assessment and Audit Regulations, 2005 (G.N. No. 348/2005), Dar es Salaam. Government Printers, Dar es Salaam.

URT., (2007). The Environmental Management (Air Quality Standards G. N. No. 237) Regulation,

URT., (2007). The Environmental Management (Water Quality Standards G. N. No. 238) Regulation, 2007

URT., (2008). The HIV and AIDS (Prevention and Control) Act, 2008. Government Printers, Dar es Salaam.

URT., (2015). The Environmental Management (Quality Standards for Control of Noise and Vibration Pollution) Regulations, 2015. Government Printers, Dar es Salaam.

URT, (2018). The Workmen's Compensation Act Cap 263. Government Printers, Dar es Salaam.

URT, (2020). The Environmental Management (Registration and Practicing of Environmental Experts) Regulations, 2020. Government Printers, Dar es Salaam.

World Bank (1991), *Environmental Assessment sourcebook volume III: Policies, procedures and cross sectoral issues*. World Bank, Washington.

World Bank, 2008: Environmental, Health and safety Guidelines

World Bank/IFC, 2008, General Environmental, Health and safety Guidelines

URT, The Water Resource Management Act, 2009 (Act No. 11/2009)

UDOM, Rolling Strategic Plan 2021/22-2025/26

APPENDICES

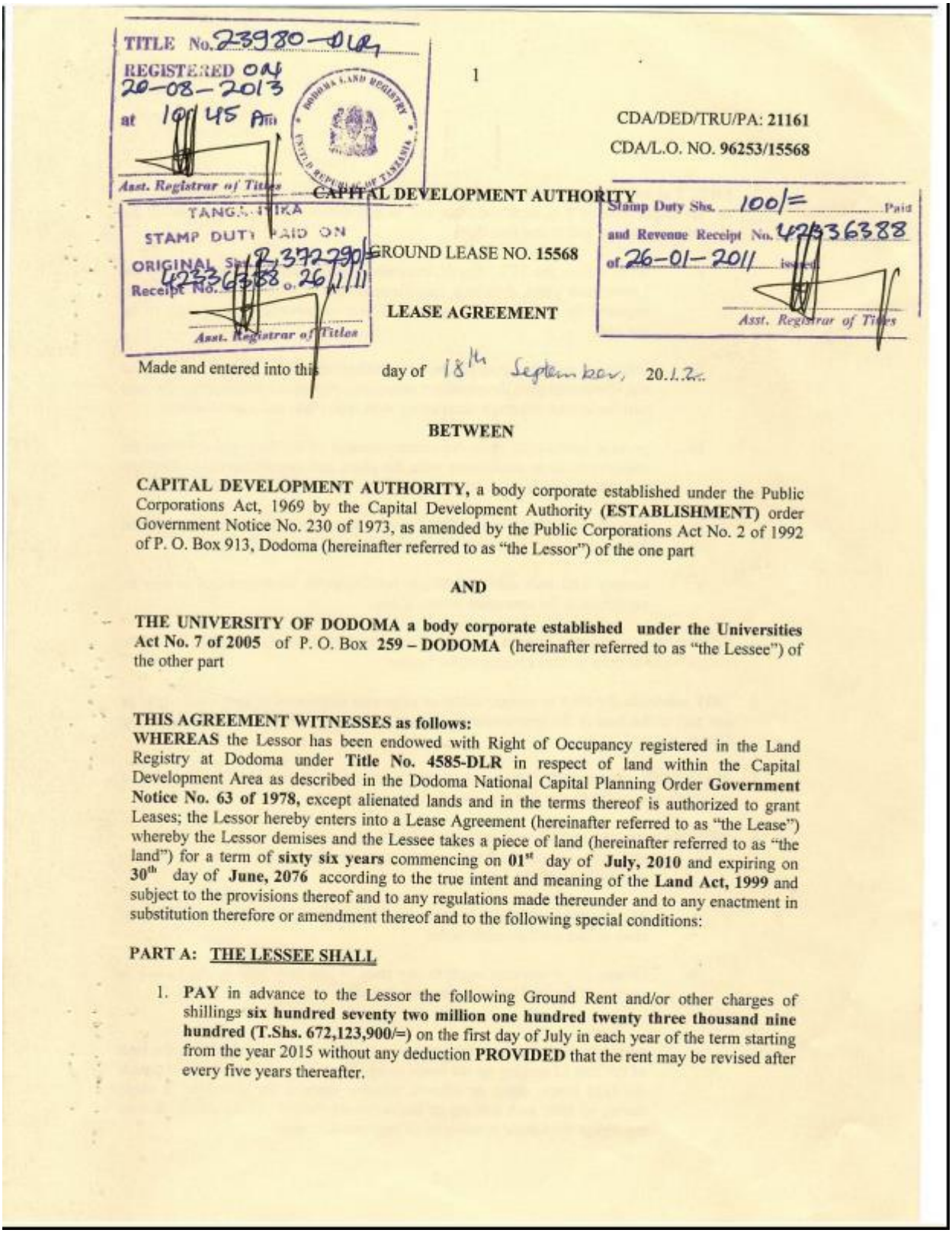
Appendix 1: Air quality Measured at site

SITE NAME	STATION POINTS COORDINATE (ARC 1960)	O_2 (%)	O_3 (%)	CO_2 (%)	CO (mg/m^3)	NO (mg/m^3)	SO_2 (mg/m^3)	H_2S (%)	CH_4 (%)
CNMS	POINT A Latitude. 6^0 13' 17.7" S Longitude.35^0 49' 12.0" E	20.9	0.00	0.02	2.30	0.008	0.00	0.00	0.00
	POINT B Latitude. 6^0 13' 13.3" S Longitude.35^0 49' 10.3E	20.9	0.00	0.12	2.10	0.005	0.00	0.00	0.00
	POINT C Latitude. 6^0 13' 15.1" S Longitude.35^0 49' 14.1" E	20.9	0.00	0.00	0.00	0.006	0.00	0.00	0.00
	POINT D Latitude. 6^0 13' 19.1" S Longitude.35^0 49' 8.1" E	20.9	0.00	0.02	0.00	0.007	0.00	0.00	0.00
	POINT E Latitude. 6^0 13' 22.1" S Longitude.35^0 49' 12.2" E	20.9	0.00	0.05	2.05	0.0024	0.00	0.00	0.00
	POINT F Latitude. 6^0 13' 18.1" S Longitude.35^0 49' 15.0" E	20.9	0.00	0.05	3.85	0.0028	0.00	0.00	0.00
CoESE	POINT A Latitude. 6^0 13' 48.5" S Longitude.35^0 48' 35.5" E	20.9	0.00	0.04	2.30	0.007	0.00	0.00	0.00
	POINT B Latitude. 6^0 13' 42.7" S Longitude.35^0 48' 32.9E	20.9	0.00	0.14	2.9	0.007	0.00	0.00	0.00
	POINT C Latitude. 6^0 13' 49.0" S Longitude.35^0 48' 30.2" E	20.9	0.00	0.00	0.00	0.007	0.00	0.00	0.00
	POINT D Latitude. 6^0 13' 53.7" S Longitude.35^0 48' 37,5" E	20.9	0.00	0.03	0.00	0.009	0.00	0.00	0.00

SITE NAME	STATION POINTS COORDINATE (ARC 1960)	O_2 (%)	O_3 (%)	CO_2 (%)	CO (mg/m^3)	NO (mg/m^3)	SO_2 (mg/m^3)	H_2S (%)	CH_4 (%)
	POINT E Latitude. 6^0 13' 52.1" S Longitude.35^0 48' 42.2" E	20.9	0.00	0.07	2.05	0.0024	0.00	0.00	0.00
	POINT F Latitude. 6^0 13' 46.8" S Longitude.35^0 48' 40.1" E	20.9	0.00	0.06	3.85	0.0029	0.00	0.00	0.00
	WHO/IFC Guideline	19.5	0.1	-	30	0.2	0.5	20	-
	TBS LIMITS	21.00	0.12	0.5	10	0.12	0.5	-	-

(Source: Site visit results on14th February 2022)

Appendix 2: Title Deed



TITLE No. 23980-DLR
REGISTERED ON 20-08-2013
at 10:45 AM
Asst. Registrar of Titles

TANGANYIKA
STAMP DUTY PAID ON
ORIGINAL Sh. 2,372,790/=
Receipt No. 42336388 of 26/1/11
Asst. Registrar of Titles

CDA/DED/TRU/PA: **21161**
CDA/L.O. NO. **96253/15568**

CAPITAL DEVELOPMENT AUTHORITY

Stamp Duty Shs. 100/= Paid
and Revenue Receipt No. 42336388
of 26-01-2011 issued
Asst. Registrar of Titles

GROUND LEASE NO. **15568**

LEASE AGREEMENT

Made and entered into this day of 18th September, 20.12.

BETWEEN

CAPITAL DEVELOPMENT AUTHORITY, a body corporate established under the Public Corporations Act, 1969 by the Capital Development Authority **(ESTABLISHMENT)** order Government Notice No. 230 of 1973, as amended by the Public Corporations Act No. 2 of 1992 of P. O. Box 913, Dodoma (hereinafter referred to as "the Lessor") of the one part

AND

THE UNIVERSITY OF DODOMA a body corporate established under the Universities Act No. 7 of 2005 of P. O. Box **259 – DODOMA** (hereinafter referred to as "the Lessee") of the other part

THIS AGREEMENT WITNESSES as follows:

WHEREAS the Lessor has been endowed with Right of Occupancy registered in the Land Registry at Dodoma under **Title No. 4585-DLR** in respect of land within the Capital Development Area as described in the Dodoma National Capital Planning Order **Government Notice No. 63 of 1978,** except alienated lands and in the terms thereof is authorized to grant Leases; the Lessor hereby enters into a Lease Agreement (hereinafter referred to as "the Lease") whereby the Lessor demises and the Lessee takes a piece of land (hereinafter referred to as "the land") for a term of **sixty six years** commencing on **01st** day of **July, 2010** and expiring on **30th** day of **June, 2076** according to the true intent and meaning of the **Land Act, 1999** and subject to the provisions thereof and to any regulations made thereunder and to any enactment in substitution therefore or amendment thereof and to the following special conditions:

PART A: THE LESSEE SHALL

1. **PAY** in advance to the Lessor the following Ground Rent and/or other charges of shillings **six hundred seventy two million one hundred twenty three thousand nine hundred (T.Shs. 672,123,900/=)** on the first day of July in each year of the term starting from the year 2015 without any deduction **PROVIDED** that the rent may be revised after every five years thereafter.

2. **ERECT** or cause to be erected on the land a building or buildings (hereinafter referred to as "the improvements") in such materials and in accordance with specifications as the Lessor may require, and to that end shall:

   i. on or before the **31st** day of **December, 2010** submit for approval by the Lessor such plans, drawings, specifications and other information as may be required by the Lessor in respect of the improvements proposed to be erected;

   ii. within **six months** from the date of notification by the Lessor of approval of the aforementioned development proposals, commence building on the land and the improvements in accordance with such plans and specifications;

   iii. proceed continually from the commencement of building and complete the improvements in accordance with the plans and specifications so that they are capable of use and occupation on or before the **30th** day of **June 2043.**

   iv. throughout the remainder of the term hereby granted have and maintain the land and the improvement to the satisfaction of the Lessor;

   v. comply with such other conditions relating to the improvements as may be contained in the annexture hereto, if any.

3. **NOT** erect or commence to erect on the land any building, buildings or other structures, except with the prior written consent of the Lessor.

4. **NOT** subdivide the land or assign, sublet or otherwise dispose of or deal with whole or any part of the land or the improvements thereon without the prior written consent of the Lessor.

5. **MAINTAIN** and protect all beacons on the land and be responsible for the cost of replacing any such beacons that may be missing or destroyed.

6. **BE** liable to pay any and all costs arising herefrom and in particular:-

   i. any fees or stamp duties which may be discovered to be payable in connection with the Lease.

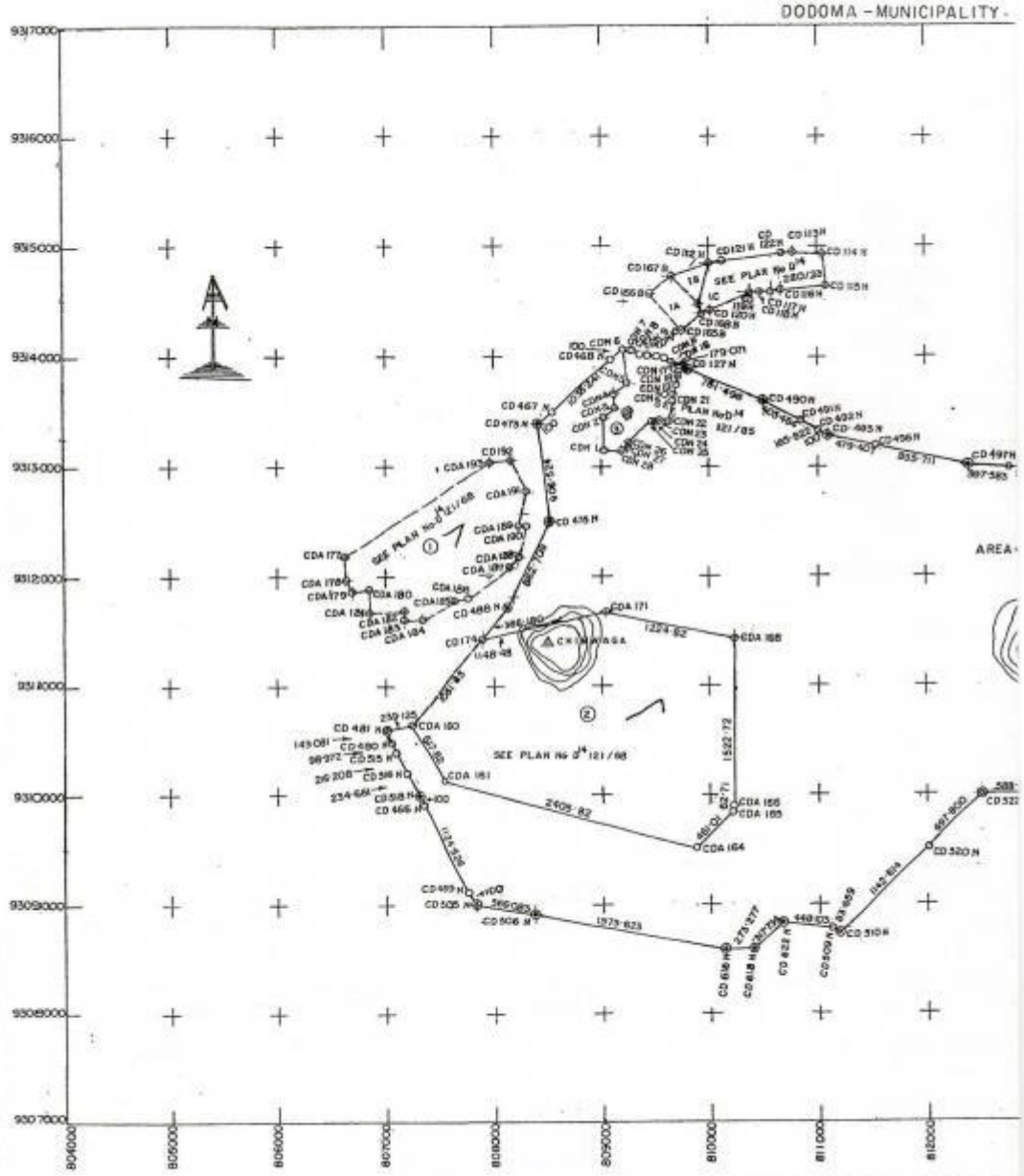
   ii. an amount or amounts leviable by duly authorized institutions by way of rates or like local property taxes.

   iii. an amount or amounts equal to any rates or like levy paid by the Lessor in respect of the land or improvements thereon.

   iv. such sum as the Lessor shall assess as a proper share attributable to the land of the cost of making up the roads or improvements of the same upon which the land fronts, abuts or adjoins, whether demand for such sum is made during or after such making or improvement thereof. (This condition does not oblige the Lessor to make up or improve the roads).

L.O. NO. 96253/.....

SURVEY OF PLOT No. 4 CHIMWA
DODOMA - MUNICIPALITY -



COMPS D14 307

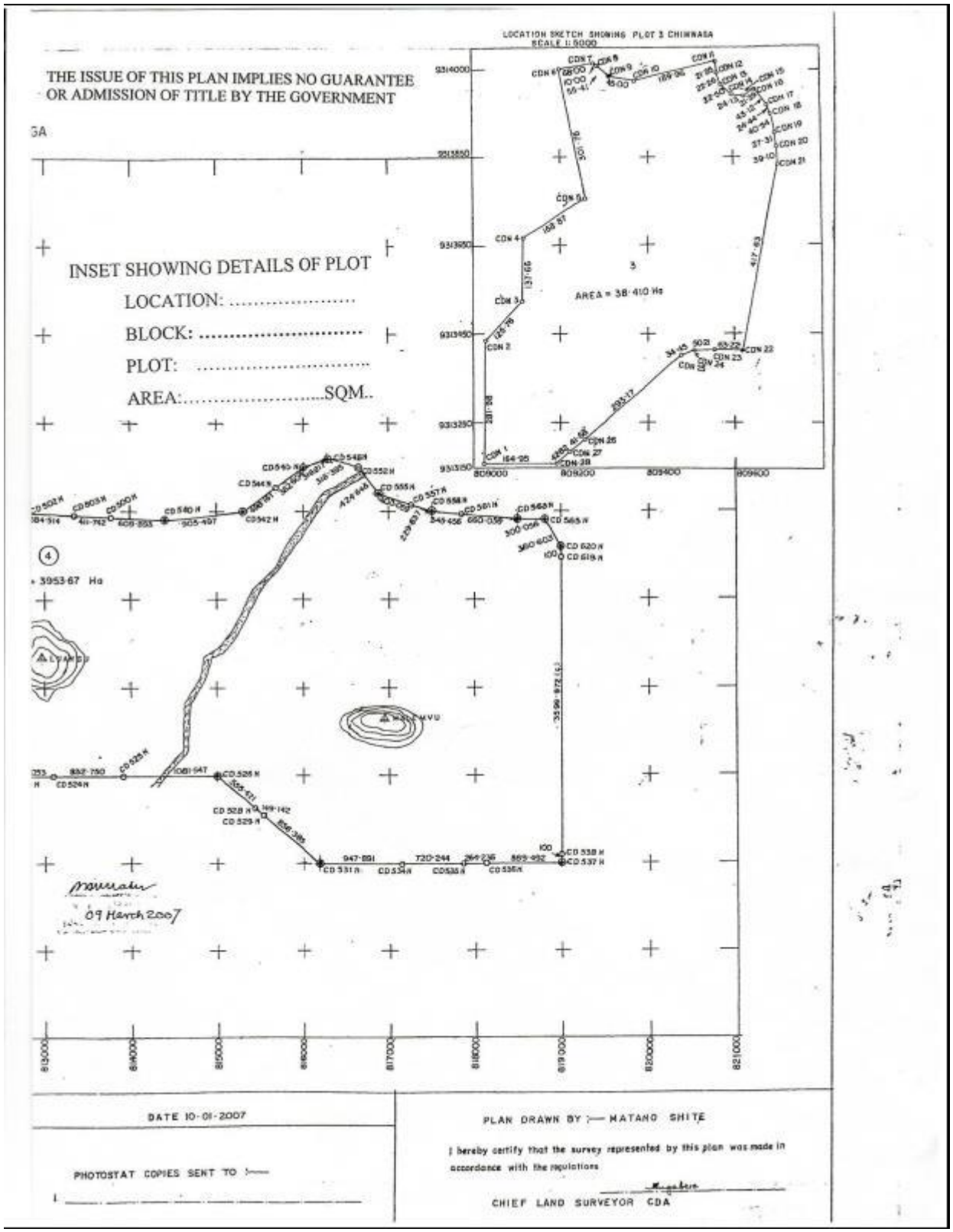
M-P DO/13/110

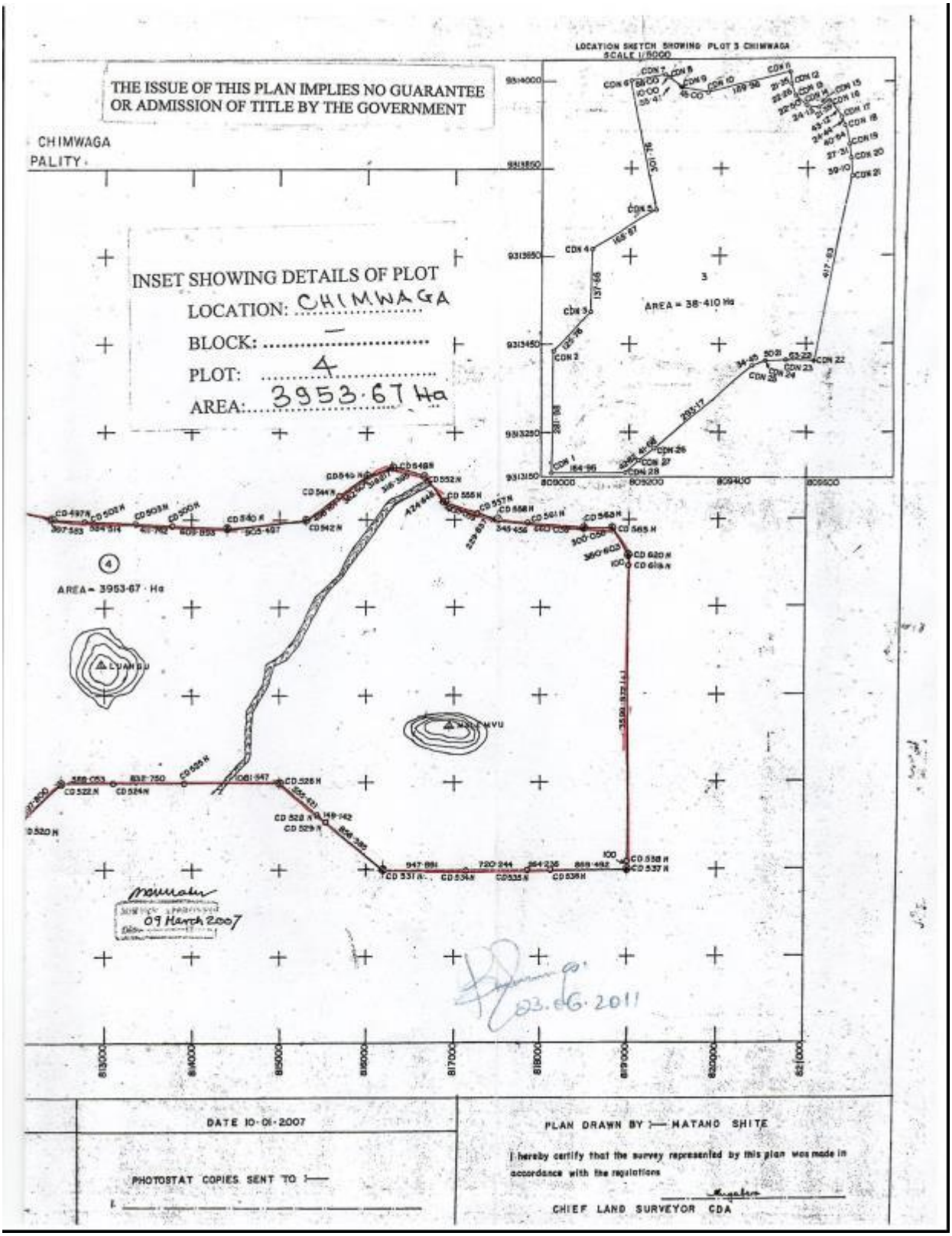
STD SHEET No. DO/13

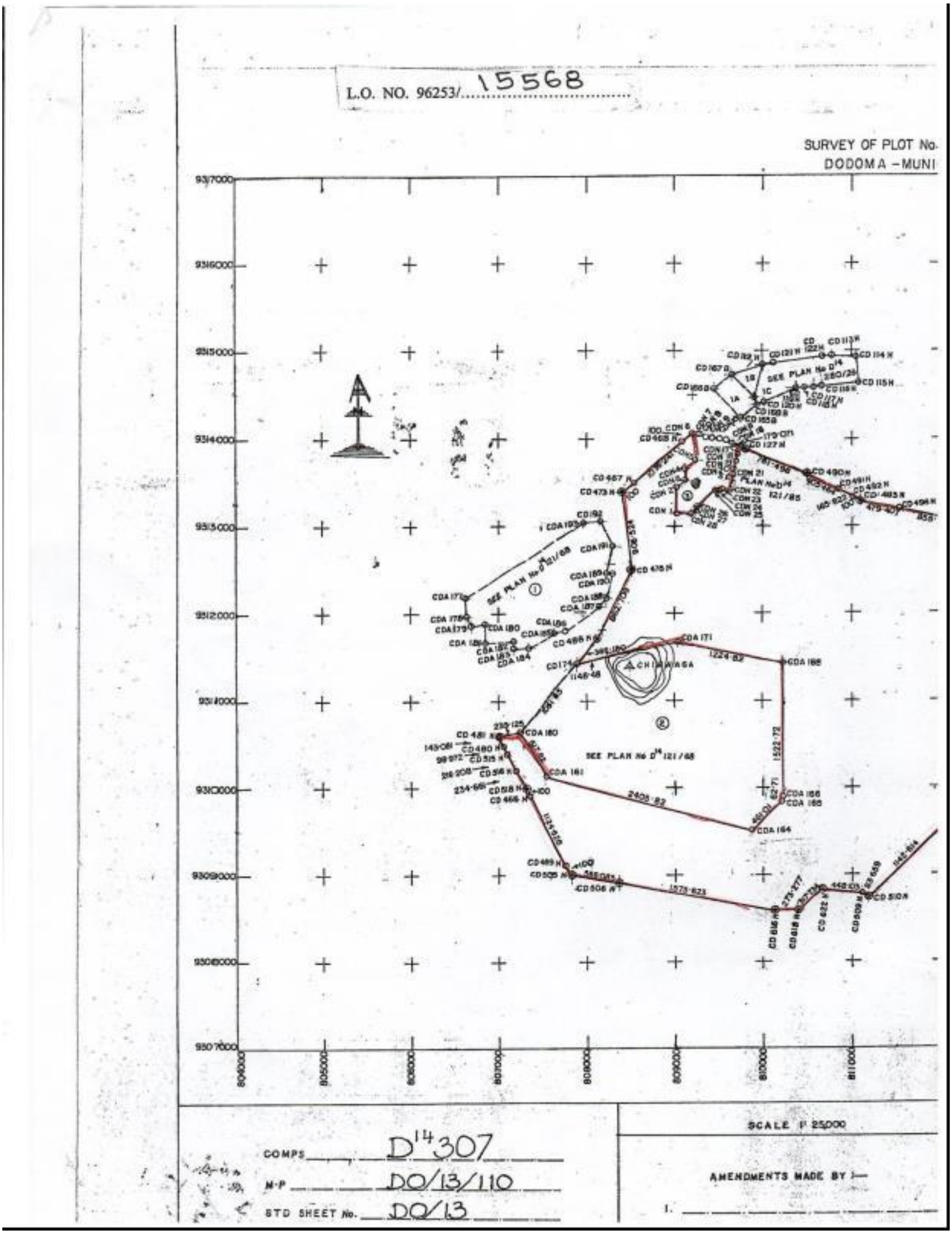
SCALE 1" 25,000

AMENDMENTS MADE BY :-

1. _____


LOCATION SKETCH SHOWING PLOT 3 CHIKWASA
SCALE 1:6000
THE ISSUE OF THIS PLAN IMPLIES NO GUARANTEE
OR ADMISSION OF TITLE BY THE GOVERNMENT
INSET SHOWING DETAILS OF PLOT
LOCATION: .....
BLOCK: .....
PLOT: .....
AREA:.....SQM..
AREA = 38·410 Ha
3953·67 Ha
09 March 2007
DATE 10-01-2007
PHOTOSTAT COPIES SENT TO :—
PLAN DRAWN BY :— MATANO SHITE
I hereby certify that the survey represented by this plan was made in accordance with the regulations
CHIEF LAND SURVEYOR CDA


LOCATION SKETCH SHOWING PLOT 3 CHIMWAGA
SCALE 1/8000
THE ISSUE OF THIS PLAN IMPLIES NO GUARANTEE
OR ADMISSION OF TITLE BY THE GOVERNMENT
CHIMWAGA
PALITY.
INSET SHOWING DETAILS OF PLOT
LOCATION: CHIMWAGA
BLOCK: —
PLOT: 4
AREA: 3953.67 Ha
AREA = 38·410 Ha
AREA = 3953·67 · Ha
09 March 2007
03.06.2011
DATE 10-01-2007
PHOTOSTAT COPIES SENT TO :—
PLAN DRAWN BY :— HATANO SHITE
I hereby certify that the survey represented by this plan was made in accordance with the regulations
CHIEF LAND SURVEYOR CDA


L.O. NO. 96253/ 15568
SURVEY OF PLOT No.
DODOMA - MUNI
SEE PLAN No D14 121/68
CHIMWAGA
SCALE 1:25000
COMPS D14 307
M.P DO/13/110
STD SHEET No. DO/13
AMENDMENTS MADE BY :-

SCHEDULE

All that land known as **Plot No. 4 Chimwaga** Dodoma Municipality being part of the land within the Capital Development Area registered under certificate of **TITLE NO. 4585-DLR** containing **three thousand nine hundred fifty three decimal point six seven (3,953.67)** Hectares, shown for identification only edged red on the plan attached to this Lease Agreement and defined on the registered Plan Numbered **46183** deposited at the office of the Director of Surveys and Mapping at Dar es Salaam.

We the LESSOR and the **LESSEE(S)** hereby accept the terms and conditions contained in the foregoing Lease Agreement.

SEALED with the **COMMON SEAL** of the said **CAPITAL DEVELOPMENT AUTHORITY** and **DELIVERED** in the presence of us this 12th day of OCTOBER 2012

Signature:.....
Name: **PASKASI DAMIAN MURAGILI**
Postal Address: **P.O. BOX 913, DODOMA**
Qualification: **AG. DIRECTOR GENERAL**

Signature:.....
Name: **MERCY ROWLAND KYAMBA**
Postal Address: **P.O. BOX 913, DODOMA**
Qualification: **CORPORATION SECRETARY**

Seal

SEALED with the **COMMON SEAL** of the said **UNIVERSITY OF DODOMA** and **DELIVERED** in the presence of us this ..... day of 18th Sept. 2012

Signature:.....
Name: PROF. IDRIS S. KIKULA
Postal Address P.O. BOX 259 DODOMA
Qualification: VICE CHANCELLOR

Seal

Signature:.....
Name: PROF. S.A.K. MLACHA
Postal Address P.O.BOX 259, DODOMA
Qualification: DEPUTY VICE CHANCELLOR (PFA)

7. **USE** the land solely for **Institutional** purposes use group **'K'** use class **(b)** as defined in the Town and Country Planning (Development and Zoning) (Capital Development Area) Regulations, **1979**

8. **BE** responsible, where applicable:-

   i. for protecting and preserving throughout the term of the lease all the existing and future infrastructure facilities on the land. Any damage, destruction or loss caused thereto shall be made good at the Lessee's expense.

   ii. for further protecting and conserving existing and future horticultural amenities such as trees, flower gardens etc provided within or immediately adjoining the land. Any damage, destruction or loss caused thereto shall be made good at any time at the Lessee's expense.

9. **YIELD** up to the Lessor the land and improvements in good order and condition upon determination of the Lease by effluxion of time or otherwise.

PART B: THE LESSOR SHALL

1. **ENSURE** that the Lessee paying ground rent and/or other charges hereby reserved in **PART "A"** Clause 1 hereof and complying with other terms and conditions hereinbefore contained shall peaceably and quietly hold and enjoy the land and improvements during the said term without interruption from the Lessor or any other person claiming under or in trust for the Lessor.

2. **NOTWITHSTANDING** the restrictions contained in **Part "A"** Clause **4** hereof permit the Lessee to grant a sublease or subleases in respect of the land and improvements for a term not exceeding five years, provided the Lessee has complied with the development conditions set out in **Part "A",** Clause **2** hereof.

3. **UPON** breach by the Lessee of any the foregoing terms and conditions re-enter upon the land and improvements thereon and forfeit the Lease and immediately thereupon the said term shall absolutely determine and whenever this power of re-entry and forfeiture shall arise the Lessor shall serve upon the Lessee a written notice specifying the nature and extent of the breach and requiring the Lessee to remedy the breach within the time to be specified in the said notice and also the action to be taken by the Lessor if the breach is not remedied within the specified period.

4. **GRANT** to the Lessee at the lessee's option and on satisfactory performance of the obligations hereinbefore contained, an extension of the Lease on such terms and conditions as may be agreed by the parties provided that the Lessee serves upon the Lessor not more than six months notice in writing prior to the expiry of the Lease provided that such an extension will not be granted where the land is required by the Lessor for other development.

PART C: ARBITRATION

In the event of any dispute arising between the parties hereto in respect hereof either the Lessor or the Lessee may apply for arbitration to the Minister for the time being responsible for land matters and the Minister's decision shall be binding on both parties.