

**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED
EXPANSION OF THE INSTITUTE OF FINANCE MANAGEMENT- SIMIYU CAMPUS
LOCATED ON PLOT NO. 79, BLOCK “B” (MD), SAPIWI VILLAGE, SAPIWI WARD BARIADI
DISTRICT COUNCIL, SIMIYU REGION, TANZANIA**



PROPONENT

Institute of Finance Management (IFM)
P.O. Box 3918
Dar es Salaam, Tanzania.



MARCH, 2024

EXECUTIVE SUMMARY

INTRODUCTION

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. The Institute of Finance Management (IFM) in Simiyu is one among the institutions benefited from the Higher Education for Economic Transformation (HEET) project. The IFM is intending to use the HEET funds to expand Simiyu Campus by constructing a Functional hall, a Multipurpose Teaching block, a Library and Computer Lab, Hostel blocks, Community building, Sports grounds and External works. This development will help to strengthen the learning environment and labour market orientation of priority programs in beneficiary higher education institutions and strengthen the Management of the higher education system.

However, the construction of buildings and associated activities are expected to have adverse environmental, social and economic impacts. These impacts need to be identified, predicted and evaluated so that positive impacts are enhanced while mitigation measures are developed for negative impacts. IFM has therefore contracted ARMS on Environment Limited to undertake an Environmental and Social Impact Assessment (ESIA) prior to project implementation as prescribed by Tanzanian Environmental Management Act of 2004 and Third Schedule to Environmental Management Act, Cap 191 and First Schedule to Environmental Impact Assessment and Audit (Amendment) Regulations, 2018 and the World Bank Environment and Social Framework (ESF), Environmental and Social Standards as well as the HEET Project's Environmental and Social Management Framework (ESMF) were observed in the study.

PROJECT DESCRIPTION

The proposed project site is specifically located on plot No. 79, Block "B" (MD), Sapiwi Village, Sapiwi Ward, Bariadi District Council, Simiyu Region. The project will cover a total area of 12.27Ha, which is legally owned by IFM with the certificate of Occupancy No.75361. The project

area is compatible with the Urban Planning (Use groups and Classes) Regulation of 2018 as the area is designed for Institutional purposes. The proposed expansion will include the construction of a three (3) storey Multipurpose Teaching block, a two (2) storey Library and Computer Lab Block, a Community building, Hostel blocks, Sports grounds and other external works . Upon completion the project will enroll a total number of 3000 students.

EXISTING ENVIRONMENT AND SURROUNDING

The project is at the design stage. Activities at this stage include obtaining different permits and approvals; conducting perimeter and topographic surveys; conducting feasibility studies, detailed engineering designs and environmental and social impact assessment studies. The project area is covered with trees, shrubs and grasses and is boarded with residential houses on both sides. When the project implementation kicks off some vegetation in the project site are going to be modified. However, after the construction phase of the project is over, some of the open spaces will be re-planted with grasses, trees and flowers.

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 the IFM Simiyu Campus, Sapiwi village, Bariadi district. A survey, in this case, refers to land investigations, drilling, measurements and pre-works examination of the site. The 20 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. The operation phase will involve running of the campus while decommissioning phase will involve shutting down a campus and/or removing it from operation or use, followed by re-commissioning, repurposing or demolition.

POLICY, ADMINISTRATIVE AND LEGAL FRAMEWORK

Some of the National laws, policies, plans, strategies and legislation relevant to this project have been discussed in this report. Furthermore, this ESIA study has also complied with the following

tools: World Bank's new Environmental and Social Framework (ESF) and The World Bank Environmental and Social Safeguarding Policy for Investment and Social Standards (ESSs).

BASELINE INFORMATION

The Information on the bio-physical, socio-economic environment, institutional and legal regimes were collected from a variety of sources, namely project documents and general literature review, visual and inspection, expert opinion, consultations with selected stakeholders and discussions with proponent representatives. The proposed site is flat with gentle undulations. With areas of alluvial of top soils, black cotton (heavy clay soils), and brown grayish Clayey Gravelly soils mix with Cal Crete, brownish fine/course gravelly soils and whitish sandy gravelly.

The site has different tree species. The identified species were *Melia azedarach*, *Casabelathevetia*, *Azadirachta indica*, *Senna siamea*, *Euphorbia tirucalli*, *Psidium guajava*, *Vachellia tortilis* and *Solanum mauritianum*. The vegetation of the area gives the indication for habitat for fauna and based on the vegetation condition of the area there was no indication for presence of large wild animal. Few species of birds were observed in the area while some small reptiles, and insects are expected to be present in some parts of the general area. Thus, there was no identified specie with significance conservation status (i.e. threated or endangered as per IUCN guidelines/CITES List) in the area.

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).

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 stakeholder consultation involved face to face interviews with representatives of relevant government institutions, agencies and local government authorities. The identification of stakeholders was based on how they are related to the project, how the project is going to affect them and why should they be consulted. The identified stakeholders can be categorized into Developers; Decision makers; Interested parties; and Affected parties positively or negatively and directly or indirectly. In addition, a mechanism was

put in place to address grievances, Gender based Violence (GBV), Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH).

PROJECT ALTERNATIVES

Several project alternatives were considered for this project based on the techno-economic, environmental and social criteria.

- (i) “No Project Alternative”; VS “Project Alternative”-The project Alternative was selected in favour of the: No Project Alternative” due to its long-term social and economic benefits.
- (ii) Alternative source of water: Borehole and rain water harvesting were preferred since the village area depend on water from the boreholes and rain.
- (iii) Alternative source of energy: National grid electricity is the preferred option and this can be supplemented by solar power and/or standby generator.
- (iv) Solid Waste Management Alternatives: By adopting the principles of reduce, reuse, recycle and recover resources, Integrated solid waste management system offers significant environmental and financial benefits compared to landfilling and open waste burning.
- (v) Liquid Waste Management Alternatives: Given the space limitations, high water table and regular emptying, Anaerobic waste water treatment plant is recommended as the most feasible and sustainable liquid waste management alternative for the proposed project.

ASSESSMENT OF ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS

(a) The assessed environmental risks and impacts were based on:

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

(b) The assessed socio-economic risks and impacts were based on:

- i. Threats to human security through crime or violence; and

- ii. Risks that project impacts fall disproportionately on individuals and groups who because of their particular circumstances, may be disadvantaged or vulnerable

All positive and negative impacts on environment, social, economic and their respective mitigation measurements were made exhaustively as detailed in the main report.

ENVIRONMENTAL AND SOCIALMANAGEMENT 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 project's ESMP in which the majority of them are based on good engineering practices. The Environmental and Social Management Plan (ESMP) presents the implementation schedule for the proposed mitigation measures to both environmental and social impacts as well as planning for long-term monitoring activities. The project's ESMP also includes the associated environmental costs needed to implement the recommended mitigation measures. The engineering designs shall include the mitigation measures recommended in this report.

ENVIRONMENTAL AND SOCIAL MONITORING PLAN

The EIS presents an outline of the Environmental and Social Monitoring Plan (ESMoP) to record parameters to be monitored and frequency of monitoring.

COST-BENEFIT ANALYSIS OF THE PROJECT

The EIS presents an assessment of the project, in terms of negative impacts, compared to the socio-economic benefits that will not happen if the project is not implemented. Environmental cost benefit analysis has been assessed in terms of the negative versus positive impacts. The potential benefits of the project, in terms of financial and social benefit are substantial. Similarly, the environmental impacts can be reasonably mitigated and the financial resources needed to mitigate negative impacts, when compared to the required investment, are relatively small.

DECOMMISSIONING

A preliminary decommissioning plan has been developed. Should the decommission become inevitable the plan provides a general description of decommissioning methods considered feasible for the proposed 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. 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. However, the proposed project will have a long-life span of more than fifty years.

SUMMARY AND CONCLUSION OF THE ESIA STUDY

The ESIA was undertaken at all levels by following guidelines, laws and regulation related with environmental and social issues at a high level of care and due diligence. The assessment has also considered important stakeholders who are in one way or the other being impacted by the project. The ESIA study has scrutinized the environmental and social implications of the proposed buildings at Simiyu campus and it was conducted to comply with relevant Acts, Laws and Regulations as well as World Bank Environment and Social Framework (ESF) and the project's Environmental and Social Management Framework (ESMF) respectively.

From the ESIA study that has been conducted, it has been concluded that the construction of the proposed project will generate significant socio-economic benefits to the students, people in the project area and the country. The study has also identified several negative environmental and social impacts and risks that will arise as a result of the project. However, if the mitigation measures that have been proposed in this ESIA report will be properly implemented, the negative impacts will be mitigated by avoiding, minimizing or even eliminating some of the negative impacts.

STUDY TEAM

This Environmental and Social Impact Statement has been prepared by the team of experts as tabulated in Table 1. below.

Table 1. ESIA Team information






SN	NAME	TITLE	SIGNATURE
1	Dr. Abubakar Salum Rajabu	Team Leader Environmental Scientist	
2	Dr Joseph Mango	GIS Specialist	
3	Miss. Paulina Simon	Environmental Scientist	
4	Miss. Mary Ngajilo	Sociologist	
5	Miss Vicky Moshi	GBV Expert	

TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
TABLE OF CONTENTS	viii
LIST OF TABLES.....	xv
LIST OF FIGURES	xvi
LIST OF APPENDICES	xvi
CHAPTER ONE	1
INTRODUCTION.....	1
1.1 Project Background.....	1
1.2 Project Objectives of the IFM HEET Project.....	2
1.3 Project Rationale	2
1.4 Objectives of the Environmental and Social Impact Assessment Study	4
1.5 Scope of Work	4
1.8 Approach and Methodology	5
1.8.1 Approach	5
1.8.2 Methodology	5
1.9 Report Structure	7
CHAPTER TWO	9
PROJECT DESCRIPTION	9
2.1 Introduction.....	9
2.2 Nature of the Project.....	9
2.3 Project Location, Accessibility and Size	9
2.4 Land Tenure, Use, Ownership and Management.....	9
2.5 Adjacent Development.....	10
2.6 Status of Cadastral Surveying.....	10
2.7 Existing Environment and Surrounding	11
2.8 Project Components	12
2.9 Project Design	13
2.9.1 Climate Change risks mitigation and adaptation in the Project Design	14
2.9.2 Special Needs and Gender Inclusivity.....	15
2.9.3 Disaster Risk Management.....	16
2.10 Project Phases	16
2.10.1 Pre-construction Phase.....	16

2.10.2	Construction Phase.....	16
2.10.3	Operational Phase	22
2.10.4	Decommissioning Phase.....	25
2.11	Health and Safety Measures	26
2.11.1	OHS During Construction Phase.....	26
2.11.2	OHS during Operation Phase	27
CHAPTER THREE.....		31
POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK		31
3.1	Introduction.....	31
3.2	National Policies Frameworks.....	31
3.2.1	National Environment Policy NEP (2021)	31
3.2.2	The Energy Policy, 2015	32
3.2.3	National Land Policy (2019)	32
3.2.4	The Construction IndustryPolicy (2003).....	32
3.2.5	Natural Water Policy (2002)	33
3.2.6	National Gender Development Policy (2002).....	33
3.2.7	National Employment Policy 2008	34
3.2.8	National Health Policy (2003).....	34
3.2.9	The Urban Planning Regulations (Space Standards), 2018	35
3.2.10	Education Training Policy (2014).....	35
3.2.11	National Mineral Policy (2009).....	36
3.2.12	National Policy on HIV/AIDS (2003)	36
3.3	National Legal Framework.....	37
3.3.1	Environmental Management Act Cap 191	37
3.3.2	Occupational Health and Safety Act No. 5 of 2003.....	38
3.3.3	The Land Act Cap 113 R. E 2019.....	38
3.3.4	The Urban Planning Act (2007).....	38
3.3.5	Water Resource Management Act 2009.....	39
3.3.6	The Public Health Act 2009.....	39
3.3.7	Workers Compensation Act Cap263 R. E 2015.....	40
3.3.8	HIV and AIDS (Prevention and Control) Act No. 28 of 2008	40
3.3.9	The Engineers Registration Act and its Amendments 1997 and 2007	40
3.3.10	The Contractors Registration Act, 1997.....	41
3.3.11	The Architects and Quantity Surveyors Act (1997).....	41

3.3.12	Fire and Rescue Act (2007).....	42
3.3.13	Employment and Labour Relations Act (No.6), 2004	42
3.3.14	The Law of the Child Act	42
3.3.15	The Roads Act No. 13 of 2007	42
3.3.16	The Persons with Disability Act, 2010	43
3.3.17	The Standard Act of 2009	43
3.3.18	The Education (Amendment) Act, 1995.....	45
3.4	Relevant National Plans and Strategies	46
3.4.1	The Tanzania Development Vision (2025)	46
3.4.2	The Third National Five-Year Development Plan (FYDP III; 2021/22 – 2025/26)	46
3.4.3	The National Plan of Action to End Violence Against Women and Children (NPA-VAWC) 2017/18-2021/22	47
3.5	Relevant Regulations and Guidelines	47
3.5.1	The Tanzania Development Vision (2025).....	47
3.5.2	Environmental Impact Assessment and Audit Regulations (2005 amended in 2018)	48
3.5.3	The Environmental Management (Fee and charges) (amendment) Regulations, 2021) ...	48
3.5.4	The Environmental Management (Prohibition of Plastic Carrier Bags)Regulations, 2019.	48
3.5.5	The Environmental (Solid Waste Management) Regulations. 2009 as amended in 2016.	49
3.5.6	The Environmental Management (Standards for the Control of Noise and Vibrations Pollution) Regulations, 2015	49
3.5.7	The Environment (Registration of Environment Experts) Regulations 2005.....	50
3.5.8	Environmental Management (Air Quality Standards) Regulation, 2007	50
3.5.9	The Fire and Rescue Force (Fire Precautions in Building) Regulations, 2015	51
3.5.10	Environmental Management (Soil Quality Standards) Regulation, 2007	51
3.5.11	Environmental Management (Water Quality Standard) Regulation, 2007	52
3.5.12	Urban Planning (Zoning of Land Uses) Regulations, 2018	53
3.5.13	The Urban Planning (Application for Planning Consent) Regulations, 2018	54
3.5.14	Environmental Management (Control of Ozone Depleting Substances and Hydrofluorocarbons) Regulations, 2022	54
3.6	Administrative Framework / Institutional Arrangement	55
3.7	IFM Project Implentation Unit.....	56
3.8	Key players in implementing the ESMP	60
3.8.1	Funding Institutions.....	60
3.8.2	The Institute of Finance Management - UPIU.....	60

3.8.3 NEMC	61
3.8.4 The Contractor	61
3.9 Relevant World Bank Environmental and Social Frameworks	62
3.9.1 Objective of the Environmental and Social Framework	62
3.9.2 World Bank Environmental and Social Standards	63
CHAPTER FOUR.....	67
ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS	67
4.1 Introduction.....	67
4.2 The Physical Environment	67
4.2.1 Climate	67
4.2.2 Climate Change	69
4.2.3 Existing Land Use	70
4.2.5 Topography.....	70
4.2.6 Soils.....	71
4.2.7 Soil Erosion Potential.....	71
4.2.8 Hydrological Characteristics.....	72
4.2.9 Air Quality, Noise level and Vibration Measurements	72
4.3 Biological Environment	73
4.3.1 Flora	73
4.3.2 Fauna	73
4.3 Socio-Economic and Cultural Conditions	74
4.3.1 Population.....	74
4.3.2 Education.....	74
4.3.3 Health Services.....	75
4.3.4 Water Supply	75
4.3.5 Power Supply.....	75
4.3.6 Solid and Liquid Waste Management.....	76
4.3.7 Farming Activities.....	76
4.3.8 Livestock Keeping Activities.....	76
4.3.9 Commercial Activities.....	77
CHAPTER FIVE.....	78
STAKEHOLDER INVOLVEMENT AND GRIEVANCES REDRESS MECHANISMS.....	78
5.1 Introduction.....	78
5.2 Identification of Stakeholders	78

5.3	Engagement Approach During Preparation Phase.....	79
5.5	Stakeholders Views and Concerns	79
5.4	Analysis of Issues and Problems	88
5.5	Stakeholders Engagement during Implementation.....	89
5.6	Stakeholders Engagement During Implementation: Proposed Strategy for information Engagement.....	93
5.7	Stakeholders' Engagement Plan (SEP).....	96
5.6	Grievance Redress Mechanisms	103
5.8.1	Levels of Grievances Handling at IFM.....	103
5.6.2.	Grievance Procedure for Construction and Operational GRMs at IFM	105
CHAPTER SIX.....		110
IDENTIFICATION AND ASSESSMENT OF IMPACTS AND MITIGATION MEASURES.....		110
6.1	Introduction.....	110
6.2	Methodology of Impact Identification.....	111
6.3	Impact Evaluation and Scoring Matrix.....	113
6.3.1	Magnitude.....	113
6.3.2	Significance	113
6.3.3	Probability of Occurrence.....	113
6.3.4	Duration	114
6.4	Impact Rating Criteria	117
6.5	Impacts Mitigation and Enhancement Measures.....	118
6.4	Description of Environmental Impacts and their Management Measures	119
6.4.1	Impacts During Mobilization Phase	119
6.4.2	Impacts from the Construction Phase	123
6.4.4	Impacts from Operation Phase.....	139
6.4.2.3	NegativeSocial Impacts	141
6.4.2.4	Impacts on Physical Environment	143
6.4.6	Impacts During Decommissioning Phase	149
6.5	Cumulative Impacts	153
6.5.1	Increase of Volume of Traffic	153
6.5.2	Socioeconomic Issues.....	153
CHAPTER SEVEN.....		154
CONSIDERATION OF PROJECT ALTERNATIVES		154
7.1	Introduction	154

7.1.1	No Project Alternative	154
7.1.2	Develop the Project Alternative	155
7.1.3	Alternative Source of Water	155
7.1.4	Alternative Source of Energy	156
7.1.5	Solid Waste Management Alternatives.....	156
7.1.7	Liquid Waste Management Alternatives	157
CHAPTER EIGHT		160
ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLANS.....		160
8.1	Introduction	160
8.2	Institutional Roles and Responsibilities	160
8.2.1	Financing Agency	160
8.2.2	Implementing Agency	160
8.2.3	Supervision Consultant	160
8.2.4	Contractor.....	161
8.2.5	Local Government Authorities and Local NGOs / CBOs.....	161
8.2.6	Local Communities	161
8.2.7	Environmental and Social Cost	161
8.3	Disaster Risk Management Plan	181
8.3.1	Disaster Risks at the Campus and Level of Management	181
8.3.2	Disaster Risk Management Plan	182
8.3.3	Assumption Made in the Plan	182
8.4	Traffic Management Plan	182
8.5	Health and Safety Management Plan.....	183
8.5.1	Responsibilities.....	183
8.5.2	General Safety Facility Operation.....	184
8.6	Health and Safety Measures.....	188
8.7	Environmental and Social Monitoring Plan	192
CHAPTER NINE		216
COST BENEFIT ANALYSIS.....		216
9.1	Introduction.....	216
9.2	Benefits Related to the Project.....	216
9.2.1	Benefits to IFM.....	217
9.2.2	Benefit to the Neighbourhood	217
9.2.3	Benefit to the Government	218

9.2	Costs Related to the Project	219
9.3.1	Costs to Community	219
9.3.2	Costs to Government	219
9.3.3	Environmental Cost	219
9.4	Project Cost Benefit Analysis	220
CHAPTER TEN	.....	221
DECOMMISSIONING PLAN OF THE PROJECT	.....	221
10.1	Introduction	221
10.2	Aim of the Preliminary Plan	221
10.3	Content of the Preliminary	222
10.4	Project Decommissioning Methodology and Schedule	222
10.2	Decommissioning Impacts and Mitigation.....	224
CHAPTER ELEVEN	.....	227
SUMMARY AND CONCLUSION	.....	227
11.1	Introduction	227
11.2	Summary.....	227
11.3	Conclusion	227
REFERENCES	.....	229
LIST OF APPENDIXES	.....	231

LIST OF TABLES

Table 2.0: ESIA Team information.....	ii
Table 1.1; Location/Coordinates of the IFM Simiyu campus by Google Earth in WGS84 Datum.....	10
Table 2.2: Raw materials, Source and Quantity.....	18
Table 2.3: Types, amounts and treatment/disposal of wastes during the construction phase....	21
Table 2.4: Waste generated, amount and disposal method.....	24
Table 3.1: Institutional Framework.....	57
Table 3.2: Applicable Environmental and Social Standards.....	63
Table 3.3: Institutional arrangement for Environmental and Social management at IFM.....	74
Table 5.1: Stakeholders consulted and their views.....	83
Table 5.2: Categories of issues and problems.....	91
Table: 5.3 Summary of the stakeholders' engagement during Implementation.....	93
Table 5.4: Summary of Stakeholders Communication Strategy that reflect the characteristics and corresponding specific needs.....	97
Table: 5.5: Stakeholders' Engagement Plan.....	100
Table 5.6: Levels of Grievances Redress Mechanism.....	107
Table 5.7: Grievance Procedure for Construction and Operational GRMs at IFM.....	108
Table 6.1: Impact scoring matrix with significant level.....	118
Table 6.2: Spatial Rating.....	121
Table 6.3: Temporal Rating.....	132
Table 6.4: Sources of the harmful effects on health and community safety.....	133
Table 6.5: Project activities and Impacts.....	137
Table 6.6: Emission of construction equipment and vehicles.....	141
Table 7.1: Management sanitary pads approaches and solutions.....	166
Table 8.1: Proposed Environmental and Social Impact Management Plan.....	184
Table 8.2: Disaster Risks and management level.....	196
Table 8.3: Proposed Environmental and Social Monitoring Plan.....	228
Table 10.1: Decommissioning activities plan.....	210

LIST OF FIGURES

Figure 2.1: IFM Simiyu Campus-Global Location Views.....	11
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LIST OF APPENDICES

Appendix 1: Title Deed.....	234
Appendix 2: Baseline Data on Air Quality, Noise and Vibrations.....	238
Appendix 3: Buildings Site Plan.....	241
Appendix 4: Geotechnical Investigation and Soil Surveys Report.....	242

LIST OF ACRONYMS AND ABBREVIATIONS

AIDS	Acquired Immunity Deficiency Syndrome
dB	Decibel
DOE	Division of Environment
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
ESIA	Environmental and Social Impact Assessment
EHSSO	Environmental, Health and Safety Site Officer
HEET	Higher Education for Economic Transformation
HIV	Human Immune Virus
IFM	Institute of Finance Management
IFM SO	Institute of Finance Management Student Organization
KVA	Kilo Volt Amperes
LVBWB	Lake Victoria Basin Water Board
MoEST	Ministry of Education, Science and Technology
NACTVET	National Council for Technical and Vocational and Training
NEMC	National Environment Management Council
NEP	National Environment Policy
NGOs	Non-Governmental Organizations
PAP	People Affected by the Project
PPE	Personal Protective Equipment
OSHA	Occupational Safety and Health Authority
RUWASA	Rural Water Supply and Sanitation Agency
SSO	Social Site Officer
TBA	Tanzania Building Agency
TANESCO	Tanzania Electricity Supply Company
TBS	Tanzania Bureau of Standards
TIN	Taxpayer Identification Number
TOR	Terms of Reference
TRA	Tanzania Revenue Authority
URT	United Republic of Tanzania
VAT	Value Added Tax
WHO	World Health Organization

CHAPTER ONE

INTRODUCTION

1.1 Project Background

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. The Institute of Finance Management (IFM) in Simiyu is one among the institutions benefited from the Higher Education for Economic Transformation (HEET) project.

The IFM is intending to use the HEET funds to expand Simiyu Campus by constructing a Functional hall, a Multipurpose Teaching block, a Library and Computer Lab, Hostel blocks, Community building, Sports grounds and External works. This development will help to strengthen the learning environment and labour market orientation of priority programs in beneficiary higher education institutions and strengthen the Management of the higher education system.

However, the construction of buildings and associated activities is expected to have adverse environmental, social and economic impacts. These impacts need to be identified, predicted and evaluated so that positive impacts are enhanced while mitigation measures are developed for negative impacts. IFM has therefore contracted ARMS on Environment Limited to undertake an Environmental and Social Impact Assessment (ESIA) prior to project implementation as prescribed by Tanzanian Environmental Management Act of 2004 and Third Schedule to Environmental Management Act, Cap 191 and First Schedule to Environmental Impact Assessment and Audit (Amendment) Regulations, 2018.

Similarly, the World Bank provides Environmental and Social Framework (ESF), Environmental and Social Safeguarding Policies (ESSP) and relevant Environmental and Social Standards (ESSs), which aim to offset the anticipated social and environmental risks and impacts. The

ESS1 for example, sets out the requirements for Borrowers relating to the identification and assessment of environmental and social risks and impacts and development of mitigation measures.

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

1.2 Project Objectives of the IFM HEET Project

According to the HEET's Project Appraisal Document (PAD) of 2021, the Project Development Objective (PDO) is to strengthen the learning environment and labour market orientation of priority programs in beneficiary higher education institutions and strengthen the Management of the higher education system.

1.3 Project Rationale

According to the Environmental and Social Management Framework (ESMF, 2021), Tanzania has made commendable gains in basic education in recent years. For example, enrolment at the primary level has shown an increase of 24.5% from 8,116,488 in 2015 to 10,111,671 pupils in 2018 (10,601,616 in 2019). Similarly, the enrolment trend in secondary education in the year 2013/14 showed a positive increase in the number of students transitioning to post-primary education. Student demand for higher education is expected to surge by 2030, so the tertiary Education system (public and private) must expand and be of better quality to accommodate these additional students (PAD, 2021).

While the country has recorded expansion in basic education, there is widespread acknowledgement among policy makers that the overall outcome of the successful performance in basic education is the demand for subsequent levels of education and especially higher education. In this regard, the main challenge is inability of the system to absorb the expanding number of graduates in basic education inspired and capable of joining the higher education subsector. Of immediate need is the expansion of investment in infrastructure, facilities and quality assurance system in Engineering (agro-processing, mechanized agriculture, railway, hydropower, aeronautic etc.), Medical Science and Technology, Agriculture and Allied Sciences,

Energy and Minerals, Forestry and Natural Resource Management. Another concern is on the gender issues.

HEET Project Appraisal Document of 2021, points out a number of challenges in the current higher education system. These include:

- i. Gender inequality in lower levels of education (especially upper secondary) that persists up to the institute level, although the gender parity index in higher education has improved from 56.5 percent in 2013 to 67.4 percent in 2018;
- ii. Th institute graduates struggle to find jobs, at least in part due to skills mismatches;
- iii. Demand-side considerations underscore the need for greater numbers of students in disciplines and programs sought after by employers, such as engineering, agribusiness, tourism, and climate change. The overall quality of post-secondary academic programs is low and does not prepare institute graduates adequately for current and future formal jobs or self-employment;
- iv. Shortage of well-trained lecturers and the majority of academic staff use traditional teaching methodologies;
- v. Most of higher education institutions are not currently able to access or use modern technologies to deliver training; and
- vi. The global pandemic has reinforced the need for higher education institutions to develop thoughtful resiliency plans.

A more strategic mix of education, skills and technology will help Tanzania develop its productive sectors and create jobs for the growing number of youths entering the labour market (PAD, 2021).

The Higher Education for Economic Transformation (HEET) Project will finance the development of infrastructure, faculties, and quality assurance systems in higher education to facilitate rapid economic transformation in the country. Through HEET project, the Government of the United Republic of Tanzania seeks to build requisite operational capacity for public universities to empower them to be dependable drivers for economic transformation by building on their respective institutional visions, missions, objectives and core values.

In line with this and since the establishment of IFM and the successive institutional transformations that have culminated to the establishment of IFM, there has been a need to increase the human resource in the fields of engineering and science as recommended in

various stakeholders' meetings during review and development of curriculums for the institute's programmes. IFM intend to expand Simiyu Campus by constructing a Functional hall, a Multipurpose Teaching block, a Library and Computer Lab, Hostel blocks, Community building, Sports grounds and External works.

1.4 Objectives of the Environmental and Social Impact Assessment Study

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

- i. To identify, predict and evaluate the significant environmental impacts of the project
- ii. To evaluate the impacts and risks of the various alternatives on the project
- iii. To propose mitigation measures for the significant negative impacts of the project on the environment.
- iv. To generate baseline data for monitoring and evaluating impacts, including mitigation measures during the project cycle.
- v. To seek the views and concerns of all stakeholders in regard to the proposed project.
- vi. Develop an Environmental and Social Management Plan with mechanisms for monitoring and evaluating compliance and environmental performance.

1.5 Scope of Work

This study entailed the following: -

- i. To provide a description of the relevant parts of the project including project location, design, components and activities;
- ii. To review of policies, legislation, standards and regulations governing the Environment at the International, Regional and Local levels;
- iii. To assemble, evaluate, and present baseline data on the relevant environmental and social characteristics of the project area;
- iv. To make a consultation with Government agencies, local communities and the private sector operating near the project area;
- v. To assess and quantify significant environmental impacts resulting from the building development, especially within the zone of influence of the project;
- vi. Describe alternatives that were examined in the course of developing the proposed

project and identify other alternatives, which would achieve the same objectives;

- vii. To develop an Environmental Management Plan (EMP) detailing actions and responsibilities for impacts mitigation and monitoring

1.8 Approach and Methodology

1.8.1 Approach

Several approaches and study methods are to be used in carrying out this assignment with the view of obtaining quantitative and qualitative data (baseline data) in order to prepare the report.

Main approaches used were;

- i. Follow the Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulation of 2018.)
- ii. Follow broad ecological examinations such as transect walk and detail analysis of the project area.
- iii. The scoping is being undertaken as initial stakeholder identification through the identification of issues, problems and concerns, a summary of results and ToR for EIA.

1.8.2 Methodology

The ESIA study for the project was carried out in accordance with the approved Terms of Reference as provided in Appendix 1. The study was undertaken in May, 2023 and included the following methodology:

- i. Meetings and Interviews;
- ii. Review of Documents;
- iii. Transect Walk;
- iv. Site visits and;
- v. Measurement of Environmental Parameters

i. Meetings and Interviews

Key stakeholders were identified and specific meetings and interviews were schedules to gather their views and perceptions on the project. Some of the key Stakeholders consulted in this process include the following; Bariadi District Council- District Executive Officer (DED), District Environment Management Officer (DEMO), District Town Planning Officer, OSHA- Occupation Health Inspector, Fire and Rescue Force, Rural Water Supply and Sanitation Agency and

Village Executive Officer (VEO). Specific results of the interview and meeting is presented in subsequent chapters in this report.

ii. Review of Documents

Reviews involved the acquisition and review of project documents, reports, maps and drawings relevant to the project. Other documents reviewed included different pieces of national legislation, policies, guidelines and regulations as well as international policies and guidelines and procedures.

iii. Site Visits

The objectives of site visits were to observe and capture baseline data on the existing biophysical and socio-economic environment of the project area. In addition, the visits provided an opportunity to consult stakeholders and senior government officials on their views regarding the project and its significant impacts.

iv. Transect Walk

The EIA team undertook a transect walk around the project site. This exercise was carried out in order to observe physical features existing in the project site to establish relationships with the project building that pose environmental and social issues worth noting for studies and identify the major environmental and socially sensitive receptors. The transect walk was undertaken in sub-wards in the vicinity of the project to consult members living near the project site.

v. Measurement of Environmental Parameters

The ESIA team collected and analyzed baseline air quality, noise levels and vibrations at the proposed project site and adjacent areas. Four (4) sampling locations were selected based on relative distance to the proposed project sites and existing multiple sources of air pollution. The ESIA team considered the four corners of the project site and the standby generator to be the main sources of air pollution in the area. The measurements were done to establish baseline on air quality, noise and vibrations;

a. Measurement of ambient dust levels (PM2.5 and PM10)

Dust in terms of [articulate matter as PM10 and PM2.5 was measured using Dust Monitor. During the measurements, the dust monitor was fixed at a breathing height of approximately 1.5

meters above the ground. The recorded PM10 and PM2.5 values were then compared with their respective TBS and WHO Guidelines to check the level of compliance.

b. Ambient Pollutant Gases Assessment

The ambient pollutant gases were measured using the Portable Multi Gas Analyser capable of measuring Carbon monoxide (CO) [mg/m³], Nitrogen dioxide (NO₂) [mg/m³], Sulphur dioxide (SO₂) [mg/m³], and Hydrogen sulphide (H₂S) [%]. During measurement, the equipment was mounted 1.5m above the ground. Three readings were collected at each sampling point, and the mean value was used as a representative value of that particular point. Results were compared with local and international standards.

c. Ambient Noise Levels and vibrations

Noise levels assessment was carried out using a Digital Sound Level Meter at a range of 30dB – 180dB (A). On taking measurements, the meter was set to the “A” weighed measurement scale, which enables the meter to respond in the same manner as the human ear. The “A” scale is applicable for workplace compliance testing, environmental measurement, and workplace design and law enforcement. The meter was held approximately 1.5 m above the floor and at least 0.5 m away from hard reflecting surfaces such as walls.

Ground vibration level was measured by using Vibration meter. Both local standards and international guidelines were referenced in the assessment.

1.9 Report Structure

The ESIA study was prepared as per the guidelines provided under the Environmental Management Act No. 20 of 2004 (Cap 191) (Amendment 2018) and its subsequent EIA and Audits Regulations GN 349 of 2005. Thus, EIS is comprises of sections and chapters as follows;

- i. Executive Summary
- ii. Introduction, objectives, rationale and methodology
- iii. Project description
- iv. Policy, Legal and Administrative Framework
- v. Baseline Information
- vi. Public Participation and Stakeholder Consultations
- vii. Assessment of Impacts and Identification of Alternatives
- viii. Environmental Mitigation measures

- ix. Environmental and Social Management Plan
- x. Environmental and Social Monitoring Plan
- xi. Cost Benefit Analysis
- xii. Decommissioning
- xiii. Summary and Conclusions
- xiv. List of References
- xv. Appendices

CHAPTER TWO

PROJECT DESCRIPTION

2.1 Introduction

In this chapter, an attempt has been made to describe the nature of the project, location and accessibility of the project site, project boundaries, existing situation, project components, project utilities, and project activities to be undertaken.

2.2 Nature of the Project

The EIA study addresses all environmental and social aspects of the proposed establishment of IFM Simiyu Campus. As already stated above, this EIA study has been conducted in accordance with World Bank Environmental and Social Standards and the National Environmental Impact Assessment and Audit (amendment) regulations 2018, formulated for the purpose of implementing the Environmental Management Act No. 20 of 2004. This Act specifically requires mandatory carrying out of EIA for development projects implemented in Tanzania. The nature of the proposed project falls under category 'A', mandatory EIA, thus the study.

2.3 Project Location, Accessibility and Size

The proposed project site is located on plot No. 79, Block "B" (MD), Sapiwi Village, Sapiwi Ward, Bariadi District Council, Simiyu Region. The site can be accessed by the Mwanza-Musoma highway (trunk road T4) and then cross to Bariadi road. The campus is approximately forty (40) meters off Bariadi road. The project site will cover a total area of 12.27Ha.

2.4 Land Tenure, Use, Ownership and Management

The parcel of land is legally owned by IFM with the certificate of Occupancy No.75361. The land and the buildings erected thereon shall be maintained and the same shall be used for Institute purposes only; Use Group 'K' Use Classes (d) as defined in the Urban Planning (Use groups and Classes) Regulation of 2018. See attached copy of the ownership document. Hence the development in the area is compatible with the designed land use of the title.

2.5 Adjacent Development

The proposed project area is surrounded by Residential houses on the Northern, Southern and Eastern sides, and Bariadi road on the Eastern.

2.6 Status of Cadastral Surveying

Cadastral Surveying is the discipline of land surveying that relates to the laws of land ownership and the definition of property boundaries. It involves interpreting and advising on boundary locations, on the status of land ownership and on the rights, restrictions and interests in property, as well as the recording of such information for use on plans, maps, etc. It also involves the physical delineation of property boundaries and the determination of dimensions, areas and certain rights associated with properties. The environment team inspected the project site and identified its existing cadastral with boundary coordinates indicated in Table 2. The plot is registered in 2019 as plot number 79 from the survey plan number 107354 of Block B.

Table 2.1; Location/Coordinates of the IFM Simiyu campus by Google Earth in WGS84 Datum

Sn	Longitude	Latitude	Description
1	33.965779°	-2.368885°	Corner point 1
2	33.967541°	-2.368507°	Corner point 2
3	33.969454°	-2.372201°	Corner point 3
4	33.968913°	-2.373344°	Corner point 4
5	33.967060°	-2.374043°	Corner point 5

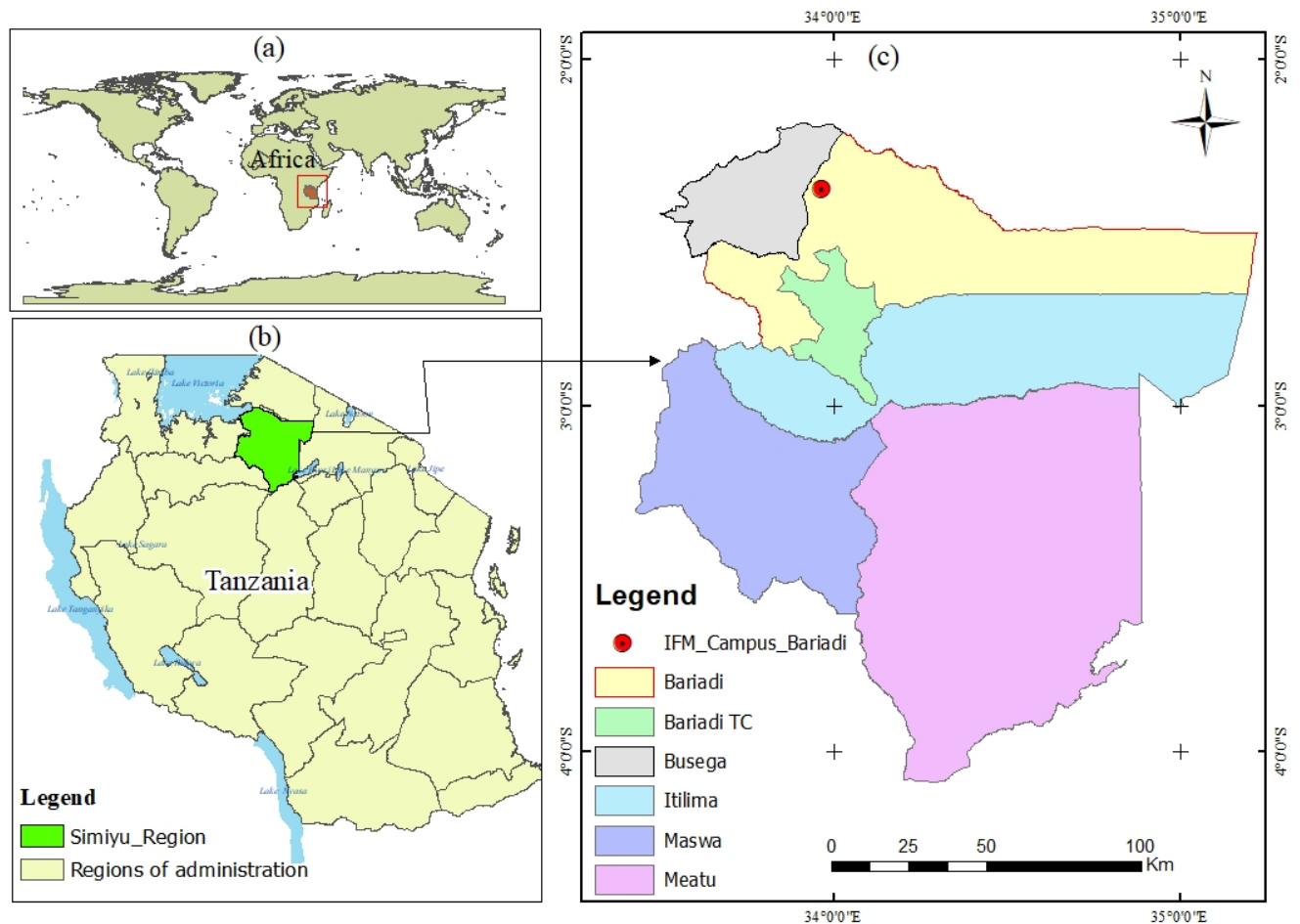


Figure 2.1: IFM Simiyu Campus-Global Location Views

Source: ESIA Team on December 2023

2.7 Existing Environment and Surrounding

There are several facilities within the campus; including a classroom block with a seating capacity of 321 students, six (6) Hostel Blocks with a capacity of accommodating 288 students, a Library with the capacity to accommodate 120 students at the same time, Canteen with the capacity to accommodate 100 students, an Administration block with the capacity to accommodate 40 staff, four (4) Staff houses, and a temporary sports grounds.

The area is well vegetated consisting of indigenous trees, planted trees and grasses. When the project implementation kicks off some vegetation in the project site are going to be modified. However, after the construction phase of the project is over, some of the open spaces will be replanted with grasses, trees and flowers.

2.8 Project Components

Current there are about 240 students. After completion, the campus will accommodate 3000 people. The proposed expansion will include the construction of;

1. The functional hall comprises of;
 - (i) Male and female changing room, Washrooms (10), disabled toilets (2), Special entry, Waiting room, Platform, Four (4) main entries, VIP room, VIP lounge, Student hall.
 - (ii) The building will have the capacity of accommodating 500 people at once.

2. Three (3) storey Multipurpose Teaching block comprises of;
 - (i) Ground floor plan with rooms capacity of 60, 90,130,45,100 and 100students; Toilets (10 females and 10 males) disabled toilet; staff toilets 2 Courtyard green area; 4 Corridors; 5 Offices; Lactation room; Entry lobby; 4 Passages.
 - (ii) First-floor plan with rooms capacity of 60,130,90,60,70,70,90 students; Accountant offices; Toilets (10 females and 10 males) disabled toilet; staff toilets; Lactation room; 4 Corridors; 4 Passages.
 - (iii) Second-floor plan with rooms capacity of 60, 90, 130, 110, 90,90,60,70,70,70 students; Lactation room; Office; 5 Corridors; Toilets (10 females and 10 males) disabled toilet; staff toilets.
 - (iv) Third-floor plan with rooms capacity of 60,90,130,70,70,110,90,90,60 students; Office; Lactation room; Toilets (10 females and 10 males) disabled toilet; staff toilets.
 - (v) The building will have the capacity of hosting 3000 students
The dimensions of the building are: Area: 2142 sqm on each floor with a total of 8568 sqm

3. Two (2) storey Library and Computer Lab Block
 - (i) Ground floor plan (Library) comprises of 11 bookshelves; an entry veranda; an office; staff and a student toilet.
 - (ii) First floor plan with rooms comprises of computer lab; 2 offices; staff and student toilets; fire exit balcony.
 - (iii) Third floor plan comprises of computer lab; 2 offices; staff and student toilets; fire exit balcony;
 - (iv) The building will have the capacity to house 480 students

(v) Area: 700 sqm on each floor, a total of 2100 sqm

4. Hostel blocks-Boys and Girls. Each block will comprise of the ground floor and first floor

(i) Ground floor plan comprises of 14 rooms each with 2 beds; office; common area; entrance verandah; fire exit; 4 dhobi sinks; disabled toilet and other student toilets, urinals

(ii) First floor plan comprises of 14 rooms each with 2 beds; office; common area; entrance verandah; fire exit; 4 dhobi sinks; disabled toilet and other student toilets; urinals

(iii) Each block will accommodate 240 students, total of 480 student

- Area: 530 sqm on each floor a total of 1590 sqm

(iv) Community building comprises of;

- Verandah; Dispensary; Financial services; Body shops and saloons; Convenience stores; Bookshop; Stationery services; Gym.

- Area: 1543 sqm

(v) Sports grounds comprise of;

Football, volleyball, basketball and netball

(vi) External works have

- Water management structures (open channels, culverts) Pavements, walk ways, internal roads and general landscaping.

2.9 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, IFM 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.

2.9.1 Climate Change risks mitigation and adaptation in the Project Design

In order to mitigate and adapt the climate change risks (e.g heat, drought, floods, water scarcity, etc), the design of the IFM Simiyu campus shall accommodated the infrastructures to enhance low energy use, rainwater harvesting, storm water management systems, adequate natural ventilation and lighting, and maintaining a significant green spaces, as described hereunder;

i. 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.

ii. Greenery Walkways

The design maximizes pedestrian movement and minimizes motorized transport within the site in order 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.

iii. Botanical Garden

The zoning of different land uses at the proposed site was guided by inner roads, which act as veins dispersing from the artery and provide vistas of the hills on the eastern part and crossing the botanical garden, which acts as the heart of the whole site. The botanical garden which include the green belt and conservation area, the constraints areas, and the Campus Park is the breathing space for the whole site and an urban filter in terms of urban climate. Further, the botanic garden will allow cross ventilation and other sanitary waste treatment.

iv. 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 in the eastern part of the site. Vegetation including artificial forests will reduce soil erosion in sloping plains and all areas prone to soil erosion.

v. **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, laboratories and workshop areas; proper orientation to reduce indoor discomfort and capture natural air as much as possible and minimization of the sun effects (installation of fins; 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;

vi. **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.

2.9.2 Special Needs and Gender Inclusivity

The campus buildings will be developed to be smart and friendly to gender and special needs (e.g. physical, learning impairment, emotional and behavioural).

a. ***Special Needs Considerations***

- i. At least one entrance per facility should be accessible to a wheelchair user
- ii. All work areas in which physically disabled persons may be employed should be accessible.
- iii. New office buildings should be as accessible as possible so as to accommodate all persons and not hinder employment of disabled persons.
- iv. In lecture halls, spectator seating in sports centres, and other assembly halls with fixed seating, some seats with removable or flip-up armrests should be provided at row ends to accommodate a wheelchair user or a person with limited ambulatory mobility

b. Gender Considerations

Ensure that classrooms, hostels, staff offices and toilets have important facilities that address gender needs.

2.9.3 Disaster Risk Management

The proposed project will have provisions for fire prevention and firefighting facilities. Also, the building will have provisions for solid waste and liquid waste management for diseases prevention. In addition, two possible access roads will be used to ensure easy walkability and vehicular access to and from the building to avoid car accidents. The roads will be safely connected to the parking area huge enough to accommodate cars. IFM Simiyu campus will have an emergency management plan that assigns the responsibilities for various emergency tasks, specifically to WHO does, WHAT, WHEN AND HOW.

2.10 Project Phases

The proposed project will include a number of phases: pre-construction phase, construction phase, operation phase and decommission phase. Each specific phase has its own activities which are well elaborated as follows:

2.10.1 Pre-construction Phase

The implementation of the project's design and construction phase will start with a thorough investigation of the site's biological and physical resources in order to minimize any unforeseen adverse impacts during the project cycle. This includes;

- i. Topographical survey to establish the boundaries and the ground levels
- ii. Geotechnical investigations to study the soil profile of the underlying geological formations
- iii. Architectural, Engineering and Services Designs to provide drawings which fit the proposed plan
- iv. Environmental and Social Impact Assessment conducted by following the EIA and Audit (Amendment) regulations of 2018;
- v. Acquisition of various permits/certificates (i.e. Building permits)

2.10.2 Construction Phase

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

i. Site Preparation

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

ii. Construction of Temporary Facilities

This includes the construction of temporary structures such as a reception room, power room, changing rooms, engineers conference hall, engineer office, store and canteen.

iii. Construction Workers

A construction labour force of both skilled and non-skilled workers will be employed. About 100 workers are expected to be employed. The contractor will also add other workers depending on the construction activity. Gender will be considered during employment. For the semi-skilled and unskilled workers, the Contractor will employ people from the communities which live around the project area as a way of making sure that the project benefits the people community members in the project area.

iv. Construction Equipment

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

- (i) Bull Dozers for clearing the site, removal of topsoil and vegetation materials, and pushing out stumps;
- (ii) Graders for grading and levelling land for buildings and access road formation;
- (iii) Tippers/lorries for transporting construction materials and workers;
- (iv) Light machinery like pedestrian rollers for access road compaction;
- (v) Heavy rollers for access roads compaction;
- (vi) Front-end loader for loading materials onto tippers and lorries;
- (vii) Several light equipment like wheel burrows, shovels, picks;
- (viii) Concrete mixers;
- (ix) Earthmover;
- (x) Compactor;
- (xi) Wheelbarrow; and

(xii)Hammers and bolt and nut fasteners, hand saw, electric and gas welders, electric saws and grinders, load roller, trucks, hand drills and drill bits, wire cutters, concrete mixer trucks, wheel loader, forklift, excavator etc.

v) Sourcing and Transportation of Building Materials

Building materials will be transported to the project site from their extraction, manufacture, or storage sites using transport trucks. Materials such as sand, gravel and quarry stone will be obtained from approved sources in the surrounding areas. Sand will be obtained from the Walajulu River located at Masewa ward or the Duma River located at Mwamondi village, Dutwa ward. Aggregates will be obtained from Nyakabindi. Water for construction activities will be obtained from the borehole owned by IFM. The borehole has a pump with a capacity of pumping 9200 litres of water per hour and is stored in a storage tank with a capacity of 52000 litres.

Concrete blocks will be used for construction. Use of concrete blocks is more environmentally friendly than the use of burnt bricks, which contribute to deforestation. The concrete blocks are stronger and long-lasting, do not lead to deforestation as burnt bricks do and the procurement of large quantities of cement for making the concrete blocks will contribute to increased growth of the local economy.

Other materials such as cement, paints, timber, roofing materials, windows, doors and other joinery, tilt and roller doors, wallboard and plasterboard, light fittings, fuel and oil, electricity, water, ceramic tiles, polythene, steel, steel pipes, PVC pipes, adhesives, copper wires, gas (acetylene and oxygen), the cardboard will also be sourced for the project. Construction materials will be sourced depending on the construction stage. The table below shows raw materials, source and quantity.

Table2.2 : Raw Materials, Source and Quantity

Requirements	Type	Source	Quantity (Estimates)	Mode of Transport
Raw Materials	Aggregates	Nyakabindi	4,700-6,000m3	Trucks
	Sand	Walajulu	15,000-30,000m3	Trucks
	Cement	Dar es Salaam	7,500-9,000Tons	Trucks

Requirements	Type	Source	Quantity (Estimates)	Mode of Transport
	Water	Borehole		Trucks
	Reinforcement bars	Dar es Salaam/Mwanza	6,100Tons	Trucks
Manpower	Skilled	Contractor	25	Communal buses
	Unskilled	Community around	75	Communal buses
Equipment	Excavator	Contractor	1	Trucks
	Bulldozer	Contractor	1	Trucks
	Motor grader	Contractor	1	Trucks
	Plate compactor	Contractor	1	Trucks
	Trucks	Contractor	5	
	Construction Crane	Contractor	2	Trucks

Source: *Consultant Analysis, 2023*

vi. Storage of Materials

Building materials will be stored on site. Bulky materials such as rough stones, ballast, sand and steel will be carefully piled on site. To avoid piling large quantities of materials on site, the proponent will order bulky materials such as sand, gravel and stones in bits. Materials such as cement, paints and glasses among others will be stored in temporary storage structures, which will be constructed within the project site for this purpose.

vii. Structural Steel Works

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

viii. Electrical Work

Construction phase will involve the use of electricity for welding, metal cutting etc., Electricity will be supplied by TANESCO and there will be a standby generator with a capacity of 220KVA to be used when power is cut off.

Electrical works such as installation of electrical gadgets, devices and appliances including electrical cables, lighting apparatus, sockets etc. will be carried out by a licensed electrician to the satisfaction of the TANESCO.

ix. Mechanical Works

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

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

x. Landscaping

To improve the aesthetic value or visual quality of the site once construction ceases, the proponent will carry out landscaping. This will include the establishment of a theme garden and lush grass lawns where applicable and will involve replenishment of the topsoil. It is noteworthy that the proponent will use plant species that are available locally preferably indigenous ones for landscaping.

xi. Construction Wastes

It is anticipated that the project will generate a variety of wastes during its construction phase. The characteristics of the wastes are discussed in this section.

a. Soil

The soil generated during excavation will be stockpiled along the foundation trenches and used for re-establishment of the site at the end of the project.

b. Pieces of timber/wood, empty cement bags and pieces of iron steel

Large pieces of timber/wood generated during the construction phase will be transported back to the contractor's yard for reuse in future while the small pieces of timber/wood will be disposed-off for use as fuel for cooking and heating. Empty cement bags will be collected and disposed to the dumpsite/ sold to local vendors.

c. Empty Paint Buckets

These will be reused elsewhere in the project. The damaged ones will be disposed-off to registered plastic waste dealers.

d. Excess sand and Stockpiles

These can be used for future construction activities e.g. renovations. Upon completion of the project, these will be moved by the contractor to a suitable yard.

e. Domestic Wastes such as Food Remains, Plastic Bottles etc

The proponent will provide dust bins for temporary storage of waste within the premises before final disposal to the designated dumping site.

f. Hazardous Materials

These include hydrocarbons such as used oil and diesel for running diesel powered machines at site. Also, there will be remaining paint containers, plastic bottles etc., Fuel, oil, lubricants, scrap metals and plastics will be temporary collected and stored at a designated area before provided and/or sold to recyclers.

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

Waste	Types	Amount	Treatment/disposal
Solid Waste (Degradable)	Garbage: Food remains, papers	40kg/day (based on a generation rate of 0.4kg/day/ person and there will be about 100 workers)	-Collected in a large skip bucket -Sold to recyclers -Taken to the Kidulya dumpsite
Solid waste (Non-Degradable)	Scrap, remains of timber cuts, Glass, plastic containers, packaging materials i.e. empty cement bags empty paint buckets	50kg	-Reused elsewhere in the project for storing water, damaged will be disposed off to registered plastic waste dealers -Will be stockpiled along the

	Excess sand and stockpiles	1000 m ³ . The estimate is based on the area to be excavated	foundation trenches and used for re-establishment of the site at the end of the project -These can be used for future construction activities
Liquid waste	Sewage	3200litres/day (Based on 100 people, 40l/capita/day water consumption and 80% becomes wastewater)	-Septic tank
	Oils and greases		Car maintenance will be done at proper garages

Source: *Consultant Analysis, 2023*

2.10.3 Operational Phase

This will involve running of the proposed project.

i. Water Supply

The project will be supplied with water from the borehole owned by IFM. The borehole has a pump with a capacity of pumping 9200 litres of water per hour and is stored in a storage tank with a capacity of 52000 litres. There are also three (3) water storage tanks with a capacity of 5000 litres located in the hostels and one (1) tank with a storage capacity of 10,000L located in the administration block.

Currently, the campus uses an approximate of 9600L of water per day. After expansion, about 12000L of water per day are estimated to be used. It is estimated that 40 litres will be used by one person per day.

ii. Electricity Supply

The project area is supplied with electricity from TANESCO. Current the campus use an approximate of 4125KVA per month which is equivalent to 137.5KVA per day. It is expected that the power consumption of the campus will increase to 385KVA/day after expansion.

Currently, there is a standby generator with a capacity of 220KVA to serve during power cuts. After expansion a backup generator with a capacity of 500 KVA will be added. The generator will be leak free and silent.

iii. Waste Generation

a. Solid Waste

Significant amount of solid waste will be generated during the operation of the proposed project. Waste to be generated includes papers, food remains, packaging materials, general office waste etc. To ensure effective management of solid waste generated the management shall emphasise a proper waste management system that will start with a collection of wastes by sorting to the designated dustbins. Current waste management is poor (wastes are burnt onsite and there is no sorting).

It is estimated 1200kg of solid waste will be generated per day. NB: Assuming that one (1) person produces 0.4kg/day of solid waste and there will be about 3000 students.

b. Liquid Waste

Waste water will be generated from kitchen, bathrooms and toilets. Sewage generated from each building will be discharged into the Septic Tanks. In the future the campus will use Anaerobic waste treatment plant.

It will also be important to ensure that sewage pipes are not blocked or damaged since such vices can lead to the release of the effluent, resulting in land and water contamination. Such blockages or damages have to be fixed expeditiously to avoid spread of diseases.

It is estimated that 96000litres of liquid waste will be generated per day. NB: Assuming that one (1) person consumes 40 litres of water per day and discharges 80% of it and there will be about 3000 students.

c. Hazardous Materials/Waste Management

Types of hazardous waste to be generated include fuel, oil, lubricants, scrap metals, sanitary wastes and plastics bottles. Fuel, oil, lubricants, scrap metals and plastics will be temporary collected and stored at a designated area before provided and/or sold to recyclers. Sanitary wastes will be managed by using High Tech Incinerator to be constructed within the site. (See Incinerator design in the list of appendix)

The table below shows the type of waste generated, amount and disposal method;

Table 2.4: Waste generated, amount and disposal method

Waste	Types	Amount	Treatment/ Disposal
Solid Waste (Degradable)	Food remains, paper, boxes	1200Kg/day (based on a generation rate of 0.4kg/day/ person for 3000 people)	-All wastes shall be collected to the designated dustbins and designated dustbins. The collected wastes will be taken by a contracted waste collector operating in the area to a disposal site.
Solid Waste (Non-Degradable)	Scrap metals, plastic bottles, Tins, glasses, cement bags	50Kg/day	Sold to recyclers
Liquid wastes	Sewage	96000 L/day (Based on 3000 people, 40L/capita/day water consumption and 80% becomes wastewater)	Directed to the septic waste to be constructed onsite.
	Oil and greases		Car maintenance will be done at proper garages

Source: Consultant Analysis, 2023

d. Storm Water Management

At the proposed site and marginal zone areas, there is no stormwater drainage system. Water management structures (open channels, culverts) will be constructed to maintain stormwater following the natural topography of the area.

v. Cleaning

The proponent will be responsible for regular cleaning of the surrounding area. Student tenants will be responsible for washing and cleaning their premises/rooms. Cleaning operations will involve the use of substantial amounts of water, disinfectants and detergents.

vi. General Repairs and Maintenance

The project facilities will be repaired and maintained regularly during the operational phase of the project. Such activities will include the repair of building walls and floors, repairs and maintenance of electrical gadgets and equipment, repairs of refrigeration equipment, repairs of leaking water pipes, painting, maintenance of flower gardens and grass lawns, and replacement of worn-out materials among others.

2.10.4 Decommissioning Phase

i. Demolition works

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

ii. Dismantling of Equipment and Fixtures

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

iii. Site Restoration

Once all the waste resulting from demolition and dismantling works is removed from the site, the site will be restored through replenishment of the topsoil and re-vegetation using indigenous plant species.

The following shall be done before and during decommissioning;

1. The management shall come up with a decommissioning plan that addresses:
 - i. Characterization data summary
 - ii. Facility description and history
 - iii. Health and safety plans
 - iv. Project scope and objectives
 - v. Risk assessment
 - vi. Site release criteria
 - vii. Specific decommissioning methods
 - viii. Waste generation estimates and waste disposal procedures

2. When a decommissioning plan is developed, it will be based on
 - a. Adequately protecting public and occupational safety and health
 - Adhere to the occupational health and safety regulations while conducting the decommissioning
 - b. Compliance with statutory, contractual and regulatory requirements
 - Consider waste minimization and appropriate disposal
 - c. Effective project management, including selection among viable alternatives based on risk, cost and desired facility end state
 - Evaluate the potential for re-use and recovery of material and equipment
 - d. Human capital management, consistent with future site utilization plans
 - e. Significant environmental and ecological impacts

2.11 Health and Safety Measures

The project site should be registered to the Occupational Safety and Health Authority (OSHA) before commencement of any business operation as per section 16(2) of the Occupational Health and Safety Act, 2003.

2.11.1 OHS During Construction Phase

Occupational health and safety in construction involves the identification, assessment, and control of hazards to minimize the risk of injury and illness to workers. It is essential to ensure that all workers have the necessary training, knowledge, and equipment to work safely.

Before the work starts, competent Environment Health and Safety personnel should:

- (i) Identify and devise risks and their management strategy
- (ii) Ensure training – site specific and job-specific
- (iii) See that the workforce has access to PPEs and know how to use them
- (iv) Observe, inspect and report that agreed safe work methods are implemented, site-wide

Upon arrival at the site, employees, contractors and visitors should receive information about the site hazards and steps taken to control those risks. Also, briefing them about the hazards, PPEs, welfare facilities and site rules can ensure that the work in progress is smooth and efficient.

Moreover, it is important to promote a safety culture in the construction industry, where workers are encouraged to report hazards and near-misses, and where safety is given priority over productivity.

a. Preventive Measures

Much of the construction works include scaffolds, and collective fall prevention becomes a necessity. They must be equipped with guardrails, toe boards and brick guards. Personal prevention such as podium steps, can be used to prevent falls while working at height. If the weather seems inappropriate, emergency and rescue procedures should be well-defined in advance to avoid adverse effect on workers. All working platforms must be checked for safe conditions and should be inspected for slip and trip hazards.

Other preventive measures that make safe conditions certain are:

- i. Regular inspections of the site and the machineries to detect hazards in the first place
- ii. Selection of the right PPE (respirators, helmets) to avoid inhalation of asbestos, dust and fibre with provision for appropriate trainings.
- iii. Avoid repetitive motions and use long-handled tools to reduce the need of bending down.
- iv. Make sure that workers are protected from wet concrete (provide PPE and proper washing facilities)
- v. Ensure safe dismantling procedures are in place
- vi. Site traffic (for vehicles or moving equipment) should be planned and managed to avoid fatalities onsite
- vii. Forklifts should be used carefully in material handling
- viii. Pneumatic silencers should be used to reduce noise; electrical hazards (faulty wiring) must be checked and firefighting equipment should be in place

2.11.2 OHS during Operation Phase

To comply with safety standards, the project will be operated following all procedures provided by OSHA. Here are different OHS procedures;

a) Risk Assessment

A systematic process of evaluating potential hazards before they can cause harm. Once these risks are clearly understood, appropriate measures are taken to mitigate (reduce the potential impact or likelihood) or eliminate the risks. For some hazards, elimination might be possible, like

replacing a toxic substance with a non-toxic one. For others, mitigation measures might be more appropriate, like using protective gear or improving ventilation.

b) Emergency Response Planning

Essential components of this plan include marked evacuation routes, designated assembly points outside the danger zone, and a list of emergency contact numbers, including local authorities and medical facilities. Regular drills are pivotal in familiarizing all employees/students with the plan, ensuring that panic doesn't set in in the face of a real emergency and everyone knows their roles and responsibilities.

c) Chemical Handling and Storage

Some workplaces use chemicals, some of which can be hazardous if inhaled, ingested, or even touched. A designated storage area ensures that chemicals are stored in controlled conditions, minimizing the risk of spillage or unwanted reactions. Employees, especially those directly handling these chemicals, need rigorous training on safe handling procedures, which includes the correct method of transferring chemicals between containers, the importance of using fume hoods, and steps to take in case of accidental exposure.

d) Ergonomics

Ergonomics involves designing and arranging a workplace to optimize it for human use, ensuring that tasks, equipment, and the environment support the user's ability to work efficiently and safely. Ergonomic keyboards and mice can reduce the risk of repetitive strain injuries like carpal tunnel syndrome. Moreover, the arrangement of daily tasks plays a role too. Intermittently changing tasks or taking short breaks can prevent muscle fatigue and cognitive burnout, ensuring the employee's well-being.

e) First Aid

The immediate care given to an injured person before professional medical care is available. A crucial element of first aid preparedness is having a kit with essentials like bandages, antiseptics, and pain relievers, which can address minor injuries or stabilize more severe ones. But merely having a kit is not enough. Workers/students should have basic knowledge of first aid practices.

f) Housekeeping

A clean and organized workplace is not just aesthetically pleasing but also critical for safety. Regular cleaning ensures that potential hazards, like spills that can cause slips, are immediately addressed. Organized walkways without obstructions can prevent tripping hazards and are especially vital during emergencies for swift evacuations.

g) Fire Safety

Fires are among the most common and destructive hazards. Preparedness for such an eventuality begins with having fire extinguishers readily available. But it's equally important for employees to know how to use them. Different fires (electrical, chemical, or paper-based) require specific types of extinguishers, and using the wrong one can exacerbate the situation. Modern buildings also use smoke detectors and sprinkler systems as early warning and response systems. These devices need regular testing to ensure they are always functional. The objective is to detect a fire early, suppress it if possible, and allow safe evacuation.

h) Training and Education

Specific training sessions should be conducted whenever new students or staffs are introduced. This holistic approach to training ensures that the entire workforce is prepared, aware, and actively participating in maintaining a safe work environment.

2.12 Project Boundaries

We can identify three types of boundaries that are considered in conducting EIA. The boundaries are Institutional, Temporal and Spatial boundaries.

2.12.1 Institutional Boundaries

Institutional boundaries refer to those institutions and sectoral boundaries in which the project lies or interacts. These can be determined from political boundaries, Acts, regulations and institutional mandates and administrative structures. This proposed development touches the interest of a number of people and administrative units in relation to several policies, laws and plans, and the overall land and settlements acts. The institutional framework includes; Minister responsible for environment in the Vice President's office, Division of Environment NEMC, District Council and Ward and sub-ward (with committees for environment).

2.12.2 Temporal Boundaries

Temporal boundaries refer to the lifespan and reversibility of impacts. The impact of the proposed project will have implications that stretch very far into the future until when decommissioning is undertaken. Also, consideration needs to be given to what happens when the project ends, where there is need for site restoration and decommissioning of the project.

2.12.3 Spatial Boundaries

Spatial boundaries are crucial to decide on whether impacts are likely to occur at Local, Regional, National or International Level. The proposed project will have wide ranging implications that could be felt Locally, Regionally, Nationally and probably outside the country thus, causing impacts as far as those areas. In this study, spatial impacts will be determined from the core project area (the area within the proposed project development). The Area of Impact and Area of Influence.

a) Core Project Area

In determining the spatial dimension of the project, it is important to consider impact in a contour layout, starting with the Core Project Area (CPA). This is the area where the project is located and, which will bear most impacts than the rest. In this case the Sapiwi village, Sapiwi Ward, Bariadi District is the Core Project Area (CPA).

b) Area of Impact (Aoi)

This is the area which surrounds the Core Project Area (CPA). This is an area that borders the proposed project area. This area plays an important role and bears some positive or negative impacts. The area of Impact in the case of the proposed project would include Busega, Itilima, Maswa and Meatu. These areas will be linked with the proposed development through road transport, supply of services and goods as well as labor force.

c) Area of Influence (Aoi)

The area beyond the area of impact is further away from the proposed project. It consists of the centers of decision making that can influence the development of the industry. This center of decision making includes National Environment Management Council and the Ministry responsible for Environment. The proposed project may attract contractors and consultants beyond Tanzania.

CHAPTER THREE

POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

3.1 Introduction

The project shall comply with relevant national environmental and social management requirements as well as the World Bank ESS applicable to the project. The legislations and institutions relevant to environmental and social are presented in order for the users of the ESMF to know the minimal legislative requirements and key actors involved in approving, enforcing, implementing or coordinating the requirements.

3.2 National Policies Frameworks

Relevant policies and legislation about about ground water and surface water pollution, pollution of soil, land and land use, air pollution health and safety were examined, among others to ensure that the proposed establishment of the proposed project meets and abide to the existing regulations. These are described below.

3.2.1 National Environment Policy NEP (2021)

The National Environmental Policy 2021 comes into force following the review of 1997. There are emerging environmental challenges that were not explicitly addressed in the previous policy. These include climate change; invasive species; electrical and electronic equipment wastes (e-wastes); Genetically Modified Organisms (GMOs); management of oil and gas; and sound management of chemicals. Some of these issues aggravated further the deteriorating state of the environment in the country because of inadequate interventions to address these challenges. Under these circumstances, climate change contributed further to land degradation due to frequent and prolonged droughts. The proliferation of Invasive Species also had impacts on the accelerated loss of wildlife habitat and biodiversity. The increase in use of electrical and electronic equipment has led to an increased accumulation of e-waste with toxic substances further polluting the land and ground water all of which pose challenges to human health and the environment. These emerging environmental challenges require concerted attention that include the provision of specific and clear policy guidance to effectively address them.

Compliance: The project will be required to address policy objectives by ensuring that damage to the biophysical and social environment is avoided or minimized during implementation of the project activities which are expected to have adverse impacts.

3.2.2 The Energy Policy, 2015

The policy among others focuses on the utilization of energy resources in a suitable and environmentally friendly manner. The policy recognizes that; energy is a prerequisite for the proper function of all subsectors of the economy. It is an essential service whose availability, quantity and quality determine the success or failures of development endeavours. The policy stresses the use of renewable and alternative energy sources such as wind, solar, hydro, liquefied petroleum gas (LPG) and natural gas. The policy promotes energy efficiency and conservation as a means towards cleaner production and pollution control measures.

Compliance; The proposed project will use electricity from TANESCO also energy efficiency bulbs and appliances which are energy savers. Also, there will be a backup diesel generator of 200KVA.

3.2.3 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.

Compliance:In the context of this project, IFM 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.

3.2.4 The Construction Industry Policy (2003)

Among the major objectives of the policy, which supports a sustainable block development sector, including the promotion and application of cost-effective and innovative technologies and

practices to support socio-economic development activities such as blocks, roadworks, water supply, sanitation, shelter delivery and income generating activities and to ensure application of practices, technologies and products which are not harmful to either the environment or human health.

Compliance: This project is in-line with this policy as ultra-modern technology shall be used during construction and its operation. Implementation of the proposed project will as much as possible make use of cost-effective and environmentally friendly technologies to minimise wastage of resources, especially building materials, water and energy.

3.2.5 Natural Water Policy (2002)

NAWAPO's objective is to develop a comprehensive framework for sustainable management of the national water resources. In this case, the policy recognizes the need to protect water sources against pollution and environmental degradation. The Water Policy reflects the shift in approach towards comprehensiveness and economics. In addition, the Policy aims at ensuring that beneficiaries participate fully in all states of water resource developments and recognizes the fundamental but intricate linkages between water and socio-economic development, including environmental requirements. The Policy expounds on the importance of water for domestic use, agriculture, livestock keeping, mining energy, fisheries, environment, human health, wildlife and tourism, forestry, navigation and trans-boundary requirements. The policy states that "a holistic water (river) basin approach, integrating multi-sector and multi-objective planning and management, should be taken to ensure sustainability and protection of the resource."

Compliance; The proposed project could result in pollution for ground and surface water in the area. In this case, project designs will ensure water sources (including streams which ultimately flow into the water sources) are suitably protected to minimize impacts during the construction and operational phases of the project.

3.2.6 National Gender Development Policy (2002)

The main objective of this policy is to provide guidelines to ensure gender-sensitive plans, programs and strategies in all sectors and institutions. The policy emphasizes gender equality with its aims at establishing strategies for poverty eradication by ensuring that both women and men get access to existing resources for their development. It values the role played by women in bringing about development in society. The construction sector is also committed to ensuring

gender mainstreaming at all levels, through the provision of equal opportunities to both men and women in road works and related activities.

Compliance: The policy requires the project management to ensure that gender issues are given emphasis. It also requires that women and men are given equal employment opportunities in the project, whenever possible. Therefore, this project will ensure that women will be adequately involved at all levels of the project planning to implementation.

3.2.7 National Employment Policy 2008

This reviewed Policy therefore focuses on filling in the gaps in past policies and addresses new developments that have had significant adverse impacts on employment creation. In this respect, this policy emphasizes the need to sensitize and mobilize all sectors of the economy to mainstream employment promotion in their respective policies and development programmes. The overall objective is to stimulate national productivity, to attain full, gainful and freely chosen productive employment, to reduce unemployment, and underemployment rates and enhance labour productivity.

Compliance: The contractor and the management will abide by the relevant provisions of the policy to ensure that residents, especially the youth, women and other vulnerable groups, are given priority in all employment opportunities that will arise during the construction and operational phases of the project.

3.2.8 National Health Policy (2003)

The Health Policy is a vital guide towards the health development of any country. It is particularly, important in a country like ours where resources and technology are more limited than in other countries, which are relatively better off in both technology and resources. The National Health Policy is aimed at providing direction towards improvement and sustainability of the health status of all the people, by reducing disability, morbidity and mortality, improving nutritional status and raising life expectancy. The policy recognizes that good health is a major resource essential for poverty eradication and economic development. The main objectives of the policy are:

- (i) Sensitize the community on common preventable health problems, and improve the capabilities at all levels of society to assess and analyse problems and design appropriate action through genuine community involvement.

- (ii) Promote awareness among Government employees and the community at large that, health problems can only be adequately solved through multi-sectoral cooperation involving such sectors as Education, Agriculture, Water, and Private Sector including Non-Governmental Organizations, Civil Society and Central Ministries, Regional Administration and Local Government, and Community Development, Gender and Children.
- (iii) Promote and sustain public-private partnerships in the delivery of health services.

Compliance; The implementation of this project will ensure that all the staff and workers at the project site will have the necessary personal protective equipment depending on their line of duty and be protected against all health risks, including awareness of health problems to attain poverty reduction hence to achieve economic development.

3.2.9 The Urban Planning Regulations (Space Standards), 2018

The Urban Planning Space Standards guides and guides space utilization to achieve harmony and sustainable development. In the construction of buildings, this document informed the design of the buildings and the selection of construction sites. Space standards provide suitable heights for buildings according to their use, guide space to be reserved between one building and another (setbacks), plot coverage and plot ratio. It also guides the provision of space to accommodate both motorized and non-motorized transport systems such as roads, parking and footpaths/pedestrian walkways.

Compliance; The project has taken into consideration the requirements of urban planning space standards in the inception and design of buildings to be constructed, and will continue taking proper utilization of the project area during its implementation.

3.2.10 Education Training Policy (2014)

The education training policy, of 2014 stressed that to improvement of the quality of education in Tanzania, there should be a shift from using many text books to using a single textbook for each subject. 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 institute fees will be affordable to all people.

Compliance; The project will increase teaching and learning infrastructure which in the end will increase the enrolment of the students.

3.2.11 National Mineral Policy (2009)

The National Mineral Policy also addresses that mining activities should be undertaken sustainably. Reclamation of lands after mining activities is recommended. As far as this project is concerned, mining activities are directed to quarrying activities for obtaining stones and aggregates.

Compliance; Fine and course aggregates for the proposed project will be strictly purchased from authorised vendors.

3.2.12 National Policy on HIV/AIDS (2003)

The policy provides a framework, direction and general principles in the national response to interventions in the prevention, care and support of the infected and affected by the HIV/AIDS epidemics and mitigation of its impacts. Tanzania is facing major threats to the survival of its people and the development chances of the nation from a concentrated and generalized HIV /AIDS epidemic. The National Multi-Sectoral Strategic Framework (NMSF) on HIV / AIDS will translate the National Policy of HIV/AIDS by providing strategic guidance to the planning of programmes, projects and interventions by various stakeholders in the fight against HIV/AIDS. To make sure that NMSF meets its objectives, the following goals were set

GOAL 1: Reduce the spread of HIV in the country.

GOAL 2: Reduce HIV transmission to infants.

GOAL 3: Political and government leaders consistently give high visibility to HIV /AIDS in their proceedings and public appearances.

GOAL 4: Political leaders, public and private programmes, projects and interventions address stigma and discrimination and take the Human Rights of persons living with HIV /AIDS into account.

GOAL 5: HIV /AIDS concerns are fully integrated and prioritized in the National Poverty Reduction Strategy and Tanzania Assistance Strategy.

GOAL 6: Reduce the prevalence of STIs in the population.

GOAL 7: Increase the knowledge of HIV transmission in the population.

GOAL 8: Increase the number of Persons living with HIV /AIDS who have access to a continuum of Care and Support from Home / Community to Hospital levels.

GOAL 9: Reduce the adverse effects of HIV /AIDS on orphans

Compliance: The establishment of the project will increase business opportunities for the community; hence the Management and the District Council are required to make sure that there is no discrimination and stigma and also take the Human rights of a person living with HIV/AIDS into account.

3.3 National Legal Framework

This section addresses the legal (Laws, Regulations and Guidelines) and regulatory framework, which are relevant to the proposed project. The legal and regulatory framework provides the various legal aspects that must be adhered to as the project is designed, implemented and later when it is decommissioned.

3.3.1 Environmental Management Act Cap 191

The Environmental Management Act, Cap 191 seeks to provide for a legal and institutional framework for sustainable management of the environment in the implementation of the National Environmental Policy.

The Environmental Management Act provides for the continued existence of the National Environmental Management Council (NEMC). Under this Act, NEMC is mandated to undertake enforcement, compliance, review and monitoring of environmental impact assessment and has a role of facilitating public participation in environmental decision-making, exercising general supervision and coordinating over all matters relating to the environment. The Act also requires the Council to determine whether the proposed project should be subjected to an EIA, approves consultants to undertake the EIA study, invites public comments and also has the statutory authority to review EIS and recommend to the Minister for approval and issuance of EIA certificate. The Act imposes an obligation on the proponent to conduct an EIA before 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. Article 82 makes EIA mandatory for all projects that fall under the EIA mandatory list (third Schedule).

Compliance: The proponent has complied with relevant provisions of the Act by carrying out this EIA Study.

3.3.2 Occupational Health and Safety Act No. 5 of 2003

Part IV of this Act makes provisions for safety, health and welfare for persons at work in factories and other places of work; to provide for the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with activities for persons at work. The proposed modern market will entail the employment of both skilled and unskilled labourers, and as such will comply with this Act. Part 111 of the Act calls for the registration of the market or workplaces to obtain compliance certificates as well as submission of drawings in blue prints which depict vital sections to the OSHA's Chief Inspector for approval. Occupational health and safety are key aspects of the operations. First aid equipment, sanitary facilities and effective Personal Protective gears will be provided to employees and maintained by the contractor during the period of construction.

Compliance:The proponent shall observe the provision of this Act during all stages of the project development and operation.

3.3.3 The Land Act Cap 113 R. E 2019

The Land Act seeks to control land use and clarify issues about ownership of land and land-based resources, transactions on land and land administration. This Act identifies three categories of land – village, public and general, and distinguishes protected or restricted land (e.g. National parks, forest reserves, etc.) and ensures that tenure and rights of legitimate land users are considered and respected. Land sensitivity and potential environment impact of the proposed establishment shall be considered to ensure that the land is not polluted and to allow for natural and rapid restoration of cleared vegetation or disturbed land.

Compliance: The design and implementation of this EIA process is consistent with this legislation. The proposed project will be carried out within the limits of the site earmarked for the activity.

3.3.4 The Urban Planning Act (2007)

The law provides for the orderly and sustainable development of land in urban areas, to preserve and improve amenities; to provide for the grant of consent to develop land and powers of control over the use of land and to provide for other related matters.

Compliance:The project will seek planning consent and building permits from relevant authorities.

3.3.5 Water Resource Management Act 2009

The water resources management Act of 2009 principally seeks to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways that take into account ten (10) fundamental principles including:

- i. Protecting biological diversity, especially the aquatic ecosystems;
- ii. Promoting the efficient, sustainable and beneficial use of water in the public interest;
- iii. Providing systems for managing the growing demand for water use through integrated planning and management of surface and groundwater resources, in ways that incorporate economic, environmental and social dimensions in the planning process;
- iv. Proving implementation of international obligations stipulated under international legal instruments to which Tanzania is party and
- v. Facilitating social economic development.

Apart from incorporating sustainable water use principles and having pollution prevention conditionality in the water permits, the Act goes a step further by putting in place a regime for water resource protection, abstraction (surface and groundwater) and use. Under Section 33(1) of the Act, for the whole or part of a water source, a determination of the ecological reserve shall ensure that adequate allowance is made for each aspect of a reserve.

Compliance: This ESIA study will ensure that all relevant potential impacts from the proposed establishment are properly mitigated to avoid any potential social and environmental problems. The discharge of waste water will be restricted as stated in the law, that waste water should be treated before being discharged into the environment. Construction of the project will ensure sustainable and efficient use of water.

3.3.6 The Public Health Act 2009

Part IV of the Act provides for the need to maintain cleanness and hygiene and prevent nuisance during construction works. It calls for effective management of solid, liquid, gaseous, and hazardous wastes. Section 76 of the Act specifically requires every authority to undertake periodic studies to determine the type of solid and liquid wastes generated from markets, institutions and industries; and determine appropriate methods for sorting and storage of the wastes.

Compliance: This project will involve a level of waste generation, the proponent and contractor will ensure that all solid wastes generated during the renovation, operation and decommissioning of the project on-site are collected separately and disposed of to the designated district dumpsite.

3.3.7 Workers Compensation Act Cap263 R. E 2015

An Act to provide for compensation to employees for disablement or death caused by or resulting from injuries or diseases sustained or contracted in the course of employment; to establish the Fund for administration and regulation of workers' compensation and to provide for related matters.

Compliance: This Act is very relevant to this project as workers will be exposed to various hazards during the construction of the project. The developer and the contractor will ensure the safety and health of workers at all stages of the project by providing adequate PPEs to all the staff depending on their line of duty and also by providing compensation due to the occurrence of accidents or injuries or death.

3.3.8 HIV and AIDS (Prevention and Control) Act No. 28 of 2008

The Act provides for the prevention, treatment, care, support and control of HIV and AIDS, for the promotion of public health about HIV and AIDS. HIV and AIDS education in the workplace, the Act requires that every employer in consultation with the ministry shall establish and coordinate a workplace programme on HIV and AIDS for employees under his control and such a program shall include the provision of gender response HIV and AIDS education, distribution of condoms and support to people living with HIV and AIDS.

Compliance: The project Proponent will highly observe the requirement of this Act during project implementation by promoting awareness and education concerning the prevention and control of the spread of the disease.

3.3.9 The Engineers Registration Act and its Amendments 1997 and 2007

There is hereby established Board known as the Engineers Registration Board which has the responsibility of regulating the activities and conduct of engineers and engineering consulting firms following the functions and powers conferred upon it by this Act. Qualification for registration of Engineers as stated in part iii section 10(1) of this act that "subject to the

provisions of this Act, a person shall be entitled, on making an application to the Board in the prescribed manner and on payment to the Board of the prescribed fee, to be registered under this Act and to have his name entered in the register as a registered engineer”.

Compliance: This project has engineering work which involves various designs for the construction of the project. Example design for Building, Installation facilities such electricity, sewerage systems, and waste management (waste water treatment plant, solid waste management system). All required engineering parts will be done by a registered engineer to ensure compliance of the Act.

3.3.10 The Contractors Registration Act, 1997

There is hereby established Board known as the Contractors Registration Board. The purpose of the contractor’s registration Board is stated under this act in part ii section 3(2a-d). As explained in this act a contractor is “any person who himself as a developer or investor, undertakes the construction, erection, installation or alteration of any structure, for public use or otherwise, situate below, on or above the ground or other work connected therewith or the execution of any alteration or otherwise to any structure, for public use or otherwise, or other work connected therewith, where such person undertaking to do any such work.”

Part iii section 7(1) of this act states the registration of the contractors. “The Registrar shall keep and maintain registers of contractors of different types, categories and classes, in which the name of every person entitled to have his name in them as a registered contractor, shall be entered as soon as it is practicable after being accepted by the Board for registration”.

Compliance: The contractors to be involved will be registered members of the board as already explained in part iii section 7(1) of the contractor’s registration Act of 1997.

3.3.11 The Architects and Quantity Surveyors Act (1997)

Similarly require architects and quantity surveyors (QS) are to be registered with the Board before practising.

Compliance: Only registered architects and quantity surveyors shall be involved in the implementation of the proposed project.

3.3.12 Fire and Rescue Act (2007)

The Act obliges the owners and managers of the structures to set aside places with free means of escape and install fire alarm and detection systems, or other escape and rescue modalities in the event of fire.

Compliance: The design and construction of all buildings shall take into strict consideration the requirements specified in this Act.

3.3.13 Employment and Labour Relations Act (No.6), 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, a framework for collective bargaining, prevention and settlement of disputes and other related matters. The Act strictly prohibits child labour and discrimination.

Compliance: IFM will ensure that it operates within the requirements of this legislation and will comply with stipulated conditions of the Employment and Labour Relations Act, 2004.

3.3.14 The Law of the Child Act

An act to provide for reform and consolidation of laws relating to children, to stipulate rights of the child and to, promote, protect and maintain the welfare of a child with a view to giving effect to international and regional convention on the rights of the child; to provide for, affiliation, foster care, adoption and custody of the child; to further regulate employment, apprenticeship; to make provisions with respect to a child in conflict with law and to provide for related matters.

Compliance: IFM will ensure that it operates within the requirements of this Act and will comply with stipulated conditions of the Law of the Child Act especially during construction phase.

3.3.15 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.

Compliance: The proposed project shall utilise the current public roads and therefore obliged to observe the requirement of this Act.

3.3.16 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.

Compliance: The project proponent shall fulfil this legal requirement in all project phases, from design, construction and operation.

3.3.17 The Standard Act of 2009

This Act aims at the promotion of specifications of commodities and services, re-establish the Tanzania Bureau of Standards (TBS), the designated national standards authority established under the TBS Act 1975 and repealed by this act. TBS is responsible for developing all kinds of national standards, including environmental standards. The Standards Act has established National Environmental Standards Compendium (NESC) which is a collection of various standards prepared at different times and recognized by EMA 2004. NESC is divided into three parts. Part 1 comprises of standards that require compulsory compliance. Compulsory standards are categorized as generic or specific. Specific standards cover those industries with peculiar effects to the environment while other industries without a specific standard for Tolerance Limits of Emissions discharge including water quality, discharge of effluent into water, air quality, control of noise and vibration pollution, sub-sonic vibrations, soil quality, control of noxious smells, light pollution, and electromagnetic waves and microwaves Part 2 of NESC contains those standards that may be implemented on voluntary basis. These include guideline standards, codes of practice, and other such standards that may not necessarily be directly enforced, but whose results are implied in some legal requirements. One of such standards include the Environmental Management Systems (EMS) standards, like TZS 701/ISO 14001

whose compliance specifications include the relevant legal requirements. Part 2 thus has important requirements for companies and developers who wish to demonstrate their commitment to sustainable development by way of self-regulation mechanism. On the other hand, some companies or developers may be compelled to follow these standards because of requirements from mother companies and for other various reasons like certification requirements by environment friendly banks or tenders. Part 2 also includes standards used in evaluating environmental performance.

Part 3 has the requisite test methods that should be followed when testing for compliance. The test methods included are referred to in at least one of the specification standards appearing under Part 1. Although it is not stated in the Act, in the absence of national standards, project proponents are encouraged to use international standards such as those of the World Health Organisation (WHO), World Bank, British Standards (BS), European Union (EU), American Public Health Association (APHA), United States Environmental Protection Agency (US EPA) etc. Standards set by the relevant sectors, which also make use of the international standards, are also applicable. Such standards include the environmental standards set under the Mining (Environmental Management and Control) Regulations, 1999. Relevant national environmental standards include:

- i. TZS 860:2005 Municipal and Industrial Wastewaters – General Tolerance Limits for Municipal and Industrial Wastewaters: This standard provides permissible limits of important environmental parameters such as BOD, COD, pH, colour, temperature range, total suspended solids and turbidity. It also gives permissible limits of a range of inorganic and organic components. All effluents discharged from the project will need to comply with these specifications.
- ii. TZS 845:2005 Air Quality – Specification: This standard gives permissible emission limits of sulphur oxides, carbon monoxide, hydrocarbons (as total organic carbon), dust, nitrogen oxides and lead. The emissions from earth moving equipment, power generation plant and other will include SO₂, CO, dust and NO_x; as such the project will have to observe these limits.
- iii. TZS 983:2007 Air Quality - Vehicular Exhaust Emissions Limits: This standard is mainly derived from EU Directives 96/69/EC, 91/542/EEC and 97/24/EC. This Tanzania Standard gives permissible limits of some common substances found in exhaust emissions of motor vehicles, namely carbon monoxides, suspended particulate matter (PM), oxides of nitrogen, and hydrocarbons. The standard covers all types of vehicles

namely, passenger cars, light commercial vehicles, heavy-duty vehicles, and two and four strokes motorcycles and scooters. In order to carry out quarrying activities and processing operations, the project will operate a fleet of heavy duty and light vehicles in addition to hiring other vehicular equipment. As such, the project will need to observe the provisions of these standards.

- iv. TYS 932:2006: Acoustics - General Tolerance Limits for Environmental Noise: This standard focuses on urban environmental noise, and does not cover occupation environment. In the absence of other standards, it may be used to give indication of permissible noise levels in factory/workshop environment.
- v. TYS 789:2003 - Drinking (potable) water – Specification: This standard prescribes the quality requirements for drinking water other than packaged drinking water. It does not cover the requirements for natural mineral water. It prescribes the quality requirements for drinking water distributed in the food industry, domestic and catering purposes. It applies to bacteriological, biological, virological, physical, chemical and radiological quality criteria. It is intended also to community piped water supplies i.e. those water systems serving cities, municipalities and townships, community standpipes and wells and drinking water distributed by tankers.
- vi. TYS 931:2006 Protection against ionising radiation - Limits for occupational exposure: This standard aims at protecting workers, whose practices expose them to ionising radiation, namely; gamma- and X-rays, alpha, beta and other particles that can induce ionisation. The Standard does not apply to non-ionising radiation such as microwave, ultraviolet, visible light and infrared radiation. It applies to all workplaces in which employees are occupationally exposed or in which there is a potential for occupational exposure to ionising radiation, unless exempted by the Regulatory Authority.

Compliance :IFM project will be adhered to this Act requirement, during the implementation.

3.3.18 The Education (Amendment) Act, 1995

This Act amended the Education Act, 1978 that establish the Higher Education Accreditation Council, to provide the procedure for accreditation and other related matters. Among other functions, the council accredits higher education institutions; approve admissions into state institutions of higher education, to examine and approve proposals for courses of study and course regulations submitted to it by institutions of higher education; make regulations in respect of admission of persons seeking to enrol in state institutions of higher education and to

provide a central admission service to higher education institutions; and make visitations and inspection of higher institutions.

Compliance : IFM HEET project will be monitored by Accreditation Council.

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)

Composite Development Goal for the Tanzania Development Vision 2025 (URT, 2000) foresees the alleviation of poverty through improved socio-economic opportunities, good governance, transparency and improved public sector performance. These objectives not only deal with economic issues but also include social challenges such as education, health, the environment and increasing involvement of the people in working for their development. The thrust of these objectives is to attain sustainable development of the people. Vision 2025 seeks to mobilize the people, the private sector and public resources towards achieving shared goals and achieving a sustainable semi-industrialized middle market economy by the year 2025.

Compliance: Therefore, the implementation of this project is yet another milestone to enable Tanzania realizes its Development Vision objectives notably eradicating poverty. IFM project will contribute to the attainment of the 2025 Vision through provision of adequate skilled labor 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.

Compliance: The proposed project supports this development plan by increasing academic, research and innovation opportunities in various geographical areas of Tanzania including Simiyu 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.

Compliance: To put the plan in action, IFM 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 Relevant Regulations and Guidelines

3.5.1 The Tanzania Development Vision (2025)

Composite Development Goal for the Tanzania Development Vision 2025 (URT, 2000) foresees the alleviation of poverty through improved socio-economic opportunities, good governance, transparency and improved public sector performance. These objectives, not only deal with economic issues but also include social challenges such as education, health, the environment and increasing involvement of the people in working for their development. The thrust of these objectives is to attain sustainable development of the people. Vision 2025 seeks to mobilize the

people, the private sector and public resources towards achieving shared goals and achieve a sustainable semi-industrialized middle market economy by the year 2025.

Compliance: The establishment of the project aims to strengthen the learning environment and labour market orientation of priority programs in beneficiary higher education institutions and strengthen the Management of the higher education system.

3.5.2 Environmental Impact Assessment and Audit Regulations (2005 amended in 2018)

The EIA and Audit Regulations were made according to the Environmental Management Act No. 20 of 2004. The regulations form the basis upon which EIAs and Environmental Audits for various types of development projects with significant environmental impacts are undertaken. The regulations outline the EIA process from project registration to the issuance of the EIA certificate.

Compliance: The proposed project falls under type B1 projects in which EIA is mandatory. The proponent registers the project to National Environment Management Council and conducts this EIA study.

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

The principal Regulations prescribe fees concerning environmental impact assessment; environmental compliance monitoring and audit; registration of environmental experts; environmental quality standards; ozone-depleting substances, management of wastes, biosafety, noise and vibrations, and other activities related to the environment.

Compliance: The proponent complies with the requirements of this Act by engaging a registered Firm that complies with the regulation. The firm has paid all the fees required and has all the permits to undertake Environmental Impact Assessment and Environmental Audit study.

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

These Regulations may be cited as the Environmental Management (Prohibition of Plastic Carrier Bags) Regulations, 2019 and shall come into force on the 1st day of June, 2019. The objectives of these Regulations are to- (a) impose a total ban on the import, export, manufacturing, sale, and use of plastic carrier bags regardless of their thickness; (b) protect human and animal health as well as the environment from the likely adverse effects of utilization

of plastic carrier bags; and (c) provide economic and financial incentives for the production and importation of alternative carrier bag. All plastic carrier bags, regardless of their thickness are prohibited from being imported, exported, manufactured, sold, stored, supplied and used in Mainland Tanzania.

Compliance; The proponent will abide by these regulations and will not import, export, manufacturing, sale, supply, storage and use plastic carrier bags instead they shall use alternative carrier bags.

3.5.5 The Environmental (Solid Waste Management) Regulations. 2009 as amended in 2016

The regulation has been made under sections 114, 115, 116,117, 118, 119, 120,121, 122 and 230 of the Environmental Management Act, 2004. These regulations apply to all matters about solid waste management. They aimed among other things at setting the standard for a permit to operate solid waste disposal sites, permit to transport solid waste, permit to dispose of solid waste and license to own or operate solid waste disposal sites.

Compliance; The solid wastes generated during all the project phases shall be separated at the point of generation and stored in the dustbins and collected by special vehicles to the designated dumpsite.

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

These Regulations shall apply to the control of noise and environmental vibrations in Mainland Tanzania. The objectives of these Regulations shall be to- (a) ensure the maintenance of a healthy environment for all the people in Mainland Tanzania, the tranquillity of their surroundings and their psychological wellbeing by regulating noise and vibration levels; (b) prescribe the maximum permissible noise and vibration levels from a facility or activity to which a person may be exposed; (c) provide for the control of noise and vibration and mitigating measures for the reduction of noise and vibration; (d) set baseline parameters on noise and vibration permissible levels based on several practical considerations and acceptable limits; (e) enforce minimum noise and vibration limits prescribed by the National Environmental Standards Committee; (f) help developers such as industrialists to keep abreast with environmentally

friendly technologies; and (g) ensure the protection of human health and the environment from various sources of noise and vibration pollution.

Compliance: The proponent shall abide by these regulations and shall not make or cause to be made excessive vibrations which annoy, disturb, injure or endanger the comfort, repose, health or safety of others and the environment; also the workers shall be provided by noise protection gears during all phases of the project.

3.5.7 The Environment (Registration of Environment Experts) Regulations 2005

These Regulations make provisions concerning Environmental Experts and establish the Environmental Expert Committee. The Regulations provide for the certification and registration of Environmental Experts and contain rules relative to the practice and discipline of Environmental Experts and define functions, powers and internal organization of the Committee.

Compliance; The proponent complies with the requirements of this Act as it has engaged a registered and experienced Firm to conduct the Environmental Impact Assessment for the proposed project.

3.5.8 Environmental Management (Air Quality Standards) Regulation, 2007

The object of these regulations is to set baseline parameters on air quality and emissions and enforce minimum air quality standards. They are also meant to help developers including industrialists to keep abreast with environmentally friendly technologies and ensure that public health as well as the environment is protected from various air pollution emissions sources. These Regulations stipulate the role and powers of the National Environmental Standards Committee. According to the regulations, the approval of a permit for the emission of air pollutants shall be guided by ambient, receptor, emission and specification standards approved by the Minister. Offences and penalties for contraveners are also provided for in the regulations. Emission and emission limits of sulphur and nitrogen dioxides, carbon monoxide, lead, ozone, black smoke and suspended particulate matter together with their test methods are specified. Tolerance limits and test methods for dust, sulphur dioxide and nitrogen oxides from cement factories into the air as well as from motor vehicles are also given. These pollutants are not expected to be generated from the project activities in significant amounts since special measures will be implemented to avoid emissions during operation.

Compliance: The proponent and contractor will ensure that mitigation measures on dust and gaseous emission are enforced on the implementation of the project throughout the life cycle.

3.5.9 The Fire and Rescue Force (Fire Precautions in Building) Regulations, 2015

3.-(1) The provisions of this Part shall apply in determining the design, construction, protection, location, arrangement and maintenance of exit facilities to provide safe means of escape for occupants from all buildings hereafter erected, altered or changed in occupancy.

4.-(1) The areas which are designated as means of escape shall include- (a) exit staircase; (b) firefighting lobby; (c) smoke stop lobby; (d) exit passageway; and (e) escape corridors. (2) The areas which are designated as means of escape shall not be turned into other usages. The determination of exit requirements for a building shall be based upon the type of use or occupancy of the building, the occupant load, the floor area, the travel distance to an exit and the capacity of exits as provided in Table 6 of the First Schedule. Every storey of a building shall be provided with exit facilities for its occupant load. The capacity of exits, exit staircases, exit passageways, corridors, exit doors and other exit facilities shall be measured in units of width of half a metre. Subject to regulation 9, where a room or space is required to be provided with two exits, each exit shall be of sufficient width to accommodate not less than half the total occupant load

Compliance: The proponent abides by this regulation by including Smoke detectors and heat detectors in the Architectural drawings. Also, there will be a Fire control panel, Fire repeater control panel, Manual call point, Exit luminaire (ceiling mount, double site), Exit luminaire (wall mount) Fire cable, Fire escape routes and Fire extinguisher. Also, the proponent will employ skilled and knowledgeable personal to use the equipment.

3.5.10 Environmental Management (Soil Quality Standards) Regulation, 2007

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

with NEMC and obtain a soil pollutants discharge permit. Obligations of polluters are also given. According to the regulations, the NEMC plays a crucial role in soil quality compliance and enforcement. Recording and reporting requirements, Offences and penalties for non-compliance as well as how appeals against aggrieved decisions should be handled are stipulated. Contaminant limits for selected soil pollutants mainly halogenated hydrocarbons (for example, trichloroethylene, dichloromethane, tetrachloroethylene, carbon tetrachloride, etc.), fuel hydrocarbons (benzene, ethylbenzene, total xylenes, toluene, etc.), organic and inorganic pesticides (lindane, Atrazine, DDT, sulphur, Hexachlorobenzene, Aldrin, etc.) and their respective test methods are specified. The Regulations also cover contaminant limits for some heavy metals (e.g. arsenic, cadmium, nickel, copper, zinc, etc.) together with their test methods. Most of the pollutants covered in these regulations will not be produced from the project activities in appreciable concentrations. However, there is a potential for soil pollution from petroleum hydrocarbons due to the use of fossil fuels for running types of machinery, plants and vehicles during the construction phase. Fossil fuels will be applied rationally to minimize residues and consequently soil and water pollution.

Compliance: The proponent will manage well all solid and liquid wastes to be generated and oil spills at each project phase to avoid soil contamination.

3.5.11 Environmental Management (Water Quality Standard) Regulation, 2007

Among others, the object of the regulations is to enforce minimum water quality standards prescribed by the National Environmental Standards Committee, enable the National Environmental Standards Committee to determine water usage for purposes of establishing environmental quality standards and values for each usage and ensure all discharges of pollutants take into considerations the ability of the receiving water to accommodate contaminants for protection of human health and conservation of marine and aquatic environments. The Regulations elucidate the role of the National Environmental Standards Committee of Tanzania Bureau of Standards in setting minimum quality standards for water, sewerage, etc. They also give prohibitions and prescribed minimum water quality standards. The applicant of a water right is obliged to indicate the likely impact on the environment and comply with prescribed effluent or receiving water standards, which are not below the standards specified in these regulations if the water right or permit is granted. The regulations give NEMC the power to designate main water polluting activities for which a prior grant of the permit must be obtained from the Council. It can be observed from the regulations that, the NEMC plays a

crucial role in water quality compliance and enforcement. Recording and reporting requirements, Offences and penalties for non-compliance as well as how appeals against aggrieved decisions should be handled are stipulated.

The Regulations specify permissible limits for selected physical, inorganic, organic and microbiological components of Municipal and industrial effluents and the respective test methods of the pollutants. Specific tolerances and methods of testing for effluents of chrome and vegetable tanning industries and fertilizer industries are given. Regarding drinking water, the regulations specify microbiological requirements and classification of non-chlorinated piped water sources, chemical and physical limits as well as radioactive materials limits for quality of drinking water supplies. Also specified in the regulations are minimum distances from sources of water contamination and sampling frequency for water quality monitoring of various sources.

Compliance: The developer will minimize the impacts of the project activities to groundwater and nearby surface water sources.

3.5.12 Urban Planning (Zoning of Land Uses) Regulations, 2018

For the purposes of these Regulations, uses of land that are permitted and those that may be permitted under special circumstances by the planning authority in different zones of the local planning area shall be as follows: (i) Residential (ii) Commercial (Retail and Wholesale) (iii) Industrial (Light, Medium, Heavy & Service) (iv) Institutional (v) Public Utilities (vi) Beach, Open Spaces and Recreational (vii) Transportation, Communication and Microwave towers (viii) Agricultural (ix) Water bodies (x) Conservation (xi) Economic Development.

The uses permitted include central and local government offices, agencies and centre offices, educational, college campus including hostel facilities for students, cultural and religious institutions such as church, temple and other places of worship, educational, medical/engineering/ technical and research institutions, (on the sites having minimum 2 hectares with a minimum of 12 metre wide approach road). It also includes libraries, reading rooms and clubs, medical and health institutions, recreational areas, public toilets, parking and cafeteria, cultural institutions like community halls, opera houses, clubs, predominantly non commercial in nature, utilities and services, water supply installations including disposal works, electric power plants, high tension and low tension transmission lines, sub stations, gas installation and gas works, fire fighting stations, banks, and quarters for essential staff and all uses permitted under parks and playgrounds.

Compliance: The proposed project site is within the Institutional Zone. Therefore, IFM complied with the regulation.

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

The act restrict development within the Planning Area without a planning consent granted by the Planning Authority under section 32 of the Act and the Regulation. Also, Changes of use of public open spaces is not be allowed. However, any person who desires to obtain planning consent subject to subsequent approval of the particulars of the proposed development shall give sufficient details on the appropriate form and plans to enable a decision to be made.

Compliance:The act is not relevant to the project since the site is used as planned and there was no need for land use change.

3.5.14 Environmental Management (Control of Ozone Depleting Substances and Hydrofluorocarbons) Regulations, 2022

The Regulations shall apply to- (a) all persons who handle or use controlled chemical substances or products that contain, are made with or are dependent on, or designed to contain controlled chemical substances that have: (i) the potential to destroy ozone molecules in the stratosphere and includes the products listed in the First Schedule; or (ii) high Global Warming Potential listed in the Second Schedule; (b) any manufacturer, importer, exporter or distributor of ozone depleting substances or HFCs with high global warming potential;(c) any manufacturer, exporter and importer of technology which uses ozone depleting or HFCs with high global warming potential; (d) any company and individual who services refrigerators, air conditioners including mobile and other technologies using ozone depleting substances or HFCs with high global warming potential; and (e) any company or individual who uses or services fire extinguishers using ozone depleting substances or HFCs with high global warming potential.

Compliance: The IFM Simiyu Campus shall abide to this Regulation by:

- i. Buy air-conditioning and refrigeration equipment that do not use HCFCs as refrigerant;
- ii. Buy aerosol products that do not use HCFCs or CFCs as propellants;
- iii. Conduct regular inspection and maintenance of air-conditioning and refrigeration appliances to prevent and minimize refrigerant leakage;

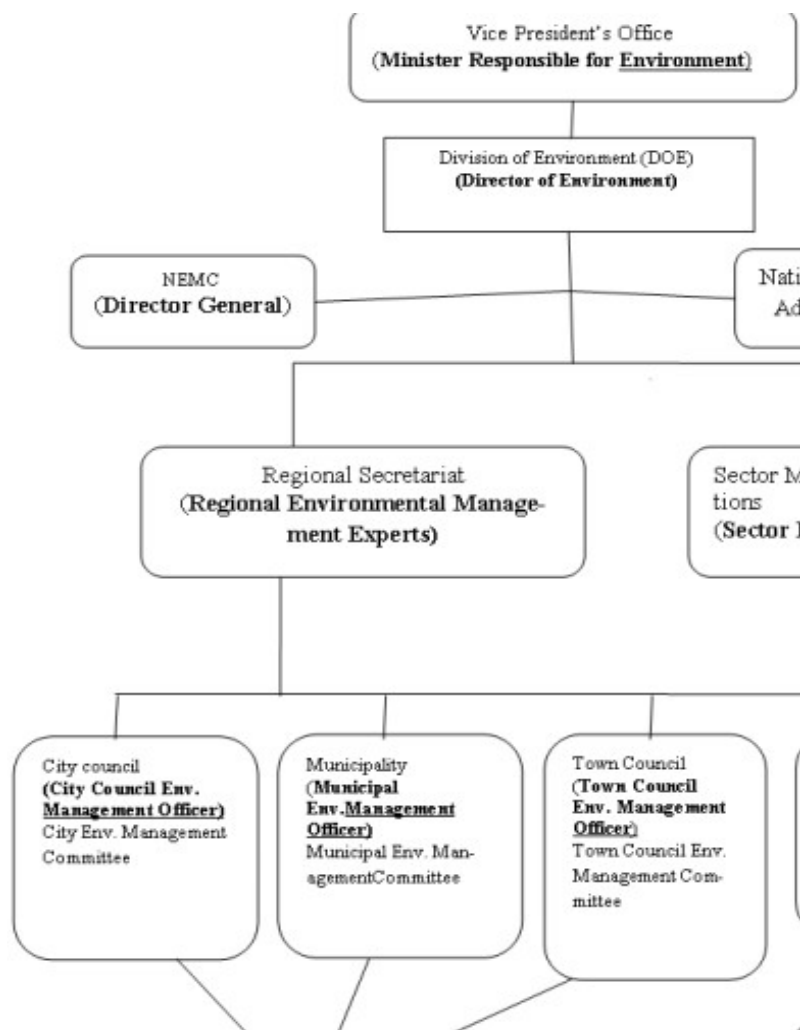
- iv. For existing air-conditioning and refrigeration appliances that operate on HCFCs or CFCs, the refrigerant should be recovered or recycled whenever an overhaul of equipment is to be carried out. Replacing or retrofitting such equipment to operate on non-HCFCs refrigerant should also be considered; and
- v. When motor vehicle air-conditioners need servicing, make sure that the refrigerants are properly recovered and recycled instead of being vented to the atmosphere.

3.6 Administrative Framework / Institutional Arrangement

EIA practice in Tanzania places different functions and responsibilities on all parties involved in the EIA process of any proposed development undertaking to which EIA is obligatory. Table 3.1 below is a list of key institutions that underpins the proposed integrated poultry feed production. The Environmental Management Act No.20 of 2004 gives NEMC the to undertake enforcement, compliance, review and monitoring of environmental impact assessment as well as playing a central role in facilitating public participation in environmental decision-making, exercising general supervision and coordinating over all matters relating to the environment.

The Act empowers NEMC to determine the nature of assessment a proposed project should be subjected to, approves consultants to undertake EIA studies, invites public comments and also has the statutory authority to issue, in consultation with the Minister responsible for Environment, the certificates of approval. NEMC is currently the designated authority to carry out the review of EIA including site visits and handling TAC meetings, monitoring and auditing of the environmental performance of the project (periodic and independent re-assessment of the undertaking).

Figure3.1: Institutional Set Up for Environmental Management in Tanzania Mainland



3.7 IFM Project Implementation Unit

The IFM responsibility is to ensure that the implementation process of the ESMP and Mitigation measures are in line with the relevant national policies and legislations and World Bank Environmental and Social Standard 1. The IFM has the Project implementation Unit (PIU) with 18 people responsible for supervision and monitoring the implementation of the project construction activities. The management of all project activities during operation is under the PIU, in collaboration with other departments and units depending on the nature of the activity. In general, the PIU falls under the management of the IFM executing day-to-day activities in the project. The PIU is guided by management meetings that are chaired by the Vice Chancellor.

The management meetings provide support, guidance and oversight of the progress of the PIU. Further, among the PIU staffs, 3 are working as Environmental and Social Safeguard

Specialists (i.e Gender specialist/Social Specialist, Health and Environment Specialist) who will monitor the environmental and social activities of the project during all project phases. The Environment specialist holds a Masters degree in Geography and Environment , Social Specialist holds PhD in Sociology and Gender specialist holds a PHD in Management Science and Engineering and is a focal gender person of the IFM. Further the IFM shall commission the consulting engineer to supervisor the contractor during construction among others on Environmental and Social Issues. The roles and responsibility on environmental and social issues is covered on table 3.1 below; -

Table 3.1: Institutional Responsibilities at Project Level

Institution	Roles and responsibility
World Bank	<ul style="list-style-type: none"> • Project financing • Ensures that the project is carried IFM to the highest environmental standards strictly in accordance with the ESMF and ESIA project report and the mitigation measures set IFM therein. • Also requires that environmental and social impacts are managed in accordance with the World Bank ESF and its ESS. • Provide second line of monitoring compliance and commitments made in the ESMPs through supervision.
PS-MoEST	<ul style="list-style-type: none"> • E&S monitoring and surveillance of all project components investments that will be undertaken by project. • The ministry will report results of this monitoring to the World Bank.
NPIU Environmental and Social Team	<ul style="list-style-type: none"> • Coordinate different activities to ensure that, the project meets the country legal and World Bank requirements with regard to Environment and Social Framework
Implementing institutions (IFM - PIU) Environmental and Social Team	<ul style="list-style-type: none"> • Maintaining the PIU chaired by the Deputy Vice Chancellor and assisted by qualified and experienced staffs in adequate numbers and under terms of reference as outlined in the Project Operational Manual (POM). • The PIU is vested with the responsibility of the day-to-day implementation of the project activities including financial

Institution	Roles and responsibility
	<p>management, procurement, environmental and social risk management, governance and anti-corruption, monitoring and evaluation, and reporting;</p> <ul style="list-style-type: none"> • Coordinate specialist/consultants for any support missions or attend different meetings and provide any guidance in the bid to ascertain that the different challenges identified for each sub-project/activity are duly covered from risk. • Support the procurement officer at IFM in making sure that the bidding documents clearly cover the health, safety and environmental component with appropriate provisions of the same for the contractors to bid. • Coordinate preparation of ESIA and environmental and social management plans (ESMPs) done by consultant and site-specific ESMPs (SSESMP). • Ensure that contractors have an Environmental Health and Safety Officers (EHS), who are familiar with the compliance requirements, including WB EHS guidelines • Prepare regular progress report
<p>Consultant (Environmental and Social Team)</p>	<ul style="list-style-type: none"> • Work with the NPIU//UPIU to understand the requirements of the environmental and social assessment; • Conduct initial site visits with the UPIU to understand the sub-project setting and site-specific requirements; • Prepare the ESIA and ESMPs based on the procedures described in the ESMF including carrying IFM an alignment walk, alternatives analysis and baselines studies, identifying the E&S risks and impacts, developing mitigation measures and monitoring plans incorporating EHS requirements; • Cost all the mitigation and management measures proposed in the ESMPs and SSEMPs • Propose a capacity building plan for the implementation of the sub-projects (where necessary) • Carry IFM public consultations;

Institution	Roles and responsibility
	<ul style="list-style-type: none"> • Assist the UPIU in preparing documentation to obtain certification from NEMC for the ESIA's and ESMPs. • The E&S shall be responsible for monitoring the compliance of the contractor in implementing the ESMP and that the E&S shall be responsible for regular reporting of the progress. • Review and approve Code of Conduct
Contractors (Environmental and Social Team)	<ul style="list-style-type: none"> • Compliance with relevant environmental and social legislative requirements (project-specific, district- and national level), including allocating adequate budget for implementation of these requirements; • Work within the scope of contractual requirements and other tender conditions; • Prepare CESMPs based on the ESMP in the bidding documents and contracts; • Train workers about EHS (including relevant WBG EHS Guidelines) and the site specific environmental and social measures to be followed; • The EHS officer of the contractor will participate in the joint site inspections with the UPIU and Environmental Supervision Engineer/consultant; • Immediate notification of the NPIU and supervision engineer of any significant social or environmental health and safety incident linked with the project, and indication about the measures taken or that are planned to be taken to address the incident as well as propose any measures to prevent its recurrence. • Carry IFM any corrective actions instructed by the Supervision Engineer/consultant; • In case of non-compliances/discrepancies, carry IFM investigation and submit proposals on mitigation measures, and implement remedial measures to reduce environmental impact; • Propose and carry IFM corrective actions in order to minimize the environmental impacts;

Institution	Roles and responsibility
	<ul style="list-style-type: none"> • Send weekly reports of non-compliance to the Supervision Engineer/consultant; • Send monthly progress reports to the Supervision Engineer/consultant • Review and approve Code of Conduct

3.8 Key players in implementing the ESMP

To ensure the sound development and effective implementation of the ESMP, it will be necessary to identify and define the responsibilities and authority of the various persons and organizations that will be involved in the project. The following entities will be involved in the implementation of this ESMP:

- i. Funding Institutions
- ii. The Institute of Finance Management
- iii. National Environmental Management Council (NEMC)
- iv. Contractor;

3.8.1 Funding Institutions

The funding organization will have an overarching responsibility to ensure that the project is carried IFM to the highest environmental standards strictly in accordance with the ESMF and ESIA project report and the mitigation measures set IFM therein. Additionally, the funding Institution requires that environmental and social impacts are managed in accordance with the World Bank ESF and its ESS.

3.8.2 The Institute of Finance Management - UPIU

The proponent responsibility is to ensure that the implementation process of the ESMP and Mitigation measures are line with the relevant national policies and legislations and World Bank Environmental and Social Standard 1. The IFM has the Project implementation unit (PIU) responsible for supervision and monitoring the implementation of the project construction activities. The management of all project activities during operation is under the PIU, in collaboration with other departments and units depending on the nature of the activity. In general, the PIU falls under the management of the IFM executing day-to-day activities in the project. The PIU is guided by management meetings that are chaired by the Deputy Vice Chancellor. The management meetings provide support, guidance and oversight of the progress

of the PIU. Further, the PIU will designate among PIU staffs an Environmental and Social Safeguard Specialist(s) who will monitor the implementation during the construction and operation phases of the project. The PIU team has enough staffs with capacity to undertake the required monitoring and supervision roles to include Environmental and Social specialists.

3.8.3 NEMC

NEMC is charged with the overall role of providing oversight regarding monitoring for all project activities that have potential impacts on the environment. NEMC will undertake periodic monitoring of the project during the mobilization, construction and operational phases to ensure that the mitigation measures set IFM in chapter 8 of ESMP are fully implemented. In respect to this project, NEMC has a specific role of monitoring and ensuring that the mitigation measures are fully implemented as per certificate conditions (to be issued). It will ensure that its Zonal staff are fully trained and equipped to perform its monitoring role. It will review the results of any monitoring and Audit reports generated as part of the project implementation phase and will issue directives based on the monitoring activities to ensure full compliance with the mitigation measures required and address any issues that may arise.

3.8.4 The Contractor

The project will be implemented by a Contractor and will be responsible to IFM for constructing 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 recommended that before commencement of actual construction, the Contractor should submit a work site plan that complies with the national environmental guidelines and an ESMP for the different phases of the work. The environmental plan 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 nominate a Project Environmental Site Officer (ESO) and Project Social Site Officer (SSO) who will be the Contractor's focal point for all environmental and social matters. The ESO and SSO will be routinely on-site for the duration of the construction works. Both officers will have a 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 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 the IFM Safeguard specialist on the level of compliance with the ESMP achieved by the contractor regularly for the duration of the contract;
- viii. Controlling and supervising the implementation of the ESMP;
- ix. Preparing environmental and social progress or "audits" reports on the implementation status of measures and management of site works.

3.9 Relevant World Bank Environmental and Social Frameworks

The World Bank Environmental and Social Framework (ESF) is a set of policies 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.

3.9.1 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 adverse impacts that could arise from Bank-financed projects and promotes sustainable development. The ESF enables the World Bank and Borrowers to better manage environmental and social risks of projects and to improve development outcomes. The ESF also places more emphasis on building Borrower governments' own capacity to deal with environmental and social issues. The ESF offers broad and systematic coverage of environmental and social risks. It makes important advances in areas such as climate change; labour standards; transparency; nondiscrimination; social inclusion; public participation; and accountability - including expanded roles of grievance redress mechanisms.

The ESF codifies best practice in development policies. It brings the World Bank’s environmental and social protections into closer harmony with those of other development institutions; and encourages Client countries to use, and improve, their own national environment and social policies, when these policies are materially consistent with the ESF and supported by adequate implementation capacity. The ESF provides an incentive for countries to develop and build their own environmental and social policies and capacity.

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

This section (Table 3.2) shows how the 10 E&S standards of the World Bank are taken on board on ensuring that all projects to be implemented at IFM are environmentally and socially sensitive.

Table 3.2: Applicable Environmental and Social Standards

Environmental and Social Standard(ESS)	Applicability	Requirements
ESS1:Assessment and Management of Environmental and Social Risks and Impacts	YES	The standard focuses on helping project beneficiaries to manage and reduce both environmental and social risks and enhance project positive impacts. The project will use this requirement to strengthen the environmental and social

		framework for the assessment, development and implementation of World Bank-financed projects where appropriate.
ESS2: Labour and Working Conditions	YES	The standard focuses on the adoption of standard labour practices that take into account the acceptable working conditions for the people to be employed in the execution of the project activities. It requires the Borrower to prepare and adopt labour management procedures. Among others the standard call for provisions on the treatment of direct, contracted, community, primary supply workers, and government civil servants. It further calls for fair terms and conditions of work, non-discrimination and equal opportunity and worker's organizations. Provisions on child labour and forced labour. Requirements on occupational health and safety, in keeping with the World Bank Group's Environmental, Health, and Safety Guidelines (EHSG).
ESS3:Resource Efficiency and Pollution Prevention and Management	YES	The standard aims at enhancing the effective use of resources and control of pollution. It further requires an estimate of gross greenhouse gas emissions resulting from the project (unless minor), where technically and financially feasible. Requirements on the management of wastes, chemical and hazardous materials, and contains provisions to address historical pollution. ESS3 refers to national law and Good International Industry Practice, in the first instance the World Bank Groups' EHSGs.
ESS4:Community Health and Safety	YES	The standard aims at protecting local communities against any health risks and

		ensuring their safety against project activities. It requires infrastructure to take into account taking safety and climate change, and apply the concept of universal access which is technically and financially feasible. It requires further on traffic and road safety, including road safety assessments and monitoring. It calls for addressing risks arising from impacts on provisioning and regulating ecosystem service. Measures to avoid or minimize the risk of water-related, communicable, and non-communicable diseases. Requirements to assess risks associated with security personnel, and review and report unlawful and abusive acts to relevant authorities.
ESS5:Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	NO	This is not relevant, the area is legally owned by IFM with the certificate of occupancy No.75361
ESS6:Biodiversity Conservation and Sustainable Management of Living Natural Resources	NO	This ESS is not relevant to the proposed project as the site is not located in protected area/wetland/game reserve area/virgin land.
ESS7: Indigenous Peoples/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
ESS8:Cultural Heritage	YES	This ESS is relevant due to chance of finding physical cultural resources during excavation activities for new construction of the proposed project
ESS9:Financial Intermediaries (FIs)	NO	This ESS is not relevant to the project. Not featured in the ESMF
ESS10:Stakeholder Engagement	YES	The standard aims at making stakeholders part of

and Information Disclosure		<p>the project through continuous sharing of information and updates. The standard call for stakeholder engagement throughout the project life cycle, and preparation and implementation of a Stakeholder Engagement Plan (SEP). It requires early identification of stakeholders, both project-affected parties and other interested parties and clarification on how effective engagement takes place. Stakeholder engagement is to be conducted in a manner proportionate to the nature, scale, risks and impacts of the project, and appropriate to stakeholders' interests.</p>
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CHAPTER FOUR

ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS

4.1 Introduction

This section describes the baseline condition as they relate to the physical environment, biological environment, the socio-economic environment within the core project area and the marginal zones. The sub-sections of physical, economic, social characteristics and infrastructure and demographic characteristics are based on secondary data observation, while the last sub-section including biological environment is based on the primary survey obtained during fieldwork. Air quality and noise level data were obtained by measuring ambient gases emission, particulate matter (PM 2.5 and 10) and noise.

4.2 The Physical Environment

4.2.1 Climate

Generally, the area experiences a Tropical wet and dry or Savanna climate (Classification: Aw). The town has two seasons; (a) a rainy season that begins around mid-October and stretches until mid-May, with a dry spell in January, and (b) a dry season that begins in mid-May and lasts until mid-October.

i. Rainfall

Bariadi has a tropical wet and dry climate. Annual total rainfall averages between 600 millimetres (24 in) and 900 millimetres (35 in). Bariadi experiences extreme seasonal variation in monthly rainfall. The rainy period of the year lasts for 8.3 months, from September 26 to June 4, with a sliding 31-day rainfall of at least 0.5 inches. The month with the most rain in Bariadi is March, with an average rainfall of 4.1 inches. The rainless period of the year lasts for 3.7 months, from June 4 to September 26. The month with the least rain in Bariadi is July, with an average rainfall of 0.1 inches. Source: <https://weatherandclimate.com/tanzania/simiyu/bariadi>.

Temperature fluctuates between day and night as well as from one season to another. The hottest months are March, February, and then October. The warmest time of year is generally early March where highs are regularly around 85.6°F (29.8°C) with temperatures rarely dropping below 66.1°F (18.9°C) at night. Source: <https://weatherandclimate.com/tanzania/simiyu/bariadi>.

The proposed developments at the site, have potential to cause changed in to the local mean temperature. Clearance of local vegetation and the establishment of paved area may increase the local temperature. Pavements absorb and store solar radiation, leading to a further increase in the surface temperatures. This phenomenon is known as the urban heat island (UHI) effect. Large quantities of solar radiation are absorbed by these materials during the day and released during the night time.

Bariadi experiences some seasonal variation in the perceived humidity. The muggier period of the year lasts for 6.8 months, from October 31 to May 23, during which time the comfort level is muggy, oppressive, or miserable at least 7% of the time. The month with the most muggy days in Bariadi is January, with 8.4 days that are muggy or worse. The month with the fewest muggy days in Bariadi is July, with 0.0 days that are muggy or worse. Source: <https://weatherandclimate.com/tanzania/simiyu/bariadi>.

ii. Sun Hours and Potential for Solar Energy

The length of the day in Bariadi does not vary substantially over the course of the year, staying within 17 minutes of 12 hours throughout. In 2023, the shortest day is June 21, with 11 hours, 58 minutes of daylight; the longest day is December 22, with 12 hours, 17 minutes of daylight.

The hot climatic condition as well as availability of sunlight in almost 12 hours per day makes Bariadi District a potential zone for harvesting of solar power of which if properly harnessed could provide reliable alternative source of energy at the campus. Solar energy may be tapped to reduce the running cost of the campus through connecting it to class rooms, labs, lecture theatres, offices, staff houses and a health centre. Photovoltaic generation of electricity through the use of solar panels can be adopted by the campus to tap the sun's energy. With solar energy, the campus will have reliable and affordable alternative source of energy to cover the gap of power breakdown in Bariadi and other parts of the country, which has been widely affecting the functions of the campus. Solar energy is very possible renewable source of energy at Simiyu campus, because the campus is situated in the area where the number of sunny days and the direct radiation of the sun (supported by topography) are sufficient to harvest adequate solar energy potentials.

This information is important when considering the potential for installation of solar panel at the proposed Simiyu Campus. Also, the design of structures and buildings for the campus has

considered a design. The design of the campus has provided for solar lights along the pathways, open spaces and parking areas.

4.2.2 Climate Change

i. Greenhouse Gas (GHG) Emissions in Tanzania

Countries are struggling to reduce GHGs emissions, in line with the Kyoto Protocol. However, due to increase in urbanisation and industrialisation, GHGs emissions continue to increase and many countries have not taken adequate measures to reduce emissions in line with scientific findings and recommendations of the Protocol and related climate discussion (NCCS, 2012). Tanzania has ratified the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol in 1996 and 2002 respectively and has participated in the annual Conference of the Parties (CoP). The outcomes of these CoP meetings include decisions to put in place national policies, strategies and programmes to reduce greenhouse gas emissions and respond to the impacts of climate change (TNCCFA, 2013). The national estimates indicate that, Tanzania has negligible emissions levels of GHGs in terms of total and per capita whereby per capita emissions are estimated at 0.2 tCO₂e (NCCSR, 2019). The principal source of GHGs emissions in Tanzania is the Land Use, Land-Use Change and Forestry (LULUCF). Emissions from the LULUCF sector contribute about two-thirds of overall emission levels in Tanzania (NCCSR, 2019). *However, although the proposed project fall under LULUCF, the campus land use plan indicate that more than 44.2% of the total land will be not undergo land use change, but rather be better maintained.* Other sectors which contribute to greenhouse gas emissions in the country are Agriculture, Energy, Waste and Industrial Process and Product Use.

According to the National Climate Change Statistics Report (NCCSR, 2019), evidences of climate change in recent periods are observed. The mean monthly maximum temperatures (28.5 °C) for the short period (2012 - 2018) are slightly higher than the long term monthly means for 1981-2010 recorded at 28.2 °C which indicates an increasing pattern of temperature over the same shorter period. The data also indicate increased trends of precipitation in recent period. The monthly average rainfall (85.4 mm) observed for the short period of 2012 - 2018 is slightly higher than the monthly average rainfall (83.3 mm) recorded for the long term period, 1981-2010. In addition, there is a gradual rise of mean sea level from 1,992 mm in 2000 to 2,115 mm in 2019.

ii. Potential Impacts of Climate Change

Climate change is now recognized to have a significant impact on disaster management efforts in Tanzania and pose a significant threat to the efforts to meet the growing needs of the most vulnerable populations (NCCSR, 2019). Climate change is a cross cutting issue affecting a number of sectors including forestry, agriculture, water, lands, energy, infrastructure and others. Anticipated impacts of climate changes are basically on the energy sector, transport sector, and water and sanitation sectors and on trade.

4.2.3 Existing Land Use

The proposed land use plan generally makes provisions for the land and the buildings erected thereon shall be maintained and the same shall be used for Institute purposes only; Use Group 'K' Use Classes (d) as defined in the Urban Planning (Use groups and Classes) Regulation of 2018.

Therefore, the proposed land use will be used for constructing Functional hall, three (3) storey Multipurpose Teaching block (lecture theatres, classrooms and service areas such as student consultation rooms and lecturer offices), two (2) storey Computer Lab, two (2) storey Hostels (for boys and girls), community building, sports grounds and external works (water management structures, pavements, walkways, internal roads and general landscaping).

4.2.4 Existing Land Cover

Large part of the area is covered with vegetation cover. This makes the landscape attractive and cool hence altering the surrounding air temperature, the situation that favours students to use outdoor environment during day time. The utility consumption of the building is minimized by student tendency of spending the outdoor environment during day time. When construction activities kick off some trees will be cleared, hence will reduce the green space coverage. The proposed project land covers a total area of 12.27Ha.

When the project implementation kicks off some vegetations will be cleared during excavations and leveling of the areas for setting out buildings.

4.2.5 Topography

IFM Simiyu campus is characterized by flat, gently undulating surface covered with vegetation as indicated on the topographic map. The current built up area is situated on a flat area. The topography at Simiyu campus portrays the potential for natural storm water drainage and rain

water harvest systems. Infrastructure design may consider to utilize this potential while conserving the environment at the campus. In addition, the presence of valleys imply that storm water produced at the campus flows towards these two valleys. They may also guide the design of water retention ponds, storm water drainage and choice of location to set up waste water treatment plants.

4.2.6 Soils

The surface soil is predominantly of alluvial of top soils, black cotton (heavy clay soils), and brown grayish Clayey Gravelly soils mix with Cal Crete, brownish fine/course gravelly soils and whitish sandy gravelly soils from ground level based on the observation of the investigated five open pits. According to Geotechnical study the subsurface soil is characterized by black cotton soil at a depth of 0-0.9m. The Clayey Gravel soil at the depth of 0.9m to 2.2m. From 1.9 – 2.2 m, the soil is Silt Clayey soil mixed with Calcrete particles.

Generally, the geotechnical study has affirmed that the site is suitable for construction of the proposed building blocks(building structure foundation footing starting at between 1.8m and 2.2m from the existing ground level with stiff strata southern and northern side of the proposed block site). Also no water table was encountered at either of 5Nos of trial pits down to depth range of 2.5m from ground level.

4.2.7 Soil Erosion Potential

Physical observation revealed that soil erosion was evident in the Northern part of the proposed site. The major type of soil erosion observed at the site is rill erosion as small channels were observed.

The construction of the proposed buildings shall increase storm water volume. It is probable that the slopes and the erosion will continue to grow, and multiple rill erosions may merge into one very wide valley which will hamper the other land development activities at the campus. This implies that the effective soil conservation measures and proper storm water management methods are needed during project implementation.

4.2.8 Hydrological Characteristics

There is water scarcity in the area. The campus is supplied with water obtained from the borehole drilled within the campus. The quality of water collected from the borehole shows that water can be used for all human activities.

The primary runoff flow during the rainy season moves from South East to North West of the site. The wet zone of the campus site is between contours 1140m and 1150m amsl. This implies that 1650.sqm area of the site is water lodged during the rainy season which needs to be controlled by good drainage design. The construction of the building structures at the campus contributes to impervious surfaces leading to higher generation of surface runoff that need more attention in their management.

4.2.9 Air Quality, Noise level and Vibration Measurements

4.2.9.1 Average Ambient Gas Emission

a) Ambient Pollutant Gases

All the measured baseline data on ambient pollutant gases were found to be below their respective TBS and/or WHO limits. The summary of ambient pollutant gases baseline data (i.e. CO, NO₂, SO₂, and H₂S), are presented in Appendix 2a.

4.2.9.2 Average Dust–Particulate Matters (PM 2.5 and PM10)

The dust measurements were done with a view to establish the baseline status with respect to particulate matter in terms of PM10 and PM2.5 for the proposed project area (Appendix 2b). All the measured PM10 and PM2.5 levels were found to be within limits prescribed by both TBS and WHO guidelines, respectively.

4.2.9.3 Average Ambient 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 measured noise levels in all measured stations were found to be within the TBS and WHO limits specified for institutional areas.

4.2.9.4 Vibration Levels

Ground vibrations were monitored at as part of ESIA study using vibrometer 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. 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.

4.3 Biological Environment

This part gives details of the biological environment; Flora and Fauna (animals and plants) that affect human life (as in a particular place or period).

4.3.1 Flora

The team found out that, the project site is composed of high diversity of plant species of different life forms including herbs, grass, shrubs and trees. The area is dominated by the life forms of trees, herbs, shrubs and grasses which are represented by the high number of species. The presence of many tree species indicates that the community is less disturbed by human activities such as pole cutting and fuel wood collection besides being surrounded by human settlements.

Table 4.1:Types of vegetation identified in the proposed construction areas

S/N	Vegetation type	Botanical Name
1.	Shrubs	<i>Sennasingueana, Lippiaukambesis, Lantanaauleata, Psidiumguajava, Lantanacamara, Grewiabicolar</i>
2.	Herbs	<i>OcimumBasilicum, Agavesisalan, Hoslundiaopposita,</i>
3.	Trees	<i>Melia azedarach, Cascabelathevetia, Azadirachtaindica, Senna siamea, Euphorbia tirucalli, Psidiumguajava, Vachelliatortilis and Solanummauritianum.</i>
4.	Grass	<i>Digitaria Sanguinali and Cynodon dactylon</i>

4.3.2 Fauna

The animals observed during assessment are not included on either the CITES or the IUCN red list. Most of the animals discovered at the site are domestic animals from nearby community or

surrounding residential areas. These animals include goats, cows, dogs, chicken, birds and others.

4.3 Socio-Economic and Cultural Conditions

The socio-economic survey documented a number of activities in the area for people and communities living around. In the area, the main economic activities are crop farming and animal husbandry. Also, the people in this area engage in other kind of economic activities like retail shops and food vendors.

4.3.1 Population

According to the 2022 National Household and Population Census reports, Simiyu region has a population of 2,140,497 people of which 1,034,681 are Male and 1,105,816 Females. At Sapiwi village where the project is located the population is about 4530 people (National Bureau of Statistics Tanzania, 2022). After construction 3000 students are expected to be enrolled.

The increase in the number of people as the result of project implementation is expected to increase pressure on the available social services and change the lives of the people of Sapiwi and the surrounding communities. The Population of Sapiwi village is expected to triple in the next few years as a result of the IFM Simiyu campus construction. During construction, the project is expecting to employ more than one hundred (100) people from outside Sapiwi village. Therefore the village will be having more people than before. The change in population level due to influx of workers and laborers will contribute to the new market opportunities for small, middle and big business persons. This will increase money circulation at the area leading to high income to the local suppliers and service providers.

4.3.2 Education

Bariadi district council, in which IFM Simiyu campus is located has a number of educational facilities. These include Pre – Primary School, Primary School, Secondary School and Colleges and Vocational Training Schools/Centers. The Sapiwi ward has eight (8) Primary schools and two (2) secondary schools both are Government schools. However, the IFM Simiyu campus has the potential to stimulate the development of existing educational facilities in Sapiwi village as well as knowledge dissemination to the surrounding community.

Residences in the project area and surrounding communities do not have sufficient education facilities. In view of this, the influx of people in the project area will increase pressure on the

already limited education institutions and may without the taking of steps to alleviate this place a heavy additional burden on the existing service delivery system.

4.3.3 Health Services

There is a Regional Hospital or referral Hospital and three District Hospitals which are in Maswa, Meatu and Bariadi and one designated hospital owned by a religion institution. In Sapiwi village there is no hospital, health centre nor dispensary, but within Sapiwi Ward there are three public health centres which are found in Igegu, Mwandamo and Nyamikoma villages.

Following limited health institutions, health care services are likely to be inadequate to serve the increased population after the commencement of the project. Furthermore, the influx of job speculators from other parts of Tanzania and neighboring regions will increase interaction, consequently increasing the risk of getting HIV/AIDS infections and other communicable diseases. That, the growth of trading centers in the area will attract different businesses and different people to the extent that the level of prostitution will also increase in the area provided that there will be employees from other areas of the country. Increased prevalence of communicable diseases like HIV/AIDS will likely to happen and consequently cause burden to the existing health services.

4.3.4 Water Supply

Water supply is a major challenge in the Simiyu Region, where only about 20% of the urban and 40 % of the rural population have access to clean drinking water. In Sapiwi Ward, water is mainly from the boreholes. Water pumps are located in Kisesa and Nkindwabiye sub wards. At the proposed project site there is a borehole which was drilled by IFM to supply water at the campus.

4.3.5 Power Supply

Electricity Supplied in the Region is through the National Grid. All the Districts of Simiyu are accessed by electricity.

According to TANESCO –Simiyu, the power demand falls under medium distribution (33KV).The medium transmission (33KV) line passes across the IFM-Simiyu campus site. However, the other source of power at the project site includes kerosene, solar power, charcoal and firewood.

4.3.6 Solid and Liquid Waste Management

District Solid waste are taken to Kidulya dumpsite. The dumpsite operates every day of the week from 6 am to 6 pm with a lunch break between 1 pm and 2 pm for the personnel.

The campus has no proper waste management system for solid waste. Solid waste is managed by burning at the site. Current, about 96kg of solid waste are generated per day. After expansion 1200kg of waste are expected to be generated per day based on 3000 students. Therefore the proposed expansion will increase the generation of solid waste.

Wastewater is treated in septic tank and soak away pit. However septic tank tends to overflow regularly and therefore emptied after every seven days. Current, about 7680L of liquid waste are generated per day. After expansion 96000L of waste are expected to be generated per day based on 3000 students.

4.3.7 Farming Activities

Sapiwi village farming activities are both small and larger scale. Farming is conducted mainly seasonally in the area. However, there is small-scale irrigation taking place. The ward has the potential for the cultivation of different crops, such as food and cash crops. Food crops include rice, maize, cassava, sweet potatoes, and millet, while cash crops include cotton and tomatoes. Most farmers use hand hoes, and few of them use tractors. Existing potentials for crop production include the presence of human resources, water sources and the northern plateau, which provide suitable conditions for crop production. Farming activities' challenges include poor infrastructure, poverty, soil erosion, diseases and pests, price fluctuation and climatic change. The effects of climate change have been felt mainly by the farmers due to their dependence on rain-fed agriculture. The changing and unpredictable rainy seasons have significantly affected their ability to plan their farming activities. It brings the need for more exploitation of irrigation farming. It is estimated that intensified irrigation can increase agricultural productivity depending on the crops and incomes.

4.3.8 Livestock Keeping Activities

Livestock keeping is the second major economic activity of the region. Simiyu Region has total number of 1,412,911 Cattle, 674,402 Goats, 254,746 Sheep, 1,501,146 Chicken, and 1, 723 pigs. Within Sapiwi Ward, cattle are the dominant livestock in the Ward, followed by goats, sheep, chickens and pigs. Due to the lack of land use planning in the Ward, there are conflicts

between farmers and livestock keepers. Moreover, livestock keeping is facing climatic change-related challenges and a shortage of extension officers.

4.3.9 Commercial Activities

Sapiwi ward centre harbours both formal and informal commercial activities. Besides, it includes a weekly market which takes place on Saturdays. At the Sapiwi centre, there are shops for households' domestic goods. Transacted goods include agricultural products found within the Ward and manufactured goods. Even though business and commerce is a promising sector for Sapiwi village residents, the sector operates at a minimal scale due to a lack of market at the village level.

It is envisaged that the expansion of IFM campus at Sapiwi village; Bariadi district will attract a number of investors from within and outside surrounding communities to invest in meeting the needs of the increased population as well as people seeking for employment in the area. This is likely to enhance the development of the centers at surrounding areas. It is also expected that service providers such as food vendors and general kiosks (dukas) may be established and increase to provide services to both students, investors and staff working in the project site.

CHAPTER FIVE

STAKEHOLDER INVOLVEMENT AND GRIEVANCES REDRESS MECHANISMS

5.1 Introduction

This chapter presents description of the engagement activities undertaken as well as future engagement activities planned as part of the EIA process for the proposed project. Moreover 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. Stakeholders engagement is the requirements of 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. The consultation process gives stakeholders an opportunity to comment on the proposed project as well as on the reports that are produced during each phase of the EIA. This enables the affected communities to actually be a part of the solutions when it comes to mitigating impacts or implementing management measures.

5.2 Identification of Stakeholders

The study identified stakeholders to be consulted and involved throughout the project life cycle. Stakeholders' identification in this study was done through a continuous and comprehensive brainstorming process to collect an exhaustive list of people/ groups or institutions that are likely to be affected by the project/affect the project, influence the direction of the project or have those having interest over the project. In this study the following stakeholders were identified;

- i. Public institutions who have influence on the project- The identified stakeholders under this study were Ministry of Education Science and Technology (MoEST), Bariadi District Council (BDC), National Council for Technical and Vocational Training (NACTVET) Occupation and Safety Authority (OSHA), Fire and Rescue Army, Rural Water Supply and Sanitation Agency (RUWASA), Tanzania Building Agency (TBA)

- ii. Project Affected Communities-IFM Students Government Organization (IFM-SO)
- iii. Local government authorities- Sapiwi Village Executive Officer (VEO)
- iv. Non-Governmental Organizations-Tanzania Bankers Association

5.3 Engagement Approach During Preparation Phase

During this period the consultations, presentations/interviews and discussion with the above-identified stakeholders were conducted. In the presentations, the team shared with these stakeholders timely, relevant, understandable and accessible information in a culturally appropriately manner free of manipulation, interference, coercion, discrimination and intimidation (Figure 5.1). During this stage, the team collected the views and opinions on project design, risk.

5.5 Stakeholders Views and Concerns

Initial consultation process focused on the Proponent. It considered various issues that may pose adverse impacts on the environment. It included issues on employment, waste management and so on. The role of the consultant was to moderate the meeting, and the team assistant took notes. The question and answer sessions took place until the questions were exhausted and some form of consensus was reached. The main issues discussed by some stakeholders are summarized in Table 10 and the list of people consulted during the consultation process is presented in Appendix 4.

Table 5.1: Stakeholders consulted and their views

Sn	Organization	Views/Concerns/Comments	Response Section on issues raised
1.	Ministry of Education, Science and Technology	<ul style="list-style-type: none"> i. The proponent should consider reduction of noise and other nuisance during construction phase ii. Proponent should control dust and exhaust emissions from construction activities/operations iii. Avoid pollution of water sources at the project area iv. Ensure proper handling of waste 	<ul style="list-style-type: none"> i. The contractor should only work during the normal hours from 7.00am-5.00pm so that the community around is not disturbed ii. Water will be applied regularly to civil work and earth roads to suppress dust iii. There will be several dust bin positioned in different location
2.	Bariadi District Council	<ul style="list-style-type: none"> i. The community was involved during land acquisition process. ii. So far there are no complaints regarding the campus operations. i. An incinerator should be built for the management of sanitary pads ii. Proper sorting of solid wastes should be done on site iii. Proponent should consider the 	<ul style="list-style-type: none"> i. High tech Incinerator will be built for the management of sanitary pads, see the incinerator design in appendix 13 ii. Sorting of wastes will be done from the point of source. iii. Modern technology for wastewater treatment will be considered

		<p>treatment of wastewater by using modern technology rather than an oxidation pond due nature of the landscape</p> <ul style="list-style-type: none"> iv. Trees should be planted after construction v. The land use of the area is mainly residential or commercial vi. The surveying process has already been done to the areas surrounding the project vii. The presence of the institute may result in the growth of the economy (for example food vendors, stationaries, private hostels etc.) 	
5.	Fire and Rescue Force - Simiyu	<ul style="list-style-type: none"> i. The proponent should submit an architectural drawing for approval. ii. The proponent should install fire extinguishers at the strategic locations such as portable fire extinguishers, fire detection systems, fire hydrants, fire horse reels, and fire alarms 	<ul style="list-style-type: none"> i. The project's architectural drawings will be submitted before construction. ii. In the new buildings Fire extinguishers, fire assembly points, Fire escape routes and Smoke detectors will be installed at the strategic locations. Fire extinguishers, fire

		<ul style="list-style-type: none"> iii. There should be a borehole which will be used in case of fire emergencies iv. Training on fire safety should be conducted for the workers v. The building should be inspected by responsible personnel from fire rescue offices and a fire certificate shall be issued 	<p>assembly points, Fire escape routes and Smoke detectors are present in the existing buildings</p> <ul style="list-style-type: none"> iii. Regular training on fire safety will be conducted for the workers and students iv. At the project site, there is a borehole hence it will be used when fire emergencies occur.
6.	OSHA	<ul style="list-style-type: none"> i. The proponent should register the project with OSHA ii. Workers' medical examinations should be done annually iii. There should be good sanitary facilities for all gender iv. Workers should be provided with appropriate PPEs during all project phases v. Workers should attend health and safety training and first aid training vi. Occupation Risk assessment should be done after completion of the EIA study 	<ul style="list-style-type: none"> i. The management/contractor will register the workplace to OSHA ii. Medical checkups will be conducted to workers annually iii. Good housekeeping will be maintained at all project phases iv. Appropriate PPEs will be provided to the workers depending on their line of duty

		vii. Health and safety policy should be formulated	
7.	RUWASA	<ul style="list-style-type: none"> i. There is one borehole drilled by RUWASA ii. There is a plan of drilling another borehole to increase the supply of water. 	
8.	NACTVET	<ul style="list-style-type: none"> i. Procedures for campus registration and inspections were followed ii. IFM should make sure they have all required permits before construction and during the operation of the premise iii. Building designs should consider disability people iv. The IFM management should make sure that there are sufficient and qualified staff v. There are should be staff houses vi. The courses to be provided should benefit the students and community vii. Infrastructures like library, internet etc. should be available. viii. Disabled students and staff should 	<ul style="list-style-type: none"> i. Building Permits,Architectural Drawings, Title deeds etc. are present ii. Services like ramps, staircases, lift, corridors, toilets etc. are designed in a manner that even the disabled will access easily, see architectural drawings in the list of appendices iii. Staff houses are present and more to be constructed. iv. There will be a library and computer lab with capacity to house 480 students v. The design has considered special need students and staffs

		be considered in the design	
2.	Tanzania Bankers Association (TBA)	<ul style="list-style-type: none"> i. Institutions should improve and maintain the quality of education to ensure that their programs meet labor market demand ii. IFM should create a link between the courses provided and the market iii. The management should make sure students attend training at workplace with enough time 	<ul style="list-style-type: none"> i. The management will put more to ensure that their programs meet the labor market demand
3.	Lake Victoria Basin Water Board Office (LVBWB)	<ul style="list-style-type: none"> i. The proponent should adhere to Water Resource Management Act (WRMA) No. 11 of 2009 as amended by Act No. 8 of 2022 ii. The proponent should ensure proper management of hazardous waste i.e sanitary pads throughout the project life span iii. Ensure proper management of solid and liquid wastes in all phases of the project iv. Ensure proper management of storm water around the project site 	<ul style="list-style-type: none"> i. The IFM Management will adhere to the Act by prevention and control of water pollution; ii. High tech Incinerator will be constructed for managing sanitary pads

		through the project life span	
4.	Sapiwi Village Village Executive Officer	<ul style="list-style-type: none"> i. The management should collaborate with the local Government office on different matters ii. Priority on Employment opportunities should favour the people living around the community where the project is situated. iii. Corporate social responsibility issues should be adhered to. 	<ul style="list-style-type: none"> iii. Priority will be given to the locals on employment opportunities iv. The management will collaborate with the local Government office on different matters v. The Institution has already provided training on finance management to the community around
5.	Sapiwi Village Members of the village council	<ul style="list-style-type: none"> i. Priority on Employment opportunities should favour the people living around the community where the project is situated. 	<ul style="list-style-type: none"> i. Priority will be given to the locals on employment opportunities
6.	Sapiwi Village Village chairperson	<ul style="list-style-type: none"> i. The management should collaborate with the local Government office on different matters 	<ul style="list-style-type: none"> i. The management will collaborate with the local Government office on different matters
7.	Sapiwi Village Sub ward chairperson	<ul style="list-style-type: none"> i. Employment should consider gender 	<ul style="list-style-type: none"> ii. Gender will be considered during employment
8.	Tanzania Building Agency-TBA	<ul style="list-style-type: none"> i. Register the project with relevant board i.e AQRB, ERB,CRB etc 	<ul style="list-style-type: none"> i. The project will be registered to AQRB, ERB,CRB

		<ul style="list-style-type: none"> ii. Design consideration should be achieved (special needs, openings, spatial organization, plot coverage (not more than 55%)) iii. Design should cover/relevant to density/population (Ratio density) iv. Design according to Arch standard v. Site layout should indicate number of parking, hard surface and soft surface area covered, number of entrance, private and public spacial organization vi. Indicate transformation of one phase to the next phase during construction (one building construction to another building construction) 	<ul style="list-style-type: none"> ii. The design has considered special needs, see Architectural Drawings Appendix 8 i. Plot ratio, coverage and parking areas were considered during designing, see Architectural Drawings appendix 8
9.	Students Organization IFM-Simiyu Campus	<ul style="list-style-type: none"> i. All students are aware about the campus expansion ii. The building designs should consider disabled people iii. The Management can consider space for outside studying iv. The management can hire a 	<ul style="list-style-type: none"> i. The design has considered disabled people ii. There will be a place for outside studying

		<p>cleaning agency to make sure toilets/bathrooms and the general environment is well cleaned</p> <p>v. Rooms should be big enough and well ventilated</p> <p>vi. Chairs and shelves in the hostel should be equal the number of students living in</p> <p>vii. Crime (theft) should be controlled</p>	<p>iii. A cleaning agency will be hired</p> <p>iv. To reduce crime (theft) there will be security guards, security light, security cameras etc.,</p>
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5.4 Analysis of Issues and Problems

Consultation with stakeholders indicated that, the proposed project is viewed as a positive venture that may stimulate new economic and social activities and enhance academic excellence at Simiyu. In addition, participants were convinced that the project will not pose irreversible negative impacts on the environment or community in the foreseeable future if the project is well planned and monitored.

Environmental and Socio-economic issues that emerged during the consultations with stakeholders and from other sources regarding the HEET project can be categorized into; employment, businesses, health impacts; environmental, safety and security; community services; and general wellbeing impacts. Both actual and perceived impacts are described, having been gathered from people's opinion as well as factual data and comment.

Most of the economic impacts of the proposed project are positive, in that the implementation of HEET project at Simiyu is associated with benefits. Health impacts – both real and perceived – are those associated with water pollution as a result of the project, and increased risk of accident and security/ incidents. Many of the anticipated community impacts – especially on safety and security need prompt handling. The identified environmental and socio-economic impacts are summarised in the following Table 5.2.

Table 5.2: Categories of issues and problems

S/N	Category of issues /problems	Issues/Problems	Responsibility
1.	Employment opportunities	<ul style="list-style-type: none"> ▪ Priority to the locals ▪ Gender consideration 	Developer
2.	Revenue Generation	<ul style="list-style-type: none"> ▪ Taxation ▪ Job creations 	Developer, TRA,
3.	Waste management	<ul style="list-style-type: none"> ▪ Type of waste ▪ Current practice in disposal ▪ Spread of diseases 	Contractor, Developer, Municipal Environmental Officer
4.	Infrastructure	<ul style="list-style-type: none"> ▪ Storm water drainage ▪ Sewerage system ▪ Road network 	Contractor, Developer, Town planner

5.	Source of construction material	<ul style="list-style-type: none"> ▪ Type of construction material 	Developer, contractor
6.	Safety of workers	<ul style="list-style-type: none"> ▪ Available safety measures in place 	OSHA, Developer
7.	Environmental and Health issues	<ul style="list-style-type: none"> ▪ Noise levels to the community ▪ Air quality – dust from the project ▪ Loss of vegetation ▪ Water pollution 	OSHA, Developer, District Environmental Officer

Source: Consultant analysis, May 2023

5.5 Stakeholders Engagement during Implementation

During Project implementation, engagement activities will be undertaken in relation to project activities under Component 1: Transforming IFM Simiyu Campus with a focus on priority disciplines for Economic growth; Component 2: Strengthening management of the IFM Simiyu Campus; and Component 3: Support for Project Coordination and Management. At this stage, the study will conduct a number of structured and formal meetings, focus group discussions, community meetings, one to one interview, distribution of information (pamphlets) and site visits that will involve a number of stakeholders as identified in 5.1 above. The timing for the conducts of the above meetings will be determined by the progress of the project implementation and when seems necessary to invite stakeholders for their comments and observation. However, the sharing of information and progress with stakeholders will be subject to scrutiny with regards to the kind of information to be shared and how the same will be communicated to both stakeholders, PAPs and OIPs. Furthermore, at this stage, the IFM Simiyu Campus will ensure equal and effective participation from project preparation to implementation stages. To ensure stakeholders' views and concerns are well captured, the SEP will have different methods of collecting information based on their needs i.e. disadvantaged or vulnerable groups (Table 5.3).

Table: 5.3 Summary of the stakeholders' engagement during Implementation

SN	OBJECTIVE	MESSAGES	MEANS OF COMMUNICATION
PROJECT PREPARATION			
1.	To present the draft SEP (for comment) and final versions of the instruments.	<ul style="list-style-type: none"> • Presentation of the Project and its implementation schedule • Present potential environmental and social impacts and risks reports and its enhancement and mitigation plan. • Describe Grievance Redress Mechanism • Present a list of identified stakeholders and describe an approach their engagement. 	<ul style="list-style-type: none"> • Organized public meetings /Consultations based on Stakeholders needs and circumstances. (GD, one on one meetings etc. • Disclosure on IFM Website • Emailing to respective stakeholders • Email copies of the instruments to Non-State Actors and other institutions. • Sharing of executive summaries in hard copy during meetings • For stakeholders who are illiterate, information will be presented verbally during meetings in local language. • Disclosure of Project documentation in appropriate and accessible manner • The instruments will be disclosed in Swahili language in project offices and hard copies will be accessible to PAPs and OIP.
2.	ESIA / ESMP Preparation and Disclosure	<ul style="list-style-type: none"> • To inform the preparation of the Environmental Statement/ ESMP etc. and present findings when 	<ul style="list-style-type: none"> • Face to Face Meetings • Community Meetings • Site Visits based on stakeholders needs and

		drafted to all the identified stakeholders	<p>circumstances.</p> <ul style="list-style-type: none"> • FGD, one on one meetings etc. • Disclosure of Project documentation in appropriate and accessible manner • The instruments will be disclosed in Swahili language at the Institute and in the offices of the identified stakeholders or public meetings
CONSTRUCTION PHASE			
2.	Meeting to Alert stakeholders to the start of construction	<ul style="list-style-type: none"> • Inform stakeholders on the commencement of construction activities • Provide project Information and education on the risks and impacts, GRM, workers code of conduct etc. 	<ul style="list-style-type: none"> • Public Meetings • Face to Face Meetings • Groups Discussions based on stakeholders needs and circumstances. • FGD, one on one meetings etc.
	Alert stakeholders of any new activities and Provide updates on project progress (every month)	<ul style="list-style-type: none"> • Inform public about any emerging issues; provide information on risks and impacts. GRM, workers code of conduct etc. 	<ul style="list-style-type: none"> • Public Announcements • Focus Group Discussions • Community Meetings • Meetings with village council of Sapiwi village and ward
4.	Contact with the Project Coordination Team	<ul style="list-style-type: none"> • Provide phone number/WhatsApp account and email for stakeholders to submit questions and give out comments 	<ul style="list-style-type: none"> • Meetings with village council of Sapiwi village and ward as well as PAP and OIP

		THROUGHOUT THE PROJECT	
5.	Information dissemination	<ul style="list-style-type: none"> • General information on IFM HEET implementation 	<ul style="list-style-type: none"> • Posting on bulletin boards; Information leaflets • Outreach activities with students such as presentations, workshops and public meetings. • Sharing on IFM social media and website
	Contact with the Project Coordination Team	<ul style="list-style-type: none"> • Maintain website with contact box, email, social media accounts and phone number for people to submit questions, comments and concerns. 	<ul style="list-style-type: none"> • IFM Websites • IFM Simiyu Campus phone number for HEET activities and concerns will be shared to project sites and all

NOTE: The face-to-face consultations with stakeholders will strictly follow national and international guidelines on health and hygiene procedures In order to avoid the spread of diseases including COVID-19 and other respiratory diseases.

5.6 Stakeholders Engagement During Implementation: Proposed Strategy for information Engagement

Information disclosure strategies attempts to increase the availability of information on the proposed expansion and the entire HEET project at Simiyu campus. The public disclosure of the information will be very useful in motivating and improving the performance of the project. During implementation, when new activities are being developed engagement will be undertaken to inform the development of the specific sub-project and plans. Further engagement on the frameworks will also be undertaken (Table 5.4). However and depending on the need of each stakeholder, IFM Simiyu campus will use the following methods;

- i. **Structured Agenda** – Depending on the issue at hand, IFM will be developing focused agenda so as to ensure that key strategic and risk items can be discussed with all relevant stakeholders in order to foster decision making and address risk factors and develop enhancement measures during project implementation.
- ii. **Focus Group Meetings/ Discussions** – IFM will employ FGD when aiming to bring together stakeholders with the same interests or common characteristics into a meeting to discuss specific topics or project components in a focused manner. FGD will be employed to explore issues that are relevant to specific groups or sub-groups of a community – such as youth, the elderly, women, students and people with disabilities. The intention of using this approach is centred upon establishing of similarities and differences among people of the same or different groups.
- iii. **Formal meetings** - These meetings will be focused to identify and discuss specific stakeholder concerns and to disclose project information. Participation in these meetings will be influenced by the issues under consideration and will include adequate representation of women as well as other marginalized and vulnerable people where possible.
- iv. **One-on-one interviews** – The interviews will aim to give chance to individuals to air concerns on project and will involve PAPs and OIPs depending on the issues to be addressed.
- v. **Distribution of pamphlets** – This is a way of sharing information to a wide range of individuals.

vi. **Site visits** – These visits are focused to identify and discuss stakeholder concerns and to disclose project information within communities.

Table 5.4: Summary of Stakeholders Communication Strategy that reflect the characteristics and corresponding specific needs

SN	Stakeholders group	Specific needs	Language	Communication Means
1.	Government Entities and Implementing Institutions and Agencies (OSHA, Fire, BDC)	i. Inclusion in the decision making processes and implementation role of the project	Kiswahili	Correspondence by phone/email Meetings Roundtable discussions
2.	Communities and local government authorities of Sapiwi village	i. Sensitization as to the project, its benefits and their role. ii. Information on the Project and approach to managing environmental and social issues.	Kiswahili	Community meetings Outreach activities
3	Students, Students government and people with disabilities	i. Sensitization as to the project, its benefits and their role ii. Information on the Project and approach to managing environmental and social issues iii. Consideration of their decision making processes	Kiswahili	Meetings Roundtable discussions Community meetings Group discussions Outreach activities

4	Vulnerable Groups (women, youth and elders)	<ul style="list-style-type: none"> i. Sensitization as to the project, its benefits and their role. ii. Information on the Project and approach to managing environmental and social issues. iii. Efforts to ensure VGs feel that their issues will be heard and addressed. 	Kiswahili	<p>Disclosure of Project documentation in a culturally appropriate and accessible manner.</p> <p>Community meetings</p> <p>Group Discussions</p> <p>Outreach activities</p>
5	Other interested parties	<ul style="list-style-type: none"> i. Depend on stakeholder to be met 	Kiswahili	<p>Correspondence by phone/email</p> <p>Meetings</p> <p>Roundtable discussions</p>
6	IFM Staff (Both Academic and Administrative Staff)	<ul style="list-style-type: none"> i. Sensitization as to the project, its benefits and their role. ii. Information on the Project and approach to managing environmental and social issues. 	Kiswahili	<p>Correspondence by phone/email</p> <p>meetings</p> <p>Roundtable discussions</p>
7	Students and student organisation	<ul style="list-style-type: none"> i. Sensitization as to the project, its benefits and their role. ii. Information on the Project and approach to managing environmental and social issues 	Kiswahili	<p>Correspondence by phone/email</p> <p>Meetings</p> <p>Roundtable discussions</p>

5.7 Stakeholders' Engagement Plan (SEP)

The engagement plan will be reviewed and updated throughout the project implementation. During this process, the focus and scope of the SEP may change to reflect the varying stages of project implementation and to encompass any changes in project design and lessons learnt from previous phases of the Project. However, it is important to develop a guiding framework that may act as roadmap for stakeholders' engagement as shown in the Table 5.5.

Table: 5.5: Stakeholders’ Engagement Plan

Target Stakeholders	Objective	Messages/ Agenda	Means of Communication	Schedule/ frequency	Responsible person/group
PROJECT PREPARATION AND PRE CONSTRUCTION PHASE					
Representatives of implementing institutions and agencies(OSHA, Fire, BDC); Community groups representatives from Sapiwi village and ward, Students and Student organisation, IFM staff, service providers and private sector	<ul style="list-style-type: none"> i. To present drafts and get stakeholders inputs on the following instruments: ii. Environmental and Social Management Framework (ESMF); iii. Stakeholder Engagement Plan (SEP) 	<ul style="list-style-type: none"> 1. Presentation on the Project– objectives, rationale, components, benefits and beneficiaries, implementation arrangements. 2. Implementation schedule and period 3. Potential environmental and social impacts, measures for mitigation and management 4. Describe Grievance Redress Mechanism 5. Present stakeholders identified and 6. Describe approach to 	Organized public Meetings/ Consultations Disclosure of Project documentation	At least once per each stage of the project implementation	IFM Monitoring and evaluation team

Target Stakeholders	Objective	Messages/ Agenda	Means of Communication	Schedule/ frequency	Responsible person/group
		<p>stakeholder engagement</p> <p>7. Explain on the measures, actions, plans, and expected timelines for compliance with ESS documents</p> <p>8. The LMP identifies the main labour requirements and risks associated with the project.</p>			
<p>Representatives of implementing institutions and agencies(OSHA, Fire, BDC); Local NSAs; Community groups representatives from Sapiwi village and ward, Students and Student organisation, IFM staff,</p>	<p>1. To disclose finalized ESMF, SEP, LMP and ESCP and ESIA</p>	<p>1. Email message to advise Stakeholders of disclosure and where to access the disclosed documents.</p> <p>2. Disclosure of Project documentation in an accessible manner</p>	<p>Organized public Meetings/ Consultations</p> <p>Disclosure of Project documentation</p> <p>Email copies to key individuals and organizations.</p>	<p>At least once per each stage of the project or once when there is changes or revision</p>	<p>IFM Monitoring and evaluation team</p>

Target Stakeholders	Objective	Messages/ Agenda	Means of Communication	Schedule/ frequency	Responsible person/group
service providers and private sector					
CONSTRUCTION PHASE					
Representatives of implementing institutions and agencies(OSHA, Fire, BDC); Local NSAs; Community groups representatives from Sapiwi village and ward, Students and Student organisation, IFM staff, service providers and private sector	1. Meeting to inform stakeholders to the start of construction	1. Inform stakeholders that construction will commence. 2. Information and education on the risks and impacts, GRM, workers code of conduct etc. 3. Inform the stakeholders of the construction plans, builders, route for transportation of materials, water sources	Public Meetings Focus Groups Discussions. Face to Face Meetings	At least once per each stage of the project or once when there is changes or revision	IFM Monitoring and evaluation team
Representatives of implementing institutions and agencies(OSHA, Fire, BDC); Local NSAs;	1. To inform stakeholders of any new activities, unexpected	3. Inform on the new changes and progress	Public Meetings Focus Groups Discussions. Face to Face	At least once per each stage of the	IFM Monitoring and evaluation team

Target Stakeholders	Objective	Messages/ Agenda	Means of Communication	Schedule/ frequency	Responsible person/group
Community groups representatives from Sapiwi village and ward, Students and Student organisation, IFM staff, service providers and private sector	impacts etc. during construction. 2. To Provide updates on project progress		Meetings	project or once when there is changes or revision	
Representatives of implementing institutions and agencies(OSHA, Fire, BDC); Local NSAs; Community groups representatives from Sapiwi village and ward, Students and Student organisation, IFM staff, service providers and private sector	1. Inform stakeholders of any new activities, unexpected impacts etc. during construction. 2. Provide updates on project progress	Inform public about any emerging issues Information and education on the risks and impacts, GRM, workers code of conduct etc. Updates on project progress etc.	Public Meetings Focus Groups Discussions. Face to Face Meetings	At least once per each stage of the project or once when there is changes or revision	IFM Monitoring and evaluation team
Community groups representatives from Sapiwi village and Sapiwi ward, Students	1. Resolve grievances received	1. To address grievances related to construction activities 2. Refer persons	Face-to-face meetings Confidential and safe	Every time a grievance is received	IFM Monitoring and evaluation team, IFM Gender Unit and Gender

Target Stakeholders	Objective	Messages/ Agenda	Means of Communication	Schedule/ frequency	Responsible person/group
and Student organisation, IFM staff, service providers and private sector		affected by project related GBV/SEA to services 3. To promote accountability for violations of GBV by project staff.	face to face referral for GBV survivors Meetings and aggrieved persons		expert
Representatives of implementing institutions and agencies(OSHA, Fire, BDC); Local NSAs; Community groups representatives from Sapiwi village and ward, Students and Student organisation, IFM staff, service providers and private sector	1. Contact with the Environmental and Social Project Experts	1. Sharing of phone number and WhatsApp number to submit questions and other comments.	Phone number WhatsApp number	At least once per each stage of the project or once when there is changes or revision	
THROUGHOUT THE PROJECT (ALL COMPONENTS)					
Representatives of implementing institutions and agencies(OSHA,	1. Information dissemination	1. To share general information on project, activities	Posting on bulletin boards; Information leaflets	At least once per each stage	PRO office

Target Stakeholders	Objective	Messages/ Agenda	Means of Communication	Schedule/ frequency	Responsible person/group
Fire, BDC); Local NSAs; Community groups representatives from Sapiwi village and ward, Students and Student organisation, IFM staff, service providers and private sector			Community meetings Outreach activities – Focus groups. One to one meeting Sharing on IFM social media and website	of the project or once when there is changes or revision	
Representatives of implementing institutions and agencies(OSHA, Fire, BDC); Local NSAs; Community groups representatives from Sapiwi village and ward, Students and Student organisation, IFM staff, service providers and private sector	2. Contact with the Environmental and Social Project Experts	2. Sharing of phone number and WhatsApp number to submit questions and other comments.	Phone number WhatsApp number	At least once per each stage of the project or once when there is changes or revision	

5.6 Grievance Redress Mechanisms

A Grievance Redress Mechanism (GRM) is necessary for addressing the legitimate concerns of the project-affected persons (PAP). Grievance handling mechanisms provide a formal avenue for affected groups or stakeholders to engage with the project on issues of concern or unaddressed impacts. Grievances are any complaints or suggestions about the way a project is being implemented, and they may take the form of specific complaints for damages/injury, concerns around resettlement and compensation, concerns about routine project activities, or perceived incidents or impacts. GRM provide a formal avenue for affected groups or stakeholders to engage with the project on issues of concern or unaddressed impacts. To make this aim a reality, IFM will develop a grievance-handling mechanisms and procedures to address grievances associated with the proposed project related to PAP, workers and contractors.

The proposed grievances officers at IFM lead Legal Counsel/Officer of the institute and Director of the tender. However, the Vice Chancellor has a mandate and jurisdiction to decide otherwise on the team composition or appoint a new team when deemed fit and necessary to do so.

5.8.1 Levels of Grievances Handling at IFM

Currently, no Grievance redress mechanism is connected with the proposed project. However, during the study, we found zero complaints related with the implementation of the project. The grievance redress mechanisms at the institute will involve three levels as displayed in Table 5.6.

Table 5.6: Levels of Grievances Redress Mechanism

SN	LEVEL OF GRIEVANCE	NATURE OF GRIEVANCES AND PROCEDURE FOR GRM	RESPONSIBLE PERSON	SUPPORT PERSONS
1.	Level One	<ol style="list-style-type: none"> 1. To resolve an issue quickly, politely, transparently and amicably to facilitate project activities to move forward 2. Existing mechanisms such as at the Village/Mtaa level will be utilized as needed to address complaints on specific issues depending on their nature 	Legal Counsel/Officer of IFM	<p>Mtaa Executive Officers and Mtaa Chairpersons of Sapiwi</p> <p>IFM Gender Director</p> <p>Student union</p> <p>A representative from the contractor</p>
2.	Level Two	<ol style="list-style-type: none"> 1. Grievances that can't be resolved by the team above or the ones are are that are complicated will be referred to the Higher IFM Management who will be responsible for receiving and resolving grievances in a fair, objective, and constructive manner, all claims or complaints raised by project affected persons. 	<p>Vice Chancellor (VC)</p> <p>Deputy Vice-Chancellor</p> <p>Deputy Vice-Chancellor</p>	Legal Counsel/Officer of IFM

3.	Level Three:	1. The PAP that will not be satisfied by the decision of IFM GRM will be advised to seek further redress to the MoEST	MoEST	Vice Chancellor (VC) Deputy Vice-Chancellor Deputy Vice-Chancellor
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5.6.2. Grievance Procedure for Construction and Operational GRMs at IFM

For a grievance to be full resolved, IFM has laid down several procedures that the whole process will go through as displayed in the Table 5.7

Table 5.7: Grievance Procedure for Construction and Operational GRMs at IFM

SN	STEP	PROCEDURE	MEANS OF COMMUNICATION	TIMEFRAME	RESPONSIBLE
1.	Step 1: Submission of Grievances	1. The affected person shall file their grievance to the Legal Counsel and Gender Unit of IFM, which will be recorded in writing	Through suggestion box in construction sites During regular meetings held with stakeholders During informal meetings Letter addressed to the management email, what's app	Anytime a grievance happen and the same will be channelled at the next stage within 5 working days after its submission	Legal Counsel/Officer of IFM, Gender experts

			messages and telephone		
2.	Step Two: Logging the Grievance	1. Once a grievance has been received it must first be logged in the grievance database register before assigned a date for investigation and hearing	Through writing a formal letter By phone calls, WhatsApp messages and email, formal and informal meetings by IFM	Registration is done once the grievance is received and processed within five working days	Legal Counsel/Officer of IFM, Gender experts
3.	Step Three: Providing the Initial Response	1. The person, community, or stakeholder that lodged the initial grievance will then be contacted within 2 days to acknowledge that the same has been received and provide its status and notification 2. The notification will include details of the next steps for investigation of the grievance, including the person/department	Through writing a formal letter By phone calls, WhatsApp messages and email, formal and informal meetings	Response to given within 5 days and the notification for the next steps In case of continuous harm, immediate response will be taken without delay to prevent the harm	Legal Counsel/Officer of IFM, Gender experts

		<p>responsible for the case and the proposed timeline for investigation and resolution which will depend on the severity of the incident.</p> <p>3. Depending on the context and situation, it may be necessary to provide an immediate response to avoid further harm while more detailed investigations are undertaken e.g. in the case of fatalities, workplace accidents, community safety pollution of natural resources, conflict with communities etc.</p>			
	Step Four: Investigating the Grievance	<p>1. The GRM team will initiate investigation within one weeks after a grievance is received.</p> <p>2. Depending on the nature of the grievance, the team</p>	<p>Through writing a formal letter</p> <p>By phone calls, WhatsApp messages and</p>	<p>The team will continually update the aggrieved on the progress of the investigation and the timeline for the</p>	<p>Team to be selected by Vice Chancellor (VC), Deputy Vice Chancellor, Deputy Vice</p>

		involved in the investigation will vary. 3. The investigation team will involve the aggrieved person/people in this investigation, where possible.	email, formal and informal meetings	conclusion. The investigation should be completed within 14 days	Chancellor depending on the issue at hand
	Step Five: Communication of the Response	1. The grievances team will outline the steps taken to ensure that the grievance does not re-occur and any measures needed to resolve the complaint.	Through writing a formal letter By phone calls, WhatsApp messages and email, formal and informal meetings	The response will be communicated within 1 day of the resolution being determined.	Legal Counsel/Officer of IFM, Gender experts
	Step Six: Complainant Response	1. When a complainant is satisfied then the team will seek their sign off 2. The team and the complainant will agree and determine if any follow up is needed to monitor the implementation of the	Through writing a formal letter By phone calls, WhatsApp messages and email, formal and informal meetings	Within 5 days	Legal Counsel/Officer of IFM, Gender experts

		resolution.			
	Step Seven: Grievance Closure or Taking Further Steps if the Grievance Remains Open	<ol style="list-style-type: none"> 1. Once the measures have been implemented to the complainant's satisfaction, the grievance should be closed. If, however the grievance still stands then the team will initiate further investigation and determine the steps for future action. 2. Once all possible redress has been proposed and if the compliant is still not satisfied then they should be advised of their right to the next step of contacting the MoEST 	<p>Through writing a formal letter</p> <p>By phone calls, WhatsApp messages and email, formal and informal meetings</p>		

CHAPTER SIX

IDENTIFICATION AND ASSESSMENT OF IMPACTS AND MITIGATION MEASURES

6.1 Introduction

This section outlines the process of impact identification and assessment of the impacts in each stage of the proposed project. The proposed mitigation measures are outlined of which MoEST through IFM is committed to undertake so as to prevent or reduce the identified adverse impacts. This study is conducted for envisaging a road map to ensure the investments to be financed under this project are designed and implemented in an environmentally sound and socially acceptable manner that meets both requirements of World Bank Environmental Standards (ESS) and the Government of Tanzania (GoT) legislations.

- i. Environmental risks and impacts assessment done included: (i) those defined by the WB Environmental Health and Safety Guidelines, EHSGs; (ii) those related to community safety; (iii) those related to climate change (iv) any material threat to the protection, conservation, maintenance and restoration of natural habitats and biodiversity; and (v) those related to ecosystem services and the use of living natural resources;
- ii. Social risks and impacts assessment done included: (i) threats to human security through crime or violence; (ii) risks that project impacts fall disproportionately on individuals and groups who, because of their particular circumstances, may be disadvantaged or vulnerable; (iii) impacts on social services and infrastructure, or community health and health services; and (iii) negative economic and social impacts relating to the involuntary taking of land or restrictions on land use.

Construction and operation of the proposed project is expected to generate a range of impacts in the project impact area. The anticipated impacts will be on a range of biophysical and socio-economic aspects of the environment. Some of the impacts are expected to be positive while others may be negative. This chapter identify the potential environmental impacts associated with the project from planning and design, construction, demobilization and operation and maintenance phases; assess their extent and significance; and propose mitigation and enhancement measures to manage the impacts. The positive measures if properly enhanced will contribute towards the social and economic development of the area and Tanzania as a whole. The negative impacts will have to be managed to prevent environmental degradation of

both the social and physical environment in the project area. Specifically, the chapter is aimed at the following:

- a) Predict the potential environmental and social impacts and risks arising from the implementation of the project;
- b) Assess the possible extent /severity of the predicted impacts (both positive and negative);
- c) Assess the significance of the predicted impacts; and
- d) Recommend measures for managing the impacts.

6.2 Methodology of Impact Identification

Impact identification was done by analyzing the project activities and determining their influence on the baseline environmental and social characteristics of the project area. The environmental characteristics of the project include biophysical (topography, soils, climate, rainfall, water resources, flora and fauna) and social characteristics (demography, settlement, land administration and tenure, economic activities, infrastructures and services, water supply and sanitation, healthy and HIV and AIDS). Public consultation complemented the field investigations and literature review. Identification of potential impacts and physical assessment of the following environmental components likely to be impacted was also conducted: a) physical /chemical; b) biological /ecological; c) social /cultural; and d) economic /operational.

Based on the project activities, the approach followed included:

- a) Analysis of topographical maps, in order to identify the main environmental and social components of topography, land under cultivation, existing industrial establishments, infrastructure and water resources;
- b) Site investigations, focusing particularly on the areas of project influence especially the neighboring designated institutions to identify critical environmental and social elements to be affected including soils, physical developments, social infrastructure, water and sanitation, health, flora and fauna, soils and local economy;
- c) Screening of the anticipated potential and significant impacts of the project, following the project stages of planning and design, construction, operation and maintenance and decommissioning; and
- d) Assessment of environmental impacts to describe the positive and negative impacts, both direct and indirect as identified at each stage of the project cycle.

The methodology adopted for impact identification mainly considered the environmental impacts at various phases of the project and the activities to be undertaken at each phase. The following phases were considered:

- a) **Planning Phase** – Activities during the planning and design phase include land surveying; preparation of a master plan; preparation of detailed layout plans; preparation of building designs, tender process, obtaining building permits and all the approvals necessary for the construction and operation of the project. It is expected that the environmental management measures, which will be proposed for the project will be incorporated into the engineering design of the project.
- b) **Construction Phase** – For this phase, the main activities are land clearing; landscaping; grading; excavation; compacting; trenching; construction of service infrastructure such as access roads, construction of temporary structures such as storage, sanitary facilities and an office facility; backfilling with compaction consolidation; levelling and earth marking; transportation of building materials; and construction of administration block, library, hostel, staff house and other related buildings. Other infrastructure such as drainages and utility reticulation will also be constructed.
- c) **Operation Phase** – During the operation phase, the structures will be occupied and used for of administration block, library, hostel, staff house etc., The impacts were identified by considering project activities including inputs and outputs in the various project phases outlined above and how these would affect various components of the environment.
- d) **Decommissioning phase** – Decommissioning will involve demolition of the project components including building structures, pavements, drainage systems, and perimeter fence. The steps undertaken were:

- i. **Assessment of Baseline Conditions**

The purpose of assessing baseline conditions was to understand the existing situation as this is the basis for determining changes that may occur as a result of the project.

- ii. **Assessment of project inputs associated with the project**

Project inputs were examined to determine the potential changes and impacts that would be created through the application of project inputs.

iii. Assessment of project activities that will be undertaken

Project activities were examined to identify the impacts that the activities would bring on the environment.

iv. Assessment of project outputs associated with the project

Project outputs were examined to determine the potential changes and impacts that would happen as a result of the outputs.

v. Determination of environmental impacts

Based on the above steps, the environmental impacts of the project were identified.

6.3 Impact Evaluation and Scoring Matrix

After identifying the positive and negative environmental impacts the project will have on the environment, further analysis was conducted to determine the extent and significance of the impacts. The aspects that were considered were magnitude, significance, probability of occurrence and duration of impacts which have been properly explained.

6.3.1 Magnitude

Magnitude is a measure of the general degree, extensiveness, or scale of impacts. The magnitude was scored at four levels i.e. household level, local level, regional level and national level.

6.3.2 Significance

This is a measure of the importance of a particular action on the environmental factor in the specific instance under consideration. This was scored using values ranging from +3 to - 3 with a score of 1 representing a low/minimal impact, 2 moderate impact and 3 representing a high impact. Negative impacts were assigned a minus (-) sign and positive impacts are given a plus (+) sign.

6.3.3 Probability of Occurrence

Provides an estimate of the probability of an impact occurring before mitigation is applied. The impacts were considered as:

- a) Possible (impact may occur but it is not probable);

- b) Probable (the impact is very likely to occur); and
- c) Definite (impact is unavoidable).

6.3.4 Duration

Refers to the period of time over which an impact may occur, from once-off to continuous for the life of the project. Duration of impacts was considered as 1 for a low/ minimal impact and the score of 3 for a high impact. Each impact is given a score from 1 to 3 against each of the four attributes. The scores for each impact are added to give a total score for the four attributes, indicating the overall severity of the impact. A high score (3) represents a high impact and a low score (1) represents a low impact. Negative impacts are assigned a minus sign and positive impacts are given a plus sign. Table 15 shows the scoring scale used for evaluation of the impacts. The four rows allow evaluation of impacts in terms of the magnitude, significance, probability and duration. The columns outline the scoring scale; with a score of 1 for a low/ minimal impact and the score of 3 for a high impact. Each impact is given a score from 1 to 3 against each of the four attributes. The scores for each impact are added to give a total score for the four attributes, indicating the overall severity of the impact. A high score (3) represents a high impact and a low score (1) represents a low impact. Negative impacts are assigned a minus sign and positive impacts are given a plus sign. For purposes of this analysis an impact matrix was prepared and is provided in Table 6.1.

Table 6.1: Impact scoring matrix with significant level

Impact	Spatial extent of the impacts	Significance of the impact	Probability of occurrence of the impact	Duration of the impact	Total Score
IMPACTS DURING PLANNING AND DESIGN					
POSITIVE IMPACTS					
1. Creation of employment	1	1	3	1	6
IMPACTS DURING CONSTRUCTION					
POSITIVE IMPACTS					
1. Creation of employment	3	3	3	3	12
2. Creation of a market for local construction materials	3	3	3	2	11
3. Promotion of small scale businesses	3	3	3	2	11
NEGATIVE IMPACTS					
1. Air Pollution	-3	-3	-3	-2	-11
2. Noise Pollution	-1	-2	-2	-3	-8
3. Soil erosion	-2	-3	-3	-3	-11
4. Soil contamination	-1	-2	-2	-3	-8
5. Increase in accident incidences	-1	-3	-2	-3	-9
6. Increase in the spread of HIV/AIDS and other sexually transmitted diseases	-1	-3	-3	-3	-10
7. Increase in criminal activities	-1	-3	-3	-3	-10
8. Poor waste management	-1	-3	-3	-2	-9
9. Poor sanitation	-2	-3	-3	-2	-10
10. Land degradation	-2	-3	-3	-3	-11

IMPACTS DURING OPERATION					
POSITIVE IMPACTS					
1.Provision of modern and affordable student hostels and other facilities at Bariadi Campus	3	3	3	3	12
2.Increase in performance of students academically as students will live close to the hostel and easily access college facilities	3	3	3	2	11
3.Improvement of the infrastructure	3	3	3	3	12
4.Improve security in the area	3	2	2	3	10
5.Creation of employment	3	2	2	3	10
6.Increase in economic activities in the project area	3	3	3	3	12
7.Increase in government revenue through taxes	2	3	3	3	11
NEGATIVE IMPACTS					
1.Increase in the spread of HIV/AIDS and other sexually transmitted diseases	-1	-3	-3	-3	-10
2.Increase in Criminal Activities	-1	-3	-3	-3	-10
3.Poor waste management	-1	-3	-3	-2	-9
4,Poor sanitation	-2	-3	-3	-2	-10

IMPACTS DURING DEMOLITION					
POSITIVE IMPACTS					
1. Employment Opportunities	3	3	3	3	12
2. Rehabilitation	3	2	3	2	10
NEGATIVE IMPACTS					
1. Soil Erosion	-2	-3	-3	-3	-11
2. Loss of employment	-1	-2	-2	-3	-8
3. Loss of income	-1	-3	-2	-3	-9
4. Solid Waste Generation	-1	-3	-3	-2	-9
5. Workers accidents and hazards during demolition	-1	-3	-3	-3	-10

Negative impacts with a high total score as presented in Table 10 are considered severe and should be accorded serious attention by the developer.

Key

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

6.4 Impact Rating Criteria

Seven criteria were used to determine the significance of the impacts in the Matrix, these include

- i. **Spatial Scale**-The spatial dimension encompasses the geographical spread of the impacts regardless of whether they are short term or long term. Table 6.2 describes the ratings used in the Simple Matrix as far as spatial scale is concerned.

Table 6.2: Spatial Rating

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

ii. **Temporal Scale**-Temporal boundaries refer to the lifespan of impacts. Table 6.3 describes the ratings used in the Simple Matrix.

Table 6.3: Temporal Rating

Short-Term (ST)	during construction
Medium-Term (MT)	Life of project
Long –Term (LT)	Residual impacts beyond life of project

iii. **Phase**- During which phase of the construction is the impact likely to occur. The phases included Mobilization, Construction, Demobilization and Operation.

iv. **Reversibility of the impact**- Every impact was checked if its effect can be reversed or not. Letter R was used to denote reversible impacts while IR was used to denote Irreversible impacts

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

vi. **Residual Impacts**- These are long term impacts which go beyond the lifetime of the project.

6.5 Impacts Mitigation and Enhancement Measures

This chapter is devoted to describing measures or interventions that shall be implemented to minimize the potential negative impacts and enhance the potential positive impacts identified in the preceding chapter. Many of the proposed mitigation measures are essentially good practice that shall be adhered to during all the project phases.

The design of the mitigation measures for the identified Environmental and Social impacts and Risks applied the mitigation hierarchy suggested in the ESF (i.e. 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
- a) Where significant residual impacts remain, compensate for or offset them, where technically and financially feasible.

6.4 Description of Environmental Impacts and their Management Measures

6.4.1 Impacts During Mobilization Phase

The mobilization phase will involve construction of temporary office facilities, a temporary store, kitchen, toilets, delivery of machinery and site equipment's, mobilization of raw materials, land clearing, excavation etc.

6.4.1.1 Positive Social Impacts

i. Creation of different Employment Opportunities

Both direct and indirect forms of employment shall arise from the project initiation. Direct employment will be mainly through skilled and unskilled labourers whose workforce shall be needed to build the proposed project and accompanying building. Employment opportunities will be a benefit both in economic and social sense. In the economic sense it means abundant unskilled labour will be used in economic production. Several workers including casual labourers, masons, carpenters, joiners, electricians and plumbers are expected to work on the site for a period that the project will start to the end. Apart from casual labour, semi-skilled and unskilled labour and formal employees are also expected to obtain gainful employment during the period of construction. *This impact is high, regional and will be long term.*

Enhancement Measures

- a. The proponent shall be encouraged to employ local, unemployed yet willing to work hard, manpower to the extent viable subject to a maximum of 50% unskilled labour. This will ensure that local people are more benefited out of the project;
- b. Employment should be on equal opportunities for both gender;
- c. Proponent shall provide on job and safety training; and

- d. Proponent shall not cause children under the age eighteen (18) to be employed or be engaged in any project activities.

ii. Increased Market Opportunities and Sources of Income

The project will require supply of large quantities of building materials most of which will be sourced locally within the vicinity of the surrounding areas. This provides ready market for building material suppliers such as quarrying companies, hardware shops and individuals with such materials. The project will create a new source of income for both the people within Sapiwi (service providers), communities surrounding the campus and those from other areas interest. *This impact is high, regional and will be long term.*

Enhancement Measures

- a. Designating an area as a market close to the project site.

6.4.1.2 Negative Social Impact

i. Increased Level of Crimes

It is expected that the selection and design stage will recruit a considerable number of workers both skilled and non-skilled from the communities around and other from the nearby communities. In addition, the project will attract people from various areas to come and invest on the provisions of good and services. Although this stage is not expected to attract a big number of people, but population increase is expected to some extent and this in turn will stimulate the growth of the trading centres around the project site. Experience and sociological point of view show that where there is a big concentration of people from various backgrounds and behaviour, levels of crimes and changes in norms and behaviour are common. *This impact is moderate, localized and will be long term.*

Mitigation Measure

- a. Construction of police station in order to strengthen security services within the campus and the surrounding community
- b. Establish community based security in collaboration with village/ward leaders.
- c. The contractor shall establish his own security to protect his properties and should establish community policing to support insufficient police force.
- d. The community should be encouraged to participate in security matters by providing information on suspects

- e. The cooperation of local people together will help to lessen criminal incidents and maintain security of people and their properties.
- f. Participatory community security measures (*ulinzishirikishi*) should be encouraged in the surrounding communities of Sapiwi village

ii. Prevalence of Communicable Diseases

Influx of job speculators from other parts of Tanzania and neighbouring regions will increase interaction, consequently increasing the risk of getting HIV/AIDS infections and other communicable diseases. The growth of trading centers in the area will attract different businesses and different people to the extent that the level of prostitution will also increase in the area provided that there will be employees from other areas of the country. Increased prevalence of communicable diseases like HIV/AIDS will likely to happen and consequently result to the increased number of orphans and single parenting in the project area. *This impact is moderate, local and will be long term.*

Mitigation Measure

- a. Provide awareness to public on pathways communicable diseases;
- b. Provide Voluntary Counselling and Testing (VCT) centres for HIV/AIDS at Simiyu Campus and the surrounding communities;
- c. Provide more health facilities;
- d. Work close to government and private institutions that deal with the spread of communicable diseases

6.4.1.3 Negative Environmental Impacts

i. Air pollution

During mobilization dust is the main pollutant expected to be generated. Dust will be generated from various activities such as land clearing, excavation, and vehicles movement for transportation of materials to the project site. Dust will lead to increase in the background suspended particulate matter concentration of the area if proper measures are not adopted. However this will be temporary and reversible in nature and restricted to small area for short duration taking the fact that the land will be developed has been previously disturbed.

Mitigation Measure

- a. Protect stockpiles of friable material subject to wind through wetting;
- b. Cover loads with friable material during transportation;
- c. Restrict speed on loose surface roads to 30 km/hr during dry or dusty conditions; and,
- d. Douse with water work sites with loose open soil to reduce dust generation when necessary.

ii. Noise Pollution

During site preparation, noise emission is expected to be primarily related to the operation of heavy equipment and related activities. The level of noise will increase mainly due to vehicles and equipment involved in excavation and site clearance. *This is a short-terms impact. There will be no blasting activities or involvement of heavy or high noise machinery.*

Mitigation Measure

- a. Vehicles carrying construction materials shall be restricted to work during night time only;
- b. Machine operators in various sections with significant noise levels shall be provided with noise protective gear; and,
- c. Construction equipment shall be selected, operated and maintained to minimize noise.

iii. Land Degradation

Most of the building materials such as stones, aggregates, and sand required for construction of the proposed project will be obtained from nearby quarry sites and borrow pits. Since substantial quantities of these materials will be required for construction of the development, the availability and sustainability of land resources at the extraction sites will be negatively affected as they are not renewable in the short term. In addition, the sites from which the materials will be extracted may be significantly affected in several ways including landscape changes, displacement of animals and vegetation, poor visual quality and opening of depressions on the surface leading to several human and animal health and safety risks. *The impact can be highly improved/eliminated with mitigation. Therefore, the impact is negative and of low significance.*

Mitigation Measure

- a. Exploitation of construction materials will take place from authorized sources only;

- b. Restoration of the borrow pits/quarries after use constituting of levelling the area and seeding or planting of trees and/or grasses will be done in association with local government (department responsible for natural resources) and local environmental NGOs. If appropriate, the levelled area will be left for natural re-vegetation;

iv. Solid waste generation

During mobilization phase solid waste such as excavated soil, waste from the papers used for packing cement, plastics, timber remains, aggregate products, concrete and gravel are anticipated to be generated.

Mitigation Measure

- a. The contractor shall have adequate facilities for handling the construction waste; and
- b. Topsoil shall be stock piled and used for reclamation or re-vegetation at the site during landscaping.

6.4.2 Impacts from the Construction Phase

Activities that will be carried out during this phase will include, land clearing, platform preparations, digging foundations, construction of buildings, and drainage works. There will also be lots of construction vehicles that will be bringing construction materials to the site.

6.4.2.1 Positive social impacts

i. Creation of Employment

Construction activities will include land clearing and levelling using excavators and graders, construction of hostels, library, administration block, car park, septic tanks and drainage systems. The proposed Project will create employment for several several workers, especially casual workers within the Bariadi district. Though the employment terms will be temporary or permanent, those who will be employed will earn income and hence use the money to satisfy some of their needs. About 100 people will be employed during this phase. *This impact is high, regional and will be long term.*

Enhancement Measures

- a. As part of the bidding requirements the contractor shall be encouraged to employ local, unemployed yet willing to work hard, manpower to the extent viable subject to a maximum of 50% unskilled labour. This will ensure that local people are more benefited out of the project;

- b. Employment will be on the basis of non-discrimination / equal opportunities for both genders as well as free of other forms of discrimination on the basis of individual characteristics;
- c. Contractor shall provide on job skills and training to workers; and
- d. Local communities in Sapiwi village shall be encouraged by the Implementation unit to produce quality goods and services at the project site through early engagement of likely requirement

ii. Increase in the market for local construction materials

The construction of the proposed project will entail the purchase of construction-related materials such as cement, sand, quarry, and timber iron sheets. This will create an opportunity for traders to sell their products. *This impact is high, regional and will be long term.*

Enhancement Measure

- a. Ensure monitoring of labour standards among contractors, sub-contractors, workers and service providers;
- b. Purchasing materials from as many local suppliers; and
- c. Academic institution to design appropriate means of collecting revenues.

iii. Increase in business activities within the project area

The presence of construction workers at the project site will create an opportunity for small-scale businessmen and women to sell food stuffs, refreshments and to open barbershops and grocery shops.

Enhancement Measure

- a. Designating an area as a market close to the project site.

6.4.2.2 Negative social impacts

i. Increase in accidents/incidences

The road that will be used by vehicles bringing construction materials is also used by other road users. People crossing the roads may be hit by such vehicles. Because of the intensive engineering and construction activities including erection and fastening of roofing materials, metal grinding and cutting, concrete work, steel erection and welding among others,

construction workers will be exposed to risks of accidents and injuries. Such injuries can result from accidental falls from high elevations, injuries from hand tools and construction equipment cuts from sharp edges of metal sheets and collapse of building sections among others. *This impact is considered to be direct negative, short-term and of high significance.*

Mitigation Measure

- a. Introducing humps on the road to help reduce the speed of vehicles;
- b. Erecting warning signs showing that heavy machinery and construction vehicles are using that road for people to be alert;
- c. Providing workers with protective clothing;
- d. Following health and safety regulations;
- e. Training workers in the proper use and handling of heavy equipment and machinery; and
- f. Maintaining a first aid kit at the project site.

iii. Increase in the spread of HIV/AIDS and other sexually transmitted diseases

The construction of the project shall definitely be accompanied by in-migration of job seekers and opportunistic businesses and speculators. This will increase social interactions amongst the construction workers and local communities. The presence of a large number of workers can give rise to an increased spread of communicable diseases. This among other factors may also produce an inherent increased risk of transmission of sexually transmitted diseases, HIV/AIDS and other contagious diseases taking into consideration that the project will be implemented within university campuses. In addition, the increase in disease like COVID-19 associated with the entry of a temporary labour force into community could also occur. *Therefore, the impact is negative and of high significance.*

Mitigation Measures

- a. In order to prevent more HIV/AIDS infection, during the implementation phase, the project shall include information education and communication component (IEC) for workers and the community in its budget. This will help to raise more awareness on HIV/AIDS and means to suppress its incidence.
- b. The contractor shall deploy locally available labour as practically possible
- c. A safety, health and environment induction training shall be conducted to all workers, putting more emphasis on HIV/AIDS and communicable diseases

- d. Staff shall be encouraged the use of preventive measures like condoms by availing condom dispensers.
- e. Contractors will be required as part of the ESMP to include measures to demonstrate how they will work in a Covid-19 secure manner where relevant to minimise transmission risks.
- f. Worksites will be well maintained to avoid the creation of breeding sites for vectors. This will include to avoid the construction of small pools of water (mosquitos), waste (rodents) etc. which contribute to diseases transmission. (water will be stored in containers)
- g. Contractors will have access to potable water and adequate sanitation facilities to prevent disease transmission.

iv. Increase in Criminal Acts

The influx of people to the project area may attract people with bad intentions who can create havoc within the project surrounding areas. There may also be conflicts between the migrant workers and the locals that may culminate into violent acts.

Mitigation Measures

- a. Employ people from the surrounding areas to reduce the number of migrant workers;
- b. Sensitizing the community members on the ownership of the project;
- c. Introduce community policing;

iv. Gender-based violence

The social-cultural relationship in the project may imply imply gender-based violence. Gender-based violence is violence directed against a person because of their gender. Both women and men experience gender-based violence but the majority of violence is inflicted on women and girls, by men. Many forms of violence against women are rooted in power inequalities between women and men. *This impact is minor, localized and cumulative.*

Mitigation Measures The project will prepare a GBV Action Plan that ensures the project awareness-raising strategy (for workers and community members), a list of GBV service Providers to which GBV survivors will be referred, revisions to the GRM to ensure it can address GBV complaints and information on GBV allegation procedures in the workplace.

v. Impact Associated with Child Labour

There is a risk that some project-related activities could involve child labour - employment of children in project activities depriving children of their childhood and that is mentally, physically, socially or morally dangerous and harmful. The Labour Management Plan may need to be provided that no one under the age of 18 may be employed or engaged in connection with the project. *This impact is minor, localized and will be short-term.*

Mitigation Measures

- a. IFM will conduct regular monitoring of project workers about health, working conditions, hours of work, minimum age, and the other requirement of national law.
- b. Work with local authorities and schools in the area to control school dropout
- c. Cooperate with relevant authorities like the Ministry of Labour to control child labour
- d. Create awareness raising to the communities on the importance of education for the children
- e. The local authorities should develop bylaws to control the engagement of children in petty business or work in project-related activities

vi. Impact associated with Gender Discrimination

The proposed project may cause men to treat women, unfairly because of their sex. This might lead into more project benefits to men than women. Tanzania regulations encourages equal opportunities to men and women. *This impact is minor, localized and cumulative.*

Mitigation measures

This project will ensure that there is involvement of women in project activities.

vii. Traffic Density

The project will come along with increased (vehicle) traffic along the connecting routes especially during the construction phase. *The impact is considered to be direct, long-term and of medium level.*

Mitigation Measures

- a. Notify the motorists about the project once implementation is started. Warning/informative signs (bill boards) must be erected at the site. The signs should be positioned in a way to be easily viewed by the public and mostly motorists.

- b. The traffic along the connecting roads should be controlled especially during the construction phase and mostly when trucks are turning into the site, say when delivering of materials.
- c. Employ traffic marshals to control traffic along the adjacent roads and in and out of the site.
- d. Rehabilitate the access road leading to the property. In case the major road is damaged by the heavy trucks and machinery, the proponent should embark on repair after completion of construction phase.

viii. Community Health, Safety and Security

Due to technological developments and investment in labour saving equipment, the skilled and non-skilled workforce will be needed. The skilled construction workers will be imported to the area of construction and will reside in labour camps. A smaller number of local low-skilled jobs may be envisaged. These will include protection and guarding of the construction companies' properties. Low skilled workers will be hired around the project jurisdiction if necessary.

It is expected that the increased number of workers and higher concentration of residents near construction sites will have negative impact on local communities. Uncontrolled movement of workers will affect residents around the settlements. Due to this, workers must receive training and sign a labour code of conduct. With an increase in construction activities and the possibility of job seekers arriving, it may be more difficult to identify strangers in the community. In addition, the increase in cases of diseases like COVID-19 and HIV/AIDS associated with the entry of a temporary labour force into community could also occur. There may also be negative issues that need to be managed such as increases in local prices, crime, prostitution or alcohol abuse.

The presence of a large number of workers can give rise to an increase in spread of communicable diseases. Also, construction of the project shall definitely be accompanied by immigration of job seekers and opportunistic businesses and speculators. This will bring many people in the project areas. This will increase social interactions amongst the construction workers and local communities. This among other factors may produce an inherent increased risk of incidences of sexually transmitted diseases, HIV/AIDS and other contagious diseases taking into consideration that the project will be implemented within the campus.

In addition, during the construction phase risks related to public safety and the construction workers may increase. Increased traffic volume related to construction activities will contribute in increasing road accident risks especially on local roads, which will be used by trucks and construction equipment of the contractors. Construction vehicles and machines will pass through public roads and as such residents of local settlements located along these roads will be exposed to increased risks for accidents. The sources of harmful effects to the general public are identified in Table 6.4. *This impact is moderate, localized and will be long term.*

Table 6.4: Sources of the harmful effects on health and community safety

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

Mitigation measures

- a. Maintain good security in the area with signage like “No employment at the moment”, to keep away job seeker to avoid unnecessary people in project sites
- b. Develop and implement an emergency response plan including spill response and train workers on the same;
- c. 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 graphics programs;
- d. 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
- e. Undertake stakeholder engagement with local communities to inform them of activities on the site and associated risks.

6.4.2.3 Negative Environmental Impacts

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

i. Air Pollution Due to Dust Emission

Measurement done in four locations around the proposed sites indicated that PM_{2.5} and PM₁₀ concentrations were between 4 µg/m³ and 12 µg/m³; and between 9µg/m³ and 23 µg/m³ respectively, as shown in Chapter 4, section 4.10.2. These ranges are below WHO and Tanzania Emission Limits. During the construction phase air quality is expected to decline as a result of an increase in levels of fugitive dust from the construction activities mainly due to vegetation clearance, foundation excavation and movements of heavy machinery. This may cause localized temporary disturbance to workers at construction sites and areas where sand and aggregates will be collected. Respirable particulates are a public health hazard and may otherwise create considerable nuisances to the public and fauna. The overall magnitude of the impact of the project is negative, temporary (only during construction phase) and high in significant taking into consideration that the projects will take place inside the campus area. Potential sources of dust at the site and off site are summarized in Table 6.5. *This impact is moderate, localized and will be short term.*

Table 6.5: Project activities and Impacts

Activity	Source of production of dust
On-site building work producing dust and gaseous emissions	
Clearance and terracing of the site	<ul style="list-style-type: none"> i. Earthworks ii. Initial soil spreading after excavation. iii. The movement of construction traffic and movement of materials iv. Stored materials subjected to wind action
Excavation	<p>The important sources are:</p> <ul style="list-style-type: none"> i. Movement of traffic construction vehicles ii. Handling and storage of waste iii. Excavation and transport of materials and onsite storage

Building Foundations	The important sources are: i. Foundation excavation ii. Movement of construction traffic iii. Handling and the storage of waste iv. Excavation and transport of materials and onsite storage
Building Works	Movement of traffic of construction vehicles. Potential of a certain strongly localized harmful effect like dust inhalation if the completion of work requires “smoothing and sanding” of the wall to obtain a desirable completion.
Auxiliary work -	
Off-site building work producing dust	
Material transportation	Any movement of traffic on unpaved roads Surface materials brought by the wind
Aggregate mixing unit	Stored materials Filtering and other methods for processing construction materials Handling of materials (loading output) Traffic congestion
Tool maintenance course	Materials on the surface brought by the wind Traffic of construction

With regard to the gaseous emissions, the sources of atmospheric emissions associated with construction activities are mainly from units of construction and the possible generators, by evaluating these sources, the following conclusions can be drawn:

- a. The majority of the sources are mobile and will generate dispersed emissions and in a temporary way;
- b. The majority of the emissions will be generated starting from the concentrations of activities which are rather far away from the sensitive receivers; and
- c. The level of the emissions of the precursory pollutants and the atmospheric pollutants will vary from day to day, according to the type of the activity, but even if the impact is very limited in time, it does not remain about it less than it is subjected to a factor of

expansion in space with knowing the weather conditions. Of this fact the intensity of the impact of the building site on air pollution especially by the suspended particles is evaluated like average.

Mitigation Measures

Impairment of air quality due to emissions

- a. Equipment shall be maintained in good running condition, no equipment to be used that generates excessive black smoke;
- b. Enforce vehicle road restrictions to avoid excess emissions from engine overloading, where practical switching off engines will be done when not in use;
- c. There will be routine inspection of equipment;
- d. Trucks transporting materials shall be fully covered; and
- e. Turn off engines to reduce idling.

Impairment of Air Quality Due to Dust

- a. Protect stockpiles of friable material subject to wind through wetting;
- b. Cover loads with of friable material during transportation;
- c. Restrict speed on loose surface roads to 30Km/hr during dry or dusty conditions; and
- d. Douse with water of roadways and work sites to reduce dust when necessary.

ii. Noise Pollution

Measurements done in different locations around the proposed project sites indicated that the daytime noise levels ranged between 43.35 dB (A) and 57.4 dB (A). Tanzania Standard limits (TZS) guidelines require noise emission levels to be less than 55 dBA during the day within residential/institution areas. This implies that the noise level is slightly above the range by 2.4dBA. The proposed project activities will inevitably increase noise level. Noises from vehicles, equipment, construction crew, etc may rather be significant. Noise beyond some level (70dBA) is itself a nuisance and need to be avoided. Due to an increase in activities and number of operational vehicles, the impacts of noise will cause disturbance to normal campus operations especially due to the construction of the proposed studio building. This impact shall not be significant to projects to be implemented at the high zone of the campus as to a great extent are far away from busy campus activities. *The impact of the project on noise level generation short-term, local and moderate.*

Operation of heavy construction machinery and vehicle movements would generate a lot of noise which could be a nuisance to workers and people staying close to the project site. Noise can create stress and can be a hazard within the project site since it can make it difficult for workers to communicate or hear warning signs. *This is a short-term impact. There will be no blasting activities or involvement of heavy or high-noise machinery.*

Mitigation Measures

- a. Vehicles carrying construction materials shall be restricted to work during day time only;
- b. Fitting construction vehicles with silencers to reduce noise;
- c. Servicing machinery so that they can be in good condition at all times; and
- d. Providing ear protection materials for the workers in noisy areas.

iii. Soil Erosion

The soil will be exposed once the vegetation has been cleared resulting in soil erosion. The other sources include topsoil stripping during land preparation and construction works. *It is expected that the impacts will be low, local, and they will occur mostly during the construction stage (short term).*

Mitigation Measures

- a. Carrying out construction works during the dry season from May to September;
- b. Creating drainage channels to direct stormwater movement;
- c. Creating stone pitching where soils have been excavated; and
- d. Clearing only those places where buildings will be constructed

iv. Soil Contamination from oil and fuel spills

Construction works will involve the use of heavy machines such as graders, tractors, tippers and vehicles. Oil and fuel spills from these machines could contaminate soils within the project site. *This impact is localized around machinery, maintenance areas or garage and areas of concentrated activities.*

Mitigation Measures

- a. Construction vehicles should be in good condition to avoid fuel leaks; and

- b. Servicing areas for vehicles should have impermeable surfaces and be bundled to contain the spills.

e. Poo-solid Waste Management

Construction rubble, scrap metal, used oils and domestic wastes will be produced and accumulated within the project site. This waste will negatively impact the aesthetic value of the site and surrounding environments if not properly managed. Current there is no good management of waste, waste are just burnt within the project site. *The impact is considered to be direct. Improper management of construction waste constitutes a long-term negative impact.*

Mitigation Measures

- a. Provision of dust bins or rubbish pits for the wastes produced;
- b. Segregation of waste by providing different bins for each type of waste;
- c. Identification of a dumping site within the project area for various types of waste; and
- d. Disposing of wastes at Kidulya dumpsite regularly

vi. Poor Liquid Waste Management

The types of wastewater generated during construction activities include sewage, gray water and process water. Sewage effluent from camps and associated buildings will be produced in the sanitary facilities provided and collected on site. Septic waste produced in scattered sites will also pose a problem to human health. This will be particularly severe if the waste is not collected directly and / or is released directly into the wild without any treatment. Gray sewage will pose less of a direct problem to human health but will be produced in large quantities in the camps. Hunting and process water will be generated from batching plants, equipment maintenance centers and ordinary sites. Wastewater discharge in the natural environment can pollute environment and causing unhygienic sanitary conditions and nuisances to the human perceptions. With appropriate mitigation, the impact is considered to be indirect, long term and insignificant. Types and sources of wastewater are shown in table 6.6.

Table 6.6: Types and sources of waste water

Type	Source
Sewage	Works Camp
	Offices
	Other elements of the main

	camp
	Remote secondary facilities
	Sites
Gray water	Works Camp, cooking, personal and clothes washing
	Offices/Other camps
Hunting and process water	Oil spills
	Aggregates and process plants
	Equipment maintenance centers
	Ordinary sites

Mitigation measures

- a. Wastewater shall be properly treated in the Septic Tank Before disposal into the Soak Away Pit within the site;
- b. Contractor shall be instructed to put on his/her methodologies for handling hazardous waste such as oils, lubricants and non-combustible waste; and
- c. Training on waste management shall be done to all personnel, operators and services providers.

vii. Land and River Bank Degradation

The prospect of a ready market for sand and quarry stone may promote unauthorized quarry and sand mining by local artisans. This may contribute to the degradation of land and river banks being the source of these resources. The impact can be highly improved/eliminated with mitigation. *Therefore, the impact is negative and of low significance.*

Mitigation Measures:

- a. Buying sand and quarry from registered local artisans;
- b. Carrying out sensitization of local artisans on good mining practices;
- c. Designating places for sand and quarry mining; and
- d. Assisting communities with afforestation programs for river banks

vii. Increased Vibration

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods employed. The vibration will be produced by construction vehicles, plants and machinery during the delivery of materials, processing of materials, and actual construction work. The Construction activities that typically generate the most severe vibrations are blasting and impact pile driving for the foundation. Due to an increase in activities and the number of operational vehicles, the impacts of vibration include causing disturbance to neighbours and physical damage to properties near the construction site. *This impact is direct, moderate, localized and will be short-term.*

Mitigation Measures

- a. Impact pile driving shall be avoided where possible in vibration-sensitive areas; and,
- b. Vibratory rollers and packers shall be avoided

ix. Loss of Flora (vegetation) and Fauna

Much of the natural vegetation in the project area is characterized by bushes and shrubs. There are also natural and manmade forests. Other natural vegetation can only be seen at Observation Hill. Overall the clearance of the plants will have significant impacts on the ecology of the site and the nearby surroundings.

The only negative impact anticipated from the clearing of vegetation will be the opening up of the area, especially by felling large indigenous trees aforementioned and this will change the panoramic view of the area. Exposed areas as a result of trees felling are likely to be exposed to the agents of soil erosion, especially wind and water. Clearance of vegetation— especially bulldozing to ground level - tends to damage local vegetation cover and potentially damage/ loss of habitats and local biodiversity and increase risks to soil erosion. Permanent clearance will be confined only to project site. *This impact is direct, moderate, local and will be long-term.*

Mitigation Measures

- a. Clearance of patches of trees remaining in the neighbourhood of the proposed project shall be avoided;
- b. Close supervision of earthworks shall be observed to confine land clearance within the project site;

- c. The contractor shall be instructed to give the uprooted trees to the residents through ward/streets governments or any other arrangement that may seem convenient provided he does not contravene the Forest Acts 2002; and,
- d. Appropriate landscaping programme to help in the re-vegetation of part of the project area after construction shall be designed and implemented.

x. Contribution to Climate Change

The project will contribute to climate change in two ways. Firstly, it will be through generation of Green House Gas emissions (SO_x, NO_x, CO_x, VOCs). Secondly, the project is expected to reduce Carbon dioxide sequestration due to reduction of vegetated area of the campus.

Mitigation Measures

IFM shall reduce direct and indirect greenhouse gas generation in the following ways;

- a. To change the consumption behaviour in terms of energy and water
- b. Use of renewable energy technologies to minimize the carbon dioxide emission.
- c. Promote use of natural green space at IFM to increase energy saving
- d. The institute has to transform to digital software operated work, in order to minimize paper consumption rates. This will greatly influence the educational standards. And will save a great deal to reduce the amount of forest resources consumed.

xi. Increased Greenhouse Gas Generation

According to the ESS1, the current and projected atmospheric concentration of greenhouse gases (GHG) threatens the welfare of current and future generations. The construction of the proposed buildings will most likely be associated with greenhouse emissions from cars, equipment, plants etc. Various internal combustion engines will release Greenhouse gases notably carbon-dioxide (CO₂), small quantities of noxious gases such as Nitrogen Oxides (NO_x), Sulphur Oxides (SO_x) and hydrocarbons. The generation and emission rate will depend on equipment type, road condition, speed of vehicles, quantities of equipment, duration, and prevailing atmospheric conditions, particularly wind and moisture of the air. The main source of emission of atmospheric pollutants will emanate from mobile sources-the exhaust engines (trucks/tipper, wheel loaders). Table 6.6 shows the emission factors of the various construction equipment and vehicles, and approximated emissions.

Table 6.6: Emission of construction equipment and vehicles

S/N	Type	Quantity	Emission factors (Giuntaet al., 2019)		Total Emission	
			CO - g/hp-hr	NOx - g/hp-hr	CO g/day	NOx g /day
1	Excavator	1	0.75	4.31	0.34	1.90
2	Bulldozer	1	0.94	4.67	0.42	2.09
3	Trucks	5	11.24	15.27	25.12	34.13
4	Motor grader	1	0.75	4.31	0.34	1.90
5	Compactor	1	0.94	4.67	0.42	2.09
6	Crane	2	170	260	340	520

Data collected around project sites indicated that all values are below WHO guidelines and Tanzania Emission Limits. Gaseous emissions are expected to increase due to construction activities, equipment and vehicle movements, hence contributing to climate change which has various global impacts. However, emissions from stationary emission sources is estimated to be far less compared to the mobile source emissions. Thus, the contribution of emissions from stationary source to cumulative emissions by mobiles sources is projected to be negligible. The level of the emissions of the precursory pollutants and the atmospheric pollutants from mobile sources will vary from day to day, according to the type of activity done. However, even if the impact is very limited in time, it does not remain the same depending on the weather conditions. Of this fact the intensity of the impact of the building construction on air pollution especially by mobile emissions is evaluated to be negative, cumulative, global, short term and moderate as there are hundreds of vehicles plying in Bariadi roads which emit same air pollutants. *This impact is moderate, international and will be long term.*

Mitigation measures

- a. Proper engine tune up
- b. Regular inspection and maintenance of construction equipment's
- c. Reduce machines and vehicles idling time

xii. Reduction of CO₂ Sequestration Potential

The ESS1 recognised CO₂ sequestration potential as one category of the Ecosystem Services (i.e. regulating services). Vegetation clearance during construction activities will reduce the CO₂

sequestration process hence reduction of global efforts towards climate change mitigation. *Hence, this impact is minor, international and Long-term.*

Mitigation measures

- a. The proponent shall ensure that open areas of the project site are re-planted with grass, flowers and trees.
- b. The proponent shall ensure proper demarcation of the project area to be affected by the construction works
- c. Topsoil excavated from the construction site shall be re-spread in areas to be landscaped to enhance plant health.

6.4.4 Impacts from Operation Phase

6.4.4.1 Positive Social Impacts

i. Increase of Admission of Students to Simiyu Campus

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

Enhancement Measure:

- a. Gender and disadvantaged groups will be considered during the student selection process
- b. IFM-Simiyu Campus shall increase advertisements to attract more students to study the priority programmes for the Nation

ii. Provision of modern and adequate and affordable Student hostels facilities

The students' hostels will provide modern and affordable hostel facilities to the enrolled students which will also be near the learning facilities. *This impact is direct, positive, long term and of high significance.*

Enhancement Measure:

- a. Sourcing funds for maintenance so that the hostels should be in good condition and be in operation for a long time; and

- b. Provide affordable rates for accommodation to the student

iii. Increase in performance of students academically as most students will live close to the campus and easily access college facilities

Due to the proximity of the student's hostels to the learning facilities, there will be an increase in the performance of students academically. The travel time will be used for learning and reading. *This impact is direct, positive, long term and of high significance.*

Enhancement Measures

Sourcing funds for maintenance so that the hostels should be in good condition and be in operation for a long time.

iv. Improve Security in the Area

Security will improve in the area due to the coming in of the project as the site was idle and overgrown with vegetation. *This impact is direct, positive, long term and of high significance.*

Enhancement Measures

- a. Guard houses will be in place at the gate. Security guards should always monitor the gate of the facility to keep away intruders and to control movement within the site.
- b. The guards stationed at the gates should document movements in and out of the site/property

v. Creation of Employment

Several workers will be employed in various sections during the operation of the project. There will be employment opportunities for both skilled and unskilled labourers during the operation phase. *This impact is direct, positive, long term and of high significance.*

Enhancement Measures:

- a. Employing more people from the communities surrounding the project area and other areas within the country for both unskilled and skilled jobs; and
- b. Giving equal employment opportunities for both men and women.

vi. Improved Access to Social Services by the Local Community

The operation phase of the project will facilitate the introduction of electricity, potable water and access to an improved road network. The community can have access to these facilities and improve their living standards. *This impact is direct, positive, long term and of high significance.*

Enhancement measures

- i. Providing extra social services that can be accessed by the communities.

vii. Increase in Economic Activities

The operation of the campus will provide local traders to sell foodstuffs like fruits, sugarcane, groundnuts, fresh, cooked and roasted maize, and vegetables to students and workers. There will also be an opportunity to supply foodstuffs for student meals. *This impact is direct, positive, long term and of high significance.*

Enhancement Measures

- a. Designating a place where the local traders will be selling their merchandise; and
- b. Traders from the project area to be allowed to supply foodstuff for student meals

viii. Increase in Revenue by the Government through Taxes

Employees and the people supplying goods and services at the project site will be paying taxes that will be remitted to TRA. *This impact is direct, positive, long term and of high significance.*

Enhancement Measure

Remitting taxes to TRA from wages and service provisions in time

6.4.2.3 Negative Social Impacts

i. Increase in the spread of HIV/AIDS, COVID 19 and other sexually transmitted diseases

Interaction among male and female students as well as workers and the neighbouring community may result in unacceptable unions that may increase the spread of HIV/AIDS, COVID 19 and sexually transmitted diseases. *This impact is indirect, negative, long term and of high significance.*

Mitigation Measures

- a. Carry out sensitization meetings for students, workers and local communities from time to time;
- b. Empowering the community through outsourcing of non-core activities
- c. Develop an HIV/AIDS workplace policy; and
- d. Distribution of condoms and Education, information and communication materials on HIV and AIDS to students and workers.

ii. Increase in Criminal Acts

The presence of the project may attract thieves trying to steal student property. These may also end up stealing from the surrounding communities. Conflicts may arise between students and the surrounding communities that may culminate into violent acts. *The impact is indirect, long term and significant.*

Mitigation Measures:

- a. Sensitize the communities and students on how they can live in harmony;
- b. Introduce community policing in conjunction with Sanctuary Police station;
- c. Request for a police unit within the project area.

iii. Increased Energy Demand

There will be increased use of energy operation phase (electricity used by the occupants of the housing project). Current, the campus use an approximate of 4125KVA per month which is equivalent to 137.5KVA per day. It is expected that the power consumption of the campus will increase to 385KVA/day after expansion.

Energy conservation is thus fundamental. Energy conservation involves optimum use of petroleum products (diesel and gasoline), electrical appliances (equipment), lighting systems and other electric machinery as used for different purposes. It also includes use of renewable energy sources. *This impact is considered to be direct, negative, long term and of high significance.*

Mitigation measures

- a. Put off all lights immediately when not in use or are not needed
- b. Use energy-conserving electric bulbs for general lighting

- c. Make use of alternative sources of energy such as solar power. Solar panels proposed in the project should be fully utilized and timely repaired in case of damage

iv. Increased Water Demand

Currently, the campus consume about 9600L of water per day. After expansion, about 12000L of water per day are estimated to be used. The demand for water will also increase; mostly for domestic use. Lack of adequate water during the occupation phase may result to dirty surfaces exposing the residents to disease. The subject plot will be served by the conventional water supply system. With appropriate mitigation measures the impact is considered to be insignificant but direct and of long-term.

Mitigation Measures

- a. Install water-conserving taps that turn off automatically when water is not in use
- b. Encourage water reuse/recycling during occupation phases
- c. Roof catchments of building blocks should be provided with rainwater harvesting systems (gutters, down pipes and water storage facilities) to enhance the collection and storage of the resulting run-off. Such water can be used in watering flower gardens, general cleaning etc.
- d. Provide notices and information signs to sensitize on means and needs to conserve water resource i.e. Keep/Leave the Tap Closed etc. This will awaken the civic consciousness of the workers and residents with regard to water usage and management

6.4.2.4 Impacts on Physical Environment

i. Poor Solid Waste Management

There will be a total of 2500 people when the project is operating at full capacity. These will generate a lot of trash in the form of paper, used bottles, and domestic waste. *The impact is direct, long term and significant.*

Mitigation Measures:

- a. Provide each section of the facility with sufficient trash bins that promote sorting at the source
- b. Encourage staff to handle waste through the hierarchy of options that includes reduction at source, separation of waste to make it easier to undertake recycling or reuse
- c. Collecting and disposing of wastes at designated Kidulya regularly; and

- d. Construction of High Tech Incinerators for the management of sanitary pads
- e. Used chemicals should be disposed of in appropriate manner

ii. Poor Liquid Waste Management

Effluent/sewage resulting from areas such as sanitary facilities and the kitchen is of significant concern concerning the environment. It should never come into contact with the surroundings i.e. water, soil, air etc. to avoid disease outbreaks such as cholera, and diarrhoea. It should always drain effectively into the sewerage systems via well-designed (closed) and laid pipe networks. For this particular project, the proponent will construct a septic tank. *The impact is direct, long term and significant.*

Mitigation measures

- a. Discharge all the liquid waste into a waste treatment plant. The design of the internal sewerage system should consider the estimated discharges from individual sources and the cumulative discharge of the entire project i.e. it should have the capacity to consistently handle the loads even during peak volumes;
- b. All drain pipes passing under the building, driveway or parking should be of heavy-duty PVC pipe tube encased in concrete surround. All manholes on driveways and parking areas should have heavy-duty covers set and double sealed airtight; as approved by specialists;
- c. Sanitary facilities should be kept clean always, through regular washing/cleaning;
- d. Frequent monitoring of the internal drainage system; and
- e. Blockages and damages should be fixed expeditiously
- f. Use Anaerobic wastewater treatment plant for the management of liquid waste

iii. Mismanagement of Harzadous Waste

Harzadous wastes such as medical waste, Waste Batteries, E-waste, Plastics, sanitary waste , used oil, such as vehicle crankcase oils, hydraulic oils from elevators, contaminated packaging are expected to be generated during. If not properly managed can be harmful not only to people but to the environment as well. Pollution and contamination are possible and can negatively impact our environment. This, in turn, threatens wildlife and even the health and safety of the people within the community.

Waste types and Associated Risks

HAZARDOUS WASTE TYPE	IMPACTS/RISKS
<p>Waste Batteries (Single batteries, rechargeable batteries and automotive batteries)</p>	<p>Most rechargeable batteries contain toxic metals such as cadmium, cobalt, lead, nickel, lithium etc. Improper disposal of batteries may contribute to water and air pollution.</p> <p>When depleted batteries are thrown into the environment, they decay and leak the toxic metals. As batteries corrode, their chemicals soak into soil and contaminate soils, groundwater and surface water.</p> <ul style="list-style-type: none"> ▪ Leached toxic materials released into the environment may poison food chain and pose serious threats to human health and the environment. ▪ If burned haphazardly, toxic fumes are produced. Long term exposures to the toxic fumes may result to chronic illness, including damage to the respiratory system. ▪ Most heavy metals in the batteries are known carcinogens i.e. exposure may lead to cancer development.
<p>E-waste (Used/old/ damaged electronic devices including printer, photocopies. Lab equipment, workshop electronic equipment, gadgets etc)</p>	<p>E-waste contains a list of chemicals that are harmful to people and the environment, like: mercury, lead, beryllium, brominated flame retardants, and cadmium.</p> <p>When electronics are mishandled during disposal, these chemicals may leach out and end up in soil oils, where it can washed away with runoff, and contaminate soils, water, and air.</p> <ul style="list-style-type: none"> • The open-air burning releases toxic fumes, while acid baths leaches toxic materials leaching into the environment. • The most dangerous property of heavy metals is

	<p>their toxicity and tendency to accumulate in the environment. Highly toxic substances such as mercury, lead, beryllium, and cadmium can accumulate in bio water, in plants and animal tissues and pose a significant threat to the environment even in minute quantities Heavy metals.</p> <p>Impacts on Climate Change:</p> <p>Failing to recycle e-waste means more primary raw materials need to be extracted and refined, which might lead to an increase in greenhouse gas emissions.</p>
Plastics	<p>Plastics are non-biodegradable. When haphazardly dumped in the environment, it may take up to 1,000 years to decompose, leaching potentially toxic substances into the soil and water. Further, haphazard disposal of plastics on land and open air burning can lead to the release of toxic chemicals into the air causing public health hazards.</p> <ul style="list-style-type: none"> ▪ Contamination of water resources: Chlorinated plastic can release harmful chemicals into soils & water resources, and eventually contaminate food chain (micro plastics have been found in soils, water and aquatic organisms) and cause toxic effects.
Sanitary waste	<p>Their lifecycle pollutes water bodies and landfills, leading to microplastics and other environmental and health hazards</p>

Mitigation Measures:

- a. All hazardous materials must be collected separately, stored in appropriately bonded containers and placed on concrete floor
- b. Hazardous waste should be disposed by a licensed personnel/company
- c. Refueling and maintenance of large vehicles shall not take place at the construction site
- d. Maintaining spill response kits at the site office

- e. On site spill response procedures will be prepared
- f. Training of workers on spill response and management
- g. Use High tech incinerator for disposing sanitary waste

iv. Poor Sanitation

The students and members of staff will be using water-borne toilets. Poor management of liquid wastes and sewerage disposal systems may result in poor sanitation and contribute to pollution of the air at the site. *This impact is considered to be direct, negative, long term and of high significance.*

Mitigation Measures:

- a. Provision of adequate toilets for students and members of staff;
- b. Use Anaerobic wastewater treatment plant for management of liquid waste
- c. Regular inspection and maintenance of the septic tank network;
- d. Use of improved pit latrines for easy maintenance;
- e. Provision of potable water within the site; and
- f. Sensitization of students and members of staff on the importance of good hygiene practices.

v. Poor Surface Drainage

The drainage of the general site comes in handy to enhance effective flow of the much anticipated surface run-off emanating from the roof catchments and other impermeable areas within the site. The subject plot lies on a gentle slope; during the operation phase, there is a risk of flooding on the lower part of the plot since a large section will be covered by a hardscape.

Mitigation measures

- a. Rainwater harvesting gutters and storage tanks should be installed to reduce the amount of rainfall reaching the surface.
- b. Semi-permeable materials should be used for the construction of pavements
- c. After completion of construction, the proponent should embark on comprehensive landscaping to increase the soft cape cover on the plot.

vi. Risks of Fire Hazards

Fire causes both economic and social drawbacks. If not contained in time fire outbreaks may result in injuries, loss of human life and air pollution beyond the boundary of the project area. It is therefore important to consider the issue of fire. *This impact is considered to be indirect, negative and of high significance.*

Mitigation Measures

- a. Hire a competent and properly authorized electrical contractor to do the wiring and other electrical works
- b. Install a fire alarm system for the entire project
- c. Install smoke detectors in kitchens
- d. Installation of firefighting equipment following Country Fire requirements
- e. Conduct regular firefighting drills within the site
- f. Develop and adopt an (fire) emergency response plan for the project during and occupation stage
- g. Ensure that all firefighting equipment is regularly maintained and serviced
- h. Provide fire hazard signs such as “No Smoking sign”, Direction to exit in case of any fire incidents and emergency numbers.

vii. Contribution to Climate Change

During the operation phase, the proposed project will have both direct and indirect CO₂ emissions to the atmosphere hence contributing to climate change. Currently, Simiyu campus emits greenhouse gases directly through cooking fuel (Charcoal, firewood and natural gas) and waste management. The indirect emissions come from the use of electricity, water, forestry products (Paper and timber) and consumption of food stuffs. Thus, materials consumed at Simiyu campus have potential contribution to climate change through CO₂ emissions which cannot be realized by eyes onsite and offsite. As the number is expected to increase, the current consumption is expected to change due to population growth (increasing students' enrolment); increase of new human activities; and changes in consumption behaviour where people will use more resources due to technological advancement and the modernization. *This impact is moderate, international and will be long term.*

Mitigation Measures

- a. To change the consumption behaviour in terms of energy and water

- b. Use of renewable energy technologies to minimize the carbon dioxide emission.
- c. Promote use of natural green space at the campus to increase energy saving
- d. The institute has to transform to digital software operated work, in order to minimize paper consumption rates. This will greatly influence the educational standards. And will save a great deal to reduce the amount of forest resources consumed.

6.4.6 Impacts During Decommissioning Phase

6.4.6.1 Positive Social Impact

i. Employment Opportunities

The demolition phase will require several people in demolishing the existing building and infrastructures, collect wastes generated and rehabilitate the area. Among others, the following staff will be directly or indirectly linked to the project: Supervising Engineering team, Ecologist, Environmental Officer, Electrical Engineer, Water Resources and Plumber Engineer, unskilled labour force and other essential services and monitoring personnel from various government institutions (NEMC and OSHA). *This is considered to be of short-term with high significance.*

6.4.6.2 Negative Social impacts

i. Loss of Employment

Demolition of the proposed project will result to the loss of employment to a good number of people including cooks, servers, security personnel, engineers, managers, drivers etc. who were employed by the developer. This loss will be significant at individual level and at the national level, especially as national policies seek to create more jobs. *This impact is direct, negative, long term and of high significance.*

Mitigation measures

- a. Ensuring that all employees are members of the social security fund and the employer will ensure that the company contributions are made;
- b. Employees will also be prepared for forced retirement by providing skills for self-employment; and
- c. The project will provide relevant skills to workers through on job training to make them marketable after decommission.

ii. Loss of Income

The loss of employment as a result of decommissioning process will impact negatively the lifestyle and quality of life of the people. Mostly affected ones are the workers who were working at the project also, business vendors who were depending on delivering goods such as food, drinks, and fruits to the students. Lack of proper measures to deal with the effects of losing a job can make life of the workers more difficult socially, psychologically and economically. So the developer has to timely pay the pension/terminal benefits of workers. *This is considered to be of the short term with high significance.*

Mitigation measures

- a. The developer should ensure that all workers are provided with various skills and pieces of training for self-employment that will help them when they lost their employment position at the facility;
- b. Ensuring that workers are provided with small loans for them to invest in small businesses that will be their backbone in life once they lost employment.

iii. Workers' accidents and hazards during demolition

During the demolition of the proposed project, it is expected that workers are likely to have accidental injuries and hazards as a result of falls, slipping, crane accidents, scaffolding accidents, workers being run over by operating equipment, electrical accidents, trench collapses, fires and explosions, and welding accidents also handling of hazardous waste. *With proper mitigation measures the impact is indirect, short term and insignificant. Hence the impact is considered to be a direct and short-term impact.*

Mitigation measures

- a. Proper signs on site to warn workers of safety requirements as regards machines with moving parts and other equipment at the site;
- b. A first Aid box and a trained person to handle site emergencies and incidents will be in place;
- c. Site vehicle to specifically transport the injured to the hospital will be available;
- d. Providing fire-fighting mechanism at the site;
- e. Providing safe scaffoldings and railings at heights;

- f. Providing washing (enclosed bathroom) and toilet facilities at the site with both drinking and washing water. The number of workers engaged determines the number of toilets and bathrooms provided; and
- g. Providing safety helmets, safety masks (welders), safety shoes (loaders), uniforms and hand gloves to the workers.

6.4.6.2 Positive Environmental Impact

i. Rehabilitation

Upon decommissioning, rehabilitation of the project site will be carried out to restore the site to its original status. This will include the replacement of topsoil and revegetation that will lead to improved visual quality of the area.

6.4.6.3 Negative Environmental Impacts

i. Soil Erosion

Decommissioning will involve demolition of structures, management of spoil material and trucking them from the site. This would require more trucks to do the work, which may result in soil erosion and increased levels of dust. Heavy trucks moving between the site and the dumping place may also cause vibration that may result in accelerating soil erosion. *This impact is direct, negative, short term and of medium significance.*

Mitigation Measures

- a. Planting indigenous plants on site to support the disturbed soil;
- b. Backfilling any foundation and trenches by using the topsoil onsite to stabilize the disturbed area;
- c. Reestablish the original grade and drainage pattern to the extent practicable;

ii. Increased Solid Waste Generation

Demolition of the proposed development will result in large quantities of solid waste. The waste will contain the materials used in construction including concrete, metal, drywall, wood, glass, paints, adhesives, sealants and fasteners. There is growing evidence that large quantities of such waste may lead to the release of certain hazardous chemicals into the environment. In addition, even the generally non-toxic chemicals such as chloride, sodium, sulphate and ammonia which may be released as a result of leaching of demolition waste, are known to lead

to degradation of ground and surface water quality. Hence the impact is considered to be direct and short-term impact. *This is considered to be of short-term with high significance.*

Mitigation Measures

- a. A site waste management plan will be prepared by the contractor before commencement of demolition activities. This will include designation of appropriate waste storage areas, collection and removal schedule, identification of approved disposal site, and a system for supervision and monitoring;
- b. Trash and waste shall be well collected and removed from the site to district dumpsite;
- c. Reusable materials like doors, windows and timber will be sold to licensed scrap dealers;
- d. Decomposable materials shall be collected and taken to the approved dumpsite outside the park boundary. Plastics and other recyclable materials will be collected and sent out for recycling; and
- e. Making arrangements for the daily collection of litter and demolition debris from the site by a licensed solid waste transporter for dumping at approved site.

iii. Dust and Gases Emission

Large quantities of dust will be generated during demolition works that have an effect on the health of the workers and impact the visual of the area. Also, various machinery to be used for the demolition of the proposed project and trucks to carry the debris out of the project site will emit exhausts gases including carbon monoxide, carbon dioxide, sulphur and nitrogen gases which have a direct effect on the health of people within the park and wild animals, in addition to that plants are also affected by some of these gases. *The impact is direct short term and significant.*

Mitigation Measures

- a. Covering all haulage vehicles carrying debris for dumping at approved sites;
- b. Stockpiles of fine materials will be wetted or covered with tarpaulin during windy conditions;
- c. Workers should be issued with proper protective equipment;

6.5 Cumulative Impacts

Cumulative impacts are impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project. They occur when impacts from the proposed project have an additive effect on the impact resulting from existing major facilities, or from reasonably foreseeable future projects within the project area. Cumulative impacts identified for the proposed project are presented below for each scenario.

6.5.1 Increase of Volume of Traffic

An increase of traffic volume may result from the increased number of trucks going in proposed project. This impact will add to the problem of traffic on the road leading to the site. To manage this impact, the proponent will employ security guards who will be instructed to control traffic along the private road leading to the site and assist vehicles as they enter and exit the project site.

6.5.2 Socioeconomic Issues

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

CHAPTER SEVEN

CONSIDERATION OF PROJECT ALTERNATIVES

7.1 Introduction

Consideration of project alternatives is crucial in ensuring that the developer and decision-makers have a wider base from which they can choose the most appropriate option. In this Environmental Impact Statement, the following alternatives were considered and examined in detail during the EIA process.

7.1.1 No Project Alternative

This alternative would mean that the project does not proceed. It entails retaining the current status quo of the site.

Advantages

- a. The natural ecosystem will remain undisturbed.
- b. Air pollution from dust as a result of the construction process will not occur.
- c. There wouldn't be soil compaction as a result of heavy machinery use.
- d. There will be a reduction of soil erosion due to less loosening of soil on the surface.
- e. There would be no soil or water contamination from the alien materials that will be introduced in the system.

Disadvantages

- a. The HEET project aims to revitalize and expand IFM's capacity in key areas crucial for Tanzania's transition to an industrialized, knowledge-based economy. The no project scenario would not address this critical need.
- b. Construction of the new facilities is expected to enhance the quality of teaching, learning and research at IFM by providing modern infrastructure. This opportunity would be forgone.
- c. There will be no creation of employment.
- d. The expected income to the developer and the economy will not be realized.
- e. The value of land might improve but it will remain underdeveloped.
- f. There will be stagnant development among the local community.
- g. The campus will continue experiencing shortage of accommodation and teaching facility in the campus.

7.1.2 Develop the Project Alternative

The alternative was considered assuming that construction of the project facilities will proceed as proposed. The alternative will induce several environmental and socio-economic impacts both positive and negative.

Advantages

- a. Increased employment opportunities at local and national level especially during construction phase
- b. Creation of market for goods and services
- c. Increased economic activities within the project area
- d. Skills transfer to different people at local and national level
- e. Improved students' performance

Disadvantages

- a. Loss of vegetation due to land clearance during construction
- b. Increased waste generation (solid and liquid) from construction camps and construction sites
- c. Population influx due to migration of construction workers to the site
- d. Social disruption and family instability due to influx of people to the area
- e. Generation of construction waste
- f. Construction related accidents
- g. Increased burden on and competition for public service provision

7.1.3 Alternative Source of Water

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: Drilling of 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 2: Rainwater Harvesting offers a supplemental local source reducing overall demand on district supply. A storage and collection system would need designing and constructing. Quantity harvested depends on unpredictable rainfall patterns.

Conclusion: Based on analysis, both two alternatives were preferred since the village area depend on water from the boreholes and rain.

7.1.4 Alternative Source of Energy

IFM considered various energy alternatives for powering the proposed project. Reliable access to energy is critical for running educational facilities. 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.

7.1.5 Solid Waste Management Alternatives

The proposed project 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. Three primary alternatives for managing the solid waste – landfilling, burning and an integrated waste management approach were identified.

Alternative 1: 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 campus budget requiring allocation of funds on an indefinite basis.

Alternative 2: Open Waste Burning. Burning waste is usually an environmentally poor waste management option because potential resources are lost and it can cause air, land and water pollution.

Alternative 3: Integrated solid waste management system: An integrated 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 3 offers significant environmental and financial benefits compared to landfilling and open waste burning. 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.

7.1.7 Liquid Waste Management Alternatives

Four alternatives were considered for managing liquid waste:

Alternative 1: Use of septic tank and soak away pit. The campus currently use septic tank and soak away pit for liquid waste management. Septic tanks are low-cost option, the main disadvantage is that they need periodic emptying, and this could raise the operation cost over

time. With the large volume of effluents that will be discharged from the project during operation, the septic tanks will need to be emptied regularly.

Alternative 2: Use of stabilization ponds/lagoons. This refers to the use of a series of ponds/lagoons which allow several biological processes to take place, before the water is released back to the water body. Speaking of space this method requires a large field for natural treatment to take place which is not available at the proposed building site. Furthermore; lagoons will present vulnerable situations due to trespassers. They are usually a nuisance to the public because of smell from the lagoons/ponds. However, with strict and professional management, they are the most economical and environmentally sound in the long term.

Alternative 3: Constructed wetland. Constructed wetlands are engineered system designed and constructed to copy natural processes taking place in the natural wetlands. Constructed wetlands remove pollutants in wastewater through the combination of physical, biological and chemical processes. They are either subsurface flow where the flow is below the surface of soil or surface flow where the flow of wastewater is above the soil.

Alternative 4: Anaerobic waste water treatment plant such as;

- a. One Up-flow Anaerobic Sludge Blanket (UASB) + Anaerobic Biogas Reactor (ABR)
- b. Two Fixed Dom Chinese Biogas Reactors + Anaerobic Biogas Reactor (ABR) System.

Advantages of UASB

- a. High organic loading capacity
- b. Short HRTs
- c. High COD removal efficiency
- d. No need for support media

Advantages of Chinese Biogas Reactors + Anaerobic Biogas Reactor (ABR) System

- a. Biogas is eco-friendly
- b. Biogas generation reduces soil and water pollution
- c. Biogas generation produces organic fertilizer
- d. It's simple and low-cost technology

In conclusion, given the space limitations, high water table and regular emptying, Anaerobic waste water treatment plant is recommended as the most feasible and sustainable liquid waste management alternative for the proposed project.

CHAPTER EIGHT

ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLANS

8.1 Introduction

This chapter describes how an Environmental and Social Management Plan (ESMP) outlines the procedures of managing, enhancing, minimizing and mitigating the environmental impacts of the project. The ESMP is also an environmental management tool that is used to monitor implementation of environmental management measures. This ESMP outlines environmental impacts and their management measures, assigns implementation responsibilities to stakeholders within a given time frame and estimates costs of implementing the measures. The ESMP for the construction, operation and decommissioning phases of the proposed project is provided in Table 8.1.

8.2 Institutional Roles and Responsibilities

8.2.1 Financing Agency

IFM is the financing agency for this project. They are responsible for providing funds for implementation of mitigation measures and compliance monitoring.

8.2.2 Implementing Agency

The implementing agency for this project is the IFM. The instituter holds final responsibility for the environmental performance of the project.

8.2.3 Supervision Consultant

The Supervision Consultant is appointed by the implementing agency and is responsible for monitoring and supervision of the construction works including implementation of ESMP. The Consultant shall appoint a Resident Engineer to oversee the construction works and monitor the works undertaken by the Contractor and implementation of ESMP to ensure compliance with contract specification and contractual requirements. However, for supervision and monitoring of the implementation of ESMP throughout the construction phase the implementing agency can engage an Independent Environmental Consultant. The Environmental Consultant shall be responsible for environmental compliance monitoring. This includes checking, verifying and

validating the overall environmental performance of the project through regular audits, inspection and review of project submissions.

8.2.4 Contractor

The Contractor shall be responsible for implementation of construction works and ensure compliance with environmental requirements. The Contractor shall appoint a Site Engineer who shall be responsible for implementation and management of the ESMP programme and the required environmental monitoring works. Most important will be Occupational Safety and Health of workers.

8.2.5 Local Government Authorities and Local NGOs / CBOs

The involvement of local authorities is crucial for successful implementation of ESMP because some of the mitigation measures are better undertaken by local communities with the support of the local government authorities and NGOs. It is therefore important that the Bariadi District Council be involved in the implementation of ESMP. The respective local government authorities and local NGOs should be well informed and invited to comment on the ESIA report at the design stage rather than when all major decisions have been made. One copy of this report should be sent to Bariadi District Council to ensure that, the Council through its Environmental Management Officer will be involved in monitoring compliance with mitigation measures.

8.2.6 Local Communities

In general, the local communities do support the project because they know it is going to benefit them and the nation at large. However, the project can obtain maximum benefit if it involves the local communities and spends some amount of funds for the benefit of the local communities. Table 8.1 outlines the environmental and social management plan for the proposed development. The plan considers the development activity, predicted environmental impact, proposed mitigations, actors, timeframe and costs for implementation.

8.2.7 Environmental and Social Cost

The environmental and social cost were proposed based on knowledge of activities involved, consultations and experience of the experts. However, the proposed costs are only indicative, should the proposed development proceed with the suggested changes, the developer will work

out on actual costs and include them in the overall cost of the project. These costs are indicated in Table 8.1. IFM shall cover all the costs proposed in the ESMP.

Table 8.1: Proposed Environmental and Social Impact Management Plan

Item	Identified impact	Recommended Enhancement/Mitigation Measure	Responsible Authority	Costs (Tshs)
IMPACTS DURING CONSTRUCTION PHASE OF THE PROJECT				
POSITIVE IMPACTS				
1	Creation of employment	<ul style="list-style-type: none"> The proponent shall be encouraged to employ local, unemployed yet willing to work hard, manpower to the extent viable subject to a maximum of 50% unskilled labour. This will ensure that local people are more benefited out of the project; Employment should be on equal opportunities for both gender; Proponent shall provide on job and safety training; and Proponent shall not cause children under the age eighteen (18) to be employed or be engaged in any project activities. 	Proponent	N/A
2	Increase in market for local construction materials	<ul style="list-style-type: none"> Purchasing materials from as many local suppliers Hiring trucks to transport construction materials like sand, quarry and cement to the project site. 	Contractor/ Project manager	N/A
2	Increase in business activities within the project	<ul style="list-style-type: none"> Designating an area as a market within the project site 	Contractor	NA

	area			
NEGATIVE IMPACTS				
1	Air pollution	<ul style="list-style-type: none"> • Applying water regularly to civil works and earth roads to suppress dust • Controlling the speed of construction vehicles to reduce generation of dust. 	Contractor/IFM	5,000,000
2	Noise Pollution	<ul style="list-style-type: none"> • Fitting construction vehicles with silencers to reduce the noise • Servicing machinery so that they can be in good condition at all times • Providing ear protection materials for the workers in noisy areas • During construction at site, the contractor should only work during the normal hours from 8.00am-11.00pm so that the community around is not disturbed; • Some building materials and components to be processed off site and fixed on site; • Provide a noise monitoring meter at noise site; 	Contractor/IFM	5,000,000
3	Soil erosion	<ul style="list-style-type: none"> • Carrying out construction works out from May - September • Clearing only those places where buildings will be constructed 	Contractor/IFM	3,000,000

		<ul style="list-style-type: none"> • Creating drainage channels to direct storm water movement • Creating stone pitching where soils have been excavated 		
4	Soil Contamination	<ul style="list-style-type: none"> • Construction vehicles should be in good condition to avoid fuel leaks • Servicing areas for vehicles should have impermeable surfaces and should be bunded • All oil products and materials should be stored on site stores and should be handled appropriately to avoid spills and leaks. 	Contractor/IFM	
5	Increase in accident/incidences	<ul style="list-style-type: none"> • Introducing humps on the road to help reduce the speed of the vehicles • Erecting warning signs showing that there is heavy machinery and construction vehicles using that road for people to be alert • Providing workers with protective clothing • Training workers in the proper use and handling of heavy equipment and machinery • There should be a first aid kit on site and all workers trained on how to provide first aid when needed; • The site should be installed with firefighting equipment and that all workers are able to use 	Contractor/IFM	10,000,000

		<p>them.</p> <ul style="list-style-type: none"> • Following health and safety regulations 		
7	Increase in HIV and AIDS and other diseases	<ul style="list-style-type: none"> • The contractor and other health centers/organizations has to raise awareness to workers on HIV/AIDs and other sexual transmitted diseases; • There should be a box containing protections (condoms) on site; and • There should be a post of reminding workers on the effect of sexual transmitted diseases and HIV/AIDs on site. 	Contractor/IFM	2,000,000
8	Increase in criminal Acts	<ul style="list-style-type: none"> • Employ people from the surrounding areas to reduce number of migrant workers • Introduce community policing in conjunction with Sapiwi Police station • Sensitize the community on the ownership of the project 	Contractor/IFM	N/A
9	Poor solid waste management	<ul style="list-style-type: none"> • Provision of dust bins or rubbish pits for the wastes produced • Segregation of wastes by providing different bins for each type of waste • Identification of a dumping site within the project area for various types of wastes • Disposing of wastes at the designated places 	Contractor/IFM	5,000,000

		regularly		
10	Poor liquid waste management	<ul style="list-style-type: none"> Wastewater shall be properly treated in the Septic Tank Before disposal into the Soak Away Pit within the site; Contractor shall be instructed to put on his/her methodologies for handling hazardous waste such as oils, lubricants and non-combustible waste; and Training on waste management shall be done to all personnel, operators and services providers. 	Contractor/IFM	Included in project cost
11	Degradation of land and river banks	<ul style="list-style-type: none"> Buying sand and quarry from registered local artisans Carrying out sensitization of local artisans on good mining practices Assisting communities with afforestation programs for river banks Introducing alternative income generating activities in the area. 	Walajulu river Nyakabindi	5,000,000
12	Traffic Density	<ul style="list-style-type: none"> Notify the motorists about the project once implementation is started Put in place warning/ informative signs (bill boards) at the site The signs should be positioned in a way to be easily viewed by the public and mostly motorists The traffic along the connecting roads should be controlled especially during construction phase 	Contractor/IFM	1,000,000

		<p>and mostly when trucks are turning into the site, say when delivering of materials.</p> <ul style="list-style-type: none"> • Employ traffic marshals to control traffic along the adjacent roads and in and out of the site. 		
13	Risks of child labour on the construction site	<ul style="list-style-type: none"> • Recruitment of workers through district labour office • Erect sign board “ NO CHILD LABOUR” on site 	Contractor/IFM	N/A
14	Mismanagement of Hazardous waste	<ul style="list-style-type: none"> • All hazardous materials must be collected separately, stored in appropriately bonded containers and placed on concrete floor • Hazardous waste should have disposed by a licensed personnel/company • Refueling and maintenance of large vehicles shall not take place at the construction site • Maintaining spill response kits at the site office • On site spill response procedures will be prepared 	Contractor/IFM	10,000,000
15	Contribution to Climate Changes	<ul style="list-style-type: none"> • To change the consumption behaviour in terms of energy and water • Use of renewable energy technologies to minimize the carbon dioxide emission. • Promote use of natural green space at IFM to increase energy saving • The campus has to transform to digital software operated work, in order to minimize paper 	Contractor/IFM	N/A

		consumption rates. This will greatly influence the educational standards. And will save a great deal to reduce the amount of forest resources consumed.		
16	Increased Greenhouse gas generation	<ul style="list-style-type: none"> • Proper engine tune up • Regular inspection and maintenance of construction equipment's • Reduce machines and vehicles idling time 	Contractor/IFM	5,000,0000
17	Reduction of CO ₂ Sequestration Potential	<ul style="list-style-type: none"> • The proponent shall ensure that open areas of the project site are re-planted with grass, flowers and trees. • The proponent shall ensure proper demarcation of the project area to be affected by the construction works • Topsoil excavated from the construction site shall be re-spread in areas to be landscaped to enhance plant health. 	Contractor/IFM	N/A
18	Gender based	<ul style="list-style-type: none"> • The project shall ensure gender balance during employment 	Contractor/IFM	N/A
19	Cultural heritage	<ul style="list-style-type: none"> • Notify relevant authorities of found objects or sites by cultural heritage experts; • Fence-off the area of finds or sites to avoid further disturbance; 	Contractor/IFM	N/A

		<ul style="list-style-type: none"> • Conduct an assessment of found objects or sites by cultural heritage experts; • Identify and implement actions consistent with the requirements of ESS and national law; and • Train project personnel and project workers on chance find procedures • Identify movable cultural heritage objects that may be endangered by the project and make provisions for their protection throughout the project life cycle. • Inform religious or secular authorities or other custodians with responsibility for overseeing and protecting the movable cultural heritage objects of the schedule for project activities and alert them regarding the potential vulnerability of such items. 		
20	Human remains	<ul style="list-style-type: none"> • Notify the archeologist to determine the nature of the remains 	Contractor/IFM	N/A

Item	Identified impact	Recommended Measure	Enhancement/Mitigation	Responsible Authority	Costs (Tshs)
IMPACT FROM OPERATION PHASE					
POSITIVE IMPACTS					
1	Provision of modern and affordable student hostels facilities	<ul style="list-style-type: none"> Sourcing funds for maintenance so that the hostels should be in good condition and be in operation for a long time; and Providing equal enrolment opportunities for male and female students 		IFM	N/A
2	Increase in performance of students academically as students will live close to the campus and easily access college facilities	<ul style="list-style-type: none"> Sourcing funds for maintenance so that the hostels should be in good condition and be in operation for a long time 		IFM	N/A
3	Improve security in the area	<ul style="list-style-type: none"> The project site will be enclosed using suitable walls to beef-up security and to 		IFM	5,000,000

		<p>control movement within the site</p> <ul style="list-style-type: none"> • Guard houses will be in place at the gate. Security guards should always monitor the gate of the facility to keep away the intruders and to control movement within the site <p>The guards stationed at the gates should document movements in and out of the site/property.</p>		
4	Creation of employment	<ul style="list-style-type: none"> • Employing more people from the communities surrounding the project area and other areas within the country for both unskilled and skilled jobs • Giving equal employment opportunities for both men and women 	IFM	N/A
5	Improved access to social services by the local community	<ul style="list-style-type: none"> • Providing extra social services that can be accessed by the communities. 	IFM	N/A
6	Increase in economic activities	<ul style="list-style-type: none"> • Sourcing funds for operation and maintenance cost for the students' hostels to be in operation for a long time • Traders from the project area to be given the opportunity to supply food stuffs for student meals. • Outsourcing non-core functions 	IFM	N/A

7	Increase in revenue by government through taxes	<ul style="list-style-type: none"> Remitting taxes to TRA from wages and service contracts in time 	IFM	N/A
Item	Identified impact	Recommended Enhancement/Mitigation Measure	Responsible Authority	Costs (Tshs)
NEGATIVE IMPACTS				
1	Poor solid waste management	<ul style="list-style-type: none"> Provision of dust bins or rubbish pits for the wastes produced Segregation of wastes by providing different bins for each type of waste Maintaining the dumping site that will be identified during construction Collecting and disposing of wastes at Kidulya dumpsite regularly Use high tech incinerator for managing sanitary pads Used chemicals should be disposed in appropriate manner 	IFM	5,000,000
2	Poor Sanitation	<ul style="list-style-type: none"> Provision of adequate toilets for students and workers Use Anaerobic wastewater treatment plants for disposal of liquid wastes Regular Inspection and maintenance of the septic tank network 	IFM	5,000,000/-

3	Increase in HIV and AIDS and other sexually transmitted diseases	<ul style="list-style-type: none"> • Carry out sensitization meetings for students and workers from time to time • Develop an HIV and AIDS workplace policy; • Distribution of condoms and Education, Information and Communication materials on HIV and AIDS to workers and students 	IFM/ Hospital/Dispensary	5,000,000
4	Increase in criminal acts	<ul style="list-style-type: none"> • Sensitize the communities and students on how they can live in harmony • Introduce community policing in conjunction with Sapiwi Police station • Sensitizing the students on the ownership of the college 	IFM/Police Station	3,000,000
5	Liquid Waste	<ul style="list-style-type: none"> • Construction of the double chamber septic tank. The design of the internal sewerage system should consider the estimate discharges from individual sources and the cumulative discharge of the entire project i.e. it should have the capacity to consistently handle the loads even during peak volumes • Use Anaerobic wastewater treatment plants • All drain pipes passing under building, driveway or parking should be of heavy duty PVC pipe tube encased in concrete surround. • All manholes on drive ways and parking areas 	IFM	5,000,000

		<p>should have heavy duty covers set and double sealed airtight; as approved by specialists.</p> <ul style="list-style-type: none"> • Sanitary facilities should be kept clean always, through regular washing/cleaning. • Frequent monitoring of the internal drainage system. • Blockages and damages should be fixed expeditiously 		
6	Poor Surface Drainage	<ul style="list-style-type: none"> • Rain water harvesting gutters and storage tanks should be installed to reduce the amount of rainfall reaching the surface. • Semi permeable materials should be used for construction of pavements. • After completion of construction, the proponent should embark on comprehensive landscaping to increase softscape cover on the plot. 	IFM	4,500,000
7	Fire Outbreak	<ul style="list-style-type: none"> • Hire competent and properly authorized electrical contractor to do the wiring and other electrical works. • Install fire alarm system for entire project • Install smoke detectors in kitchens. • Installation of firefighting equipment following Country Fire requirements. 	IFM	6,500,000

		<ul style="list-style-type: none"> • Conduct regular firefighting drills within the site. • Develop and adapt an (fire) emergency response plan for the project during and occupation stage. • Ensure that all firefighting equipment are regularly maintained and serviced. • Provide fire hazard signs such as “No Smoking sign”, Direction to exit in case of any fire incidence and emergency numbers. 		
8	Increase in Energy Demand	<ul style="list-style-type: none"> • Put off all lights immediately when not in use or are not needed. • Use energy conserving electric lamps for general lighting. • Make use of alternative source of energy such as solar power. Solar panels proposed in the project should be fully utilized and timely repaired in case of damage. 	IFM	5,000,000
9	Increase in water demand	<ul style="list-style-type: none"> • Install water conserving taps that turn off automatically when water is not in use. • Encourage water reuse/recycling during occupation phases. • Roof catchments of building blocks should be provided with rainwater harvesting systems (gutters, down pipes and water storage 	IFM	4,500,000

		<p>facilities) to enhance collection and storage of the resulting run-off. Such water can be used in watering flower gardens, general cleaning etc.</p> <ul style="list-style-type: none"> • Provide notices and information signs to sensitize on means and needs to conserve water resource i.e. Keep/Leave the Tap Closed etc. This will awaken the civic consciousness of the workers and residents with regard to water usage and management 		
Item	Identified impact	Recommended Enhancement/Mitigation Measure	Responsible Authority	Costs (Tshs)
IMPACT FROM DECOMMISSION PHASE				
NEGATIVE IMPACTS				
1	Soil Erosion	<ul style="list-style-type: none"> • Planting indigenous plants on site to support the disturbed soil; • Backfilling any foundation and trenches by used the top soil onsite so as to stabilize the disturbed area; • Reestablish the original grade and drainage pattern to the extent practicable. 	IFM	9,000,000
2	Loss of employment	<ul style="list-style-type: none"> • Ensuring that all employees are members of the security fund and the employer will ensure that the company contributions are 	IFM	10,000,000

		<p>made;</p> <ul style="list-style-type: none"> • Employees will also be prepared for forced retirement by providing skills for self-employment; and • The project will provide relevant skills to workers through on job training to make them marketable after decommission 		
3	Loss of income	<ul style="list-style-type: none"> • The developer should ensure that all workers employed are provided with various skills and trainings for self-employment that will help them when they lost their employment position at the facility; • Ensuring that workers are provided with small loans for them to invest in small business that will be their backbone in life once they lost employment. 	IFM	10,000,000
4	Solid Waste Generation	<ul style="list-style-type: none"> • A site waste management plan will be prepared by the contractor prior to commencement of demolition activities. This will include designation of appropriate waste storage areas, collection and removal schedule, identification of approved disposal site, and a system for supervision and monitoring; 	IFM	3,000,000

		<ul style="list-style-type: none"> • Trash and waste shall be well collected and removed from the site to district dumpsite; • Reusable materials like doors, windows and timber will be sold to licensed scrap dealers; • Decomposable materials shall be collected and taken to the approved dumpsite outside the park boundary. Plastics and other recyclable materials will be collected and sent out for recycling; and • Making arrangements for the daily collection of litter and demolition debris from the site by a licensed solid waste transporter for dumping at approved site. • Decomposable materials shall be collected and taken to the approved dumpsite outside the park boundary. Plastics and other recyclable materials will be collected and sent out for recycling; and • Making arrangements for the daily collection of litter and demolition debris from the site by a licensed solid waste transporter for dumping at approved site. 		
5	Workers accidents and hazards during demolition	<ul style="list-style-type: none"> • Proper signs on site to warn workers safety requirements as regards machines with 	IFM	9,000,000

		<p>moving parts and other equipment at site;</p> <ul style="list-style-type: none"> • First Aid box and have a trained person to handle site emergencies and incidences will be in place; • Site vehicle to specifically transport the injured to hospital will be available; • Providing fire-fighting mechanism at site; • Providing safe scaffoldings and railings at heights; • Providing washing (enclosed bathroom) and toilet facilities at site with both drinking and washing water. The number of workers engaged determines the number of the toilets and bathrooms provided; and • Providing safety helmets, safety masks (welders), safety shoes (loaders), uniforms and hand gloves to the workers. 		
6	Dust and gases emission	<ul style="list-style-type: none"> • Covering of all haulage vehicles carrying debris for dumping at approved sites; • Stockpiles of fine materials will be wetted or covered with tarpaulin during windy conditions; • Workers are going to be issued with proper protective equipment. 	IFM	7,000,000

8.3 Disaster Risk Management Plan

8.3.1 Disaster Risks at the Campus and Level of Management

The campus is vulnerable to range of disaster risks, which pose risk to the students, teachers and other staff. The campus is vulnerable to the fire outbreak, diseases outbreak, traffic accident, robbery, ICT appliance damage and data loss. Other disaster risks include; terrorist attack, ammunition accidents, earthquake, and tsunamis. The current level of disaster risk preparedness and management for IFM is moderate because equipment (Measures) are in place but not enough to accommodate the whole campus (Table 8.2).

Table 8.2: Disaster Risks and management level

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

8.3.2 Disaster Risk Management Plan

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

8.3.3 Assumption Made in the Plan

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

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

8.4 Traffic Management Plan

An appropriate systematic traffic management system is essential for safety and smooth traffic flows on roads. Good traffic management help to;

- a) To achieve smooth traffic flow
- b) To reduce traffic accidents, and
- c) To create pedestrian –friendly facilities

The typical management plan includes;

- i. **Give way signs:** to indicate who has the right of way
- ii. **Prohibitive/restriction signs:** to indicate the only direction in which the motorist is obliged to follow example No entry for all type of vehivles, No pedestrian crossing, No parking etc.,
- iii. **Speed limits:** set maximum speed that motorist are allowed to drive inside the campus
- iv. **Traffic cones:** to direct traffic around a construction site or other hazard
- v. **Barricades:** to block off an area entrily
- vi. **Traffic controllers:** used with other traffic controls, such signs and cones, to help direct motorists safety through an area
- vii. **Traffic lights:** to control the sequence of flow
- viii. **Pedestrian crossings:** to provide safe crossing points for road users

8.5 Health and Safety Management Plan

Health Safety Management Plan (HSMP) helps in implementation, maintaining and continually improving Health and Safety management system following the requirements of Occupational Health and Safety Assessment Series (OHSAS) standards. It is therefore important that this is reflected in the institute operations and responsibilities of every level of management within an organization. This plan shall help to implement the Safety and Health direction of the construction of the proposed project. It clearly states the requirements of donors, legislation, suppliers, management and employees in Safety and Health management.

8.5.1 Responsibilities

- i. IFM Simiyu Campus Management: The management is committed to the principle of safe working and desires that on no account should any person ever be exposed to risk.
- ii. Supervisors: It is the responsibility of the Supervisors to review and ensure awareness of emergency procedures among all the personnel.
- iii. Employees and students: It is also the responsibility of all employees and students to continually familiarize themselves with the assembly procedures for their relevant areas of work.
- iv. General: Any information being relayed about an emergency shall be clear and precise giving the exact location, the nature of the emergency and the seriousness of the emergency and contact numbers and names.

8.5.2 General Safety Facility Operation

i. General Site Rules

General site rules will be applied to all employees of IFM Simiyu Campus, including employees of contractors and subcontractors, all students and all related personnel from third parties and visitors. Those rules are comprised of brief information about site emergency response plan, emergency contacts, map with permission marks and all other necessary information, and those will be shared with all employees, students and third parties.

ii. Site Entrance and Exit

The entry to the project area will be subject to the security personnel's supervision to ensure that all entries are performed in accordance with health and safety system and to prevent unauthorized access. Security personnel should be trained to meet both legislative and international standards by HSE Manager. Emergency exits of buildings and Project site should be clearly marked to be visible even in total darkness and be unobstructed at all the times. There should be minimum two exits from any work area.

iii. Safe Access

Passageways for pedestrians and vehicles within and outside buildings should be segregated and provide for easy, safe, and appropriate access. During construction, equipment and installations requiring servicing, inspection, and/or cleaning should have unobstructed, unrestricted, and ready access. Only authorized personnel have access to dangerous operation areas and measures will be taken by locked door to prevent unauthorized access to dangerous areas should be in place.

iv. Parking

Parking at the project site will only be restricted to the designated area. Parking shall be reverse and in the direction of exit. It is forbidden to park in front of fire extinguishers or hydrants, waste storage areas and emergency exits.

v. Smoking

Smoking in the construction site is strictly forbidden. There will be a designated open-air area or areas for smoking, where smoking is allowed only. Warning signs will be placed in accordance

with the Law. Moreover, employees/students smoking other than the designated areas will be warned and fined, if necessary.

vi. Working Hours

The working hours in construction and operation phases of the Project will be in accordance with the legal work and overtime hours stated in the Labor Law No. 4857. Working hours can be shortened and additional required resting hours can be provided to the workers as a result of risk assessments and exposure to a hazardous situation. Special working hour arrangements will be made under extreme conditions such as exposure to extreme hot, cold and humid environments to prevent health risks of employees. Work and rest periods can be determined and implemented by work-specific risk assessments for the activities such as working in confined spaces, gaseous, dusty or noisy areas.

vii. Classes and Offices

Classes/ Offices and hostels will be cleaned and ventilated regularly. If it is not ensured, necessary warning signs shall be placed indicating the floor is slippery. Deteriorations, shelves and other materials will be repaired and/or fixed. Cleaning materials will be used with proper PPE and informed with the Material Safety Data Sheets (MSDSs).

Air conditioning devices will be regularly controlled according to industrial hygiene necessities. Sufficient lighting will be provided to the personnel working in the office/class. All employees/students shall be trained on office ergonomics.

Electrical equipment will be checked and labelled color codes in every three months by the electricians. Electrical distribution panels and fuse boxes will be kept locked, labelled and prevented from unauthorized use. Office/class/hostel will be equipped with detectors and fire extinguishers in case of fire hazards. Emergency exit doors and roads will be set at least 80 cm in length.

Students and employees/ who are exposed to workplace violence, retaliation, mobbing or any types of discrimination will be encouraged to report the situation in accordance with the Grievance Mechanism Procedure.

viii. Housekeeping

Employees will be informed through training that the major sources of hazards are negligence of keeping the site clean and tidy during all phases of the Project. Those training will include the some of the following consequences of lack of cleanliness and tidiness:

- a. Trip and fall hazards: Materials and equipment left on the floor can cause trip and fall of an employee/student. The result can be bone fractures and severe injury. If trip and fall is happened in a higher place without fall protection equipment, the incident may result with fatality
- b. Drop of a Material: Materials left in higher places may fall down and cause injuries
- c. Hygiene: Non-clean areas threaten employees' and students health. Biological risks that may arise in the site are also assessed in this context and are tried to be avoided. All employees should wash their hands regularly, especially prior to eating and drinking.

All wastes generated in the site will be stored in the designated waste storage areas, by segregating according to their type. Waste management implementations are specified in Waste Management Plan for all phases of the Project.

Chemicals will be stored according to their hazardousness classifications and MSDSs. All chemicals will be ordered according to need and stored according to MSDSs. Bulk buying and storage will not be allowed. Hazardous materials will be stored in accordance with the relevant national regulations.

ix. Training

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

x. Awareness

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

xi. Emergency Plan

All actions will be coordinated with the overall emergency plan operated by the Supervisor. The General Manager is overall responsible to coordinate all emergency procedures along with the Health & Safety Manager. All emergency telephone numbers and contact names shall be

posted at strategic points on site. For Fire press 114, Ambulance press 115, Police press 112 etc.

Subsequent actions as listed below will be taken either as in instruction from the Supervisor.

- a. Stop all work and report to the nearest evacuation area/ assembly area and await further instructions.
- b. Stop all equipment and vehicles.
- c. Contact the Health & Safety Manager and relay message to the Supervisor and General Manager.
- d. Ensure all personnel are aware of the emergency.

xii. Assembly Point

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

xiii. Head Count

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

xiv. Rescue Team

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

xv. Fire Fighting

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

xvi. All Clear

Normal work will be resumed only after all clear signal is received from the Supervisor. As such the supervisors shall make all arrangements to meet the concerned authorities.

8.6 Health and Safety Measures

i. Slips and Trips Safety Precautions

Both slips and trips result from unintended or unexpected change in the contact between the feet and the ground or walking surface. This fact shows that good housekeeping, quality of walking surfaces (flooring), selection of proper footwear, and appropriate pace of walking are critical for preventing fall incidents. Basic housekeeping is often the simplest way to reduce the risk.

Safety measures include;

- a. Make repairs or replace the floor surface if required.
- b. Ensure personnel wear suitable and appropriate footwear, this includes visitors.
- c. Assess the cause of slippery surfaces and treat accordingly, for example treat chemically and use appropriate cleaning methods.
- d. Warn of risks at any change in surface, for example dry to wet, even to uneven, traffic routes, by using signs, mats or markings.
- e. Where there is a change in surface level, ensure good visibility and lighting, provide hand rails and add tread markers or other floor markings as required.
- f. Clean up all spillages immediately. If the floor is wet, use appropriate signs to tell people that extra care is needed or use another route until the spillage or wetness is gone.
- g. Make sure rugs or mats are securely fixed and that edges do not present a trip hazard
- h. Avoid cables crossing pedestrian routes and use cable guards to cover where required
- i. Implement a defect reporting system to ensure the hazards are identified and addressed as soon as possible.

ii. Ergonomics

Employees will be provided with the appropriate tools, equipment, parts and materials. Controlling and identification of ergonomic risk factors and reduction of hazards will be provided through the following means when and where necessary:

- a. Engineering controls; which are the most reliable means to controlling or preventing injury. This is achieved by focusing on the physical modifications of jobs, workstations, tools, equipment, or processes.

- b. Administrative controls; which means controlling or preventing injury by implementing administrative changes such as job rotation, job enlargement, rest/recovery breaks, work pace adjustment, redesign of methods and/or worker education.
- c. Work practice controls; which means controlling or preventing injury through proper work practices. These include proper work techniques, posture and conditioning.
- d. PPE; which is personal protective equipment and can control or prevent injury.

iii. Working at Height

Working from a level difference and the possibility of injury as a result of falling are considered for the employees as “working at height”. Travelling, conducting a stationary job, or any time under risk of exposure to a fall from a surface that is not protected by approved handrails, guardrails or some other/similar types of approved arrest or restraint devices are included in the scope of working at height.

The hazard distance for falling is measured from the employee’s feet to the walking/working ground. The prevention of fall should be planned during the design stage as possible, and continuously controlled.

Hazards resulting from fall risks can be eliminated by several measures. These are:

- a. **Elimination of the works at height:** performing the work on the ground as much as possible or maximizing the pre-assembly works on the ground for the structural components
- b. **Design safety and engineering controls:** reviewing the project drawings, interfacing with the project owners and material suppliers to design safety features into structure, material or equipment to be used, or addition of the safety features such as attachment points for guardrail system, etc. to the project design.
- c. **Fall prevention and protection systems:** fall prevention and protection systems differ in terms of the work type. Guardrail systems, fall restraints, fall arrest systems, barricades, etc. are some of them. The most effective one should be selected depending on the work to be performed.
- d. **Elevated equipment:** this equipment are the ones which the employees are required to be tied-off 100% of the time when conducting the job such as crane suspended works or scissors lifts.

- e. **Housekeeping:** housekeeping is also another important factors which may cause falling. The whole area should be enforced daily clean-up and free of debris, materials, unnecessary equipment and provided a sufficient number of trash containers for cleanup.

iv. **Struck by Objects**

Struck-by-object injuries involve a worker being hit by any piece of equipment or object that's falling, swinging, or rolling, including a moving vehicle. Take the following measures to make your workplace safe and reduce the risk of struck-by-object incidents;

- a. Provide safety eyewear
- b. Enforce hardhats at work sites
- c. Ensure workers are highly visible
- d. Lower blades and lock moving parts of machines when not in use
- e. Inspect tools and equipment
- f. Limit access to work areas

v. **Working with Construction Machinery**

Measures to be taken when working with or around the construction machinery are listed as:

- a. Construction machinery will be accepted to the site according to site entry rules.
- b. Daily and periodic maintenance of construction machinery will be ensured and shared with OHS team and the operator will perform a visual check before each use.
- c. Obeying general rules for operators, which are summarized below, will be ensured
- d. Operators will have a valid operator license
- e. Operators will have induction training
- f. Operator will visually control his/her construction machinery from top and bottom
- g. Operator will check any leakages such as oil, engine fluids, accumulator etc
- h. Operator will check engine, gearbox, hydraulic oil and radiator fluid levels
- i. Refueling of construction machinery will be performed in designated areas or outside of the Project area.
- j. Construction machinery will not reverse without a flagman

vi. Over-exertion

Overexertion can occur when you push yourself too hard physically. It can cause inflammation, leading to pain and discomfort. If it is not addressed, overexertion can lead to tearing or overstretching in muscles, tendons, and ligaments. There are many things you can do both at home, at play, and at work to prevent overexertion.

- i. **Warm up.** Before doing physical activity, stretch and move your body to warm up your muscles.
- ii. **Take small breaks.** When doing repetitive motion or a lot of lifting, take a lot of small breaks. Even a break of 20 seconds to stretch the muscles you are using can be helpful.
- iii. **Lift properly.** When lifting anything, it is important to have proper posture and form. Follow these steps to avoid overexertion:
 - a. Stand close to what you are lifting.
 - b. Place your feet wide apart to give yourself a solid base.
 - c. Bend your knees instead of your hips and back.
 - d. Tighten your core muscles to help you lift the object.
 - e. Use your leg muscles to lift, not your back.
 - f. Don't twist your body while holding something heavy. Turn your whole body, including your feet. Your nose and toes should always be pointing in the same direction while lifting.
 - g. When putting down a heavy object, bend with your knees so you squat to put it down instead of hinging at the hips.
- iv. **Raise work tables to waist height.** If your work table is too low, you may put yourself at risk of over-exertion from bending over too much. Raise your work table to the proper height to avoid this.
- v. **Maintain your tools or get new ones.** Use tools in good condition to avoid overexerting yourself.
- vi. **Use available equipment to move heavy objects.** If available, use tools meant for lifting assistance. This could be anything from a lifting belt that gives you more core support, to machinery that lifts items for you and carries them where they need to go.
- vii. **Avoid carrying things that are too heavy.** Everyone's limit for how much they can carry is different. If you do not regularly carry heavy objects or work out, what you can safely carry may be less than someone else. Listen to your body, and ask for help when needed.

8.7 Environmental and Social Monitoring Plan

The monitoring plan is vital because it is used as check if the mitigation measures prescribed in the management plan are being implemented. It provides parameters to be monitored, indicators to be used for monitoring, means of verification that mitigation/enhancement measures were implemented, frequency of monitoring and assigns responsibility for monitoring.

To ensure that the environmental and social management plan for the proposed project is implemented, an environmental and social monitoring plan has been prepared as outlined in Table 8.3. Stakeholders that have been assigned a responsibility in the monitoring plan need to budget for fuel and subsistence allowances for their officers for them to carry out the inspection. This urges the developer to implement the management plans so that the implementation of their project does not contribute to environmental degradation in the project area or impinge on the welfare of employees, students and local communities.

Table 8.3: Proposed Environmental and Social Monitoring Plan

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Tshs)
IMPACTS DURING CONSTRUCTION PHASE OF THE PROJECT							
POSITIVE IMPACTS							
1	Creation of employment	<ul style="list-style-type: none"> Employing unskilled labours as much as possible from the project area Giving women equal employment opportunities as men. 	<p>Number of local people employed</p> <p>Number of women employed</p>	Records	Quarterly	Proponent/ Project manager	5,000,000
2	Increase in market for local construction materials	<ul style="list-style-type: none"> Designating a place for the local market close to the site Purchasing materials from as many local suppliers. Piling trucks to transport 	<p>No. of local people supplying materials</p> <p>Number of local transporters ferrying material</p>	interviews	Quarterly	Contractor/ Project manager	5,000,000

		construction materials like sand, quarry and cement to the project site					
3	Increase in business activities within the project area	<ul style="list-style-type: none"> Designating an area as a market within the project site 	Number of local people selling goods at the project site	Interviews	Contractor	Quarterly	1,000,000
NEGATIVE IMPACTS							
1	Gaseous and Dust Emissions SO ₂ , CO, CO ₂ , and NO _x Ambient air quality (PM _{2.5} and 10)	<ul style="list-style-type: none"> Applying water regularly to civil works and earth roads to suppress dust; Controlling the speed of construction vehicles to reduce generation of dust. 	SO ₂ <0.5 µg/m ³ for 10 mins CO < 150 µg/m ³ for less than 15 mins NO _x < 150 µg/m ³ for 24 hours PM 2.5 [WHO:2005] 25 µg/m ³ PM 10 Local standard (TZS:	Measurement of dust particles (PM 2.5 and 10) Measurement of gaseous emission (CO ₂ , CO, NO ₂ , SO ₂ ,)	Contractor/	Quarterly	5,000,000

			845:2005)60-90 µg/m ³ PM 10 [WHO:2005] 50 µg/m ³				
2	Noise	<ul style="list-style-type: none"> Fitting construction vehicles with silencers to reduce the noise Servicing machinery so that they can be in good condition at all times Providing ear protection materials for the workers in noisy areas 	<p>No. of vehicles fitted with silencers</p> <p>Machines in good condition</p> <p>No. of workers using PPEs inspections</p>	<p>In compliance with WB and TBS standards:</p> <ul style="list-style-type: none"> Daytime noise levels < 60 dB Night-time noise levels < 50 dB 	Quarterly	Contractor	4,750,000
3	Soil erosion	<ul style="list-style-type: none"> Carrying out construction works out from May – September Creating drainage channels to direct 	<p>Construction period</p> <p>Availability of drainage channels</p>	Inspections	Once on commencement	Contractor	3,500,000

		<p>storm water movement</p> <ul style="list-style-type: none"> • Creating stone pitching where soils have been excavated • Clearing only those places where buildings will be constructed 	<p>Presence of stone pitching</p>				
4	Soil Contamination	<ul style="list-style-type: none"> • Construction vehicles should be in good condition to avoid fuel leaks • Servicing areas for vehicles should have impermeable surfaces 	<p>No. of vehicles serviced</p> <p>Availability of impermeable surface</p>	Records	quarterly	Contractor/ Project Manager	5,000,000
5	Increase in accident/ incidences	<ul style="list-style-type: none"> • Introducing humps on the road to help reduce the speed of the vehicles • Erecting warning signs showing that 	<p>No. of humps on the local road</p> <p>No. of warning signs erected</p> <p>No. of people</p>	Inspections	Once on commencement	Contractor/ Project Manager	9,000,000

		<p>there is heavy machinery and construction vehicles using that road for people to be alert</p> <ul style="list-style-type: none"> • Following health and safety regulations • Providing workers with protective clothing • Training workers in the proper use and handling of heavy equipment and machinery • Maintaining a first aid kit at the project site 	<p>using PPEs</p> <p>No. of people trained</p> <p>Presence of a first aid kit</p>				
6	Increase in HIV/AIDS and other diseases	<ul style="list-style-type: none"> • Sensitizing local people and workers at the site on the dangers of unacceptable unions 	<p>No. of sensitization meetings</p> <p>No of school</p>	Records	Quarterly	Contractor/ Local leaders/ District AIDS Coordinator	7,000,000

		<ul style="list-style-type: none"> • Distribute condoms to both men and women • Encouraging girls to go to school to avoid early marriages • Providing women with loans for small scale businesses so that they can be self-sufficient • Develop an HIV and AIDS workplace policy 	<p>drop outs</p> <p>No. of women carrying out businesses</p> <p>HIV policy in place Records</p>				
7	Increase in criminal Acts.	<ul style="list-style-type: none"> • Employ people from the surrounding areas to reduce number of migrant workers • Sensitize the community on the ownership of the project • Introduce 	<p>No of criminal incidences</p> <p>No. of local people employed</p> <p>Community policing in place</p> <p>Police unit in</p>	Police records Records	Quarterly Once on commencement	Developer	5,000,000

		<p>community policing in conjunction with Sapiwi Police station</p> <ul style="list-style-type: none"> Request for a police unit within the project area 	place				
8	Poor waste management	<ul style="list-style-type: none"> Provision of dust bins or rubbish pits for the wastes produced Segregation of wastes by providing different bins for each type of waste Identification of a dumping site within the project area for various types of wastes Disposing of wastes at the designated places regularly 	<p>Dust bins for each type of waste in place</p> <p>Dumping site identified</p> <p>No. of times rubbish is removed</p>	Inspections	<p>Quarterly</p> <p>Once on commencement</p>	Contractor	5,000,000

9	Poor sanitation	<ul style="list-style-type: none"> • Provision of pit latrines for workers on the construction site Provision of potable water within the site • Sensitization of workers on the importance of good hygiene practices 	Pit latrines in place Potable water in place No. of sensitization meetings	Inspections records	Quarterly Once during commencement	Contractor Project Manager	5,000,000
10	Degradation of land and river banks	<ul style="list-style-type: none"> • Buying sand and quarry from registered local artisans • Carrying out sensitization of local artisans on good mining practices • Designating places for sand and quarry mining • Assisting communities with afforestation 	No. of local registered local artisans supplying materials No. of meetings No. of official mining sites No. of afforestation programs	Records	Quarterly	Only from authorized miners	8,000,000

		<p>programs for river banks</p> <ul style="list-style-type: none"> Introducing alternative income generating activities in the area. 					
11	Risks of child labour on the construction site	<ul style="list-style-type: none"> Recruitment of workers through district labour office Erect sign board "NO CHILD LABOUR" on site 	<p>Records of recruitment</p> <p>Presence of sign of "No Child Labour"</p>	Signposts Records	Monthly	Ministry of Labour	2,500,000
12	Use of lead based paint products	<ul style="list-style-type: none"> The Contractor shall ensure that paints with toxic ingredients or solvents or lead-based paints will not be used 	Evidence of using non lead based paint	Purchase records/receipts	Quarterly	Contractor/ Proponent	1,000,000

13	Risks of inappropriate contacts between workers and students	<ul style="list-style-type: none"> Periodic sensitization of workers and students on zero tolerance against the malpractices 	Number of meetings	Minutes	Monthly	Dean of Students	1,000,000
IMPACTS FROM OPERATION PHASE							
POSITIVE IMPACTS							
1	Creation of employment	<ul style="list-style-type: none"> Employing more people from the communities surrounding the project area and other areas within the country for both unskilled and skilled jobs Giving equal employment opportunities for both men and women 	No. of people local people employed No. of women employed	Records	Annually	Proponent	N/A
2	Improved access to	<ul style="list-style-type: none"> Providing extra social services that 	Presence of	Inspection	Once operation start	Local communities	N/A

	social services by the local community	can be accessed by the communities.	social services				
3	Increase in economic activities	<ul style="list-style-type: none"> Sourcing funds for operation and maintenance cost Outsourcing non-core functions Traders from the project area to be given the opportunity to supply food stuffs for student meals. 	No. of traders supplying goods	Records	Quarterly	Proponent	N/A
4	Increase in revenue by government through taxes	<ul style="list-style-type: none"> Remitting taxes to TRA from wages and service contracts in time 	Remittances to TRA	Records	Quarterly	Proponent	N/A
NEGATIVE IMPACTS							
1	Poor waste management	<ul style="list-style-type: none"> Provision of dust bins or rubbish pits for the wastes produced Segregation of 	No. of dust bins Presence of dumping site Frequency of	Inspections Records	Quarterly Once during operation	IFM Simiyu Campus Management /students/ staffs	10,000,000

		<p>wastes by providing different bins for each type of waste</p> <ul style="list-style-type: none"> • Maintaining the dumping site that will be identified during construction • Collecting and disposing of wastes at the designated places regularly • Used chemicals should be disposed in consultation 	<p>waste disposal</p> <p>Presence of hazardous waste disposal site</p>	<p>Inspections</p>	<p>quarterly</p>		
2	Poor Sanitation	<ul style="list-style-type: none"> • Provision of adequate toilets for students and members of staff • Use septic tanks, soak away pits or Anaerobic waste treatment for disposal of liquid wastes 	<p>No of toilets</p> <p>Presence of septic tank in good condition</p>	<p>Inspections</p>	<p>Once during operation</p> <p>Quarterly</p>	<p>IFM management/s</p> <p>tudents/</p> <p>staffs</p>	10,000,000

		<ul style="list-style-type: none"> Regular Inspection and maintenance of the septic tank network 					
3	Increase in HIV and AIDS and other sexually transmitted diseases	<ul style="list-style-type: none"> Carry out sensitization meetings for students, teachers support staff and local communities from time to time. Develop an HIV and AIDS workplace policy; Distribution of condoms and information materials on HIV and AIDS to workers 	<p>No of meetings</p> <p>Policy in place</p> <p>No. of condoms distributed</p>	Records	Quarterly	Local Communities/ Management	3,000,000
4	Increase in criminal acts	<ul style="list-style-type: none"> Sensitize the communities and students on how they can live in harmony 	<p>No. of criminal incidences</p> <p>Community policing in place</p>	<p>Police</p> <p>Records</p> <p>Inspections</p>	<p>Quarterly</p> <p>Once during operation</p>	Sapiwi Police Station	2,000,000

		<ul style="list-style-type: none"> • Sensitizing the community members on the ownership of the college • Introduce community policing in conjunction with Sapiwi Police station • Request for a police unit within the project area. 	Police unit in place				
5	Surface Drainage	<ul style="list-style-type: none"> • Rain water harvesting gutters and storage tanks should be installed to reduce the amount of rainfall reaching the surface. • Semi permeable materials should be used for construction of 	Presence of rain harvesting gutters and storage tank	Inspection	Bi-annual	IFM Simiyu Campus Management	7,500,000

		<p>pavements.</p> <ul style="list-style-type: none"> • After completion of construction, the proponent should embark on comprehensive landscaping to increase softscape cover on the plot. 					
6	Fire outbreaks	<ul style="list-style-type: none"> • Hire competent and properly authorized electrical contractor to do the wiring and other electrical works. • Install fire alarm system for entire project • Install smoke detectors in kitchens. • Installation of firefighting equipment following 	<p>Presence of fire exit signs</p> <p>Presence of firefighting equipment and records of servicing</p> <p>Presence of fire hazard signs</p>	Inspection	Bi-annual	IFM Simiyu Campus Management	10,000,000

		<p>Country Fire requirements.</p> <ul style="list-style-type: none"> • Conduct regular firefighting drills within the site. • Develop and adapt an (fire) emergency response plan for the project during and occupation stage. • Ensure that all firefighting equipment are regularly maintained and serviced. • Provide fire hazard signs such as “No Smoking sign”, Direction to exit in case of any fire incidence and emergency numbers. 					
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8	Increase in Energy Demand	<ul style="list-style-type: none"> Put off all lights immediately when not in use or are not needed. Use energy conserving electric lamps for general lighting Make use of alternative source of energy such as solar power. Solar panels proposed in the project should be fully utilized and timely repaired in case of damage. 	Presence of energy conserving electric lamps Availability and condition of solar panels	Inspection	Quarterly	Energy Department	10,000,000
9	Increase in water demand	<ul style="list-style-type: none"> Install water conserving taps that turn-off automatically when water is not in use. Encourage water 	Presence of water conserving taps Monthly bills	Inspection	Quarterly	Water department	10,000,000

		<p>reuse/recycling during occupation phases.</p> <ul style="list-style-type: none">• Roof catchments of building blocks should be provided with rainwater harvesting systems (gutters, down pipes and water storage facilities) to enhance collection and storage of the resulting run-off. Such water can be used in watering flower gardens, general cleaning etc.• Provide notices and information signs to sensitize on means and needs to conserve water					
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		<p>resource i.e. Keep/Leave the Tap Closed etc. This will awaken the civic consciousness of the workers and residents with regard to water usage and management</p>					
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IMPACTS FROM DECOMMISSIONING PHASE

POSITIVE IMPACTS

1	Reduced noise levels	<ul style="list-style-type: none"> Removing all working and damaged construction machinery and equipment 	All equipment removed	Inspections	Once upon decommission	Contractor Project Manager	N/A
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NEGATIVE IMPACTS							
1	Loss of employment	<ul style="list-style-type: none"> • Informing workers of project duration when employing them • Educating the labour force on the need to save part of their wages • Paying severance benefits to all laid off workers according to the provisions of the labour laws 	Severance benefits	Records	Once	Contractor Project Manager	N/A
2	Poor waste management	<ul style="list-style-type: none"> • Disposing of construction wastes at the dumping sites that will be identified during construction phase. • Scrap metals will have to be sold or disposed at a dumping site that 	Site clear of construction wastes and scrap metal	Inspections	Once	Contractor Project Manager	N/A

		<p>will be designated specifically for such wastes.</p> <ul style="list-style-type: none"> Trees and grass should be planted in bare areas of the project site as a way of restoring the area. 	Well landscaped premise				
3	Loss of business opportunities	<ul style="list-style-type: none"> Informing local traders of the project duration in time Paying for all materials that were obtained on loan in time Outsourcing some services for non-core activities for the college 	Materials paid for	Records	Once	Contractor Project Manager	N/A
4	Noise pollution	<ul style="list-style-type: none"> Demolition activities to be restricted to daytime i.e. 8am to 5pm 	TBS standards	Inspection Observation Routine	Daily	Proponent Contractor Workers	

		<ul style="list-style-type: none"> • Use of Suppressors on noisy equipment or use of noise shields for instance corrugated iron sheet structures • Workers in the vicinity or involved in high level noise to wear respective safety & protective gear. • Comply with TBS (Noise and excessive vibration pollution control) Regulations 200 		Maintenance			
5	Health and safety of workers	<ul style="list-style-type: none"> • All workers to wear PPEs e.g. helmets. • All workers will be sensitized before demolition begins, on how to control accidents related to 	<p>No. of warning signs erected</p> <p>No. of people using PPEs</p> <p>No. of people\ trained</p>	<p>Inspection</p> <p>Observation</p> <p>Routine maintenance</p>	Daily	Proponent Contractor Workers	10,000,000

		<p>construction.</p> <ul style="list-style-type: none">• Accordingly, adherence to safety procedures will be enforced.• All workers will be adequately insured against accidents.	<p>Presence of a first aid kit</p>				
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CHAPTER NINE

COST BENEFIT ANALYSIS

9.1 Introduction

The cost-benefit analysis presents a brief comparison of environmental and social costs of implementing the proposed project versus benefits accrued from the project when implementation of the project has been completed. It is a clear fact that, it is not possible to account for all the impacts accrued from the implementation of the project. This is because some of the impacts are direct while others are indirect; some are short-term while others are long-term, some of the impacts are site specific while others cross the boundaries of the project area to affect a much larger population, though it may not be necessarily a significant impact. Similarly, valuation of these impacts is more or less dictated by the social group biases tied to the environment to which the project has been subjected. Therefore, methodology used in this cost benefit analysis, will base on comparing between the following:

“The total amount of cash that would be spent by the proponent into the local environment” termed as “**BENEFIT**” **Versus** “The opportunity cost of the items the people and the society will miss when the project is implemented” plus “environmental costs of mitigating any significant impact caused by the project’s activities after it is fully implemented to the closure phase”. Termed as “**COST**”

Since this project is expected to exist for 100 years, with 3 year of development costs and one year of decommissioning, the aspect of “Time Value for Money” will be ignored and all the costs will be considered as “Constant Dollar” with inflation and cost escalation assumed to be zero.

9.2. Benefits Related to the Project

Benefits from the proposed project at the institute can be classified as direct benefits and indirect benefits to institute, neighbour and the government. However, primary benefits of this project is further classified as direct benefits and indirect benefits. Construction activities may generate negative benefits though; they are usually minimal compared to the positive benefits. Some of those impacts are non- quantifiable thus cannot be used in the benefit-cost analysis estimations. Generally, the benefits of the project is experienced in all phases from mobilization, construction, operation to decommissioning phase. To mention few, employment opportunities and public benefits will occur during both the construction and the operation phases. Several

benefits are associated with the proposed development both at local and national level in terms of revenue generation and the multiplier effects associated with linkages with local and national economy.

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

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

9.2.1 Benefits to IFM

The proposed project has positive impacts to IFM since its benefit is a lifetime process throughout the project life span (99 years). The completion of these projects will be one of the pooling factor for increased number of students' enrolment thus in monetary cost its value has potential to increase annually. IFM financial capacity and sustainability are going to improve by far. Further, the improved financial standing is not only going to promote enrolment but also good governance and efficient running of the institute. Teaching, Research and Public Service and its envisioned centre of excellence in knowledge and dissemination to a wide spectrum of beneficiaries at national and regional levels are ones among the benefits. The project will also have several intangible benefits to IFM which include improving the institute image.

9.2.2 Benefit to the Neighbourhood

The proposed project meant to increase the capacity of infrastructure. This improvement may lead to the increase in staff requirement that is technical, administrators and academicians. During and after construction phase the project is going to provide additional employment opportunities for people surrounding IFM campus related to operation and maintenance. However, non-skilled labourers will benefit from the daily wages. The institute will also create

business opportunities in vicinity of the campus. Business opportunities will be supporting government initiatives to create employment opportunities for Tanzanians as advocated by the current Government. Notwithstanding that now salaries are yet to be specified, it is envisaged that from employment, workers will get incomes, which will improve quality of their lives and perhaps improve their lifestyles. However, employment opportunities and income from salaries provided will extend beyond the workers and benefits many other people including dependants.

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

- a. Utilization of locally available resources;
- b. Revenue to the Government will increase through payment of the various taxes (indirect and direct).
- c. Contribute to the development of housing and settlements as well as commercial real estate industry in Simiyu region.
- d. Boosting the infrastructure and economy of the country and Bariadi district in particular Sapiwi ward in which the project is located.

9.2.3 Benefit to the Government

The project will benefit the government in different aspects. These includes budget saving due to the relatively decrease in IFM financial dependence on the government. It is anticipated that during the operation phase the project will improve IFM financial capacity and sustainability resulting from project earnings. For that case, the government will have the opportunity to use the share of the budget which was supposed to go to IFM for other government development plans. Further the ability of IFM in contributing towards the realization of National Policies such as Education Reforms through expansion of enrolment of students into various degree programmes is going to increase. The increase in the number of enrolment mean the increase in financial capacity of the institution.

However, the government will benefit from the increased number of experts in priority discipline with different disciplines that will be graduating from IFM. This will create the potential of the

government to use internal resources (home country experts) in different future projects rather than contracting foreign experts.

9.2 Costs Related to the Project

The estimated costs for implementing enhancement measures, impact management as well as monitoring process as outlined in Chapters 8. The estimated costs for mitigation do not include the environmental costs, which could not be accurately calculated. Since some of the impacts will only to be realized during construction phase, the costs for these will also be short term, especially if mitigation measures are fully implemented. The construction costs for all the projects are detailed in Bills of Quantities.

9.3.1 Costs to Community

The resulting negative environmental and social impacts and risks such as noise, impairment of air quality, and Safety and health risks due to project activities will be absorbed by the surrounding communities. However, the introduction of mitigation measures will reduce the anticipated impacts. Apart from the above, no any community activities will be disrupted. IFM Simiyu Campus management is committed to mitigate the negative social and environmental impacts.

9.3.2 Costs to Government

The Government of the United Republic of Tanzania through the Ministry of Education, Science and Technology (MoEST) has secured fund from World Bank to promote higher education as a catalytic force in the new Tanzanian economy. The project is designed to revitalize the key areas for innovation, economic development, and labour market relevance. Also as already mentioned the Government will directly and indirectly benefit from taxes generated during both phases of the project. Apart from tax generation, the investment will also enhance the economic growth, enhancement of industrialization and businesses.

9.3.3 Environmental Cost

Environmental cost benefit analysis is assessed in terms of the negative and positive impacts. Furthermore, the analysis is considering whether the impacts are mitigatable and the costs of mitigating the impacts are reasonable.

9.4 Project Cost Benefit Analysis

As it has been mentioned in Chapters 6 – 8, the potential benefits of the project, in terms of financial and social benefit are substantial. The environmental impacts are reasonably mitigatable and the financial resources needed to mitigate negative impacts, when compared to the required investment are relatively small. However, the benefit cost ratio concluded the project to have more benefits compared to the total cost of the project, this implies that the project is viable and the proponent is encouraged to develop it.

CHAPTER TEN

DECOMMISSIONING PLAN OF THE PROJECT

10.1 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.

10.2 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 identify 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.

10.3 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.

10.4 Project Decommissioning Methodology and Schedule

IFM 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.

- i. 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 district council directives.
- ii. Employees will not be terminated from their employments rather will be relocated to the other area of works.
- iii. On decommissioning the proponent will search for experts' opinions in order to convert the entire area into another or other uses.
- iv. 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.
- v. Also, proponent Management shall obtain all permits required to undertake decommissioning of the Project. This basically will include Pension Fund, District 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: (i) pre-removal monitoring; (ii) permitting; (iii) interim protective measures; (iv) Project removal and associated protective actions; and (v) post-removal activities, including monitoring of environment and socio-economic activities.

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

(i) Pre-removal Monitoring

Pre-removal monitoring includes environmental and socio-economic status of the multipurpose teaching block, hostels, library and computer lab, community building and the surroundings. This monitoring is essential to identify if there is any environmental or social liability that needs to be settled before the permit for closure is given. This period will also be used to inventory all assets and facilities that need to be disposed of and to prepare a final decommissioning plan for approval by NEMC.

(ii) Permitting

Proponent shall obtain all permits required to undertake removal of the multipurpose teaching block, hostels, library and computer lab and community building. This basically will include NEMC, CRB, ERB, Social Security Funds, and Local Government Authorities etc.

(iii) Project Removal

As noted above, the removal of the multipurpose teaching block, hostels, library and computer lab and community building will be completed within six months.

(iv) Post-Removal Activities

Post-project removal monitoring will continue for one year.

The Proponent shall remove the structures safely and in a manner that minimizes environmental impact 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.).

10.2 Decommissioning Impacts and Mitigation

Decommissioning activities, particularly the removal of project components and grading could cause negative environmental effects similar to those of the construction phase. For example, there is the potential for disturbance (erosion/sedimentation/oil spills) to the environment. Mitigation measures similar to those employed during the construction phase of the project will

be implemented. These will remain in place until the site is stabilized in order to mitigate erosion and silt/sediment runoff and any potential effects on the features located adjacent to the project location especially residences.

Road traffic will temporarily increase due to the movement of decommissioning crews and equipment given the location of the site being adjacent the road. There may be an increase in localized particulate matter (dust) in adjacent areas during the decommissioning phase. Additionally, there will be emissions from the diesel engines of deployed machinery and equipment which may cause minor localized impacts to air quality. Decommissioning activities will lead to temporary elevated noise levels from heavy machinery and an increase in trips to the project location. Likewise, mitigation measures similar to those employed during the construction phase of the project will be implemented.

There will also be a loss of employment during the closure phase. As a mitigation measure, adequate advance notice will be provided to workers and service providers. The closures will finally result into generation of wastes from obsolete and unwanted materials. Mechanisms of identifying, collecting and disposal to ensure all wastes have been collected, removed and safely disposed will be put in place as described in Table 10.1.

Table 10.1: Waste Generation and Management Measures During Decommissioning

Type of waste	Management procedure
Overburden materials	<ul style="list-style-type: none"> -Avoid unnecessary excavation of land - Stockpile and store most of overburden produced for site rehabilitation -Use rest of overburden materials for land reclamation activities at the project sites
Debris	<ul style="list-style-type: none"> -Temporary collect the waste materials at the site; - Distribute the recyclable and re-usable materials (i.e. containers; timber, pipes, etc.) to local community members in Simiyu and through their local governments; - Dispose the waste materials at an authorized and certified facility
Liquid wastes from sanitary facilities	<ul style="list-style-type: none"> - Disinfect wastewater from the onsite sanitary facilities with chlorine or any other approved disinfectant;

	<ul style="list-style-type: none"> - Empty the liquid wastes (including slurry and sludge) in the existing sanitary facilities; - Safely dispose the wastewater (including slurry and sludge) at authorized and official wastewater treatment facilities
Steel / metal structures and piping materials Concrete from civil structures	<ul style="list-style-type: none"> -These materials will be transported to where the metals and steel parts will be recycled and re-used. -Concrete materials will be broken down and transported by the contractor to landfill or site rehabilitations

(Source; Consultant, 2023)

CHAPTER ELEVEN

SUMMARY AND CONCLUSION

11.1 Introduction

This chapter summarises and gives a concluding remark on the suitability of the project as described in the previous chapters.

11.2 Summary

The ESIA study has been undertaken at all levels by following guidelines, laws and regulation related with environmental and social issues at a high level of care and due diligence. The assessment has also considered important stakeholders who are in one way or the other being impacted by the project. Comments, suggestions, views and opinions were documented and included herein in this report in regards to their stake in the project. The team is satisfied that all procedures and processes involved in the assessment were in line with the modus operandi of environmental and society and that all important views and comments have been used to prepare the document. The ESIA study has scrutinized the environmental and social implications of the proposed multipurpose teaching block, hostel blocks, library and computer lab and functional hall at Sapiwi Village, Sapiwi Ward Bariadi District Council, Simiyu 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.

11.3 Conclusion

Based on the findings, it is evident that development of the proposed multipurpose teaching block, hostel blocks, library and computer lab, and functional hall will greatly contribute towards provision of quality education by IFM 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 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 IFM 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.

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LIST OF APPENDIXES

Appendix 1: Title Deed



THE UNITED REPUBLIC OF TANZANIA

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

CERTIFICATE OF OCCUPANCY

(Under Section 29)

T
S
E
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L.

The 31st day of October T

THIS IS TO CERTIFY that THE INSTITUTE OF FINANCE established under The Institute of Finance Management / Registered Office at Dar Es Salaam of P.O. Box 3918 DAR called "the Occupier") is entitled to the Right of Occupancy (hereinafter referred to as "the Right of Occupancy") in and over the land described in the Schedule hereto (hereinafter referred to as "the Land") for a term of ninety nine years from the first day of October, 1999 according to the true intent and meaning of the Land Act and its amendments and to any regulations made there under and to any enactments and amendments thereof and to the following special conditions:-

LR 21/2019

TANGANYIKA STAMP DUTY ACT.
 Stamp Duty Spst. _____
 Receipt No. _____

 Stamp Duty Office

TANGANYIKA STAMP DUTY ACT.
 Paid _____
 On Original Receipt Stamp _____

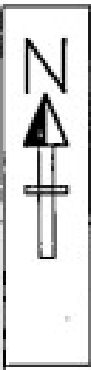
 Stamp Duty Office

- (iii) Building to be in permanent materials.
- (iv) Building plans to be submitted to the **Bariad** _____ months from the date of the commencement of t
- (v) Building construction to begin within six month
- (vi) Building to be completed within thirty six 1 commencement of the Right.

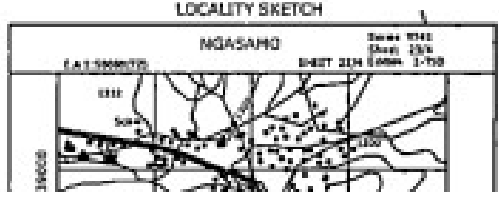
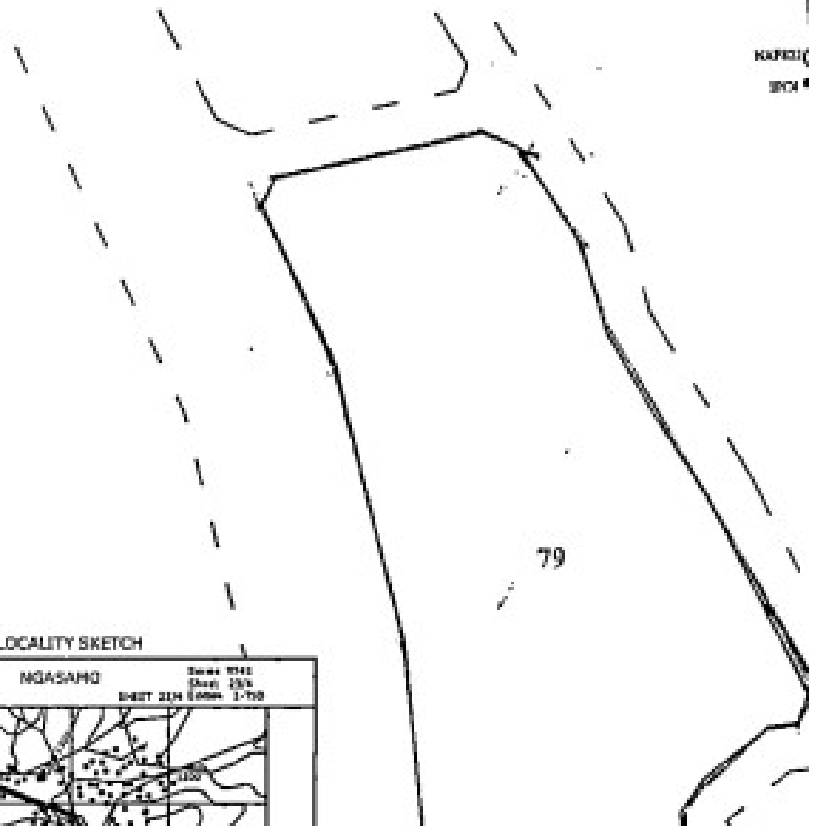
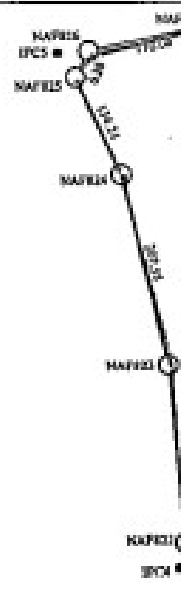
LR 21/2019

- 3. **USER:** The land shall be used for **Institute Purpos** classes (d) as defined in The Urban Planning (U Regulations 2018.
- 4. The Occupier shall not assign the Right within three y the prior approval of the Commissioner.
- 5. The Occupier shall deliver to the Commissioner prescribed form before or at the time the disposition i payment of all premia, taxes and dues prescribed in con
- 6. The President may revoke the right for good cause and

BARIADI DISTRICT



LOCALITY SAPIWI.....
BLOCK "B" (MD).....
FARM NONE.....
PLOT NO 79.....
L. O. NO 196445.....
AREA 12.27 Ha.....



SCHEDULE 'A.M.D'

ALL that Land known as Plot No. 79 Block "B" situated
Bariadi Distet Council containing ~~One Hundred Twenty~~ ^{Twelve Deca}
~~Hundred Twenty Six (122,726)~~ ^{12.2726} square metres shown for i
~~red~~ on the plan attached to this Certificate and defined on the
Numbered ~~107354~~ ¹¹⁶²¹⁵ deposited at the Office of the Director for
Dar es Salaam.

Given under my hand and my official seal the day and year fir

ASS. COMMISSIONER FOR LA

^{insino} The within named ^{The} INSTITUTE OF FINANCE MANAGEMENT
and conditions contained in the foregoing Certificate of Occupancy.

SEALED with the COMMON SEAL of the)

Appendix 2: Baseline Data on Air Quality, Noise and Vibrations

Appendix 2a: Average values of measured gaseous compared with local and/or international standards

Sampling Point	Measured Average Ambient Pollutant Gases			
	CO	NO ₂	SO ₂	H ₂ S
	mg/m ³	mg/m ³	mg/m ³	mg/m ³
AB1 (-2.368885'S, 33.965779'E)	3.00	0.00	0.01	0.00
AB2 (2.368507'S, 33.967541'E)	2.00	0.02	0.00	0.00
AB3 (-2.372201'S, 33.969454'E)	4.00	0.10	0.00	0.00
AB4 (2.374043'S, 33.967060'E)	2.00	0.10	0.00	0.00
Standby generator	5.00	0.20	0.01	0.01
TBS Limits	30	0.2	0.5	-
International standard [WHO:2005]	15	0.12	0.5	-

Source: Field measurement. Sampling date: December, 2023

Appendix 2b: Average values of measured PM 2.5 and 10 compared with local and/or international standards

Sampling Point	PM 2.5 [µg/m ³]	PM 10 [µg/m ³]
AB1 (-2.368885'S, 33.965779'E)	6	13
AB2 (2.368507'S, 33.967541'E)	5	11
AB3 (-2.372201'S, 33.969454'E)	7	13
AB4 (2.374043'S, 33.967060'E)	4	9
Standby generator	12	23
TBS STANDARD LIMIT	75	150
WHO STANDARD	25	50

Source: Field measurement. Sampling date: December, 2023

Appendix 2c: Average values of measured Noise levels compared with local and/or international standards

Sampling Point	Noise Levels in dBA
AB1 (-2.368885'S, 33.965779'E)	33.0
AB2 (2.368507'S, 33.967541'E)	41.7
AB3 (-2.372201'S, 33.969454'E)	44.5

AB4 (2.374043'S, 33.967060'E)	44.7
Standby generator	60.8
WHO guideline	55
TBS LIMITS	52

Source: Field measurement. Sampling date: December , 2023

Appendix 2d: Vibration level recorded at the site

Sampling Point	Vibration level measured (mm/s²)
AB1 (-2.368885'S, 33.965779'E)	0.006
AB2 (2.368507'S, 33.967541'E)	0.002
AB3 (-2.372201'S, 33.969454'E)	0.0043
AB4 (2.374043'S, 33.967060'E)	0.072
TBS Standard Limit	5
Human Detection level	0.15

Source: Field measurement. Sampling date: 16th May, 2023

Appendix 3: Buildings Site Plan



Appendix 4: Geotechnical Investigation and Soil Surveys Report

EXECUTIVE SUMMARY

- 1.0) THE RECTOR- INSTITUTE OF FINANCE MANAGEMENT (DAR ES SALAAM through letter, Ref. No: GA.264/134, APRIL, 2019 commissioned REGIONAL MANAGER'S OFFICE, Mara of Ministry of Works, Transport and Communication site and soil Investigation works for the proposed construct Finance Management Teaching Center Administration Sapiwi Village within Bariadi District Council in Simiyu.**

The purpose of this geotechnical investigation and soils tests and recommendations for the **buildings structure** foundations based on laboratory and field tests results.

The ground investigation revealed that the geology of the site is predominantly of alluvial of top soils, black cotton (ferruginous) brown grayish Clayey Gravelly soils mix with Cal Crete, silty gravelly soils and whitish sandy gravelly soils from ground observation of the investigated five open pits.

- 2.0) Using laboratory test results, visual observations and engineering calculations, the bearing capacity of the proposed **building structure** were established.**

The study carried out suggests the following:

- a) Adopt the **building structure foundation footing** **1.8m and 2.2m** from the existing ground level with stiff bearing capacity on the northern side of the proposed block site.

No water table was encountered at either of 5Nos of trial pits in the range of 2.5m from ground level.

- b) The presumption of bearing capacity of soils range from **100 KN/m²** Referring Terzaghi and Peck (1967).