ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT

FOR

THE CONSTRUCTION OF STUDENTS' HOSTELS AT COLLEGE OF MEDICINE AT BLANTYRE CAMPUS

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ACKNOWLEDGEMENTS

This Environmental and Social Impact Assessment (ESIA) report is for the construction of students' hostels at College of Medicine at Blantyre Campus under the Public, Private Partnership ("PPP") Agreement. The ESIA report has been prepared with the support of many people. The Consultant is grateful to all of them. The Consultant would like to recognize in a special way the support rendered by Management and Staff of Old Mutual Investment Group; Environmental Affairs Department; Blantyre City Council; Management and Staff of the Ministry of Lands, Housing and Urban Development; and Management and Staff of College of Medicine, Blantyre Campus, where the project will be implemented. The guidance provided by these officials is highly appreciated as it assisted the Consultant to prepare this report.

LIST OF ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
DC	District Commissioner
DEC	District Executive Committee
DESC	District Environmental Sub Committee
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EMA	Environment Management Act
EMP	Environmental Management Plan
ENRMC	Environment and Natural Resources Management Consultants
ESCOM	Electricity Supply Corporation of Malawi
ESIA	Environment and Social Impact Assessment
ESMP	Environmental and Social Management Plan
GDP	Gross Domestic Product
GIS	Geographic Information System
Ha	Hectare(s)
HIV	Human Immunodeficiency Virus
IDA	International Development Association
MGDS	Malawi Growth and Development Strategy
NCHE	National Council for Higher Education
NCIC	National Construction Industry Council
NSO	National Statistical Office of Malawi
STI	Sexually Transmitted Infection
TA	Traditional Authorities
ToRs	Terms of Reference
UmCoM	University of Malawi, College of Medicine
WB	World Bank

EXECUTIVE SUMMARY

1.0 Introduction

Old Mutual Investment Group would like to construct students' hostels at College of Medicine at Blantyre campus under the Public, Private Partnership ("PPP") Agreement. The decision to construct the students' hostels follows the realization that there is generally a critical shortage of modern and adequate student hostels facilities in both public and private universities in Malawi and College of Medicine is no exceptional. Shortage of modern and adequate students' hostels at College of Medicine in Blantyre is negatively affecting students' enrolment and their academic performance. The college does not have enough bed spaces to accommodate an increased number of students on campus. As a result, the institution is not able to enrol many students. Again, most of the students that are enrolled at the college stay off campus and travel long distances to access university facilities. It is therefore anticipated that the project will assist to increase students' enrolment and will enhance students' academic performance at the college as the project will help to create more bed spaces which will in turn assist to accommodate more students on campus.

Considering that construction activities for the project will generate a number of impacts on the bio-physical and socio-economic environment in the project area and beyond, Old Mutual Investment Group commissioned an Environmental and Social Impact Assessment study to identify potential environmental and social impacts related to the activities of the project; to assess the extent and significance of both positive and negative impacts; and to come up with measures to enhance the positive impacts and measures to mitigate the negative impacts.

2.0 Nature and scope of the construction of the students' accommodation

The project will construct students' accommodation at College of Medicine at Blantyre campus, access roads and car parks. To avoid space wastage, the hostels will be high rising buildings with a minimum of three storeys. The hostels will be fitted with elevators to allow students move freely to and from different floors. The different categories of students will be accommodated in different hostels. In all there will be 1 Postgraduate (PhD) students hostel with 3 storeys, 1 Postgraduate (Master of Science) students' hostel with 3 storeys and 1 undergraduate students' hostel with 5 storeys. The 3 hostels will have a total capacity of 550 bed spaces broken down into 400 bed spaces for undergraduate students, 100 bed spaces for Master of Science Students, and 50 bed spaces for PhD students.

Construction activities for the project will take 36 months starting from June 2019 to May 2022. Some of the materials that will be used to construct the hostels shall include Steel structural frame; nominally reinforced concrete floor slabs, sand/cement hollow blocks or solid blocks depending on application, fiber cement boards for non-structural applications, pressed metal door frames, masonite faced flush panel solid core doors, and natural anodized aluminium windows with top hung opening sections and permanent louvre ventilation. Old Mutual will require about U$ 20,000,000.00, which Old Mutual Investment Group has already secured from investors in a form of equity and debt. Over 150 people will be employed to work at the site when construction activities begin. Once construction activities are completed, the college will use the hostels to accommodate students on campus.

3.0 Stage of the project

The project is at planning and design stage. Activities under planning and design stage include obtaining different permits and approvals for the project; conducting perimeter and topographic

surveys; conducting feasibility studies, detailed engineering designs and environmental and social impact assessment studies.

4.0 Methodology for the study

The ESIA study was conducted using the following steps:

a) Site visits and meetings with the University's management;
b) Desk study of literature materials pertinent to the proposed project and its location;
c) Field survey to collect baseline information through direct observations, interviews with relevant stakeholders; and
d) Preparation of the ESIA study report as per the Environmental Impact Assessment Guidelines of 1997.

5.0 Key environmental and social issues

The study identified a number of bio-physical and socio-economic impacts that will be generated by the activities of the project. A summary of the positive and negative impacts of the project are outlined below:

5.1 A summary of the key positive impacts identified in this ESIA report include:

The following is a summary of the main positive impacts:

a) Provision of modern and adequate and affordable students' hostels facilities at College of Medicine;
b) Increase in general student enrolment;
c) Increase in performance of students academically as most students will leave close to the campus and easily access college facilities;
d) Creation of Employment;
e) Increase in market for local construction materials;
f) Increase in business activities within the project area;
g) Improve security in the area;
h) Increase in economic activities;
i) Improved aesthetic value; and
j) Increase in revenue by government through taxes.

5.2 Summary of key negative impacts

The following is a summary of the main negative impacts:

a) Labour influx;
b) Increased generation of waste;
c) Injuries due to construction works;
d) Increased risk of dust emission and air pollution;
e) Risk of social conflict;
f) Increased risk of illicit behavior and crime;
g) Impacts on community dynamics;
h) Increased burden on and competition for public service provision;
i) Increased risk of communicable diseases;
j) Increased cases of accidents;
k) Possible disruption of public service utilities;
l) Disruption of flow of traffic and public mobility;
m) Visual Intrusion;
n) Increased demand for sanitary facilities; and
o) Noise Pollution;
p) Increase in the spread of HIV AND AIDS and other sexually transmitted diseases;

q) Increased energy demand; and
r) Increased Water demand

6.0 Conclusion and recommendations of the ESIA study

From the ESIA study, it has been established that construction of the new hostels at College of Medicine Blantyre campus will generate significant socio-economic benefits to the students, people in the project area and the country. If the enhancement measures that have been proposed in this ESIA report will be properly implemented, the positive impacts will be enhanced. The study has also identified some negative environmental and social impacts that the project will generate. However, if the mitigation measures that have been proposed in this ESIA report will be properly implemented, the negative impacts will be mitigated by either avoiding, minimizing or even eliminating some of them completely.

It is therefore recommended that the proponent of the project should be allowed to implement the project and adopt the recommendations advanced in this report.

CHAPTER 1 INTRODUCTION AND BACKGROUND

1.1 Introduction

Old Mutual Investment Group would like to construct students' hostels at College of Medicine campus in Blantyre under the Public, Private Partnership ("PPP") Agreement. Old Mutual will operate the hostels after construction activities are completed for 35 years, during which period, Old Mutual will recover all its capital investment and the associated profits. After 35 years of operating the hostels, Old Mutual will hand over the hostels to College of Medicine to become the property of the college.

The decision to construct these hostels at College of Medicine in Blantyre follows the realization that there is generally a critical shortage of modern and adequate students' hostels in both public and private universities in Malawi and College of Medicine in Blantyre campus is no exceptional. Shortage of modern and adequate hostels at College of Medicine in Blantyre is negatively affecting students' enrolment and students' academic performance. The College does not have enough bed spaces in Blantyre. As a result, the institution is not able to enrol many students. Again, most of the students that are enrolled at the campus stay off campus and travel long distances to access university facilities. It is therefore anticipated that the project will assist to increase students' enrolment and will enhance students' academic performance at College of Medicine in Blantyre as the project will help to create more bed spaces which will assist to accommodate more students on campus.

Considering that construction activities for the project will generate a number of impacts on the bio-physical and socio-economic environment in the project area and beyond, Old Mutual Investment Group contracted Environment and Natural Resources Management Consultants to undertake an Environmental and Social Impact Assessment study and to prepare an Environmental and Social Impact Assessment report and the associated Environmental and Social Management Plan and the Environmental and Social Monitoring Plan for the project. The Environmental and Social Impact Assessment study identified potential environmental and social impacts related to the activities of the project; assessed the extent and significance of both positive and negative impacts and came up with measures to enhance the positive impacts and measures to mitigate the negative impacts.

1.2 Background information

The College of Medicine (CoM), which was established in 1991 is one of the four constituent colleges of the University of Malawi, the oldest and largest public university in the country. The College was established with the aim of training doctors and other health professionals, in clinical service and medical research responsive to the health needs of Malawi and its neighbours in the southern African region. The other three constituent colleges of the University of Malawi are Chancellor College in Zomba, the Malawi Polytechnic in Blantyre, and Kamuzu College of Nursing in Blantyre and Lilongwe. The College of Medicine houses the Faculty of Medicine, and Faculty of Biomedical Science and Health Profession. The College has gradually grown from a program with an intake of 10-15 students per year to a program with an intake of on average 60 students per year with 110 faculty members, of whom approximately 67% are Malawians. As of 2018 the College has 300 students of whom 275 are undergraduate, 20 postgraduates and 5 Doctoral students. To date the college has graduated over 250 medical doctors. The college is in

dare need of expanding enrolment of students in order to effectively cater for the needs of the different health facilities in the country. However, students' hostels have been a big bottleneck for increased enrolment.

The academic principles of the College are that: -

a) medical training be community and public health based in order to reflect the health needs of Malawi;
b) learning should be "problem based" to foster an attitude of enquiry;
c) research should be directed to the medical challenges and diseases specific to Malawi;
d) as far as possible the undergraduate curriculum should be integrated both horizontally in the basic medical science disciplines as well as vertically in the clinical disciplines; and
e) the college is committed to a policy of gender equality.

The Vision of the College is to be a public university committed to enhancing the health of the nation while the Mission of the College is to be an academic centre of excellence in the training of doctors and other health professionals, in clinical service and medical research responsive to the health needs of Malawi and its neighbours in the southern African region.

The College recognizes three core tasks namely teaching and training; research; and service delivery. Teaching and training is a core task of the College and should be of the highest possible quality, following international developments, both in terms of content and in terms of teaching methodology. The College of Medicine wants to offer its students an enabling environment for their professional and personal development. It is in the process of reviewing and reforming its curriculum.

Research in the College directly and indirectly influences the health debate, policies and decisions in the country for the benefit of the people of Malawi. This research is closely linked to the teaching and service delivery activities within the College. The quality of its research reflects directly on the College of Medicine's national and international standing.

Service delivery is one of the College of Medicine's tasks where it concerns delivery of clinical services in the teaching hospitals or provision of services that no other institution in Malawi can provide, i.e. certain laboratory and consultancy services. In some instances, service delivery is done as part of research projects.

1.2.1 Programmes offered by the College

The anchor academic program is the five-year Bachelor of Medicine and Bachelor of Surgery (MBBS) degree. Other undergraduate programs include Bachelor of Pharmacy and Bachelor of Medical Laboratory Technology.

Postgraduate degrees offered at the College include the two-year Master of Public Health, the four-year Master of Medicine in the clinical disciplines, and a Doctoral degree programme in collaboration with outside institutions.

1.2.1.1 Undergraduate Programmes

The following undergraduate courses are offered at UMCoM:

a) Bachelor of Medicine and Bachelor of Surgery (MBBS);

b) Bachelor of Pharmacy (BPharm); and
c) Bachelor of Science in Medical Laboratory Technology (BScMLT).

1.2.1.2 Graduate Programmes

The following postgraduate courses are offered at the UMCM:

a) Master of Medicine (MMed) in Internal Medicine;
b) Master of Medicine (MMed) in Family Medicine;
c) Master of Medicine (MMed) in Obstetrics and Gynecology;
d) Master of Medicine (MMed) in Pediatrics;
e) Master of Medicine (MMed) in General Surgery; and
f) Doctor of Philosophy (PhD).

1.2.2 Campuses of the College

The College's main campus is in the city of Blantyre, Malawi's financial capital and largest city, adjacent to Queen Elizabeth Central Hospital, the University's teaching hospital. Figure 1.1 provides an overview picture of the College of Medicine Campus in Blantyre.

Figure 1. 1 An overview of picture of the College of Medicine Campus in Blantyre

The medical college maintains a second campus in Lilongwe. Figure 1.2 provides an overview picture of the College of Medicine Campus in Lilongwe.

Figure 1. 2 An overview picture of the College of Medicine Campus in Lilongwe

A third campus is planned in the town of Mangochi, along the southern shores of Lake Malawi, at the premises of Mangochi District Hospital.

1.2.2.1 College of Medicine campus in Blantyre

College of Medicine Campus in Blantyre started to operate in 1991.The campus has grown over time and it is now enrolling over 300. The available bed space is of shared room type with shared bathrooms and toilets, which is not suitable for graduate students. Not all students are accommodated on campus resulting in some students either staying with their relatives in town or find their own accommodation off campus. It is therefore anticipated that the proposed project will increase students' enrolment both at undergraduate and graduate levels and will enhance students' academic performance as the project will create modern and adequate accommodation facilities at the campus.

1.3 Nature and scope of the construction works

The project will construct student's hostels at College of Medicine in Blantyre, access roads and car parks. To avoid space wastage, the hostels will be high rising buildings with three storeys. Each hostel will be fitted with elevators to allow students move freely to and from different floors. The different categories of students will be accommodated in different hostels. In all, there will be 1 Postgraduate (PhD) students hostel with 3 storeys, 1 Postgraduate (Master of Science) students' hostel with 3 storeys, and 1 undergraduate students' hostel with 5 storeys. The 3 hostels will have a total capacity of 550 bed spaces broken down into 400 bed spaces for undergraduate students, 100 bed spaces for Master of Science Students, and 50 bed spaces for PhD students.

The hostel for undergraduate students will have rooms with 2 beds and built in furniture such as book shelves, reading desks, reading lumps, lockers/wardrobes and other storage facilities. The

students will use common shower rooms, toilets and laundry facilities. Each hostel wing will be self-contained with each wing having its own set of combined toilets/bathroom, kitchen and laundry facilities. The ground floor for the hostels for the undergraduate students will consist of a lounge and a purposely-built hygiene communal area (like food court). The food court will be in a form of a combination of self-catering services and spaces which will be demarcated into several lockable kiosks (which will be let out) and provide various foods to students.

The hostel for Masters' of Science students will have rooms with single beds with built in furniture such as book shelves, reading desks, reading lumps, lockers/wardrobes and other storage facilities. Some rooms will be self-contained while others will not. The hostels will have a shared common lounge area on every floor. Each wing of the hostel will be self-contained with its own set of combined toilets/bathrooms, kitchen and laundry facilities.

The hostel for PhD Students will comprise of a combination of single studio flats each with kitchenette and will be ensuites, and 2-bedroomed family flats with lounge/dining, kitchenette and family bathroom. The hostel will have a shared common room/lounge area on ground floor only. The lower ground floor will accommodate offices and stores for the facilities manager.

Activities for the project will be implemented in four phases namely planning, construction, demobilization, and operation and maintenance phases. Activities under **planning phase** include obtaining different permits and approvals for the project; conducting perimeter and topographic surveys; conducting feasibility studies, detailed engineering designs and environmental and social impact assessment studies.

Activities under **construction phase** shall include site establishment; mobilization of workers; transportation of equipment (bull dozers, caterpillars, heavy duty vehicles, etc); transportation of construction materials (e.g. stone aggregates, steel, cement blocks, sand, cement, gravel, fiber cement boards, pressed metal door frames, masonite faced flush panel solid core doors, and natural anodized aluminium windows etc); construction of workers' camp; clearing of access roads and diversions; excavation and stockpiling of excavated materials (gravel and aggregate stone); cordoning; fencing the area within which access will be limited to construction workers and people working at the campus; and construction hostel facilities.

Construction will generally be of plain concrete strip footing, load bearing cement blocks walls in foundations, load bearing cement blocks walls, reinforced concrete ground slab, steel frame structure, steel roof structure, steel door frames and windows, timber doors, ceramic tiles to some floors and glazed tiles to walls in toilets, lime putty plaster and paint to the rest of the walls internally, fair face pointed externally, painted ceiling, joinery fittings, sanitary, plumbing and electrical services.

Construction activities will take 36 months starting from June 2019 – May 2022 and will require about U$ 20,000,000.00, which Old Mutual Investment Group has already secured from investors in a form of equity and debt. Over 150 people will be employed to work at the site when construction activities begin. Once construction activities are completed, the college will use the facility to accommodate students on campus.

Activities under **demobilization phase** will include laying off workforce employed during construction phase; demobilization of equipment; demolition of workers and Contractor's camp; rehabilitation/restoration of access roads; closure and restoration of materials storage yards; removal of construction wastes; re-vegetating areas that were cleared by the Contractor along the access roads and restoration of damaged areas; and places occupied by the project construction facilities to other beneficial uses.

Activities during **operation and maintenance phase** will include commissioning the use and regular maintenance of the constructed hostels facility for the intended purpose.

1.4 Project Proponent

The project proponent is Old Mutual Investment Group. Details of the project proponent are provided as follows:

Project Developer:	Old Mutual Investment Group
Project details:	Construction of a Hostel facility at College of Medicine, Blantyre Campus
Postal Address:	Old Mutual Investment Group, Old Mutual Building, 30 Glyn Jones Road, P.O. Box 393, **Blantyre**
Contact Person:	Ms. Linda Kumsinda
Email:	lkumsinda@oldmutual.co.mw
Phone Number:	0999953970

1.5 Project Location

The College of Medicine, Blantyre campus is located along Mahatma Ghandi Avenue, in the city of Blantyre, Malawi's financial capital and largest city, adjacent to Queen Elizabeth Central Hospital, the University's teaching hospital. The geographical coordinates of the medical college's main campus are: 15°48'06.0"S, 35°00'56.0"E (Latitude: -15.801667; Longitude: 35.015556). Figure 1.3 provides the location details of the campus while Figure 1.4 provides the site-specific map for the hostels.

Figure 1. 3 Location map for hostels project at College of Medicine in Blantyre

Figure 1. 4 Map of existing establishments in the project area at College of Medicine at Blantyre Campus

1.6 Current Status of the Project

The project is at 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 study. It is expected that the environmental and social management measures that have been prescribed in this ESIA report will be incorporated into the project activities during construction phase.

1.7 Project Objectives

The project will assist to create modern and adequate students' hostels at College of Medicine, Blantyre campus. The students' hostels that will be constructed will assist to enhance students' academic performance at the College and will also assist to increase students' enrolment as enough bed spaces will be available to accommodate increased numbers of students on Campus. Once construction activities are completed, the college will use the students' hostels to accommodate some students who will then have easy access to different learning facilities at the college. Besides, the new students' hostels will provide conducive amenities to facilitate learning.

1.8 Objective of Environmental and Social Impact Assessment study

The objective of the ESIA study was to ensure that environmental concerns are integrated in all the 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 proposed project was to:

a) Examine in detail the likely adverse environmental impacts;
b) Propose appropriate mitigation measures for the significant negative impacts; and
c) Develop an Environmental and Social Management Plan with mechanisms for monitoring and evaluating compliance and environmental performance.

1.9 Scope of the ESIA study

The ESIA study was prepared as per the guidelines provided under the Environmental Impact Assessment Guidelines of 1997 and World Bank Safeguards guidelines. The ESIA contains Introduction and background to the project in Chapter 1, Project Description in Chapter 2, Consideration of Alternatives in Chapter 3, Biophysical and Socio-Economic Environment in Chapter 4, Malawi's Environmental Regulatory Framework in Chapter 5, Impact Identification and their Management Measures in Chapter 6, Environmental and Social Management and Monitoring Plans in Chapter 7 and Conclusion and Recommendations in Chapter 8.

1.10 Potential Users of the ESIA report

The ESIA and the associated ESMP has been prepared for use by different stakeholders to be involved in the planning, implementation, management and monitoring of the proposed project activities. Some of the users will include the Developer; Contractor; Blantyre City Council; College of Medicine, Blantyre Campus; Environmental Affairs Department; and Ministry of Lands, Housing and Urban Development. The report contains useful information on policies and procedures to be adhered to, implementation modalities, analysis of potential environmental and social impacts and suggested mitigation measures at various stages of the project activities.

1.11 Methodology

The ESIA study for the proposed project was carried out in accordance with the Terms of Reference that were provided by EAD as provided in Annex 1. The study was undertaken between August and October 2018 and included the following methodology:

a) Literature review;
b) Site visits; and
c) Stakeholder consultation.

1.11.1 Literature Review

Literature review involved 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. Examples of the information obtained from the different documents include project design, planned project activities.

1.11.2 Site visits

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

1.11.3 Stakeholder consultations

Stakeholder Consultations formed an important feature of the ESIA study. The consultation meetings provided an opportunity for stakeholders, particularly community members around the project area to express their views on the proposed project as well as to raise any issues of concern relating to the Project. The methodology employed for Stakeholder Consultations included:

a) Public meetings (where general information about the project was delivered, Questions and Answers conducted);
b) Focus Group Discussions with only those who will be potentially affected by the project; (disaggregated by gender, status, age, women; men; youth); and
c) Key Informant Interviews (KII) which covered institutional leaders and other key figures.

A number of stakeholder consultation meetings were conducted in the project area in order to:

a) Inform the different stakeholders about the project;
b) Provide an opportunity for the stakeholders to discuss their opinions and concerns;
c) Manage their expectations and misconceptions regarding the project;
d) verify the significance of environmental, social and health impacts identified;
e) get inputs on compensation issues;
f) disseminate concepts of the proposed Project activities with a view to provoking Project interest amongst the stakeholders;
g) promote sense of ownership for the Project; and
h) inform the process of developing appropriate mitigation measures.

Details of the people consulted are presented in Annex 2, while responses to different people who were consulted are provided in Annex 3 and Details of the Consultants who conducted the Environmental and Social Assessment studies are provided in Annex 4.

1.12 Existing Land Uses in the Project Area

Land for the proposed project belongs to College of Medicine, Blantyre Campus. The campus has 24 ha of land out of which 4.8ha is the proposed project site. The project therefore will not require any additional land out of the campus hence no issues of land take, resettlement and compensation will arise as the project will only use land that belongs to the college.

CHAPTER 2 PROJECT DESCRIPTION

2.1 Project design considerations

The overall design of the hostels will promote use of construction materials, which are environmentally friendly, durable, and vandal-proof and those which require minimal periodic maintenance. The general design considerations will incorporate aspects of modern architecture, the current local government building policy guidelines and the latest standards developed by NCIC and the National Council of Higher Education (NCHE) Architectural Metric Handbook which will include:

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

b) **Lighting**: The design caters for various types of energy efficient luminaries including fluorescent lamps and natural lighting through glass windows and doors as appropriate for both security and lighting;

c) **Sanitary accommodation**: The number of toilets and wash hand basins will be selected according to the number of students in each hostel;

d) **Waste water management:** Waste water will be managed through wastewater stabilization ponds

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

f) **Solid waste management:** The campus management will be required to contract a waste handler for proper waste disposal; and

g) **Fire protections**: The design of the hostels will incorporate fire- fighting equipment to be installed in each building.

2.2 Description of main project activities

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

2.2.1. Planning phase

Planning phase for the project commenced in August 2017 and will be concluded in April 2019. Activities during planning phase include identification of land for the project; land surveying; preparation of a master plan; preparation of detailed lay out plans; preparation of building designs, tender processing, obtaining approvals under the Physical Planning Act No 17 of 2016 and the Bye-Laws and obtaining different approvals necessary for construction and operation of the project facilities. Environmental and Social Impact Assessment study is part of the planning phase.

2.2.2. Construction phase

2.2.2.1 Consideration for constructing different structures

Different considerations will be given when constructing different project structures. These will aim to provide stability and durability of the structures. Some of the considerations are discussed in the sections that follow.

a) Founding conditions

The hostels will require foundation on a good and uniform soil to avoid deferential settlement. A full geotechnical investigation shall be conducted to ascertain the exact founding conditions of the structures for the hostels. A soil raft of min 300mm thick G5 material will be used as pioneer layer.

b) Durability of the concrete

Durability of any concrete is dependent on the cement being used, aggregates, admixtures, concrete mix design and curing. Ordinary Portland Cements (OPC) shall be used to construct the hostels. Rapid hardening cements will be avoided due to greater evolution of heat which can lead to increased shrinkage cracking.

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

c) Outline of Construction Activities

Construction activities will take 36 months starting from June 2019 – May 2022. Over 150 people will be employed to work at the site when construction activities begin. Construction activities will involve land clearing; landscaping; grading; excavation; compacting; trenching; construction of service infrastructure such access roads and a car park, construction of a workers' camp which will provide hostels to workers, storage facilities and an office facility; backfilling with compaction consolidation; levelling and earth marking; transportation of building materials; and construction of different infrastructures and other related buildings. Other infrastructure such as drainages and utility reticulation shall also be constructed. Details of facilities that will be constructed are provided in Table 2.1 and Figure 2.1 provides a site plan, which provides the location of the hostels in relation to other facilities on the project site.

Table 2. 1 Details of the hostels to be constructed

Beds	No. of buildings	Type	Block area (m^2)	Total gross area (m^2)
400	1 x 5 storeys	Undergraduate students	9,600	9,600
100	1 x 3 storeys	Postgraduate (MSc students)	4,200	4,200
50	1 x 3 storeys	Postgraduate (PhD students)	4,260	4,260
550	**3**			**18,060m^2**

Note: *Gross Area includes service areas, covered walk ways and terraces, drying yards*

Figure 2. 1 Lay out Plan for the proposed hostels at College of Medicine in Blantyre

2.2.2.2 Construction activities

a) Site Preparation

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

b) Construction of the workers' camp

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

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

c) Construction of new hostels

Some of the activities to be undertake will include excavation of foundation footing, laying down a brick base; pouring a concrete slab, installation of framework, installation of plumbing workers, putting a wall frame, roofing and finishing. External works infrastructure will consist of paved roads and parking areas, lined storm water drains, foul and waste drainage system and landscaping. Sidewalks will be provided for pedestrians.

2.2.2.3 Construction workers

In all, about 150 people will be employed during construction phase. The people to be employed will include a minimum of 40% women in the workforce. The people will include supervisors, skilled and unskilled laborers. For the semiskilled 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.

2.2.2.4 Construction equipment

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

i) Bull Dozers for clearing the site, removal of top soil 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) Earth mover;
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, fork lift, excavator etc.

2.2.2.5 Construction materials

Different raw materials will be required during construction phase. Materials such as sand, gravel and quarry stone will be sourced from the surrounding areas. Quarry stone will be obtained from Njuli Quarry. Sand will be obtained from Likhubula while gravel will be obtained from Chiradzulu borrow pit. The sites where quarry stone, gravel and sand will be collected from are approved sites.

Use of concrete blocks for construction of different infrastructures will be more environmentally friendly than 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 that 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), cardboard will also be sourced for the project. Construction materials will be sourced depending on the construction stage.

Construction will be done by a private contractor and the client will hire a Clerk of Works to supervise the construction phase of the project to ensure that the contractor complies with the design standards. The developer together with the Ministry of Transport and Public Works Officials (Buildings Department) will work hand in hand in supervision of works and monitoring progress. Construction will require various input materials to produce several outputs. Table 2.2 outlines the inputs and outputs during the construction and operation phases.

Table 2. 2 Overview of the main inputs and outputs from the proposed project

Category of developments on the site	**Main inputs into the activities**	**Main outputs from the activities**
Construction of service infrastructure		
Land preparation activities		
Land surveying	surveying equipment	Lay out plan for the proposed infrastructure
Site development activities		
Land harrowing and land levelling	Excavators and graders	Levelled land
Construction of an access road	Graders, caterpillars, compactors, gravel	Earth access road upgraded to gravel standard
Reticulation of water facilities	Water pipes and accessories	Underground reticulation of water facilities

Reticulation of electricity facilities	Wooden poles, a transformer, Electrical wires and tubes	Installation of electricity facilities in the new and rehabilitated structures
Telecommunication	Poles, wires, radio receivers, dual channel lines	Installed telecommunication network
Construction and rehabilitation of buildings		
Construction of the students' hostels, access roads and car parks	Cement blocks, cement, quarry, planks, iron sheets, aluminum windows, pressed metal door frames, window panes, sand, gravel and water	Completed students' hostels, access roads and car parks
Construction of waste water management systems		
Construction of sewer lines to connect the sewer system to Zingwangwa waste water treatment plant.	Pipes and channels	Sewer line to connect the sewer line to Zingwangwa waste water treatment plant

2.2.3 Demobilization Phase

Decommissioning of the students' hostels is not expected to occur under the project, and potential future issues can be minimized by avoiding use of hazardous materials in the initial construction. Decommissioning of auxiliary facilities such as quarries/ borrow pits could be an issue, but these are unlikely to be opened specifically for the construction of the proposed students' hostels hence construction works will use existing quarries/borrow pits to obtain aggregate stone and gravel.

The main activities to be undertaken during demobilisation phase shall include demolition of the workers' camp, which will take place from June – August 2022. Rubble from construction activities and demolished workers' camp and other waste from construction activities will be used as fillers during foundations. Any leftover solid materials likely to be composed of bricks and crumbles of cement will be disposed by levelling off other degraded areas within the project area and within the surrounding communities in collaboration with Council Engineer responsible for roads.

Demobilization will further involve laying out of workers, removal of construction equipment and left-over materials, dismantling of workers' camp and levelling the site, landscaping, filling of borrow pits and laying off construction workers.

2.2.4 Operation and maintenance phase

Activities during operation and maintenance phase will include commissioning the use and regular maintenance of the student students' hostels. The effect of this is that different wastes both solid and liquid waste will be generated in a year and substantial liquid waste will be generated within the same period, which will require to be managed properly.

CHAPTER 3 CONSIDERATION OF ALTERNATIVES

Alternatives to projects are different ways to achieve the same purpose that the proposed project intends to achieve. Environmental and Social Assessments require looking into alternatives to the proposed projects in order to make prudent decisions.

3.1 Factors considered

3.1.1 Existing policies, legislation and standards regarding construction industry in Malawi

A review of available policies, legislation and standards of construction industry in Malawi was carried out to ensure that the hostel building conform to the required standards. This was done to ensure the safety of the building.

3.1.2 Environmental considerations

Environmental factors were also considered in the choice of building materials, citing of other facilities such as wastewater treatment facilities and choice of wastewater treatment technology. This was done in order to ensure that the project does not cause irreparable damage to the environment.

3.1.3 Cost benefit analysis

An analysis of technologies to be used was made to ensure that the amount of money that was budgeted for the proposed project is adequate. However, this was done without compromising the quality or safety of the buildings.

3.1.4 Location and layout alternatives

The location and layout alternatives were not considered since the proposed construction works will take place within the premises where other structures for College of Medicine, Blantyre campus exist and therefore alternative sitting and layout was not an option.

3.2 Project alternatives

The project alternative is defined as a possible course of action, in place of another that will meet the same purpose and needs. The role of project alternatives is to find the most effective way of meeting the need and purpose of the proposed project, either through enhancing the environmental benefits of the proposed activity, and or through reducing or avoiding potentially significant negative impacts. The assessment has therefore analyzed the following alternatives: Do-Nothing /'Without Project' Option; Develop the proposed project; Technologies alternatives; Alternatives to building materials for Associated Civil and Building Works; and environmental and social considerations of alternatives.

3.2.1 Do-Nothing /'Without Project' Option

The "Do Nothing alternative" sometimes referred to as the 'no-action' alternative' assumes that the project does not go ahead, implying a continuation of the current situation or the status quo. Construction of the students' hostels and other support facilities will not be undertaken. Table 3.1 presents the advantages and disadvantages of the alternative. It is important to note that this Do-Nothing alternative is the baseline against which all other alternatives and the development proposal have been assessed. The Do-Nothing alternative will not register any of the impacts (both positive and negative) associated with any specific alternative or the development proposal.

Assessing the other alternatives would therefore unintentionally provide an assessment of the Do-Nothing alternative. In addition to the direct implications of retaining the status quo there are certain other indirect impacts, which may occur should the Do- Nothing alternative be followed. The Do-nothing alternative will entail continued absence of modern and adequate hostels at the campus. Failure to build the new students' hostels at the campus will affect students' intake at the college as the college will not be able to accommodate many students. Besides, the absence of a modern and adequate hostels at the campus will negatively affect students' performance as most students will continue to leave far away from the college there by having difficulties to access college facilities.

Table 3. 1 Advantages and Disadvantages of the "Do Nothing Alternative"

Advantages	**Disadvantages**
The natural resources meant to be used for construction works at the site such as sand, water, and quarry will be saved.	The new students' hostels at the campus will not be constructed. Instead, the accommodation problems being experienced at the campus will continue, which will continue to affect students' enrolment and their academic performance.
The different social and economic impacts the project would cause in the project area will not occur.	The access road to the new students' hostels will not be constructed.
	Loss of employment opportunity for both skilled and unskilled workers expected to be employed during construction of the new students' hostels.
	Lack of a modern and adequate students' hostels at the campus which will continue to affect students' enrolment and their academic performance.

The Do-Nothing alternative means that the new students' hostels will not be constructed at the campus. Without constructing the modern and adequate hostels at the campus, the college will not be able to increase its intake and students' performance will not be improved as the students who stay off campus will continue to walk long distances to access college facilities.

3.2.2 Develop the proposed project alternative

The alternative was considered assuming that construction of the new students' hostels will proceed as proposed. The project will proceed with construction of the new students' hostels. The alternative will induce several environmental and socio-economic impacts both positive and negative. Table 3.2 provides the positive impacts (advantage of the alternative) and the negative impacts (disadvantage of the alternative).

Table 3. 2 Advantages and disadvantages of the "Develop the project alternative"

Positive impacts (advantages of the alternative)	**Negative impacts (disadvantages of the alternative).**
Increased employment opportunities at local and national level especially during construction phase	Increased waste generation (solid and liquid) from construction camps and construction sites
Creation of market for goods and services	Population influx due to migration of construction workers to the site
Increased economic activities within the project area	Generation of construction waste
Skills transfer to different people at local and national level	Construction related accidents
Increased students enrolment	Increased risk of illicit behavior and crime
Improved students' performance	

The alternative will generate a number of positive and negative impacts once the project activities proceed as proposed. However, the anticipated negative impacts can be easily mitigated during construction and operation phase. The "Develop the Proposed Project" alternative is therefore a preferred alternative since it will lead to socio- economic development of the country through increased students' intake and improved students' performance.

3.3 Alternative building technologies

In the construction industry, there are a number of choices on the building materials. The choice of building materials can determine the durability of the structures to be built, the beauty of the structures, the cost of building the structures and the damage that can be impacted on the environment. Four options, use of burnt bricks, use of eco bricks, stabilized soil blocks and concrete bricks were considered as follows:

3.3.1 Use of burnt bricks

In Malawi, use of burnt bricks is cheap because they are locally made and can be close to the project site. The traditional fired/burnt bricks are made from soil that is mixed with water, dried in the sun there after baked using wood fuel.

Disadvantage of burnt bricks

For a large project, a large amount of firewood and soil will be required to produce adequate amount of bricks. This can lead to destruction of natural forest and land degradation due to formation of borrow pits.

Advantages of burnt bricks

a) Bricks are strong and durable;
b) They require low maintenance cost;
c) Have excellent thermal mass i.e. in winter they keep the buildings warmer while in summer they keep the buildings cooler; and
d) They are fire resistant.

3.3.2 Stabilised soil blocks (SSB)

Stabilised soil blocks are made by mixing soil and cement in appropriate proportions. The process requires skilled labour because the strength of the bricks depends on the mixture and quality of soil used.

Disadvantage of SSB

The use of soils for a large project can lead to borrow pits which can lead to ponding and creation of breeding grounds for disease victors. However, the cost is lower than the cement blocks.

Advantages of SSB

a) SSB allows users to produce uniform blocks of greater strength than typical fired blocks that provide better thermal insulation;
b) The total cost of building a structure with SSB is 20%-30% cheaper than building with fired bricks because far less mortar is required;
c) SSB can be made on site so transportation costs are minimized;
d) SSB are environmentally friendly because they are cured in the sun as such do not contribute to deforestation as compared to fired/burnt bricks; and
e) The bricks have an appealing aesthetic with an elegant profile and uniform size that doesn't require plastering.

3.3.3 Concrete blocks

Concrete blocks are made from a mixture of quarry dust and cement to which water has been added. Like SSB, the mixture is compacted using a manual machine to ensure strength and quality.

Disadvantage of concrete blocks

The bricks are usually expensive due to increased costs of cement.

Advantages of Concrete blocks

a) Like SSB, concrete blocks allow users to produce uniform blocks of greater strength;
b) Concrete blocks can be made on site so transportation costs are minimized; and
c) Because Concrete blocks are cured in the sun, there is no fuel needed thereby helping to curb deforestation as such they are environmentally friendly like SSB;
d) Concrete blocks are strong and durable; and
   Concrete blocks are fire resistant.

3.3.4 Eco bricks

The main building materials in Malawi in both urban and rural setting are burnt bricks, which are made from soil that is mixed with water, dried in the sun thereafter baked using wood fuel. Two major concerns in the Malawi brick sector are increased deforestation due to use of fuel wood and poor brick quality resulting in poor construction quality. All the brick making activities use fuel wood fired in clamps. It has been calculated that the brick industry in Malawi alone consumes around 850,000 metric tonnes (MT) of fuel wood per year. At this rate of fuel wood consumption, the entire country will be deforested within 25-30 years only from the brick industry. In Malawi, because more fuel wood is consumed than re-grown, the combustion of wood results in an increased amount of carbon dioxide emission in the atmosphere which adds to the greenhouse gas

effect. In the clamp around 20MT wood is consumed to fire 40,000 bricks. For smaller diameter wood, the consumption is more. With the kind of wood being used the average specific energy consumption in clamps is around 3.66 MJ/kg. This is expected to be much higher since the required temperature and quality is not achieved.

Eco bricks are made using the Vertical Shaft Brick Kiln (VSBK) Technology for firing the green bricks. The VSBK (Eco Kiln) technology is based on vertical shaft principles and is the most energy efficient and environmentally friendly burnt brick production technology available globally. The technology does not use fuel wood. Instead it uses waste material containing carbon to fire green bricks. Thus, if VSBK is adopted to replace clamps, then it will result in:

a) Saving of 850,000 tonnes of fuel wood annually;
b) Saving of 1,500,000 tonnes of CO_2 annually;
c) Recurring income of USD 9 million worth of foreign exchange annually;
d) Creation of more than 1,000 small to medium scale enterprises in the SME sector and ancillary industries;
e) Creation of more than 20,000 sustainable "GREEN JOBS" thereby helping in reducing poverty;
f) Use of more than 90,000 tonnes of industrial waste (e.g. boiler ash and leftovers of tobacco industry, duff coal) supporting the Malawi's contribution towards reducing pollution;
g) Recurring use of 50,000 tons of coal creating a business of USD 10 million within the country thereby promoting inclusive growth;
h) Improving the quality of housing in Malawi and incurring a saving of around 40% from bricks and mortar alone;
i) Reducing the embodied energy in housing, thereby pioneering the path of energy saving in Africa;
j) Greenhouse gas emissions are also enviably less making it an obvious choice for the carbon market;
k) VSBK is versatile and can be adapted to any scale of production;
l) It produces consistent quality bricks with higher returns than clamp brick production; and
m) Is cheaper than SSB and concrete blocks.

After analysing advantages and disadvantages of using SSB, concrete blocks, burnt bricks, and eco bricks, it was found that sand/cement hollow blocks would be cost effective and have better precision. The blocks can also be produced on site with convenience.

3.4 Alternative sewage disposal methods

It is expected that during operation phase more than 55,000 liters of wastewater will be generated on daily basis. This volume was calculated based on assumption that one individual generates about 100 liters of wastewater per day. As such, there is need to consider how to properly manage and dispose of this volume of wastewater. Considering that most private units in Blantyre are not connected to any sewerage for wastewater treatment, options such as use of septic tanks and use of wastewater stabilization ponds were considered and are discussed as follows:

3.4.1 Use of septic tanks

Use of septic tanks to manage wastewater was one of the options that were considered. Advantages of using septic tanks over wastewater stabilization ponds (WSP) include:

a) Septic tanks are easier to operate than WSP as such they do not require personnel to manage its operations except when there are blockages;
b) Septic tanks do not generate odor as they are usually under cover;
c) Septic tanks do not require a lot of space as compared to WSP; and
d) Septic tanks are not left open as the case is with WSP which become breeding ground for vector insects and pose as potential hazards to the general public and children in case of drowning.

The main disadvantage of using septic tanks 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 time and again making the alternative not viable.

3.4.2 Use of wastewater stabilization ponds

Use of wastewater stabilization ponds is one of the commonly used methods of treating wastewater in the tropics. Although this is one of the cheapest ways of treating wastewater, the method requires more space than the other wastewater treatment facilities. Since space is a limiting factor for the project, this is not a preferred option.

Disadvantages of using WSP include:

a) WSP require more space than other wastewater treatment facilities;
b) If not properly managed, wastewater stabilization ponds result into breeding grounds for mosquitoes;
c) Can generate odour if the system is not operating effectively; and
d) Has the potential to pollute recipient water body if there is system failure as such it needs personnel to manage to ensure that it operates effectively and efficiently;

Advantages of using WSP include:

a) As compared to septic tanks, WSP do not require emptying of wastewater as it is discharged into the environment after its treatment;
b) Cheap and easy to operate;

Considering that the campus does not have enough space to accommodate the wastewater stabilization ponds away from other structures such as class rooms, hostels and the administration block, the alternative was not preferred. However, use of septic tanks was preferred to waste water stabilization ponds.

3.4.3 Discharging liquid waste to the sewer line to Zingwangwa wastewater treatment plant

The campus is already connected to Zingwangwa waste water treatment plant. Considering that a large volume of liquid waste will be discharged from the campus on daily basis, it will be environmentally friendly to discharge the liquid waste into the sewer line for treatment at Zingwangwa.

Advantages of discharging liquid waste to the sewer line to Zingwangwa wastewater treatment plant:

a) No space will be required at the campus for treating waste water as in the case of waste stabilization ponds;
b) If not properly managed, wastewater stabilization ponds result into breeding grounds for mosquitoes. With the sewer lines, no breeding grounds for vector insects will be constructed on site;
c) There will be no odor at the campus as the case is with stabilization ponds;
d) The waste water is contained properly with no potential to pollute recipient water body if there is no system failure and
e) No need for periodic emptying as the case is with septic tanks;

The only disadvantage at the moment is that the sewer line that connects to the Zingwangwa sewer line is currently damaged to an extent that waste water is being discharged directly into the environment at the campus. This is causing bad odour and polluting the environment. The College will be required to repair the broken sewer line before discharging the effluents into the sewer line that collects the waste water to Zingwangwa waste water treatment plant. But once this is done there will be minimal maintenance costs for the operation of the facility.

Considering that the campus does not have enough space to accommodate the wastewater stabilization ponds away from other structures such as class rooms, students' hostels and the administration block, and that septic tanks will need to be emptied from time to time, the preferred alternative is that to discharge waste water into the sewer line that discharges all the waste water to Zingwangwa waste water treatment plant.

3.5 Alternative solid waste disposal methods

3.5.1 Bio waste

With the increased number of students at the campus, it is expected that bio waste will be generated on daily basis and an analysis of alternative disposal methods was made as follows:

3.5.1.1 Use of rubbish pits

The use of rubbish pits inside the college compound to dispose of bio waste was considered as one of the alternatives. However, this option was not favoured because this could lead to breeding of houseflies and could attract scavengers such as dogs and cats. Despite this, advantages include low cost in terms of operation because there will be no costs related to transportation and handling of the waste.

3.5.1.2 Use of waste disposal site operated by Blantyre City Council

This method involves arranging with Blantyre City Council to collect bio waste for disposal at designated dumping site for the council. However, in an event that the council fails to collect the bio waste, the bio waste can produce bad odour which can attract flies, dogs etc. As such for this arrangement to work properly, the college needs to have a standby vehicle to assist when such a situation arises. In addition, in order to reduce the volume of bio waste, an arrangement will be

made with people/institutions that are in piggery business to come and collect bio waste to feed their stock. This alternative was considered to be favourable for the disposal of bio waste.

3.5.2 Waste paper

The teaching and learning activities at the college are likely going to generate waste paper that will need to be disposed of. There are a number of disposal alternatives that were analyzed and these include:

3.5.2.1 Use of rubbish pits

This alternative was not favored because waste paper could easily be blown off by wind from the rubbish pit and litter the college campus. An advantage to this alternative include low cost in terms of operation because there will be no charges related to transportation and handling of the waste.

3.5.2.2 Recycling of wastepaper

The college will either embark on waste recycling project or arrange with waste paper recycling companies to come to collect waste paper periodically. It was envisaged that this initiative will not only benefit the college but also the whole Blantyre City Council because the volume of waste paper flying around the Council will be reduced. As such this was the favored option in the management of waste paper.

CHAPTER 4 BIOPHYSICAL AND SOCIO-ECONOMIC ENVIRONMENT

A baseline study of the existing environment has been carried out on the physical, biological and socio-economic features in the project impact area. The study provides a measure of the existing state of the environment against which future changes imposed by the construction and installation of students' hostels could be measured and monitored. The physical and biological baseline factors considered include climate, air quality, topography, drainage, vegetation, fauna, geology and soils, existing road traffic, and socio-economic factors. The sections which follow provide the detailed explanations of these factors.

4.1 PHYSICAL ENVIRONMENT

Following are the Physical characteristics analyzed in this report:

4.1.1 Water Resource

The nearest river to the proposed project site is Naperi River, which flows into Mudi River and later into Likhubula a tributary of Shire River. The dam on the Mudi River supplies part of its water to Blantyre City. The stream close to site is a tributary to Naperi River and therefore any discharge into the stream has far reaching pollution consequences as it will eventually end up into Shire River.

4.1.2 Topography and Geology

Metamorphic rocks of sedimentary origins underlie the project site. The sediments are in a form of alluvial and residual deposits.

4.1.3 Soils

The dominant type of soil types in Blantyre plain are ferruginous and lithosals. The soils on the project site are dark brown to grey clay. These soils are prevalent from the proposed site. The soil becomes water logged when wet. Any building on the site needs to have strong foundations to avoid cracking or sinking.

4.1.4 Climate

Blantyre has a tropical climate and falls into two main seasons. The wet (rain) season starts from November and ends in April while the dry (hot) season starts from May and ends in October. The highest amount of rain falls between December and March and the average annual rainfall is about 834 mm.

The mean annual temperature is about 22.4 ^{o}C. The hottest months are October and November with temperatures averaging 31 ^{o}C. June and July are the coldest months with temperatures averaging 13 ^{o}C.

4.2 BIOLOGICAL ENVIRONMENT

Biological characteristics analyzed in this report are as follows:

4.2.1 Flora and Fauna

The site lost its natural vegetation due to urban development. The area is almost 30 % bear with patches of Couch grass (kapinga: *Dactyloctenium aegytium*) and tsekera (*Pennisetum purpureimi*). There are some reeds on the banks of the stream. The presence of wildlife is minimal although

rarely lizards, frogs, and insects and occasionally snakes have been sited. Figure 4.1 shows a picture of the site.

Figure 4. 1 Picture of the proposed site

4.3 SOCIO-ECONOMIC ENVIRONMENT

4.3.1 Population

Blantyre City is one of the fast growing cities in Malawi. According to the 2018 Population and Housing Census, Blantyre City has a total population of 800264 people. The population of the City has been growing since many people have steadily been moving to the City from the rural areas in search of employment and better living conditions. Over 70 % of the population of Blantyre City live in the high density areas (squatters) and Traditional Housing Areas (THAs).

4.3.2 Health facilities and common diseases

The main health facility in the area is Queen Elizabeth Hospital which is about 1.2 km away through access road . The hospital acts as the main referral hospital for Blantyre and the surrounding districts. The College also runs its own medical facility. It is recommended that the Contractor enters into agreement with the College for emergency treatment of its workers on site in case of emergency for minor cases. Another facility would be QECH but this is mostly for referral cases from other hospitals.

To assist minimize risks from such injuries, staff will be regularly trained in occupation safety. In addition, different personal protective equipment will be used in different instances such as safety footwear, protective clothing (dust coats), goggles, respirators and gloves.

4.3.3 Water Supply

Blantyre Water Board (BWB) is responsible for providing potable water supply in the city of Blantyre. The BWB is an executing agency under the Ministry of Agriculture, Irrigation and Water

Development (MoAIWD) and reports both to MoAIWD and Controller of Statutory Bodies. The main water source utilized by Blantyre Water Board is Walkers Ferry on Shire River and Mudi Dam on Mudi River. The city most often is subjected to water rations due to adequate supply of the same due to low water levels as well as limitations in pumping facilities. Water usage by clients is therefore restricted.

It is however recommended that water for suppressing dust and for all construction activities should be untreated water which can be drawn just below the stream on the site or Naperi River, since potable water is expensive for the purpose and sometimes not readily available from the water board. In order not to ensure uninterrupted water supply to the hostels, the project proponent will install a stand by water tank of 200 m^3 capacity.

4.3.4 Power Supply

Electricity Supply Corporation of Malawi (ESCOM) supplies electricity to Blantyre City. According to National Statistical Office of Malawi (NSO), about 46 percent of the households used electricity for lighting in 2007, while only 18.5 percent used electricity for cooking. Firewood and charcoal are still the dominant sources of energy for cooking with attendant problem of deforestation.

Nationwide, power demand surpasses power supply, leading to frequent power outages. ESCOM carries out planned load shedding throughout the country including Blantyre City. A power back-up system will be required at the project site to ensure that the inconveniences suffered from power outages are minimized. The power transmission network is composed of high and medium voltage lines. Low voltage lines of 400 V and 230 V are utilized to user's connection. ESCOM power sales increased from 902 GWh in 2000 to 1,116 GWh in 2006. Daily power demand usually peaks around 18:00 to 20:00.

ESCOM has recently been split into two and the new entity solely responsible for producing power (EGENCO) is now in charge of the power production stations and will be selling power to ESCOM to feed the national grid.

However at least 25% of electrical energy requirements will come from solar panels to back up power failure. The hostels and other support buildings will be supplied with hot water generated from a combination of electrical calorifiers and solar geysers. In addition it will be necessary during the construction and operation phase to have a heavy duty generator to cater for times when the national generation capacity goes down leading to prolonged load shedding periods.

4.3.5 Telecommunications

The area is within the coverage of Access, Airtel, MTL and TNM networks hence people are able to make and receive calls and send and receive messages from friends and relatives using cell phones and land lines and there are a number of service providers of internent including Skyband, Malawi Net, Globe Internet, and Broadband Digital Solutions.

4.3.6 Sanitation

The sewage disposal system at the proposed site will use the existing network which connects to Zingwangwa sewerage treatment Plant. The current network has been vandalized which requires

rehabilitation as it is discharging raw waste water directly into the environment as can be seen from Figure 4.2. It is therefore recommended that the rehabilitation should take place as soon as possible before construction begins The connection and new additions from the construction should therefore implement vandal proof installations to ensure that sewer spillages are kept at a minimum. During construction, mobile latrines will be used to serve as toilets.

Figure 4. 2 Raw Waste water being discharged directly into the environment

4.3.7 Waste Disposal

Rubble during construction will be used to level off excavated sites on site and as fillers during foundations. Any leftover solid materials likely to be composed of crumbles of cement will be disposed by levelling off earth roads within the city in collaboration with Blantyre City Engineer responsible for roads.

Currently different solid wastes are being placed in well covered bins and skip for collection by Blantyre City Council for disposal to Mzedi Waste Management Site as the designated waste disposal site for Blantyre City Council. Figure 4.3 shows details of current waste management practices at the campus. Some wastes like pads are incinerated. Since the site seems now being overburdened by wastes, biodegradable waste will be composted and used as manure for flowers.

Figure 4. 3 Current waste management practices at campus

4.3.8 Economy

Commercial activities in Blantyre City are dominated by large scale businesses, small and medium enterprise (SMEs) sized businesses. The majority of these businesses have limited access to lending institutions.

Investing in the construction of students' hostels benefits to the population of the city. It will provide business opportunities, and enhanced health, and environmental services and standards. The hostels will also make the area and the city beautiful.

4.3.9 Activities around the proposed site

The project site is located within the College of Medicine land opposite the College of Medicine Sports Complex building and football ground. The site borders with Beit Cure and a residential area on one hand it faces a semi perennial stream which restricts access to connect to the main campus. The main activity on the site is occasional cultivation of sugarcane and maize by casual workers and also borders a footpath to Naperi.

4.3.10 Roads

The project site is accessed through Chipatala Road which is also the main access to Queen Elizabeth Referral Hospital, Beit Cure, Red Cross and Blantyre Youth Centre. Use of this only access road at the moment requires that the Contractor should manage bulk deliveries to the project site during construction. The site does not have an accessible footpath from inside the campus making it difficult for students to access the main teaching area. It is therefore recommended that access should be provided connecting the main campus and the proposed students' hostels site before occupation

4.3.11 Employment

Blantyre registers the highest unemployment rate at 16.1% compared to other cities. The economy of Blantyre relies on various sectors such as the civil service, tobacco industry, services, construction industry and informal sector. Some of the employers are investors from outside the country. The civil service remains the largest formal employer in the city with 25% of the city's work force.

Employment rate in Blantyre City has been increasing since 2007 due to several construction projects currently taking shape in the city. The employment rate rose to 83.9 in 2007 from about 81% in 2005 (NSO, 2007). Whereas the majority of those classified as employees or in wage employment totaling 50.4% worked in the social and community services sector (58.8%), a good proportion was in the manufacturing sector.

4.3.12 Industry and Commerce

Commerce: Although the sector has been facing some challenges, there is significant growth. The opening of major chain stores has created windows for commercial suppliers in the City. New shopping malls are under construction and small and medium scale businessmen are investing in various enterprises.

Informal Sector: Many people in the City are self-employed in family (24%) or private (22%) businesses. There are people who are employed by private individuals (18%). The sector is a major contributor to commercial, services and industrial growth in the city.

Manufacturing Sector: The manufacturing sector is the second largest wage employer (12.6%) after social and community services sector. Although it is still underdeveloped, the sector contributes significantly to the local and national economies.

4.3.13 Gender analysis and mainstreaming

Sections 20 and 41 of the Constitution of Malawi uphold the principle of equal rights for men and women and prohibit any discrimination based on gender or marital status.The Republic of Malawi ratified the Convention on *'The Elimination of All Forms of Discrimination against Women'* in 1987. Malawi signed the Optional Protocol in 2000, but has yet to proceed with ratification. It ratified the Protocol to the African Charter on Human and Peoples' Rights on the Rights of Women in Africa in 2005. Malawi has achieved gender parity with respect to primary school enrolments, which indicates an improvement in attitudes towards girls' education.

College of Medicine has deliberate Policy to encourage the employment of both men and women. The policy also encourages that there should be equal employment benefits for both men and women. The contractor for the pproject will therefore be encourgaed to use the policy to ensure that there are equal employment opportunities for both men and women.

4.3.14 HIV AND AIDS

BlantyreCity treats gender and HIV and AIDS as crosscutting issues in all programmes being implemented with the Department of Health taking the lead in the implementation of Gender and HIV and AIDS initiatives. HIV and AIDS rates stood at about 15 percent in 2007 down from about

25 percent in 1996. Other institutions that have contributed to efforts to tackle HIV and AIDS include the National AIDS Commission (NAC) and local development and humanitarian organizations.

4.3.15 Transport and Communication

Minibuses, private vehicles, and bicycle taxis are the common modes of transport in the city of Blantyre. An average of about 40 percent of the population rely on minibuses to transport them from one location to another. Taxi services are available but they are too expensive for the poor majority. bicycle taxis are also increasing in popularity in the peri-urban and low-income areas. However, the current roads infrastructure is inadequate to support the growing number of vehicles leading to increased traffic congestion and a lot of time wasted in traffic jams.

The city has one international airport and a railway station. Many people however still walk to their various places of work resulting in a high number of pedestrians. However, the absence of footpaths creates conflict between motorists and pedestrians and has resulted in a high increase in road accidents. The local authorities need to provide adequate transport infrastructure such as footpaths, bicycle paths, safe pedestrian crossings and flyovers, and well-protected bus lay-bys.

The Road Traffic Directorate in the Ministry of Transport and Public Works provides the legal framework for the transport industry. It administers regulatory provisions governing motor vehicle administration, driver licensing, operator authorization, permit control and other related traffic management controls.

The road network in the City comprises main, secondary and minor roads. M1 forms the centre trunk axis. Secondary and (minor) urban roads extend from M1 to main urban development areas and settlements, especially in the southern part of the city. The total road length is approximately 500km. Overall, the main and secondary roads are well developed in terms of pavement condition.

The traffic survey carried by the JICA Team in 2010 indicates that traffic volumes in the city vary between 1,200 and 25000, cars per day. The most serious bottleneck point is along the highway from Kamuzu Stadium Round About to Mount Soche Hotel the daily traffic volume is very high. The traffic circulation of other sections are within the road capacities.

4.3.16 Cultural, Ancestral framework and Local customs and traditions

According to Population and Housing Census carried out by the National Statitistics of Malawi(NSO) in 2008, there is mixing of cultures in Blantyre City, as a result of co-existence of the major tribes Mang'anja, Chewa, Ngoni, Senga, Tumbuka, Yao and foreigners. Almost all the areas in the study area are ethnically mixed, reflecting a regional trend with significant numbers of settlers from other parts of Malawi. Chichewa is the most common language that is used; other languages spoken are mang'anja, yao and tumbuka. All the tribes have beliefs such as witchcraft and evil spirits/ supernatural gods. All people in the area have different beliefs according to their customs and norms.

4.3.17 Monuments and buildings

In terms of specific places of cultural and historical interest, Blantyre has a few, including original mission stations and centers of excellence for handcrafts however, the project will not interfere

with any monuments or buildings. The project area is already disturbed, and no cultural heritage is expected to be affected by the construction activities of the extra students' hostels. However, should any physical cultural resources be found during excavations, the Contractor will link up with Department of Museums and Monuments according the Monuments and Relics Act of 1990.

4.3.18 Security

In an attempt to promote safety and security in the project area, College of Medicine has outsourced the services to a private security company. In addition, the College has responsible officers to supervise the security company. The College also seeks assistance of Blantyre Police whenever there is need for escalation of security protection.

CHAPTER 5 REVIEW OF RELEVANT POLICIES, LEGAL AND INSTITUTIONAL FRAMEWORK

5.1 Malawi's environmental regulatory framework

Malawi has over the years, developed a number of policies and legislation to guide environmentally and socially sustainable development in various sectors of the economy through mainstreaming of environmental and social issues in project planning and implementation. These include the Constitution of the Republic of Malawi of 1995; different policies and pieces of legislation. Besides, Malawi also uses different international procedures, policies and guidelines where national laws, policies, procedures, guidelines and legislation are falling short to guide sustainable development.

This chapter therefore outlines the policies, legislative and administrative framework relevant to guide implementation of activities of the proposed project.

5.2 Policy framework

Over the years Malawi has developed various national policies to guide implementation of different project activities in the country. Some of the policies relevant to the activities of the proposed project are discussed below.

5.2.1 National Environmental Policy, 2004

The National Environmental Policy of 2004 is based on the principles of National Environmental Action Plan, and provides a policy framework on environmental planning in development programmes including undertaking environmental and social impact assessments for different development projects. The overall goal of the Policy is to promote sustainable social and economic development through sound management of the environment in Malawi. The policy among other things seeks to:

a) promote efficient utilisation and management of the country's natural resources and encourage, where appropriate, long-term self-sufficiency in food, fuel wood and other energy requirements; and
b) facilitate the restoration, maintenance and enhancement of the ecosystems and ecological processes essential for the functioning of the biosphere and prudent use of renewable resources;

The activities for the proposed project shall among other things involve clearing, excavation and levelling of soil, extraction of gravel and quarry, transportation of materials, compaction of sub-base material and construction of students' hostel at College of Medicine, which will have the potential to cause occupational harm and pollution of the environment and water bodies. The implication of the policy is that the project has to put in place measures to reduce adverse impacts arising from the activities of the project and that implementation of the activities of this project has to take sustainability issues on board.

The Policy has implications on the proposed Project as the Project will cause a number of negative impacts in the project area and beyond. Some of the impacts will include increased generation of waste; injuries due to construction works; increased risk of dust emission and air pollution; risk of social conflict; increased risk of illicit behavior and crime; impacts on community dynamics;

increased risk of communicable diseases; increased cases of accidents; possible disruption of public service utilities; increased demand for sanitary facilities; and increased disruption of activities at the research station. As a requirement under the environmental policy, the developer will therefore prepare an environmental and social management plan, which will be implemented during project construction and operation phases.

In line with this policy and through this ESIA, the project developer will integrate the environmental and social concerns into their planning processes and will promote public participation, enhance public awareness, and cooperation with other institutions.

5.2.2 National Land Policy, 2002

This is the principal policy that guides land management and administration issues in Malawi. The policy introduces major reforms intended in land planning, use, management and tenure. It provides clear definition of land ownership categories (Section 4), and addresses the issue of compensation payment for land (Section 4.6).

The policy also has provisions for environmental management covering issues related to both urban and rural management of solid and liquid waste, protection of sensitive areas, agricultural resource conservation and land use, community forests and woodland management, over-dependence on fuel wood, forest programs, co-ordination of multiple land use, water resources and wetlands, lakeshore environmental management and mining and minerals. Of particular importance is Section 9.8.1 (c) which states that development activities in fragile ecosystems such as wetlands, game reserves, forest reserves and critical habitants will only be permitted after the appropriate authority has conducted an environmental and social impact assessment.

The proposed project will not cause loss of land and property by the people in the project area as the project will be implemented on land that already belongs to College of Medicine. Issues of resettlement and compensation will therefore not arise as a result of the project. Furthermore, the ESMP in the ESIA report will cover all issues to do with waste management, deforestation, conservation and land use and protection of sensitive areas.

5.2.3 National Construction and Industry Council Policy, 2017

The policy identifies improvement of standards and cross cutting issues as some of the key issues for the construction industry. The policy therefore aims to build capacity of the local industry and enhance quality of work. In cross-cutting areas the policy emphasises the need to manage environmental factors that are associated with the construction industries such as dust, chemical pollution, soil erosion and noise. In addition the policy emphasises on risk identification and management, adherence to occupational health undertakings. The policy identifies NCIC as a key regulator in the construction industry and therefore advocates working in cooperation with all relevant regulatory agencies in ensuring good practices in the industry. It is therefore expected that the client will carry out due diligence with the council to ensure that the contractor and supervisors are in good books prior to engagement.

5.2.4 Malawi National HIV and AIDS Policy, 2003

The Malawi National HIV and AIDS policy was adopted by government in 2003. Its main goal is to prevent HIV and AIDS infections, to reduce vulnerability to HIV and AIDS, to improve the

provision of treatment, care and support for people living with HIV and AIDS and to mitigate the socio-economic impact of HIV and AIDS on individuals, families, communities and the nation.

Chapter 7 of the Policy observes that in workplaces unfair discrimination against people living with HIV and AIDS has been perpetuated through practices such as pre-employment HIV and AIDS testing, dismissal for being HIV and AIDS positive and the denial of employee benefits if known to be infected. HIV and AIDS affects every workplace. Absenteeism and death impact on productivity, employee benefits, production costs and workplace morale.

The project will have the potential to cause labour influx in the project area which will likely cause spread of HIV and AIDS. As a way of implementing the Malawi National HIV and AIDS policy, the proponent will implement an HIV and AIDS workplace policy and prevention, treatment, care, support and impact mitigation programmes as one way of effectively reducing and managing the impact of HIV and AIDS in the work place.

5.2.5 Guidelines of Environmental Impact Assessment in Malawi, 1997

The Guidelines are a key tool in providing guidance on how the ESIA study should be carried out in Malawi. It includes a list of all prescribed projects for which ESIAs are required. The Guidelines provide further advice on the procedures to be followed in getting approval for the various projects. In particular, the proposed developer will submit the report to the Environmental Affairs Department where the Technical Committee on the Environment will provide the necessary input to allow the National Committee on Environmental to make an informed decision on the submitted ESIA Reports.

5.2.6 National Land Resources Management Policy and Strategy, 2000

Malawi Government developed the National Land Resources Policy and Strategy to promote efficient diversified and sustainable use of land based resources both for agriculture and other sustainable socio-economic developments. This was because for a long time different development processes in the country have been accompanied by unprecedented infrastructure development. A considerable proportion of these development projects have been carried out without special coordination within the context of the policy thereby resulting into land use conflicts and unsustainable land use management practices. The developer will site the accommodation units in line with the land use demarcations for the campus.

5.2.8 Gender Policy, 2015

Malawi Government appreciates that gender inequality is a significant constraint to socio-economic growth and poverty reduction. The policy specifies that Government has a responsibility to integrate gender into the development, design, implementation, and monitoring of different development programs. The enrolment of both male and females students is expected to increase since one of the hindrance is inadequate accommodation.

According to this Policy, Government of Malawi is expected to implement a constitutional obligation of building a society where men, women, boys and girls equally and effectively participate in and benefit from different development processes. The project will ensure that wherever there are any employment opportunities, women will be given equal chances as men for

employment. Deliberate effort will also be made to ensure that among the employees, 40% should be women.

5.3 Regulatory Framework

The section provides a review of key national legislation pertinent to development and operation of the proposed project. The project proponent intends to develop and operate the proposed project in line with all relevant national laws. Details of the legal frameworks considered are presented in the sections that follow.

5.3.1 The Constitution of the Republic of Malawi, 1995

The Constitution of the Republic of Malawi (1995) is the supreme law of the land. It contains, among other things, principles of national policy in Section 13. The section sets out a broad framework for sustainable environmental and social management at various levels in Malawi. Among other issues, the section provides for environmental and social issues under Principles of National Policy. Section 13 (d) of the Constitution provides that the state shall actively promote the welfare and development of the people of Malawi by progressively adopting and implementing policies and legislation aimed at managing the environment responsibly in order to:-

a) Prevent the degradation of the environment;
b) Provide a health living and working environment for the people of Malawi;
c) Accord full recognition to the rights of future generations by means of promoting environmental and social protection and sustainable development of natural resources;
d) Conserve and enhance the biological diversity of Malawi; and
e) Enhance the quality of life in rural communities with the ultimate aim of attaining sustainable development.

The Constitution further provides for a framework for the integration of environmental and social consideration into any development programs. The implication of this provision is that Government, its cooperating partners and the private sector have a responsibility of ensuring that development programs and projects are undertaken in an environmentally and socially responsible manner.

5.3.2 Environment Management Act, 2017

The Environment Management Act of 2017 makes provision for the protection and management of the environment and the conservation and sustainable utilization of natural resources. Sections 24, 25 and 26 of the EMA provide the legal framework for managing the Environmental Impact Assessment (EIA) process. - Section 24 outlines activities that require an EIA before they can be implemented. A prescribed list of Projects for which EIA is mandatory is provided in Malawi's Guidelines for EIA, 1997. The proposed Project is a prescribed Project under the Environment Management Act and therefore requires an ESIA study before it can be implemented.

Section 26 (3) of the EMA provides that "a licensing authority shall not issue any licence under any written law with respect to a project for which an environmental and social impact assessment is required under EMA unless the Director has certified in writing that the project has been approved by the Minister under EMA or that an environmental and social impact assessment is not required under EMA." In this way, the developer for the proposed project will have to demonstrate that it has taken sufficient efforts to identify all possible negative impacts and suggest reasonable

measures in order to obtain an ESIA Certificate first before construction activities of the proposed project are undertaken.

5.3.3 Land Act, 2016

The Land Act, 2016, which repealed the Land Act of 1965,is the principal legislation dealing with land tenure, land use and land transfer. The Commissioner of Lands is responsible for the administration of the Act. Section 7 of the Act recognizes two categories of land namely; public land and private land. Public land is defined as land as held in trust for the people of Malawi and managed by Government, a local government authority and a Traditional Authority. Private land is defined as all land which is owned, held or occupied under a freehold title, leasehold title or as a customary estate or which is registered as private land under the Registered Land Act. The Act recognizes that every person has a natural dependency on land and that it is therefore important that Government provides for secure and equitable access to land as a multipurpose resource and an economic assert by defining issues of security of tenure.

The Land Act outlines some procedures to be followed for land acquisition by individuals or Government including issuance of formal notices to persons with existing land interests to payment of compensation however most provisions relating to acquisition of land are in the Land Acquisition Act as amended.

The proposed project will not require any land take from the general public. As a result, issues of compensation and resettlement will not arise.

5.3.4 The Lands Acquisition Act, 2017

The Lands Acquisition Act of 2017 has amended some provisions of the Lands Acquisition Act, the main one being that the Amendment Act now provides for the acquisition and compensation of land in the citation.

Section 3 of the Act read with the Amendment Act empowers the Minister responsible for lands whenever he is of the opinion that it is desirable or expedient in the interests of Malawi, to acquire land for public utility, either compulsorily or by agreement, and pay compensation as may be agreed or determined under the Act.

Sections 5-7 of the Act provide for the issuing of notices upon the persons who are possessed of an interest in the land. According to section 12 of the Amended Act when a notice to acquire land has been issued and published, the land shall revert to the Government as public land within 2 months of the publication of the notice.

Section 9 as amended provides for the payment of compensation. It provides that where any land is acquired by the Minister under this Act the Minister shall pay in respect thereof appropriate compensation agreed or determined in accordance with the provisions of this Act. The Amendment Act further provides that compensation shall be paid in one lump sum; therefore, the assumption is that compensation shall only be monetary.

Amended provisions relating to assessment of appropriate compensation provide that an assessment is to be done by an independent valuer appointed by the Minister, unless the parties

agree otherwise. The Amendment to the Act also provides information on the grounds on which compensation can be calculated which include; loss of occupational rights, loss of land, costs of professional advice and disturbances which are a natural and reasonable consequence of the disposition of land. The Amendment has inserted substantive provisions on matters to be taken into consideration in assessing compensation for alienated land under section 10A.

Section 11 of the Act deals with the effect of payment of the compensation and states that a person who has been paid compensation for land cannot make further claims in respect of the land. However, this does not prevent any subsequent proceedings against the person to whom the same was awarded by any person claiming to have a better right to the compensation or the right to a share thereof.

However, the project will not have any implications on the proposed project considering that the proposed project will not require any land take from the general public since it is going to be constructed on land already allocated to College of Medicine, the client. What is important though is that the College should give adequate notice to the people who have been temporarily cultivating maize and sugarcane to stop doing so before the next cultivation season. As a result, issues of compensation and resettlement will not arise.

5.3.5 Customary Land Act, 2016

The Customary Land Act of 2016 provides for the management and administration of traditional land. Customary land consists of land within the boundaries of a Traditional Land Management Area other than Government or reserved land, land designated as customary land under the Land Act of 2016, land, the boundaries of which have been demarcated as traditional land under any written law or administrative procedure in force at the time before the Act came into operation and land the boundaries of which have been agreed upon by a land committee claiming jurisdiction over that land.

A certificate is issued by the Commissioner of Lands for each Traditional Land Management Area in respect of which the boundaries to the area have been demarcated or agreed. Such certificate, issued in the name of the Traditional Authority, confers upon the land committees in that area the function of management of customary land and affirms the occupation and use of customary land by the persons in the Traditional Land Management Area in accordance with the customary law applicable to land in that area.

The Act established customary land committee in section 5 of the Act. These committees are supposed to be at Group Village Headman level and their main function is to manage customary land within its area of jurisdiction, on trust, as if the committee were a trustee of the land and the villagers were beneficiaries. The Act provides that the customary land committee may not allocate land or grant a customary estate without the prior approval of the relevant Traditional Authority.

The proposed project will not require any land take from the general public. As a result, issues of compensation and resettlement will not arise.

5.3.6 Local Government Act, 1998

The Act, as read with Section 146 of the Constitution, provides the mandate to the local assemblies in planning, administration, and implementation of various development programs in their areas. It further provides for environmental functions, which include urban management, local planning, local afforestation programs, control of soil erosion, and appropriate management of solid and liquid waste. Blantyre City Council where the project will be implemented was consulted with respect to their mandate at the municipal level and how the proposed project would comply with their planning requirements.

5.3.7 Public Health Act, 1982

The Public Health Act requires developers to provide sanitary and health facilities in work places to promote health and well-being of the primary occupants and to avoid harmful effects of waste on public health.

The Environmental and Social Management Plan recognizes the importance of practicing improved hygiene and use of improved sanitary facilities for sustainable livelihood. The developer will comply with the requirements of this Act by constructing sanitary facilities and waste disposal facilities and will ensure good hygiene practices, some of which have been mainstreamed in this Environmental and Social Management Plan (ESMP).

5.3.8 Occupational Safety, Health and Welfare Act, 1997

The Act regulates work conditions with respect to safety, health, and welfare of workers. During construction phase, there will be a number of workers working on the site using different types of machinery and facilities.

Construction activities in general pose a number of occupational health and safety risks and probable risk to workers and the surrounding communities at large. Furthermore, increased movement of vehicles and equipment during construction can pose a risk of accidents to the surrounding communities as well as the construction workers.

The Act therefore places a duty of care on contractors throughout the project construction phase and similarly, the workers have a duty to take reasonable care for their own safety and health. The duty of ensuring safety, health, and welfare of workers is on the employer. However, every employee is required to take reasonable care for his/her own safety and that of other workers. The key provisions relevant to the project under discussion are as follows:

i) Section 13(1) places a duty on every employer to ensure the safety, health and welfare of all his employees at work;
ii) Section 51(1) mandates that manufacturers, importers and suppliers of hazardous substances used at workplaces shall provide sufficient information on such substances as well as the precautions to be taken; and
iii) Section 81 (7) stipulates that where the use of hazardous chemicals is likely to penetrate the skin and cause rash, skin contact with hazardous chemical shall be avoided and personal hygiene and the type of clothing worn shall be such as to enable rapid removal of any chemical from skin contact.

Considering that the construction phase of the project will require a lot of labour force and use of heavy machinery, the Occupational Safety, Health and Welfare Act is important in safeguarding

the health and welfare of all workers. The contractor will ensure that there is adequate protection for the workers who will be on site as required by the Act.

Section 66 of the Act defines the procedure to be followed in case of the occurrence of an accident which either can cause loss of life or disables a person from carrying out the normal duties at which he is employed. Furthermore, it stipulates measures that relate to work in confined spaces (section 55), matters relating to bulk storage of dangerous materials, matters dealing with noise (section 63) and general matters relating to health and safety.

This Environmental and Social Impact Assessment study has examined all aspects of occupational health, safety and welfare of all the persons involved in the project to determine compliance of the outlined sections of the law. In this effect the proponent will allow the Ministry of Labour to assess the site and make determinations of the adequacy of the mitigation measures towards occupational safety of the workers.

5.3.9 Water Resources Act, 2013

Section 39 (1) of the Water Resources Act prohibits the abstraction and use of water unless authorized to do so under this Act. The Developer will therefore, in compliance with provisions of this Act, apply for water abstraction from under the ground or stream for construction use at the proposed project site and apply for a connection to Blantyre Water Board for potable water on site. Further, Part VIII, Section 89 (1) of the Act prohibits any person who owns, controls, occupies or uses land on which an activity or process is or was performed to pollute water resources and which, unless authorized under this Part, causes, has caused or is likely to cause pollution of a water resource, shall take all such measures as may be necessary to prevent any such pollution from occurring, continuing or recurring.

The Developer will therefore apply for a water abstraction permit from the Water Resources Board whose establishment is being provided for in this Act. In addition, the Developer will ensure that activities at the College do not pollute water in the nearby streams and rivers by ensuring that water from drainages do not go into natural storm water ways indiscriminately. Measures to minimize pollution of the water include proper disposal of both domestic, chemicals from laboratories and effluent from all the stations activities.

5.3.10 Gender Equality Act, 2013

The Act was developed to ensure that men, women, boys and girls equally and effectively participate in and benefit from different development processes. The Act was put in place to assist to:

a) promote gender equality, equal integration, influence, empowerment, dignity and opportunities for men and women in all functions of society;
b) prohibit and provide redress for sex discrimination, harmful practices and sexual harassment; and
c) provide for public awareness on promotion of gender equality.

Considering that the project will employ a number of people both during construction and operation phases of the project, both the Developer and the Contractor will be expected to apply provisions of this Act. The project will ensure that wherever there are any employment

opportunities, women will be given equal chances as men for employment. In addition the extra accommodation space will enable the institution to increase both male and female student enrolment with no either gender having less than 40 % enrolment that would result in providing the desirable ratio for the labour market.

5.3.11 Physical Planning Act, 2016

The provides for orderly planning and development of land in both urban and rual setting with the aim of ensuring preservation and improvement of amenities and also for purposes of granting permission to develop. The act allows for establishment of a Physical Planning Council that receives any plans and has the duty to see to it that relevant organisations and people within the planned development are consulted. In this case since the development is within the institution, the main stakeholders are the College membership. The Act further requires that local physical plans detailing buildings be deposited with the Commissioner and gazetted. Where necessary a review and or eventually a modification of the plans may be effected.

5.4 Institutional Framework

The Environment Management Act and the EIA Guidelines provide for the administrative framework of the EIA process. The EIA process is managed by the Director of Environmental Affairs. The Director of Environmental Affairs works with other line Ministries/agencies and stakeholders.

Under section 26 of the Environment Management Act, a prescribed project cannot receive the required authorization to proceed from the relevant licensing authority unless the Director has issued a certificate that an EIA is not required or that he has approved the project on the basis of an EIA report. The Director is empowered under the Act to require changes to a project in order to reduce environmental impact and to reject a project, if, in his view, the project will cause significant and irreparable injury to the environment. A person not satisfied with the decision of the Director may appeal to the Environmental Appeals Tribunal.

The Director relies upon the advice of the Technical Committee on the Environment established under section 16 of the Environment Management Act in order to make his determination. Through this committee, member agencies are informed about projects being appraised; participate in reviews of project briefs, ESIA ToRs and ESIA reports; develop project approval terms and conditions; develop and monitor project auditing conditions; and recommends courses of action to the Director. The Director is not bound by the advice of the Committee to arrive at any action that may be considered necessary.

Institutional responsibilities for the co-ordination, planning, administration, management and control of development and environmental issues are fragmented among a number of agencies, ministries and organizations. The major institutions to be involved in this project shall include:

a) Environmental Affairs Department;
b) Ministry of Lands, Housing and Urban Development;
c) Blantyre Water Board;
d) Ministry of Labour, Youth, Sports and Manpower Development;
e) Ministry of Natural Resources, Energy and Mining;
f) Ministry of Agriculture, Irrigation and Water Development;

g) Ministry of Local Government and District Administration; and
h) Blantyre City Council.

During the preparation of the Environmental and Social Management Plan, these major institutions including the client structures and/or their documents were consulted for their technical advice, expert knowledge and concerns or future programs as related to the project.

5.5.1 Operational Policy 4:01 (Environmental Assessment).

The objective of Operational Policy 4:01 (Environmental Assessment) is to ensure that Bank-financed projects are environmentally sound and sustainable, and that decision-making is improved through appropriate analysis of actions and mitigation of their likely environmental impacts. This policy is triggered if a project is likely to have potential adverse environmental and social impacts in its area of influence. Construction activities of the proposed facilities will have some adverse environmental and social impacts, which will require mitigation. In order to comply with this safeguard policy, an Environmental and Social Management Plan (ESMP) has been prepared for the project to guide implementation of mitigation measures where need will be.

5.6 Summary of approvals and licences which the proponent has to obtain

There are a number of statutory and regulatory approvals or licences that developer need to get in the courses of project implementation to ensure that the project is in line with sound environmental management practices and is in compliance with other relevant pieces of legislations. These have been summaries in Table 5.1 below:

Table 5. 1 List of statutory approvals and licences required

List of statutory approvals or licences to be obtained	Legal and regulatory framework	Responsible institution for processing approval or licence
Environmental Impact Assessment Certificate	Environment Management Act (1996)	Environmental Affairs Department
Planning Permission	Country and Town Planning Act /The Physical Planning Act No 17 of 2016	Blantyre City Council
Permission to Develop	Country and Town Planning Act /The Physical Planning Act No 17 of 2016	Blantyre City Council
Approval to dispose of waste	Local Government Act (1998) Waste Management Licence	Blantyre City Council Environmental Affairs Department
Registration Certificate for generation of electricity on a heavy duty generator	Energy Regulatory Act No. 20 (2004)	MERA

Work Place Registration Certificate. To guide on procedures on workers' environmental health, safety during project implementation and operations.	Occupational Health, Safety and Welfare Act (Cap 55:01)	Ministry of Labour, Youth and Manpower Development
Consent to use potable water	Water Works Act (1995)	Blantyre Water Board

CHAPTER 6 IMPACT IDENTIFICATION AND ASSESSMENT

6.1 Identification of potential impacts

Construction and operation of the proposed students' hostels at College of Medicine is expected to generate a range of impacts in the project impact area. The anticipated impacts will be to a greater extent on the socio-economic and to a lesser extent on the biophysical aspects of the environment. Some of the impacts are expected to be positive while others may be negative. The main purpose of this chapter is to identify the potential environmental impacts associated with the proposed 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 social and economic development of the area and Malawi 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 arising from implementation of the proposed 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.

6.1.1 Methodology of impact identification

Impact identification was done by analyzing the proposed project activities and determining their influence on the baseline environmental and social characteristics of the proposed 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 neighbouring establishments and facilities, 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, in accordance with the project stages of planning and design, construction, operation and maintenance and decommissioning; and

d) Assessment of environmental impacts in order 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 planning and design phase include acquisition of land; land surveying; preparation of a master plan; preparation of detailed lay out plans; preparation of building designs, compensation of the affected households, tender process, obtaining approvals under the Town and Country Planning Act and the Bye-Laws and obtaining all the approvals necessary for the construction and operation of the proposed students' hostels. It is expected that the environmental management measures, which will be proposed for the project will be incorporated into the architectural and engineering design of the proposed 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, a borehole for water supply, construction of a workers' camp which will provide accommodation to the workers, storage facilities and an office facility; backfilling with compaction consolidation; levelling and earth marking; transportation of building materials; Other infrastructure such as drainages and utility reticulation shall also be constructed.

c) **Demobilization Phase -** The term demobilization is used to describe the range of actions necessary to remove or make safe components of a project, and to restore the area occupied by the project to other beneficial uses once construction activities are over. Decommissioning of the students' hostels is not included in this EIA at this stage. However, a Decommissioning Plan is to be prepared two years prior to decommissioning the students' hostels should that need arise. The main activities to be undertaken during demobilization phase are:
    i) Demobilization of Contractors workforce;
    ii) Revegetating areas that were cleared by the Contractor around the project impact area;
    iii) Removal of construction waste from project site; and
    iv) Rehabilitation of borrow pits created during construction of access roads and project buildings and other associated infrastructure.

d) **Operation Phase** – During operation phase, the college structures will be occupied medical students. The college is already enrolling students having opened its doors to the first cohort in 1991.The College has a total academic staff compliment of about 110 and is likely to expand as it is about to be delinked from University of Malawi.

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. The steps undertaken were:

a) 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 proposed project.

b) Assessment of project inputs associated with the proposed project

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

c) Assessment of project activities that will be undertaken

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

d) Assessment of project outputs associated with the proposed project

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

e) Determination of environmental impacts

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

6.2 Impact Evaluation and Scoring Matrix

After identifying the positive and negative environmental impacts the proposed 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.

6.2.1 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.

6.2.2 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.

6.2.3 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).

6.2.4 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 5 for a high impact. Each impact is given a score from 1 to 5 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 (5) 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 6.1 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 5 for a high impact. Each impact is given a score from 1 to 5 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 (5) 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 of scoring matrix with significant levels

	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	5	5	5	3	18
2	Creation of a market for local construction materials	3	4	5	2	14
3	Promotion of small scale businesses	3	3	3	2	11
NEGATIVE IMPACTS						
1	Air Pollution	-3	-3	-3	-2	-11
2	Noise	-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

Impact		Spatial extent of the impacts	Significance of the impact	Probability of occurrence of the impact	Duration of the impact	Total Score
6	Increase in the spread of HIV and AIDS and other sexually transmitted diseases	-1	-4	-5	-3	-14
7	Increase in Criminal Acts	-1	-3	-3	-3	-10
8	Poor waste management	-1	-3	-3	-2	-9
9	Poor sanitation	-2	-3	-4	-2	-11
10	Land and river bank degradation	-2	-3	-4	-5	-14
IMPACTS DURING DEMOBILIZATION						
POSITIVE IMPACTS						
1	Reduced noise levels	1	2	2	3	8
NEGATIVE IMPACTS						
1	Loss of employment	5	5	5	3	18
2	Poor waste management	1	3	3	2	9
3	Loss of business opportunities	3	4	5	2	14
IMPACTS DURING OPERATION AND MAINTENANCE						
POSITIVE IMPACT						
1	Increase in graduate medical personnel	5	5	5	5	20
2	Creation of employment	5	4	5	3	17
3	Improved access to social services by communities	2	3	3	4	12
4	Increase in economic activities in the project area	3	3	3	3	12
5	Increase in government revenue through taxes	4	5	4	5	18
NEGATIVE IMPACTS						
1	Increase in the spread of HIV and AIDS and other sexually transmitted diseases	-1	-4	-5	-3	-14

Impact		Spatial extent of the impacts	Significance of the impact	Probability of occurrence of the impact	Duration of the impact	Total Score
2	Increase in Criminal Acts	-1	-3	-3	-3	-10
3	Increase in the spread of HIV and AIDS and other sexually transmitted infections	-1	-3	-3	-1	-8
4	Poor waste management	-1	-3	-3	-2	-9
5	Poor sanitation	-2	-3	-4	-2	-11

Negative impacts with a high total score as presented in Table 6.2 are considered severe and should be accorded serious attention by the developer.

6.3 Description of environmental impacts and their management measures

6.3.1 Impacts from Design and Planning Phase

The planning and design phase will involve surveying, preparation of maps, detailed layout plans and building plans.

Positive Impacts

a) Creation of Employment:

The planning and design phase provided employment to consultants for the preparation of location plan, detailed layout plan site plan and building plans for students' hostels and ancillary buildings. Another team was engaged to carry out an environmental impact assessment.

Enhancement Measures

The project developer employed local consultants who carried out some of the works during the planning and design phase.

6.3.2 Impacts from 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 on the site creating traffic congestion on the Chipatala Road.

Positive Impacts

a) Creation of Employment

Construction activities for the students' hostels will include: land clearing and levelling using excavators and graders, construction of, dining snack lounges, manholes and drainage systems. A total of 250 people will be employed during this phase.

Enhancement Measures:

i) Employing more people as much as from the city surrounding the project area; and

ii) Giving women equal employment opportunities as men.

b) Increase in market for local construction materials

The construction of the students' hostels and ancillary facilities will entail the purchase of construction related materials such as cement, sand, quarry, timber iron sheets. This will create an opportunity for traders to sale their products.

Enhancement Measure:

i) Purchasing materials from as many local suppliers; and

ii) Hiring trucks to transport construction materials like sand, quarry and cement to the project site.

c) Increase in business activities within the project area

The presence of construction workers at the project site will create an opportunity for small scale business men and women to sale food stuffs, refreshments and to offer required services

Enhancement Measure: Designating an area as a market close to the project site.

Negative Impacts

a) Air pollution

Dust particles will be emitted into the atmosphere through clearing of the land, levelling and platform preparation for the construction of buildings.

Mitigation Measures

- Applying water regularly to civil works and earth roads to suppress dust; and
- Controlling the speed of construction vehicles to reduce generation of dust.

b) Noise

Operation of heavy construction machineries and vehicle movements would generate a lot of noise which could be a nuisance to workers and people staying close to the project site especially students at the institution. The most affected people will be those at The CoM Sports Complex area since this is the main wind direction area. 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.

Mitigation Measures

i) Fitting construction vehicles with silencers to reduce the noise;

ii) Servicing machinery so that they can be in good condition at all times; and

iii) Providing ear protection materials for the workers in noisy areas.

c) Soil erosion

The soil will be exposed once the vegetation has been cleared resulting in soil erosion. The other sources include top soil stripping during land preparation and construction works.

Mitigation Measures

i) Carrying out construction works during the dry season from May to September;
ii) Creating drainage channels to direct storm water movement;
iii) Creating stone pitching where soils have been excavated; and
iv) Clearing only those places where buildings will be constructed

d) Soil Contamination

Construction works will involve 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.

Mitigation Measures

i) Construction vehicles should be in good condition to avoid fuel leaks; and
ii) Servicing areas for vehicles should have impermeable surfaces.

e) Increase in accident/incidences

The access road that will be used by vehicles bringing construction materials is also used by vendors, patients guardians, patients and office workers when going to their work places or visiting the hospital. The main access road during construction is therefore congested with pedestrians during morning hours 6:30 to 8.00 and lunch hours 11:30 am to 2: pm and 4:30 to 6:30 pm during weekdays. The pedestrian traffic on Saturdays is significant only during morning and mid afternoon, 2:00 pm.

Mitigation Measure:

i) Managing deliveries of supplies taking advantage of off peak hours and public holidays including weekends
ii) Introducing humps on the road to help reduce the speed of the vehicles;
iii) Erecting warning signs showing that there is heavy machinery and construction vehicles using that road for people to be alert;
iv) Providing workers with protective clothing;
v) Following work place health and safety regulations;
vi) Training workers in the proper use and handling of heavy equipment and machinery; and
vii) Maintaining a first aid kit at the project site.

f) Increase in the spread of HIV and AIDS and other sexually transmitted diseases

The project will be migrant workers, traders as well as local workers with more money from the wages and sales in the project area. This can promote unacceptable unions that will contribute to the increase in the spread of HIV and AIDS and other sexually transmitted diseases in the project area.

Mitigation Measures

i) Sensitizing local people and workers at the work area and campus on the dangers of unsafe sexual activities;
ii) Distributing condoms to both men and women working at the site and
iii) Implement an HIV and AIDS workplace policy.

g) Increase in criminal Acts

The influx of people to the project area and availability of construction materials on site may attract people with bad intentions who can create havoc within the communities. There may also be conflicts between the migrant workers and the local communities that may culminate into violent acts.

Mitigation Measures

i) Employ people from the surrounding areas to reduce number of migrant workers;
ii) Sensitizing the students on the ownership of the project;
iii) Establish a special working relationship and cooperation with Blantyre Police station focusing on common criminal and conflict scenarios associated with a construction site.

h) Poor waste management

Construction rubble, scrap metal, used oils and domestic wastes will be produced and accumulate within the project site.

Mitigation Measures:

i) Provision of dust bins or rubbish pits for the wastes produced;
ii) Segregation of wastes by providing different bins for each type of waste;
iii) Identification of a dumping site within the project area for various types of wastes; and
iv) Disposing of wastes at the designated places regularly.

i) Poor sanitation

Construction workers may be relieving themselves in the bushes or nearby gardens which is very unhygienic if not provided with proper sanitary facilities. They may also be drinking from poor water sources in the absence of potable water. This may contribute to the spread of communicable diseases like cholera and bilharzia in the project area.

Mitigation Measures:

i) Provision of pit latrines for workers on the construction site;
ii) Provision of potable water within the site; and
iii) Sensitization of workers on the importance of good hygiene practices.

j) 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.

Mitigation Measures:

i) Buying sand and quarry from registered local artisans;
ii) Carrying out sensitization of local artisans on good mining practices;
iii) Designating places for sand and quarry mining;

6.3.3 Impacts during demobilization

There will be need to demolish the temporary structures that will be used for store rooms and accommodation for some construction workers. The construction rubble and construction wastes will have to be cleared from the site in readiness for the operation phase of the project.

Positive impacts

a) Reduced noise levels

The heavy machinery and the 250 construction workers will leave the site thereby reducing the amount of noise from the project site.

Enhancement measures: The contractor and the developer should ensure that all working and damaged construction equipment is removed from the site

Negative impacts

a) Loss of employment

All construction workers will be laid off once construction works are completed. This will mean loss of income and source of livelihood for 250 workers.

Mitigation measures:

i) The construction workers should be made aware of the duration for the construction phase so that they can make other plans in time;
ii) Educating the labour force on the need to save part of their income; and
iii) Paying severance benefits to all laid off workers according to the provisions of the labour laws.

b) Poor management of Construction wastes

The construction rubble and wastes that will be generated from demolition of construction works and temporary houses for skeleton construction workers will have to be removed from the site. Rehabilitation works will be carried out on the site upon completing the construction works.

Mitigation measures

i) Disposing of construction wastes at the dumping sites that will be identified in liaison with Blantyre City Council during construction phase;
ii) Scrap metals will have to be sold or disposed of at a dumping site that will be designated specifically for such wastes; and
iii) Trees and grass should be planted in bare areas of the project site as a way of restoring the area.

c) Loss of business opportunities

Local traders selling construction materials will lose their source of income and livelihood. The small scale business men and women selling foodstuffs, and fruits to construction workers will also lose their source of income.

Mitigation measures:

i) Informing local traders of the project duration in time;
ii) Incorporating TEVET training in the project;
iii) Out sourcing some services for non-core activities for the college; and
iv) Paying for all materials that were obtained on loan in time.

6.3.4 Impacts from Operation Phase

The main activity during the operation phase will be the teaching and learning by the academic and students at the College as students utilize the facilities for both accommodation and study.

Positive Impacts

a) Increase in the number of medical personnel in the country

The students' hostels will provide accommodation and study units to medical students pursuing various disciplines at the College. This will in turn improve the quality of health services delivery since qualified personnel will be available to work in various medical facilities in the country.

Enhancement Measure:

i) Putting in place maintenance programme so that the students' hostels should be in operation for a long time; and
ii) Providing equal enrolment opportunities for men and women students from across the country.

b) Creation of employment

A total of 150 people will be employed in various sections during the operation of the students' hostels. There will be employment opportunities for both skilled and unskilled labourers during the operation phase.

Enhancement Measures:

i) Employing more people from the communities surrounding the project area and other areas within the country for both unskilled and skilled jobs; and
ii) giving equal employment opportunities for both men and women

c) Increase in economic activities

The operation of the students' hostels will provide local traders to sale food stuffs like fruits, sugarcane, groundnuts, fresh, cooked and roasted maize, and vegetables to students and members of staff. There will also be an opportunity to supply150food stuffs for student food courts.

Enhancement Measures

i) Sourcing funds for operation and maintenance cost for the students' hostels to be in operation for a long time;
ii) Outsourcing non-core functions; and
iii) Traders from the project area to be given the opportunity to supply food stuffs for student meals.

d) Increase in revenue by government through taxes

Employees and the people supplying goods and services associated with the students' hostels will be paying taxes that will be remitted to MRA.

Enhancement Measure: Remitting taxes to MRA from wages and service provisions in time

Negative Impacts

a) Increase in the spread of HIV and AIDS and other sexually transmitted diseases

Interaction among male and female students as well as workers may result in unacceptable unions that may increase the spread of HIV and AIDS and sexually transmitted diseases.

Mitigation Measures:

i) Carry out sensitization meetings for students, staff and local communities from time to time;
ii) Empowering the community through outsourcing of non-core activities;
iii) Develop and implement an HIV and AIDS workplace policy; and
iv) Distribution of condoms and information materials on HIV and AIDS to workers and students.

b) Increase in criminal acts

The College may attract thieves trying to steal college and student property. These may also end up stealing from the local communities. Conflicts may arise between students and the local communities that may culminate into violent acts.

Mitigation Measures:

i) Sensitize the communities and students on how they can live in harmony;
ii) Develop a special working coordination with the police consistent with student centerd matters
iii) Introduce community policing in conjunction with Blantyre Police station;
iv) Sensitizing the community on the ownership of the college; and
v) Request for a police unit within the project area.

c) Poor waste management

There will be an addition total of 500students and when the construction of the accommodation units is completed and the College is operating at full capacity. These will generate a significant amount of trash in form of paper, used bottles, and domestic waste.

Mitigation Measures:

i) Provision of dust bins or rubbish pits for the wastes produced;
ii) Segregation of wastes by providing different bins for each type of waste;
iii) Maintaining the dumping site that will be identified during construction; and
iv) Collecting and disposing of wastes at the designated places regularly.

d) Poor sanitation

The students and members of staff will be using water borne toilets and some ground labourers may continue using the pit latrines that were meant for the construction workers. Poor management of liquid wastes and sewerage disposal systems may result in poor sanitation and contribute to pollution of the air at the site.

Lack of potable water may lead to the use of poor water sources in the absence of potable water. This may contribute to the spread of communicable diseases such as cholera and diarrhea in the project area.

Mitigation Measures:

i) Provision of adequate toilets for students and members of staff;
ii) Regular Inspection and maintenance of the sewerage network;
iii) Decommissioning of the pit latrines once the construction is complete;
iv) Provision of potable water within the site; and
v) Sensitization of students and members of staff on the importance of good hygiene practices**.**

CHAPTER 7 ENVIRONMENTAL AND MANAGEMENT AND MONITORING PLANS

7.1 Environmental and Social Management Plan

An Environmental and Social Management Plan (ESMP) outlines how the environmental impacts of a project are going to be managed, enhanced, minimized and mitigated. 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 College of Medicine students' hostels is provided in Table 7.1.

Table 7. 1 Proposed Environmental and Social Management Plan

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Responsible Authority	Costs (Mk)
IMPACTS FROM PLANNING AND DESIGN PHASE				
POSITIVE IMPACTS				
1	Creation of employment	Employment of local consultants	• College of Medicine • Old Mutual • Ministry of Labour	N/A
IMPACTS DURING CONSTRUCTION PHASE OF THE PROJECT				
POSITIVE IMPACTS				
1	Creation of employment	• Employing unskilled labour as much as possible from the project area • Giving women equal employment opportunities as men.	• College of Medicine/ Project manager/Contractor • Ministry of Labour	N/A
2	Increase in market for local construction materials	• 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	NA
NEGATIVE IMPACTS				
1	Air pollution	• Applying water regularly to civil works and earth roads to suppress dust • Controlling the speed of construction vehicles to reduce generation of dust.	Contractor/EDO	1,000,000
2	Noise	• Fitting construction vehicles with silencers to reduce the noise	Contractor	850,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Responsible Authority	Costs (Mk)
		• Servicing machinery so that they can be in good condition at all times • Providing ear protection materials for the workers in noisy areas		
3	Soil erosion	• Carrying out construction works out from May - September • Clearing only those places where buildings will be constructed • Creating drainage channels to direct storm water movement • Creating stone pitching where soils have been excavated	Contractor/EDO	850,000
4	Soil Contamination	• Construction vehicles should be in good condition to avoid fuel leaks • Servicing areas for vehicles should have impermeable surfaces	Contractor Project Manager	
5	Increase in accident incidences	• Introducing humps on the road to help reduce the speed of the vehicles • Plan deliveries of construction material during off peak hours • 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 • Maintaining a first aid kit at the project site • Following health and safety regulations	Contractor Project Manager RI Manager	700,000
6	Increase in HIV and AIDS and other diseases	• Develop an HIV and AIDS workplace policy; • Distribute condoms to both women and men working at the site	Contractor City Assembly College of Medicine RI Manager	1,000,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Responsible Authority	Costs (Mk)
7	Increase in criminal Acts	• Establishing targeted working relationship with the police consistent with a construction site • Employ people from the surrounding areas to reduce number of migrant workers • Introduce community policing in conjunction with Blantyre Police station • Request for a police unit within the project area • Sensitize the students on the ownership of the project	Developer College of Medicine RI Manager	1,500,000 N/A
8	Poor waste management	• 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	Contractor EDO College of Medicine	1,350,000
9	Poor sanitation	• Provision of pit latrines for workers and drivers on the construction site • Provision of potable water within the site • Sensitization of workers on the importance of good hygiene practices.	Contractor Project Manager	Included in project cost
10	Degradation of land and river banks	• 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 programs for river banks	Min. of Mines Local Assembly	1,250,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Responsible Authority	Costs (Mk)
		• Introducing alternative income generating activities in the area.		
	IMPACTS FROM DEMOBILIZATION PHASE			
	POSITIVE IMPACTS			
1	Reduced noise levels	• Removing all working and damaged construction machinery and equipment	Contractor Project Manager	N/A
	NEGATIVE IMPACTS			
1	Loss of employment	• 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.	Contractor Project manager Ministry of Labour	Part of project costs
2	Poor waste management	• Disposing of construction wastes at the dumping sites that will be identified during construction phase. • Selling Scrap metals will have to be sold or disposed at a dumping site that will be designated specifically for such wastes. • Trees and grass should be planted in bare areas of the project site as a way of restoring the area.	Contractor Project manager EDO College of Medicine	
3	Loss of business opportunities	• Informing local traders of the project duration in time • Paying for all materials that were obtained on loan in time • Incorporate TEVET training in the project; • Outsourcing some services for non-core activities for the college	Contractor Project Manager	N/A

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Responsible Authority	Costs (Mk)
IMPACTS FROM OPERATION AND PHASE				
POSITIVE IMPACTS				
1	Increase in the number of doctors in the country	• Instituting a programme for running costs so that the students' hostels should be in operation for a long time • Providing equal enrolment opportunities for men and women medical personnel from across the country	College of Medicine Old Mutual	N/A
2	Creation of employment	• Employing more people from the communities surrounding the project area and other areas within the country for both unskilled and skilled jobs • giving equal employment opportunities for both men and women	Developer/Ministry of Labour	N/A
3	Improved access to social services by the local community	• Providing extra social services that can be accessed by the communities.	College of Medicine Old Mutual	N/A
4	Increase in economic activities	• 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	College of Medicine Old Mutual	N/A
5	Increase in revenue by government through taxes	• Remitting taxes to MRA from wages and service contracts in time	College of Medicine	N/A
NEGATIVE IMPACTS				
1	Poor waste management	• Provision of dust bins or rubbish pits for the wastes produced • Segregation of wastes by providing different bins for each type of waste	College of Medicine EAD	N/A

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Responsible Authority	Costs (Mk)
		• Maintaining the dumping site that will be identified during construction • Collecting and disposing of wastes at the designated places regularly		
2	Poor Sanitation	• Provision of adequate toilets for students and members of staff • Regular Inspection and maintenance of the sewerage network	College of Medicine Old Mutual	1,350,000 Part of project cost
3	Increase in HIV and AIDS and other sexually transmitted diseases	• Carry out sensitization meetings for students, staff from time to time. • Develop an HIV and AIDS workplace policy; • Distribution of condoms and information materials on HIV and AIDS to workers	City Assembly College of Medicine Old Mutual	750,000
4	Increase in criminal acts	• Establishing targeted working relationship with the police consistent with a construction site • Introduce community policing in conjunction with Blantyre Police station • Request for a police unit within the project area •	College of Medicine Blantyre Police	1,000,000

7.2 Environmental and Social Monitoring Plan

The monitoring plan is vital because it is used as a 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, and frequency of monitoring and assigns responsibility for monitoring.

To ensure that the environmental management plan for the proposed College of Medicine students' hostels is implemented, an environmental monitoring plan has been prepared as outlined in Table 7.2. 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 social welfare of employees, students and local communities.

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Table 7. 2 Proposed Environmental and Social Monitoring Plan

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
	IMPACTS FROM PLANNING AND DESIGN PHASE						
	POSITIVE IMPACTS						
1	Creation of employment	Employment of local consultants	No. of local consultants employed	Employment records	Once, on commencement of assignment	College of Medicine Old Mutual Ministry of Labour	N/A
	IMPACTS DURING CONSTRUCTION PHASE OF THE PROJECT						
	POSITIVE IMPACTS						
1	Creation of employment	• Employing unskilled labourers as much as possible from the project area • Giving women equal employment opportunities as men.	Number of local people employed Number of women employed	Records	quarterly	Client/ Project manager Ministry of Labour	500,000
2	Increase in market for local construction materials	• Designating a place for the local market close to the site • Purchasing materials from as many local suppliers. • Piling trucks to transport construction materials like	No. of accessible market(s) to the site No. of local people supplying materials	interviews	quarterly	Contractor Project manager College of Medicine Old Mutual	500,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
		sand, quarry and cement to the project site.	Number of local transporters ferrying material				
	NEGATIVE IMPACTS						
1	Air pollution	• Applying water regularly to civil works and earth roads to suppress dust; • Controlling the speed of construction vehicles to reduce generation of dust.	No. of times water is applied per No of vehicles over speeding	record	quarterly	Contractor/EDO	500,000
2	Noise	• 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	No. of vehicles fitted with silencers Machines in good condition No. of workers using PPEs	inspections	quarterly	Contractor	750,000
3	Soil erosion	• Design taking into consideration of topographical features of the area • Creating drainage channels to direct storm water movement • Creating stone pitching where soils have been excavated	Availability of drainages Area of stone pitched No. of trees and area planted with grass within the site	inspections	Once on commencement	Contractor/EDO, Architect	500,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
		• Vegetative cover on bare ground •					
4	Soil Contamination	• Construction vehicles should be in good condition to avoid fuel leaks • Servicing areas for vehicles should have impermeable surfaces	No. of vehicles serviced Availability of impermeable surfaces	Records	quarterly	Contractor Project Manager EDO	1,000,000
5	Increase in accident/incidences	• Introducing temporary earth humps on the road to help manage the speed of the vehicles of visitors and construction. • Erecting warning signs, speed limits signs, showing that there is heavy machinery and construction vehicles using that road for people to be alert • Following health and safety regulations • Providing workers with protective clothing • Training workers in the proper use and handling of heavy equipment and machinery	No. of humps on the local road No. of warning signs erected No. of people using PPEs No. of people trained Presence of a first aid kit	inspections	Once on commencement quarterly	Contractor Project Manager Ministry of Labour	1,000,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
		• Maintaining a first aid kit at the project site					
6	Increase in HIV and AIDS and other diseases	• Sensitizing local people and workers at the site on the dangers of unacceptable unions • Distribute condoms to both men and women at the work place and students • Develop an HIV and AIDS workplace policy;	No. of sensitization meetings HIV and AIDS policy in place	Records	quarterly	Contractor Local leaders College of Medicine	1,000,000
7	Increase in criminal Acts.	• Employ people from the surrounding areas to reduce number of migrant workers • Sensitize the community on the ownership of the project • Introduce community policing in conjunction with Blantyre Police station • Request for a police unit within the project area	No of criminal incidences No. of local people employed Community policing in place Police unit in place	Police records Records	Quarterly Once on commencement	Developer	1,000,000
8	Poor waste management	• Provision of dust bins or rubbish pits for the wastes produced	Dust bins for each type of waste in place	Inspections	Quarterly	Contractor EDO	1,000,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
		• 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	Dumping site identified No. of times rubbish is removed		Once on commencement quarterly		
9	Poor sanitation	• 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	Once during commencement quarterly	Contractor Project Manager	1,250,000
10	Degradation of land and river banks	• 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 programs for river banks •	No. of local registered local artisans supplying materials No. of meetings No of official mining sites No. of afforestation programs	records	quarterly	College of Medicine Mines Local communities	1,000,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
	IMPACTS FROM DECOMMISSIONING PHASE						
	POSITIVE IMPACTS						
1	Reduced noise levels	• Removing all working and damaged construction machinery and equipment	All equipment removed	inspections	Once upon decommissioning	Contractor Project Manager	1,250,000
	NEGATIVE IMPACTS						
1	Loss of employment	• 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 on decommissioning	Contractor Project manager Min. of Labour	50,000
2	Poor waste management	• Disposing of construction wastes at the dumping sites that will be identified during construction phase.	Site clear of construction wastes and scrap metal	inspections	Once	Contractor Project manager EDO	500,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
		• Scrap metals will have to be sold or disposed at a dumping site that will be designated specifically for such wastes.				College of Medicine	
3	Presence of bare areas'	• Trees and grass should be planted in bare areas of the project site as a way of restoring the area.	Well landscaped premises	inspections	once	Contractor Project manager EDO College of Medicine	500000
4	Loss of business opportunities	• Informing local traders of the project duration in time • Paying for all materials that were obtained on loan in time • Incorporate TEVET training in the project • Outsourcing some services for non-core activities for the college	Materials paid for	records	Once	Contractor Project Manager College of Medicine	850,000
	IMPACTS FROM OPERATION PHASE						
	POSITIVE IMPACTS						
1	Increase in students accommodation	• Completion of the construction	No. of bed spaces available	inspection	once	College of Medicine	

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
2	increase in the number of medical personnel in the country	• Sourcing funds for running costs so that the students' hostels should be in operation for a long time • Providing equal enrolment opportunities for men and women medical personnel from across the country through career talk sensitization	No. of medical personnel trained No. of women enrolled	records	Annually	College of Medicine	500,000
3	Creation of employment	• Employing more people from the communities surrounding the project area and other areas within the country for both unskilled and skilled jobs • giving equal employment opportunities for both men and women	No. of local people employed No. of women employed	records	Annually	Developer/Ministry of Labour	750,000
4	Improved access to social services by the local community	• Providing extra social services that can be accessed by the communities.	Presence of social services	inspection	Once	College of Medicine Local communities	500,000
5	Increase in economic activities	• Sourcing funds for operation and maintenance cost for the students' hostels to be in operation for a long time.	No. of traders supplying goods to the students' hostels	records	Quarterly	College of Medicine Old Mutual	N/A

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
		• Outsourcing non-core functions • Traders from the project area to be given the opportunity to supply food stuffs for student meals.					
6	Increase in revenue by government through taxes	• Remitting taxes to MRA from wages and service contracts in time	Remittances to MRA	records	Annually	College of Medicine	N/A
	NEGATIVE IMPACTS						
1	Poor waste management	• 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 the designated places regularly • Used chemicals should be disposed in consultation with EAD	No. of dust bins Presence of dumping site Frequency of waste disposal Presence of hazardous waste disposal site	Inspections Records inspections	Quarterly Once quarterly	College of Medicine EAD Blantyre City	1,500,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
2	Poor Sanitation	• Provision of adequate toilets for students and members of staff • Regular Inspection and maintenance of the sewerage network	No of toilets Presence of connection to sewage network in good condition	inspections	Once Quarterly	College of Medicine	1,000,000
3	Increase in HIV and AIDS and other sexually transmitted diseases	• Carry out sensitization meetings for students, 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	No of meetings Policy in place No. of condoms distributed	records	Quarterly	Local Communities College of Medicine Contractor Blantyre City	750,000
4	Increase in criminal acts	• Sensitize the communities and students on how they can live in harmony • Establishing of targeted agreement relating to student matters • Sensitizing the community members on the ownership of the college • Introduce community policing in conjunction with Blantyre Police station	No. of criminal incidences Community policing in place Police unit in place	Police records inspections	Quarterly Once	College of Medicine Blantyre Police	1,000,000

Item	Potential impact	Recommended Enhancement/Mitigation Measure	Monitoring Indicator	Means of Verification	Frequency of monitoring	Responsible Authority	Costs (Mk)
		• Request for a police unit within the project area.					

CHAPTER 8 CONCLUSION AND RECOMMENDATIONS

8.1 CONCLUSION

From the environmental assessment conducted for the project, it is clear that the project potentially has some significant negative impacts which relate to the surrounding environment. The impacts relate to issues pertaining to risk of pollution of the environment in case of improper solid and liquid waste disposal; traffic congestion and general nuisance during construction. Sanitation is also a challenge that has to be appropriately considered with adequate safety measures in case of bursting of sewage pipes which may pollute the immediate environment.

It should be noted, however, that despite the above potential impacts, it is possible with adequate design and implementation measures advanced in this report to mitigate the environmental effects and reduce them to acceptable levels. It is recommended that strict monitoring measures will be instituted both from an engineering and environmental point considering the sensitivity of the site. This will ensure that the project adheres to acceptable practices and standards.

The project will assist to create modern and adequate hostel facilities at College of Medicine, Blantyre campus, which will assist to increase students' enrolment and enhance their academic performance.

8.2 SUMMARY OF POSITIVE AND NEGATIVE IMPACTS

8.2.1 Summary of key positive impacts

A summary of the key positive impacts identified in the EIA study are indicated below:

a) Provision of modern and adequate and affordable student hostels facilities at College of Medicine, Blantyre campus;
b) Increased enrolment of medical University Students;
c) Reduced demand for rented out-of-campus accommodation
d) Increase in performance of students academically as most students will leave close to the campus and easily access college facilities
e) Creation of Employment;
f) Increase in market for local construction materials;
g) Increase in business activities within the project area;
h) Improve security in the area;
i) Increase in economic activities;
j) Increase in revenue by government through taxes; and
k) Improved aesthetic value.

8.2.2 Summary of key negative impacts

The following is a summary of the main negative impacts and recommended measures to minimize or eliminated the impacts:

a) Loss of vegetation and animal habitats due to site clearing;
b) Dust generation;
c) Soil erosion and sedimentation;

d) Generation of waste;
e) Increased Noise Levels;
f) Pollution of the environment from engine oils and pollution;
g) Creation of borrow pits from quarrying of construction materials
h) Visual Intrusion;
i) Disruption of existing services;
j) Occupational safety and health risks;
k) Risk of Increased incidences of Sexually Transmitted Infections (STIs) and HIV and AIDS.

The proposed project design has integrated mitigation measures with a view to ensuring compliance with all the applicable laws and procedures. The structures will be built to the required planning/architectural/structural standards of the National Construction Industrial Council (NCIC). During project implementation and occupation, sustainable environmental management will be ensured; avoiding inadequate use of natural resources, conserving nature sensitively and guarantees a respectful and fair treatment of all people working on the project, general public at the vicinity and inhabitants of the project.

In relation to the proposed mitigation measures that will be incorporated during construction and operational/occupation phases; the development's input to the society; the project is considered beneficial and important. It is our considerable opinion that the proposed development is a timely venture that will subscribe to the government housing policy and investment call. It is thus our recommendation that the project be allowed to go ahead with the implementation provided the outlined mitigation measures are adhered to. Major concerns should nevertheless be focused towards minimizing the occurrence of impacts that would degrade the general environment. This will however be overcome through close adherence and implementation of the recommended Environmental and Social Management and Monitoring Plans (ESMPs).

8.3 OVERALL RECOMMENDATION

It is the consultant's view that the project be allowed to proceed on condition that the measures proposed in this ESIA Report and in particular in the ESMP are fully implemented. Recommendations for the prevention and mitigation of adverse impacts are as follows:

a) All solid waste materials and debris resulting from construction activities must be disposed off at Waste management dumping site at Mzedi;
b) Construction activities must be undertaken only during the day i.e. between 7:30 am – 6:00 pm to minimize disturbance to the general public within the proximity of the site/project;
c) Traffic along the access/connecting roads should be controlled during construction and especially when heavy trucks are turning in and out of the site to ensure that no accidents are caused by the site's activities;
d) During construction all loose soils must be compacted to prevent any erosion by wind or water. Other appropriate soil erosion control measures can be adapted. Any stockpiles of earth should be enclosed, covered or sprinkled with water during dry or windy conditions to minimize generation of dust particles into the air;

e) Once earthworks have been done, restoration of the worked areas should be carried out immediately by backfilling, landscaping/ levelling and planting of low grass (in open areas), flowers and suitable tree species;
f) Ensure proper water usage during construction and occupational phases. Contractor can import water using bowsers and tankers with the approval of relevant water authority. Provide water saving valves and install rainwater harvesting systems (gutters, down pipes and storage facilities);
g) Drains will be properly designed, installed and regularly maintained to prevent storm water (run-off) from accumulating within the site and spreading to the neighbourhood. These must effectively drain the storm from the premise in to the existing public drainage system along the road;
h) Proper and regular maintenance of construction machinery and equipment will reduce emission of hazardous fumes and noise resulting from friction of rubbing metal bodies. Maintenance should be conducted in a designated area and in a manner not to interfere with the environment;
i) Heavy construction activities should be limited (or avoided) during the rainy season to minimize the chances of soil degradation (soil erosion);
j) Maintenance activities must be carried out in service bay to reduce chances of oils or grease or other maintenance materials, from coming into contact with environment (water or soil). Waste water from such areas must be refrained from coming into contact with soil mass or water bodies as it contains oil/grease spills;
k) Used and new oils must be handled and stored appropriately to avoid oil leaks and spills on the site;
l) Sewerage system must be properly designed within the site /house and effectively connected to the existing sewer line. Design specifications must be followed during installation. Standard cleanliness of sanitary and waste disposal facilities at construction site must be maintained;
m) Workers must be provided with complete protective and safety gear. They must have working boots, complete overalls, helmets, gloves, earmuffs, nose-masks, goggles etc.
n) Fully equipped first aid kit must be provided within the site. Workers should get food that is hygienically prepared; the source of such food must be legalized or closely controlled;
o) The contractor must provide adequate security during the construction period and especially during the night when there are no construction activities;
p) A complete firefighting system must be provided after completion of the project. The equipment is clearly provided in the design plan, and in the report. This must be installed or provided at strategic points; and
q) Diligence on the part of the contractor and proper supervision by the Supervising Foreman during construction and the property manager during operation.

REFERENCES

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18. Government of Malawi (2017), **Forestry (Amendment) Act,** Ministry of Natural Resources, Energy and Mining;
19. Government of Malawi (2017), **Land Survey Act,** Ministry of Lands, Housing and Urban Development;
20. Government of Malawi (2017), **Lands Acquisition Act,** Ministry of Lands, Housing and Urban Development;
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24. **National Statistical Office, 2018**. Preliminary Report: Population and Household Survey, National Statistical Office
25. **Malawi Government, Physical Planning Act 2016,** Ministry of Lands, Housing and Urban Development.

ANNEXES

ANNEX 1 Terms of reference for the ESIS for construction of Students' hostels at College of Medicine, Blantyre campus

1. Provide a full description of the scope of the project with respect to the:
   (a) Name of the proponent;
   (b) The postal and physical address;
   (c) The spatial location of the site for the project,
   (d) The estimated cost of the project, the size of land for the project site,
   (e) The number of people to work on the area including water reticulation,
   (f) Waste disposal and access roads.

2. Examine the existing physical and socio-economical conditions of the proposed area by identifying and analyzing:
   (a) Geology and soil conditions of the area;
   (b) Site topography and drainage systems (water courses);
   (c) The scope of vegetative resources of the site;
   (d) The scope of fauna within the area;
   (e) Existing human land uses (e.g. cultivation by local people) and developments within and surrounding area
   (f) Suitability of the site for the proposed project.

3. Provide a site-specific map of the area (Scale 1:50,000) showing the proposed project site and (1:10,000) showing existing establishments in the proposed area and surrounding areas. A site plan for the project should also be provided.

4. Describe the major activities to be undertaken in the construction and operation of the infrastructure and facilities for the proposed mine. Identify the main construction and operation activities of the project.

4 State any alternatives considered for the project.

5. Identify the potential short and long-term environmental impacts associated with the proposed project, focusing on both the positive and negative effects as well as effects to the biophysical, social, economic and cultural components of the environment. The potential impacts must include those related to:
   (a) Project planning;
   (b) Project construction;
   (c) Project operation; and
   (d) Project decommissioning.

6. Prescribe appropriate measures /strategies to eliminate, reduce, reverse or mitigate the identified negative impacts/effects identified in 5 including the measures to enhance the positive effects.

7. Propose an environmental management and monitoring plan for the project. The EMP should be in tabular form, which should specify the predicted impacts,

mitigation measures/enhancement measures, schedule of these measures, costs to undertake these measures, and responsible persons and institutions. The Environmental Monitoring Plan should outline all the main indicators to be used for monitoring the impacts and also the frequency of monitoring.

8. Undertake public consultation to ensure that all interested and affected stakeholders are involved in the EIA process and incorporate their views into the EIA report.

9. Outline government objectives and the policy/legal framework on the environmental impact assessment - as a justification for preparation of environmental impact assessment for a project. Provide a proper citation within the study report of all the reference materials including all relevant Malawi Government Policies and laws in the case of the implementation of the proposed project (e.g. Environmental Management Act, Mines and Minerals Act, National Land Policy and Water Resources Act)

ANNEX 2 Issues raised by different stakeholders

Name	Position	Organization	Comment	Action taken
College of Medicine, Lilongwe Campus				
M. Malewa	Vice Principal	CoM	The Project is a very important one as it will assist to provide the much-needed additional bed spaces for the students	The ESIA report has outlined the benefits of the project
G. Mugawa	Finance Officer	CoM (Bt)	The Project will assist to facelift College of Medicine, Lilongwe Campus as the proposed hostels will have modern structures	The report has included details of the structures and how the Contractor should adhere to details of the architect designs
Howard Kamphinda	Stores Clerk Officer	CoM (LL)	The project will assist to improve students' performance in their academic work as the students will not be traveling longer distances to access the University facilities	The ESIA report has outlined the benefits of the project
Pacharo Chirwa	Security Officer	CoM (LL)	The project will enhance students' safety and safety of their assets as they will all be accommodated on the campus	The ESIA report has outlined the benefits of the project
Client, Old Mutual Investment Group				
Mphatso Kasalika	Head of Alternative Investment	Old Mutual	Old Mutual will continue to work with all the relevant authorities to ensure that the project is implemented as planned	Preparation of the ESIA report itself is an indication of how committed the Client is to follow all the prescribed laws and regulations when implementing this project

Linda Kumsinda	Project Coordinator	Old Mutual	Old Mutual is doing everything possible to ensure that the project is implemented in an environmentally and socially acceptable manner	Preparation of the ESIA report itself is an indication of how committed the Client is to follow all the prescribed laws and regulations when implementing this project
Brenda Mwale	Investment Manager	Old Mutual	Old Mutual will continue to work with all the relevant authorities to ensure that the project is implemented as planned. Once the plans and designs are ready Old Mutual will work hand in hand with the City Council to have the plans and designs approved	Preparation of the ESIA report itself is an indication of how committed the Client is to follow all the prescribed laws and regulations when implementing this project
Architect				
Justin Mushan	Architect	MOD	The designs of the hostels and the associated infrastructure are developed together with the developer. This will ensure that the developer's desires are incorporated into the designs.	The report has recommended that the Contractor should adhere to details of the architect designs
Patrick Calise	Architect	MOD	The designs of the hostels and the associated infrastructure are developed together with the developer. This will ensure that the developer's desires are incorporated into the designs.	the Contractor should adhere to details of the architect designs

Other stakeholders relevant to the project				
T. Mbale – Luka	Director	Environmental Affairs Department	The project is a good initiative. It will assist to make available modern and adequate hostels facilities at College of Medicine, Lilongwe Campus of LUANAR. However, the developer should ensure that the necessary laws and policies pertaining to environment and natural resources management are adhered to when implementing the project. EAD will be monitoring implementation of the project activities time and again during construction phase to ensure that the project activities comply with environmental laws of the land. Construction activities will not be allowed to commence until the ESIA report is approved	The ESIA report has recommended that implementation of the project should follow all the environmental laws and regulations
H. Nyangulu	Commissioner of Labour	Ministry of Labour, Vocation Training and Manpower Development	The Contractor should as much as possible employ Malawians in his workforce. The Contractor will further be required to introduce and enforce a site specific	The report has stipulated all the recommendations which will assist to take care of all the Occupation Health and Safety Concerns which may arise as a result of the project

			Occupation Health and Safety policy to ensure that no occupational accidents happen at work place	
Mr. Timothy Mwale	Land and Property Valuation officer	Ministry of Lands, Housing and Urban Development	The development will take place within College of Medicine, Lilongwe Campus and the land already belong to College of Medicine, Lilongwe campus hence issues of compensation and resettlement will not occur	The report has not included issues of compensation and resettlement.
Dr. Dafter Khembo.	Monitoring and Evaluation Specialist	NCHE	Availability of adequate and modern Hostels will assist to increase enrolment in these institutions of higher learning and assist to improve academic performance of students as all the students will be accommodated within the campus where access to university facilities will be easy. The project is very much required	The report has included different benefits that the project will generate

ANNEX 3 Designations and qualifications of the experts

The following personnel list was responsible for the conducting of EIA study for the project:

4.1 Lyson Kampira: (MSc. Environmental Science, Bachelor of Education Science (Hons)) Mr. Kampira is an experienced Environmental and Social Impact Assessment expert and will be the Team Leader for the Assignment. He is a seasoned Environmental and Social Impact Assessment expert with More than 10 years of practical experience in ESIA studies and environmental management in General. He has successfully conducted a number of ESIA. In all, he has successfully conducted and led more than 20 ESIA studies and has prepared more than 20 ESIA reports and Environmental and Social Management Plans for different developmental projects ranging from irrigation, road infrastructure, hydropower generation, mining, industrial development, infrastructure developments and water and sanitation which have been approved by the Environmental Affairs Department.

4.2 Jonas Mwatseteza: PhD, MSc, Bed (Hons) and Bed (Sc): An Environment and Analytical Chemist. He has conducted a number of EA studies and prepared a number of EIA reports for different development projects. Has more than 6 years of practical experience in conducting EIA studies and preparation of EIA reports. He has successfully done **more than 10 similar assignments**. The expert was involved in conducting stakeholder consultations, environment review and assessment, report writing.

4.3 Martna Chimzimu: (Bachelor of Arts in Social Science) - Majoring in Sociology with minors Political Science & Administrative Studies

Ms. Chimzimu is a seasoned Social Development Expert with wide experience in Environment and Natural Resources Management, Climate Change, Gender and HIV AND AIDS management. She has more than 5 years' experience in conducting socio-economic surveys and preparation of social impact assessment and mitigation plans. She has vast experience in public consultation.

4.4 Stanley Phiri (B.Sc. in Irrigation Engineering)

Mr. Phiri is a Water Resources Expert. He specialized in Hydrology; and Water Resources. Mr. Phiri has wide professional experience in the water sector; irrigation, water supply, disaster risk management, environment and climate change management and related water disciplines of water, sanitation and hygiene. This includes water resources policy reforms for complex water demands for urban and rural water supply, Sustainable Environmental Management of Water Schemes, Designing of Water Infrastructures and Rural Development, Surface and Groundwater Hydrology, Catchment Analysis and Management, Hydrological Modelling and Water Management, Rural Water Supply and Construction Management.