SOKOINE UNIVERSITY OF AGRICULTURE

EDWARD MORINGE CAMPUS MASTER PLAN

(2024 – 2034)

JUNE 2024

MOROGORO, TANZANIA

EDWARD MORINGE CAMPUS MASTER PLAN

EXECUTIVE SUMMARY

Introduction:

One of the strategic objectives of Sokoine University of Agriculture, as outlined in the 2021-2026 CSP, is to ensure an improved teaching and learning environment through the improvement of physical facilities to cope with future expansion needs and growth direction. To realise this and other objectives of the CSP, management initiated a process to prepare a Master Plan for the Edward Moringe campus.

The Master Plan covers 2024 to 2034 and is intended to guide the implementation of new projects, repair deficiencies, and preservation of valuable facilities, landscapes, and infrastructure of the Edward Moringe Campus over the next ten years.

The Master Plan comprises the following three chapters:

1) Introduction
2) Edward Moringe Campus Today
3) Strategic Planning and Future Needs

The preparation of the Master Plan was participatory, involving SUA management, staff, students, and other stakeholders. In addition, the preparation included field observations, spatial planning, and mapping.

Edward Moringe Campus Today:

The Edward Moringe campus has a total area of 2,376 ha, and the land uses are categorised into nine (9) zones: academic, student hostels, business, recreation, residential, administration, conservation, University training farm, and agriculture investment.

An evaluation of the zones' conditions revealed that substantial investments had been made to expand and upgrade their educational infrastructure. This has been possible because of financing from various sources, including the Government, development partners, and internally generated funds. More improvements are expected from the HEET project, which has already started.

Furthermore, the evaluation identified improvements that needed to be made in each zone. These include improving physical facilities to accommodate future expansion and growth direction.

Strategic Planning and Future Needs:

Projected enrolment growth is an essential consideration for the campus when developing its Master Plan. By accurately predicting future enrolment numbers, SUA can effectively plan the infrastructure and resources needed to accommodate the expected increase in students.

From 2009 to 2022, undergraduate enrolment increased at an average rate of 10%. Assuming linear growth, by 2034, the total number of undergraduate students is estimated at around 25,000. During the same period, postgraduate students' enrolment increased by approximately 14%. If growth continues at this pace, enrolment in 2034 is expected to be close to 2,400.

To cope with future expansion needs and growth direction. Physical facilities will need to be improved by both rehabilitating the existing facilities and building new ones.

The Master Plan has identified and mapped new buildings that will be constructed under HEET and other existing projects. The Master Plan also proposes new physical infrastructures not covered by the current funding. They include a Cafeteria near the Multipurpose lab, a Library near the Academic building, the Sino-African Agricultural Learning Complex along Iringa Road, and a Truck parking along Iringa Road.

In terms of rehabilitation requirements, the Master Plan has identified and mapped the buildings to be renovated as part of the HEET project, as well as those proposed for renovation using other sources of funds, primarily internally generated funds.

The Master Plan recommends the necessary expansion and improvements to the training farm. This involves expanding an oil palm plantation and establishing a new banana plantation, along with a plot with irrigation systems (sprinkler, pivot, drip, flood, and furrow).

In addition, the Master Plan recommends the following:

1) establishment of a rainwater harvesting system from the rooftops of campus buildings. It is reported that this system will be installed in every building built by the HEET project
2) connecting houses from Tiba Road and other localities, not yet connected to the off-site system, to the municipal wastewater network.
3) improvements to the existing road network within the campus, especially tarmacking the road from CoEBS to the Iringa main road and laying solid gravel on the Tiba road.
4) Improvement of the internet network by adding more hotspots, particularly in

areas with a high concentration of students. This should include points around the academic building to be built by the HEET project. There are ongoing internet upgrades, such as the TTCL hotspots and the HEET project.

5) main entry signage at EMC main gate and junction at Iringa Road
6) additional outdoor study slabs
7) putting uniform building signage
8) construction of sidewalks/ pedestrian walkways, especially alongside main roads
9) Protecting campus land from encroachment by erecting more beacons, establishing buffer zones, and planting trees in high-risk areas

The Master Plan has mapped proposed land uses in the Lugala area, showing Academic, Administrative, Commercial, Conservation, Plantation Forest, existing Eucalyptus plantation, Recreation, Staff Houses, and Student hostels.
Finally, the Master Plan has recommended an implementation plan for the proposed activities in the short term (2024 - 2028) and the long term (2029 - 2034).

ACRONYMS AND ABBREVIATIONS

AIC	Agribusiness Innovation Centre
ArcGIS	Aeronautical Reconnaissance Coverage Geographic Information System
CFWT	College of Forestry, Wildlife, and Tourism
CIS	Corrugated Iron Sheets
CoA	College of Agriculture
CoEBS	College of Economics and Business Studies
CSP	Corporate Strategic Plan
CSSH	College of Social Sciences and Humanities
CVMBS	Veterinary Medicine and Biomedical Sciences
DMTF	Department of Model Training Farm
DPRTC	Directorate of Postgraduate Studies, Research, Technology Transfer and Consultancy
DPRTC	Technology Transfer and Consultancy Directorate
DUS	Undergraduate Studies Directorate
EAC	East African Community
EMC	Edward Moringe Campus
GPS	Global Positioning System
HEET	Higher Education for Economic Transformation
ICE	Institute of Continuing Education
ICT	Information and Communication Technology
IPM	Institute of Pest Management
LAN	Local Area Network
LCD	Liquid Crystal Display
MDF	Magadu Dairy Farm
MORUWASA	Morogoro Water Supply and Sanitation Authority
MPC	Mizengo Pinda Campus College
msl	mean sea level
PEMC	Planning and Estate Management Committee

QGIS	Quantum Geographic Information System
RWH	Rainwater Harvesting
SAALC	Sino-African Agricultural Learning Complex
SACIDS	Southern African Centre for Infectious Disease Surveillance
SADC	Southern African Development Community
SMC	Solomon Mahlangu Campus
SNAL	Sokoine National Agricultural Library
SoET	School of Engineering and Technology
SUA	Sokoine University of Agriculture
SUAHAB	Sokoine University of Agriculture Housing and Accommodation Bureau
SUASO	Students' Organisation
SUGECO	Sokoine University Graduate Entrepreneurs Cooperative
TTCL	Tanzania Telecommunications Corporation

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1.0 INTRODUCTION

1.1 Background and Context

1.1.1 SUA Establishment

Sokoine University of Agriculture (SUA) was established by the Parliamentary Act No. 6 on 1st July 1984. The Act was repealed by the Universities Act No. 7 of 2005, which paved the way for the grant of University Charters.

The university has three academic campuses, namely, the Edward Moringe Campus (EMC), which has a total land area of 3,350 ha, located in Morogoro Municipality, Solomon Mahlangu Campus (SMC), located in Morogoro Municipality, and Mizengo Pinda Campus College (MPC), located in Kibaoni Village, Mlele District in Katavi Region.

1.1.2 Vision, Mission, and Core Values

The University is guided by the SUA vision and mission statements as well as the Corporate Strategic Plan (CSP) (2021-2026). The overall goal of the CSP is to enable SUA to become a reputable world-class university that is responsive to national, regional, and global development needs.

Vision:

To be a leading University in the provision of quality knowledge and skills in agriculture and allied sciences.

Mission:

To undertake training, research in agriculture and allied sciences, and deliver highly competitive outputs that contribute to national, regional, and global socio-economic development.

Core Values:

In achieving its vision and fulfilling its mission, SUA adheres to the following ten core values: i) Pursuit of excellence in service delivery, ii) Entrepreneurial and innovative spirit, iii) Competitive orientation, iv) Integrity, Transparency, and Accountability, v) Results/Achievement oriented, vi) Diligence on duty, vii) Adaptive and responsiveness; viii) Freedom of thought and expression, ix) Gender sensitiveness, and x) Continuous learning

1.1.3 Restructuring Process in 2014

The proposal for restructuring the management system and organisational structure of SUA was approved by the University Council at its 133rd Meeting, held on 27th March 2014, which was followed by the approval of the implementation strategy by the University Council in September 2014. Under the approved structure, Faculties were transformed into Colleges and/or Schools, and Deputy Leadership positions from the Faculty were removed. The restructuring aimed to increase operational efficiency and minimise expenditures across the University.

1.2 Purpose and Scope of the Master Plan

A master plan is a dynamic long-term planning document that provides a conceptual layout to guide future growth and development. Master planning is about connecting buildings, social settings, and their surrounding environments.

One of the strategic objectives of Sokoine University of Agriculture, as outlined in the 2021-2026 CSP, is to ensure an improved teaching and learning environment through the improvement of physical facilities to cope with future expansion needs and growth direction. To realise this and other objectives of the CSP, the management initiated a process of preparing a Master Plan for the Edward Moringe campus. The Master Plan is intended to guide the implementation of new projects, the repair of deficiencies, and the preservation of the valuable facilities, landscapes, and infrastructure of the Edward Moringe Campus over the next ten years.

The scope of this Master Plan covers an assessment of current land use and proposes improvements to the physical facilities, including minor and major renovations. The Master Plan also includes the placement of physical facilities of the ongoing projects (HEET, IPM, and SACIDS). In addition, the Master Plan includes a layout of the proposed new physical facilities over the next 10 years.

1.3 Significant Changes in the 2016 Master Plan

The major objectives and strategies of the 2016 Master Plan are all carried forward to the 2024 - 2034 Master Plan. Changes in the new plan are primarily refinements, extensions, and adaptations to emerging circumstances. Key changes include:

i) Proposed improvements to the existing physical facilities, including minor and major renovations,

ii) Physical facilities of the ongoing projects, including HEET, IPM, and SACIDS,

iii) Proposed new physical facilities for the coming ten years

iv) Proposed layout of physical facilities in the Lugala academic zone

1.4 Methodology

The Master Plan Team used a combination of methods to prepare the 2024 -2034 Edward Moringe Campus Master Plan. The methods included interviews with stakeholders from academic and administrative units, as identified in the 2014 restructuring document, students, and other stakeholders. In addition, the methods included field observation, mapping, and spatial planning. In general, the Master Plan was informed by the university vision, CSP, Campus Analysis, including facilities condition, utilisation, and space needs (Figure 1).

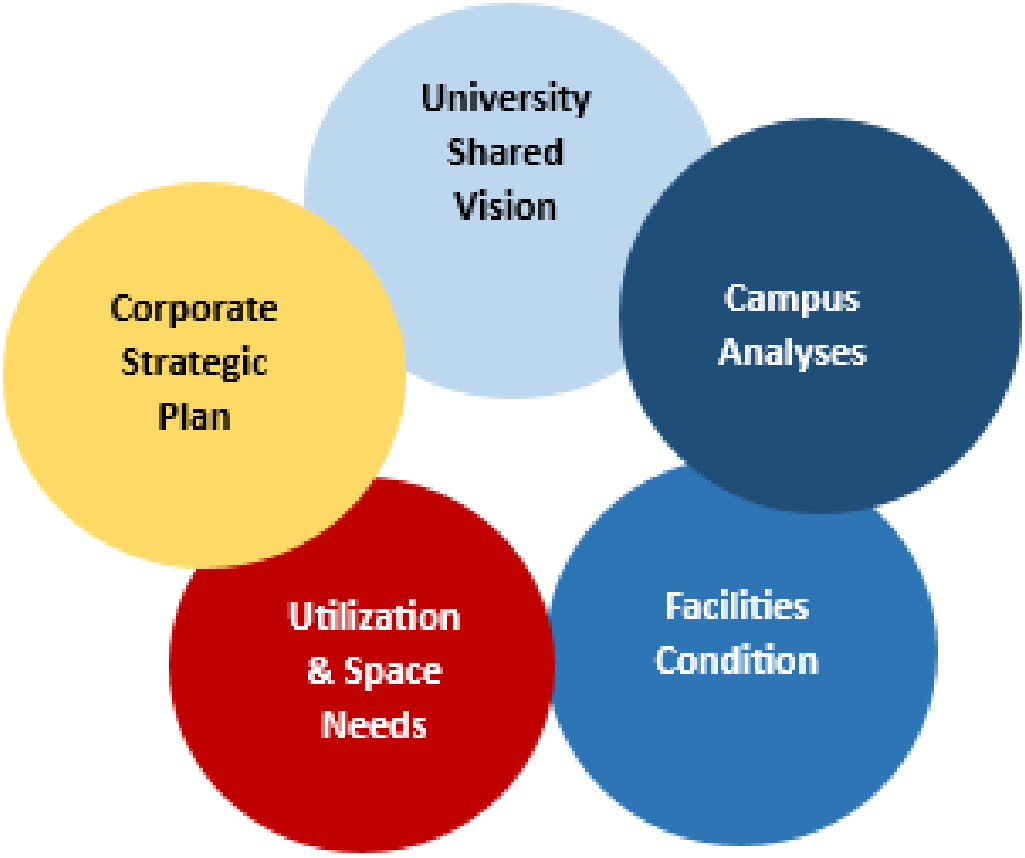


Figure 1: What informs our Master Plan

1.4.1 Interviews, Consultative Meetings and Document Reviews

To enhance ownership of the Master Plan, the team planned and conducted interviews and consultative meetings with Principals, Deans, Directors, the Head of Administrative Departments (as per the restructuring document), and Morogoro Municipality and MORUWASA. The team also solicited input through presentations to the University's leadership, the Planning and Estate Management Committee (PEMC), the Senate, and the Council.

In addition, the team conducted a separate interview with the Students' Organisation (SUASO) regarding overall instructional spaces and related technology.

For versatility and effectiveness in data collection, the team met several times to identify specific issues and needs and formed small teams to make follow-ups. The gathered information from small teams was then discussed at a roundtable by the whole team to focus on specific themes and areas of concentration to be incorporated into the Master Plan.

In general, the information gathered through interviews, consultative meetings, and document reviews is as follows:

i) student enrolment trend and plans
ii) necessary renovations (minor and major) and demolitions of physical infrastructure to address program deficiencies and deteriorating facilities
iii) additional physical infrastructure (buildings, roads/pathways, recreation, etc.) and their anticipated locations

1.4.2 Field Observation

The team conducted a field observation to collect spatial information and verify the EMC's existing land uses and infrastructure. Coordinates for the infrastructure were captured using GPS and also extracted from the OpenStreetMap layer and the Google Earth platform. The created layers include buildings, road networks, power line network, landline telephone network, drainage system, internet network, water supply lines, waste water management facilities, solid waste management facilities, model farm, and other facilities at the EMC.

1.4.3 Spatial Planning and Development of a GIS Database

A GIS database was created using both QGIS and ArcGIS to address the existing situation and identify improvement needs, based on feedback from the consultative meetings. This included the placement of new buildings under the HEET project and other projects (such as IPM and SACIDS), as well as new buildings and infrastructure per feedback from the consultative meetings.

In addition, the team created a layout for the Lugala academic zone, which currently lacks physical facilities.

2.0 EDWARD MORINGE CAMPUS TODAY

2.1 Location and Site Characteristics

2.1.1 Campus Location in Morogoro Municipality

Edward Moringe Campus is located on the slopes of the Uluguru mountains, in Morogoro Municipality, Morogoro region, Tanzania (Figure 2). The campus is situated 3.0 km from the centre of the Municipality and about 200 km west of Dar es Salaam.

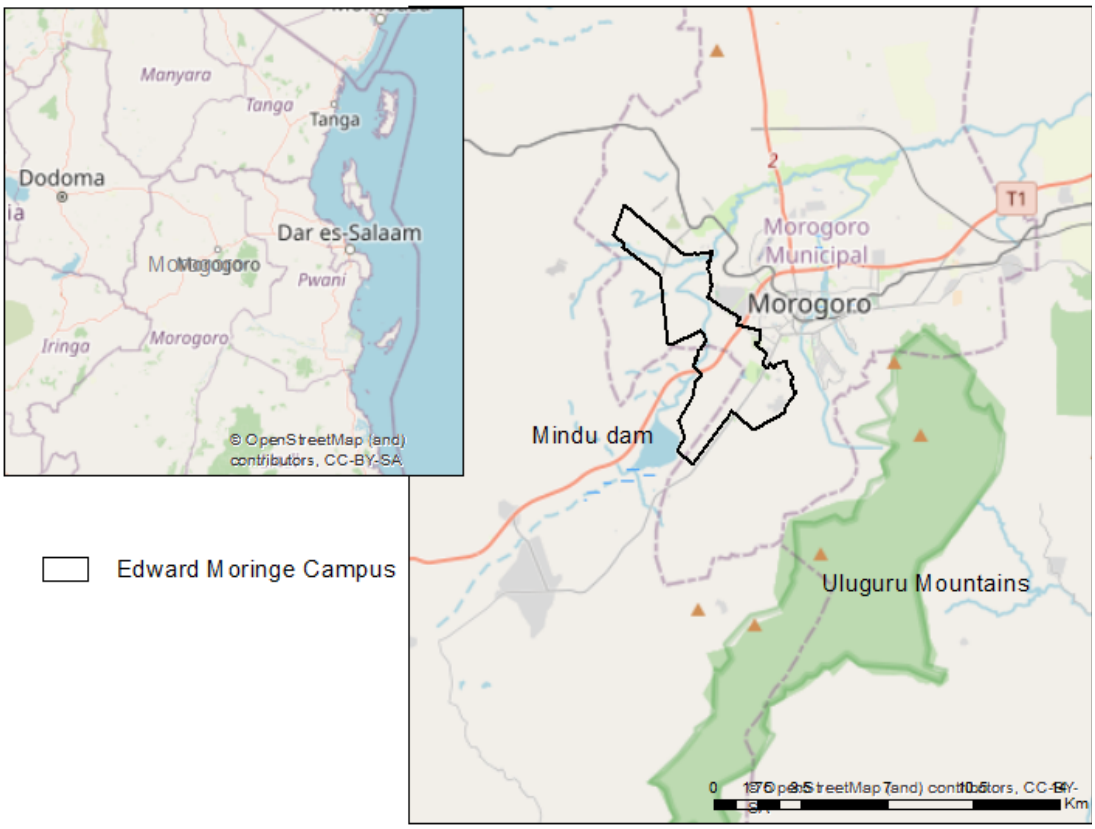


Figure 2: Location of Edward Moringe Campus

Figure 3 shows the locations of buildings and other infrastructures within the built-up area of the EMC.

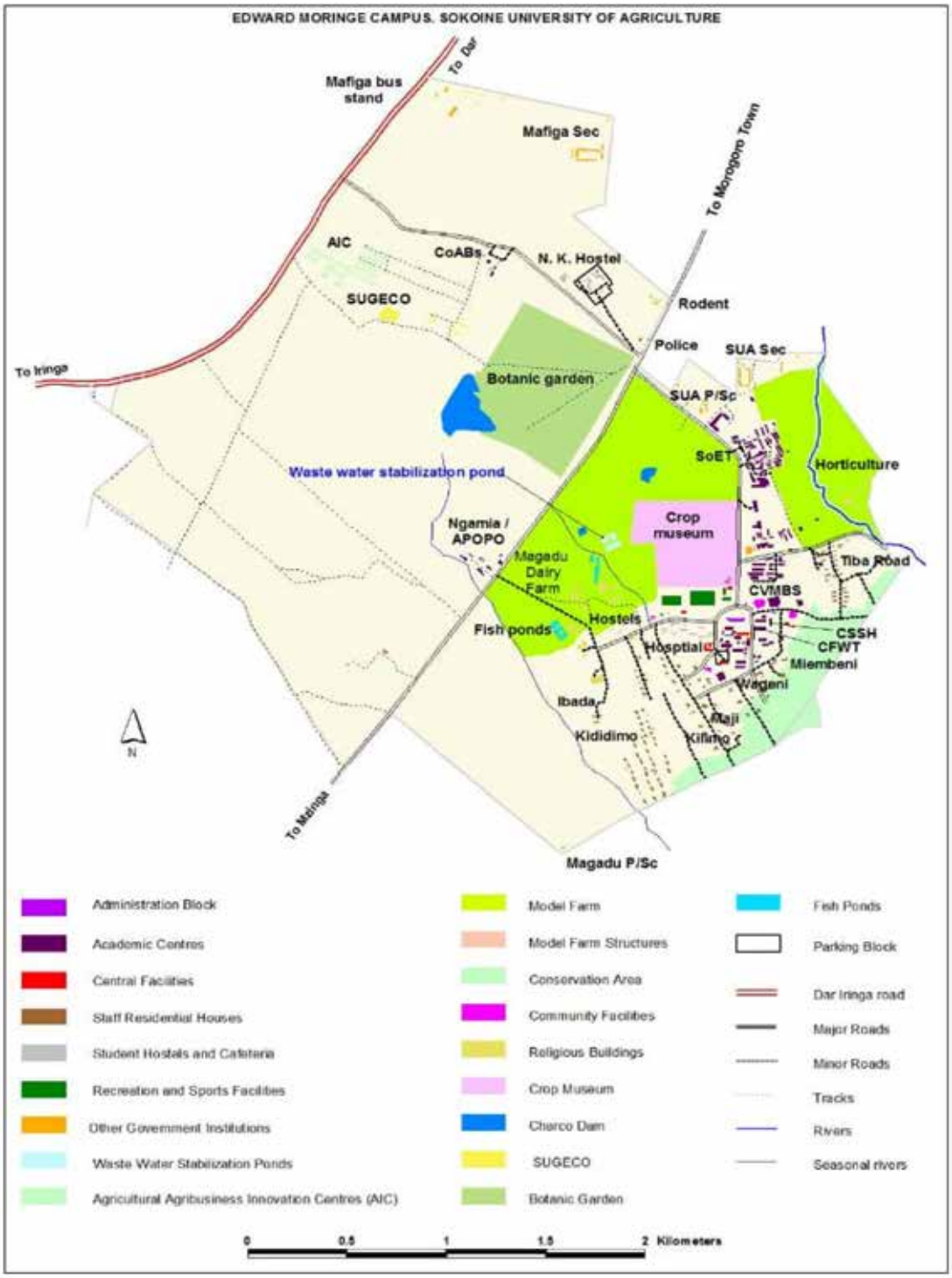


Figure 3: Locations of buildings and other infrastructures within the built-up area of the EMC

We propose developing an interactive web map based on Figure 3, which may be included on the SUA website, in addition to offering paper copies. This will be a useful tool for new students and visitors to find a specific facility.

2.1.2 Bio-physical Characteristics

Climate:

The campus receives bimodal rain, with long rains, locally known as 'Masika', starting in March and ending in May, peaking in April, while short rains, locally known as 'Vuli', start in October and end in December (Figure 4). The average annual rainfall is about 830 mm, ranging from 560 mm to 1160 mm.

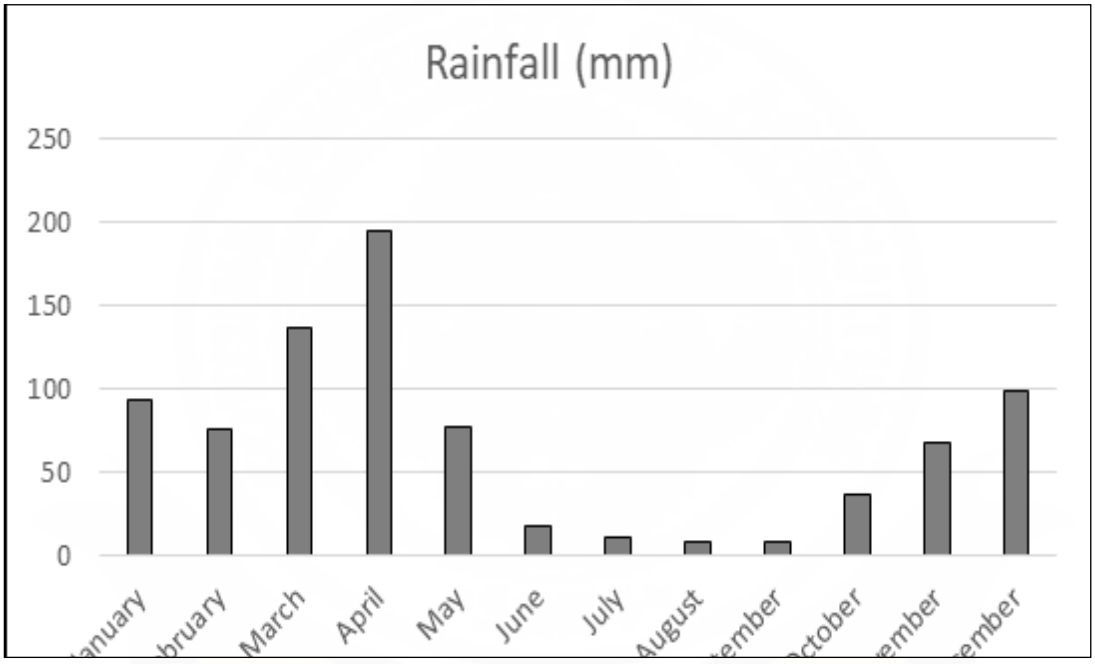


Figure 4: Mean monthly rainfall (1980 - 2010). Source: TMA, SUA weather station.

The mean maximum temperature ranges from 32.5 °C to 27.6 °C, while the mean minimum temperature ranges from 21.4 °C to 15.5 °C (Figure 5). The highest temperatures are experienced from December to February, while the lowest are experienced from June to August.

Topography significantly influences the temperature observed on campus. Temperatures generally decrease with height; thus, the higher-elevation regions tend to be cooler. In the higher areas, close to the Uluguru Mountains, the annual average temperature is about 18 °C; at mid altitude, it is around 25 °C; and at lower altitude, it is about 30 °C.

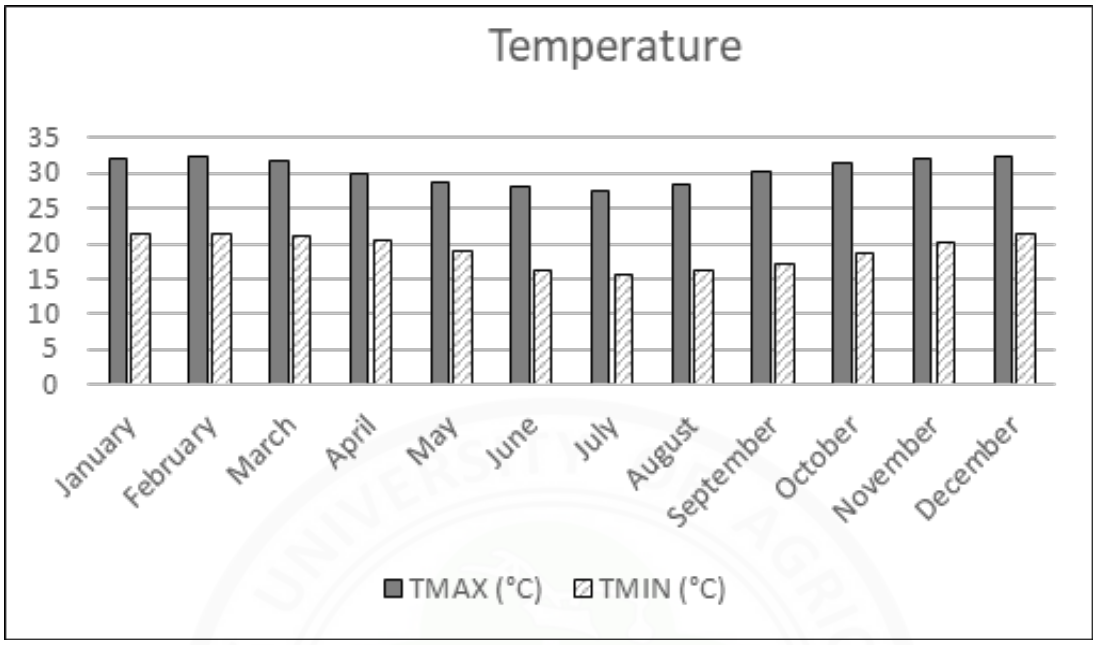


Figure 5: Mean monthly maximum and minimum temperature (1980 - 2010). Source: TMA, SUA weather station.

Soils:

In the intermediate mountainous zone and hilly areas, the predominant soils are oxisols, whereas valleys and lowlands are generally characterised by alluvial soils. A soil profile excavation and laboratory analysis conducted by the staff of the SUA Soil Science department found that the soil is characterised by unconsolidated metasedimentary materials, mainly hornblende-pyroxene granulites, with plagioclase- and quartz-rich materials, and was classified as Ultic Haplustalfs according to the USDA soil taxonomy. Ultic Haplustalfs have an argillaceous horizon with a base saturation (by the sum of cations) of less than 75 per cent throughout.

Topography:

The topography of EMC (Figure 6) can be divided into three zones: the Uluguru Mountain foothill slope, the undulating plain, and the valley. The altitude ranges from 484 to 607 m above msl, and the slope ranges from 0 to 14 degrees. The Valley landscape is drained by the Ngerengere River.

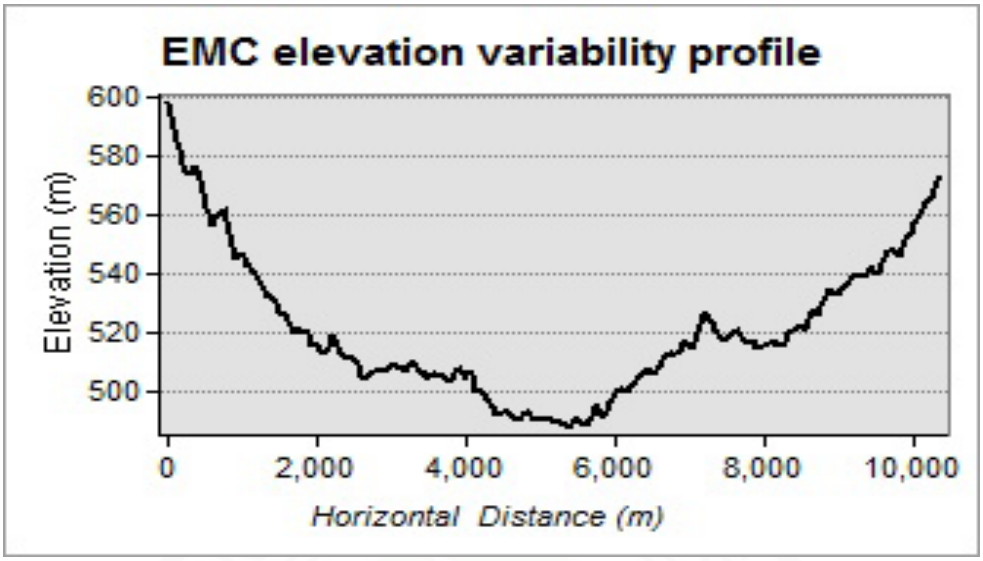


Figure 6: EMC elevation profile

2.2 Current Land Use

The Edward Moringe campus has a total area of 2,376 ha, and according to the 2022-2062 Land use plan, the land uses are categorised into nine (9) zones: academic zone, student hostels, business zone, recreation zone, residential zone, administration zone, conservation zone, University training farm, and agriculture investment zone.

2.2.1 Academic Zone

The academic zone, with a total area of 670.8 ha, comprises physical facilities used for teaching, research, and other uses needed to support the academic mission of the University and academic life. The facilities include classrooms, research space, seminar rooms, academic staff offices, training workshops, laboratories, lecture halls, and a library. According to the approved functions and organisation structure of SUA, the Edward Moringe Campus Academic zone comprises the following:

College of Agriculture (CoA), College of Forestry, Wildlife and Tourism (CFWT), College of Social Sciences and Humanities (CSSH), College of Veterinary Medicine and Biomedical Sciences (CVMBS), College of Economics and Business Studies (CoEBS), Sokoine National Agricultural Library (SNAL), Institute of Continuing Education (ICE), Institute of Pest Management (IPM), School of Engineering and Technology (SoET), Postgraduate Studies, Research, Technology Transfer and Consultancy Directorate (DPRTC), Undergraduate Studies Directorate (DUS); and SACIDS Foundation for One Health.

There are 52 classes in all on the Edward Moringe Campus. Table 1 lists the capacities and types of facilities that are installed in the classrooms.

Table 1: Classrooms, capacity and types of installed facilities

S/No	Location	Venue	Capacity	Projector	Podium	Table	Chair	PA
1	AGRICULTURE	MLT1	176	✓	✓	✓	✓	×
2		MLT2	176	✓	✓	✓	✓	✓
3		MLT3	57	×	×	✓	×	×
4		MLT4	48	×	×	✓	×	×
5		MLT5	57	×	×	✓	×	×
6	FOREST	MLT6	65	×	×	✓	×	×
7		MLT7	65	×	×	✓	×	×
8	SOIL	MLT8	80	×	×	✓	×	×
9	DUS	MLT9	232	✓	✓	✓	✓	✓
10		MLT10	238	✓	✓	✓	✓	✓
11	MULTIPURPOSE LAB	MLT 11	280	✓	✓	✓	✓	Mobile
12		MLT 12	208	✓	✓	✓	✓	Mobile
13		MLT 13	280	✓	✓	✓	✓	Mobile
14		MLT 14	208	✓	✓	✓	✓	Mobile
15		MLT 15	280	✓	✓	✓	✓	Mobile
16		MLT 16	208	✓	✓	✓	✓	Mobile
17		MLT 17	280	✓	✓	✓	✓	Mobile
18		MLT 18	208	✓	✓	✓	✓	×
19	ENGINEERING	ENG 1	30	×	✓	✓	✓	×
20		ENG 2	40	×	✓	✓	✓	×
21		ENG 3	80	×	✓	✓	✓	×
22		ENG 4	100	×	✓	✓	✓	×
23		ENG 5	80	×	✓	✓	✓	×
24		ENG 6	105	×	✓	✓	×	×
25		ENG 7	246	✓	✓	✓	✓	✓
26	FARM	FARM A1	90	×	✓	✓	✓	×
27		FARM A2	90	×	✓	✓	✓	×
28		FARM B1	204	✓	✓	✓	✓	✓
29		FARM B2	280	✓	✓	✓	✓	✓
30		DASP 1	100	×	✓	×	×	×
31		DASP 2	40	×	✓	×	×	×
32		DASP 3	110	×	✓	×	✓	×
33	HORTICULTURE	HORT 1	144	×	×	✓	×	✓
34		HORT 2	90	×	×	×	×	×
35		HORT 3	90	×	×	✓	✓	×
36	VET	VET 1	40	×	✓	×	×	×
37		VET 2	40	×	✓	×	✓	×
38		VET 3	60	×	✓	×	✓	×
39		VET 4	60	×	✓	✓	✓	×
40		VET 5	90	×	✓	✓	×	×
41		VET 6	100	×	×	✓	×	×
42		VET 7	70	×	×	×	×	×
43		VET 8	70	×	✓	×	×	×
44	ICE	EXT 2	99	✓	✓	×	✓	✓
45		EXT 3	126	✓	✓	×	✓	×
46	NCMC	NCMC 2	70	×	✓	✓	✓	×
47		NCMC 3	70	×	✓	✓	✓	×
48		NCMC 4	72	×	✓	✓	✓	×
49		NCMC 6	72	×	✓	✓	✓	×
50		NCMC 16	70	×	✓	✓	✓	×
51		NCMC 17	70	×	✓	✓	✓	×
52	MULTIPURPOSE HALL	MPH	350	×	✓	✓	✓	✓
TOTAL			**6,594**					

Table 2 provides a summary of the total number of active and dormant teaching and learning establishments. It consists of both stationary and portable facilities.

Table 2: Number and condition of installed and mobile facilities

S/No	Equipment	Active	Inactive	Total
1	LCD projectors	58	16	74
2	PA systems	9	0	9
3	Mobile PA systems	6	2	8
4	Microphones	19	0	19
5	Laptops	4	2	6
6	Desktop	0	2	2
7	Podiums	41	11	52
8	Classrooms tables	41	11	52
9	Classrooms chairs	36	16	52
10	Smart TVs	2	0	2
TOTAL		**216**	**60**	**275**

In addition to the classrooms, the EMC has a variety of laboratories and workshops spread throughout many departments. Additionally, during breaks, students do use outdoor study slabs (Plate 1).

Plate 1: Outdoor study Slab

In general, the teaching and learning environments are favourable and supportive of enhancing teaching and learning. Many venues are generally well-equipped, with the exception of a few situations in some venues:

i) Tables, chairs, and podiums are missing or not in good condition

ii) Lack of shading facilities, including curtains.

iii) Instructors have challenges in accessing power sources due to broken switch sockets, etc.

iv) Flushing systems for toilets and some urinals in some buildings are not functioning well.

v) Large venues at the multi-purpose building are inadequate in LCD projection facilities and sound systems. The venues have been designed with posts/pillars in the middle position, which compromises visibility. Thus, to aid the learning process, these large venues require additional projection screens in the middle to improve students seated near the back row's visual access to the projected slides during lectures.

Recently, SUA management, with funding from the Government, has initiated projects to increase and improve teaching facilities at EMC. This includes the construction of a multipurpose laboratory which has several lecture rooms and laboratories (Plate 2). In addition, more teaching facilities will be constructed as part of the HEET project.

Plate 2: Multipurpose building

The Sokoine University Graduate Entrepreneurs Cooperative (SUGECO) and the Agribusiness Innovation Centre (AIC) (Plate 3) are also part of the academic zone. One

of SUGECO's objectives is to prepare, enable, and support innovative, knowledge-intensive entrepreneurs as they build successful businesses across the agricultural, agribusiness, forestry, livestock, and fisheries sectors throughout Tanzania.

SUGECO organises international internship programs for students and graduates from a variety of disciplines. Participants have the opportunity to develop the skills they need to share and learn about new ideas and modern technology, advance their careers, and be accepted into the workforce through these internships. Since 2015, more than 900 graduates have benefited from the SUGECO Internship program, with 56 continuing students being placed in Denmark, 420 in the United States, and 400 in Israel.

Plate 3: Screen houses at Incubation Programme (AIC)

2.2.2 Student Hostels

Student housing is crucial to the objective of academic support for student affairs. There is ample proof that elements in the living environment can affect a student's ability to succeed and persevere. Student housing provides a safe, comfortable, and supportive living environment.

The University offers a number of hostels at Edward Moringe Campus (EMC) that cater to both undergraduate and postgraduate students. Currently, the facilities at EMC have a carrying capacity of 1,906 students (1,804 undergraduates and 102 postgraduates (Tables 3, 4, and 5). These facilities are managed by the Sokoine University of Agriculture Housing and Accommodation Bureau (SUAHAB).

Main Campus has 12 dormitories, of which 11 are for undergraduate students, and one is for master's and doctoral students. These dormitories can accommodate 748 students (256 males and 492 females). See the analysis in Table 3

Table 3: Number of undergraduate students in the Main Campus hostels

Hostel No.	Number of students in a room	Number of rooms	Number of students		
			Me	Fe	Total
1	4	24	96	0	96
2	4	24	0	96	96
3	4	16	0	64	64
4	**4**	16	64	0	64
5	4	19	0	74	74
6	4	24	0	96	96
7	4	24	0	96	96
9	2	16	32	0	32
10	2	16	32	0	32
	11 2	16	32	0	32
12	2	33	0	66	66
TOTAL		**212**	**256**	**492**	**748**

Nicholas Kuhanga has two blocks, each with five floors and 33 rooms per floor (Plate 4). Of those floors, two, or 66 rooms, are set aside for students pursuing master's and doctoral degrees, while 264 rooms are used by 1056 undergraduate students (464 men and 592 women (Table 4).

Plate 4 Nicholas Kuhanga student hostels

Table 4: Number of undergraduate students in Nicholas Kuhanga hostels

Block	Floor	Students per room	Number of rooms	Number of students		
				Me	Fe	Total
Block A	Ground Floor	4	33	68	64	132
	3rd Floor	4	33	0	132	132
	4th Floor	4	33	132	0	132
Block B	Ground Floor	4	33	132	0	132
	1st Floor	4	33	0	132	132
	2nd Floor	4	33	0	132	132
	3rd Floor	4	33	0	132	132
	4th Floor	4	33	132	0	132
TOTAL			**264**	**464**	**592**	**1056**

Table 5: Number of postgraduate students in the Main Campus and Nicholas Kuhanga hostels

Hostel No.	Students per room	Number of rooms	Number of students		
			Me	Fe	Total
8 (Main Campus)	1	36	18	18	36
Nicholas Kuhanga (Block A 1st and 2nd floor)	1	66	33	33	66
TOTAL		102	**51**	**51**	**102**

With increasing enrolment that does not correspond to hostel expansion, most students have found themselves living off campus, a situation that poses a significant challenge to their academic careers. SUAHAB identifies vacancies in private houses for students who miss accommodation in campus hostels (the contract shall be between the house owner and the student tenant).

Currently, the University is estimated to have a total of 15,014 students, but only 3597 can be accommodated in the current hostels. As a result, 11,417 students, or 76.04 per cent, are believed to be living off campus.

The condition of the hostels is not satisfactory due to wear and tear on the buildings, the infrastructure of the sanitary and sewage systems, and the electrical system.

Therefore, the facilities need to be renovated to improve the situation. Figure 7 shows the renovation requirements for the 12 hostels on the main campus.

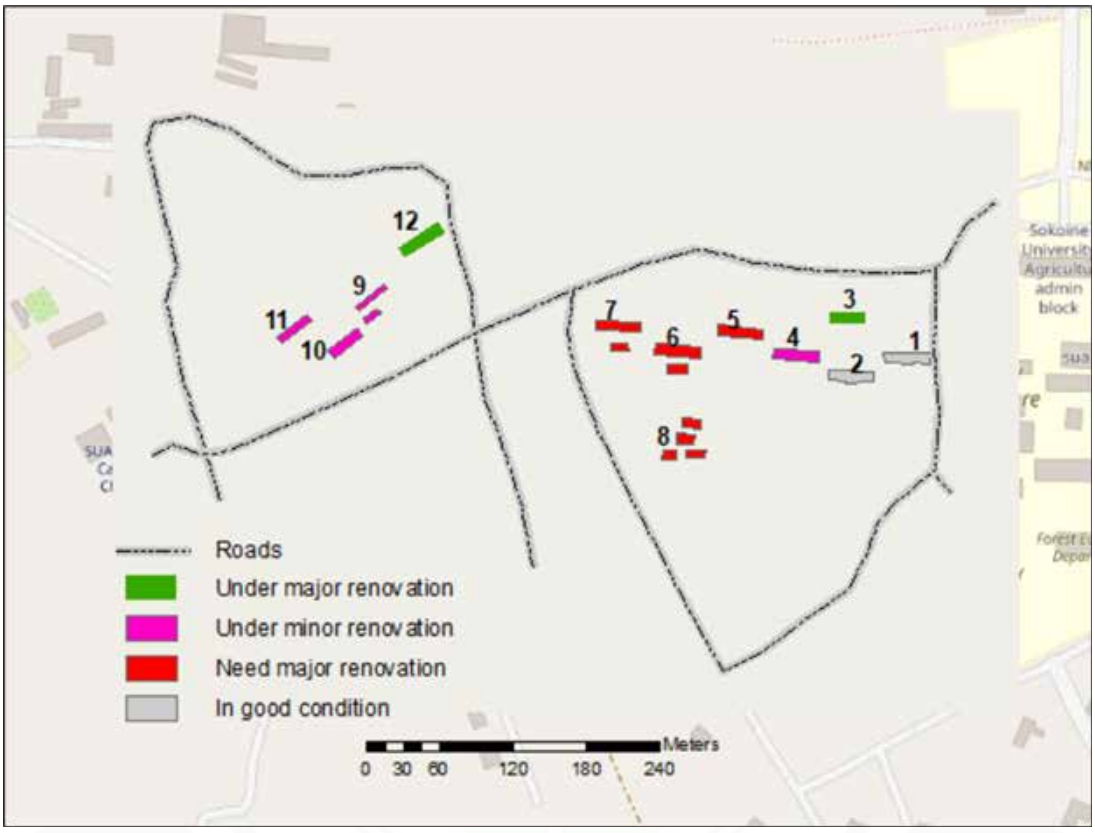


Figure 7: Renovation requirements for the students' hostels in the main campus

2.2.3 University Training Farm

The University training farm, managed by the Department of Model Training Farm (DMTF), is divided into four main sections: the field crops section, the horticulture unit, the Magadu animal farm, and the aquaculture training unit (Figure 8).

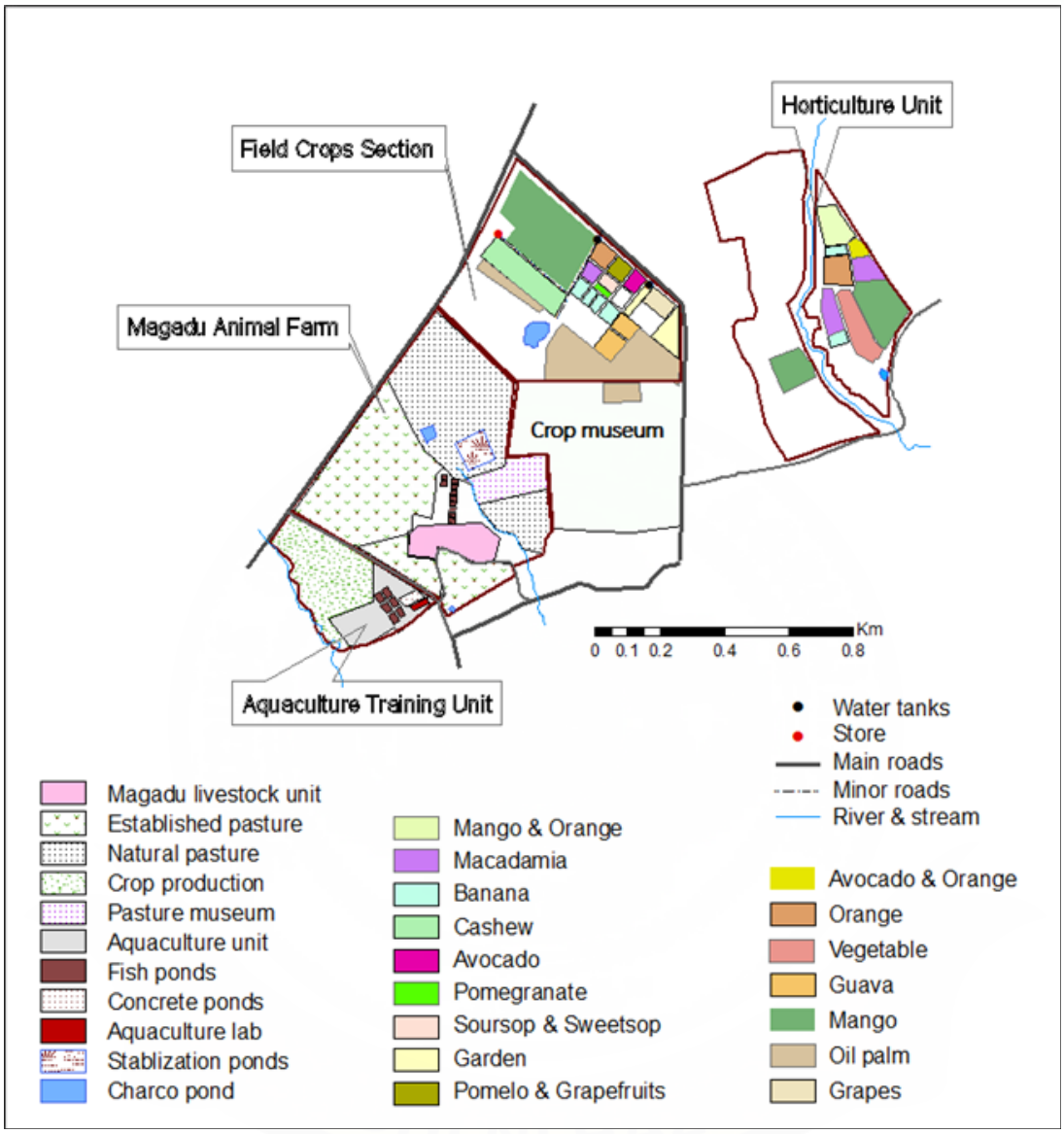


Figure 8: The University training farm

Table 6: Coverages of different crops in the University training farm

Table 1: Coverages of different crops in the University training farm

Field crops section		
No.	**Crop**	**Area (acres)**
1	Oil palm	15.5
2	Mango	14.3
3	Cashew	5.7
4	Guava	2.5
5	Garden	2.5
6	Banana	2.0
7	Grapes	1.2
8	Oranges	1.1
9	Pomelo & Grapefruits	0.9
10	Avocado	0.7
11	Macadamia	0.7
12	Soursop & Sweetsop	0.5
13	Pomegranate	0.3
Total area under crops		**47.9**

Horticulture unity		
No.	**Crop**	**Area (acres)**
1	Mango	8.6
2	Vegetables	3.4
3	Macadamia	3.3
4	Mango & Orange	2.5
5	Orange	1.9
6	Banana	1.0
7	Avocado & Orange	0.8
Total area under crops		**21.5**

Magadu animal farm		
No.	**Crop**	**Area (acres)**
1	Established pasture	43.9
2	Natural pasture	39.4
3	Crop production	16.8
4	Pasture museum	6.4
Total area under crops		**106.5**

Aquaculture Training Unit	
Total area (acres)	**9.6**

The farm in the field crop section (Main Gate Unit) consists primarily of annual crops, such as a mango orchard with mixed species of mango, oil palm, cashew, passion fruit, grapes, guava, banana, oranges, pomelo & grapefruits, pomegranate, soursop & sweetsop, avocado, and macadamia (Table 6, Plates 5and 6). This section of the farm also includes a variety of physical infrastructures that support agricultural activities. This includes pipelines for drip irrigation using water from the charco dam (Plate 7), drainage channels, and water reservoirs.

Plate 5: Banana field

Plate 6: Oil palm field

Plate 7The Charco dam used to supply water for drip irrigation in the farm.

The horticulture unit mainly comprises a range of horticultural crops, including macadamia (Plate 8), mango, avocado, orange, and banana. There is a field where vegetables are grown using drip irrigation (Plate 9). Additional units include a fruit nursery and small plots of spices. The unit has three boreholes, equipped with an electric pump and a system of furrows. There is a water reservoir connected to the drip irrigation system in the vegetable gardens. Other assets include recently installed cold rooms for the storage of fresh produce, especially vegetables.

Plate 8: Macadamia

Plate 9: Vegetable plots

The Magadu Dairy Farm (MDF) was founded in the late 1970s as an experimental, training, research, and production farm. On the farm, dairy cattle, namely crosses of the local animals (Tanzania shorthorn zebu) and Holstein-Friesian or Jersey, dairy goats (Norwegian and Toggernburg), indigenous goats, as well as a few varieties of sheep, are raised. Many fish ponds are utilised to produce aquaculture fish. A Herling-bone

type milking parlour, pasture units (natural and established), crop production (maize, sunflower), a feed conservation and storage facility, grass cutters, and facilities for animal disease prevention, such as dip tanks and spray races, are among the additional facilities in the MDF.

The Aquaculture Training Unit

The unit provides a wide range of high-quality aquaculture services to support the University's academic mission. The activities conducted in the unit include research for staff, undergraduate, and postgraduate students; laboratory analysis; and the breeding and production of Tilapia and catfish fingerlings (Plates 10 and 11).

Plate 10: Fish ponds

Plate 11: Concrete ponds for producing fingerings

2.2.4 **Business Zone**

The zone, with a total area of 126.3 ha, is located along the Iringa Road, bordering and surrounding the Nicholas Kuhanga student hostels and residents. The zone is to provide for commercial services, such as food vendors, mini-supermarkets, retail shops, a shopping mall, and conference facilities. A bus stop (Plate 12) is already operating and was established in partnership with the Morogoro Municipality.

Plate 12: Mafiga bus station

2.2.5 **Recreation Zone**

A number of pitches for different sports exist at the EMC. They include football, volleyball, basketball, and tennis. The existing sports and games facilities on campus are not only inadequate but also deteriorating due to insufficient funding. There is therefore an urgent need to improve facilities and increase the number and range of sports and games to accommodate the growing student and staff population.

The Botanic Garden (Figure 9) was created for various purposes, including education, scientific research, conservation, and recreation. The Botanic Garden occupies an area of about 48 hectares with a total of 247 shrub/tree species planted in various blocks of the Garden, covering about 13 hectares. In addition, some avenues and paths have been marked and planted with various plants. The Garden is currently operational and is in good condition.

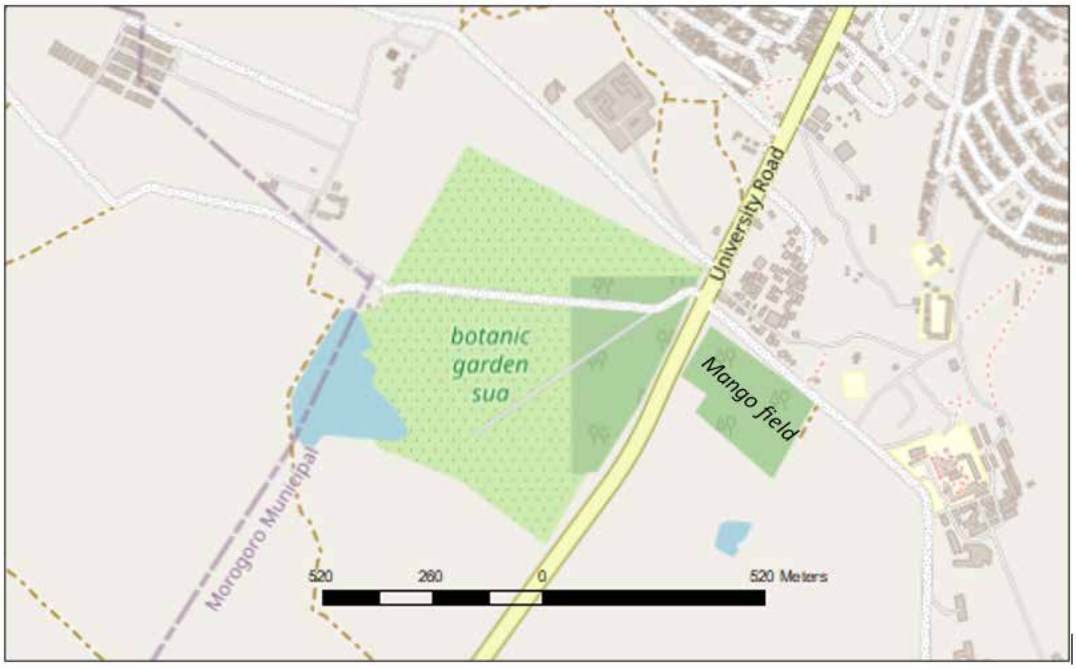


Figure 9: Location of Botanical Garden

2.2.6 Residential Zone

The zone covers 149.2 ha and consists of clusters of buildings with common features, services, and staffing. This includes staff housing, religious buildings, and public service grounds. Currently, there are 134 staff houses with 167 residents (Table 7).

Table 7: Number of houses and residents in each street

S/N	Street	Number of Houses	Number of Residents
1	Kilimo Road	29	29
2	Maji Street	08	08
3	Wageni	08	08
4	Miembeni	03	15
5	Tiba Road Concrete	05	10
6	Tiba Road Terraced	03	10
7	Tiba Road Danida	08	08
8	Tiba Road NHC	10	20
9	Kididimo THB	23	23
10	Kididimo Danida	26	26
11	Makanisa	02	01
13	Mafiga	09	09
TOTAL		**134**	**167**

Just as the students' hostels, the staff houses are not in good condition due to several factors, including dilapidated sewage systems, building wear and tear (Figure 10), and the deplorable state of the roads. Therefore, it is necessary to renovate the facilities to improve the situation.

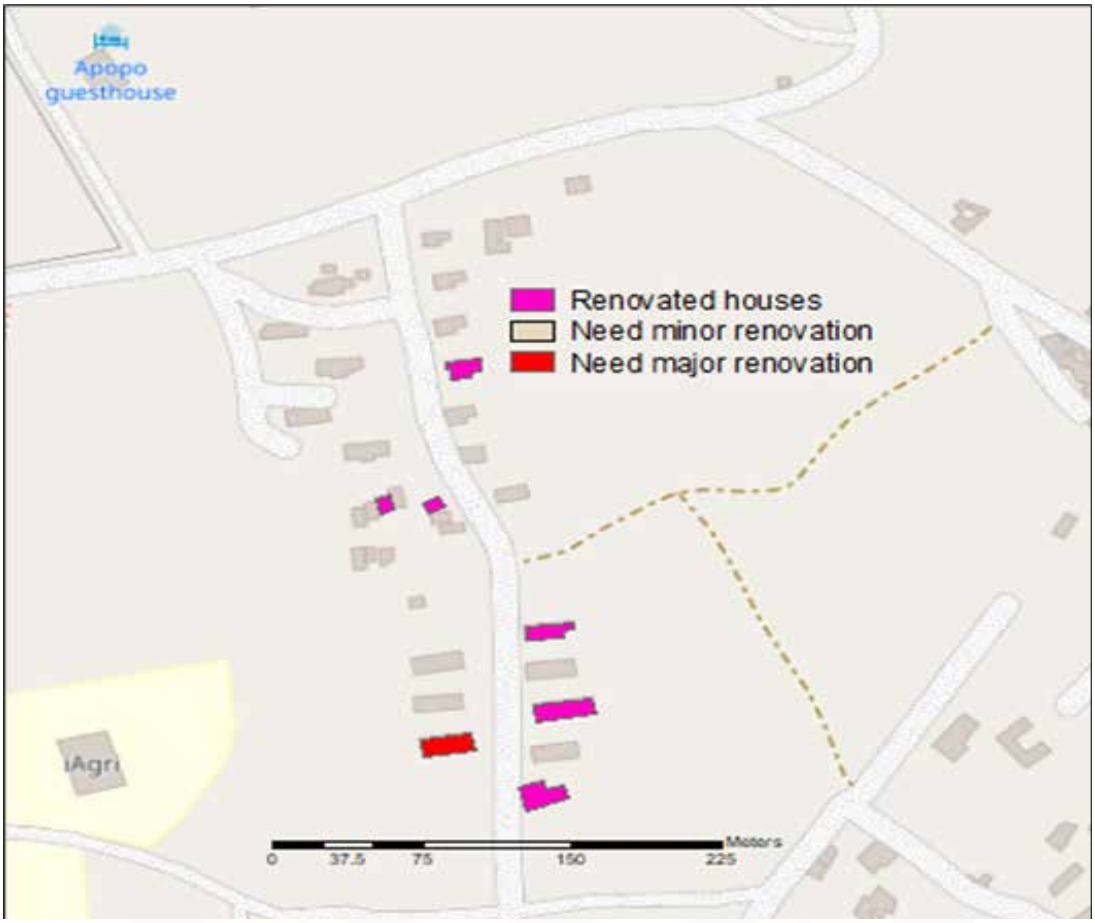


Figure 10: Renovation requirements for staff houses on Tiba Road street

2.2.7 Administration Zone

The zone contains a parking lot and the main administrative building (Plate 13). The administration building houses the administrative offices for the Vice Chancellor the Deputy Vice Chancellor (Academic, Research and Consultancy), the Deputy Vice Chancellors (Planning, Finance and Administration), and other offices including Directorate of Undergraduate Studies (DUS), Directorate of Research and Postgraduate Studies, Directorate of Intellectual Property Management and Linkages, Directorate of Planning and Investment (DPI), Department of Finance, and Department of Human Resources and Administration.

Plate 13: The Administration building

2.2.8 Conservation Zone

A Conservation Zone is defined by the Urban Planning (Zoning of Land Use) Regulation, 2018 of Tanzania, as a zone in which all ecologically fragile lands and cultural properties are reserved for conservation. No use is permitted other than viewing, recreation, and those activities incidental or necessary to facilitate conservation.

The Edward Moringe Campus Land Use Plan designated a Conservation zone occupying an area of about 227 ha, located along the Ngerengere River, the Botanical Garden, the Southern border of the Campus on the lower slopes of the foothills, along Lugala streams, and an area upstream to the Mindu dam.

The Mindu dam buffer conservation zone of 500 m was set aside to conserve the dam as per the requirements of the National Law (Plate 14). At the base of the Uluguru Mountains, on the southern border of the campus, a conservation zone was established (Plate 15) to protect the area's steep slopes from severe soil erosion.

The existing situation of the Ngerengere River and Lugala area conservation zones is highly eroded due to paddy cultivation (Plates 16 and 17).

Plate 14: Conservation zone adjacent to the Mindu dam (500 m)

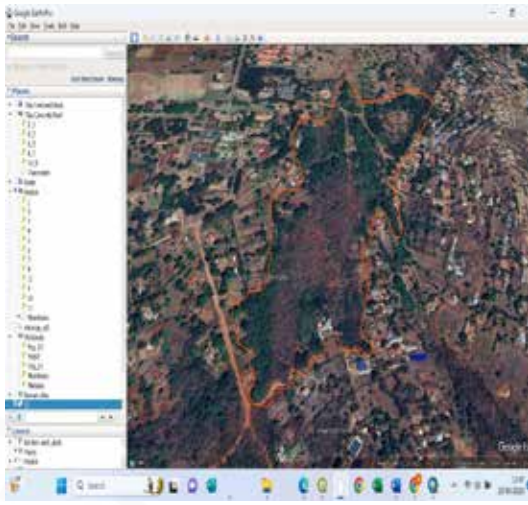


Plate 15:Conservation zone on the foot slopes of Uluguru Mountain

Plate 16:Encroached conservation zone along the Ngerengere River

Plate 17: Eroded conservation zone along the Lugala River

2.2.9 Agriculture Investment Zone

It is essential for educational institutions to have investment land to keep pace with development. SUA will allocate 877.2 ha of agricultural investment land, including land for agricultural production and trade investment.

Currently, the University farm uses a portion of the agriculture investment zone to grow sisal (Figure 11), while the remaining area is often rented to individuals to cultivate annual crops.

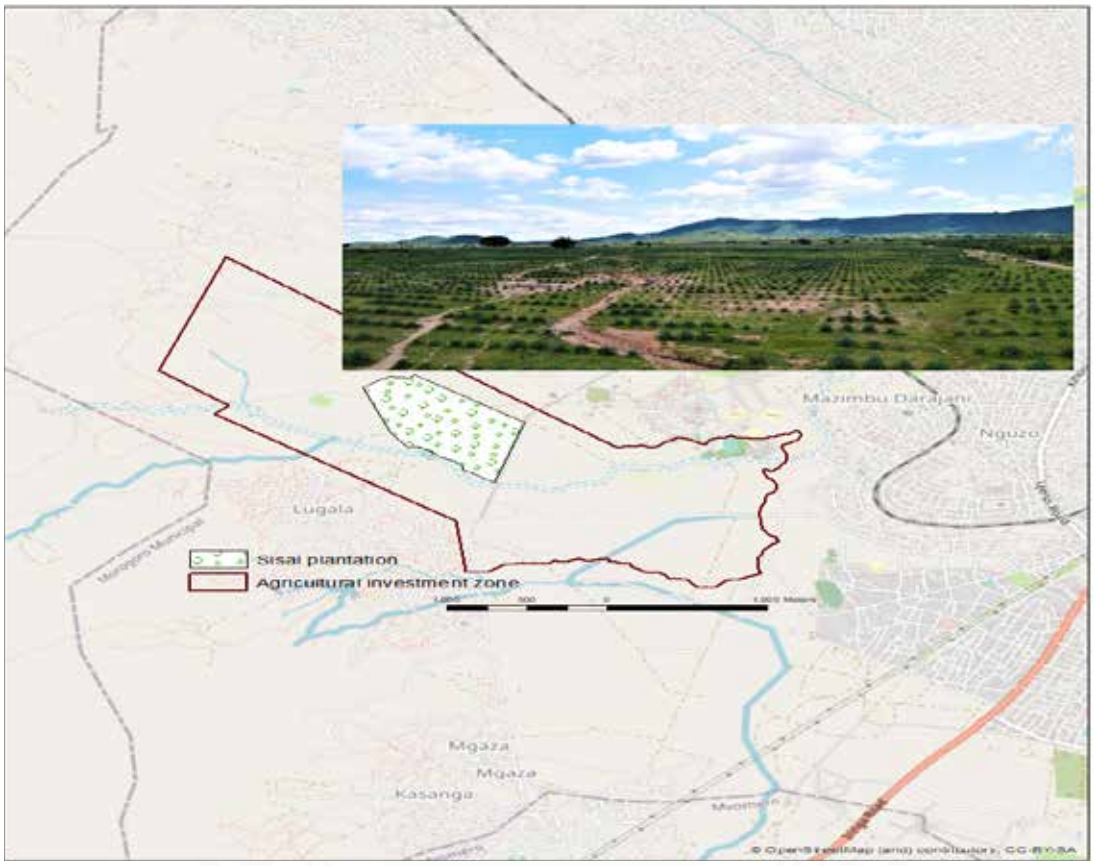


Figure 11: Sisal plantation in one of the agricultural investment zones

2.3 Existing Infrastructure

The campus infrastructure consists of water supply, sewerage and drainage systems, road network and pathways, electricity distribution network, internet network, car parking areas, and sports and games facilities.

2.3.1 Water supply

Water supply is the provision of water to customers (e.g., domestic, trade, public, etc.) through a system of facilities (wells, pumps, aqueducts, reservoirs, and water treatment plants). A water supply system involves water demand, water sources, water treatment, and water distribution. Water is very important for meeting the residential consumer demand for daily uses such as drinking, cooking, sanitary uses, and other domestic uses. It is also essential for commercial activities and industries to operate in the areas where they are located. Again, there is a need to supply water to properly located fire hydrants in institutions, offices, schools, and hospitals to provide the public with an effective level of fire protection. A water system has to meet the primary requirement of delivering an adequate and reliable amount of water to meet consumer demand.

Edward Moringe Campus water is supplied from the Kilala River at Mzinga Military intake, where water flows by gravity. The Edward Moringe Campus water users are students, workers, and other residents living near the campus, including the Kididimo community. The Kilala River has sufficient water year-round, as it is fed by five tributaries. Water from the Kilala River is nine (9) miles (where the intake is located) to the SUA community, and the project officially started to work in 2004. A ten (10) inch cast iron pipe is connected from the intake near Mzinga military area to the distributing station at Kididimo area, from which water is supplied to different users around Kididimo area and to the SUA community at large. The water supply network is presented in Figure 12.

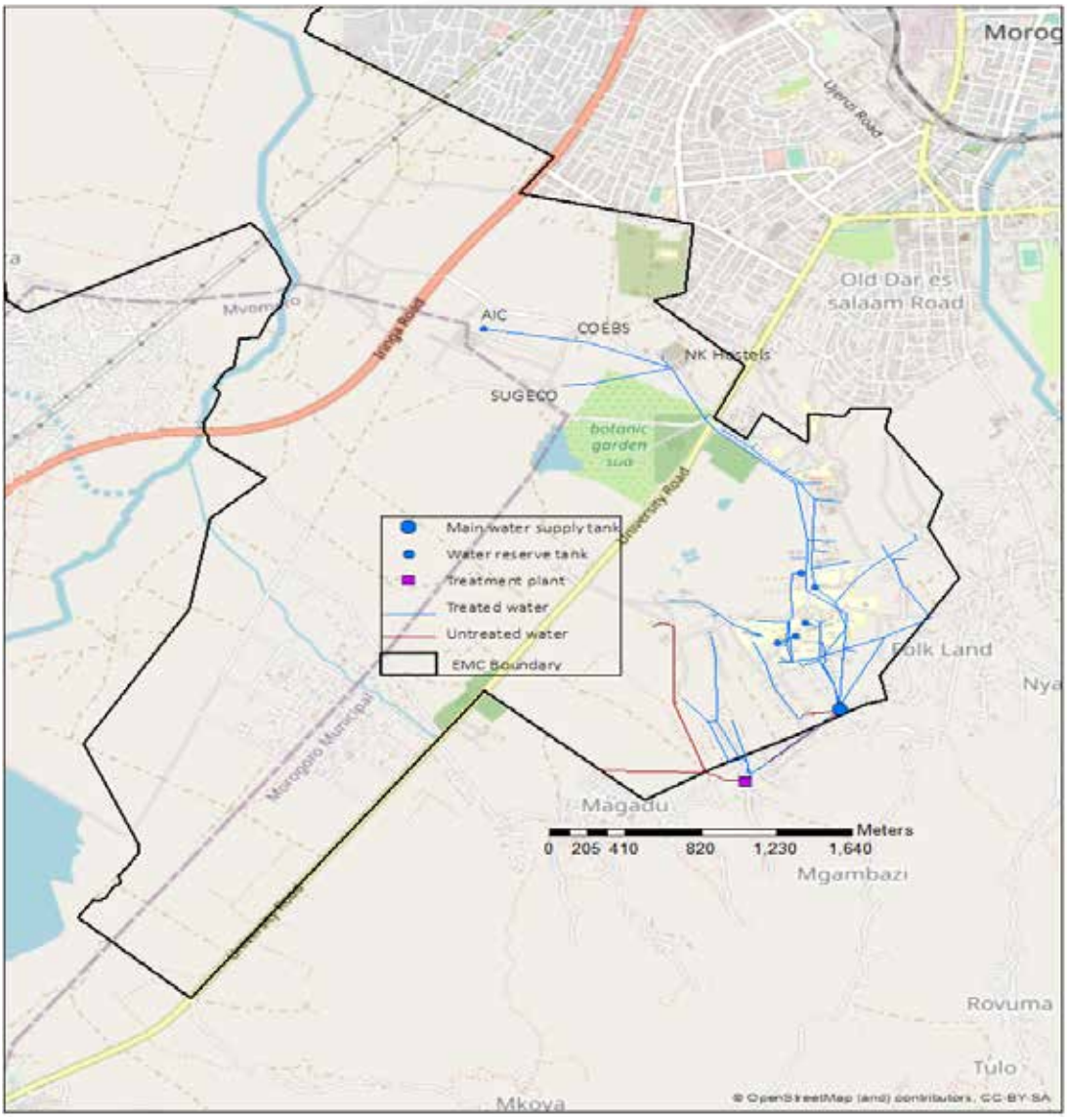


Figure 12: Water distribution network

2.3.2 **Waste Management**

Waste management, or waste disposal, includes the processes and actions required to manage waste from its inception to final disposal. Waste can be solid, liquid, or gaseous, and each type is managed and disposed of in a different way. The goal of waste management is to reduce the hazardous consequences of such waste on the environment and human health.

The techniques employed at the EMC to dispose of solid waste and wastewater are described in this Master Plan. Additionally, the locations of various solid waste disposal methods and the sewage network have been mapped in the Master Plan (Figure 13).

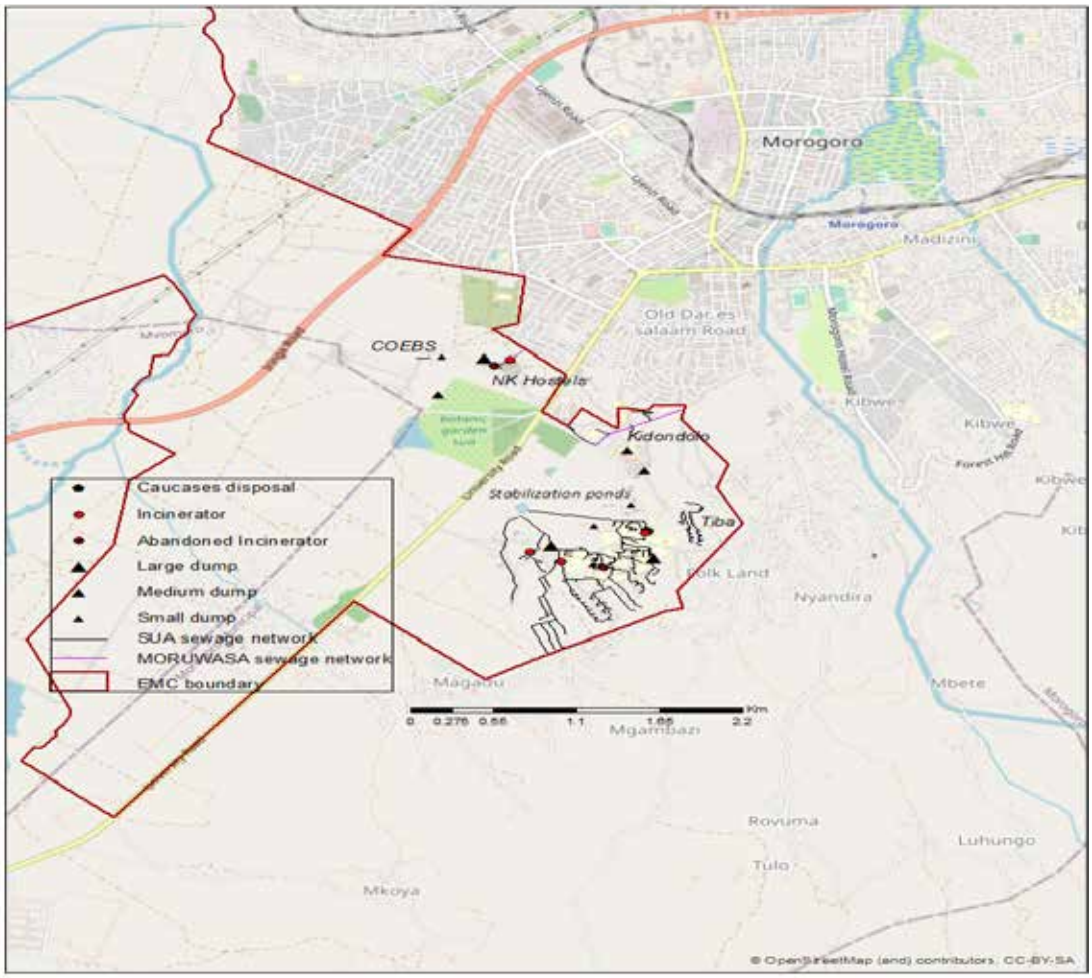


Figure 13: Sewage network and solid waste disposal

Wastewater management

Wastewater is used water. It includes substances such as human waste, food scraps, oils, soaps, and chemicals. If wastewater is not properly treated, the environment and human

health can be negatively impacted. Conventional wastewater treatment consists of a combination of physical, chemical, and biological processes and operations to remove solids, organic matter, and, sometimes, nutrients from wastewater. The principal objective of wastewater treatment is typically to enable the disposal of industrial and human effluents without endangering public health or causing unacceptable harm to the environment. The permissible limits for municipal and industrial effluents are provided by the Environmental Management (Water Quality Standards) Regulations of 2007.

There are primarily two systems for wastewater treatment and disposal at the Edward Moringe Campus:

i) the onsite treatment system with septic tanks and soakaway pits;

A septic tank is basically a watertight box where wastewater from the house collects and is treated through biodegradation. A septic tank directly receives raw sewage and removes about 60-70% of the dissolved matter. The effluent from such a tank will be foul and must be disposed of by sub-surface irrigation or soakaway pits. Septic tanks are widely used in rural areas, for example, in schools, hospitals, campuses, etc.

The onsite systems are found in Tiba Road Housing units, the Department of Animal, Aquaculture and Range Sciences, the School of Engineering and Technology (SoET), College of Economics and Business Studies (CoEBS), SUGECO, and AIC. Furthermore, the livestock production project sites at Magadu use an on-site waste disposal system in which wastewater from livestock housing is drained on the surface through small channels downstream, and the solid animal excreta from the Magadu unit is collected, carried, and manually disposed of in the Magadu Pasture ley.

ii) the off-site treatment systems having septic tanks which are linked by sewers to Waste Stabilisation Ponds (Figure 14);

The off-site system is for wastes from Wageni, Maji, Kilimo, and Kidididimo streets, Students Hostels, the Administration block, College of Veterinary, the multipurpose lab, and

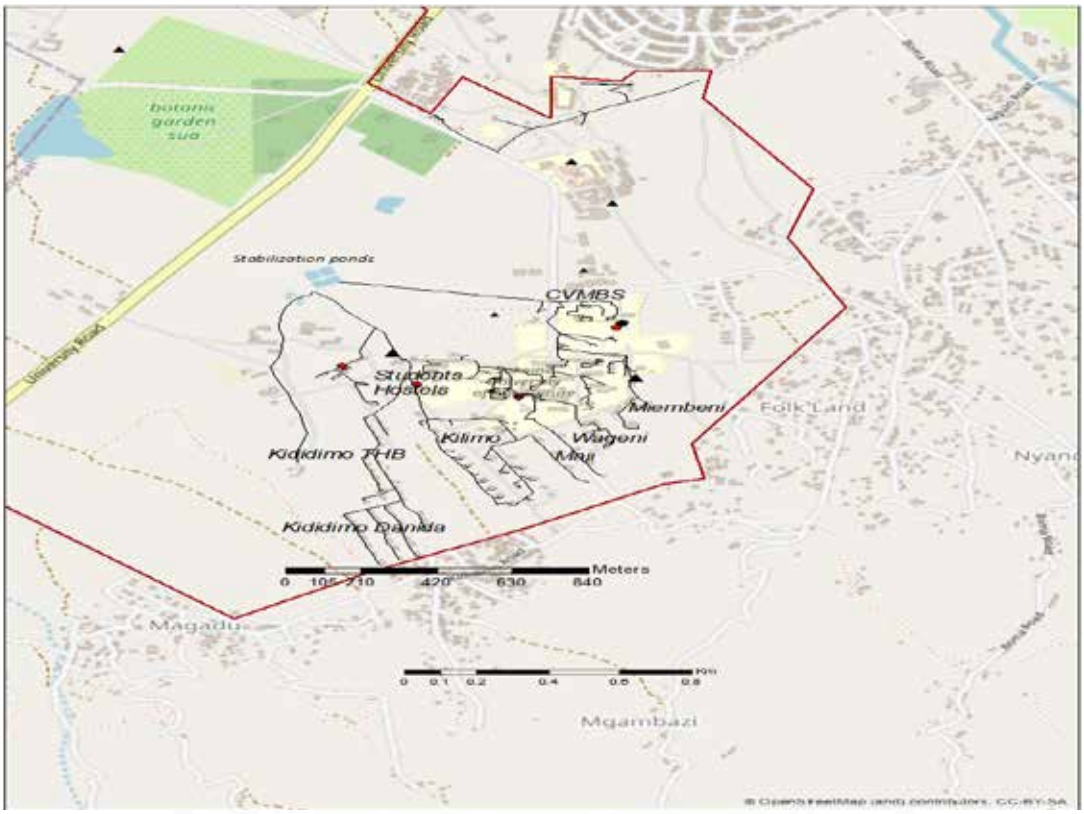


Figure 14: Sewage network discharging to the stabilisation ponds (off-site treatment systems)

The waste stabilisation ponds system in the Edward Moringe Campus has one facultative pond connected to two parallel maturation ponds (Table 8 and Plate 18). The waste stabilisation ponds currently serve 1,283 people. Additionally, it is estimated that 399 workers contribute to the daytime output of the sewage. The total amount of sewage produced each day is therefore 145,512 litres.

Table 8: Pond Dimensions and Capacities

Ponds	L (m)	W(m)	D(m)	V(m3)	Emb. slp	L: W
P1	72.6	27.5	1.0	19996.5	1:2	2.64:1
P2	35	45	1.26	1984.5	1:1.13	1.3:1
P3	35	45	0.809	1274.2	1:2.2	1.3:1

P1= facultative pond; P2 =first maturation pond; P3 = second maturation pond; L(m)= pond length in metres; W(m)= pond width in metres; V(m^3)=pond volume in cubic meters; Emb.slp= embankment slope; L: W=ration of length to width

Plate 18: EMC Waste stabilisation ponds (One facultative pond and two parallel maturation ponds) (Photo taken in August 2023)

The campus has also made an effort to connect its sewage system to the municipal sewage system of Morogoro. Nicholas Kuhanga hostels, Estate, and Multipurpose Lab are the locations that are currently connected to the Municipal sewage system.

Solid waste management

Solid waste management is the process of collecting, transporting, treating, and disposing of solid waste. In the waste management process, waste is collected from various sources and disposed of. If solid waste is not disposed of properly and safely, it can lead to serious health issues as well as a highly unpleasant living environment. Insect vectors, pests, snakes, and vermin (rats) may breed in solid waste, which increases the risk of disease transmission. It might potentially contaminate the environment and water supplies. The primary producers of solid waste include hospitals, grocery shops, feeding facilities, food distribution hubs, slaughterhouses, warehouses, office buildings used by agencies, markets and business centres, residential neighbourhoods, and lecture halls.

At EMC, the current solid waste management system is unofficial, unmapped, and unevenly arranged. A spatial database displaying the existing locations of solid waste points has been created for this Master Plan. In addition, the Master Plan has identified new locations by considering the current distribution and future expansion of physical facilities, available space, and disposal options. Additionally, the consequences of smell, smoke, water pollution, and insect vectors have been considered in the proposal for the new sites.

2.3.3 **Road network**

A road network is a system of interconnecting lines and points on a map that visualise a system of streets in a given area (Figure 15). They provide a clear picture of how roads are classified and distributed within a given location.

The Edward Moringe campus is easily accessible via a tarmac road from the city centre. Within the campus, roads provide a linkage between the institutional facilities and between the institution and the surrounding community. In this Master Plan, the roads are classified into four categories, namely: highway roads, tarmac roads, main earth roads, minor earth roads, and tracks and footpaths (Figure 15).

- The highway cuts across the SUA borders from the Mafiga bus stand to the border near Kasanga. This road serves as a trunk route connecting Dar es Salaam with the Dodoma and Iringa regions.
- The tarmac road network is about 4 km long, spanning from the EMC main gate to the administration block, and then branches to other areas, as indicated in Figure 16. The tarmac road network also connects CoEBS from the campus main gate.
- Main and minor earth roads are collector and feeder roads made from earth materials. They connect Tiba, Kididimo, Miembeni, Wageni, Maji, and Kilimo staff housing to the tarmac roads. Most of these roads are severely degraded and require major repairs (Plate 19).

Plate 19: Tiba Road during the rainy season

- Tracks and footpaths are routes mostly used by pedestrians, cyclists, and motorcycles to access institutional facilities such as lecture rooms, offices, and farms.

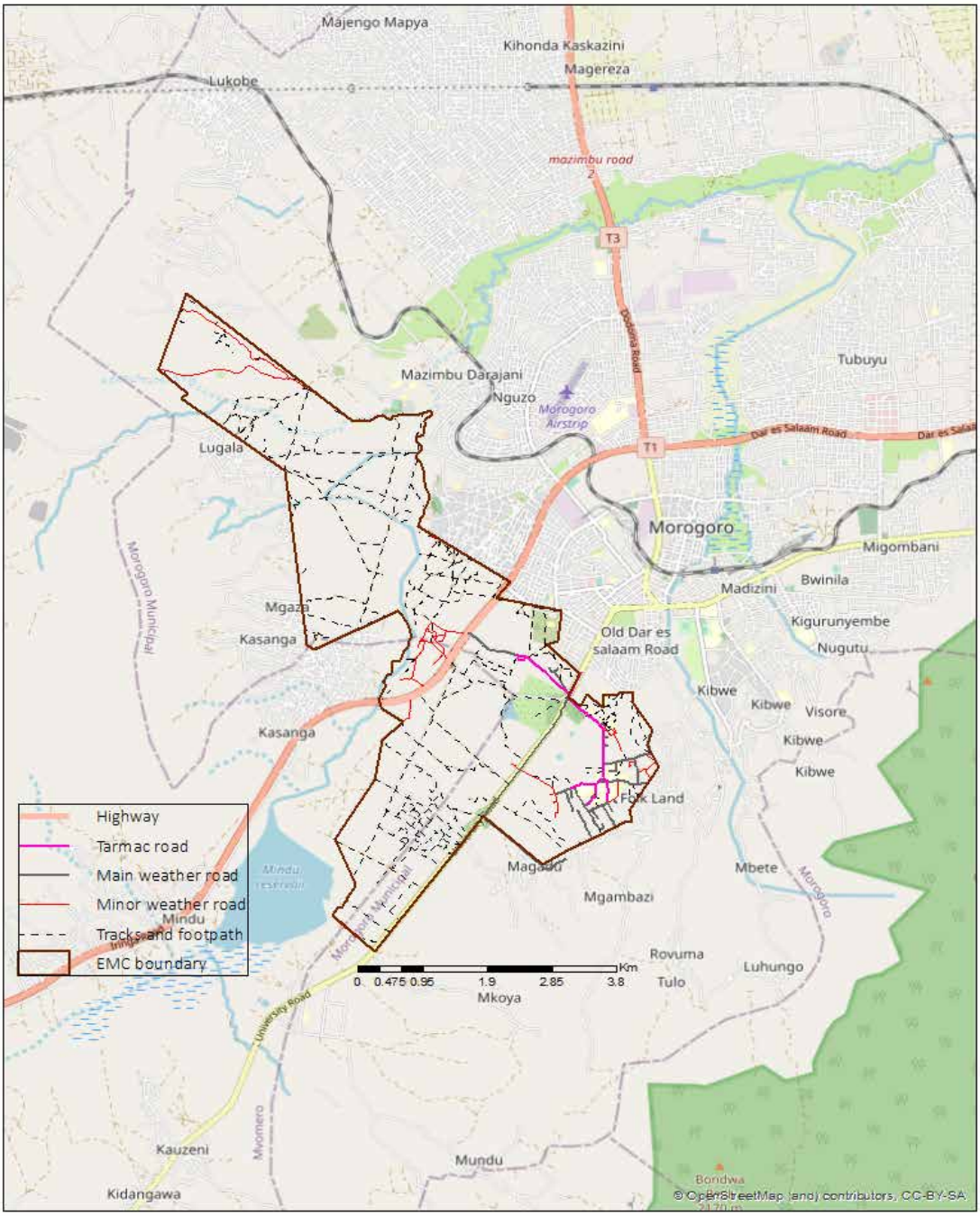


Figure 15: Road network

2.3.4 Internet network

ICT has become increasingly integral to today's educational system worldwide. This is mainly because information and communication are at the very heart of any educational system. ICT has the potential to support educational functions, such as teaching and learning, research and scholarship, and management and administration.

These technologies enhance the sharing of information, increase collaboration among students, academicians, and administrators, improve the delivery of distance education, and have led to new forms of pedagogy. ICT developments that support academic and administrative functions. These developments include the establishment and maintenance of the University's Local Area Network (LAN); the establishment of computer laboratories; the design and maintenance of the University Website; and the increase in bandwidth from 128 kbps in 1996 to 40 Mbps in 2014.

Notwithstanding these strengths and opportunities, SUA also faces several ICT-related challenges. These include inefficient local-area networks; ageing ICT facilities; inadequate computer laboratories; insufficient computers; lack of integrated information systems; and slow Internet connectivity. Already, during data collection, we found that, apart from not having mapped access points, some areas, such as the College of Economics and Business Studies (CoEBS) and Nicholas Kuhanga Hostels, do not have access to Wi-Fi hotspots (Figure 16). In addition, the team noticed problems with normal broadband internet connections to most of the visited areas from the Department of Animal and Aquatic Sciences, all the way to CoEBS.

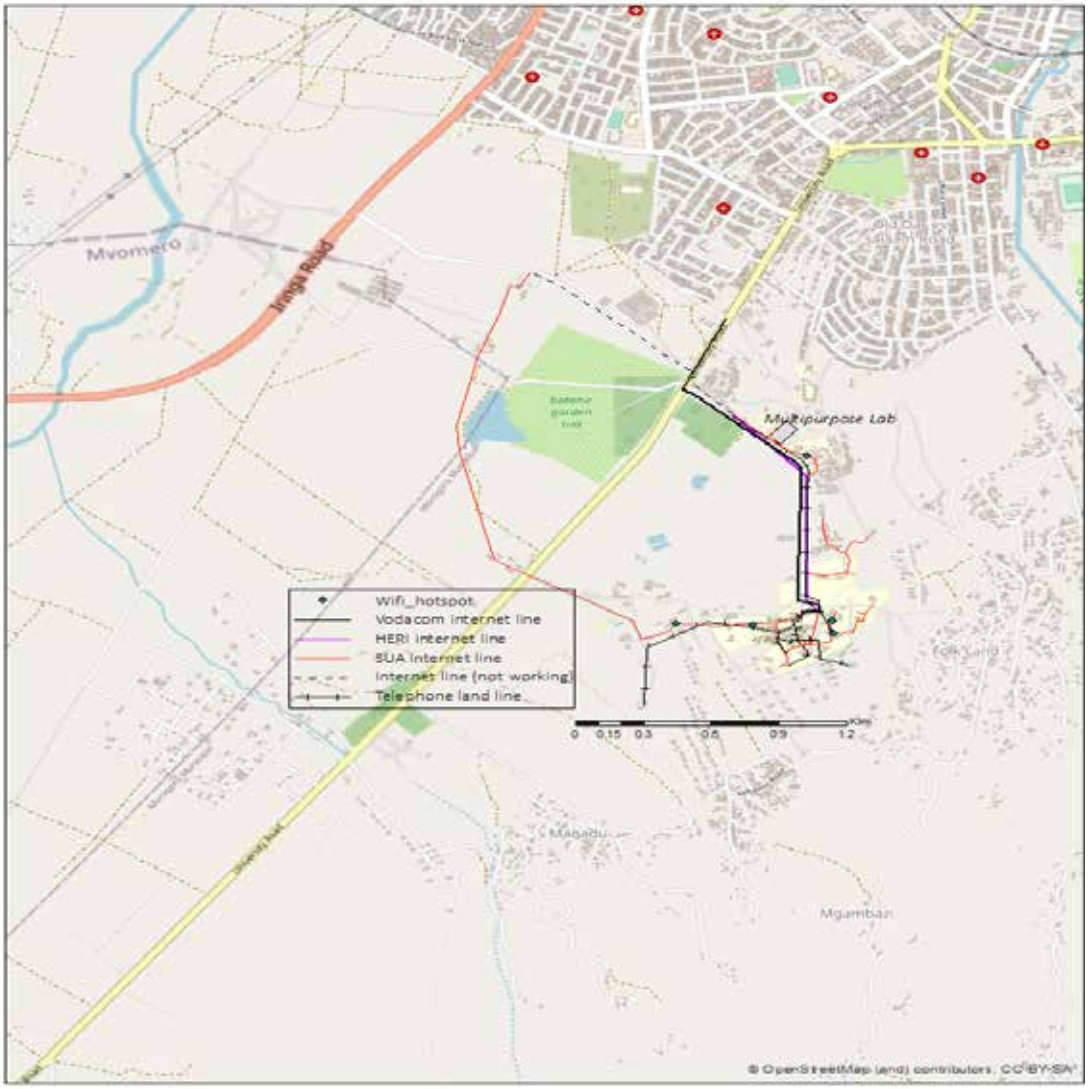


Figure 16: Internet network and location of Wi-Fi hotspots

2.3.5 Car Parks

To date, Campus does not have a centrally designated car park, but every department, unit, college, and institute has its own car park that still does not meet the existing requirements.

2.3.6 Electricity Transmission Network

The Campus gets its electricity supply from the national grid. It also has several standby electricity generators for some buildings. It has, however, been experiencing regular power cuts, which affect Internet connectivity and cold storage in laboratories and other areas. Figure 17 shows the campus electricity transmission network.

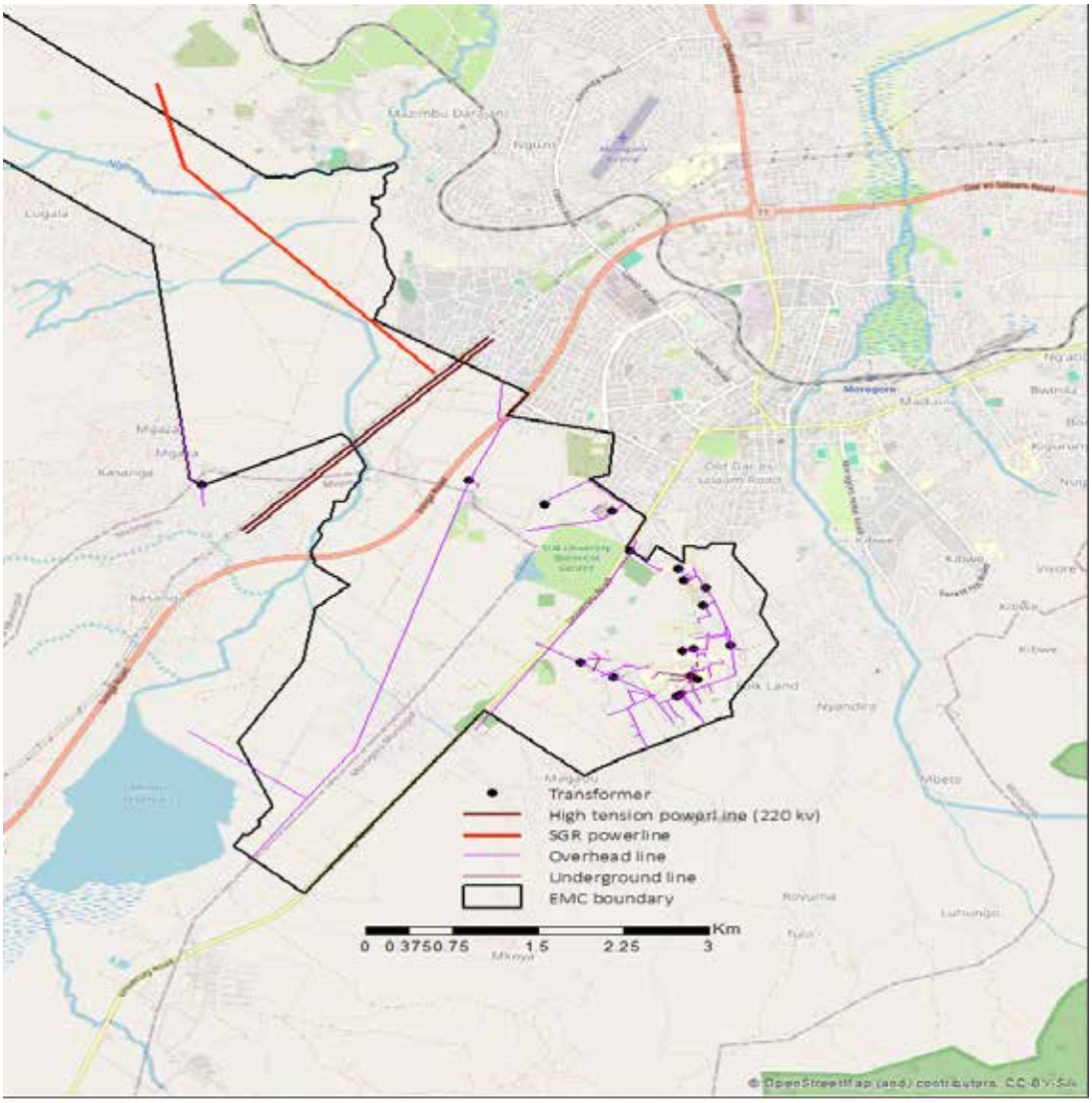


Figure 17: Electricity transmission network

2.3.7 Stormwater Management

When stormwater is absorbed into the soil, it is filtered and ultimately replenishes aquifers or flows into streams and rivers. However, when heavy rainwater hits, the saturated ground creates excess moisture that runs across the surface and into storm sewers and road ditches.

Detaining storm water and removing pollutants are the primary purposes of storm water management; however, the team noticed that it has not been adequately implemented at EMC. Previous surfaces that are porous and allow rainfall to soak into the soil, and infrastructure, such as culverts, gutters, storm sewers, and conventional piped

drainage, all of which play a part in storm water management, are not interconnected to form a complete system. In addition, the concept of rainwater harvesting, an integral part of stormwater management, has not been fully utilised. Most of the rainwater is lost and not directed into the existing charco dams and earth dams near the botanical garden.

In this Master Plan, the team mapped the existing stormwater management infrastructure and proposed extending two routes for runoff waterways from the catchment and directionless streams (Figure 18). Suggestions for the interconnectivity of drainage streams are also provided in the layout. Further enhancement of rooftop rainwater harvesting and its diversion to appropriate drainage channels is emphasised.

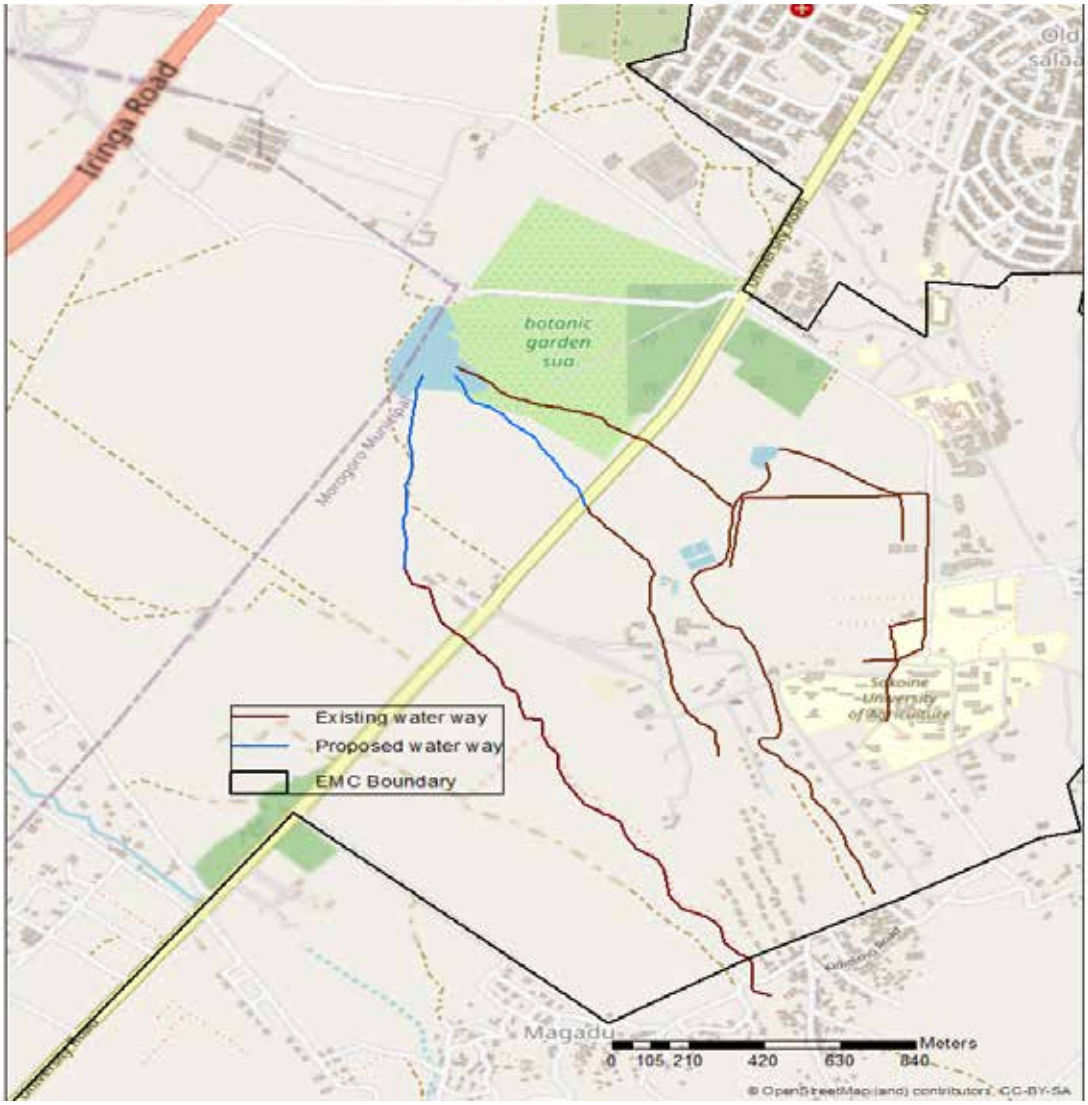


Figure 18: Existing runoff channels and proposed extension of the waterway

3.0 STRATEGIC PLANNING AND FUTURE NEEDS

The 2024 – 2034 Edward Moringe Campus Master Plan is organised around multiple overarching areas of emphasis:

a) Improvement needs to the existing buildings and infrastructures

b) Placement of new buildings under ongoing projects (HEET, IPM, SACIDS)

c) Placement of new buildings and infrastructures

d) Placement of new buildings and infrastructures in the Lugala academic zone

3.1 Projected Enrolment Growth

Projected enrolment growth is an essential consideration for the campus when developing its master plan. By accurately predicting future enrolment numbers, SUA can effectively plan for the necessary infrastructure, resources, and faculty to accommodate the expected increase in students. This involves combining internal data, historical enrolment trends, demographic projections, and market analysis to forecast future student numbers. Furthermore, the campus can implement strategic measures to attract and retain students, such as offering new programs or services that align with market demand.

3.1.1 Enrolment Growth Rate for Undergraduates

From 2009 to 2022, undergraduate enrolment increased at an average rate of 10%. In general, the rate of increase has neither been static nor linear; over the years, the total number of undergraduate students has grown intermittently. Therefore, under this Master plan, the projection of undergraduates assumes linear growth, estimating the total number of students to be around 25,000 in 2034 (Figure 19).

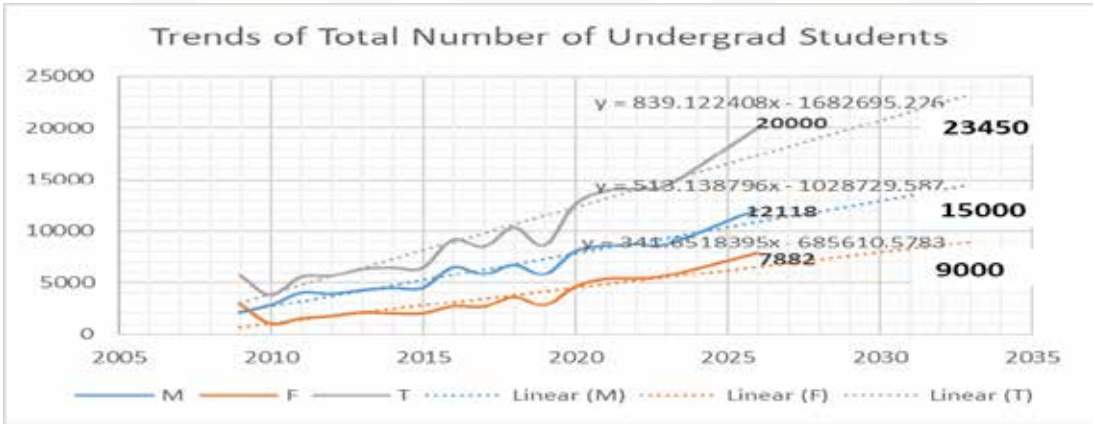


Figure 19: Trend of total number of undergraduate students from 2009 and the projections to 2034

3.12 Enrolment Growth Rate for Undergraduates

During the same period, 2009-2022, postgraduate student enrolment increased by approximately 14%. However, the variations for postgraduates were acute before 2018, to the extent of distorting the trend behaviour, showing negative growth (Figure 20).

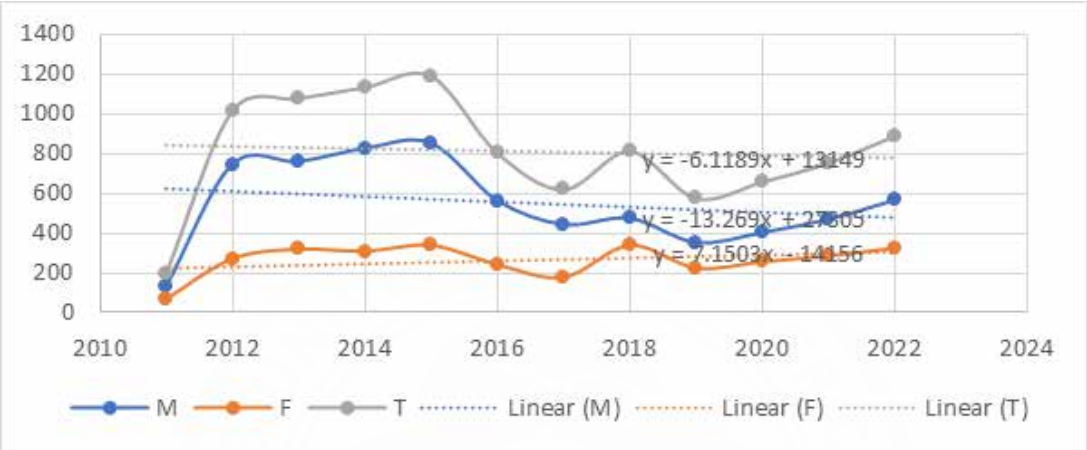


Figure 20: Enrolment trend of postgraduate students from 2009 and the projections to 2034

Noting the scenario above, the projections under this master plan considered the current three-year enrolment growth observed from 2019 to 2022 to project growth to 2034, thereby setting the target for future postgraduate enrolment. In addition, during these three years, the number of postgraduates has consistently grown at an average rate above 10% and not exceeding 20%, which makes the growth rate less ambitious. The average growth for the period 2019-2022 is 15.6%. If the growth continues linearly at a pace similar to the computed growth, it is expected that the number of enrolments in year 2034 will be 2,400 students (Figure 21).

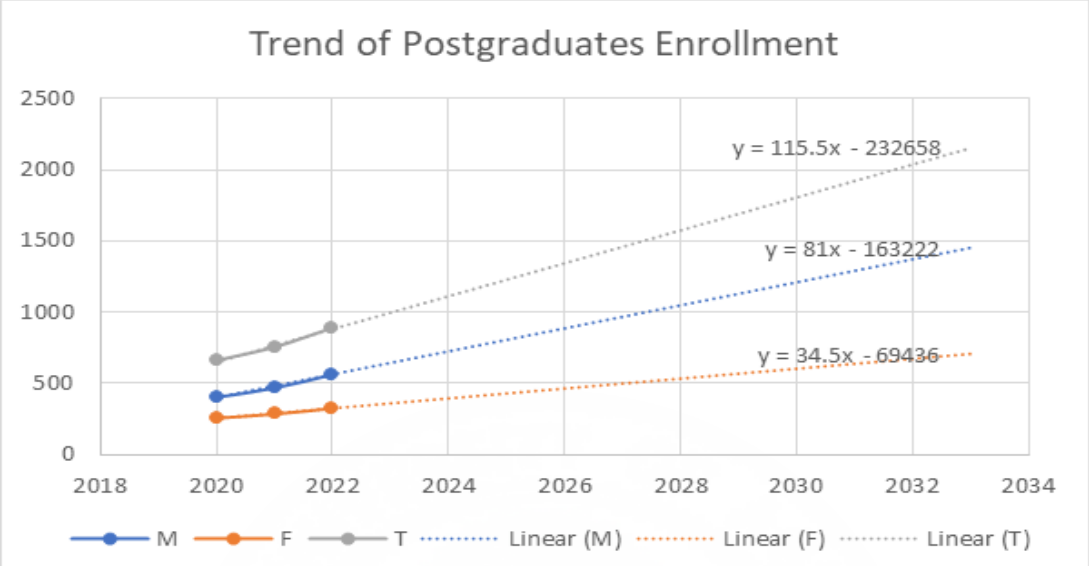


Figure 21: Enrolment trend of postgraduate students from 2019 and the projection to 2034

3.2 Proposed New Buildings and Rehabilitations

3.2.1 Proposed New Buildings

A number of new buildings are expected to be constructed in EMC over the next ten years of this Master Plan. Table 9 shows the buildings and their expected locations. For more details, refer to **Appendices 1 and 2.**

Table 9: A list of new buildings under HEET and SACIDS projects

Sno.	Facility	Location
1	4 Storeys Academic Building	Near CoEBS
2	4 Storeys Engineering and ICT Laboratory (Innovation Hub)	SoET
3	3 Storeys Academic Building	CoEBS
4	Tissue Culture Laboratory and Bio Security Building	Department of Crop Science and Horticulture
5	2-storey Gross Anatomy Laboratory	VMBS
6	Single-storey Animal Reproduction Biotechnology Laboratory,	Near Botanical Garden
7	2-story SACIDS Biomedical Laboratory	Near VMBS
8	Water and Juice plant	Near SoET
9	Block Making Project	Near AIC/ Iringa road

Note: Construction of each facility is supposed to include the following items:

- Landscaping – including parking lot
- Rainwater harvesting facility, including a water storage tank
- Renewable energy – solar for backup (lights-external)
- Special needs consideration
- Solar street lights
- Fire hydrant and fire extinguisher compartments
- Ramp, stairs
- Lift and staircase consideration
- Emphasis on people with special needs
- Wastewater collection and disposal connection to the Municipal Sewer network or existing sewer line
- Power backup/standby generator
- Solar power back-up
- Provision of outdoor reading spaces
- Smoke detectors

During our consultative meetings, the stakeholders proposed the construction of new buildings as indicated in Table 10. The proposal was based on factors such as the expected increase in population within the campus and its concentration centres. For example, a new cafeteria (Figure 22), associated with a business centre, is proposed for construction near the Multipurpose Lab to serve the population in that area (Multipurpose Lab, SoET, and Innovation hub).

Table 10: Proposed new buildings under other funding

Sno.	Facility	Location
1	Cafeteria	Multipurpose lab
2	Library building	Near the Academic building
3	SUASO building	Near hostel 3
4	Truck parking	Along Iringa Road
5	Sino-African Agricultural Learning Complex (includes Sports centre)	Along Iringa Road

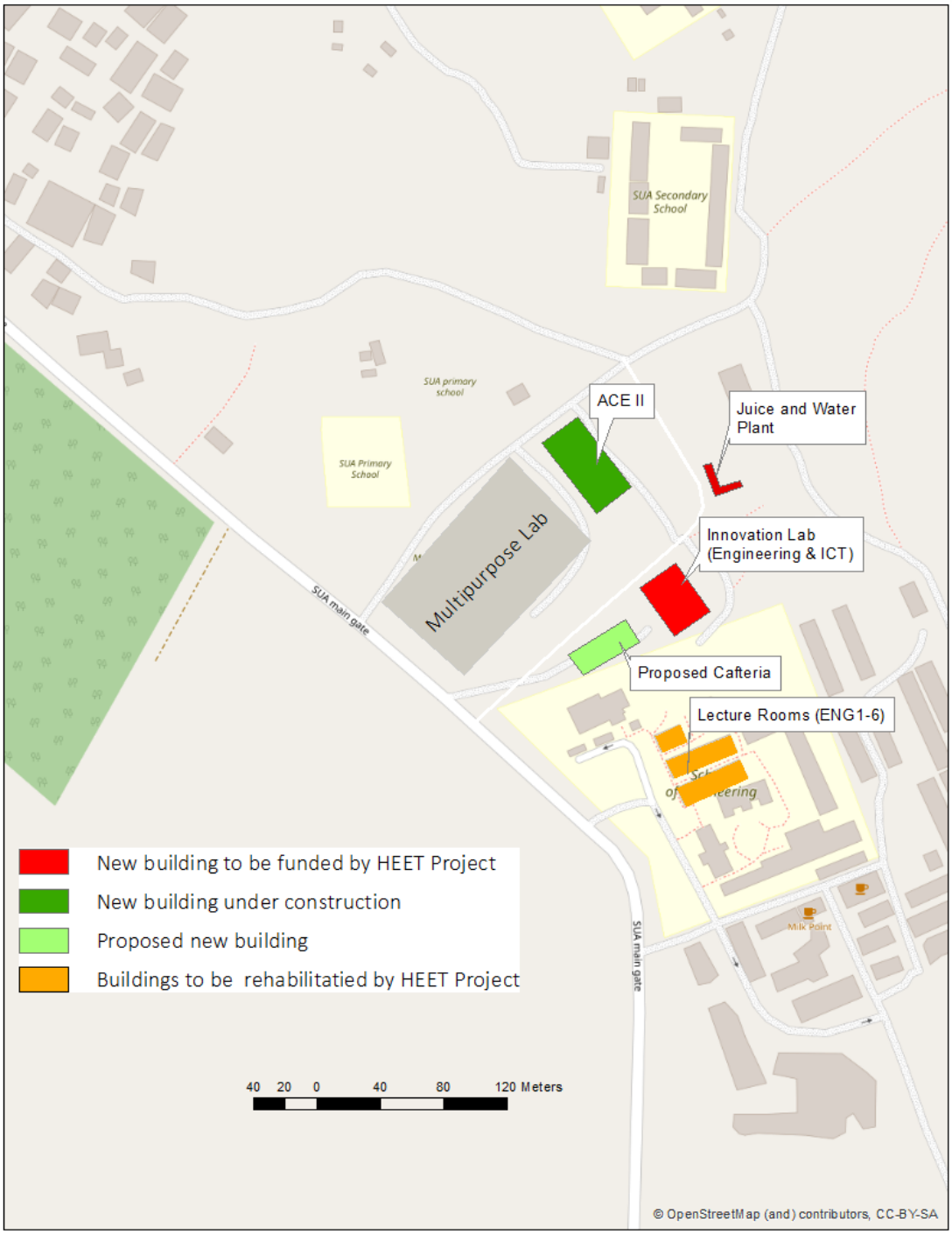


Figure 22: Proposed locations for new buildings and rehabilitation work at SoET

The proposed Sino-African Agricultural Learning Complex (SAALC) (Figure 23) will facilitate the use of Chinese expertise and experience to support Africa's efforts to achieve food self-sufficiency and eradicate poverty. By anchoring the complex at SUA,

it will provide an opportunity to develop a model for strengthening the link between higher education institutions and farming communities, allowing the institutions to have a greater impact on societal development.

Despite being built at SUA, the complex will have a regional orientation, initially focusing on the Southern African Development Community (SADC) and the East African Community (EAC). It will gradually develop into a hub for interactions with other African nations.

The complex, covering 66 ha, will include an agricultural park, a sports complex, and a building zone with a variety of amenities, such as banks and supermarkets.

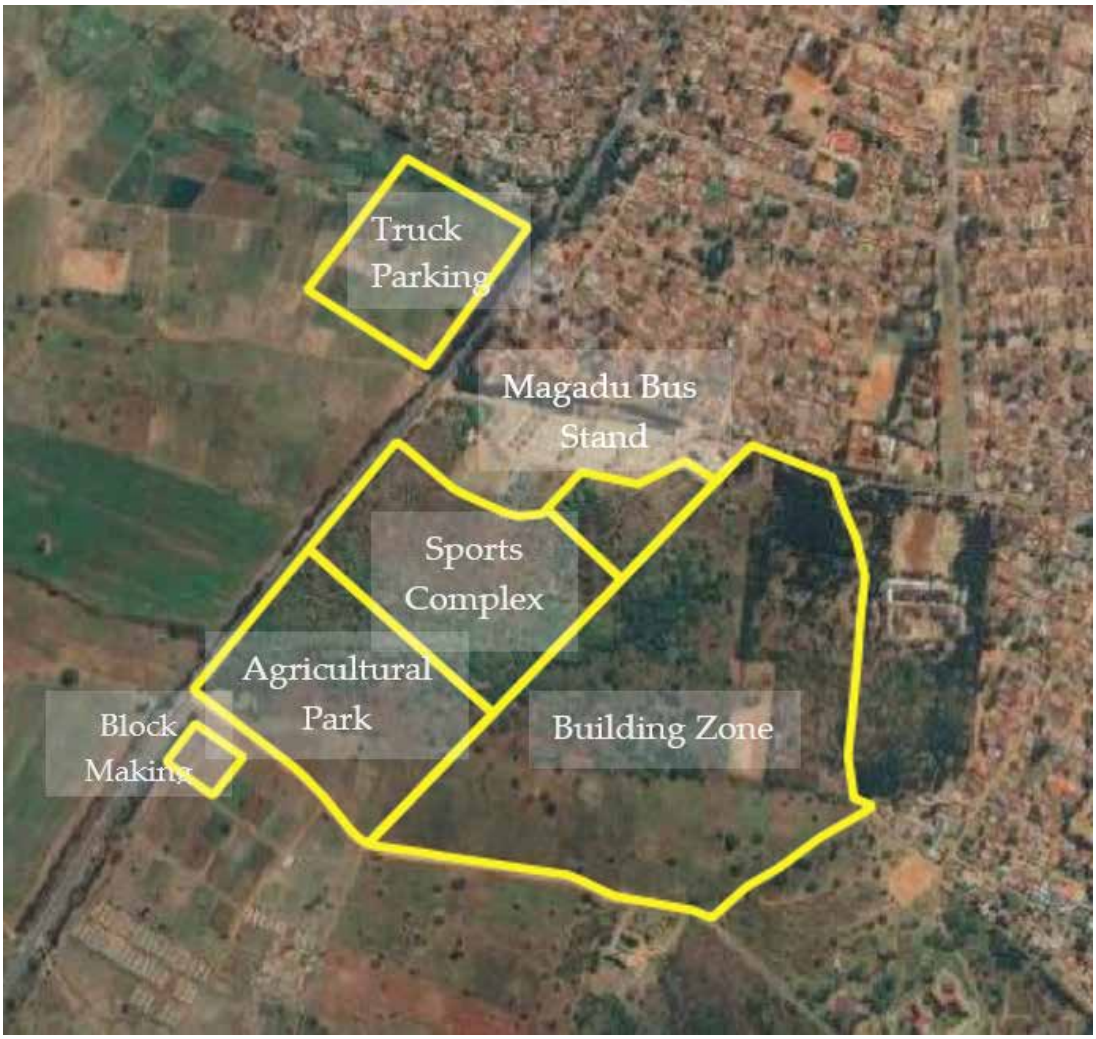


Figure 23: Proposed locations for Sino-Africa Agricultural Learning Complex, Block Making and Truck Parking Projects

3.2.2 Proposed Building Rehabilitations

Most of the building in EMC needs rehabilitation. For example, of 159 staff houses, 153 are planned for rehabilitation over the next 10 years (Table 11). The rehabilitation will also include staff houses and other buildings. Some of the rehabilitation work has already started. Examples include rehabilitation work in the Multipurpose Hall.

Table 11: Strategic Plan for Rehabilitation of University Houses in the Period of Ten Years (2023/2024-2032/2033)

NUMBER OF HOUSES EXPECTED TO BE REHABILITATED FOR THE PARTICULAR FINANCIAL YEAR										
2023/ 2024	2024/ 2025	2025/ 2026	2026/ 2027	2027/ 2028	2028/ 2029	2029/ 2030	2030/ 2031	2031/ 2032	2032/ 2033	TOTAL
17	16	16	15	14	15	15	15	15	15	**153**

The HEET project has already begun planning the rehabilitation of several buildings (Table 12).

Table 12: A list of Rehabilitation works to be funded by HEET project in EMC

Sno.	Facility
1	ADMINISTRATION BLOCK
2	SCHOOL OF ENGINEERING AND TECHNOLOGY (ENG 1-6, TOILETS, WALKWAY, STAFF OFFICES, TRACTORS OFFICE)
3	DEPARTMENT OF ANIMAL SCIENCE, AQUACULTURE AND RANGE SERVICES (DAARS)
4	MLT 1-8
5	EXT 02& 03
6	HORT 1-3
7	FORESTRY – PRINCIPAL'S BUILDING

Note: for details, refer to the HEET document

3.3 Proposed Developments in the University Training Farm

The University Training Farm is planning strategic developments. This will include expanding the existing oil palm field by 32 acres and introducing a new banana field of about 51 acres (Figure 24). Other developments include building public toilets, introducing a selling point for the farm products, and adding more land for the established pasture (Figure 24).

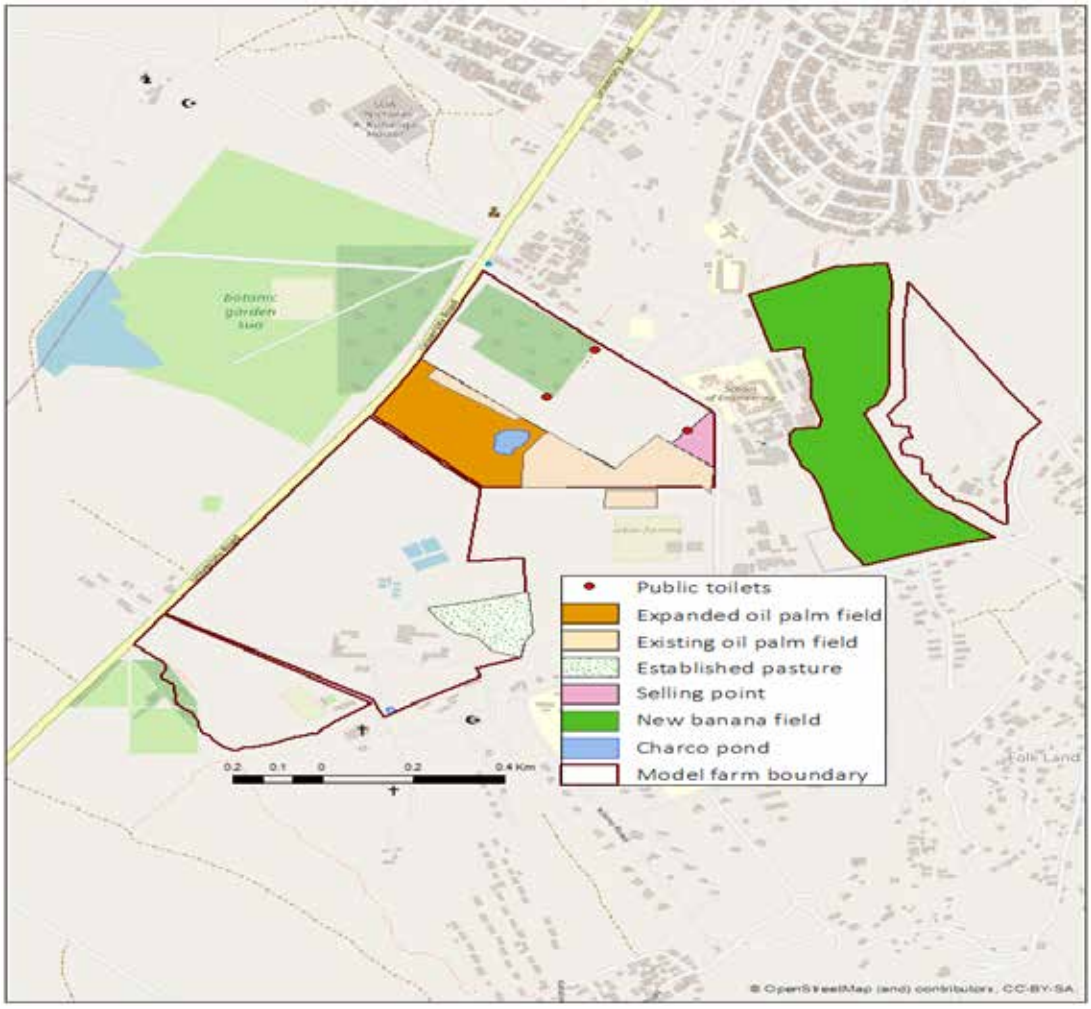
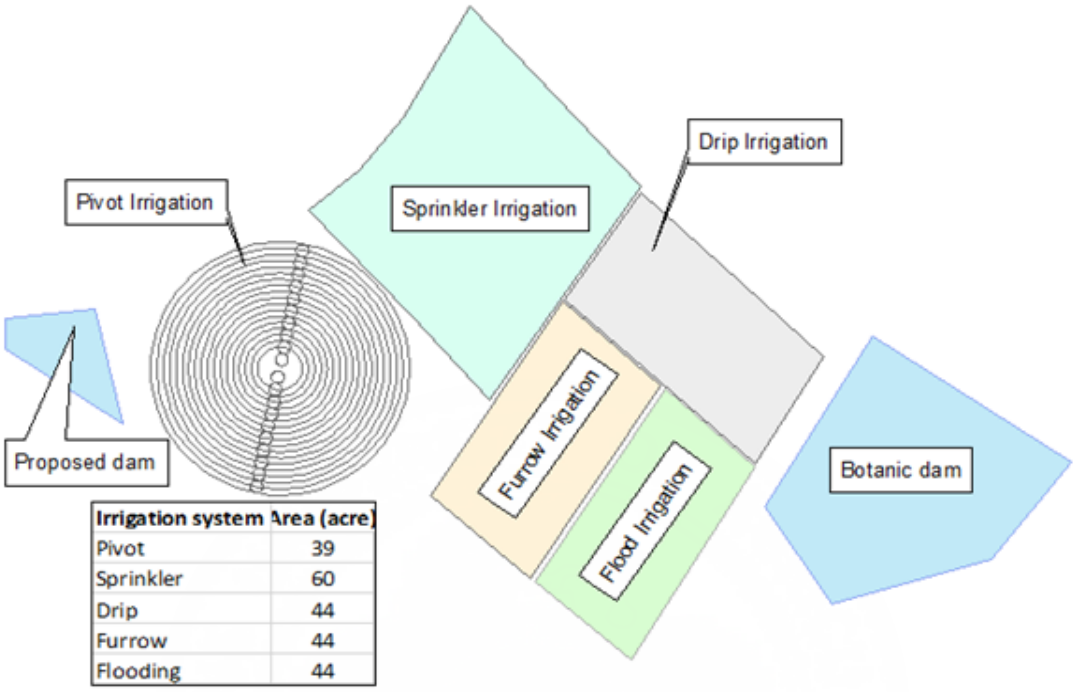


Figure 24: Proposed developments in the Model Farm

Under the HEET project, a new irrigation system, comprising the following systems: Pivot, Sprinkler, Drip, Furrow, and flood systems (Figure 25), will be established in the farm.



Irrigation system	Area (acre)
Pivot	39
Sprinkler	60
Drip	44
Furrow	44
Flooding	44

Figure 25: Proposed layout of Irrigation Systems

3.4 Proposed New Infrastructures and Improvements

3.4.1 Water supply

Rainwater harvesting:

There is great potential for rainwater harvesting at SUA. However, this potential remains untapped. A large amount of rainwater is wasted every year, which could have been used profitably. Proper management is therefore required to make use of the resource.

A large number of buildings at EMC already have conveying systems in place (gutters and downpipes). Among these are buildings at CVMBS (Plate 20), SoET (Plate 21), and Student Hostels (Plate 22). These are just a few examples of water waste due to the lack of storage facilities.

Plate 20: Wasted rainwater in one of the CVMBS buildings

Plate 21: Wasted rainwater in one of the SoET buildings

Plate 22: Wasted rainwater in one of the student hostels buildings

In a study conducted by Rwehumbiza (2003), the available and suitable roof area for Rainwater Harvesting (RWH) at EMC was estimated at 84,004.27 m^2. The catchment surfaces range from corrugated iron sheets (CIS) to asbestos, concrete, tiles, and plastic. Due to the fact that the built-up area has changed since the data reported by Rwehumbiza, we assume an increase of 20% of the built-up area. The newly built-up area is therefore about 100,804.8 m2. Taking the total rainfall for the two rainy seasons (Vuli and Masika) to be 732 mm and assuming a runoff coefficient of 80%, the volume of runoff generated is 59,031.3 m3 (59,031,300 litres).

3.4.2 Waste Management

The University has experienced population growth, leading to increased production of solid waste and wastewater. Consequently, the management has devised various measures to mitigate the impacts of waste generation. These measures fall into two categories: solid waste management and wastewater management.

Wastewater Management:

The current wastewater management at EMC is overloaded for several reasons, including the poor condition of the existing pipeline and an increase in the population (staff and students). In places like Tiba Road, on-site treatment systems (Septic and soak-away pit) have frequently overflowed, necessitating routine maintenance.

Additionally, the campus's stabilisation ponds don't produce high-quality effluent. In an effort to mitigate the effects of these challenges, the University has hired MORUWASA to assess the current wastewater network, redesign the entire sewerage system with appropriate slope, and develop a proposal for a new network that connects to the municipal wastewater system. According to the proposal, the residents of Tiba Road and neighbouring localities will be connected to the Kidondolo municipal wastewater network (Figure 26). Furthermore, the inlet of the current VET line, located near the stabilising ponds, will be switched to the inlet of the current Student Hostel and Kilimo Road line. This alteration will result in a more efficient stabilisation system, thereby extending wastewater residence time in the stabilisation ponds. Additional details on the proposal for improving the existing sewerage system can be found in **Appendix 3.**

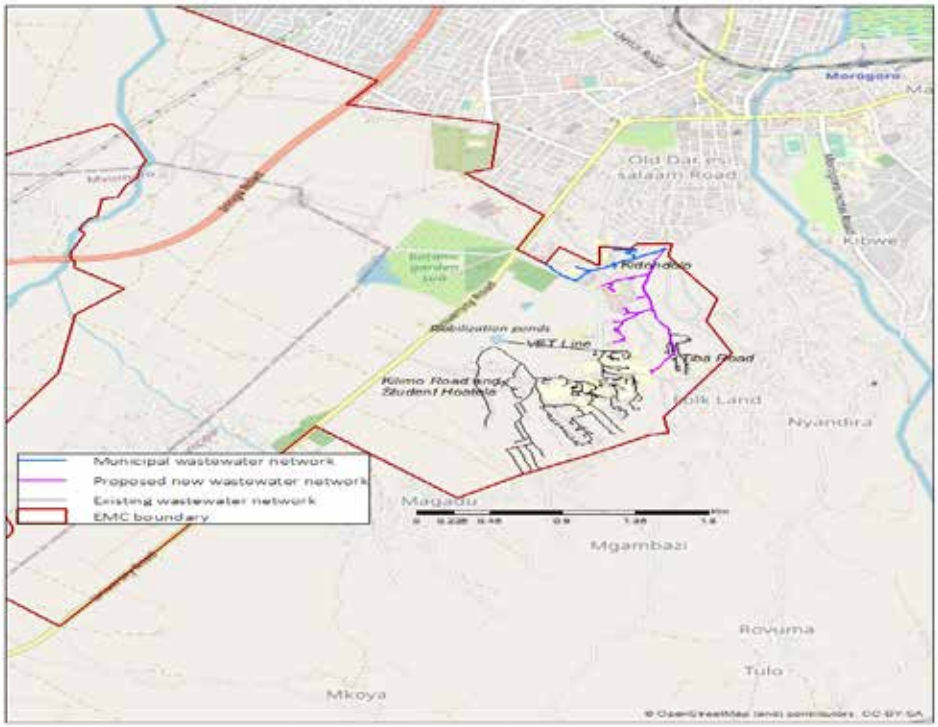


Figure 26: Proposed wastewater network connecting Tiba Road and the Municipal wastewater network

Solid Waste:

The current solid waste management is ineffective and inefficient, leading to environmental pollution. In the future, the university has to establish an efficient solid waste management network. This system should include the following:

i. Establish solid waste collection points at staff residences, student hostels, lecture rooms, and office areas.

ii. Make waste transportation easier; the idea is to use vehicles to transfer solid waste from collection stations to a centralised disposal site.

iii. Create a centralised dumping site. The proposed location for this centralised dumping site is behind the Tiba Road area.

iv. Establish sorting process; at the centralised dumping site, the waste will be sorted into different categories, such as recyclables, organic waste, and non-recyclables.

v. Implement various solid waste management techniques at the centralised site. This will include composting for organic waste, landfills for non-recyclable and non-compostable waste, and recycling and resource recovery for recyclable materials.

vi. Conduct public awareness campaigns on the usage of the waste management facilities. This will guarantee the effectiveness of the solid waste management network.

These initiatives will promote responsible waste disposal practices and foster a culture of waste reduction and recycling among the university community.

3.4.3 Road Network

The current road network has drawbacks, including its susceptibility to weather-related events and insufficient maintenance, leading to substantial road damage. To address the shortcomings, the University management is urged to take the following measures in the future: -

i. Maintaining roads regularly is crucial for ensuring their good condition, but it can be financially burdensome for any organisation. Recognising this, the University has to devise a plan to upgrade the road connecting CoEBS and Iringa Road (0.8 Km) from a regular weathered road to a durable tarmac road. By doing so, they will reduce the need for frequent maintenance and provide a more comfortable route for people travelling from the SUA road to Iringa Road.

ii. The university should rehabilitate Tiba road (0.6 Km), which has suffered significant degradation, by adding moorum/gravel materials. These road improvements will not only enhance connectivity and accessibility but also result in cost savings.

iii. Additionally, the University should rehabilitate roads crossing staff houses, such as Kilimo Road, Kididimo, and Maji Street, by adding more material. These roads have long been forgotten in the maintenance plan, leaving staff who use them uncomfortable.

3.4.4 Internet Network

The current Internet network has limitations, including damaged infrastructure and insufficient hotspot coverage. Overcoming these challenges, the University has devised a plan to enhance the local area network in the future: -

i. Transitioning from the current ring network, where core switches depend on each other, to a more efficient star topology network. In the new setup, all core switches will directly receive internet connectivity from the main server.

ii. The university aims to improve internet access by increasing and repairing existing hotspot points and plans to upgrade extension lines from the current analogue network to a digital network utilising Local Area Network technology.

iii. The University is implementing the HEET project, with one of its focus areas being to strengthen the use of digital technology. This area focuses on the use of digital technology to support teaching, learning, and research activities. Among other things, the project intends to upgrade the network, develop online learning platforms and related digital technologies, and establish multimedia studios and academic information systems.

Furthermore, the Tanzanian government, in partnership with TTCL, has initiated a project to establish free hotspot points across the country. The goal is to provide internet access to people in various communities. A recent survey conducted at Edward Moringe Campus has identified specific locations for these free hotspot points (Figure 27). The designated areas include the Multipurpose Lab, the Sokoine National Agricultural Library (SNAL), the New lecture theatres (MLT 9 & 10), the Nicholaus Kuhanga Hostel, the Hostel 1-12, and CoA. Figure 26 shows the TTCL internet line and proposed locations of hotspot points.

Based on a visual examination of the suggested locations, more hotspot spots should be added to cover the future HEET Project buildings, particularly the Academic building.

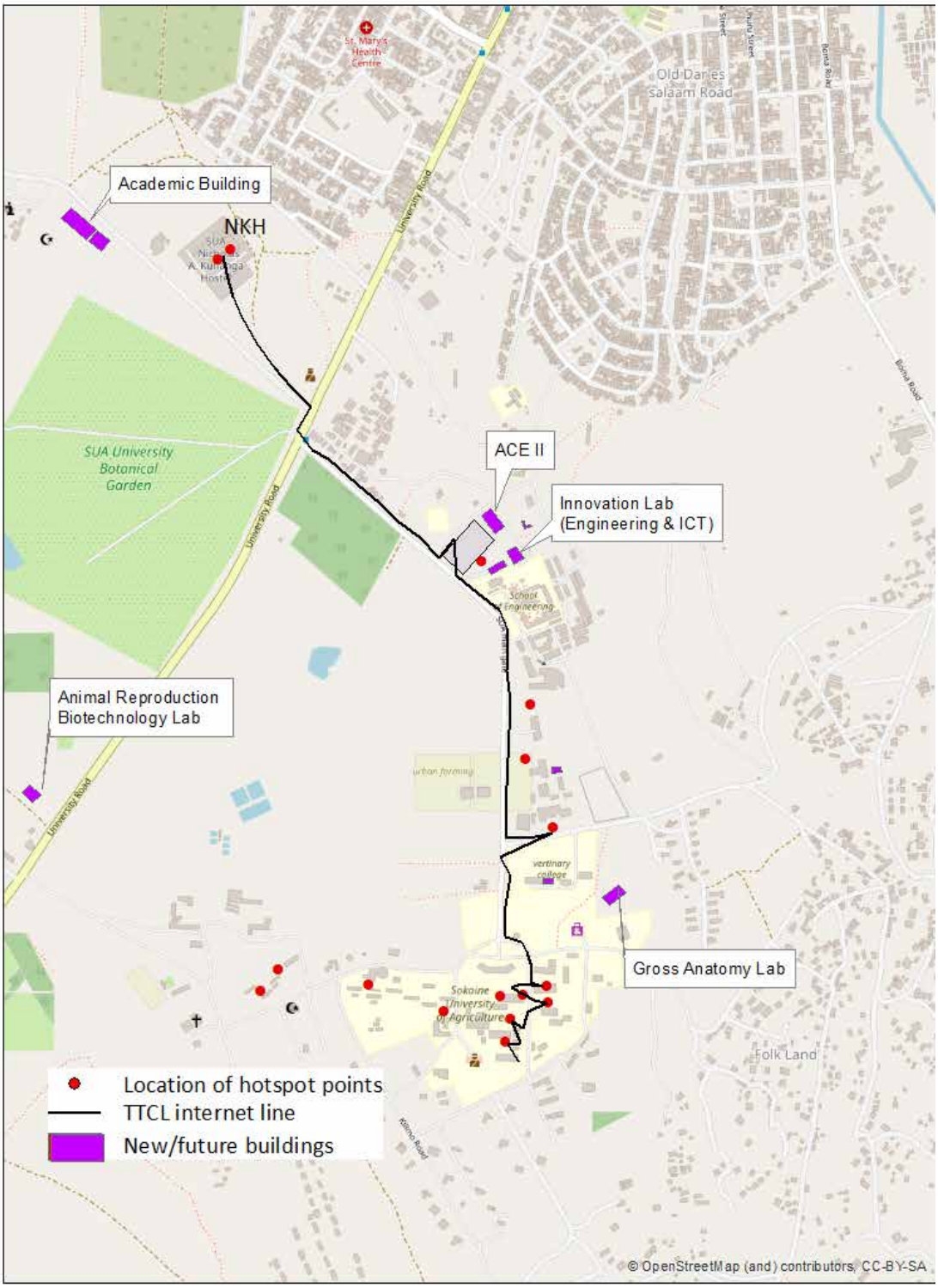


Figure 27: TTCL line to connect the proposed hotspot points

3.4.5 Additional elements to be considered

The Master Plan proposes consideration of these common elements.

1) Main entry signage (at EMC main gate and junction at Iringa Road)

Figure 28 An example of signage from the Lala Lajpat Rai University of Veterinary and Animal Sciences (LUVAS), India

2) Additional seating and benches

More outdoor study slabs will be required to accommodate the high number of students on campus.

3) Building signage

Consistency in the provision and installation of these elements will enhance the visual impact of the campus and reinforce the University's overall branding.

4) Sidewalks

There are currently no designated pedestrian walkways along the campus's main roads. The existing informal pedestrian ways are very close to the main roads, and experience localised flooding during heavy rain events.

The proposal is to construct sidewalks, especially on both sides of the main entry road to the campus. With an increase in students on campus, the sidewalks will serve an important role by minimising interactions among vehicles, motorbikes, and pedestrians.

5) Protecting campus land from encroachment

Apart from legal procedures, physical features are required to protect the campus land from encroachment. This may include erecting more beacons and buffer zones along the boundaries, especially in high-risk areas (Figure 29). The university may also consider planting trees in high-risk areas.

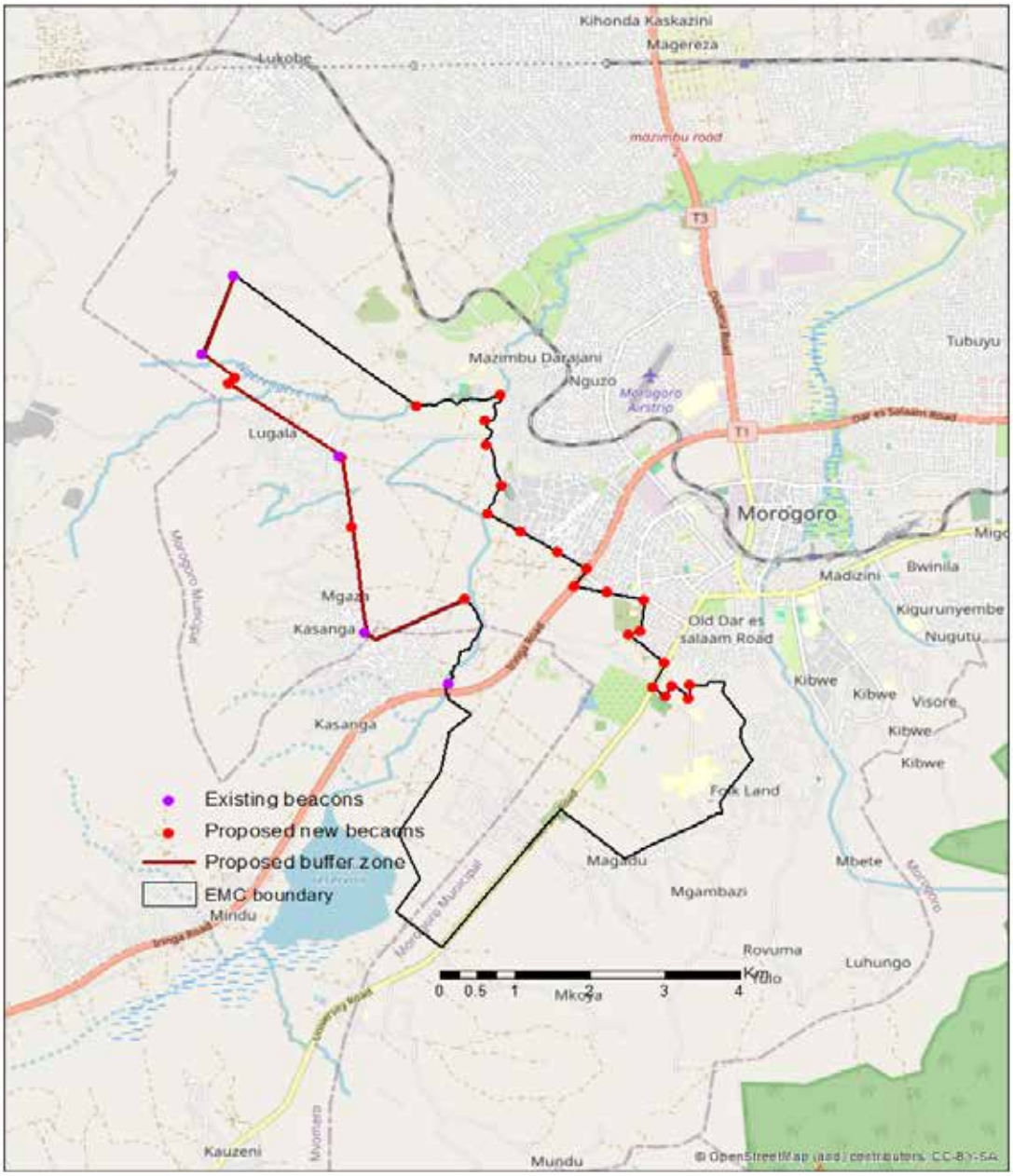


Figure 29: Proposed buffer zone and beacons to protect campus land from encroachment

3.5 Proposed Development of Lugala Area

The Master Plan proposes the development of the Lugala area, which is dedicated to academic purposes. Apart from the Academic zone, the development plan includes the following zones: Administration, Business, Conservation, Plantation Forest, existing Eucalyptus plantation, Recreation, Staff housing, and Student hostels (Figure 30).

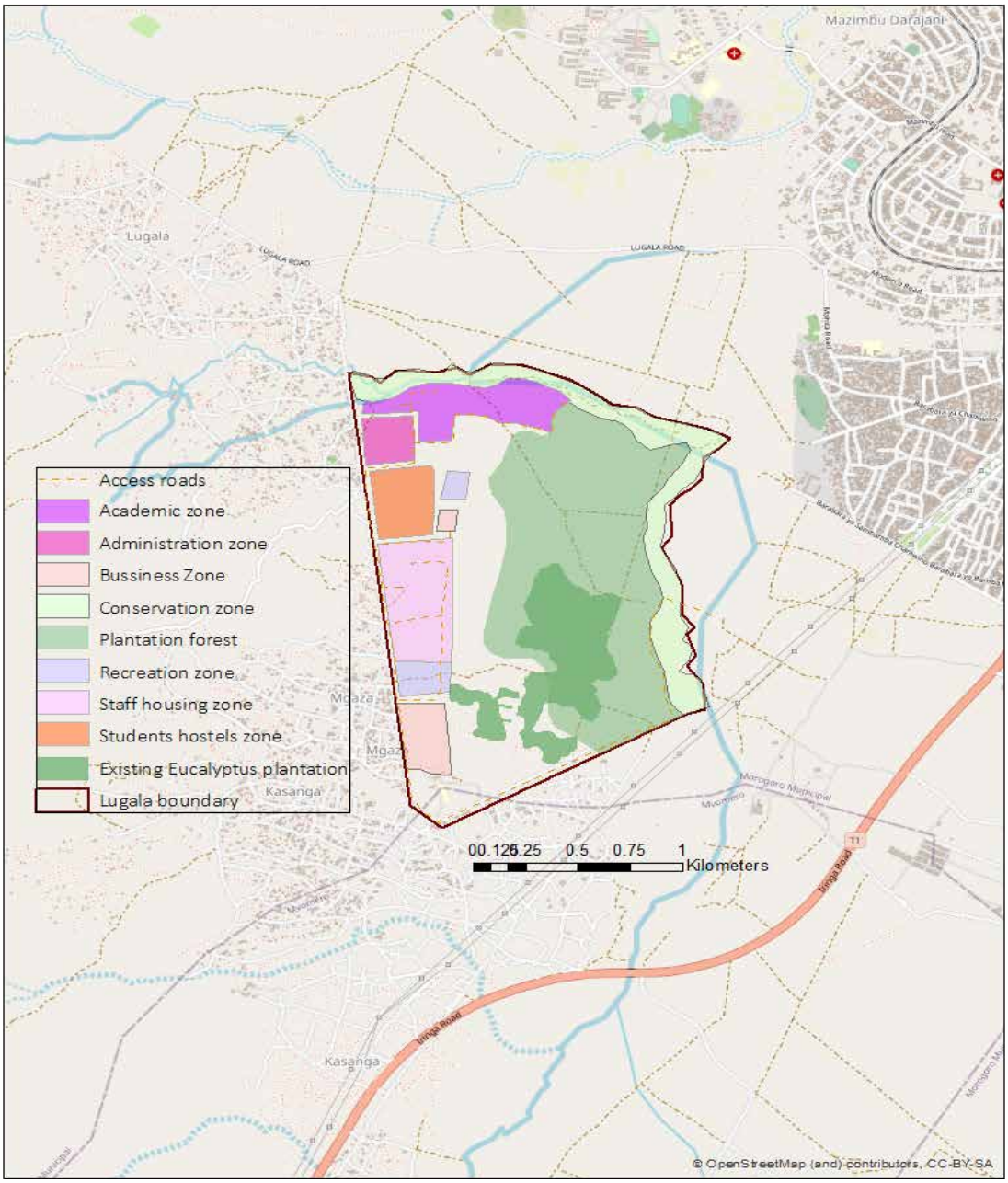


Figure 30: Proposed Land use zone map for the Lugala Academic zone

3.6 Proposed Implementation Plan

The EMC Master Plan was developed on the understanding and expectation that it will be implemented incrementally, as funding becomes available. It is a document structured to provide Sokoine University of Agriculture with a flexible decision-making framework to accommodate specific opportunities and needs for the EMC as they emerge over a five-to-ten-year time horizon. This master plan will serve as a roadmap to guide EMC's physical growth over the next decade, aligning closely with the SUA's academic mission, emerging strategic priorities, and the CSP. The University Management will use the plan to make decisions about fundraising, new construction, renovations, and land use.

It is recommended that this EMC Master Plan should figure prominently in the University's planning processes. It should be referred to throughout all development planning and design processes, and all decisions regarding the physical development of the campus and the University Management should be consistent with the Plan and refer to it. Certain components of this Master Plan may be implemented in partnership with private entities, including businesses, government agencies, organisations, or other external groups.

The implementation strategy proposed for the next 10-year period (2024-2034) is divided into two phases, as shown in Table 13. However, further improvements to the implementation strategy can be made as funding becomes available.

Table 13: Proposed implementation plan

S/N	Zone/ Infrastructure	Phase one (2024-2028)	Phase two (2029-2034)
1	Academic Zone	• HEET and SACIDS buildings in place	• Renovate all roads, tarmac roads
2	Student Hostels	• Renovation of existing hostels	• One new Hostel to accommodate students. • All hostels renovated
3	University Training Farm	• Fish meal plant in place • Fish ponds increased • Farm toilets in place • Oil palm farm expanded • New banana field introduced • Irrigation system established	• Modernisation of Magadu animal farm • Expansion of crop production
4	Business zone	• Business plans developed and implemented for different investments (Block making, Water and Juice Plant, Fish Meal, Printing Press)n	• Prepare and implement business plans to guide investment by the private sector
5	Recreation Zone	• Renovation of the existing recreation facilities • Design a sports complex near NKH • Improvement of the Botanical Garden	• Sports complex in place
6	Residential zone	• Renovation of existing staff housesn	• Renovation of existing staff houses
7	Administration zone	• Renovation of the Administration building	
8	Conservation zone	• Develop Guidelines for Management Planning of the Conservation Areas • Monitor and implement activities to protect the areas from soil erosion and other risks	• Monitor and implement activities to protect the areas from soil erosion and other risks
9	Agriculture Investment Zone	• Prepare investment policy/ guidelines	• Attract private investors
10	Water Supply System	• Improve intake and infiltration capacity • Improve water treatment plant • Renovate water distribution system • Develop/construct RWH systems	• Develop new water sources

11	Solid Waste Management System	• Install new incinerators • Develop e-waste policy • Establish e-waste collection centres • Establish a solid waste composting system • Establish a solid waste centralised final collection centre	• Acquire a solid waste collection vehicle
12	Wastewater Management System	• Renovate the Wastewater system as per the MORUWASA recommendations	• Connect the wastewater system to the Municipal wastewater treatment and disposal system
13	Road network	• Upgrade the road connecting COEBS to the Iringa road from a regular weathered road to a durable tarmac road • Renovate the Tiba road by adding moorum/gravel materials	• Construct a pedestrian lane along the main campus road from the main gate to the Administration building • Renovate roads within the campus • Design and build parking areas
14	Electricity Transmission	• Installation of Standby Generators at MLT1 lecture theatre • Installation of solar street lights along all Campus roads	• Replace all wooden electric posts with concrete posts
15	Internet network	• General rehabilitation and increase of Wi-Fi hotspot points • Increase internet bandwidth • Change landline phone signal transmission from analogue to digital	• Increase Wi-Fi hotspot points • Increase internet bandwidth
16	Lugala area	• Preparation of detailed land use and landscape plan, estimation of zone development cost, and proposal for a funding mechanism.	• Secure funding
17	Sino-Africa Agricultural Learning Complex	• Develop a project proposal • Prepare MoUs with possible partners	• Enter into an MoU with partners
18	Protecting campus land from encroachment	• Develop a detailed plan for land protection from encroachment	• Erect some of the proposed beacons

APPENDICES

APPENDIX 1 - SUA NEW HEET BUILDINGS

APPENDIX 2 - JUICE AND WATER PLANT

APPENDIX 3 - SURVEY OF EXISTING EMC SEWERAGE SYSTEM