

LEGACY PROJECT

**ARCHITECTURAL DESIGN COMPETITION:
STUDENTS EXPERIENCE CENTRE
AT
UNIVERSITY OF GHANA, LEGON**



The Organisation of an Architectural Design Competition for the proposed Students Experience Centre at the University of Ghana, Legon leading to the selection of a winning scheme as well as the provision of Pre-Contract and Post-Contract Multidisciplinary Consultancy Services by the winning Architectural Firm

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EXECUTIVE SUMMARY

University of Ghana, the premier University in Ghana, was founded as the University College of the Gold Coast on 11th August, 1948 for the purpose of providing and promoting University education, learning and research.

As the premier university in Ghana, the University of Ghana has distinguished itself as a beacon of excellence in higher education since its establishment.

In 2023, the University of Ghana celebrated its 75th anniversary under the theme: “Nurturing Resilience: Adopting Technology, Embracing Humanism”.

The year-long anniversary celebration was aimed at celebrating the University’s achievements and perseverance through years of unprecedented change.

The theme for the 75th anniversary -“*Nurturing Resilience: Adopting Technology, Embracing Humanism*” was born from the vision of the Vice-Chancellor, which also takes its direction from the University’s vision, and from the multiple and rapid changes occurring in Africa and our global world today, especially in higher education.

Over the past 75 years, the University has experienced steady growth evident through its increased capacity for groundbreaking research, strategic collaborations with top-tier institutions internationally, and strong linkages with industry.

With the imminent expiration of the 2014-2024 Strategic Plan, there was the need to have stakeholder engagements, revisit the strategic priorities and develop a plan that aligns with global trends, the ever-evolving landscape of higher education, complexities of the twenty-first century, industry expectations and stakeholder aspirations.

The new Strategic Plan, a comprehensive yet succinct document which was unveiled a couple of days ago, sets out the framework for the vision and priorities of the University of Ghana from 2024 to 2029. The Strategic Plan (2024-2029) is based on five (5) priority areas namely: Transformative Student Experience, Impactful Research, Commitment to Faculty and Staff, Engagement and Partnerships, and Sustainable Resource Mobilisation and Stewardship.

The proposed Student Experience Centre (SEC) at the University of Ghana which is the beginning of the implementation of priority 1 -Transformative Student Experience will serve as a cornerstone for fostering the holistic development of the students, as well as their community engagements, as the University envision the Students contribution to a socially and economically strong Ghana. By providing access to a comprehensive collection of resources, services, and opportunities, the

centre aims to create a vibrant and supportive environment that enhances the overall student experience and prepares them for successful futures.

The Centre will consolidate various support services such as academic advising, career counselling, mental health resources, etc. in the University under one roof. This centralised approach ensures that students have easy access to a comprehensive support network, promoting their overall well-being.

The presence of a bookshop, study areas, and 24/7 internet access within the centre will foster an environment conducive to learning and research. Students can access essential academic resources, engage in collaborative study sessions, and utilise modern technology to enhance their educational experience.

Leadership training often involves activities that push students out of their comfort zones, fostering confidence in their abilities to assume new responsibilities. Students who wish to assume leadership roles in student organisations, clubs, or extracurricular activities can benefit from tailored training to prepare them for these responsibilities.

Spaces like the auditorium, movie cinema hall, and mini restaurants create opportunities for students to come together for social and cultural activities. This fosters a sense of community, encourages interpersonal relationships, and contributes to positive campus culture.

An Artificial Intelligence (AI) Centre of Excellence within a Student Experience Centre will enrich students' education by providing a platform for learning, skill development, research, collaboration, and a real-world application of AI technologies. This holistic approach contributes to a well-rounded educational experience and prepares students for the evolving landscape of technology and innovation.

The Students Experience centre will also provide spaces for rental shops. This will help to nurture the entrepreneurial abilities among students leading to the creation of students own businesses, fostering innovation and real-world experience in business management. The centre will ultimately become a hub for creativity and entrepreneurship within the university campus community.

Sourcing of funds for the Students Experience Centre (SEC) is being led by Eban Capital Limited -a Financial Technology (FinTech) solution provider with expertise in Capital raising, cash management, digital banking, retail applications and social networking platforms in addition to supply smart POS, Biometric and other electronic devices.

COMPETITION PROMOTER

University of Ghana, the premier University in Ghana, was founded as the University College of the Gold Coast on 11th August, 1948 for the purpose of providing and promoting University education, learning and research.

The University aims to produce the next generation of thought leaders to drive national development. Through its research institutes and other centres of learning and research, faculty members are involved in studies that support policy making for national development, often in collaboration with other international institutions.

There are currently a number of Ghanaian and International institutions that hold affiliation with the University of Ghana. As a leader in tertiary education, the University has established several link agreements with universities in Africa, Europe and North America for student, faculty and staff exchange as well as collaborative research.

The student population is approximately 61,000 made up of students enrolled on regular, sandwich and weekend programme as well as distance education and including but not limited to students from affiliate institutions. The University has experienced a steady growth in number of international students who come from over 70 countries to join either the regular undergraduate and graduate programmes or enrol on the study abroad and other special programmes designed for international students.

The University of Ghana has five (5) main campuses: Legon Campus, Korle-Bu Campus, Accra City Campus, Kumasi City Campus and Takoradi City Campus:

Legon Campus: This is the main campus of the University's teaching and research are carried out. It also houses the central administration of the University. The Legon campus lies about 13 kilometres north-east of Accra, the capital of Ghana, at an altitude of between 300 and 400 feet. From the Main University Gate on the National Highway 4 (N4), the University Avenue extends to Commonwealth hall on Legon Hill.

Halls of residence, departments, lecture theatres and laboratories are grouped along the Main Avenue. Mid-way is open space -the University Square -with an ornamental fountain overlooking the balm Library (named after David Mowbray Balme, the first Principal of the University College). Across from the University Square are sports fields, and halls of residence.

Behind Commonwealth Hall is an open-air theatre with a Grecian style auditorium built into the slope of Legon Hill. On the summit of Legon Hill is the Convocation Group of Buildings which houses the University's central administration offices, the Great Hall, with a seating capacity of 1,500 and a tower donated by the Government of Ghana in 1957 to commemorate Ghana's Independence. On the southern side of the campus are residential accommodation for staff, the University basic School, a Banking Square, the Noguchi Memorial Institute for Medical Research, School of Public Health, Sports Stadium, Student residences and the University of Ghana medical Centre. On the Northern side are teaching departments, lecture theatres and laboratories. Across the N4 road from the Main University gate is a Police Station, and behind it is a University Hospital and houses for junior and senior staff.

Korle-Bu Campus: The Korle-Bu Campus houses the administration of the College of Health Sciences, which is headed by a Provost. Some of the constituent schools are also located on the Korle-Bu Campus; University of Ghana Medical School, University of Ghana Dental School and the School of Biomedical and Allied Health Sciences.

Accra City Campus: Strategically located in the central business district of Accra, the Accra City Campus is a non-residential campus. It acquired its name in February 2014 following the restructuring of the former External Degree Centre of the University which operated at the Accra Workers' College. This Campus also serves as a learning centre for the Distance Education Students.

Kumasi City Campus: The Kumasi City Campus is housed at the erstwhile Kumasi Workers' College, established in 1962. It is located behind Kumasi Technical Institute and WAEC offices. The Worker's College used to provide further education to workers and serves as a learning centre for Distance Education Students. Aside the Distance Education programmes, arrangements were made and the running of regular programmes at the Kumasi City Campus started from the 2021/2022 academic year.

Takoradi City Campus: The Takoradi City Campus is located at former Takoradi Workers' College, established in 1962 at Chapel Hill in Takoradi, near the Ghana Ports and Harbours Authority (GPHA) Hospital. It was the regional of the then Institute for Public Education, and currently serves as a learning centre for the Distance Education programmes. From 2021/2022 academic year, the Takoradi City Campus started the running of regular programmes.

In addition, the University has several research institutions and centres for learning and research, including Noguchi Memorial Institute for Medical Research (NMIMR), <http://www.noguchimedres.org/> Centre for Tropical, Clinical Pharmacology and Therapeutics, Regional Institute for Population Studies <http://www.rips-ug.edu.gh/> Institute for Environmental and Sanitation Studies <http://iess.ug.edu.gh/> and the Institute for Statistical, Social and Economic Research <http://www.isser.edu.gh/>

As a University poised to be more impactful in the years ahead, the University of Ghana strives to exceed the expectation of its mandate to remain relevant to national and global development through cutting edge research, high quality teaching and learning, and community engagement. In furtherance of this, the University has recently launched a 5-Year Strategic Plan (2024-2029) which identifies five (5) strategic priorities which capture the university's deep sense of purpose, shared vision, and commitment:

- Priority 1: Transformative Student Experience
- Priority 2: Impactful Research
- Priority 3: Commitment to our Faculty and Staff
- Priority 4: Engagement and Partnerships
- Priority 5: Sustainable Resource Mobilisation and Stewardship

THE PROJECT BRIEF

To be developed on a 5-acre land as an Eco-Community with Net-Zero energy, the Student Experience programme at University of Ghana, Legon -a **24,545 SQM** facility and a budget Eighty Million US dollars (**USD80,000,000.00**) inclusive of Furniture, Furnishing and Equipment (FFE) but exclusive of professional fees and taxes will serve as a cornerstone for fostering the holistic development of the students of University of Ghana as well as their community engagements, as we envision their contribution to a socially and economically strong Ghana. By providing access to a comprehensive collection of resources, services, and opportunities, the programme aims to create a vibrant and supportive environment that enhances the overall student experience and prepares them for successful futures.

The range of services and facilities that the Student Experience Centre (SEC) will provide to enhance the overall student experience with facilities for Leadership and Entrepreneurship development, Alumni engagement and networking, event, conference/convention, artificial intelligence and technology, career development, administrative and student offices, student leadership/union facilities, food/beverage, study rooms/social spaces, entertainment/recreation, technology and connectivity, outdoor seating/landscape areas.

Access to the facility will be off the Academic Freedom road. **The existing 1200 parking spaces at the University sports stadium in addition to other parking spaces to be developed in the near future within the vicinity of the proposed Students Experience Centre location will augment the parking needs of the entire SEC facility. In this regard, competitors are required to creatively provide not less than 200 parking spaces to serve the VIP and VVIP needs of the Students Experience centre (SEC).**

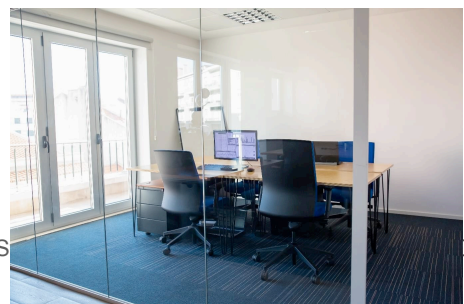
The under-listed captures the detailed breakdown :

1. OFFICE OF THE DEAN OF STUDENT AFFAIRS: 180 SQM

This will be the heartbeat of student support services. The Dean's office will continue to provide guidance on student life, extracurricular activities, and addresses concerns related to student welfare and campus life from a space integrated with core student activities.

Spaces will be required for the under-listed:

- i. Dean's Office
- ii. Vice Dean's Office
- iii. Conference Room (20 Seats)
- iv. Admin. Officer's office
- v. General office with 5 work stations
- vi. Kitchenette/Eaten Area
- vii. Sanitary Accommodation



2 ACADEMIC AFFAIRS DIRECTORATE OFFICE: 200 SQM.

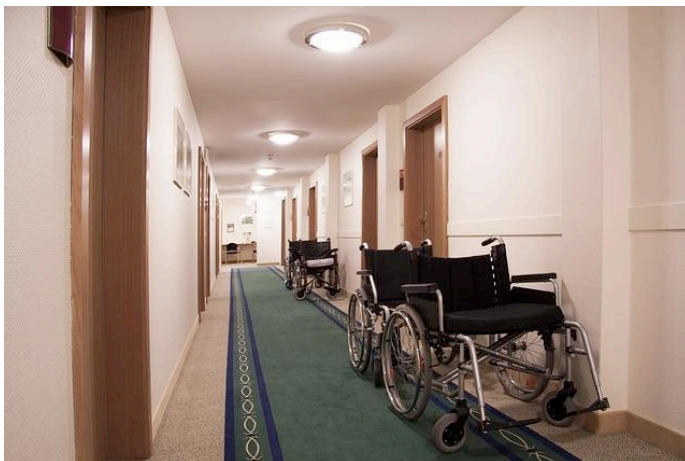
Recognising the importance of academic success for our students, the Academic Affairs Directorate will offer a satellite office for academic advising, support services, and resources to ensure this. The satellite office will have space for the under-lister:

- i. client service points for the four (4) colleges and the School of Graduate Studies
- ii. Conducive waiting area
- iii. Onsite payment for services
- iv. smart areas equipped with devices for self-service computerised applications



3. OFFICE OF STUDENTS WITH SPECIAL NEEDS: 100 SQM

There are about 300 registered students with various needs including hearing impaired, visually impaired and physically challenged students. Dedicated to inclusivity, this office will provide custom-made support services, and resources for these students with special, ensuring an accessible and enriching academic experience. The spaces to be provided will include Enclosed office, reception, waiting/lounge, Braille Study room and Examination Laboratory



4. OFFICE OF STUDENT FINANCIAL AID: 150 SQM

Navigating financial matters is facilitated through the Student Financial Aid Office. Here, students can explore scholarship opportunities, financial assistance programmes, and receive guidance on managing their educational expenses. The spatial need will comprise of the under-listed:

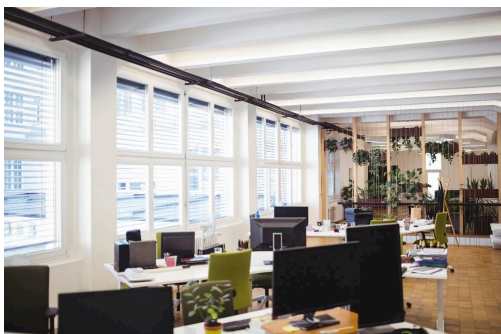
- i. 10 No. Private rooms for one-one-one interaction with needy students
- ii. Space for general administration and fundraising (Staff strength of 10)
- iii. Common spaces for IT support services



5. OFFICES OF STUDENTS' REPRESENTATIVE COUNCIL AND GRADUATE STUDENT ASSOCIATION : 500 SQM

The Students Experience Centre (SEC) will provide offices for students associations where they can work to advocate for student interests, organise events, and facilitate communication between students and university administration. Facilities will include but not limited the under-listed:

- i. Open Plan Office for SRC Executives plus Meeting Room
- ii. Open Plan Office for GRASAG Executives plus Meeting Room
- iii. Recreational Facilities
- iv. Food Courts
- v. Relaxation Areas
- vi. Reading Rooms



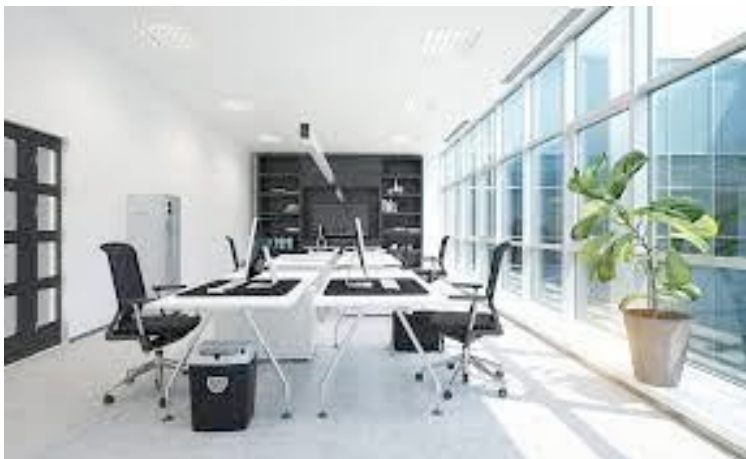
6. CAREERS AND COUNSELLING SUPPORT OFFICE: 100SQM.

The SEC will house the Careers and Counselling Centre of the University to provide guidance on career related issues and counselling services to students to ensure their mental and emotional well-being.



7. INNOVATION, INCUBATION AND CO-WORKING SPACES FOR STUDENT ENTREPRENEURS: 500 SQM

This space will enable a fostering of the student's entrepreneurial spirit where students can collaborate on design projects, access resources, and bring their ideas to life in dedicated co-working spaces.



8. LEADERSHIP TRAINING OFFICE: 400 SQM.

This office will provide resources and specialised training programmes where students can enhance their leadership skills. The Leadership Training Office will empower students to become effective leaders and contributors to their communities. This will also establish a dynamic space for student leaders from second-cycle institutions around the University of Ghana, focusing on honing leadership skills, fostering collaboration, and inspiring future leaders.



9. OFFICE OF STUDENT UNIONS: 600 SQM.

The SEC will host offices for Socio-Religious groups (PENSA, GHAMSU, LPU, VORSA, NUPSG, BASU, ETC.) on campus, fostering cultural diversity and community exchange. These spaces will provide a welcoming environment for students to explore faiths and cultures, engage in discussions, and organise events, contributing to campus life at the University of Ghana. These offices (about 10) should be big enough to cater for the meeting needs of the executives of these student unions.



10. STUDENT HOTSPOT COMFORT ZONES: 300 SQM

Here, students can relax and connect in specially designed Wifi accessible comfort zones equipped with charging stations, and comfortable seating, creating ideal spots for studying and specialising.

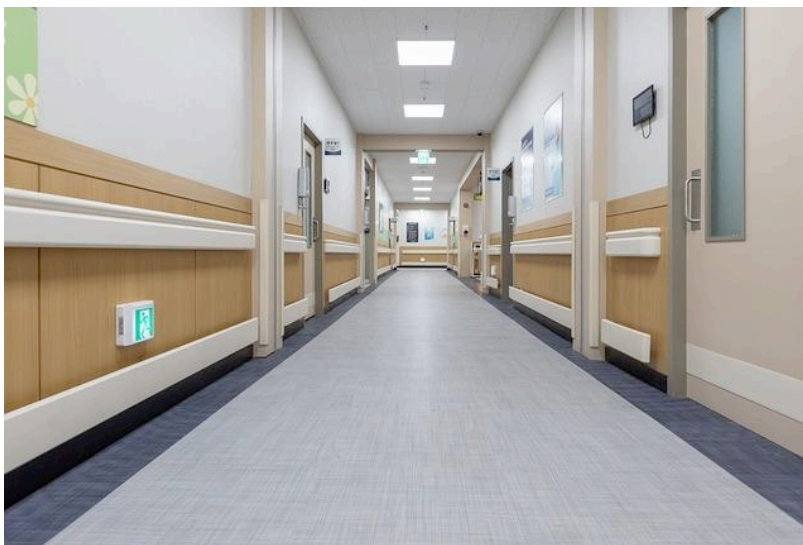


11. UNIVERSITY HEALTH SERVICES -STUDENT CLINIC: 600 SQM

Prioritise your well-being with easy access for medical services at the Student Clinic. Stay healthy and focus on your studies with the support of our dedicated healthcare professionals. The Student Clinic will have under-listed facilities:

- i. 4No. Consulting Rooms
- ii. Laboratory with waiting area big enough to hold 25 bleeding areas, 4 No. cubicles, storage space and analysis room
- iii. 1No large area to hold analysers, computers, microscopes, small cubicles to serve as office
- iv. X-Ray lab: One (1) X-ray laboratory (per regulatory specification), an outer cubicle for staff with a counter to hold 2 computers and 2 changing rooms for patients
- v. Recovery wards
- vi. Detaining/Admission wards (Male and Female) unto 20 beds with sanitary accommodation
- vii. 4 Bed Isolation wards (Male and Female) plus sanity accommodation.
- viii. Library
- ix. Pharmacy made up of dispensing area, storage, waiting area, counselling booth and an office for the Chief Pharmacy
- x. 2 No. offices for Managers (Doctor and Nurse)
- xi. Staff changing rooms (Male and Female) with sanitary accommodation
- xii. A cafeteria with kitchenette and lounge for staff

- xiii. Sanitary Accommodation (Male and Female) at least 5 cubicles each with separate sanitary accommodation for the persons with disability
- xiv. A Conference Room
- xv. Sluice room
- xvi. Injection and procedures room
- xvii. Treatment room
- xviii. Nurse's Station plus 3 cubicles for vitals
- xix. Reception Area
- xx. Cashiers office
- xxi. Triage area with 3 Beds
- xxii. Eye Screening Room
- xxiii. Examination room for sick students detained



12. STUDENT EXCHANGE PROGRAMME OFFICE: 150 SQM.

Our Student Exchange programme office will offer a global learning adventure, allowing students to collaborate with external partners, participate in international programmes, and explore diverse cultures.



13. EATERIES, BOOKSHOP, AND COMMERCIAL FACILITIES: 850 SQM.

The SEC will provide diverse dining, shopping, and commercial services, including rental spaces for student-own businesses and a Book Shop, to promote entrepreneurship and provide educational opportunities.



14. CONVENTION CENTRE: 14,000 SQM.

The SEC will provide spaces to host a diversity of events, including workshops, conferences, lectures, and performances in state-of-the-art convention halls, cinema halls and meeting rooms, that will foster collaboration and knowledge and cultural exchanges. This will include a 3000 seats capacity auditorium with raked seating and an additional 2000 seat capacity hall with collapsable partition into either 2 No. 1000 seats each or 4 No. 500 seats each. Other meeting rooms for 10 persons, 20 persons, 50 persons, 100 persons, and 200 persons.



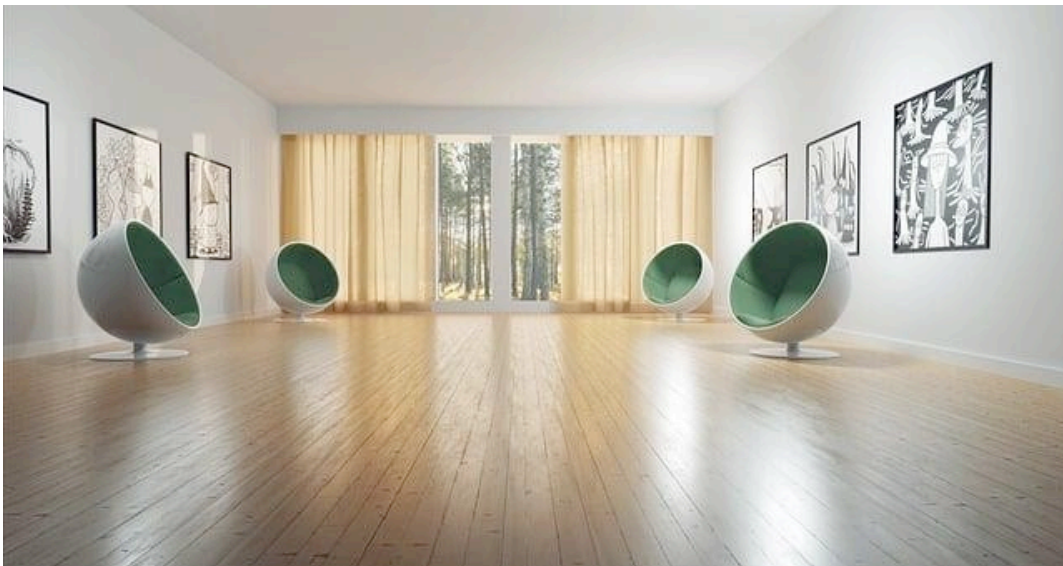
15 WASHROOMS

Clean and well-maintained washroom facilities will be conveniently located throughout the centre for comfort and convenience.



16 OFFICE OF ALUMNI ENGAGEMENT: 65 SQM.

The office of Alumni Engagement at the SEC will support alumni relationships, networking, mentorship, and collaboration, ensuring a strong connection with the University, and transforming academic experiences into lifelong opportunities and shared achievements.



17. FITNESS CENTRE: 500 SQM.

A state-of-the-art fitness facility equipped with modern exercise equipment to promote a health and active lifestyle among students.



18. SERENE OUTDOOR ENVIRONMENT

The centre will offer students serene, green outdoor spaces for relaxation and connection with nature, with shaded garden seating, vibrant gardens, and well-maintained pathways for focused study sessions and leisure breaks.



19. **ARTIFICIAL INTELLIGENCE (AI) AND DIGITAL SKILLS DEVELOPMENT HUB: 5000 SQM**
The Students Experience Centre (SEC) will incorporate facilities for computing for all categories of students including about 20 offices for facilitators and administrative staff, training facilities for both undergraduate and postgraduate in computing Artificial Intelligence (AI), in order to cater for their distinct needs while providing shared resources that foster a seamless transition from undergraduate to postgraduate studies. The facilities shall include:



- a. ***Advanced Computer Laboratories***
Undergraduate Laboratories: Equipped with standard workstations for programming, software development, and general computing courses.
Postgraduate Laboratories: Four (4) Laboratories for
- (i) Artificial Intelligence, Data Science and Machine Learning Laboratory
 - (ii) Software Engineering and Cyber Security Laboratory
 - (iii) Networking and Wireless Sensor Laboratory
 - (iv) Human-Computer interactions and Robotics Laboratories
- These laboratories will use high-performance computing facilities with advanced software, GPU clusters, and specialised tools for research and development.
- b. ***Research and Development Centres***
Undergraduate Research Areas: Spaces that encourage undergraduates to participate in research projects, with access to mentors and basic research tools.
Postgraduate Research Areas: Dedicated research centres focused on specific fields and equipped with cutting-edge technology and resources. The Postgraduate research areas will include fifty (50) syndicate rooms for use by PhD students, other postgraduate research students and visiting scholars.

- c. *Innovation and Maker Spaces*
Maker Laboratory: Shared spaces with 3D printers, electronic workbenches, IoT devices, and robotics kits. This encourage hands-on learning and prototyping for both levels.
Hackathon Spaces: Flexible areas for coding marathons, open to both undergraduates and postgraduates, promoting collaborative problem-solving and innovation.
- d. *Collaboration and Meeting Spaces*
Group Study Rooms: Rooms for group work, brainstorming sessions, and collaborative projects, equipped with whiteboards and AV equipment.
Graduate Collaboration Rooms: More advanced spaces for postgraduates with video conferencing tools for remote collaboration with industry and academic partners.
- e. *Classrooms and Lecture Theatres*
Smart 200-250 Capacity Classrooms: Equipped with interactive boards, high speed internet, and video recording equipment for both undergraduate and postgraduate courses.
Advanced Lecture Halls: Larger spaces with state-of-the-art presentation tools for guest lectures, seminars, and postgraduate classes.
- f. *Library and Resource Centres*
Digital Libraries: Access to a wide range of digital resources, including eBooks, journals, databases, and software documentation, available for both undergraduate and postgraduate students.
Research Resource Centre: A dedicated space for postgraduate students to access advanced research materials, specialised databases, and technical reports.
- g. *Career and Professional Development Services*
Undergraduate Career Centre: Focused on internship placements, resume workshops, and interview preparation.
Postgraduate Professional Development: Services including career counselling, networking events, and connections with industry professionals for research collaborations and job placements.
- h. *Social and Recreational Areas*
Student Lounge: A shared space for undergraduate and postgraduates to relax, socialise, and network.

Graduate Common Room: A quiet space for postgraduates, conducive to discussion, informal meetings, and study.

Gym: Light-equipped gym to promote wellbeing and healthy lifestyle among academics.

i. *Tech Support and Help Desks*

IT Help Desk: Accessible to both undergraduates and postgraduates for technical support, software installations, and troubleshooting.

Research Support Desk: Specialised support for postgraduate students working on research projects, including help with data analysis tools, research projects, including help with data analysis tools, research software, and methodologies.

j. *Entrepreneurship and Startup Incubators*

Startup Hub: A space where both undergraduate and postgraduate students can work on entrepreneurial ventures, with access to mentorship, funding resource, and business development tools.

Postgraduate Research Commercialisation: Support for turning research projects into commercial products or startups, including patenting and licensing assistance.

k. *Teaching and Research Assistant Offices (20 Enclosed Offices, 8 No. Open Plan for 10 persons each):*

Teaching Assistant Offices: Shared offices for teaching assistants, typically postgraduates who support undergraduate teaching.

Research Assistant Offices: Dedicated spaces for postgraduate research assistants to work on projects, typically alongside faculty members.

l. *Data Centres and Cloud Access*

On-Campus Data Centres: For hands-on learning about network management, cloud computing, and big data analytics, accessible to both undergraduates and postgraduates.

Cloud Computing Access: Resources for students to use cloud platforms for assignments, projects, and research, with more advanced features available for postgraduates.

20 GAMES ROOM: 200 SQM

The Game Room at the SEC will offer a leisure space for students to unwind and recharge. With a variety of games, it will provide a socialising hub, fostering connections and promoting a healthy balance between work and play, enhancing the overall student experience.



21. EMERGENCY EXISTS AND ASSEMBLY POINTS

The SEC will have designated Emergency Assembly Points with trained personnel and regular drills to ensure a coordinated response and safe space for evacuees.



22. SECURITY SYSTEM: 50 SQM

A 24 hour security and CCTV cameras to be incorporated so that students can focus on their academic, social and personal pursuits without concerns for safety.



23. A NET ZERO COMMUNITY

The centre will be designed as a Net Zero Community. Other consideration shall include but not limited to, Renewable Energy Generation and use, Indoor Environment Quality, Waste management, Heat Island Reduction, Ecological Enhancement, Storm Water Management, Materials, Water, etc.

The Students Experience Centre as both a learning material and a Net Zero development not only help to reduce University of Ghana's carbon footprint, but it also serves a model for environmentally conscious living, instilling a sense of responsibility and awareness among the student body.



24. THE LOGO: 100 SQM

The 3-dimensional 75th Anniversary Logo including the base and measuring (Length:1830mm, Width: 584.2mm, and Height: 1830mm) must creatively find a place in the Students Experience Centre (SEC)



26 EXPECTATIONS

The Student Experience Centre (SEC) is expected to train over 60,000 students and attract between 600,000 and 800,000 visitors annually.

COMPETITION STAGES

This is a One Stage Architectural Design Competition open to twelve (12) short-listed Architectural Firms through Expression of Interest.

COMPETITION ELIGIBILITY, REGISTRATION/SUBMISSION

This is an Architectural Design Competition which was opened to Architectural Firms practicing in Ghana through an Expression of Interest. Out of the 18 Architectural Firms that expressed Interest 13 qualified and were shortlisted for the next stage. Two firms merged after the short-listing. Hence there are 12 competitors qualified to partake in the Student Experience Centre (SEC) Architectural Design Competition

No member or employees of the promoting body, the Jury, or any one associated or close associates or employees of them shall be eligible to compete or assist a competitor.

Only Architectural Firms who have gone through the Expression of Interest process and have been short-listed will be sent a registration link. Having completed the registration using the link to be provided, a Unique Registration Number (URN) will be generated automatically.

Competitors may only submit an entry to the competition if they are officially registered through the GIA Competition link and are in possession of a Unique Registration Number (URN).

PROGRAMME

S/No.	Date	Activity	Deadline
1	24.07.2024	Competition Launch/Site Visit at University of Ghana, Legon	10:00am
2	24.07.2024	Queries from Competitors	
3	30.07.2024	End of Queries from Competitors	4:00pm
4	08.08.2024	Response to Queries	2:00pm
5	04.10.2024	Receipt of Entries	4:00pm
6	08.10.2024	Commencement of Jury of Entries	8:30am
7	11.10.2024	End of Jury of Entries	12:30pm
8	15.10.2024	Identification of Entries/Announcement of Winning Schemes	10:00am
9	31.10.2024	Submission of Final Report to Client	4:00pm

SITE LOCATION/TOPOGRAPHICAL INFORMATION AND GEOTECHNICAL SURVEY

The site located within the boundaries of University of Ghana, Legon for the Student Experience Centre (Legacy Project) is 5.0 Acres. It is located along the Main Accra-Madina Road (Refer to the attached Site Plan). Both the topographical information (in dwg format) and Geotechnical Survey Report are attached.

SITE PHOTOGRAPHS

Competitors are encouraged to take their own site photographs. However, an aerial video is attached.

SUBMISSION REQUIREMENT

1. Competitors are expected to use 6No. A1 sheet Size (594mm x 841mm) for the entire scheme.
2. All 6No. A1 Sheet size 594mm x 841mm must be landscape-oriented
3. Competitors are required to upload all in Portable Digital Format (PDF) using the competition link to be provided.
4. One of the A1 Sheet shall have a 3-Dimensional exterior view of the Building(s). This sheet shall be termed HERO Sheet and use for publicity.
5. The remaining three (5) No. A1 sheet size 594mm x 841mm shall be used for all sketches, renderings, plans, sections, elevations, diagrams, and/or other presentation tools to explain their proposal.
6. Competitors are required to submit a Design Report.
7. Competitors are expected to use up to a maximum of 64 sheets (leaves) of A4 Sheet size for the Design Report
8. Competitors are free to choose appropriate scale for the drawings.
9. Competitors may add a Video of the scheme

SUBMISSION METHOD

Submission should be uploaded on to the GIA Competition digital system before 4:00pm GMT on Friday 4th October, 2024. Further details and a unique secure link will be issued to all competitors for registration and receipt of the Unique Registration Number (URN).

Late entries shall not be accepted and the digital entry system will not permit uploads after 4:00pm GMT deadline on Friday 4th October, 2024. The digital entry system will allow competitors to amend or delete the information they upload until the stipulated deadline (date and time). Competitors are strongly advised to familiarise themselves with the system and to allow adequate time for the submission material to successfully upload.

All entries must be submitted in English.

EVALUATION CRITERIA

The evaluation will be based upon the following criteria:

ITEM	EVALUATION CRITERIA	MAXIMUM SCORE
1	OVERALL PRESENTATION (5 Marks) a. Clarity of Presentation b. Response to the Client Brief c. Meeting the Requirement set out in the Competition Dossier	2 2 1
2	ARCHITECTURAL DESIGN (40 Marks) a. Design Philosophy b. Design Ingenuity c. Architectural Identity d. Site Responsiveness e. Passive Design Strategies f. Space/Design Efficiency g. Design Report h. Massing	6 5 6 4 5 4 6 4
3	COST PLAN (10 Marks) Elemental Cost of the Building(s) Estimated Project Cost Reasonableness of Cost	3 5 2
4	SUSTAINABILITY CHECK LIST (20 Marks) Site Sensitivity (Ecological Enhancement) Heat Island Reduction Stormwater runoff reduction Waste Management Energy Efficiency Provisions to achieve Net Zero Material Use Indoor Environment Quality	3 2 3 3 5 2 2
5	Civil/Structural Engineering Considerations (10 Marks)	10
6	MEP and Fire Considerations (10 Marks)	10
7	Considerations for Persons with Disability (5 Marks)	5
	TOTAL	100

CLIENT ADVISOR



Arc. Foster Osae-Akonnor, AGIA, RIBA

Arc. Foster Osae-Akonnor is a registered Architect and a member of Ghana Institute of Architects since 1999. He was also admitted by Royal institute of British Architects as a Chartered Architect in 2003.

He is the Principle Architect of Arthro Synergeio -an architecture firm in Ghana. His profound experience spans from working locally and internationally over the years.

Form, functionality, green buildings, sustainability and detailing are his hallmark. His built and unbuilt projects include but not limited to Master Plan for Eco-Communities, Educational, Civic, Cultural, Industrial, Healthcare, Hospitality, Commercial, Office, Recreational, and Residential.

Foster has in-depth knowledge in green buildings and has been championing sustainability of the built environment in Ghana for over a decade. As a green building consultant/advocate, Foster has been instrumental in affecting government policies. Some of his contributions in the Green Building/Sustainable Development space include but not limited to -the preparation and launch of an Eco-Community national framework incorporated in the 2015 Ghana National Housing Policy, the Certification of One Airport Square in 2015 as the first green building in Ghana and for that matter in West Africa, served as a virtual Judge for the Climate CoLab of the Massachusetts Institute of Technology (MIT) which provided a virtual platform on Negawatt Challenge -a World Bank programme involving Brazil, Ghana, Kenya and Tanzania that aimed at empowering tech and IT communities to be creative and innovate around urban resource efficiency issues. He also served on the Ghana Standards Authority's Technical Committee for the development of the Ghana Building Code.

He is the lead founder of Ghana Green Building Council and the President of Ghana Institute of Architects.

COMPETITION REPORT COORDINATOR



Arc. Fiifi Yasebi Sam-Awortwi, AGIA

Arc. Fiifi Yasebi Sam-Awortwi is a certified architect of the Ghana Institute of Architects (GIA) with 15 years working experience. He has previously serve 2 terms on the GIA Council from 2014-2016 and from 2016-2018 as a Member for International Relations.

Whiles on the council, he advocated for greater inclusion in running the affairs of the Institute through the set up of the work streams or working committees, which tasked member to contribute to the Institute in one way or the other. Fiifi is currently the Honorary Secretary of Ghana Institute of Architects. He also serves as the Physical facilities inspector of the Ghana Tertiary Education Commission.

Fiifi was the Deputy Project Manager and member of the architectural team for Ghana's first Infectious Disease Centra which was a private sector-led initiative that saw the design and construction of 100 bed-hospital in a record time of 3 months. The lessons learnt on this project are invaluable and is an example of what a people can achieve with good planning and determination.

Aside regular residential, industrial and commercial commissions, notable schemes executed by his team are in the health sector (Sanford World Clinics, Solar Medical Centre), and Fuel Retail Sector. Concept designs and planning schemes for launching of the Wakanda City of Return by the African Diaspora Development Institute (ADDI) was executed by his team.

THE JURY PANEL

The Jury will be Chaired by Akosua Adomako Ampofo -a Professor of African and Gender Studies at the Institute of African Studies, University of Ghana, Legon



Arc. Ralph Sutherland, FGIA

Arc. Ralph Sutherland is a Fellow of Ghana Institute of Architects also a Project Development Consultant with over forty (40) years of professional experience in architecture and related disciplines is a Principal Partner of the architectural firm Sutherland and Sutherland which has been in practice in Ghana since 1996. At Sutherland and Sutherland, Ralph is responsible for Architecture Design and Landscaping, assist client in definition of project briefs and accommodation requirements, Conceptual development of designs, Planning and <Master Plans of large schemes. He also leads the project teams for post-contract phase of projects.

Prior to the establishment of Sutherland and Sutherland, Ralph held the position of Architect/General Manager with African Concrete Products Estates Limited, Accra from 1988 to 2000 during which his responsibilities included but not limited to Overseeing Construction, Marketing, Sales, Procurement and Negotiations.

In 2011, Arc. Ralph Sutherland lead the design team team for the Design of the Ashesi University College Campus on a 100 acre green filed site with Academic and administrative buildings including a Research and Learning Centre, The garage, Sports Centre, Students Centre, Hostels, Guest Facilities to mention but a few.

In 2020, he served as the Team Lead and Design Architect for the Accra Psychiatric Hospital. The project entailed the construction of OPD Block, Assessment and Day Care Block, Acute Treatment bed Block, Kitchen and Laundry Block, Maintenance Block, Mortuary Block, Staff Housing with accompanying infrastructure and Landscaping works on a 14.658 acre land.

Other projects include the Ghana Missions in Namibia and Equatorial Guinea, Advantage Place - 14 storey office complex plus basement and 5 level multi-storey parking structure, William Heights at Airport Residential Area, Data Bank Head Office, Barnes Road, Adabraka, Accra, etc.



Arc. Prof. Samuel Owusu Afram, FGIA

Arc. Prof. Samuel Owusu Afram is a full professor of Architecture and a former Head of Department of Architecture and former Vice Dean of the Faculty of Built Environment in the Kwame Nkrumah University of Science and Technology (KNUST), Kumasi.

Professor Afram holds BSc. and Post-graduate Diploma Degrees in Architecture from KNUST, obtained in 1981 and 1984, respectively. He was awarded the much-coveted Frank Lloyd Wright Prize for the Best Design Thesis in Architecture in the latter. He also undertook a Master's degree in Housing at the University of Newcastle Upon Tyne in the United Kingdom in 1994. He has taught for over 37 years in Construction Technology, Architectural Design and Housing as well as supervising numerous theses works of students. He has also written several academic research papers for local and international journals of repute. He also served on several Ad hoc and Statutory Committees and Boards, both outside and inside the University. He received the "Best Lecturer Award" in the Department in the Department of Architecture in the College of Architecture and Planning, KNUST for the 2018/2019 Academic Year. He is presently working on contract with KNUST.

On the national level, he is a member of the Management Board of the Building and Road Research Institute (BRRI) of the Council for Scientific and Industrial Research (CSIR). He is also the Chairman of the Ashanti Region Basketball Association, Chairman of the Infrastructure Committee, Board member of the Ghana Amateur Basketball Association (GABBA) and Chairman of the Board of Governors of Ridge School in Kumasi.

On the international level, Professor Afram is a member of the Executive Committee for Validation of Commonwealth Association of Architects (CAA) programme and schools. He is also a Chartered Member of the Chartered Institute of Housing (CHICM) in the United Kingdom.

On the professional level, he is a Fellow and past Vice President of the Ghana Institute of Architects (GIA) and runs a registered architectural practice in Ghana, working on several projects which includes residential, educational, commercial/office buildings as well as shopping complexes, the renovation of the Kumasi Cultural Centre, Ghana @ 50 Jubilee Parks, etc.

He is married with a son, and he is a jazz music and an ardent sport enthusiast.



Arc. William Nii Teiko Evans-Anfom, FGIA, PPGIA

Arc. William Nii Teiko Evans-Anfom is both a practicing architect and an academic. His teaching experience encompasses 3 years as a full-time lecturer at Kwame Nkrumah University of Science and Technology, Kumasi and another 9 years as a part-time lecturer; helping in the development and training of students of architecture and young architects. Recently he was responsible for establishing and teaching a Design course at Ashesi University for 4 years and he still maintains strong links with both institutions and Central University; frequently serving on juries for their Post graduate Design Thesis Examinations.

He has been in private practice since 1986 and is the Principal of Evans-Anfom and Associates, a multidisciplinary consulting firm which has successfully completed projects in Ghana, Togo and Benin. Some of their clients include SOS Kinderdorf International, Ghana Cocoa Board, Tractor and Equipment (now Mantra), SG-SSB Bank, Ghana Education Trust Fund, Golden Exotics Limited, Ghana Health Services, Ministry of Food and Agriculture, Ministry of youth and Sports as well as the Millennium Development Authority (MIDA).

A keen interest in Landscape and the built environment has resulted in membership of the International Association for Impact Assessment (IAIA) Ghana Chapter and being one of the founders and Board Member of Ghana Green Building Council. He is also a member of the Commonwealth Association of Architects validation Panel for Schools of Architecture and has been a nominator for the Aga Khan Award for architecture.

He has served as a juror/adjudicator for architectural designs competition in Ghana, Kenya and Uganda and attended many conferences and workshops both locally and internationally including Congresses of the Commonwealth Association of Architects (CAA), International Union of Architects (UIA), and the Africa Union of Architects (AUA).

Arc. Evans-Anfom is a Fellow and Past President of the Ghana Institute of Architects, and a Council Member of the Africa Union of Architects in 2005 where he served as a Chairman of its Development Commission for 4 years and then the AUA Vice-President for the West Africa Region. He is also an examiner of the Ghana Institute of Architects Professional Practice Examination. He

has also being a member of the governing Board of Architects Registration Council of Ghana (ARC). He also serves on the Board of Opportunities Industrialisation Centre Ghana (OICG).

A keen sportsman since his student days he has represented the nation at both cricket and volleyball.



Ing. Joshua Nii Moilai Allotey, SPE, M-GhIE, M,ASCE

Ing. Joshua Nii Moilai Allotey is the principal consultant of JUKEES Consultancy and Services. He acquired his MSC. in Civil Engineering in 1997 at the Bauhaus University in Germany, and specialised in Structural/Bridge Engineering and Project/Construction Management. He was appointed a Teaching Assistant from his 3rd Semester at the Bauhaus University, Germany, in the field of Structural Mechanics until he completed his Master's degree.

Ing. Allotey worked as an Engineer on numerous Bridge projects in Germany until 2003. Some of the projects he worked on include the (91m, 3 span, post-tensioned concrete) Millionen Bruecke in Eberswalde', and the concrete arch 'Camsdorfer Bruecke' in Jen, all in Germany. In Ghana, Ing. Allotey contributed immensely to the design of the Achimota-Ofankor overhead bridge, with the Y-shaped piers, and the design and construction supervision of over 50 small scale and long span bridges all over Ghana. He completed the total structural and civil designs of the 100 acre (one hundred (100) tonnes capacity) warehouse complex at Apowa. Ing. Allotey also did the structural and civil designs for the 45 acre Royal Senchi Hotel. He has conducted Structural Integrity Assessment on at least 50 buildings and Civil Engineering structures, and conducted over 40 peer review on structural designs in the last 6 years.

He was a member of the committee that investigated the Melcom disaster, and has headed several committees that investigated over 5 buildings collapses in Ghana and Nigeria. He once worked as an adjunct lecturer at the Central University College at Miotso, near Prampram.



Ing. Joseph Hagyinte Seripenah

Ing. Joseph H. Seripenah is a highly skilled Electrical Engineer with a proven track record in electricity management and energy efficiency. He was trained at the St. Petersburg State Technical University, St. Petersburg, Russia and Kwame Nkrumah University of Science and Technology (KNUST) as well as the Paris Graduate School of Management, Paris in France, with humble beginnings from St. Charles Secondary School and random Secondary School.

He obtained his Master of Science Degree in Renewable Energy Technology [MSc.(RET)] from the Kwame Nkrumah University of Science and Technology (KNUST) in 2015 and a Master of Business Administration (MBA) in Strategic and Project Management the Paris Graduate School of Management, Paris in France in 2007, having graduated earlier from the St. Petersburg State Technical University, St. Petersburg, Russia with the Master of Science Degree in Electrical Power Engineering with Honours -MSc. (Hons.) Eng. in 1994 and a Bachelor of Science Degree in Electrical Engineering -BSc. (Eng.) in 1992 from the same University.

He is skilled in designing and implementing electrical systems, conducting energy audits, and optimising power usage in commercial and industrial applications. He also has strong background in renewable energy technologies and sustainability practices, project management and team leadership.

Ing. Joseph H. Seripenah is a Chartered Engineer, registered by the Engineering Council UK in March, 2006 with Registration Number **469357**. He is also a Member of the Institution of Engineering and Technology (IET), London, UK with Membership Number **30061367**. He is also a Senior Professional Engineer of the Ghana Institution of Engineering (MGhIE). He has over 20 years of post-qualification experience in engineering consulting, construction and management in Ghana.

Ing. Seripenah recently retired as the General Manager, Engineering of the Ghana Ports and Harbours Authority (GPHA), where his principal role was to provide overall coordination and supervision of Engineering and Maintenance activities in the Civil, Electrical, Mechanical and Marine Engineering areas as well as the Hydrographic Surveying Department of the Ports of Tema and Takoradi.

Prior to joining GPHA in 2003, Ing. Joseph Seripenah worked with Ergs Consortium as an Electrical Engineering Consultant in the Building and Power sector. He was the consultant in charge of the rural electrification project of the entire Brong Ahafo Region from 1996 to 2001. This was after his National Service with the Electricity Company of Ghana Limited from 1994 to 1995.

He is focused, enthusiastic, and a confident individual with excellent communication and interpersonal skills. Committed to delivering innovative solutions that maximises efficiency and sustainability.

A multilingual person with high leadership qualities, he believes in continuous learning to keep up with the rapidly changing technology to help contribute towards the achievement of organisational goals.



Suivr. Prof Gabriel Nani, FGhIS, MRICS, AAQS, MGIOC, ACIPS, MGIPS

Suivr. Prof. Gabriel Nana is an Associate Professor in the Department of Construction Technology and Management of the Kwame Nkrumah University of Science and Technology, Kumasi. He holds a doctorate degree in Building Technology specialising in procurement, contract management and Quantity Surveying. He has published over 70 scholarly articles relating to contract management, Quantity Surveying, Procurement and Construction. He is a co-author of the Standard Method of Measurement of Building Works for Ghana (SMMG). He has been a member of the governing Council of the Ghana Institution of Surveyors for over 6 years and was previously the editor of the Quantity Surveyor -a magazine of the Quantity Surveying (QS) Division of the Ghana Institution of Surveyors. He is currently the Secretary to the QS Division of the Ghana Institution of Surveyors. His extensive practice in the construction industry resulted in his involvement with over one thousand construction contracts of which he performed the role of a principal consultant. In 2015, he was adjudged the construction industry personality of the year at the Ghana Construction Industry Awards.

Prof. Nani comes along with over 20 years of practice-based expert knowledge in all aspects of procurements for all types of services, good and works, with exposure covering all the demands of the professional practice, from procurement to contracts management and supervision. His practical experience covers roles of consultants, contractors, suppliers, field labour, and all inputs necessary to develop infrastructure end-to-end of the delivery chain to provide services: from Request for Expression of Interest (REoI), through Terms of Reference (TORs), Request for Proposals or Bids (RFP, RFB), Tender Evaluation template for consultants, evaluation reports, tender documents for contractors, procurement progress reports, contract documents, procurement monitoring and completion reports. His roles had also involved capacity building, design management, vetting of projects, and value-for-money assessments for projects. In overseeing delivery of projects as project management consultant, a logical extension of procurement expertise, He has previously conducted community engagement and stakeholder coordination. Prof. Nana has worked at institutional, project and programme levels in delivery and/or supervision, design and/or preparation of donor funding proposals, quality assurance and quality control oversight.



Akosua Adomako Ampofo

Akosua Adomako Ampofo is a Professor of African and Gender Studies at the Institute of African Studies, University of Ghana. Her areas of interest include African Knowledge systems, (especially ‘decolonising’ knowledge and praxis); Higher education, Race and Identity Politics; Gender relations; Masculinities; and questions of the aesthetics of Popular Culture as expressed in art, music, the built environment and so forth. She describes herself as an activist scholar, and her work is informed by, among other things, her eclectic disciplinary background (a BSc in Architectural Design and an MSc. in Development Planning from Kwame Nkrumah University of Science and technology (KNUST), Kumasi; a Post Graduate Diploma in Spatial Planning from the University of Dortmund; and a PhD in Sociology from Vanderbilt University, her faith, question of identity and power, and a commitment to social justice, especially working together with young people. These intersecting interests lead to public engagements in diverse forums.

In 2005 she became the foundation Director of the University of Ghana’s Centre for Gender Studies and Advocacy and from 2010-2015 she was the Director of the Institute of African Studies. Amoako Ampofo is the founding vice-president and immediate past President of the African Studies Association of Africa and a Fellow of the Ghana Academy of Arts and Sciences. She has been an honorary Professor at the Centre for African Studies at the University of Birmingham. Her most recent book, co-edited with Josephine Beoku-Betts, is titled *Producing Inclusive Feminist Knowledge: Positionalities and Discourses in the Global South* (Bingley: Emerald Publishing 2021). She co-produced the documentary *When Women Speak* with Kate Skinner (and directed by Aseye Tamakloe, 2022) as part of a project titled, an “Archive of Activism: Gender and Public History in Postcolonial Ghana”. The project seeks to create a publicly accessible text, audio and visual archive of gender activism and “political women”. In 2023-2024 she was the Wangari Maathai Guest Professor at the University of Kassel. Amoako Ampofo’s work is very invested in the visual aesthetic and ethic from an African-centred perspective. Thus, how we affect and how our senses respond to the environment -built and natural; sound, texture, etc. -given our historical context and contemporary African realities is crucial to her scholarship and practice.

Adomako Ampofo is editor-in-Chief, Contemporary Journal of African Studies; Co-Editor, Critical Investigations into Humanitarianism in Africa (CIHA) blog, and serves or has served on the boards of organisations such as the U.S African Studies Association; The Centre for the Advancement of Scholarship, University of Pretoria; “Africa Multiple” Cluster of Excellence, University of Bayreuth of which she is Chairperson; Perivoli Africa Research Centre, University of Bristol; Institute of Humanities in Africa, HUMA, University of Cape Town; Advisory Council, North Rhine -Westphalian Academy of International Affairs; “Beyond Borders” ZEIT-Stiftung Ebelin und Gerd Bucerius Scholarship Programme; and the Next Generation of the SSRC, among others. She is a member of The Council for the Development of Social Science Research in Africa (CODESRIA); the Network for Women’s Right in Ghana (NETRIGHT), and the Ghana Domestic Violence Coalition. She has consulted for several organisations including UNICEF, UNIFEM, UNAIDS, Save the Children, Ministry of Gender & Social Protection, Ghana; Participatory Development Associates; Gender Studies and Human Rights Documentation Centre, Kofi Annan Peacekeeping Training Centre, and World Health Organisation (WHO).

Adomako Ampofo’s work has been variously recognised: She has been a Fellow at the Rockefeller Foundation’s Bellagio Centre; a Mellon Fellow at the Centre for African Studies at the University of Cape Town; a Junior Fulbright Scholar; a New Century Fulbright Scholar and a Senior Fulbright Scholar-in-Residence. In 2010 she was awarded the feminist Activism Award by Sociologists for Women and Society (SWS). In 2015, she was the African Studies Association (of the US) African Studies Review Distinguished lecturer; and in 2019 she delivered the Audrey Richards Distinguished Public Lecture at the Centre for African Studies at the University of Cambridge.

<https://adomakoampofo.com/>

@admoakoampofo.



Clement Kwamina Insaidoo Appah

Clement Kwamina Insaidoo Appah is an Associate Professor of Linguistics at the University of Ghana (UG) where he has been working since 2004, teaching and supervising students up to PhD level. In 2016, he taught at the Department of Linguistics at Stockholm University in Sweden on a staff exchange programme. He obtained his BA degree in Linguistics and Swahili from UG in 2000 and an MPhil in Linguistics in 2003 from the Norwegian University of Science and Technology in Trondheim, Norway. His PhD in Linguistics (2013) from Lancaster University in the UK, was sponsored by the Commonwealth Scholarship Commission in the UK (GHCS-2008-94). He also spent one academic year (1998-1999) at the University of Dar es Salaam, Tanzania studying Kiswahili.

Clement Appah has participated in the governance of the University of Ghana through his service on statutory and ad-hoc boards and committees, including the Business and Executive Committees, University Academic Board, College of Humanities Academic Board, Graduate Studies Board and the Joint Examination Board. Before his current position as Ghanaian Director of the Confucius Institute at UG, he served as the Head of the Linguistics Department (2021-2023), Hall Master of Akafo Hall (2019-2021), Coordinator of the Chinese Section of the Department of Modern Languages (2017-2019), Acting Chapel Warden of Akafo Hall (2017-2019), Seminar Coordinator for the School of Languages (2014-2017) and Examinations Officer of the Department of Linguistics (2013-2015).

Clement Appah is a member of several professional associations including the Linguistics Association of the Great Britain (LAGB), The Philological Society (PhilSoc), International Pragmatics Association (IPrA), Societas Linguistica Europaea (SLE) and the Linguistics Association of Ghana (LAG). His research interests include Akan linguistics, Morphological Theory (Construction Morphology), word formation, compounding, the internal grammar of numeral constructions, expression of exocentricity in complex words, evaluative morphology and serial verb constructions. A principal concern in his research is how to account for properties of complex linguistic structures that do not emanate from their constituents. He has published papers on his various interests in reputable journals, including *Lexis*, *Constructions+*, *Word Structure*, *Language*

Sciences, Linguistik Online, Acta Linguistica Academia, Acta Linguistica Hafniensia, Acta Linguistica Hungarica, Contemporary Journal of African Studies, Italian Journal of Linguistics, Legon Journal of the Humanities, Lingue e Linguaggio, Nordic Journal of African Studies, SKASE Journal of Theoretical Linguistics, Journal of West African Languages, and Ghana Studies. He has served as a reviewer for many journals including the Linguistic Review, Journal of West African Languages, Nordic Journal of African Studies, and the Ghana Journal of Linguistics. He has also been a reviewer for the College of Humanities Provost's Award for the Best Publication in the Humanities at UG.

Outside of Academia, Clement Appah serves as member/Secretary of OneWay Africa, a Missions Organisation and CEO of Gramophone Ghana, a music development and production company specialising in choral and classical music. As a singer-songwriter, he has to his credit an album (M'enyidado) recorded in 2001 and many singles, including ASEDA released in April, 2024 <http://www.youtube.com/@ClementMusic24>. During his undergraduate years at UG, he served as the Deputy (1996-1997) and Substantive (1997-1998) Music Director for Chosen Vessels Choir (CVC) of the University Christian Fellowship and the Methodist-Presbyterian Union (MPU) Choir.

Clement Appah is a gifted public speaker who occasionally MCs events within and outside UG. He is also a regular speaker at orientation programme for graduate students in the School of Languages and an instructor on the School's Special Courses as well as the Pan-African Doctoral Academy (PADA) where he teaches Speaking and Presentation Skills. As a former Commonwealth Scholar, he spends time with would-be Commonwealth Scholars coaching them on How to write good impact statements. He also teaches Gramophone Ghana's New Year Voice College where he combines his training in Linguistics and experience in singing to help singers hone their craft.

Prof. Clement Appah is a Christian and a Methodist. He worships at the Resurrection Society in Adabraka, Accra where he is a Leader. He teaches youth groups and organises youth-oriented programmes that are aimed at helping the youth develop personal and leadership skills. His passion for youth development has also led him to organise and speak at various youth development workshops and camp meetings in Ghana and Germany. In 2018, he started a programme called the Youth Development Month aimed at equipping the young people in the Resurrection Methodist Society and the Adenta Circuit of the Methodist Church for life and leaderships. He also speaks regularly at the Livingstone School of Ministry and the Livingstone School of Leadership organised by the OneWay Africa.



Dr. Irene Appeaning Addo

Dr. Irene Appeaning Addo is a Senior Research Fellow and the Head of the Media and Visual Arts Unit at the Institute of African Studies, University of Ghana. She is also a Member of Ghana Institute of Architects with Registered Number 566. She holds a BSc. (Design) in 1994 and a Post-Graduate Diploma (Architecture) in 1999 from the Kwame Nkrumah University of Science and Technology, Kumasi, and a joint MSc. (Housing and InnerCity Revitalisation) in 2002 from the Institute of Housing and Urban Development Studies (IHS), Rotterdam and University of Delaware, USA. She acquired the PhD (Geography and Resource Development) in 2013 from the University of Ghana, Legon. Between 2013-2014, Irene was a Post-Doctoral Fellow at the Regional Institute of Population Studies, University of Ghana.

She worked as an architect at the Architectural and Engineering Services Limited (AESL) for fifteen (15) years (1999-2014) rising to the rank of Greater Accra Regional Architect (Principal Architect) until she moved to join the Institute of African Studies. At AESL, she was the lead architect for several projects including the design, construction, and supervision of several Primary and Secondary Schools, University of Ghana Projects (LECIAD), Hospitals (Korle-Bu), Government Offices, housing and other buildings. She has personally designed and constructed several homes for private clients.

Dr. Irene Addo was employed as a Research Fellow at the Institute of African Studies in 2015. She has chaired and facilitated several committees and conferences at the University of Ghana including the 2017 and 2021 Kwame Nkrumah Biennial Festival, the ACASA conference in 2017, and the 4th International Research Conference of the College of Humanities in 2018. She has led the curation of several exhibitions at the Institute of African Studies namely; the University of Ghana Architecture (2016), the Slave Resistance Exhibition that was mounted in Memphis, USA (2021), and at the Institute of African Studies, University of Ghana (2023). Irene was part of the evaluation Committee that assessed the expression of interest of various consultants for the construction and completion of the proposed University of Ghana Business School (UGBS) Business Lodge in 2017. She was also a member of the provost committee that reviewed and documented the infrastructure needs of units within the College of Humanities (COH) in 2020. Currently, she is the faculty representative of the Technical Sub-Committee of the Physical Development & Municipal Services Directorate

(PDMSD), University of Ghana. She is also the chairperson for the UG @ 75 Exhibition Planning Sub-Committee.

Her research focusses on Architecture, Urbanism, and Urban Studies. She has conducted several studies on urban housing and traditional architecture in African spaces, thermal comfort in Library buildings, expression of African Urbanism, and transnational architecture and politics. Together with Prof. Akosua Adomako Ampofo, she has co-led the Ghana team of Mellon funded project on African urbanists. She has published extensively in very high-impact journals.



Surv. Peter Abalansah

Surv. Peter Abalansah is Quantity Surveyor by Profession, a Project Manager, as well as the Acting Director of the Physical Development and Municipal Services Directorate (PDMSD) at the University of Ghana, Legon. He obtained his BSc. (Hon) in Quantity Surveying from the University of Portsmouth, UK in 2004 and MSc. in Project Management from University of Reading, UK in 2006. He is been a Member of the Royal Institute of Chartered Surveyors since 2008 and Ghana Institution of Surveyors since 2010.

His responsibilities as the Acting Director of the Physical Development and Municipal Directorate (PDMSD) at University of Ghana, Legon, since 2023 includes but not limited to Management of Construction Projects, Pre-Contract and Post Contract duties on development project within the University and off-campus stations, Management and Control of the Use of land belonging to the University, Management of the University Infrastructure.

Between 2019 and 2021, he was assigned as a Quantity Surveyor on the Construction of the University of Ghana Medical Centre Phase 2 (UGMC Phase 2) -Construction of the Phase 2 of the University of Ghana Teaching Hospital Project. His role on this USD 50M project included the provision of post contract duties in the areas of cost management and contract management.

Again from 2013 to 2016, He was the Project Quantity Surveyor on the USD184Million, 1000 Bed Teaching Hospital -University of Ghana Medical Centre Phase 1. His role as the Project Quantity Surveyor included advice on cost, process of interim payment request, process of tax exemption applications from the contractor, attendance of technical and site meetings.

He worked as a Quantity Surveyor with Holloway Squire Partnership (UK) -(2006-2008) during which his duties included the preparation of tender documents using Master Bill, Feasibility reports, cost reporting and cost planning, preparation of final accounts, interim valuations, attendance to meetings, tender evaluation, etc.



Lidwina Abena Amponsah Effah

Lidwina Abena Amponsah Effah is a driven and creative individual currently pursuing a LLB at the University of Ghana School of Law as a level 200 student, where she is dedicated to academic excellence and personal growth.

Throughout her educational journey, she has been actively engaged in various extracurricular activities that have shaped her skills and interests. During her basic education at Mary Mother of God Counsel School, she was a member of the Creative Arts and ICT Club, which sparked her interest in art and design. In high school at Holy Child School, she held various leadership positions, including executive member of the Editorial Board and American Field Service Club, and Clubs and Societies Prefect, honing her leadership, communication and teamwork skills.

Aside from her legal pursuits, Lidwina has passion for contemporary art and design, and enjoys drawing and painting in her free time. She has good eye for art themes and concepts. With strong research and analytical skills, effective communication and leadership abilities, and a commitment using her skills and knowledge to make a positive impact, Lidwina is eager to continue growing and learning in both the legal and art worlds.

JURY OBSERVERS

The under-listed persons serving as Jury Observers will attend the Jury's deliberations in honorary and non-voting capacities. They are:

1. *Arc. Foster Osae-Akonnor* *Client Advisor*
2. *Arc. Fiifi Yasebi Sam-Awortwi* *Competition Report Coordinator*
3. *Mrs. Rita Appiah-Kubi* *Central Materials Office, University of Ghana*

Mrs. Rita Appiah-Kubi, MCIPS (UK), CMILT (GH.)



Mrs. Rita Appiah-Kubi, MCIPS (UK), CMILT (GH.)

Mrs. Rita Appiah-Kubi is a Member of the Chartered Institute of Procurement and Supply Chain Management, UK since 2008 and Chartered Institute of Logistics and Transport, Ghana since 2022. Mrs. Appiah-Kubi holds a Masters degree in Logistics and Supply Chain Management from Kwame Nkrumah University of Science and Technology (KNUST), Kumasi.

She is a procurement specialist and has over twenty-one (21) years experience in the procurement profession as a practitioner and a regulator. She worked in the Health sector as a Procurement Officer from 2003 to 2008 and continued at the Public Procurement Authority -the regulator of public procurement in Ghana for twelve (12) years as a Chief Operations Officer in charge of the Ashanti, Bono, Ahafo and the Northern regions before joining the University of Ghana in 2021.

She is currently the Central Materials Officer responsible for procurement and stores activities at the Central Administration and Central Stores of the University of Ghana.

She has served on several committees as the Procurement specialists such as the “One Student One Laptop” Committee, 75th Anniversary Committee, Student medical Examination Committee, Post Covid-19 Skills Development Project for Microbiology Department, Korle-Bu, Biotechnology Centre and School of Nursing and Midwifery all at the University of Ghana sponsored by the African Development Bank (AFDB).

Rita comes along with over 21 years of practice-based expert knowledge in all aspects of procurements for all types of Goods, Works and Services, with exposure covering all the demands of the professional practice, from procurement to contracts management and supervision.

GENERAL INFORMATION

The competition is being managed and administered by GIA Competitions on behalf of the Promoter: University of Ghana

All enquiries relating to the competition should be directed to:

GIA Competitions

Number 3 Abdul Diouf Road

Ridge, Accra

Ghana

Fixed Line: +233.30.396.6841

E-Mail: competitions@gia.com.gh

Questions relating to the Competition Brief and Conditions must be submitted to GIA Competitions digital platform before close of business on Tuesday 30th July, 2024. A meeting will be held on Monday 8th August, 2024 at 2:00pm GMT at the University of Ghana to respond to all queries.

Members of the Jury Panel, the competition promoters, the Client Advisor should not be contacted for any further information after Monday day 8th August, 2024 as this may lead to disqualification from the competition.

Case Studies:

Competitors may indicate the various case studies conducted

Site Visits

The official visit to the site is scheduled for 24th July, 2024 at 3:5pm. However, competitors may conduct independent site visit after the official visit at their own cost.

HONORARIA

There shall be three (3) main prizes awarded (i.e. 1st Prize, 2nd Prize and 3rd Prize) and consolation prizes for all other competitors as follows:

S/No.	Position	Prize Award (GHS)	Remark
1	Winner	1,382,400.00	1st Prize
2	First Runner-Up	691,200.00	2nd Prize
3	Second Runner-Up	230,400.00	3rd Prize
4	Fourth - Twelfth	64,000.00	Per Competitor as Consolation Prize

COMPETITION CONDITIONS

Declaration of Authorship & Acceptance of Competition Regulations

The declaration form acknowledges the authorship of the design ideas, and by signing it, competitors agree to abide by the competition conditions and the decision of the Jury Panel as final. The completed declaration form shall NOT be uploaded onto the digital entry system together with the design submission. **Competitor are requested to upload the completed declaration form unto the digital entry system on Tuesday 15th October, 2024 not later than 9:00am.**

Please Note, the team members stated on the declaration form will be used as the credits in all promotional activity so please ensure this is reflected accurately.

Anonymity

The submissions will be adjudicated anonymously, via the use of Unique Registration Number (URN) received at the time of registration. The URN should be prominently displayed on each of the design submission sheets, report and declaration form.

Any submission that has identifying marks (including logos, text, insignia, or image) that could be used to identify the submission's/author(s) will be automatically disqualified.

Disqualification

Submissions will be disqualified from evaluation/adjudication:

1. If a competitor shall disclose his or her identity, or improperly attempt to influence the decision;
2. If submissions are received after the latest time stated under the submission method;
3. If in the opinion of the Jury, the submission does not fulfil the requirement of the Competition Brief as well as the Competition Conditions.
4. If any of the mandatory requirements of the Competition Brief and Conditions are disregarded.

Notification of Results/Publicity

The Competition results will be published after all competitors have been notified. Please note that any request for feedback should be submitted to GIA Competitions within one calendar month of the results being announced.

Competitors must not release their designs for publication to any 3rd party until and after the results have been officially announced and permission have been granted from GIA.

Competitors should note that by entering the competition, they are expected to honour the request for confidentiality to prevent information on the shortlist or winning team been leaked to the Press (either main or social media) before any official announcement is made.

The Ghana Institute of Architects (GIA) and the University of Ghana reserves the right to publicise the competition, any design submission, and the results in any promotional activity including all social media channels the GIA and the University of Ghana consider fit. Illustration of any design -either separately, or together with other designs, with or without explanatory text may be used without cost. Once anonymity has been lifted, authors will be credited and recognised in all associated media and publicity. This information will be taken from the declaration form so please ensure that the details are accurate.

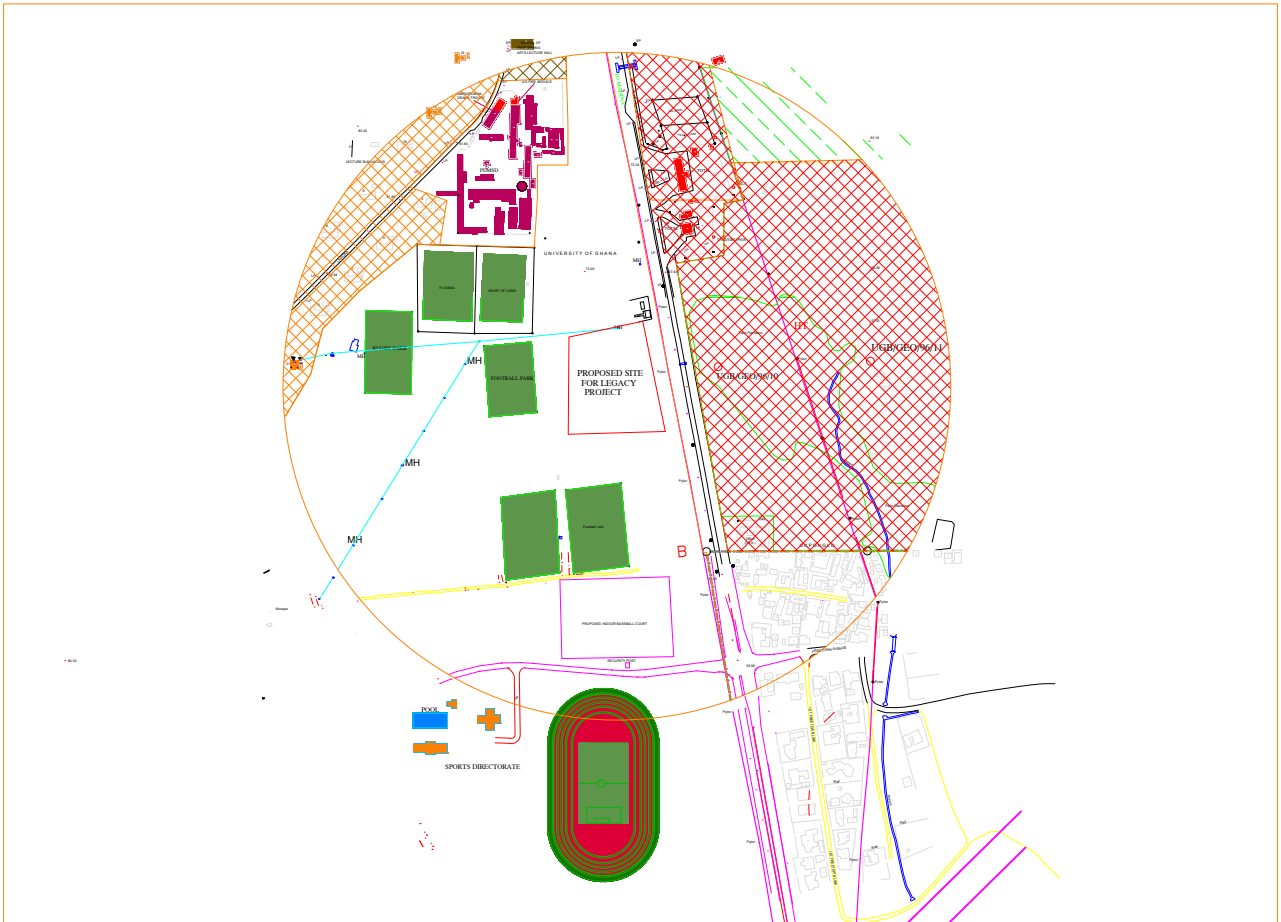
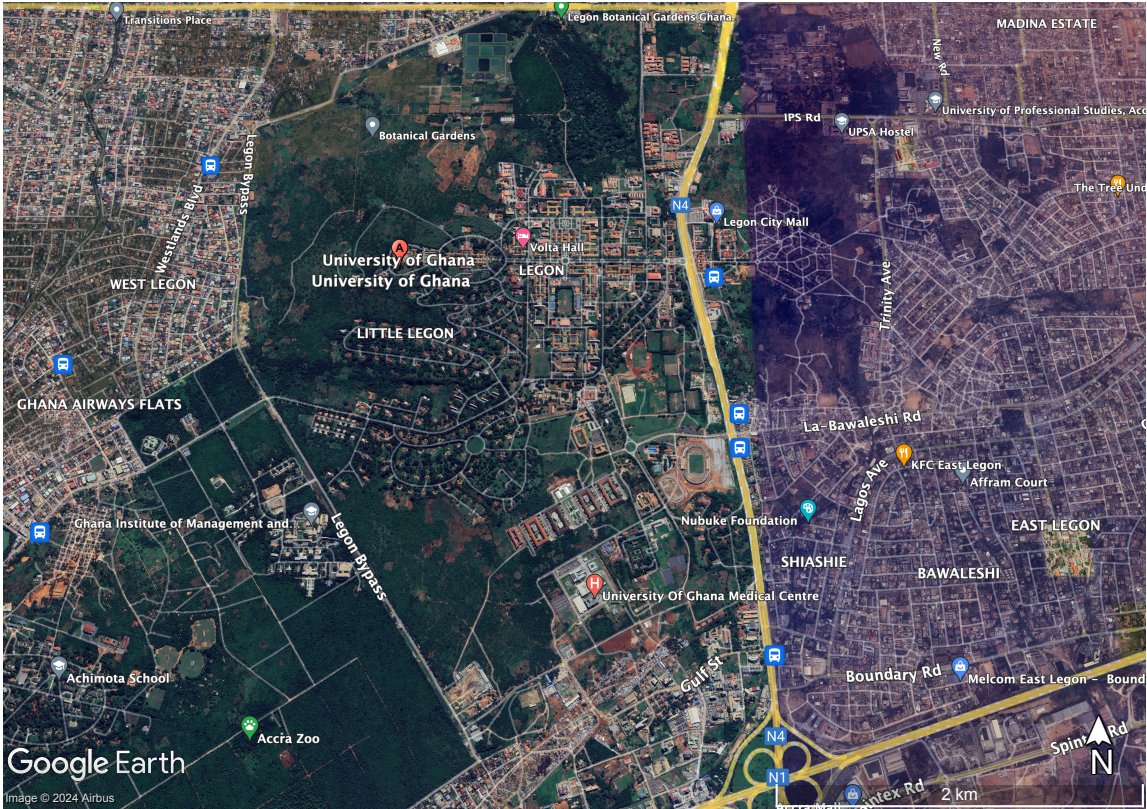
Copyright

Copy Right of the designs from the architectural design competition rest with the authors of the various submitted entries. An express consent is however, needed from either party if the design is to be replicated on other sites other than that used for the architectural design competition.

Post-competition Activities

Ghana Institute of Architects will facilitate the Post-competition activities for the pre and post-contract aspects of the project.

PROPOSED LAYOUT: *Site Allocated for SEC*



SITE PLAN

PLAN OF LAND FOR LEGACY SITE, UNIVERSITY OF GHANA

Scale 1:2500

— Shewn Edged Pink —

Area 5.00 ACRES

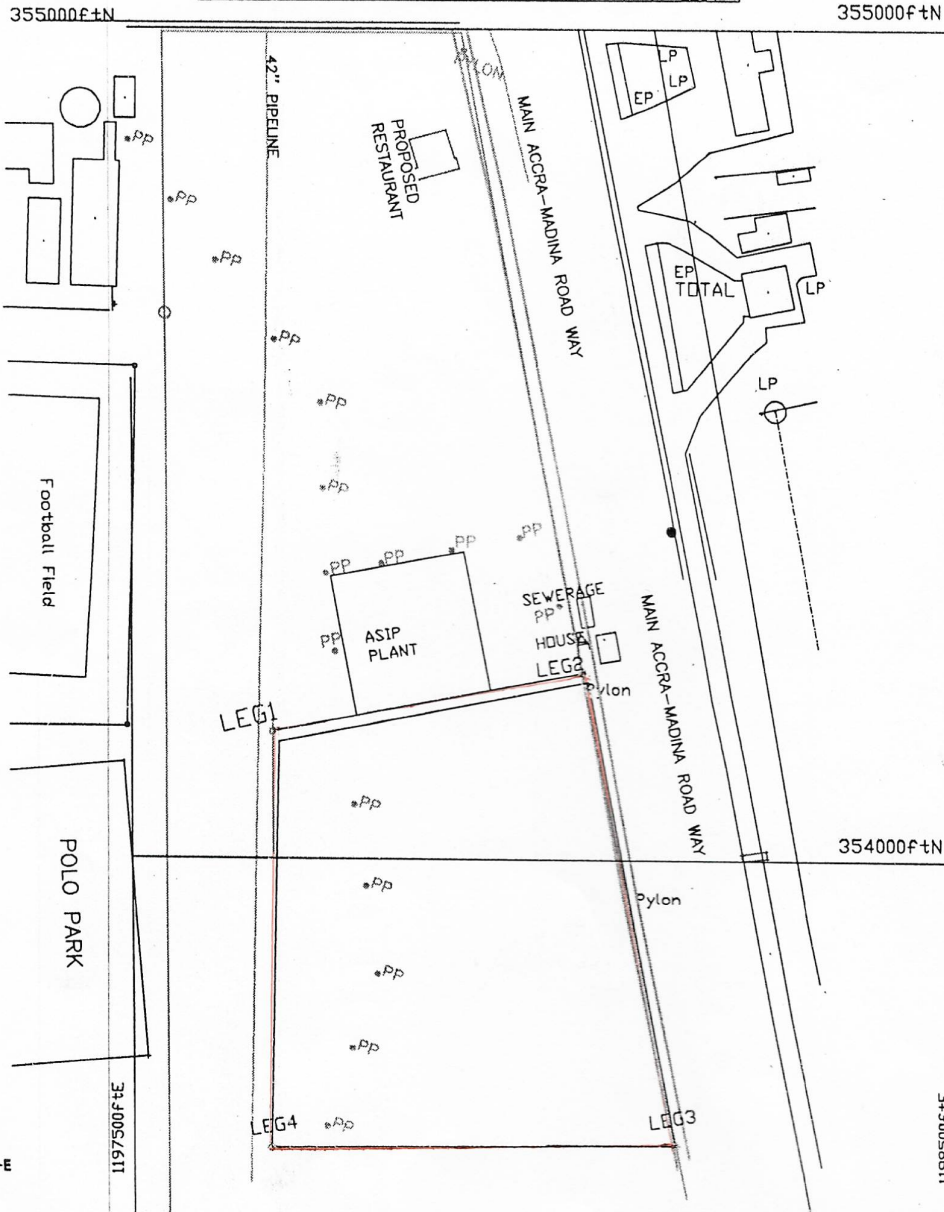
LOCALITY
LEGON

DISTRICT
AYAWASO WEST

REGION
GREATER ACCRA

BEACON INDEX

BEACON	COORDINATES		BEARING	DIST(FT)	TO
	FROM X	Y			
LEG1	354141.7	1197678.5	079°04'	382.24	LEG2
LEG2	354214.2	1198053.8	169°37'	567.70	LEG3
LEG3	353655.8	1198156.2	269°26'	489.26	LEG4
LEG4	353650.9	1197666.4	001°25'	490.95	LEG1



I, B.A.FIAH, LICENSED SURVEYOR, CERTIFY THAT THIS PLAN IS FAITHFULLY AND CORRECTLY EXECUTED AND ACCURATELY SHOWS THE LAND WITHIN THE LIMITS OF THE DESCRIPTIONS GIVEN ME BY MY CLIENT.



AERIAL SITE PHOTOGRAPHS





UNIVERSITY OF GHAHA CAMPUS: *Photo Gallery*



August, 2024, Ghana Institute of Architects: Architectural Design Competition, Students Experience Centre (UG @ 75 LEGACY PROJECT) at University of Ghana, Legon



August, 2024, Ghana Institute of Architects: Architectural Design Competition, Students Experience Centre (UG @ 75 LEGACY PROJECT) at University of Ghana, Legon



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- Appendix 1: UG Strategic Plan 2024-2029
- Appendix 2: Site Plan
- Appendix 3: Geotechnical Survey Report
- Appendix 4: UG Master Plan 2015
- Appendix 5: Declaration of Authorship Form

Competitors are to download the Topographical Survey and the Location Plan all in AutoCAD format from the GIA Competition link.



Strategic Plan

2024-2029

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Abbreviations

AQAD	Academic Quality Assurance Directorate
ASA	Academic and Student Affairs
C3SS	Centre for Climate Change and Sustainability Studies
CPD	Continuous Professional Development
CTCPT	Centre for Tropical Clinical Pharmacology and Therapeutics
CTLI	Centre for Teaching and Learning Innovation
FAQ	Frequently Asked Questions
FOHCREC	Forest and Horticultural Crops Research Centre
FTE	Full-time Equivalent
GTEC	Ghana Tertiary Education Commission
HR	Human Resource
HRODD	Human Resource and Organisational Development Directorate
IAST	Institute of Applied Science and Technology
IGF	Internally Generated Funds
IRPO	Institutional Research and Planning Office
ISSER	Institute of Statistical, Social and Economic Research
LECIAD	Legon Centre for International Affairs and Diplomacy





LESS	Institute for Environment and Sanitation Studies
LIPREC	Livestock and Poultry Research Centre
LLA	Legon Leadership Academy
LMS	Learning Management System
MEAL	Monitoring, Evaluation, Accountability and Learning
MIASA	Merian Institute for Advanced Studies in Africa
ORID	Office of Research, Innovation and Development
PADA	Pan-African Doctoral Academy
RIPS	Regional Institute for Population Studies
SIREC	Soil and Irrigation Research Centre
TTIPS	Technology Transfer and Intellectual Property Services
UG	University of Ghana
UG-UREP	University of Ghana Undergraduate Research Experience Programme
WACCBIP	West African Centre for Cell Biology of Infectious Pathogens
WACCI	West Africa Centre for Crop Improvement
WAGMC	West African Genetic Medicine Centre



FOREWORD



Prof. Nana Aba Appiah Amfo
Vice-Chancellor

As the premier university in Ghana, the University of Ghana has distinguished itself as a beacon of excellence in higher education since its establishment. Over the past 75 years, the University has experienced steady growth evident through its increased capacity for groundbreaking research, strategic collaborations with top-tier institutions internationally, and strong linkages with industry. A conducive teaching and learning environment, along with an enhanced student experience through digitalisation, further showcases the University's successes. These unparalleled feats have translated into the University's recognition as a leading university in Africa and among highly-recognised universities globally. Poised to be more impactful in the years ahead, the University of Ghana strives to exceed the expectation of its mandate to remain relevant to national and global development through cutting-edge research, high quality teaching and learning, and community engagement.

With the imminent expiration of the 2014-2024 Strategic Plan, there was the need to have stakeholder engagements, revisit the strategic priorities and develop a plan that aligns with global trends, the ever-evolving landscape of higher education, complexities of the twenty-first century, industry expectations and stakeholder aspirations.

The new Strategic Plan, a comprehensive yet succinct document, sets out the framework for the vision and priorities of the University of Ghana from 2024 to 2029. It embodies our collective aspirations and articulates a vision that is ambitious, inspiring and attainable. It challenges us to think boldly, work collaboratively and strive for excellence.

The priorities of the Strategic Plan align with the thematic areas of my six key aspirations as Vice-Chancellor which are to reinvigorate impactful research; develop technology-driven and robust processes; expand income sources; institute a vibrant and responsive governance and management system, enhance UG's visibility and rankings, and create a sense of ownership and commitment among stakeholders.

The Strategic Plan represents our deep sense of purpose, shared vision and commitment. It is a call to action for all stakeholders, both internal and external, to work conscientiously towards sustaining our enviable feat as the topmost university in Ghana and among the best universities globally.

The development of this Strategic Plan is only a first step in achieving the University of Ghana's ambition. Subsequently, these encompassing guidelines will be downscaled into unit-specific, implementable and measurable action plans to ensure that each individual within the University community is able to relate with and hence contribute to the overarching Strategic Plan.

Considering the five strategic priorities: Transformative Student Experience, Impactful Research, Commitment to Faculty and Staff, Engagement and Partnerships, and Sustainable Resource Mobilisation and Stewardship, it is obvious that this Strategic Plan emphasises diversity, fosters inclusivity and empowers individuals to realise their fullest potential. As Vice-Chancellor, I am optimistic that it will enable us push boundaries and continue to strive for excellence in all spheres of the University's operations.



Prof. Nana Aba Appiah Amfo

Vice-Chancellor

July 2024



Preamble

Our Journey from 2014 to 2024

The 2014-2024 Strategic Plan captured the University's commitment to transforming itself into a research-intensive university that responds to national and global development needs through world-class research and education. The operationalisation of the plan brought the University closer to this commitment with significant achievements in its priority areas of research, teaching and learning, and infrastructural development, underpinned by decentralised systems of governance and administration for more efficient and effective operations.



Statue located at the Balme Library roundabout, depicting the movement to a new Strategic Plan

Over the past decade, the University has improved its research ecosystem including funding, partnerships and infrastructure. Research funding has increased significantly, mainly from competitive grants. In 2023, the University received \$29.5 million from 179 grants. By comparison, the 2015 figures were \$12 million from 28 grants. The University established new hubs of cutting-edge research, including the West African Centre for Cell Biology of Infectious Pathogens (WACCBIP) and the West African Genetic Medicine Centre (WAGMC). Our research centres have contributed immensely to innovations in areas such as food security, genetics, virology, economic and social development.

The student population has more than doubled since the start of the 2014-2024 Strategic Plan, straining the University's capacity to provide conducive living and learning environments. The University has attempted to address the needs of the growing student population by expanding its residential and academic infrastructure and digitalising classroom spaces, among other initiatives. Despite these efforts, the proportion of eligible students to whom the University provides accommodation has fallen from almost half of the total student population in 2014 to a third in 2023, highlighting an area of continuing challenge.

Beyond physical infrastructure to support teaching and learning, the University has sought to improve the quality of teaching. For instance, the Academic Quality Assurance Directorate (AQAD) and the Centre for Teaching and Learning Innovation (CTLI) have introduced programmes to improve pedagogy. In recognition of the digitally-driven world in which the University and its graduates must operate, the University remains committed to the adoption of technology in teaching.

In implementing the 2014-2024 Strategic Plan, the University recognised that its aspiration to become a research-intensive university should be driven by the quality and relevance of its accredited graduate programmes. As a result, the University has increased the number of graduate programmes from 207 in 2014 to 385 in 2023. The University of Ghana established

the Pan-African Doctoral Academy (PADA) to support graduate studies through mentorship and training in a range of academic skills. Since 2015, PADA's bi-annual doctoral academy has trained 4,350 PhD students from 16 countries. In addition, PADA has constructed a multi-purpose building to provide dedicated space for doctoral students.

Responding to Current Challenges

The new Strategic Plan draws on the achievements of the past, while acknowledging new challenges at national and global levels that demand nothing short of a transformation of the cultures of teaching and learning, research practices, and institution building. The reality of limited government resources to public universities, coupled with increasing competition for research funding globally,



Research on coastal erosion and water hyacinth invasive species by Institute for Environment and Sanitation Studies (IESS), College of Basic and Applied Sciences



J. B. Danquah Avenue by day

constrain our ability to implement an ambitious research agenda, adequately resource and reward faculty and staff, and provide a transformative experience for an increasing student population. We also recognise that while we remain the preferred university for many, there is increasing competition for students in the higher education space, which should compel us to improve the intellectual, social and physical environments for current and prospective students. This will not only be of immediate benefit for students but will also ensure that we have proud alumni committed to supporting their alma mater with human and material resources.

Finally, our Strategic Plan should respond to emerging global realities. The world continues to grapple with 'old' problems such as poverty,

inequality, climate change and regional conflicts, while facing new crises in the form of global pandemics and financial meltdowns.

The 2024-2029 Strategic Plan must provide a comprehensive response to both the immediate and long-term challenges confronting higher education. We recognise that as a university, we must explicitly put people at the centre of our strategy by working harder to prepare students for a rapidly changing world, providing stronger support for faculty and staff in their work, and actively serving the diverse communities we belong to. Importantly, in the face of decreasing government support, the University must attract the resources necessary to implement this strategy and must use these resources efficiently and sustainably.

Our Strategic Priorities for the Next Five Years

The 2024-2029 Strategic Plan charts a course for the University of Ghana through the evolving landscape of higher education, building upon our past successes, while embracing the need for transformative change in teaching, learning, research and institution-building. We have identified five strategic priorities that will guide us in the next five years. These are: (1) transformative student experience, (2) impactful research, (3) commitment to our faculty and staff, (4) engagement and partnerships, and (5) resource mobilisation and stewardship.

Cutting across the strategic priorities is a commitment to sustainability, diversity and inclusion. In the face of limited government resources, it is imperative that the University

attracts its own resources and uses these efficiently, and this will guide the development of a sustainable business model that couples economic viability with environmental stewardship. A commitment to diversity and inclusion will inform our teaching, employment practices and community engagement that underscores respect for principles of equity and fairness, and also creates an environment for excellence and innovation.

1. Transformative Student Experience

At the core of our strategy is a promise to our students to cultivate an environment that nurtures personal growth and academic excellence. The University is dedicated to delivering a transformative experience to every student through student-centred, technology-driven and interdisciplinary learning. This will prepare our students with



J. B. Danquah Avenue by night

the skills and competencies they need to thrive in an increasingly complex global society.

2. Impactful Research

The University of Ghana prioritises interdisciplinary and collaborative research that addresses the most pressing issues of our time. We are committed to attracting and supporting elite researchers who venture beyond established knowledge boundaries to forge a better world for all.

3. Commitment to our Faculty and Staff

We believe that our faculty and staff are the bedrock of our institution. Their dedication and expertise are invaluable. In acknowledgement of their efforts, we pledge to reform our administrative structures to make them more agile and efficient, provide opportunities for professional growth, and devise a reward system that incentivises excellence.

4. Engagement and Partnerships

We recognise the importance of building strong partnerships with industries, governments, civil society organisations and other academic institutions. These relationships, grounded in mutual respect, will catalyse innovation, reinvigorate our practices, and amplify our influence.

5. Sustainable Resource Mobilisation and Stewardship

To realise our vision, the University of Ghana is committed to developing strategies for sustainable resource acquisition and allocation. We also prioritise the conservation and enhancement of our existing assets for the enrichment of future generations.

Our Strategic Plan is more than just a blueprint; it is a promise to our students, faculty, staff and the wider community. It is a pledge to amplify individual capabilities, enabling every member of our community to reach their potential. By working together, we aspire to carve out a legacy of excellence. Let us work together to journey to a brighter and more prosperous future.



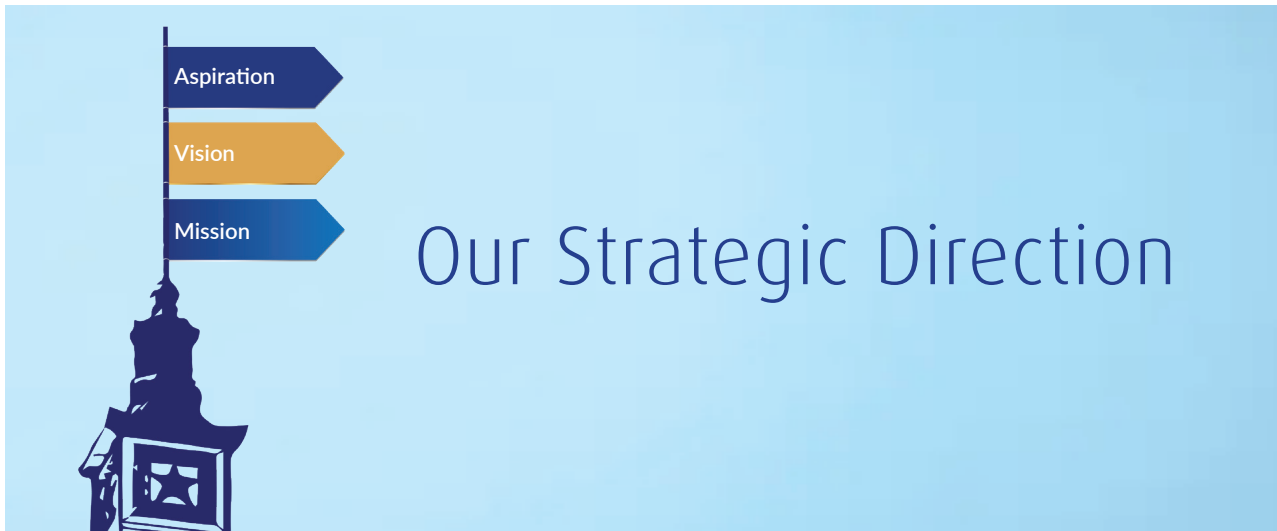
The Planning Process

Our 2024-2029 Strategic Plan emerged from extensive consultations with members of the University community including senior officials, students, unionised groups, faculty and staff, as well as external stakeholders. While crafting this new blueprint, we thoroughly revisited the preceding Strategic Plan (2014-2024). This rigorous review, facilitated by

several engagements, allowed us to grasp the successes, glean lessons and acknowledge challenges faced during its development and roll-out. Such insights paved the way for the present strategic priorities and objectives diligently curated by a committee appointed by the Vice-Chancellor.

This new Strategic Plan mirrors the collective aspirations voiced by a myriad of stakeholders throughout the review process. It underscores the University's commitment to staying attuned to the swiftly changing landscape of higher education. More importantly, it places students, faculty and staff at the heart of our strategies to navigate these challenges. Thus, the 2024-2029 Strategic Plan stands as a testament to a university poised to set itself apart in both research and teaching. By investing deeply in our community, we aim to collectively amplify our impact on local, national and international scales.





Aspiration

To transform lives and societies through unparalleled scholarship, innovation and result-oriented discoveries.

Vision

To achieve global impact through innovative research, teaching and learning, using a technology-driven and people-centred approach.

Mission

To create an enabling environment that makes the University of Ghana increasingly relevant to national and global development through cutting-edge research and quality teaching and learning.

Core Values

As a University, we are governed by the following core values:



Our Strategic Priorities

In line with our desire to contribute to national and global development, the University has identified five strategic priorities to guide its journey to becoming a globally renowned and impactful institution over the next half decade.





- 1 Transformative Student Experience.
- 2 Impactful Research.
- 3 Commitment to our Faculty and Staff.
- 4 Engagement and Partnerships.
- 5 Sustainable Resource Mobilisation and Stewardship.

PRIORITY 1

Transformative Student Experience

We envision a student experience that is transformative, where learners are appreciated as active co-creators and innovators in a dynamic education journey, nurtured by an empowering, supportive, inclusive and technologically advanced learning environment.



Context

The focus of global good practice in university education is shifting from solely imparting knowledge to students to include shaping a student's identity, self-esteem and self-perception. This means that a student's educational journey must involve fostering critical thinking, encouraging creativity, and instilling a lifelong desire for learning. Further, universities have the responsibility to positively influence their students' emotional well-being, personal development and ethical behaviour. The University of Ghana aims to offer holistic education that goes beyond conventional boundaries, encourages innovation, and inclusively supports individual growth. The University seeks to equip students with the skills and competencies to navigate an increasingly competitive and complex world, including a workplace that demands agility, innovation and resilience, while making meaningful contributions to society.

STRATEGIC OBJECTIVES (SOs)

Objective 1.1	Attract and retain promising students from diverse backgrounds.
Objective 1.2	Develop innovative curricula that respond to the future of work.
Objective 1.3	Enhance the learning experience of students through the use of cutting-edge technology.
Objective 1.4	Support student learning by equipping educators with current and appropriate pedagogical skills and tools.
Objective 1.5	Foster an inclusive and supportive university environment, through improved services, to nurture students' physical, social and mental wellbeing.



1 3D impression of one of the hotspot comfort zones under construction on display



2 Students in a group discussion



3 Students at a lecture in one of the modernised classrooms

4 5 Student athletes taking part in inter-hall games at the New UG Sports Stadium

PRIORITY 2

Impactful Research

Nurturing the highest quality research that embraces current and emerging technologies and inspires innovations in solving societal problems.



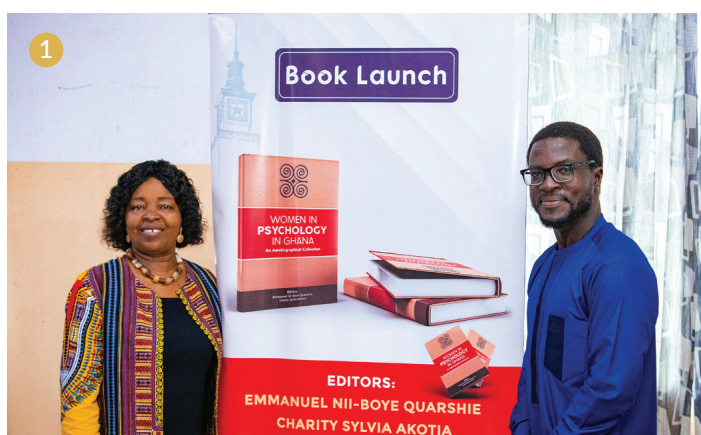
Context

To foster impactful research, the University of Ghana emphasises the cultivation of top-tier research talent. At the heart of this endeavour is our commitment to recruiting exceptional staff and providing them with the necessary support to address pressing societal challenges. Recognising that these issues are multifaceted, we promote a culture of disciplinary diversity and inclusion, encouraging multi-disciplinary research approaches.

The sustainability and growth of our research impact not only hinge on nurturing talent but also on bolstering our research infrastructure. This involves enhancing our faculty's grant management capabilities and actively seeking increased research funding. With these strategic elements in place, we are set to strengthen our focus as a research-intensive university, enhancing our dedication to innovation and the transfer of knowledge for significant societal benefit.

STRATEGIC OBJECTIVES (SOs)

Objective 2.1	Attract, nurture and retain diverse and globally competitive research talent.
Objective 2.2	Increase research funding.
Objective 2.3	Improve grant management processes to support impactful research.
Objective 2.4	Promote multi-disciplinary research to address complex societal challenges.
Objective 2.5	Support innovation and knowledge transfer for impact.



- 1 Prof. Charity Sylvia Akotia (Left) and Dr. Emmanuel Nii-Boye Quarshie (Right) editors of the book containing contributions from several female psychologists
- 2 Training on use of equipment in the first National Fish Histopathology Reference Laboratory in Ghana, at the School of Veterinary Medicine



- 3 A medical staff attending to a patient during the UG@75 Medical outreach at Madina, Accra.
- 4 Dancers from the Ghana Dance Ensemble, Institute of African Studies, in a choreographed piece
- 5 Scholarly publications from the College of Humanities on display at an exhibition



PRIORITY 3

Commitment to our Faculty and Staff

The University is committed to recognising the contributions of faculty and staff by providing a healthy, well-resourced and rewarding work environment, with opportunities for professional growth.



Context

The University recognises that faculty and staff are the cornerstone of our strategic framework and is committed to creating opportunities for growth, innovation and creativity in an environment of diversity and inclusion. We acknowledge that our success depends on the dedication of faculty and staff to excellence, and we desire to celebrate and reward that dedication.

STRATEGIC OBJECTIVES (SOs)

Objective 3.1	Enhance inclusivity and diversity to enrich the University's faculty and staff.
Objective 3.2	Prioritise the well-being of our faculty and staff through comprehensive health and wellness programmes.
Objective 3.3	Improve the productivity of faculty and staff by providing state-of-the-art infrastructure, administrative and logistical support.
Objective 3.4	Expand opportunities for the continuous development of the competencies of all categories of faculty and staff.
Objective 3.5	Celebrate the achievements of our faculty and staff with a transparent reward system.



- 1 A UG staff being cheered on, in a lime and spoon race at the 2023 UG@75 Staff Games.
- 2 UG Security undergoing training facilitated by officers from the Ghana Police Service

PRIORITY 4

Engagement and Partnerships

We envision a university that will proactively engage external partners at local, national and international levels to amplify our research, teaching and advocacy for the greater good.



Context

The “Wicked Problems” and the Global Challenges that have become existential in nature require universities to be proactive not only in reaching out to partner universities, but also to non-traditional partners such as Non-Governmental Organisations (NGOs) and local communities. With successful engagement and partnership, both locally and internationally, students and staff of the University of Ghana will have the ability to think globally and demonstrate the capacity to apply international standards and best practices in their field of study. They will also be able to function effectively in the worlds of academia, industry and government.

The University of Ghana will also have an intentional process of integrating international, intercultural and global dimensions into the purpose, functions and delivery of its vision to enhance the quality of education and research for all students and staff, and to make meaningful contributions to society.

STRATEGIC OBJECTIVES (SOs)

Objective 4.1	Establish and strengthen strategic partnerships for mutual benefits.
Objective 4.2	Enhance outreach and advocacy with International Partners to address global challenges.
Objective 4.3	Strengthen collaborations for research, scholarship, faculty and staff development.
Objective 4.4	Expand international experience for faculty and students through internationalisation of curriculum and equitable exchange opportunities.
Objective 4.5	Enhance outreach and advocacy to address national development and community needs.



UG-China partnership: Students performing at the 2024 Confucius Institute Chinese Bridge Competition



A group photograph depicting UG-Nestlé partnership, spearheaded by the Institute of Applied Science and Technology (IAST)



Students in the Department of Computer Science during a hackathon in the computer lab refurbished by GT Bank

PRIORITY 5

Sustainable Resource Mobilisation and Stewardship

We will secure the University of Ghana's future through diversified revenue streams, sound financial management, efficient procurement processes, and optimal asset stewardship to enhance growth, transparency, accountability and sustainable development.



Context

To remain competitive in the 21st century, the University of Ghana is pursuing a proactive approach to its financial management. This strategic priority leverages traditional and non-traditional revenue streams to mobilise sustainable resources which align with and support organisational strategy. This includes deliberate measures to increase the number of self-financing graduate programmes.

We will adopt efficient and transparent financial management principles and streamline the mechanisms that minimise financial risks and

procurement bottlenecks. Additionally, the University recognises the need to maintain the value of its physical assets, intellectual property and other knowledge-based products.

The University of Ghana will actively promote responsible environmental practices through the judicious use of natural resources, and the reuse and recycling of solid waste to contribute to a sustainable future.

STRATEGIC OBJECTIVES (SOs)

Objective 5.1	Increase and diversify internal and external revenue streams.
Objective 5.2	Improve operational efficiency, financial management and accountability.
Objective 5.3	Strengthen the management and maintenance of the University's assets.
Objective 5.4	Promote intelligent procurement practices.
Objective 5.5	Promote sustainable infrastructural development.



1 A part of the rice farm at UG's Soil and Irrigation Research Centre (SIREC)

2 Donated Tricycle and Bins from Coca-Cola to boost UG's recycling project



Concluding Remarks

The University of Ghana's 2024-2029 Strategic Plan provides a definitive roadmap for the next five years. This document embodies our commitment to a transformative journey. As we embark on this new chapter, our focus areas encompass a transformative student experience, impactful research and a steadfast commitment to engagement, partnerships and our valued communities.

Every unit within our University, from the overarching structure down to the individual sections, will adhere to the plan's objectives. Every initiative undertaken from 2024 through 2029 should align with and actively support our strategic directives. We count on the leadership of our Provosts, Deans and Directors to drive the strategic initiatives. Their pivotal role involves identifying opportunities for significant impact and transforming these opportunities into clear, actionable objectives.

Maintaining an informed and engaged community is paramount, and we therefore encourage all stakeholders to regularly visit our website and other communication channels for the latest updates on the Strategic Plan. Gradually, the entire University of Ghana community will discern the seamless integration of these objectives into our routine functions. With a united front and focused attention on our quintessential goals, our shared vision will come to fruition.



Iconic nighttime photo of the back of the Balme Library

Appendix

Key Performance Indicators

PRIORITY 1

Transformative Student Experience

No.	Objectives	Indicators
1.1	Attract and retain promising students from diverse backgrounds.	<ul style="list-style-type: none">• Number of outreach programmes.• Number of students reached through outreach programmes broken down by background.• Number of scholarships awarded, broken down by background.• Proportion of students admitted from less endowed schools and through affirmative action.• Processes for students to attain professional certification.• Number of Memoranda of Understanding signed with professional bodies and other institutions for internships and other student-focused programmes.• Number of award schemes for continuing students, disaggregated by college.• Scholarships available for transitioning from undergraduate to research-based graduate studies.• Number of students with disability enrolled and graduated.• Special facilities and services offered to students with disability

No.	Objectives	Indicators
1.2	Develop innovative curricula that respond to the future of work.	<ul style="list-style-type: none"> • Number of new interdisciplinary and multidisciplinary programmes. • Number of programmes integrating a module on sustainability. • Number of entrepreneurship courses that include a module on the same topic. • Frequency of student curricula satisfaction survey reviews. • Student satisfaction rate with the curriculum. • Establishment of a graduate tracker system. • Number of graduate tracer studies conducted. • Proportion of students employed in jobs relevant to their fields. • Frequency of programme reviews to align curriculum with the future of work.
1.3	Enhance the learning experience of students through the use of cutting-edge technology.	<ul style="list-style-type: none"> • Extent of internet connectivity coverage. • Internet downtime and speed. • Number of functional computer laboratories across the University. • Inventory of computer infrastructure and digital tools. • Number of computer laboratories upgraded. • Number of courses mounted on the UG LMS. • Student satisfaction rate on use of technology in pedagogy. • Frequency of use of UG's LMS by faculty. • Frequency with which students use the LMS. • Average time students spend on the LMS. • Number of IT support staff in each unit.

No.	Objectives	Indicators
1.4	Support student learning by equipping educators with current and appropriate pedagogical skills and tools.	<ul style="list-style-type: none"> • <i>Number of training programmes on innovative pedagogies.</i> • <i>Number of newly appointed academics certified by the Academic Quality Assurance Directorate.</i> • <i>Number of faculty members participating in refresher training on pedagogy every 3 years.</i>
1.5	Nurture students' physical, social and mental wellbeing by fostering an inclusive and supportive university environment, through improved services.	<ul style="list-style-type: none"> • <i>Satisfaction level with student services.</i> • <i>Student satisfaction level with co-curricular activities.</i> • <i>Student perception of safety and security on campus.</i> • <i>Student satisfaction level with healthcare services.</i> • <i>Frequency with which students use the Careers and Counselling Centre.</i> • <i>Frequency of reviews assessing the capacity of the Careers and Counselling Centre.</i> • <i>Number of mentorship initiatives.</i> • <i>Satisfaction scores for academic advising and tutorial services.</i> • <i>Response time to student service requests.</i> • <i>Number of stakeholder orientations organised to educate students, faculty and industry about UG's internship policy.</i> • <i>Number of internships secured following the internship policy.</i> • <i>Student satisfaction level with the internship policy.</i> • <i>Establishment of an award for unit with highest levels of student satisfaction.</i>

PRIORITY 2

Impactful Research

No.	Objectives	Indicators
2.1	Attract, nurture and retain diverse and globally competitive research talent.	<ul style="list-style-type: none"> • Proportion of new faculty assigned to research mentors. • Number of professional development programmes on impactful research organised for faculty. • Number of faculty participating in research communication workshops or seminars. • Percentage of internal research grant awarded as seed grants annually. • Number of faculty awarded seed grants annually. • Number of faculty benefiting from ORID training on various aspects of research (e.g., grant-writing, research management, publishing, etc.). • Number of faculty trained in impactful research areas (e.g., AI and machine learning). • Number of faculty and staff mobility programmes on research established. • Number of international faculty hired. • Number of international research graduate students admitted. • Proportion of faculty research output actively promoted on UG platforms. • Faculty h-index and i10 indices.
2.2	Increase research funding.	<ul style="list-style-type: none"> • Evaluation of the effectiveness of communication strategies in increasing research funding. • Number of grantsmanship workshops organised. • Number of grants successfully submitted.

No.	Objectives	Indicators
		<ul style="list-style-type: none"> • Policy and guidelines developed and operationalised to reward faculty engaged in fundraising. • Percentage of IGF allocated for research. • Number of collaborative research agreements signed.
2.3	Improve grant management processes to support impactful research.	<ul style="list-style-type: none"> • Improvement in grant communication processes through faculty feedback and success rates. • Number of grants-writing support programmes established. • Number of research grants awarded to the University. • Average time spent on grant applications. • Average time spent processing grants. • Average time spent procuring research items. • Number of errors identified in grant applications. • Number of errors identified in grant processing. • Number of complaints from faculty. • Satisfaction survey results from grant applicants.
2.4	Promote multidisciplinary research to address complex societal challenges.	<ul style="list-style-type: none"> • Number of interdisciplinary research projects with effective communication plans. • Number of new inter/trans-disciplinary graduate research programmes developed. • Number of new inter/trans-disciplinary centres of excellence established. • Number of structured inter/trans-disciplinary research groups in every school. • Number of faculty formally affiliated with a secondary department/unit. • Launch of UG undergraduate research experience programme (UG-UREP). • Number of undergraduates undertaking research.

No.	Objectives	Indicators
2.5	Support innovation and knowledge transfer for impact.	<ul style="list-style-type: none"> • <i>Reach and impact of research communications in public and academic circles.</i> • <i>Proportion of certified laboratory and/or research hubs.</i> • <i>Number of labs and/or research and innovation hubs with the highest certification established.</i> • <i>Number of strategic partnerships established for innovation and knowledge transfer.</i> • <i>Regular audits of Technology Transfer and Intellectual Property Services (TTIPS).</i> • <i>Number of patents filed and/or licensed.</i> • <i>Number of papers that have resulted in a policy paradigm shift.</i> • <i>Number of business start-ups created based on research findings.</i> • <i>Number of papers published by UG author(s) in journals with an impact factor of 10 and above.</i> • <i>Number of research papers making national and international news headlines.</i>

PRIORITY 3

Commitment to our Faculty and Staff

No.	Objectives	Indicators
3.1	<p>Enhance inclusivity and diversity to enrich the University's faculty and staff.</p>	<ul style="list-style-type: none"> • <i>Proportion of university buildings accessible to persons with physical disabilities.</i> • <i>Number of faculty and staff with disability provided with assistive technology.</i> • <i>Survey index on harassment, fear and intimidation available on UG intranet.</i> • <i>Proportion of ergonomical chairs and desks provided to faculty and staff.</i> • <i>Availability of flexible work schedules for faculty and staff with dependants in special circumstances such as dependants facing disability/illness or life-changing situations.</i> • <i>Frequency of UG Employees' Week celebrations.</i> • <i>Number of workshops organised on inclusivity and diversity in the workplace for faculty and staff.</i> • <i>Frequency of engagements held between administrative leaders and constituents.</i> • <i>MyBrightIdea desk/line established and accessible.</i> • <i>Number of innovative suggestions submitted through the MyBrightIdea desk/line.</i>
3.2	<p>Prioritise the wellbeing of our faculty and staff through comprehensive health and wellness programmes.</p>	<ul style="list-style-type: none"> • <i>Frequency of mental health seminars.</i> • <i>Mental health index of faculty and staff.</i> • <i>Mental health needs assessment and support for faculty and staff institutionalised.</i> • <i>Mental and Occupational Health/Wellness Policy available to all faculty and staff.</i>

No.	Objectives	Indicators
		<ul style="list-style-type: none"> • Mandatory leave periods for all faculty and staff. • Number of satellite offices of Careers and Counselling Centre operational on all UG campuses. • Number of well-equipped “Therapy and Wellness” facilities across the University. • Number of UG Self-Care Weeks annually. • Number of platforms (e.g., Digital) providing health and wellbeing information for faculty and staff. • Number of consulting and therapy rooms. • Number of professional practitioners providing wellness support services to faculty and staff.
3.3	<p>Improve the productivity of faculty and staff by providing state-of-the-art infrastructure, administrative and logistical support.</p>	<ul style="list-style-type: none"> • Proportion of faculty and staff with appropriate offices. • Proportion of faculty and staff with access to essential technology and tools. • Developed and operationalised policy on technology usage and maintenance. • Proportion of Senior Members provided with laptops for official tasks. • Frequency of staff satisfaction surveys regarding central administrative directorates’ services for staff. • Satisfaction rates from faculty and staff regarding central administrative directorates. • Improved lecturer to student ratio across colleges to conform to GTEC norms. • A functional MEAL Unit in IRPO. • Frequency of published MEAL reports. • Staff productivity index. • Indices for faculty teaching and scholarly productivity. • Full-time equivalent (FTE) productivity metrics for faculty and staff.

No.	Objectives	Indicators
3.4	Expand opportunities for the continuous development of the competencies of all categories of faculty and staff.	<ul style="list-style-type: none"> • <i>Operationalised policy on job analysis.</i> • <i>Frequency of job analysis reports.</i> • <i>Defined job roles and competencies for personnel.</i> • <i>Frequency of training needs assessment for faculty and staff.</i> • <i>Number of faculty and staff attending conferences and workshops.</i> • <i>Number of faculty and staff benefitting from the Legon Leadership Academy (LLA).</i> • <i>Number of faculty and staff undergoing UG sponsored CPDs and tailored programmes.</i> • <i>Recommended number of CPDs for faculty and staff.</i> • <i>Credits earned from attended CPDs.</i> • <i>Number of internally organised CPDs.</i>
3.5	Celebrate the achievements of our faculty and staff with a transparent reward structure.	<ul style="list-style-type: none"> • <i>A scheme established to recognise faculty and staff who secure funding for student scholarships and awards.</i> • <i>Number of faculty and staff recognised for meritorious service.</i>

PRIORITY 4

Engagement And Partnerships

No.	Objectives	Indicators
4.1	Establish and strengthen strategic partnerships for mutual benefit.	<ul style="list-style-type: none"> • <i>Number of operational guidelines developed and implemented for partnership activities.</i> • <i>Number of new international partnerships established, with a focus on emerging sectors.</i> • <i>Number of new local partnerships formed for mutual benefits.</i> • <i>Number of active partnerships with Memoranda of Understanding (MOU).</i> • <i>Quantified benefits (financial and non-financial) derived from local and international partnerships.</i> • <i>Partners' satisfaction score with the partnership engagement.</i> • <i>Overall satisfaction level with the strategic partnerships.</i> • <i>Frequency of partnership activities and collaboration.</i> • <i>Number of partner engagement programmes conducted.</i> • <i>Number of initiatives launched to strengthen existing local partnerships.</i> • <i>Number of initiatives designed to enhance newly established international partnerships.</i> • <i>Trust level among partnering organisations assessed through surveys or feedback mechanisms.</i>
4.2	Enhance outreach and advocacy with International Partners to address global challenges.	<ul style="list-style-type: none"> • <i>Level of commitment and support for the outreach and advocacy vision.</i> • <i>Number of improved existing international outreach and advocacy programmes.</i> • <i>Number of newly developed outreach and advocacy initiatives at international levels.</i>

No.	Objectives	Indicators
		<ul style="list-style-type: none"> • Number of international partnerships and alliances formed to address global challenges. • Number of international partnerships and alliances initiated to advocate for solutions to global challenges.
4.3	Strengthen collaborations for research, scholarship, and faculty and staff development.	<ul style="list-style-type: none"> • Number of collaborations established for research opportunities. • Number of collaborations established for scholarship opportunities. • Number of collaborations formed for faculty training and development. • Number of partnerships and alliances created to support faculty and staff development. • Number of partnerships and alliances formed for enhancing faculty research and scholarships. • Percentage of partner organisations gaining valuable insights or knowledge from partnership activities. • Percentage of partner organisations applying the knowledge acquired from partnership activities. • Number of annual engagements with industry to align academic curriculum with market needs.
4.4	Expand international experience for staff and students, through internationalisation of curriculum and equitable exchange opportunities.	<ul style="list-style-type: none"> • Number and proportion of staff and students participating in international study programmes, workshops and tours. • Number of international students and staff from other institutions attending study programmes, workshops and study tours at the University of Ghana. • Number of seminars held annually to promote the internationalisation of students and integration into global higher education networks.

No.	Objectives	Indicators
4.5	Enhance outreach and advocacy to address national development and community needs	<ul style="list-style-type: none"> • <i>Number of engagement activities conducted yearly across each College (Schools, Institutes, Departments and Centres).</i> • <i>Number of stakeholder engagement plans addressing partnerships with Metropolitan, Municipal and District Assemblies in Ghana.</i> • <i>Number of University-level outreach and knowledge exchange activities.</i> • <i>Number of public engagement events in research at the Unit level.</i> • <i>Number of engagements with traditional authorities to leverage their knowledge in addressing societal issues.</i>

PRIORITY 5

Sustainable Resource Mobilisation and Stewardship

No.	Objectives	Indicators
5.1	Increase and diversify internal and external revenue streams.	<ul style="list-style-type: none"> • Number of income-generating sources such as grants, fees from special programmes, commercial products, rental and leasehold, consultancy services, donations, endowments, legacy and returns from financial assets. • Number of new income-generating sources such as royalties for intellectual properties and patents. • Ratio of each income source to total income. • Ratio of income from various colleges to total income. • Growth in total revenue.
5.2	Improve operational efficiency, financial management and accountability.	<ul style="list-style-type: none"> • Ratio of accounts receivable to total income. • Ratio of accounts payable to total payments. • Ratio of operational cost to total income. • Ratio of other costs to total income. • Proportion of financial transactions that are automated. • Average number of days for paying recurrent expenditures (both procurement and non-procurement). • Average number of days for paying capital expenditures (both procurement and non-procurement). • Degree of deviation between budgeted and actual income and expenditure. • Number of financial audit queries. • Ratio of the amount in financial audit queries to total income. • Number of non-financial audit queries. • Timeliness of financial reporting.

No.	Objectives	Indicators
5.3	Strengthen the management and maintenance of the University's assets.	<ul style="list-style-type: none"> • <i>Maintenance policy and plan prepared and operational.</i> • <i>Average number of days to repair tangible assets.</i> • <i>Average number of days to renovate tangible assets.</i> • <i>Frequency of tangible assets maintenance.</i> • <i>Annual allocation for maintenance in the budget.</i> • <i>Annual budget allocation for training in asset management.</i>
5.4	Promote intelligent procurement practices.	<ul style="list-style-type: none"> • <i>Proportion of procurement processes that are automated.</i> • <i>Average number of days to complete procurement processes.</i> • <i>Staff satisfaction index regarding procurement.</i> • <i>Number of complaints related to procurement.</i> • <i>Number of procurement queries.</i> • <i>Average number of days to resolve procurement complaints.</i>
5.5	Promote sustainable infrastructural development.	<ul style="list-style-type: none"> • <i>Ratio of students to residential accommodation.</i> • <i>Ratio of students to academic facilities (e.g., lecture halls, laboratories, hubs, libraries).</i> • <i>Proportion of facilities that are fully accessible or user-friendly.</i> • <i>Number of climate change friendly building facilities.</i> • <i>Number of energy-efficient facilities including both buildings and equipment.</i> • <i>Gallons of water used monthly per building facility.</i> • <i>Kilowatts of power consumed monthly per building facility.</i>

CENTRAL ADMINISTRATION

Office of the Vice-Chancellor

Office of the Pro Vice-Chancellor (Academic & Student Affairs)

Office of the Pro Vice-Chancellor (Research, Innovation and Development)

Office of the Registrar

Balme Library

Office of Dean of Student Affairs

International Programmes Office

Centre for Teaching and Learning Innovation

University of Ghana Pan-African Doctoral Academy

Centre for Disability Studies and Advocacy (CEDSA)

ADMINISTRATIVE DIRECTORATES/UNITS

Academic Affairs Directorate

Research and Innovation Directorate

Finance Directorate

Human Resource and Organisational Development Directorate

Legal Affairs Directorate

Internal Audit Directorate

Risk Management Directorate

Public Affairs Directorate

Information Technology Directorate

Academic Quality Assurance Directorate

Health Services Directorate

Sports and Wellness Directorate

Physical Development and Municipal Services Directorate

Logistics and Procurement Directorate

Institutional Advancement Directorate

Institutional Research and Planning Directorate

Safety and Security Services Directorate

Careers and Counselling Directorate

ACADEMIC UNITS

COLLEGE OF BASIC AND APPLIED SCIENCES

SCHOOL OF PHYSICAL AND MATHEMATICAL SCIENCES

Department of Chemistry
Department of Computer Science
Department of Earth Science
Department of Mathematics
Department of Physics
Department of Statistics and Actuarial Science

SCHOOL OF BIOLOGICAL SCIENCES

Department of Animal Biology and Conservation Science
Department of Biochemistry, Cell and Molecular Biology
Department of Marine and Fisheries Sciences
Department of Nutrition and Food Science
Department of Plant and Environmental Biology

SCHOOL OF AGRICULTURE

Department of Agricultural Economics and Agribusiness
Department of Agricultural Extension
Department of Animal Science
Department of Crop Science
Department of Family and Consumer Sciences
Department of Soil Science
Forest and Horticultural Crop Research Centre (FOHCREC)
Livestock and Poultry Research Centre (LIPREC)
Soil and Irrigation Research Centre (SIREC)

SCHOOL OF VETERINARY MEDICINE

SCHOOL OF ENGINEERING SCIENCES

Department of Agricultural Engineering
Department of Biomedical Engineering
Department of Computer Engineering
Department of Food Process Engineering
Department of Materials Science and Engineering

SCHOOL OF NUCLEAR AND ALLIED SCIENCES

Department of Medical Physics
Department of Nuclear Safety and Security
Department of Nuclear Engineering
Department of Nuclear Sciences and Applications
Department of Nuclear Agriculture and Radiation Processing

INSTITUTES

Institute for Environment and Sanitation Studies (IESS)
Institute of Applied Science and Technology (IAST)

CENTRES

Centre for Climate Change and Sustainability Studies (C3SS)
West Africa Centre for Cell Biology of Infectious Pathogens Biotechnology Centre (WACCBIP)
West Africa Centre for Crop Improvement (WACCI)

COLLEGE OF EDUCATION

SCHOOL OF EDUCATION AND LEADERSHIP

Department for Educational Studies and Leadership
Department of Physical Education and Sport Studies
Department of Teacher Education

SCHOOL OF CONTINUING AND DISTANCE EDUCATION

Department of Adult Education and Human Resource Studies
Department of Distance Learning
University of Ghana Learning Centres

SCHOOL OF INFORMATION AND COMMUNICATION STUDIES

Department of Communication Studies
Department of Information Studies

UNIVERSITY OF GHANA KUMASI CITY CAMPUS

UNIVERSITY OF GHANA TAKORADI CITY CAMPUS

COLLEGE OF HEALTH SCIENCES

UNIVERSITY OF GHANA MEDICAL SCHOOL

Department of Anaesthesia
Department of Anatomy
Department of Chemical Pathology
Department of Child Health

Department of Community Health
Department of Haematology
Department of Medical Biochemistry
Department of Medical Microbiology
Department of Medical Pharmacology
Department of Medicine and Therapeutics
Department of Obstetrics and Gynaecology
Department of Pathology
Department of Physiology
Department of Psychiatry
Department of Radiology
Department of Surgery

UNIVERSITY OF GHANA DENTAL SCHOOL

Department of Biomaterial Sciences
Department of Oral and Maxillofacial Surgery
Department of Oral Biology
Department of Oral Pathology and Medicine
Department of Orthodontics and Pedodontics
Department of Preventive and Community Dentistry
Department of Restorative Dentistry

SCHOOL OF PUBLIC HEALTH

Department of Biological, Environmental and Occupational Health
Department of Biostatistics
Department of Epidemiology and Disease Control
Department of Health Policy, Planning and Management
Department of Population, Family and Reproductive Health
Department of Social and Behavioural Sciences

SCHOOL OF NURSING AND MIDWIFERY

Department of Adult Health
Department of Community Health Nursing
Department of Maternal and Child Health
Department of Mental Health
Department of Research, Education and Administration

SCHOOL OF PHARMACY

Department of Pharmaceutical Chemistry
Department of Pharmaceutics and Microbiology
Department of Pharmacognosy and Herbal Medicine
Department of Pharmacology and Toxicology
Department of Pharmacy Practice and Clinical Pharmacy

SCHOOL OF BIOMEDICAL AND ALLIED HEALTH SCIENCES

Department of Audiology, Speech and Language
Department of Medical Laboratory Sciences
Department of Nutrition and Dietetics
Department of Occupational Therapy
Department of Physiotherapy
Department of Radiography
Department of Respiratory Therapy

NOGUCHI MEMORIAL INSTITUTE FOR MEDICAL RESEARCH

Department of Animal Experimentation
Department of Bacteriology
Department of Clinical Pathology
Department of Electron Microscopy
Department of Epidemiology
Department of Immunology
Department of Nutrition
Department of Parasitology

Department of Virology

CENTRES

Centre for Tropical Clinical Pharmacology and Therapeutics (CTCPT)
West African Genetic Medicine Centre (WAGMC)

COLLEGE OF HUMANITIES

UNIVERSITY OF GHANA BUSINESS SCHOOL

Department of Accounting
Department of Finance
Department of Marketing & Entrepreneurship
Department of Operations and Management Information System
Department of Organisation and HR Management
Department of Public Administration and Health Services Management

UNIVERSITY OF GHANA SCHOOL OF LAW

SCHOOL OF ARTS

Department for the Study of Religions
Department of Archaeology and Heritage Studies
Department of History
Department of Philosophy and Classics

SCHOOL OF LANGUAGES

Department of African and Asian Languages
Department of English
Department of European Languages
Department of French
Department of Linguistics

SCHOOL OF SOCIAL SCIENCES

Department of Economics
Department of Geography and Resource Development
Department of Political Science
Department of Psychology
Department of Social Work
Department of Sociology

SCHOOL OF PERFORMING ARTS

Department of Dance Studies
Department of Music
Department of Theatre Arts

INSTITUTES

Institute of African Studies (IAS)
Institute of Statistical, Social and Economic Research (ISSER)
Merian Institute for Advanced Studies in Africa (MIASA)
Regional Institute for Population Studies (RIPS)

CENTRES

Centre for Ageing Studies
Centre for Asian Studies
Centre for European Studies
Centre for Gender Studies and Advocacy (CEGENSA)
Centre for Latin American Studies
Centre for Migration Studies
Centre for Social Policy Studies
Centre for Urban Management Studies
Language Centre
Legon Centre for International Affairs and Diplomacy (LECIAD)

UNIVERSITY OF GHANA ACCRA CITY CAMPUS

SCHOOL OF GRADUATE STUDIES

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PLAN OF LAND FOR LEGACY SITE, UNIVERSITY OF GHANA

Scale 1:2500

— Shewn Edged Pink —

Area 5.00 ACRES

LOCALITY
LEGON

DISTRICT
AYAWASO WEST

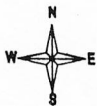
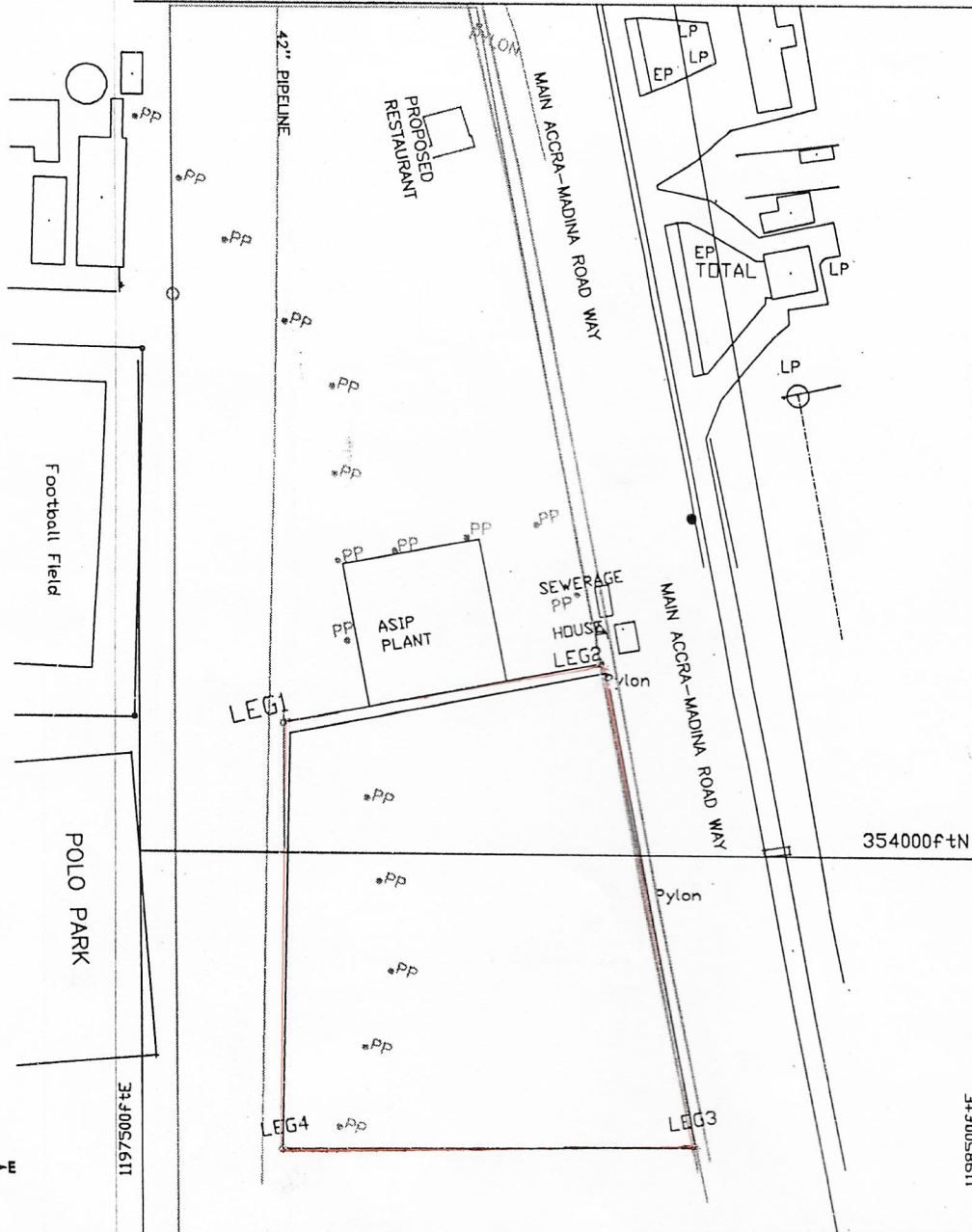
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GREATER ACCRA

BEACON INDEX

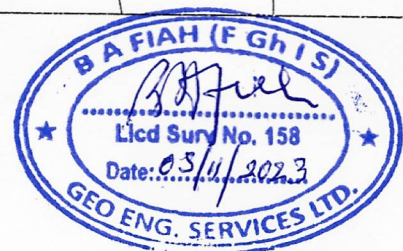
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LEG2	354214.2	1198053.8	169°37'	567.70	LEG3
LEG3	353655.8	1198156.2	269°26'	489.26	LEG4
LEG4	353650.9	1197666.4	001°25'	490.95	LEG1

355000ft+N

355000ft+N



I, B.A.FIAH, LICENSED SURVEYOR, CERTIFY THAT THIS PLAN IS FAITHFULLY AND CORRECTLY EXECUTED AND ACCURATELY SHOWS THE LAND WITHIN THE LIMITS OF THE DESCRIPTIONS GIVEN ME BY MY CLIENT.



GEOTECHNICAL REPORT

FOR THE PROPOSED

UNIVERSITY OF GHANA LEGACY PROJECT

AT

**AJAX PARK II AREA OF THE UNIVERSITY OF
GHANA IN THE GREATER ACCRA REGION OF
GHANA**

FOR

UNIVERSITY OF GHANA

The Project Manager
University of Ghana
Ghana

EM Geotech Limited
Post Box CT 3142
Cantonments - Accra

DECEMBER, 2023

Executive Summary

Geotechnical investigations has been carried out for the proposed University of Ghana Legacy project which will involve a few medium rise structures and support service facility at the Ajax Park 2 area of the University of Ghana, Accra, in the Greater Accra Region of Ghana.

Three (3No.) boreholes were drilled at locations distributed across the site to assess subsoil engineering characterization. Geophysical exploration involving seismic refraction survey was also undertaken to determine geophysical data to enable seismic velocity contrasts, configuration and depths of the subsurface geologic units

The main soil/rock layers identified across the site reveal that the site was made of a thin layer of sandy SILT topsoil, overlying very dense reddish brown sandy GRAVEL formation of 2.0 - 2.5m thickness, the former is underlain by very dense sandy GRAVEL of decomposed Schist rock formation overlying a weak highly weathered light grey quartzite Schist of the Togo series.

Spread foundations construction is feasible for the medium rise structures with possible basement development. It is recommended to be supported on a mat foundation placed on the dense sandy GRAVEL formation of ground type B, at 1.80 - 2.20m depth with safe bearing pressure of 300 kPa. For design of the mat foundation, we recommend using a nominal value of the coefficient of subgrade reaction of $k_s = (40 - 80)/B$ MPa/m, where B is the smaller dimension of the mat. We recommend the maximum allowable sustained load bearing pressure (i.e., dead plus live) not to exceed 400 kPa, and under short-term extreme loading conditions (including seismic) not to exceed 400 kPa.

An agreed on deep rock horizontal peak ground acceleration (PGA) of 0.16g is recommended for the design of the proposed substructure. These values are defined for an annual exceedance probability of 10% in 50 years.

The recommendations given in this report are based on the opinion of engineers of EM Geotech Limited, and take technical feasibility, construction expediency, and cost into account.

EM Geotech Ltd.
Civil & Geotechnical Engineers,
Accra

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1.0 Introduction

1.1 Background

The University of Ghana plans to celebrate its 75th Anniversary by undertaken a grand Legacy project which will include constructing a medium rise structure to serve the university going forward. The site allocated for the development is found close to the Ajax 2 park of the University of Ghana of Accra in the Greater Accra Region of Ghana.

EM Geotech Ltd, a Civil and Geotechnical engineering concern is charged with conducting detailed subsurface studies at the site with the goal of making recommendations on the suitability of the grounds as to its safety and reliability.

1.2 Objectives of the Report

The main objective of the investigation was:

- to obtain detailed knowledge of the soils to be encountered at the site and their likely behaviour on the substructures;
- to determine groundwater/hydrogeological potential likely to enhance habitation of the project area;
- to determine geophysical data to enable seismic velocity contrasts, configuration and depths of the subsurface geologic units.
- to establish design parameters and present basis for the design of substructure elements of the Legacy project at UG, Legon.

2.0 The Site

2.1 Location

The project is to be sited on a plot shown in figure 1. The site is geographically located about the coordinates 624600 - 624800"N and 812300 - 812500"E close to the Ajax Park 2 of the University of Ghana. The general area is virtually a farm land at the time of commencement of the project that is surrounded by football fields.

2.2 Geology of Project Site

The geology of Accra and in particular this area was extensively mapped in the late 50's and early 60's as a result of the high rate of development being carried out in the area. A geological map compiled by Harris [3] shows the project area to be underlain by the Togo Series which comprises quartzites, schist and in certain places shale's and Phyllite [1] (Fig. 2).

The superficial deposits overlying the Togo Series have been mapped with an accompanying report by Bhatia [4]. In this work the soils overlying the site are identified as medium dense

sandy SILT with gravel. A typical profile reveals that these formations rest over medium dense sand with lenses of clay which is believed to be the product of heavy weathering of the underlying bedrock. The Togo Series, being metamorphosed rocks however show a completed structure with various folding, shear planes and faults etc.

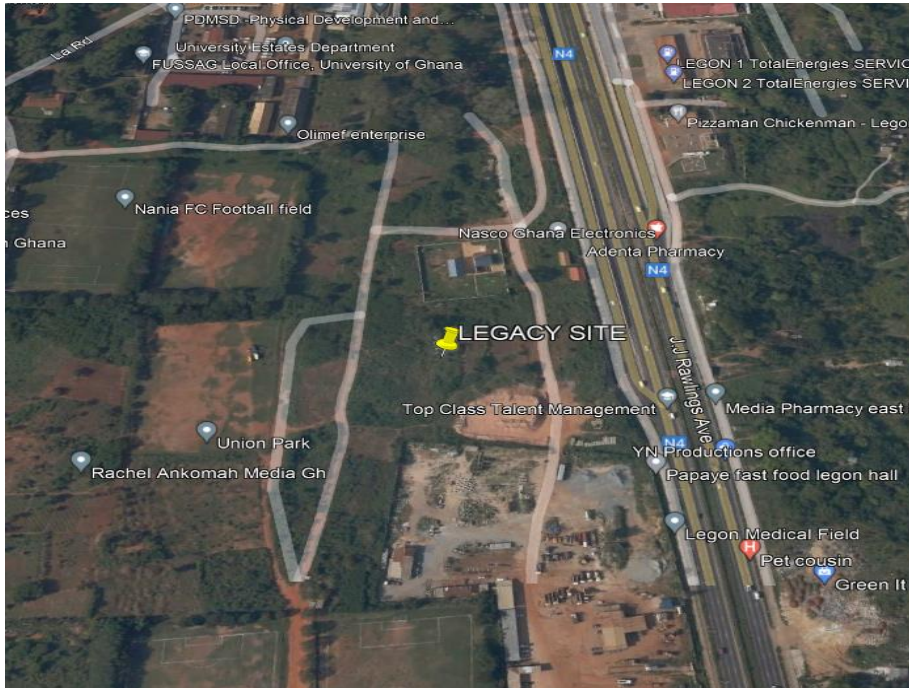


Figure 1: The Proposed UG Legacy project site

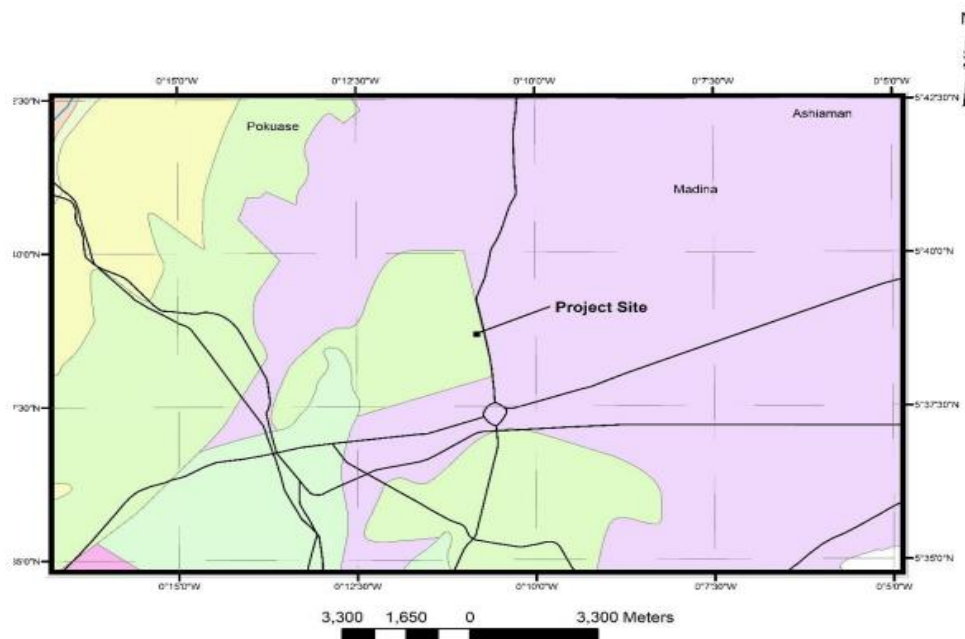


Figure 2: Geological map of the University of Ghana study area [2]

2.3 Seismicity

The tectonic setup of South-Eastern Ghana and its off-shore area is characterized by three areas with distinct tectonic elements (see Fig. 2). These are (1) the Akwapim fault zone, (2) faults in the coastal area and near coast shelf with the coastal boundary fault as main feature, and (3) the Romanche Fracture Zone [5,6].

In general, seismic activity in Ghana is concentrated along the coastal belt, with the Weija area east of Accra, noted as the most highly seismic part of the country (Appendix A). Because of the concentration and frequent occurrence of seismic activity in the area where the Akwapim fault zone and coastal boundary fault intersect and along the coastal boundary offshore zone, this area is referred to as SE-Ghana Tectono seismic Province (SEGTP) [5]. Earthquakes in this zone are generally shallow with hypocenters at depths less than 20 km.

Accra, which falls in this zone has experienced major seismic events in 1862 and 1939, in addition to numerous other minor shocks of engineering significance. Most of these had their epicenters within the SEGTP. Indeed continued seismic activity in this area is confirmed with numerous local seismic events of M3 or greater continue recorded and assigned to either fault system.

3.0 Fieldwork and Laboratory Testing

3.1 Field Investigation

The ground investigation was undertaken in accordance with the BS 5930 Standard Code of Practice for Site Investigations [7]. The investigation was commenced on the 18th November, and completed on the 20th November, 2023. Three (3No.) boreholes were drilled at the proposed locations indicated by the Engineer. Geophysical exploration involving seismic refraction survey was also done to determine seismic velocity contrasts, configuration and depths of the subsurface geologic units.

The location of the boreholes and seismic refraction survey lines are shown in Appendix A.

The Pilcon Wayfarer 1 ton cable percussion rig was employed to advance 150-mm diameter holes using steel casings and standard cable percussion tools. The boreholes were terminated when the standard penetration test (SPT) recorded refusal (i.e. $N > 50$ blows/300mm) and chiselling could not advance the hole appreciably.

The boreholes were distributed so as to give a fair representation of the existing subsurface conditions across the site. Bulk disturbed soil samples were taken from the boreholes at regular

intervals. In - situ Standard Penetration Test (SPT) was carried out frequently in the overburden as drilling progressed. Samples of the soil was extracted to help determine ground water characteristics that may be likely to be deleterious to ordinary Portland cement and steel.

3.2 Subsurface Conditions

Field identification of soil samples recovered from the boreholes reveal that the site was made of a thin layer of silty sand topsoil (0.4m) overlying very dense reddish brown sandy GRAVEL formation of 2.0 - 2.5m thickness, this then underlain by very dense sandy GRAVEL of decomposed Schist rock formation (2.0 - 2.2m thickness).

Weak, quartzite SCHIST type rock is encountered at depths of between 4.0 - 5.8m depth across the site. The thickness of this decomposed rock is obviously dependent on the degree of weathering of the underlying weathered quartzite Schist parent rock. This layer was most often penetrated by water aided chiseling.

The results of the particle size distribution carried out on samples are shown in Appendix D. The clay layer registered clay contents of 11 - 14%. The plasticity index of the clay also ranges between 9 - 12%. The dense foundation soil is reddish brown in colour and has bulk densities between 1.8 - 2.2 Mg/m³

3.2.1 Highly Weathered Schist

The country rock material encountered could best be described as a weak, light grey/yellowish brown, moderately to highly weathered quartzite schist with relic structures found beyond 4.3 m depth across the site.

The top portion of the rock is very weak and weathered but gains strength and consistency with depth.

3.2.2 Surficial Groundwater

No groundwater was encountered during the field exercise in any borehole drilled or trial pits dug. The chemical analysis of samples of soil/water however indicates that the concentrations of unsaturated sulphate ion, and the pH are within the tolerable limits and special precautions need not be applied (Appendix E).

3.3 Geophysical Exploration

3.3.1 Seismic Refraction Survey

Seismic refraction data acquisition was carried out using a 24 channel SmartSeis ST Exploration Seismograph manufactured by Geometrics Inc. of U.S.A.

Pictures in Appendix D show 8.2 kg sledgehammer source, metal plate and 4.5-Hz vertical geophones used to generate and receive primary waves that were recorded on the seismograph.

Spread cable was laid linearly on the ground. Twenty-four (24) geophones were planted into the ground and connected to a spread cable which was in turn connected to the seismograph as can be seen in Fig 3. Investigation was conducted using a geophone spacing of 5 meters. Primary waves were generated by vertically striking a metal plate with the sledgehammer at specified locations along the profile. Noise was kept to a minimum by monitoring the signals. Shots were stacked 5 to 10 times at each shot-point and, for the most part, energy was reaching across the spread. A total of two lines were run at the site namely L100 and L200 to cover the proposed project site as shown in Appendix D. Coordinates for the various Lines can also be seen on Appendix D.

The recorded seismic data were uploaded to a computer. Processing of the data was done using SeisImager/2D™ system. The first breaks were picked and travel-time diagrams were created using the Pickwin and Plotrefa modules of the SeisImager program. In processing the data collected from the field, there were three methods available in the Plotrefa module of the SeisImager software: a time-term inversion method, a reciprocal (delay-time) method, and a tomographic method. Initial velocity sections were created using the time-term method. Output from the time-term method was used to generate the initial model for the tomographic velocity sections. The tomographic velocity sections were selected as the final models because they provide more details of the subsurface materials for all the profiles.

Multichannel Analysis of Surface Waves (MASW) is a non - destructive seismic method used for subsurface characterization using shear wave velocities. The basis of most surface wave analysis methods is accurate determination of the frequency-dependent phase velocity of fundamental mode Rayleigh waves (Park, Miller, & Xia, 1999), i.e. the experimental fundamental mode dispersion curve. MASW data acquisition was carried out at the site to determine:

- i. Dispersion analysis (Determination of a Rayleigh wave dispersion curve).
- ii. Inversion analysis (Determination of a shear wave velocity profile).

In general, the uppermost 20 - 30m shear wave velocity profile of the subsurface material is of most interest for engineering purposes to evaluate the stiffness of the topmost soil layers and their load bearing capacity which is a vital parameter in both liquefaction potential and soil amplification assessments.[25]

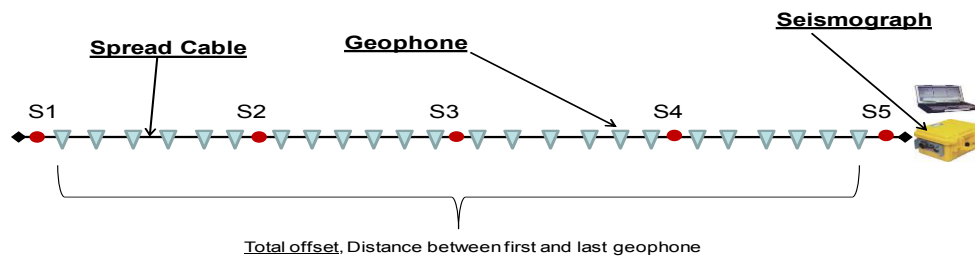


Fig 3: Schematic field configuration, red circle indicating shot location.

The depth of seismic refraction investigation (Speed length) is one third ($1/3$) of the total length of the profile which measured on site was 120m. This means the depth of investigation is 40m.

3.3.2 Procedure for MASW

The same equipment was used for the data collection. Roll along method was used for the data collection which was run perpendicular to the refraction survey. The configuration consisted of 12 geophones (4.5 Hz natural frequency) placed at a uniform spacing of 2m with a total array length of 24m. While the offset distances for the geophones were placed at different intervals in the order of 0m, 2m, 4m, 6m, and 8m to 10m.

The site provided a relatively quiet atmosphere for seismic data acquisition, as ambient and cultural noise was limited and 5 to 7 stacks were used to enhance data quality.

The selection of field parameters was based on documented guidance provided by the Kansas Geologic Survey (Ivanov, Park and Xia, 2009). For data acquisition, the recording time and sampling intervals were set at 1 second and 0.5 milliseconds, respectively. Processing of shot records was performed using the ZondST2D software package, developed by Zond geophysical software Saint Petersburg.

3.4 Laboratory Testing

The following standards engineering tests were performed on selected representative samples of soil recovered from the boreholes and trial pits dug. Results of all laboratory tests summarized and presented in Appendix E. All tests were based on the British Standard, BS 1377 [12] and BS EN 1997-Part 2 [11], and relevant AASHTO specifications [13].

3.4.1 Classification Tests

Standard tests were performed for the determination of:

- Natural moisture content
- Atterberg limits

- Particle size distribution by sieving and pipette method
- Specific gravity
- Bulk density of soil

3.4.2 Chemical Tests – Soil Extracts Only

Standard tests were conducted for the determination of

- pH of aqueous soil
- sulphate content of aqueous soil
- chloride content of aqueous soil

4.0 Geological Hazards

Strong ground shaking during an earthquake can result in ground failure conditions such as: soil liquefaction, lateral spreading, differential compaction, and excessive ground vibration. The first three are discussed below; ground vibration is accounted for by developing the seismic input for structural analysis and is tackled in the next section.

4.1 Ground Rapture

Ground rapture is the rapture of the ground due to surface faulting. Based on unidentified significant seismogenic sources in the area, ground rapture is assessed to be highly unlikely.

4.2 Seismic Compaction

Seismic densification or differential compaction occurs during strong ground shaking in loose, clean granular deposits above the water table. Soils encountered in the area generally have appreciably lower levels of clay content, the potential for seismic densification is therefore considered low.

4.3 Liquefaction

Liquefaction is the phenomenon whereby under dynamic loads, saturated soils (mainly loose sands and some loose silty or clayey soils) lose their strength and stiffness due to the build-up of excess pore pressure. The factors affecting liquefaction susceptibility include: the type and compactness of the soil, natural water content and plasticity of fines, gradation, and the magnitude and duration of the ground motion.

The site is composed mainly of an upper surficial sandy silt, underlain by a dense to dense sandy gravel. Noting the composition, denseness and plasticity of these soil layers, the soils at the site are not prone to liquefaction.

4.4 Lateral spreading

Lateral spread is the finite, lateral displacement of sloping ground (0.1 to <6 percent) as a result of soil liquefaction during an earthquake. This occurs when a soil mass slides laterally on a liquefied layer in a downslope direction. The magnitude of lateral spreading movements depends on various factors including, earthquake magnitude, distance between the site and seismic event, thickness of the liquefied layer, ground slope, etc. As stated in the previous section, the liquefaction potential for the site is considered low, lateral spread potential is therefore also considered to be low.

4.5 Seismic Design Parameters

4.5.1 PGA Estimation

A detailed seismic hazard assessment study is yet to be conducted for the country. On a macro-scale hazard for the African region, a Global Seismic Hazard Assessment study [8] was conducted. This provided the Accra region with a rock peak ground acceleration of 0.16g for an annual exceedance probability (AEP) of AEP of 10% in 50 years. This is noted in the literature to be a lower bound estimate [9].

From the above, and based on a knowledge of the seismic hazard of the area, the geologic setting of Southern Ghana, and ground motion estimates from other similar locations in the world with similar seismo-tectonic features, a deep rock PGA (i.e., zero-period spectral acceleration) with an annual exceedance probabilities of 10% in 50 years of 0.15 - 0.2g could be assumed for the site.

5.0 Foundation Consideration

5.1 General

This section provides interpretation, discussions and conclusions from the results obtained from the geotechnical investigation in regards to the suitability of foundations for the proposed UG Legacy project and its environs.

As noted, the subsurface condition comprises mainly three soil layers: a thin layer of sandy silt topsoil, overlying very dense reddish brown sandy gravel formation, the former is underlain by very dense sandy gravel of decomposed Schist rock formation.

5.2 Geophysical Testing

5.2.1 Seismic Refraction

Velocity sections from seismic refraction survey show that the subsurface is classified into four distinct seismic layers. The first layer has compressional velocities averaging between 600m/s and 770m/s. The second layer corresponds with velocities range from 970m/s to 1150m/s, indicating a layer of compact sediments. The third layer is characterized by seismic velocities averaging between 2080m/s and 2430m/s for weathered rock. The fourth layer is fresh rock with compressional velocities varying between 2820m/s and 3900m/s signifying competent bedrock which correlates well with the geology of the project site.[24]

Depth to weathered rock ranges from 2 - 6m and depth to bedrock is between 7 - 14m. Generally, the site shows moderately distribution of residual soil but variations in the thickness of the weathered rock. These zones indicate a lateral change in compressional velocities in the homogeneous rock.

5.2.2 MASW

From the phase-velocities images in frequency domain (dispersion curves) and shear wave velocity profiles, the shear wave velocity of the subsurface material to the bedrock which was run along line 100 and 200 ranges from 330m/s to 1330m/s, depth to weathered rock is between 2.7m to 3.1m and depth to bedrock ranges from 8.9m to 13.3m. maximum depth of investigation is 45m. V_{s30} is provided below ;

Geophysical investigation involving soil resistivity survey has been performed, this was to provide amongst others, information about the resistivity variation of the underlying soil material with depth.

Line / offset	Frequency Range (Hz)	Vs Range (m/s)	Depth to Weathred rock (m)	Depth to Bedrock (m)	V30
L100 (12m offset)	22 - 34	330 - 1060	3.1	8.9	760
L100 (10m offset)	23 - 45	350 - 1330	2.7	13.3	900
L200 (12m offset)	22 - 36	370 - 1090	3.1	8.7	1005
L200 (10m offset)	22 - 31	370 - 1220	3	8.7	1350

Table 1 : Results of Shear wave Velocity Profiles of all Shots Points

Based on V_{s30} values (900 - 1005), the site may be classified to be of Classification B based on the National Earthquake Hazard Reduction Program (EHRP) classification provided below as Table 2.

Soil Classification	Soil Profile	Vs30 (m/s)
A	Hard Rock	Vs30 > 1500
B	Rock	760 < Vs30 < 1500
C	Soft Rock	360 < Vs30 < 760
	Dense Soils	
D	Stiff Soils	180 < Vs30 < 360
E	Soft Soils	Vs30 < 180

Table 2: Site Classification based on NEHRP

5.3 Foundation Construction

Judging from the field SPT values, in-situ testing carried out during the borehole boring exercise, it is recommended that the foundation of the proposed medium rise structures be founded within the very dense sandy GRAVEL (Hardpan) layer. That is, the foundations may employ shallow footing at the site at 1.80 – 2.20m depth across the site. It is determined that spread foundations would be an appropriate foundation system for the proposed structure.

Groundwater was not encountered in the boreholes drilled and has subsequently been accounted for in the development of the foundation bearing estimates. The foundations could correspondingly be deeper if load considerations are excessive of a substation.

The structures are estimated to exert bearing pressures of up to 300kN/m² may be placed at a minimum depth of 1.8 m on spread foundation.

5.3.1 Ultimate Bearing Capacity

Ultimate bearing capacities were estimated using the general bearing capacity equation (Eq. 1) with derived strength parameters.

$$q_u = c_u N_c s_c i_c d_c + 0.5 B \gamma_t N_\gamma s_\gamma i_\gamma d_\gamma + q_s N_q s_q i_q d_q \quad (1)$$

where:

- c_u : undrained cohesion
- B : foundation width
- γ_t : bulk unit weight of the soil medium
- γ_w : unit weight of water
- q_s : surcharge load at foundation depth
- N_c, N_γ, N_q : bearing capacity factors
- s_c, s_γ, s_q : foundation shape factors
- i_c, i_γ, i_q : load inclination factors
- d_c, d_γ, d_q : foundation depth factors

The results obtained for ‘N’ may be used to estimate bearing ability for granular soils of sandy gravel formations. This is done in conjunction with estimated width (B) of footing, and this is read off in the relationship established by ‘Terzaghi and Peck’ [16] curve for soils, allowable bearing pressure in kN/m^2 .

$$Q_{\text{all}} = \frac{N}{0.08} \left[B + 0.3/B \right]^2 \quad \text{for } D > 0 \quad (2)$$

The SPT's of the sandy gravel generally was greater than 40, with even some locations reporting refusal. The effective friction angle of 40° is used to represent the dense sandy gravel layer, and is chosen based on SPT/density angle of friction correlations shown in Figs 4 & 5.

From Eq. (1), this provides an ultimate bearing capacity of approximately 5 MPa for footing sizes over 1.5 m under concentric loading was obtained, for footings located at the specified foundation depth of 1.2 m.

5.3.2 Settlement

At the specified foundation depth, total settlements are equal to the immediate (elastic) settlements. The parameters used for the settlement evaluation are provided below:

Sandy gravel

Poisson's ratio, ν	0.30; AASHTO [17] and Look [18]
Elastic Modulus, E_m	50 - 100MPa; Dense gravel AASHTO [17] Deriving from SPT-based correlations: SPT range used, i.e., $N > 35$ a) Bowles [19]: $1200(N + 6)$ kPa, > 48 MPa b) Rowe [20] (Fig. 14): 35 - 65MPa $E_m = 35 - 70$ MPa range used

Based on the settlement calculations, the following can be noted:

- A 300 kPa bearing pressure results in a minimum settlement of 25 mm.
- The EC7 limiting settlement of 50 mm is achieved with a bearing pressure close to 400 kPa.
- The nominal value of the coefficient of subgrade reaction (k_s) between $40,000/B$ - $80,000/B$ kPa/m, is recommended, where B is the smaller dimension of the foundation.
- Horizontal sliding of the foundation should be assessed with surface friction angles that are two-thirds of the soil friction angle, i.e. $2/3\phi$.
- Deep foundations construction is feasible with bearing pressure of 800 - 1000 kPa with parameters on axial pile capacity, skin friction and end-bearing minus the pile weight considerations.

5.3.3 Earthworks

The various earth pressure coefficients are provided in Table 3. It is important to note that seismic earth pressures are not provided for the passive state. Under the passive condition, dynamic earth pressures are opposite in direction to the static case, and result in reduced passive forces.

Table 3: Earth pressure coefficients

	Static conditions		Seismic conditions
	K_a	K_p	K_{ae}
Compacted sandy gravel	0.22	4.5	0.26
Overburden sandy soils	0.33	3.0	0.37

As noted by Kramer [22], the static portion of the seismic earth pressure can be taken to act at $H/3$, whereas the dynamic portion should be assume to act at $H/2$.

5.3.4 Deformation Properties

The required deformation properties of soils found at the site are the equivalent elastic modulus and the Poisson's ratio. The equivalent elastic modulus property of the soils, which is used for immediate settlement prediction, is estimated using SPT-based correlations from noted literatures. Due to the inherent variation of these correlations, various correlations are used for the different types of soils identified at the project site; these are basically taken from AASHTO [17] and Bowles [19].

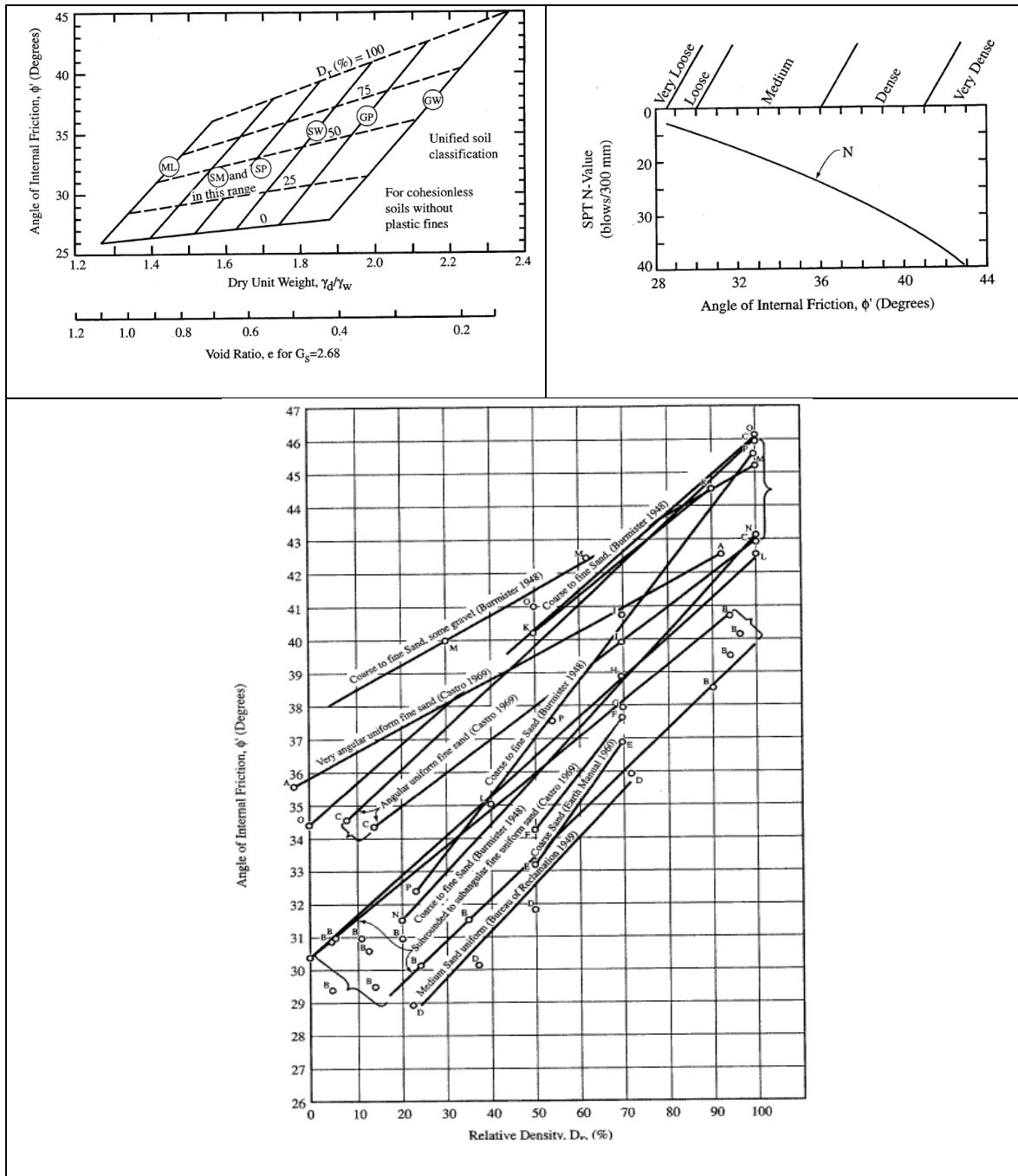


Figure 4&5: Charts of effective friction angle for various sands from FHWA guidelines[15]

6.0 Recommendations

6.1 Foundations

It is technically feasible to found on spread footings in the very dense sandy GRAVEL layer at a least depth of 1.8m, this is expected to exert bearing pressures of up to 300kN/m² considering local environment within which construction is to be undertaken.

6.2 PGA Estimation

An agreed on deep rock horizontal peak ground acceleration (PGA) of 0.16g is recommended for the design of the proposed substructure. These values are defined for an annual exceedance probability of 10% in 50 years.

6.3 Excavation and Engineering Fills

In accordance with Ref. [21], upper-surficial soils on the project site can be classified to range between Type A&B soils. Ref. [21] sets the maximum allowable slope for Type B soils with a maximum depth of 3 m to be 45°. Maximum allowable slopes for the proposed excavation for the new substation should thus be 45°, or 1:1 (H:V). In cases where cut slopes are considered to be unstable, some form of shoring should be provided, or flatter slopes should be used.

All structural filling and backfilling to foundations and structures is proposed to be tested as per the Ministry of Roads & Highway Specification (2007) [23] and approved. All fill shall be moisture-conditioned and laid in small lift thicknesses compactible with the compaction equipment. All subbase compaction must achieve 95% density relative to the laboratory MDD. The plate load testing must be employed to determine the suitable and stability of the formation as per the load bearing and deformation characteristics.

6.4 Site Drainage and Grading

Given the good natural slope of the site, it is feasible to provide a simple but effective surface drainage scheme to collect surface water from rainfall off the site without difficulty.

6.5 Construction Materials

Test must be conducted in line with the British and American Standard for the determination of suitability of all construction materials including cement, sand and water as per the necessary specifications before use for the works;

(i) Cement : Cement shall comply with the following requirements ;

BS EN 197-1 Cement Composition, specifications and conformity criteria for common cements and BS EN 4027 Specification for sulphate-resisting Portland cement stated in the relevant clauses of the Ghana Building Code (GS1207:2018) for specification for "concrete and reinforced concrete".

(ii) Sand : Sand shall be clean sharp river or pit sand, well graded and entirely free from loam, clay, dust or organic matter to the requirements of EN 13139.

(iii) Water : Water shall be potable water complying with BS EN 1008.

Potential alkali reactivity The potential alkali reactivity of aggregates shall be tested in accordance with ASTM C 289 (chemical method). The reduction in alkalinity and the amount of dissolved silica as determined from the test shall be plotted on fig. 2 of ASTM C 289 to indicate that the aggregate is considered innocuous.

6.6 Geotechnical Construction Services

During construction, field engineers should provide on-site observation and testing during installation of civil structures, shoring, earthworks, etc. These observations will allow us to compare actual with anticipated soil conditions and check to ensure that the contractor's work conforms with recommended geotechnical aspects for the project.

7.0 Limitations

This report includes boring logs, field and laboratory testing results as well for foundations, earthwork and other geotechnical related issues. The subsurface conditions presented in the report reflect only the conditions at the location and depth where the borings are drilled. The geotechnical consultant for any future construction work is responsible to interpret the results of the boring logs, field and laboratory testing results, and evaluate if the recommendations are appropriate for the project.

8.0 References

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Appendix A: List of Figures

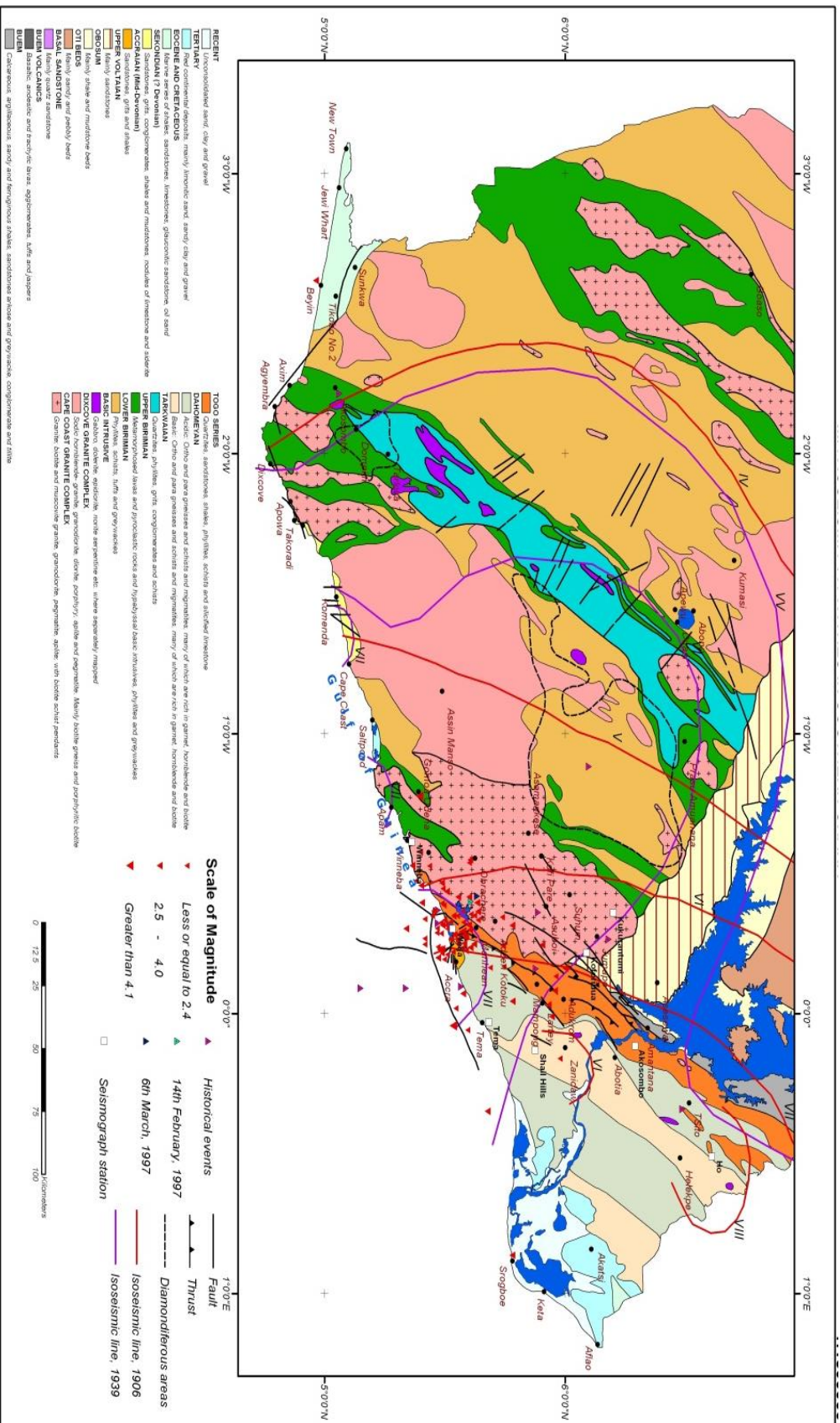


Figure 1: Geological Map of Southern Ghana

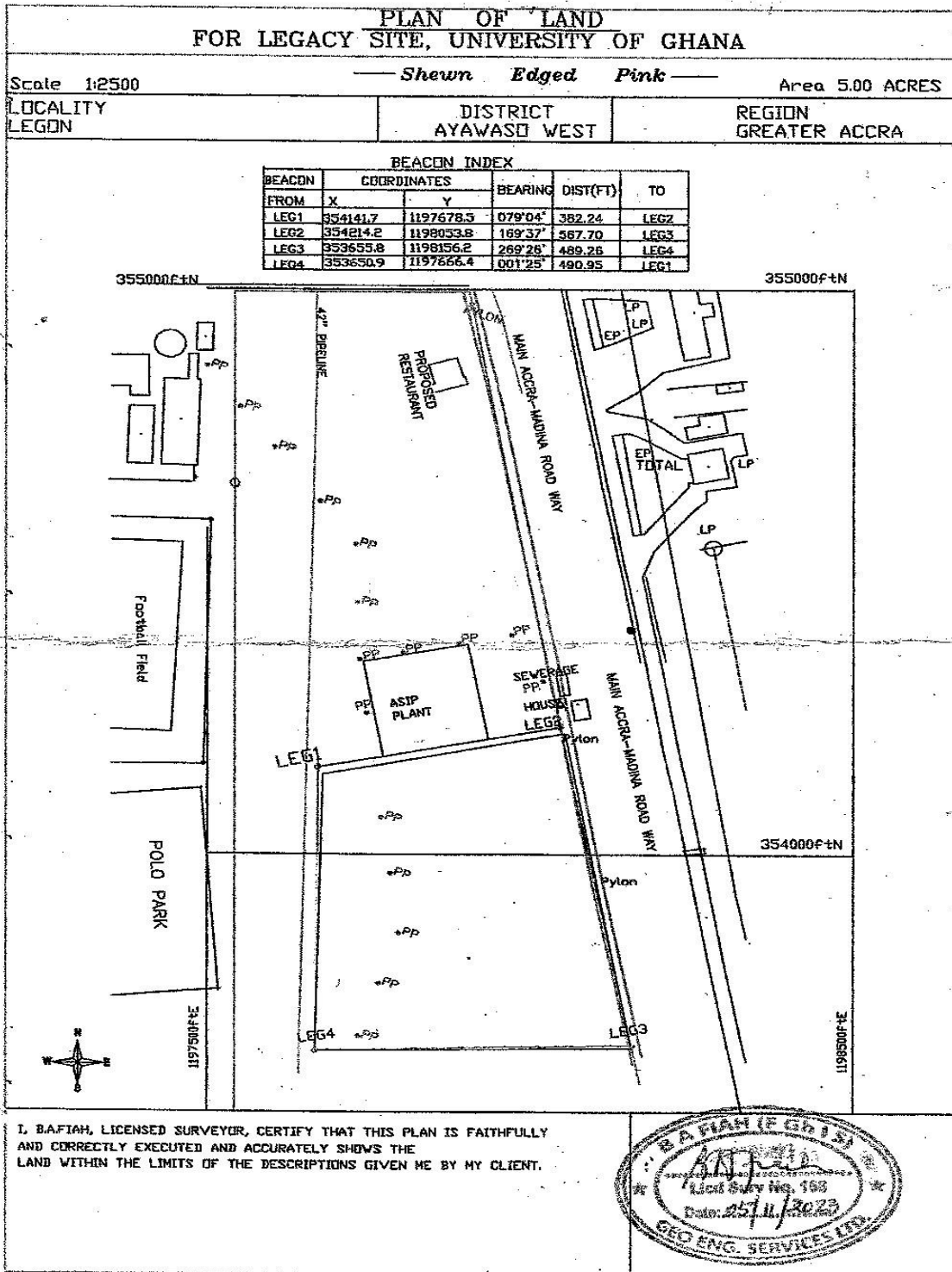


Fig 2 : Site Plan of the Legacy Project Site

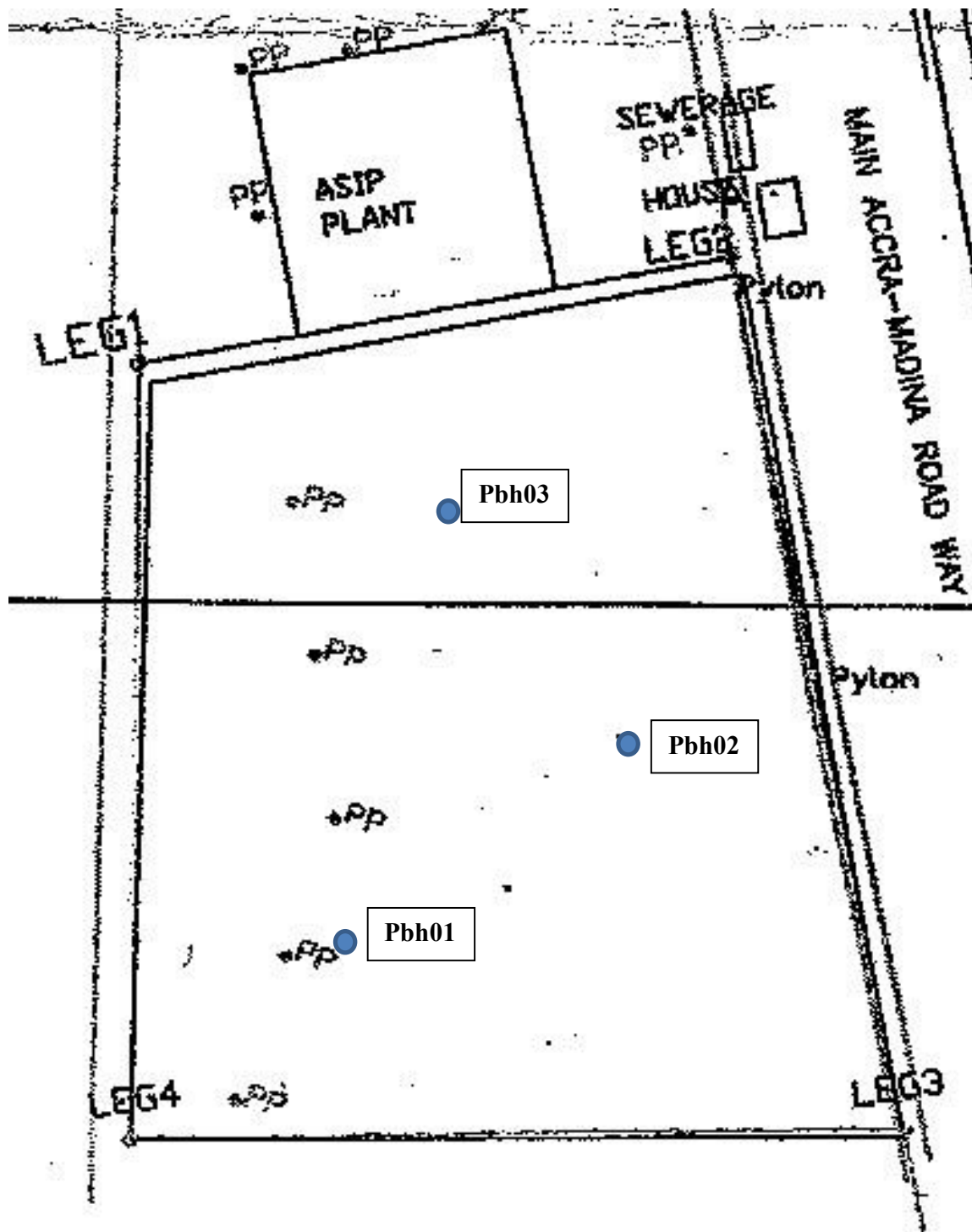
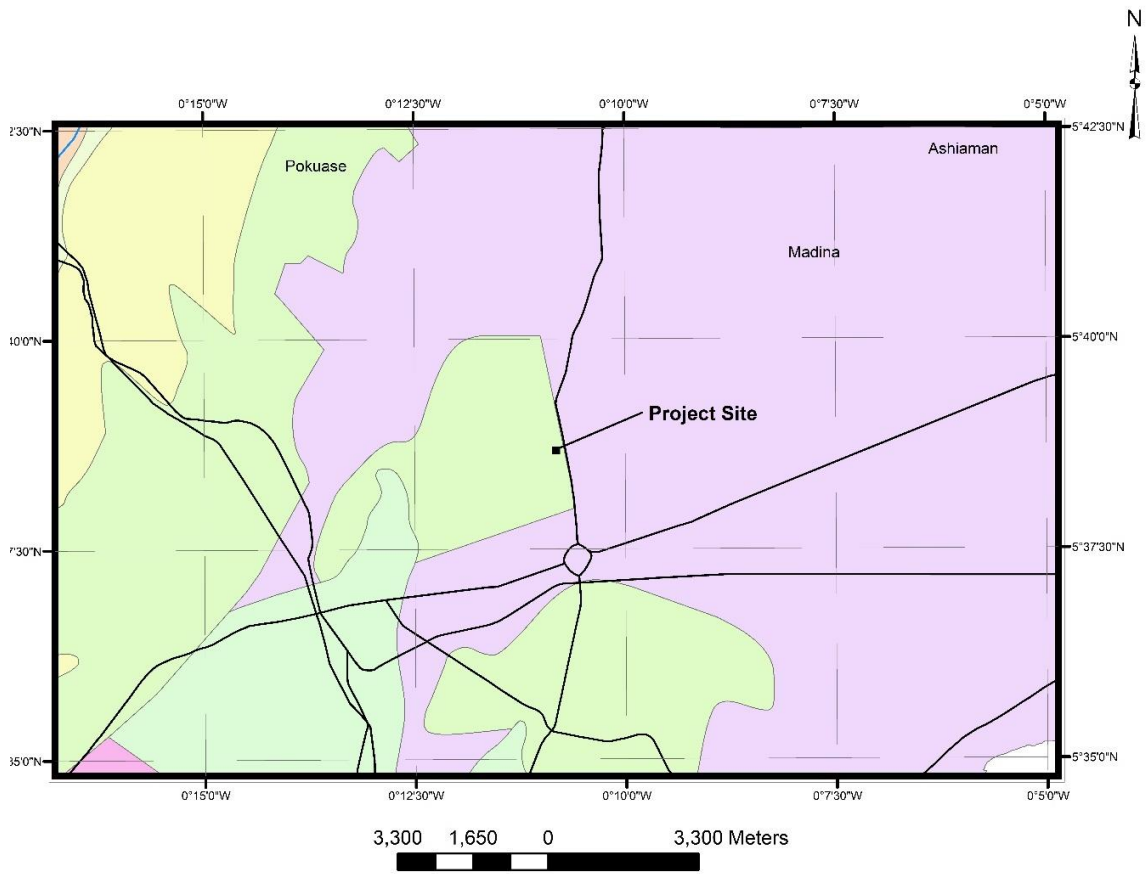


Fig 3 : Site Plan Showing Percussion Drilling Location



Legend

— transport_polyline

— hydro_polyline

geology_polygon

Legend_Tex

Garnet quartzite, quartz-sericite (-garnet) schist, quartzo-feldspathic gneiss (+/- garnet)

Granitoid gneiss, biotite gneiss

Mica schist (+/- chlorite), minor quartzite

Mudstone, finely laminated ('Korle Bu Fm')

Quartzite, minor mica schist

Sandstone, thickly bedded to cross-bedded, medium grained, quartzose, with micaceous and finer grained sandstone towards base ('Mpraeso Fm')

Sandstone, thickly bedded, medium grained ('Kaneshie Fm')

Figure 4 : Geological Map of North of Accra Showing Project location

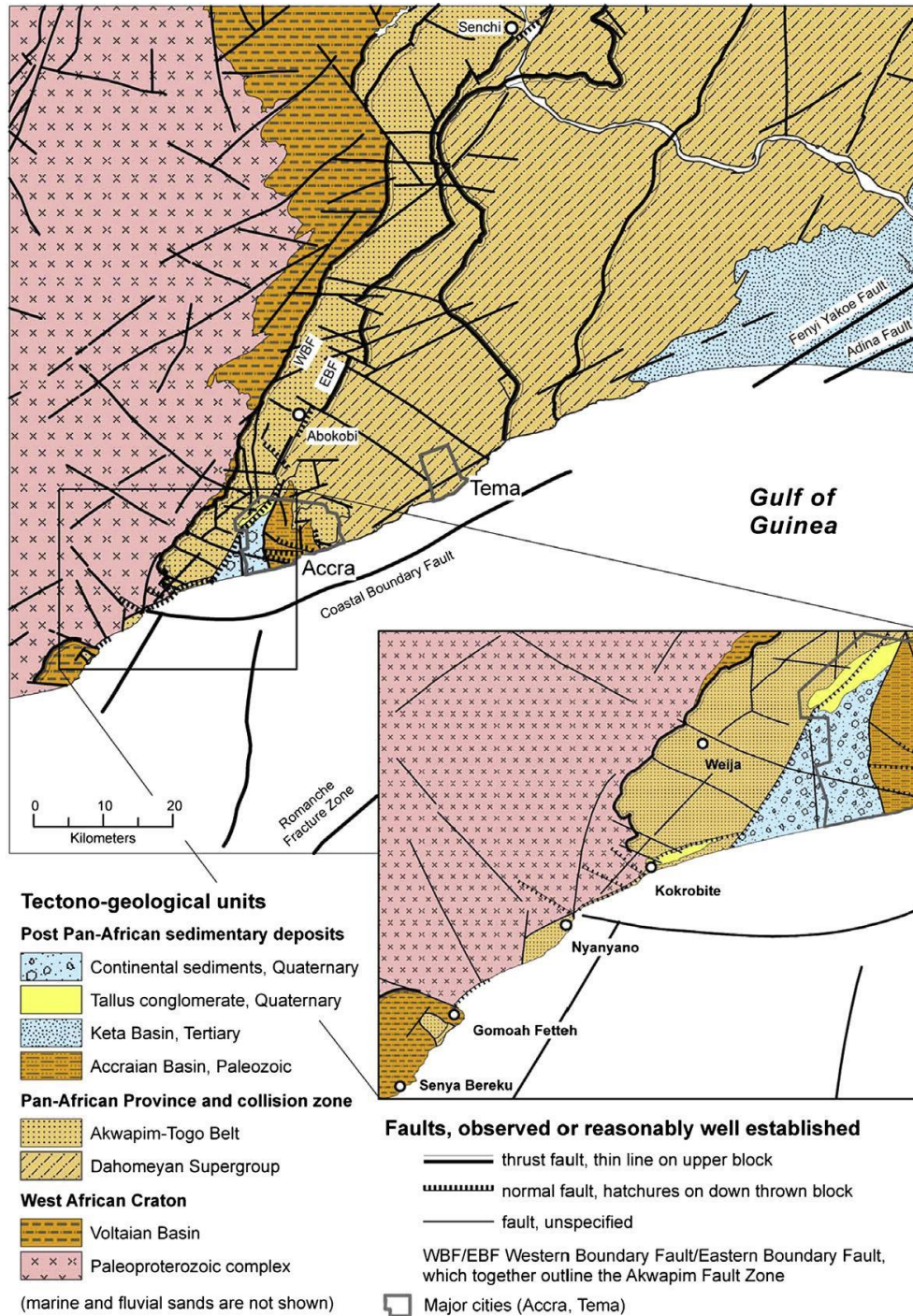


Figure 5: Tectono-Geological Sketch Map of South-Eastern Ghana

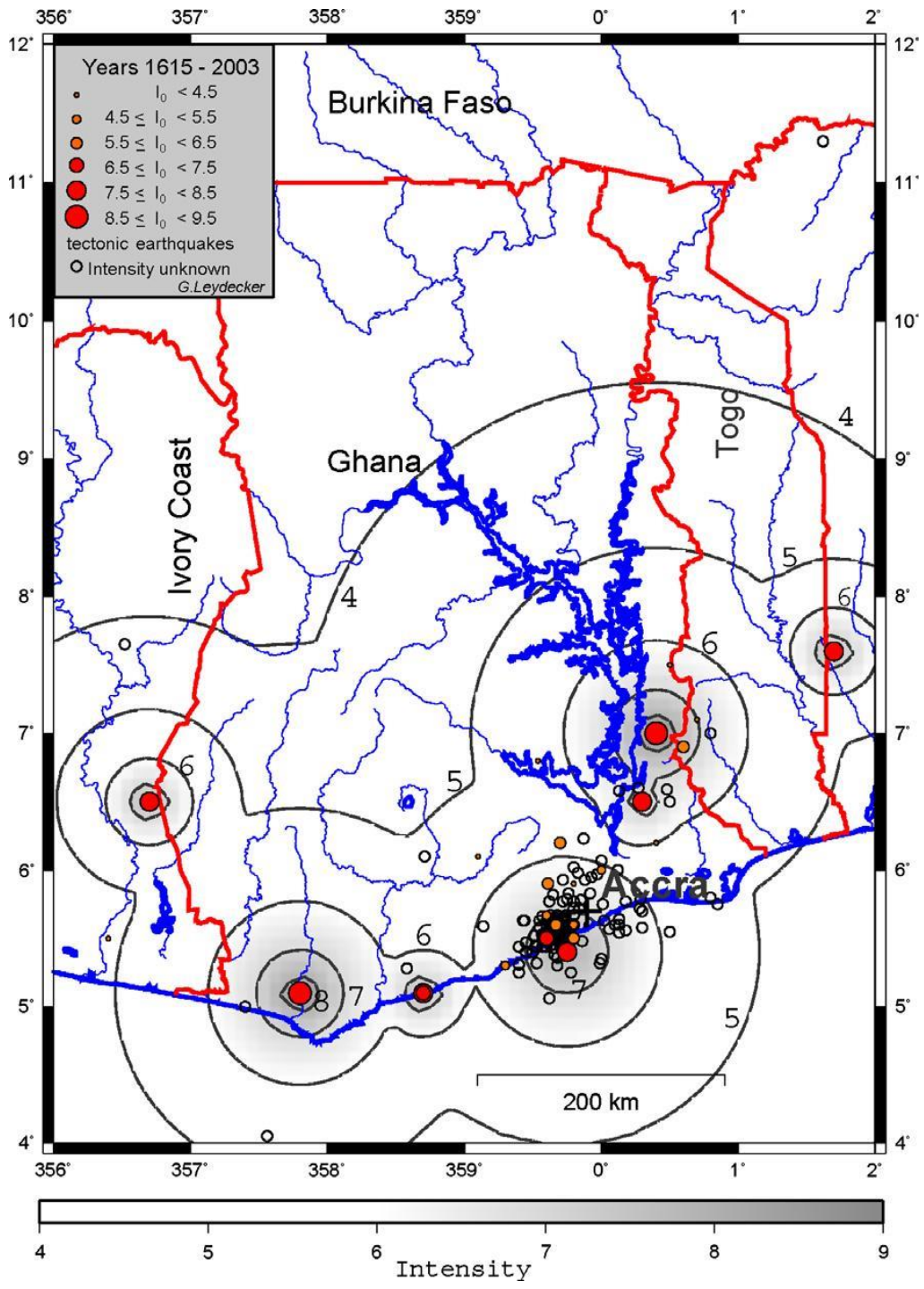


Figure 6: Earthquake Epicenter Map of Ghana & Togo with Isoseismals

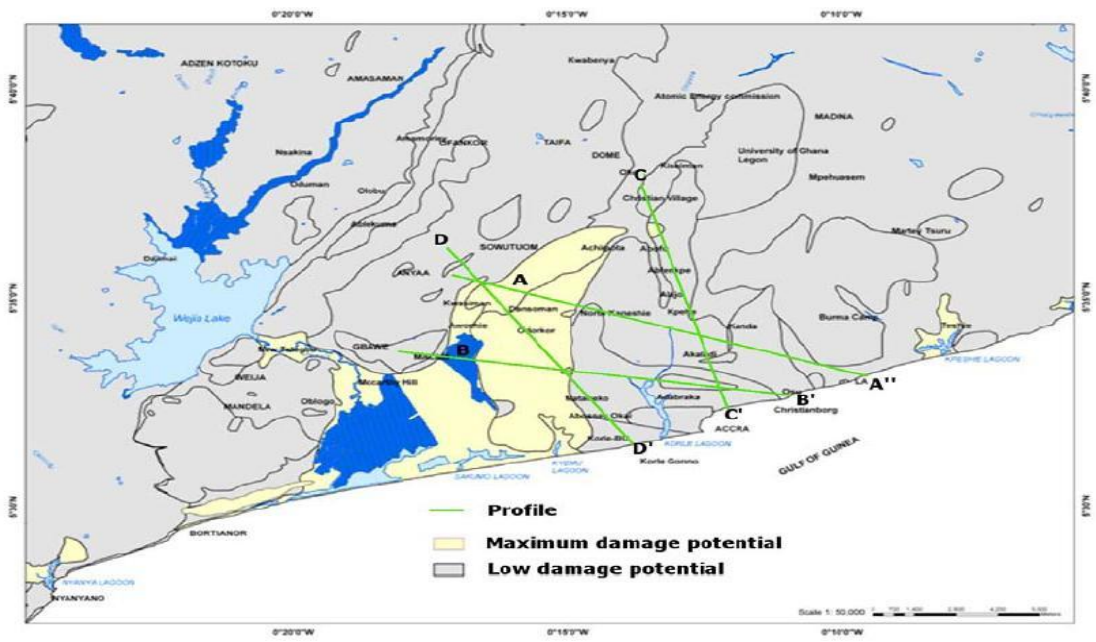


Figure 7: Ground Motion Damage Potential for GAMA area

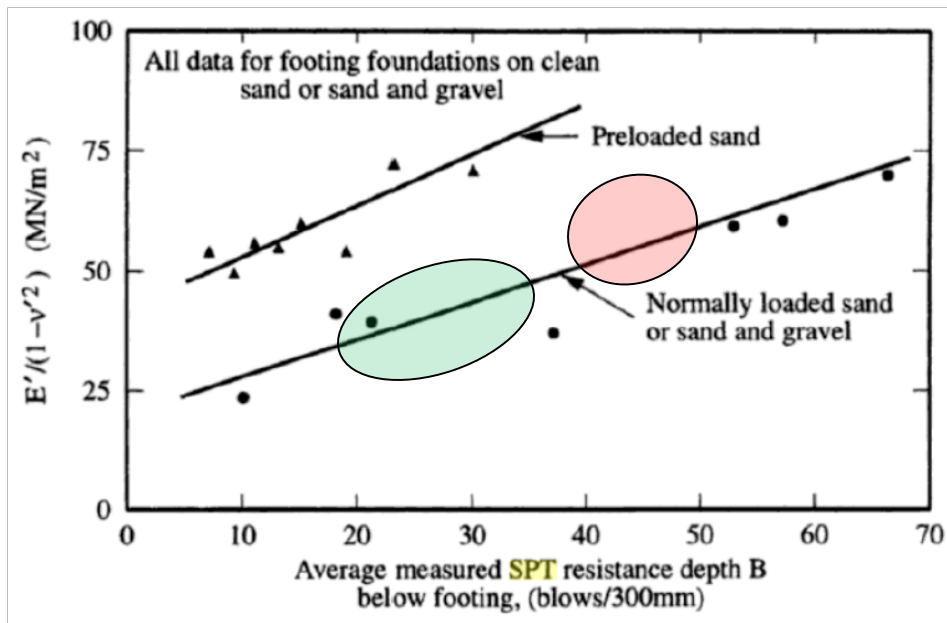


Figure 7: Range of Elastic Moduli for Sands and Gravels based on Rowe [20]

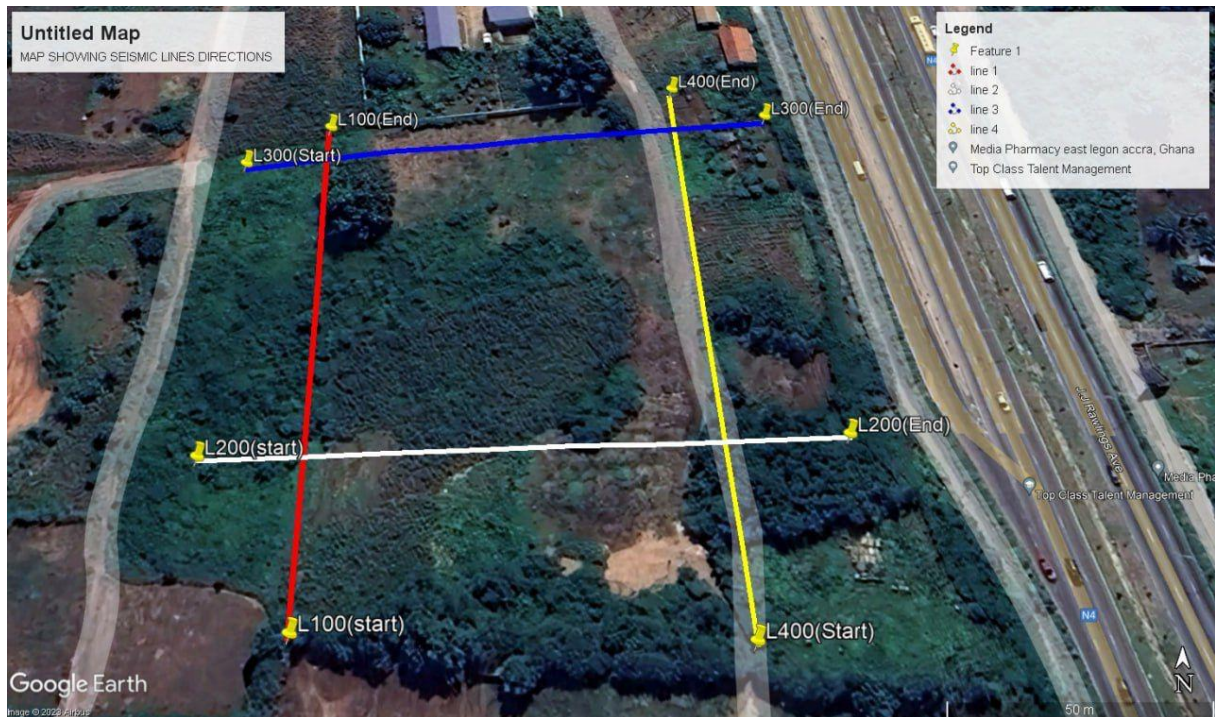
Appendix B: Borehole Logs

EM GEOTECH LIMITED		Geotechnical Engineers		Project : University of Ghana Legacy Project		N:		Borehole No. 01							
				Location : Ajax 2 Park, University of Ghana, Accra		E:		Sheet No. 1/1							
				Client : University of Ghana (UG)		Elevation (m):		Date : 18th November, 2023							
Equipment & Method of Drilling: Pilcon Wayfarer 1500 Investigator Drilling Rig with Shell and auger attachments				Driller: sammy				Logger: plus fageologo				Supervisor: ing. enyo matrevi			
DEPTH (m)	SOIL PROFILE (m)	SAMPLE TYPE/ NO.	SPT TEST		ROTARY CORE DRILLING			SOIL DESCRIPTION	STRATA DEPTH (m)	STRATA ELEVATION (m OD)	LAB TEST RESULTS				REMARKS
			No. OF BLOWS	MATERIAL RECOVERY	CORE RUN	CORE RECOVERY	RQD				Torvane	Pocket penetrometer	Undrained Triaxial Test	Laboratory Vane	
											50	100	150	200	
		D1						Medium dense, dark brown, fine grained silty SAND	0.4						
1		SPT1	N= 24 (4, 6, 7, 7)	45/45				Medium - dense, dark greyish brown, coarse grained sandy GRAVEL with presence of quartzite cobbles							
		D2													
2		SPT2	N= 32 (7, 8, 8, 9)	44/45					2.2						
		D3													
3		SPT3	N= 47 (10, 10, 13, 14)	32/45				Very dense, dark greyish/brown, coarse, highly lithified sandy GRAVEL of decomposed Schist rock formation							
		D4													
4		SPT4	N= 50+ (29, 33+)	26/45					4						
		D5													
5		SPT5	N= Ref. (46+)	17/45											Chiselled for not less than 5 hours
		D6						Weak, mottled light greyish/spotted yellowish/brown, highly decomposed quartzite SCHIST, getting stronger with depth							
7		SPT6	N= Refusal (50+)	17/45											
8															
9															
10															
End of hole at 9m															
			Split spoon sample				D	Disturbed Sample recovery							Core run
			Undisturbed sample												▲ Groundwater level

EM GEOTECH LIMITED		Project : University of Ghana Legacy Project					N:	Borehole No. 02								
Geotechnical Engineers		Location : Ajax 2 Park, University of Ghana, Accra					E:	Sheet No. 1/1								
		Client : University of Ghana (UG)					Elevation (m):	Date : 19th November, 2023								
Equipment & Method of Drilling: Pilcon Wayfarer 1500 Investigator Drilling Rig with Shell and auger attachments																
Driller: sammy		Logger: plus fagelogo			Supervisor: ing. enyo matrevi											
DEPTH (m)	SOIL PROFILE (m)	SAMPLE TYPE NO.	SPT TEST		ROTARY CORE DRILLING			SOIL DESCRIPTION	STRATA DEPTH (m)	STRATA ELEVATION (MOD)	LAB TEST RESULTS				REMARKS	
			No. OF BLOWS	MATERIAL RECOVERY	CORE RUN	CORE RECOVERY	RQD				Torvane	Pocket penetrometer	Undrained Triaxial Test	Laboratory Vane		
		D1						Loose, greyish brown, fine sandy SILT topsoil	0.5		50	100	150	200		
1		SPT1	N= 30 (5, 7, 9, 9)	30/45				Dense reddish brown, coarse grained sandy GRAVEL with presence of quartzite cobbles	2.8							
		D2														
2		SPT2	N= 42 (10, 10, 11, 11)	42/45												
		D3														
3		SPT3	N= Ref (22, 34+)	25/45				Very dense, dark mottled greyish/yellowish/brown, coarse grained sandy GRAVEL of decomposed SCHIST rock origin	4.9							
		D4														
4		SPT4	N= 50+ (17, 30+)	29/45												
		D5														
5		SPT5	N= Refusal (39+)	30/45												
		SPT6	N= Refusal (40+)	25/45												Chiselled for not less than 5 hours
6																
7		SPT7	N= Refusal (50+)	20/45				Very dense, mottled light greyish/spotted yellowish/brown, highly decomposed quartzite SCHIST, getting stronger with depth								
8																
9																
10																
End of hole at 10m																
			Split spoon sample			D	Disturbed Sample recovery									Core run
			Undisturbed sample													▲ Groundwater level

EM GEOTECH LIMITED		Project : University of Ghana Legacy Project					N:	Borehole No. 03										
Geotechnical Engineers		Location : Ajax 2 Park, University of Ghana, Accra					E:	Sheet No. 1/1										
		Client : University of Ghana (UG)					Elevation (m):	Date : 20th November, 2023										
Equipment & Method of Drilling: <i>Pilcon Wayfarer 1500 Investigator Drilling Rig with Shell and auger attachments</i>																		
Driller: <i>sammy</i>			Logger: <i>pius fagelogo</i>			Supervisor: <i>ing. enyo matrevi</i>												
DEPTH (m)	SOIL PROFILE (m)	SAMPLE TYPE/ NO.	SPT TEST		ROTARY CORE DRILLING			SOIL DESCRIPTION	STRATA DEPTH (m)	STRATA ELEVATION (mOD)	LAB TEST RESULTS					REMARKS		
			No. OF BLOWS	MATERIAL RECOVERY	CORE RUN	CORE RECOVERY	RQD				Torvane	Pocket penetrometer	Undrained Triaxial Test	Laboratory Vane	50		100	150
1		D1																
		SPT1	N= 27 (7, 6, 7, 7)	40/45														
2		D2																
		SPT2	N= 40 (9, 10, 10, 11)	38/45														
3		D3								2.6								
		SPT3	N= Ref (17, 26+)	33/45														
4		D4																
		SPT4	N= Ref (29+)	30/45														
5		D5								4.7								
		SPT5	N= Refusal (30+)	22/45														
6		D6															Chiselled for not less than	
		SPT6	N= Refusal (41+)	16/45													5 hours	
7																		
8		D6																
		SPT7	N= Refusal (50+)	16/45														
9																		
10																		
End of hole at 8m																		
			Split spoon sample															D Disturbed Sample recovery
			Undisturbed sample															Core run
																		▲ Groundwater level

Appendix C: Geophysical Test Plots



Plan View of (i) Seismic Refraction and (ii) MASW Survey



Figure 3: SmartSeis ST Seismograph used in recording signals

Line	Shot Point					Position of Geophone 1 in meters
	1	2	3	4	5	
L 100	0	32.5	62.5	95	125	5
L 200	0	32.5	62.5	92.5	125	5
L 300	0	32.5	62.5	92.5	125	5
L 400	0	32.5	62.5	92.5	125	5
MASW(L100)	-12	-10	-8			0/2/4
MASW(L200)	-12	-10	-8			0/2/4

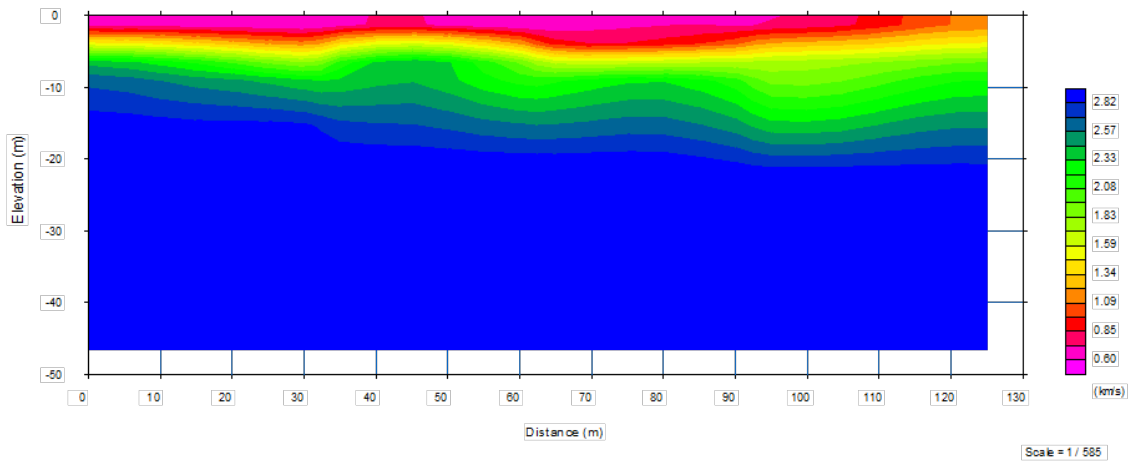
Array of geophones and shot points for the various lines across the site

Line	Start		End	
	Easting (X)	Northing (Y)	Easting (X)	Northing (Y)
Line 100	812383	624644	812379	624754
Line 200	812367	624685	812487	624680
Line 300	812360	624744	812471	624761
Line 400	812468	624643	812450	624769

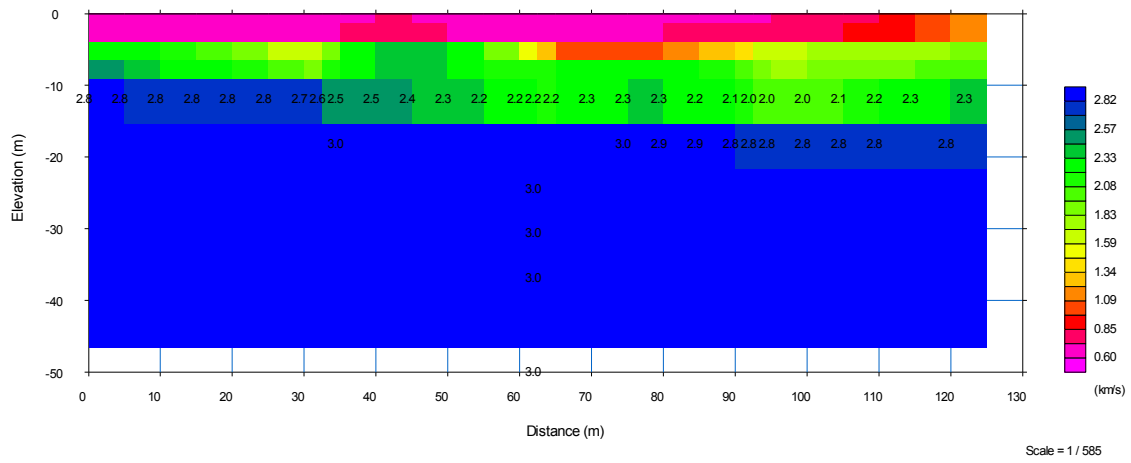
Coordinates of Survey Lines in UTM, WGS 84

Line / offset	Frequency Range (Hz)	Vs Range (m/s)	Depth to Weathered rock (m)	Depth to Bedrock (m)
L100 (12m offset)	22 - 34	330 - 1060	3.1	8.9
L100 (10m offset)	23 - 45	350 - 1330	2.7	13.3
L200 (12m offset)	22 - 36	370 - 1090	3.1	8.7
L200 (10m offset)	22 - 31	370 - 1220	3	8.7

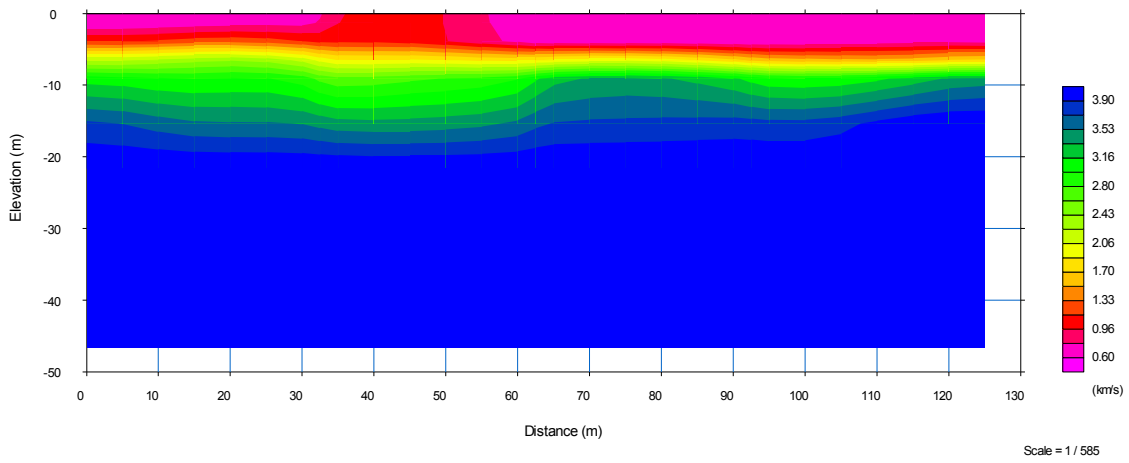
A Summary of Dispersion Curves and Shear Wave Velocity Profiles for Offset Shot Points



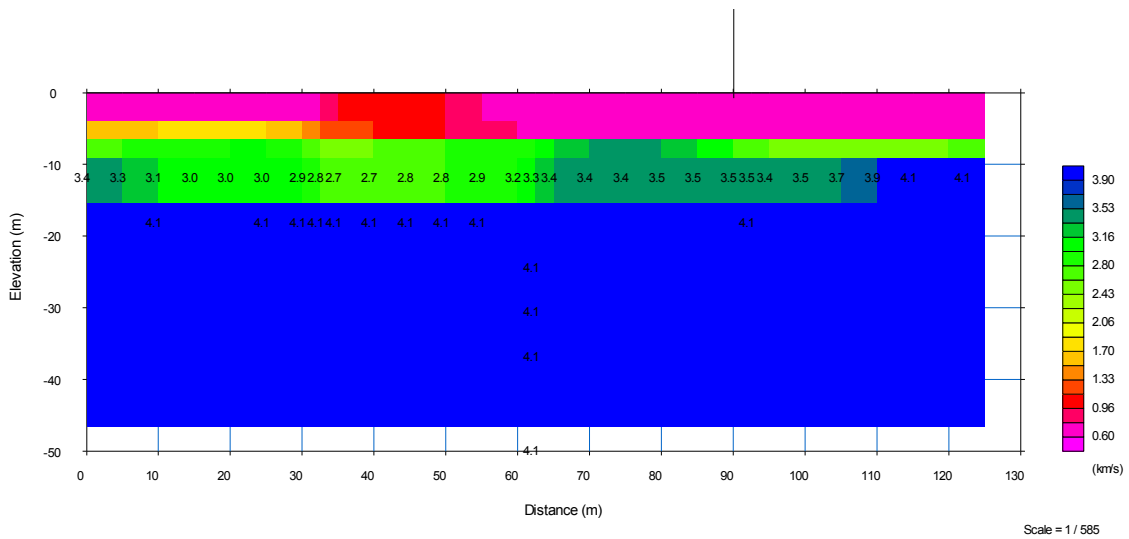
Line 100 Tomography - Seismic Refraction



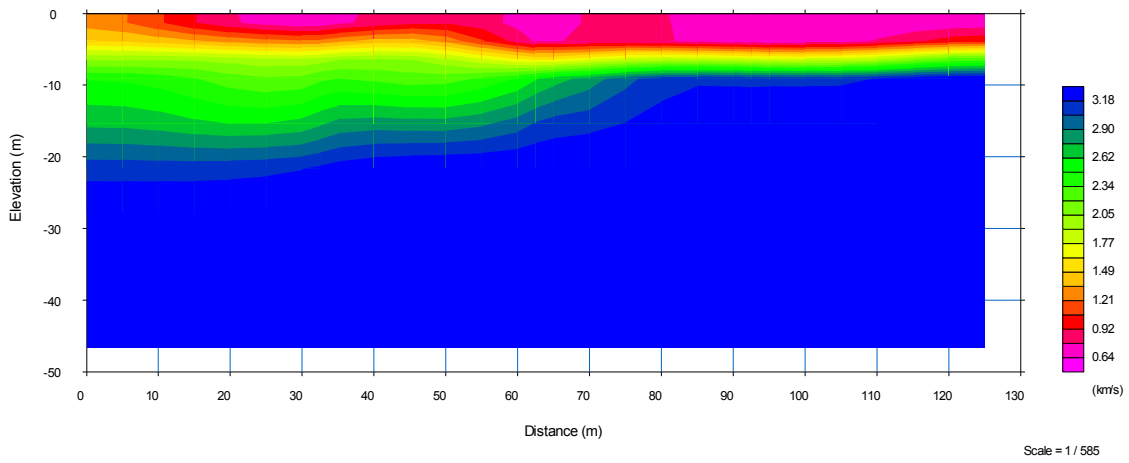
Line 100 Tomography (Compressional Velocity Cells) - Seismic Refraction



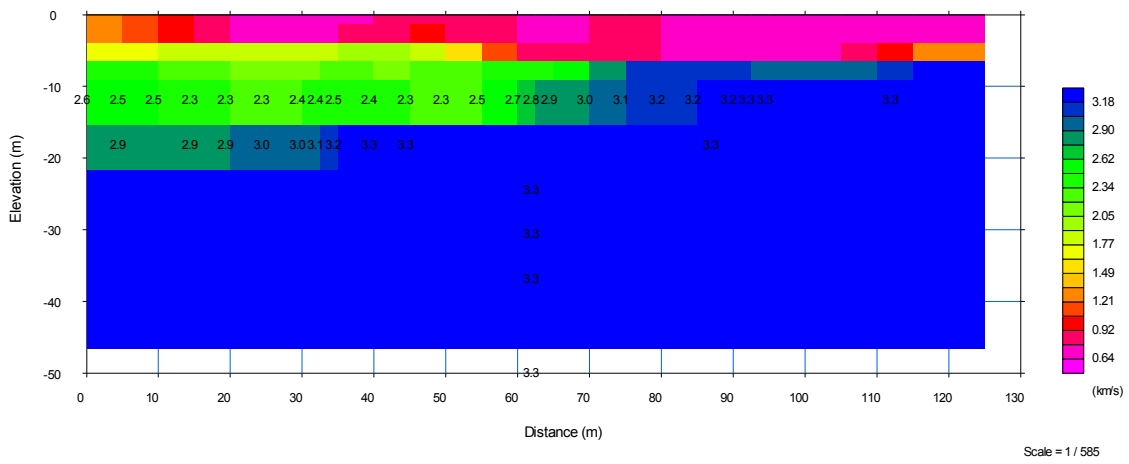
Line 200 Tomography - Seismic Refraction



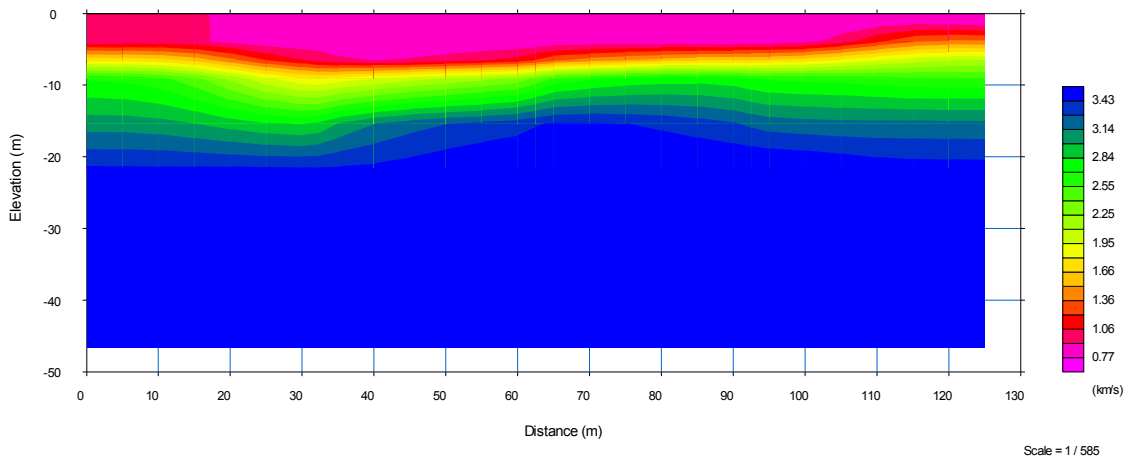
Line 200 Tomography (Compressional Velocity Cells) - Seismic Refraction



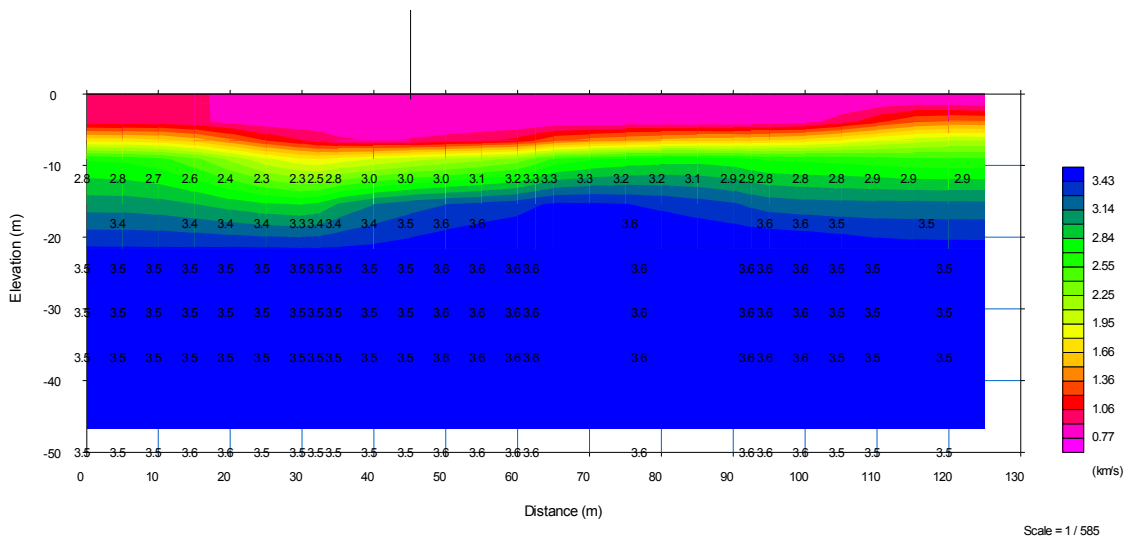
Line 300 Tomography - Seismic Refraction



Line 300 Tomography (Compressional Velocity Cells) - Seismic Refraction

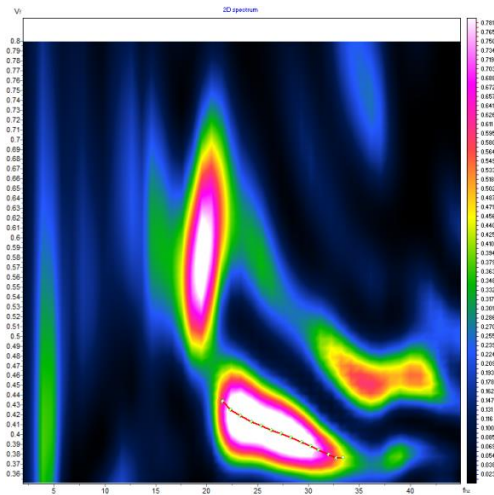


Line 400 Tomography - Seismic Refraction

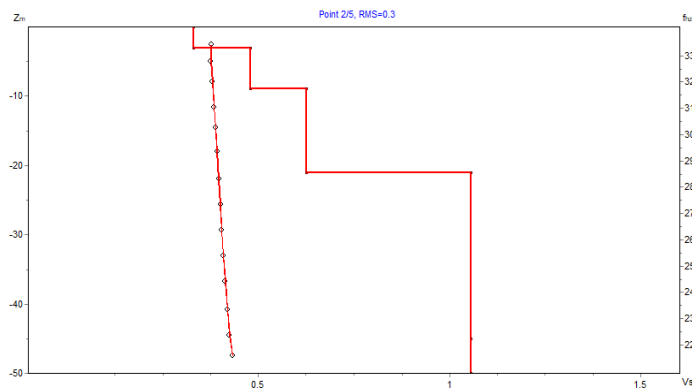


Line 400 Tomography (Compressional Velocity Cells) - Seismic Refraction

MASW Details

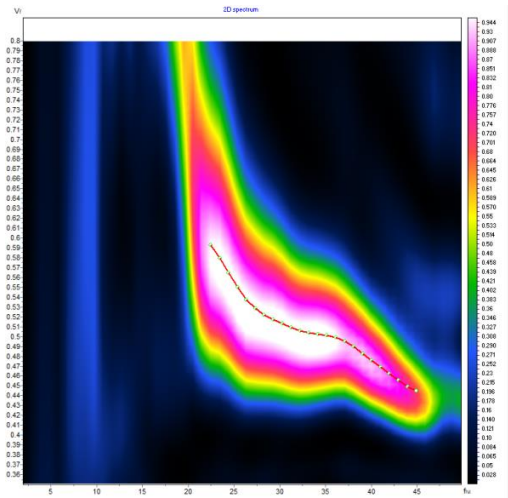


Phase-Velocity Image in Frequency Domain (L100 / 12m offset)

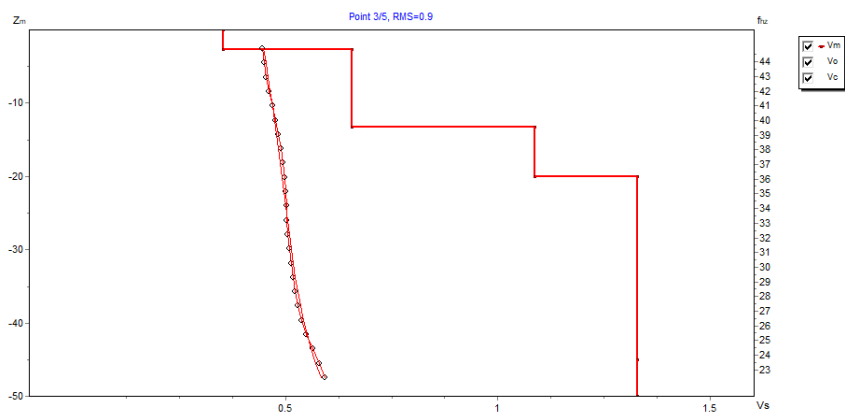


1D S-wave velocity model (L100 / 12m offset)

N	Vs	PR	p	Z	H
1	0.33	0.22	2	0	3.1
2	0.48	0.22	2	3.1	5.9
3	0.63	0.22	2	8.9	12.0
4	1.06	0.22	2	21.0	24.0
5	1.06	0.22	2	45.0	*

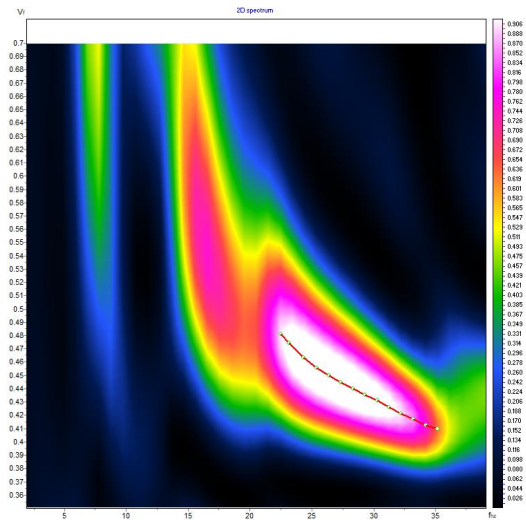


Phase-Velocity Image in Frequency Domain (L100 / 10m offset)

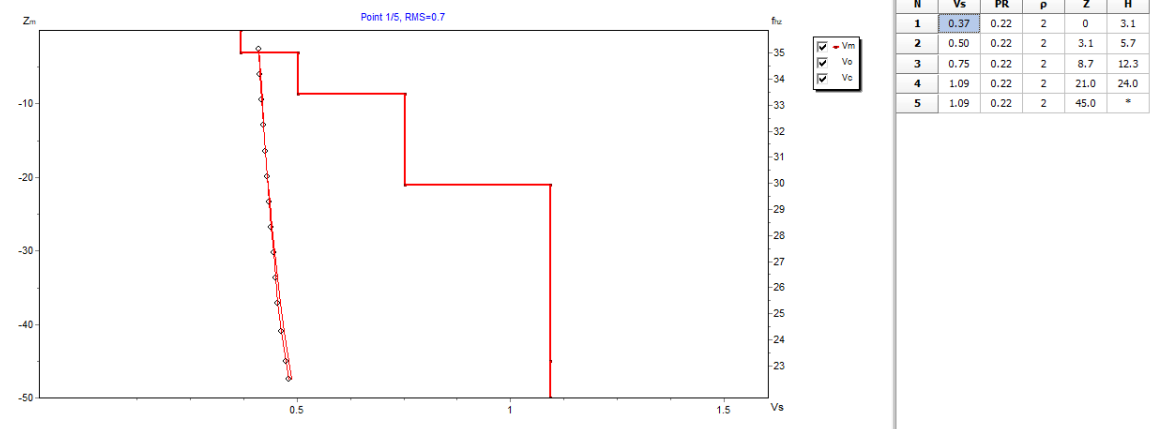


N	Vs	PR	p	Z	H
1	0.35	0.22	2	0	2.7
2	0.66	0.22	2	2.7	10.6
3	1.09	0.22	2	13.3	6.7
4	1.33	0.22	2	20.0	25.0
5	1.33	0.22	2	45.0	*

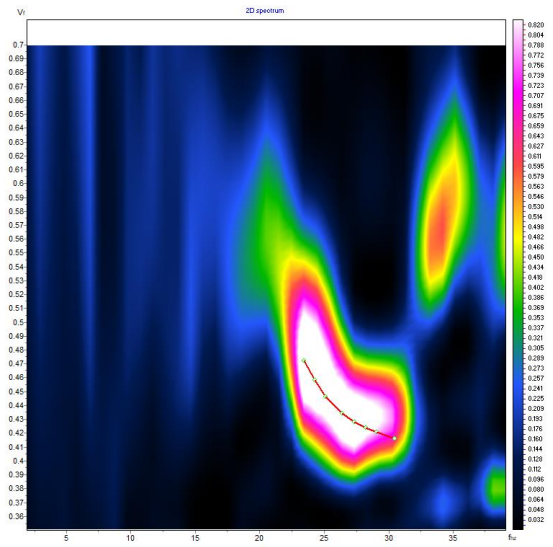
1D S-wave velocity model (L100 / 10m offset)



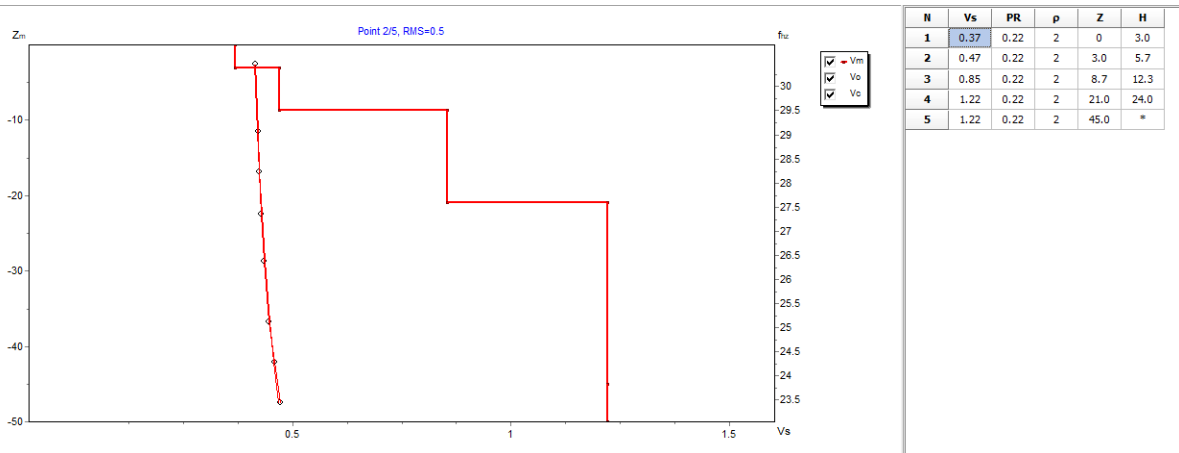
Phase-Velocity Image in Frequency Domain (L200 / 12m offset)



1D S-wave velocity model (L200 / 12m offset)



Phase-Velocity Image in Frequency Domain (L200 / 10m offset)



1D S-wave velocity model (L200 /10m offset)

Line	Velocity of Topsoil (Vp1)/ m/s	Velocity of Topsoil (Vs1)/ m/s	Velocity of Weathered Zone (Vp2)/ m/s	Velocity of Weathered Zone (Vs2)/ m/s	Velocity of Bedrock (Vp3)/m/s	Velocity of Bedrock (Vs3)/m/s	Depths to Weathered Rock / m	Depths to Bedrock /m	Vs30
Line 100	600	330	1090	630	2820	1060	2 - 4	7 - 13	900
Line 200	600	350	1700	660	3900	1330	4 - 6	8 - 13	1005
Line 300	640	370	1490	750	3180	1090	2 - 5	8 - 14	951
Line 400	770	370	1660	850	3430	1220	4 - 6	10 - 14	1065

Average Compressional Velocities and Shear Velocities of the Subsoil's/Depth to Bedrock at the site.

Appendix E: Field Pictures

















UNIVERSITY OF GHANA

REVIEW AND UPDATE OF UNIVERSITY OF GHANA MASTER PLAN



2015 MASTER PLAN PROPOSALS

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Acknowledgement

The members of the University of Ghana Physical Development and Municipal Services Planning Committee contributed their time, expertise and knowledge of the University which enriched the process of the Review and Update of the 1968 University of Ghana Master Plan.

Members of the University of Ghana Physical Development and Municipal Services (PD&MS) Committee (2013 – July 2016)

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Prof. S. K. Offei Member	-	Pro-Vice Chancellor (ASA),
Prof. J. Gyapong	-	Pro-Vice Chancellor (RID), Member
		Members nominated by the Academic Board
Mr. R. Sutherland	-	Co-opted member (Architect)
Mr. R. Acquah-Harrison	-	Co-opted member (Urban Planner)
Mr. A.L. Ashong-Lampitey Planner)	-	Co-opted member (Urban
Mrs. Mercy Haizel-Ashia	-	Registrar
Mr. P. Azundow	-	Director, PDMSD
Mr. R. Boapea	-	Director, Finance
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Ms. A. Akotoi	-	Landscape Architect

0.0 EXECUTIVE SUMMARY

Nel – Arch Consult was appointed in the late 2013 to Review and Update the University's 1968 Master Plan which has been in use since its approval. The Consultant's brief was based on the Terms of Reference contained in the document "Request for Proposals" issued to Consultants in 2012.

The update of the UG Legon Campus Master Plan has two purposes:

- To identify guiding principles and policies for the long-term planning of UG Legon Campus that will direct the physical development over the approximate 15-year plan horizon.
- To establish a conceptual framework for the campus through program development, land use determinations, intensity of development, and parking, circulation initiatives and open space development and management.

From the reconnaissance survey, desk studies, field surveys and analysis undertaken within the Legon campus, findings were deduced and gathered to serve as the basis for updating the 1968 Master Plan.

The Consultant report on the extent of implementation of the 1968 is contained in the Consultant's first report "Outline of Existing Conditions". This report presented the analysis of extent of implementation of the 1968 Master Plan, matters arising, and current conditions on the campus including the University's strengths and weaknesses. These findings deduced and gathered has served as the basis for updating the 1968 Master Plan.

0.1 ASSESSMENT OF EXISTING CHARACTER OF THE EXISTING CAMPUS

The character of UG's Legon Campus is defined by a composite of elements including:

1. The Campus Physical Setting and Attributes;
2. Management Structure for Physical Development and Municipal Services;
3. Campus Population;
4. Campus Infrastructure;
 - a. Buildings;
 - b. Transportation;
 - c. Parking;
 - d. Pedestrian Corridors and Open Spaces and;
 - e. Municipal Services;
 - f. Existing Land Use Structure/Pattern

These separate but inter-related elements are integrated into the campus and form the framework for new development. Any new construction or development shall become an extension of these elements and continue to shape and define the physical character of UG.

0.1.1 THE CAMPUS PHYSICAL SETTING AND ATTRIBUTES

a. Location,

- The University of Ghana's Campus at Legon is situated at the north-eastern part Accra which is about 13 kilometers (8miles) from the center of Accra.
- The campus has strong road connections to the Central Accra grid and surrounding neighborhoods which it shares boundaries with.
- The neighboring communities are GIMPA (University), Kisseman and Papao residential communities (West Legon), Haasto residential community (North Legon) La-Bawaleshie and Okponglo residential communities (East Legon) and the mixed-use Sub-District Center of South Legon.
- The campus covers a total land area of 3.188 acres (1,290.18 ha) out of which about 43.06 % has been developed to date.
- The campus is divided into two by the Accra Aburi highway which is the most prominent road connecting the campus with the rest of the metropolitan area.
- The Legon Campus therefore consists of the Main Campus and the Staff Village.
- The Legon Campus is bordered and defined by public roads along all its boundaries except the boundary it shares with Okponglo.

b. Site Topography, Drainage and Hydrology

- The terrain of the Legon Campus consists of a ridge which rises westward from the Accra – Aburi road to the crest of about 137 meters above sea level.
- The Legon Hill commands extensive views, inland towards the Akuapem hills, eastwards towards the Shai Plains and Southwestwards towards the Atlantic Ocean.
- The Legon Campus is drained by some important rivers and streams. Three tributaries of River Onyasia take their sources from the northwestern parts of the main campus.
- Other tributaries that feed into the Kpheshi Lagoon also take their sources from the Staff Village.

c. Site Climatic and Vegetation Conditions

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- Climatically the campus falls under the low rain belt of the Accra Plains with its natural landscape of shrubs.
- The campus open space is a mixture of rural and urban landscape including matured man-made landscape with planted trees like mahogany lining major road avenues on the campus.
- The climate on the campus is hot and humid with fairly constant temperature throughout the year. The Campus receives breeze from the South-West

0.1.2 MANAGEMENT STRUCTURE FOR PHYSICAL DEVELOPMENT AND MUNICIPAL SERVICES

- The University Council is the Statutory Body that approves all infrastructure Development on the Campus.
- The University Council in carrying that assignment is traditionally supported by University of Ghana Development Committee.
- This development committee chaired by the Vice Chancellor examines all development request on their merits and takes decision subject to approval of the University Council.
- The PDMSD is the service organization of the University responsible for:
 - Physical Planning and Development;
 - Maintenance of Physical infrastructure and facilities including grounds and gardens and utilities;
 - Management of University Estates.

0.1.3 CAMPUS STUDENT POPULATION

- In 2015 the total population of University Ghana stood at 39,386 out of which 22,853 were regular students on the Legon Campus.
- The number of regular undergraduate students was 19,311 as against 3,542 regular graduate students for the Legon Campus only.
- In the next ten (10) years (2014-2024) the University targets students population of 40,000 with an enrolment composition of 50:50 (Graduate :Undergraduate)

0.1.4 CAMPUS INFRASTRUCTURE

a. Buildings

- To date about 1,060 buildings for both academic and non-academic use have been constructed for various uses on the Campus.
- They include initial buildings provided as temporary structures which were supposed to be replaced as funds were made available.
- These buildings include the Estates (PDMSD), Department of Social Science

Buildings, Archeology, the Old Law School Building, and the Old Faculty of Social Science Building Complex, among others.

Tables 0.1 Summary of Existing Buildings

ITEM	USE CATEGORY	NO. OF BUILDINGS	PERCENTAGE	TOTAL FLOOR SPACE	FLOOR SPACE/ STUDENT
1	Academic Buildings	57	5.30	N/A	N/A
2	Research Institutions	18	1.69	N/A	N/A
3	Academic Support Buildings (Library, Bookshop etc)	3	0.56	N/A	N/A
4	Administrative Buildings (Group of Buildings)	25	2.35	N/A	N/A
5	Halls of Residence	19	1.78	N/A	N/A
6	Staff Houses	876	82.40	N/A	N/A
7	Sports Buildings	3	0.28	N/A	N/A
8	Utilities	13	2.16		
9	Social Infrastructure – group of buildings (University Basic School, Hospitals, Police Station)	31	2.91	N/A	N/A
10	Culture (Worship)	8	0.75	N/A	N/A
11	Economic Infrastructure	7	0.65	N/A	N/A
12	Security	5	0.47	N/A	N/A
	TOTAL	1,063			

Source: 2015 Campus Field Survey

Building Forms and Styles and Forms (1950 – 2015)

- Building infrastructure has expanded on the Campus under various managements since 1950.
- The Legon campus therefore consists of a wide range of building styles, types and forms that reflect their functions, the attitudes of architects, university administrators and the popular styles at the time of building construction.
- The existing buildings on the campus include those designed for Academic, Research, Academic Support, Student and Staff Residential Accommodation and Sports among others.
- Buildings on the campus vary greatly in size and form according to their intended uses, but all have been well constructed and have distinctive visual qualities and characters.
- The court yard concept and red roof tiles were widely used and have become land marks on the campus.
- The earlier buildings are Mediterranean in style and character built around

court yards. The finest buildings of Mediterranean style on campus are characterized by the following elements;

- Sloped roofs with red terra cotta tiles which cover virtually all portions of the buildings;
- Deep roof overhangs which shelter the walls;
- Traditionally proportioned windows, hardwoods screens and ventilating louvres;
- Facing stones bases complete the traditional designs;
- Rooms built around large courtyards/quadrangles.

Building Densities

- Building densities have remained generally low on the campus, especially in the core academic zone despite the fact that the University has a policy of not permitting structures below four storeys to be built in the core academic area.
- Currently the highest building in the core academic area is 6 Storeys.
- Over 82% of the buildings on the campus are single storey types which fall into staff residential building use category.
- Average residential plot for senior staff housing is about 0.75 acres gross.
- Flats for residential use comprise only 9 structures providing 54 units of flats on the campus.

Meeting Disability Standards

- Majority of the old buildings on the campus are not sensitive to the physically challenged or persons with disabilities.

Unmet Demand for Academic and Non-academic Space

- There are deficits in building space to meet the needs of both students and staff. This has resulted in overcrowding in lecture rooms and laboratories, students halls of residence.
- Current accommodation deficits for the following important infrastructure are:
 - Academic space deficit is about 1 60,000m²
 - Deficit in Students beds is 3,535
 - Deficit in Staff Housing is about 700 Units of Houses;
- Currently building infrastructure for academic (Collegiate Academic Buildings) and Students Residential Accommodation are under construction on the campus and are expected to ease space requirement for teaching and student accommodation.

Maintenance of Building Infrastructure

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- Existing permanent buildings have been well constructed to last. Considering the average age of buildings on the campus which is about 50 years, buildings on the campus are generally well maintained by the Service Staff on the campus.
- The PDMSD has a maintenance program for all physical infrastructure on the campus and plays an important role in the maintenance of buildings on the campus;

b. Roads

- The campus's hierarchy of road network has its roots in the 1949 Epstein and Hubbard Plan. This plan provided the campus with major arterial and distributor roads including the Central Avenue, the Volta, Akuafo, Osu, Annie Jiagge, Hodasi, Achimota and La roads.
- Among all the roads, the most prominent is the Central Avenue which used to be the main access road to the campus and held the network together is now partly pedestrianized when the University is in session.
- New roads have been constructed to expand the internal network land and to link the campus to nearby communities;
- The University is also in the process of upgrading the campus roads by providing asphalt overlays on major roads;

c. Parking

- The University has approximately 550,000m² of parking space, which provides spaces for approximately 3,500 cars on campus.
- Most of the campus parking spaces are located in the core academic zone which also share the greatest demand for new and expanded parking facilities.
- The unmet demand for parking facilities has encouraged on street and lawn parking on the campus.
- Currently long term parking facilities are being expanded in the registry area and other facilities;

d. PEDESTRIAN CORRIDORS AND OPEN SPACES

Pedestrian Walkways

- Pedestrian walkways form critical links between buildings, reinforce the circulation grid, and connect campus open spaces.
- The pedestrian network of walkways forms the primary circulation system for the university community.
- The decision in the early 1968 to stop vehicular through- traffic along the central avenue on the campus core expanded the available space for

pedestrians and created a safe and more relaxed atmosphere during peak pedestrian-use periods.

- Majority of the walkways are not well defined and this has allowed the campus community to walk across lawns;
- Two areas on the campus are well patronized by pedestrians and these are areas around the Balme Library and the Night market. But the walkways are not well developed.
- The University is currently in the process of constructing important network of walkways along important roads;

Open Space

- Open spaces throughout campus are dominated by both urban and rural landscapes. The Sewerage Farm, the Legon Botanical Garden, large expanses of lawns with clusters of trees and impressive shrub beds typically located at the foundations of buildings are part of the open space systems. The Botanical Gardens primarily serves as a field laboratory for the Botany Department among other uses.
- Today, UG's campus reflects a rich tradition of street tree planting. The campus core in particular and the senior staff residential area are dominated by a large number of mahogany trees.
- Unfortunately the undeveloped portions of open spaces along the campus edges have been encroached and abused by the public who use the open space as rubbish dumps, mechanic workshops, among other economic activities.

e. MUNICIPAL SERVICES;

Electricity Installation, Supply and Demand

- Campus is supplied with electricity from the National Grid and distributed at two levels; High Voltage Primary Distribution and Low Voltage Secondary Distribution.
- The injection substation (Reservoir) is located in a switch room within the campus and is independent of any other network outside the campus.
- The H.T. network comprises two loops incorporating 11KV underground cables interconnecting high voltage switch gears (RMU's) and secondary distribution transformers at 11,000/415 volts and located throughout the campus as required by the building loads;
- Over the years as a result of growth and expansion of land use

activities on the campus, energy demand and efficiency has become a high priority on the campus.

- Current buildings have been designed to accommodate the use of air conditioning and other energy intensive equipment. Energy is an important aspect of the Campus sustainability assessment.
- The underground cables on the campus which were laid in the 1950s require a comprehensive upgrading;

WATER INSTALLATION, SUPPLY AND DEMAND

- The Installed 9,000m³ capacity water service reservoir commonly referred to as the High Pressure Zone (HPZ) Reservoir since 1950 has not changed.
- The reservoir built in the 1950s and situated on top of Legon Hill is still the High Pressure Service Reservoir for the campus.
- What has been changing gradually is the gradual reduction of volume of water available for distribution from the reservoir.
- Currently, the HPZ Reservoir receives water through the 500mm (20 inch) diameter pipeline fully and the 600 mm (24 inch) diameter pipeline partially. Partially because the 600mm (24 inch) diameter pipeline was also designed to provide water to Kwabenya.
- During the period of water crisis on the campus, the University constructed 36 mechanized boreholes which now serve as backup to the public system;
- The water distribution system is a mixture of Cast Iron pipe, Asbestos Cement pipe and uPVC pipe of different sizes. Some of the old pipes have been rehabilitated whereas others have not been rehabilitated because they cannot be located.
- There is the need also for the University to undertake a comprehensive stock taking of the Water Supply Distribution System including all pipes, valves, sluice valves, air valves and washouts to determine the rehabilitation works to be undertaken to improve the system.
- It is also important to state that currently some parts of the Legon Campus suffer from low pressures or complete lack of water supply to those areas. These areas are:
 - **The Staff Village**
During the reconstruction construction of the Tetteh Quarshie - Pantang Road, the water supply line to the Staff Village was damaged and has since not been connected to the main Campus Reservoirs.

- **New Academic Areas on the Main Campus**

The area referred as New Academic Zone on the main Campus includes the new Law Faculty, ISSER, Department of Mathematics and Statistics, Department of Computer Science and Faculty of Engineering among others. Water supply to this zone is by PDMSD Tanker Service. Storage of water in this zone therefore requires improvement.

- **The Four New Halls**

Part of the four new Halls also experiences low pressure. In fact the last Hall, Jean Nelson Aka Hall hardly receives water in this zone and relies on mechanized borehole for the supply of water.

- **New South Legon Residential Area**

This area also experiences low pressure in water supply. This is because it is served by a relatively small pipe.

- **The Registry Area**

The storage and distribution system of water at the Registry needs to be reviewed to correct frequent shortage or loss of water in the system.

f. EXISTING LAND USE STRUCTURE

- The first Legon Campus Master Plan (the 1949 Master Plan) prepared by Messer Harrison, Barnes and Hubbard proposed two development axis on the Campus which to a large have been maintained with some modifications by the 1968 Master Plan;
- The main development axis is along the central avenue. Along this axis are located some Faculties, Departments, the Bookshops, Lecture Theatres the Traditional Students Halls of Residence.
- A secondary development axis also proposed by Messer Harrison, Barnes and Hubbard and revised by Messrs Shephard and Epstein in the 1968 Master Plan has also been maintained with modifications.
- The secondary axis has been developed southwards from the University Square to link the Noguchi Memorial Research Institute and the New Medical School.
- Analysis of the existing structure reveals that to a large extent the existing land use structure has been built according to the recommendations made by the two previous development plans (the 1945 and 1968) with some modifications;

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- Analysis also revealed that the current land use structure is sound and allows for further extensions of its various components.
- The existing structure had some weakness which required resolving and strengths that needs enhancing.
- The campus has been developed in sectors which contain homogeneous land use zones including Academic and Research, Students and Staff Residence and Sports among others;
- The sectors are defined by both natural and man-made boundaries including roads, fences and rural open space;
- The Sector containing commercial and social development on the campus is not well defined;
- The Campus is divided into two parts by the Accra – Aburi Road with only one direct connection between the two parts;
- The Main Campus is well developed and maintained than the Staff Village;
- Existing building densities are low allowing for the sprawls of buildings on the main campus;
- The existing campus contain undeveloped lands that could accommodate further extension of infrastructure without extending the boundaries of the campus;

0.3 MASTER PLAN PROPOSALS

0.3.1 Principles and Policies for Future Development of Legon Campus

The Master Plan Proposals identify guiding principles and policies that provide direction for the long-range development of the University of Ghana Legon Campus for the next fifteen years. The principles set forth are based on inputs from:

- Colleges, Faculties, Schools, Research Institutes, Staff, Administrators, Students and the Campus Community as a whole.
- The University's 2014 – 2024 Strategic Plan Vision intended to help maintain and enhance Legon's status as the preeminent collegiate settings in the country and;
- other applicable plans and special studies that address issues such as Student Enrolment, Academic and non-academic infrastructure, community well-being, land use compatibility, transportation, protection of natural resources, public open space and public safety and security.

0.3.2 Sector Development on the Campus

To guide future development and expansion of the campus, the Legon Campus Master Plan Divides the campus into twenty (20) sectors, each with its own development allocation (amount of building square meter allowed) and development standards as follows:

Academic and Research

- Identifies the core academic sector (Sector I) as the primary area for academic and associated research-related facilities;
- Maintains the concept of grouping student academic activities within a 10-minute walk where possible to minimize the need for automobile travel between classes and where impossible promotes the use of student 's shuttle buses services providing round the clock shuttle services;
- Anticipates approximately 133,490 m² floor area of new construction in the campus core area;
- Recommends infilling of additional building infrastructure in sector H;
- Recognizes that the core academic area will become denser (in terms of building mass and pedestrian activity);
- Proposes extension of academic and academic support infrastructure in **Sector B and Sub-divides the Sector into 12 Blocks providing 107 plots** for academic and other infrastructure.
- Creates a research and technology park for development in collaboration with the private sector in **Sector B and Sub-divides the area into 3 Blocks providing 107 plots** for academic and other infrastructure and;
- Recommends for the redevelopment of the recreational quadrangle in the core academic zone into a social center in Sector I;

Campus Administration

- Provides land for the extension of campus administration infrastructure in **Sector B and provides 12 plots** for future extension of Administrative building Infrastructure;

Student Housing

- Allocates lands/plots for additional student housing facilities in **Sectors H (14 Plots) and P (4 Plots)**;

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- Recommends for the provision of additional housing to accommodate all regular students on the campus;
- Recommends the provision of family types of student housing for married graduate and post graduate students;

Staff Housing

- Recommends new reduced plot sizes for Staff Housing **(30m x35m for bungalows)**;
- Recommends the construction of more flats to conserve land on the campus;
- Allocates lands/plots for additional staff housing facilities in **Sectors B (5 Bungalow Plots), R (118 plots for Bungalow and 115 plots for Flats), and T 20 Plots for Flats and 20 plots for semi-detached houses;**

Sports

- Recommends the development of sports infrastructure in the Sector H to serve the private halls;
- Recommends the upgrading of all sports infrastructure on the campus especially in Sectors J, L and M;

Business and Commercial

- Recognizes the Night Market Area in Sector Q as an emerging commercial and business center and recommends the area to be redeveloped to improve the area for such services and **provides 13 Plots for business infrastructure in the Sector Q;**
- Allocates land for Legon Shopping Mall in **Sector G and provides 36 plots for mixed use development;**
- Allocates lands on the edges of the Campus which have become dumping grounds for rubbish for lease to the private sector for development into mixed uses in **Sectors G, H,S and T and provides plots for mixed use development;**
- Defines a social center for students and staff to encourage social integration on the campus in sectors I,J and Q;

Open Space and Pedestrian Walkways

- Maintains the open space character of the campus by opting for high density building infrastructure in the campus;
- **Maintains an average of fifty percent of the campus lands as open except where stated differently.**

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- Recommends capital investment in the grounds and gardens to improve and maintain campus open space in all Sectors
- Maintains and enlarges the Teak Plantation which serves as vital wind breaker for the Convocation Group of buildings;
- Preserves the existing quads, proposes construction of new quads with new development, and respects the values associated with the Botanical Gardens and other natural resource areas on the campus;
- Identifies major campus entryways (portals) including the ongoing rehabilitation of entry ways;
- Identifies the high movement of pedestrians within the corridors of sectors I, J and Q which required adequate provision of pedestrian facilities to ensure safe and efficient movement of pedestrian flow.
- Recognizes the unmet demand for provisions and/or facilities for the pedestrian movements, especially pedestrian crossings which require to be addressed.
- Recommends the provision of a well – coordinated and defined pedestrian facility including cycle lanes to ensure adequate provision of sustainable transport system..

Transportation

- Recommends the construction of a new arterial road to link the Annie Jaggie Road to the GIMPA Achimota School Road through Sectors B and A. This road will provide access to the Research and Technology Park and also enable students in Private Halls in Sector H have easy access to Sector B.
- Other proposed roads in Sector B will provide access to the proposed extension of core academic infrastructure in Sector B;
- Promotes the Pedestrianization of the core academic zone, the area around the Balme Library and the night market area;
- Promotes the Several traffic management schemes such as lane markings, road signs, directional signs within the institution showing the location of the various facilities, properly designed traffic calming measures, pedestrian crossing facilities and defined walkways and cycle lanes needs to be implemented in the institution.
- Recommends the separation of through traffic (traffic using the institution as a thoroughfare) from local traffic, as much as possible, to prevent excessive distraction to the local traffic.
- Recommends the organization of public transport services and its schedules on campus to meet the demands of the passengers;

Parking

- Recommends the provision of Multi-storey car park in the Core Academic Zone to be shared by the whole campus community (Sector I)

Chapter 1 – INTRODUCTION

1.0 INTRODUCTION

University of Ghana is a comprehensive public academic and research university. The University has campus located in the ten regions in Ghana. The main campus of University is based at Legon, about 12km northeast of the center of Accra (the capital city of Ghana). The University has a Medical School in Korle Bu, with a teaching hospital and a secondary campus in the city of Accra. The University also has a Graduate School of Nuclear and Allied Science at the Ghana Atomic Energy Commission, making it one of the few Universities on the African continent offering programs in Nuclear Physics and Nuclear Engineering. In all, University of Ghana has four (4) campus located at Korle Bu, City of Accra, Ghana Atomic Energy Commission and Legon.

The UG Legon Campus Master Plan (LCMP) focuses on the 1,290.18 ha (3,188 acres) of land recognized as the campus within the city of Accra. This acreage is situated east of Accra and bounded, generally, by the Haasto-Atomic road to the north, the proposed GIMPA – Haasto road to the west, the University of Professional Studies – East Legon road to the east.

It is over 46 years since the last master plan was prepared for the University of Ghana Legon Campus. The preparation of the 1968 Master Plan was conceived as part of the Country's 10 year Development Plan at the time when the Convention Peoples Party (A Socialist Government) was in power. The 1968 Master Plan presented proposals for the Phase II of the physical development of the permanent site at Legon. The Master Plan was also associated with the process of the completion of the movement from the Achimota School Compound to the permanent site at Legon.

The preparation of the master plan was also conceived at the time when it was deemed that the country was enjoying a period of rapid economic development and political stability. Expectations for future growth in the early 1960s were high as Ghana maintained one of the highest standards of living in Africa. The preparation and launching of the 1968 Master Plan happened just after the fall of Dr Kwame Nkrumah's government in the 1966 coup. After the fall of Nkrumah's government, the country began a long period of economic decline and political instability. Planning for development became impossible under successive regimes of uncertainty. Funding of physical development became haphazard and uncoordinated and much of the campus infrastructure deteriorated or broke

down. Congestion in student accommodation and lecture rooms became a major problem.

Over this period the population of Legon Campus regular students grew from 2,300 in 1968 to over 22,366 in 2015. It is also projected that by the end of the proposed 15 year plan horizon in 2030, the population of regular students on Legon campus would have reached 35,000, creating demand for further land for campus development. This development will include new academic and non-academic infrastructure with the requisite supporting engineering and social services. Given the current level of resources available to the University for Development, the University will be hard pressed to meet the needs of its population in future. Urgent measures are therefore required to establish more efficient management systems to address the problems facing the development of Legon Campus.

The preparation of the Master Plan is an important step in providing management framework to guide and encourage sustainable development and create a better future for the population of the Legon Campus. The Plan represents two years of systematic studies and research into a range of topics by the Consultant. The Consultant has worked closely with The University Physical Development and Municipal Services Committee headed by the Vice Chancellor Professor Ernest Aryeetey, and the Physical Development and Municipal Services Directorate among other institutions on the campus.

1.1 THE LEGON CAMPUS MASTER PLAN PURPOSE AND OVERVIEW

This Master Plan incorporates framework policies and planning principles for strategic planning of the Legon Campus in the next 15 year plan horizon.

The UG Legon Campus Master Plan has two purposes:

- To identify guiding principles and policies for the long-term planning of UG Legon Campus that will direct the physical development over the approximate 15 year plan horizon.
- To establish a conceptual framework for the campus through program development, land use determinations, intensity of development, and parking and circulation initiatives.

The Legon Campus Master Plan (LCMP) was formulated to maintain and enhance the university's fundamental mission, its roles in undergraduate, graduate, research and its public service. The growth proposed in the Legon Campus Master Plan is necessary to accommodate the projected growth in

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the number of students seeking tertiary education and to support educational and research initiatives. The Legon Campus Master Plan offers flexibility in meeting the challenge of providing a compelling learning environment, while setting standards that direct future growth, guide future design decisions, and conserve and enhance the open space of the campus. In balancing these various concerns, the university truly becomes a public amenity for all in Ghana.

The 2015 Legon Campus Master Plan updates the 1968 UG Physical Development Plan and aims to meet the needs for the intellectual, economic, technological, and social advancement of the campus. The Legon Campus Master Plan is based on the contributions of administrators, faculty, staff, and students.

1.2 UNIVERSITY OF GHANA VISION STATEMENT

The Master Plan is expected to play an important role in molding the future of the Legon Campus.

UG aspires to create an enabling environment that makes the University of Ghana increasingly relevant to national and global development through cutting edge research as well as high quality teaching and learning.

UG's vision is to transform itself into a 'World Class Research-Intensive University' over the next decade. The University intends, over time to become a research-intensive university serving the growing of Ghana and the rest of the region and to be among the top 10 institutions in Africa.

To achieve this vision, UG will be true to its core values of integrity, commitment, respect, and loyalty while creating an environment that facilitates further success.

Core Values

1. Integrity

UG will demand the highest standards of ourselves to earn the trust of others.

2. Commitment

UG will be committed to knowledge generation that positively impacts the lives of those within and outside the university community.

3. Respect

UG will provide others with a world class experience that demonstrates our value for the diversity and contributions of the members of our community.

4. Loyalty

UG will demonstrate a strong resolve to give back selflessly to our university.

Achieving the Vision

The vision statement creates a picture of what the Legon Campus could be like in 2030. The achievement of this vision will be directed by several goals which set desired outcomes for the Legon Campus by the end of the plan period. These goals provide a focus for specific objectives and sector strategies outlined in the plan.

Goals set for the Master Plan were to:

- Provide a land use planning framework for the long term development of the Legon Campus;
- Provide a sustainable sources of funding for the physical development of the Legon Campus;
- Provide efficient academic and non-academic physical infrastructure administration and delivery;
- Provide adequate, safe and efficient transportation system;
- Provide basic, dependable social services;
- Provide reliable basic public services;
- Provide an environment that will ensure fulfilling experiences for internal stakeholders;
- Create the best environment for equal opportunity in gender and diversity;
- Strengthen the management of the University assets and facilities;
- Mainstream and enforce structures and processes for system-wide monitoring and evaluation;
- Build Stakeholder confidence in the capabilities of the university;

These ambitions can be translated into four broad strategic goals that should be

reflected in infrastructure proposals the updated campus master plan proposals:

Goal 1: to make University of Ghana an Undisputed African Leader in Research and scholarship

UG aspires to produce an environment in which excellent research can thrive. This is the University's central aspiration which is to drive all other activities. A range of proposals under consideration include:

- The establishment of a technology park for international research exchange,
- Provision of interdisciplinary science centers,
- Research collaborations with overseas partners and
- New buildings and equipment appropriate for world- class research.

Goal 2: to make the University Ghana a Teaching and Learning Experience Unique

Whilst research is going to be the lifeblood of University of Ghana, teaching and learning will be essential building blocks in the sharing and development of knowledge and the formation of enquiring and critical minds. Proposals under this goal are:

- To include enrolment of 50% graduate research student numbers by 2024,
- To undertake potential changes to undergraduate programs,
- Continued investment in pedagogic innovation and
- The provision of appropriate high quality teaching and learning spaces to accommodate these future needs.

Goal 3: To Turn the University into an International Portal

The University wishes to increase its international profile as a result of the above two goals, and will therefore continue the tradition of receiving and sending staff and students from all corners of the world and also seek to establish an international quarter made up of the overseas operations of some of the world's leading research universities.

Goal 4: To Enhance the University's Reputation with Stakeholders in Ghana

University of Ghana 'working region' does not easily map onto existing city and regional areas, but the University will seek to capitalize on its 'gateway' location at Accra the capital of Ghana. Engagement with the public sector to support policy and professional development will be a key feature of this approach.

The consequences of these strategic goals will be that the size and shape of the University will evolve over time. There is no significant growth anticipated in undergraduate admissions, although the potential for the establishment of up to new departments and inter-disciplinary or internationally-oriented degree programs will remain as options, but there will be an increase in graduate research student numbers.

1.3 ASSESSMENT OF EXISTING CAMPUS

The character of UG's Legon Campus is currently defined by a composite of elements including the following:

1. The Campus Physical Setting and Attributes
2. Management Structure for Physical Development and Municipal Services
3. Campus Population;
4. Campus Infrastructure;
 - a. Buildings;
 - b. Transportation;
 - c. Parking;
 - d. Pedestrian Corridors and Open Spaces and;
 - e. Municipal Services;
5. Existing Land Use Structure/Pattern

These separate but interrelated elements are integrated into the campus and form the framework for new development. Any new construction or development shall become an extension of these elements and continue to shape and define the physical character of UG.

1.3.1 The Campus Physical Setting and Attributes

a. Location and Land Area

The University of Ghana's Campus at Legon is situated at the north-eastern part Accra which is about 13 kilometers (8miles) from the center of Accra. The campus has strong road connections to the Central Accra grid and surrounding neighborhoods which it shares boundaries with. These neighboring communities are GIMPA (University), Kisseman and Papao residential communities (West Legon), Haasto residential community (North Legon) La-Balewashie and

Okponglo residential communities (East Legon) and the mixed use Sub-District Center of South Legon.

The campus covers a total land area of 3.188 acres (1,290.18 ha) out of which about 43.06 % has been developed to date. The campus is divided into two by the Accra Aburi highway which is the most prominent road connecting the campus with the rest of the metropolitan area. The Legon Campus therefore consists of the Main Campus and the Staff Village. The Legon Campus is bordered and defined by public roads along all its boundaries except the boundary it shares with Okponglo.

b. Site Topography, Drainage and Hydrology

The terrain of the Legon Campus consists of a ridge which rises westward from the Accra – Aburi road and finally to the crest of about 137 meters above sea level. The Legon Hill commands extensive views, inland towards the Akuapem hills, eastwards towards the Shai Plains and Southwestwards towards the Atlantic Ocean.

The Legon Campus is drained by some important rivers and streams. Three tributaries of River Onyasia three tributaries take their sources from the northwestern parts of the main campus. Other tributaries that feed into the Kpheshi Lagoon also take their sources from the Staff Village.

c. Site Climatic and Vegetation Conditions

Climatically the campus falls under the low rain belt of the Accra Plains with its natural landscape of shrubs. However the campus open space is a mixture of rural and urban landscape including matured man-made landscape with planted trees like mahogany lining major road avenues on the campus.

The climate on the campus is hot and humid with fairly constant temperature throughout the year. The Campus receives breeze from the South-West.

1.3.2 Physical Development and Municipal Services Management System

The success or failure of implementation of the 1968 Master Plan is reviewed under the management system in place on Campus and its capability during that period under review. The capacity for the management of the implementation of the Development Plan could be analysed both under the macro and micro levels. Important management tools considered are planning, programming, manpower and resource management, and budgeting, monitoring, controlling and marketing skills. These management tools are considered very important elements that were required to ensure full implementation of the 1968 Master Plan Proposals in view of poor financial resources available to the University and political instability in the country during the period under review.

Campus Physical Development management in this instance is a term used to describe the procedure and practices used by the University Administration to make decisions, take actions, allocate and monitor resources for the development and delivery of Campus Infrastructure. The University Council is the organization in which the overall responsibility for Campus management is vested, but it must be mentioned that many others organizations (both government and private) have specific responsibility for the provision of specific services on the campus.

The University Council

The University Council is the Statutory Body that approves all infrastructure Development on the Campus. The University Council in carrying that assignment is traditionally supported by University of Ghana Development Committee. This development committee examines all development request on their merits and takes decision subject to approval of the University Council.

As a public institution, the analysis of the management of University infrastructure development must recognized that it is set within the parameters of national objectives and the nation's program for human resources development at the tertiary level.

The University Development Committee

The Chairman of the University Development Committee is the Vice-Chancellor and assisted by the two Pro Vice-Chancellors. Others members of the Committee are:

- Three elected members from the Academic Board;

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▪ Three nominated persons from the University Council and;
Other University Officials in attendance at the committee meetings among others are:

- The Registrar;
- The Director of Finance;
- The Legal Council
- The Director of PDMSD and;
- Co-opted Member/Professionals in Private Practice

Functions of the Development Committee

The Development Committee meets every quarter to consider development proposals, issues that have been sent to the Vice- Chancellor/University for approval and implementation. Before the meeting is convened to approve the requests the requests would have been referred to a Technical Sub-Committee Chaired by the Director of the PDMSD to vet and give their Technical opinion on the matter.

All development request are considered on their merits as follows:

- Goals and Objectives of the project in the overall physical development of the Campus;
- Institutional Priorities;
- Departmental Needs;
- Availability of space for the proposal;
- Analysis of Technical Feasibility of proposal and its conformity with laid out development standards and guidelines;
- Availability of Funding ;

The University of Ghana Physical Development and Municipal Services Directorate (PDMSD)

The PDMSD is the service organization of the University responsible for:

- Physical Planning and Development;
- Maintenance of Physical infrastructure and facilities including grounds and gardens and utilities;
- Management of University Estates.

PDMSD is the technical arm of the University and has been involved in the interpretation and development of all infrastructure design proposals on the campus.

Departments under the PDMSD

The PDMSD is headed by a Director who is assisted by and Deputy Director. Various Technical Departments and Units under the PDMSD are:

- Procurement Department;
- Architecture Department;

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- Quantity Surveying Department;
- Estates Department;
 - Water and Sewerage Section;
 - Housing Section;
 - Furniture Section;
 - Electrical Section;
 - Grounds and Gardens Section;
 - Environmental Health Section;
 - Transportation Section;
- Fire Service

1.3.3 Campus Population Growth between 1968 and 2015

The University of Ghana Legon Campus is still a residential institution and residents on the campus include Students and Staff (academic and service staff) and their families. Currently the campus population including Students and Staff is estimated at about 35,000. The growth of Campus Population is determined by policies decisions undertaken by the University Council on the size of annual student enrolment and staff to be engaged.

Growth of Student Enrolment on Legon Campus between 1968 and 2015

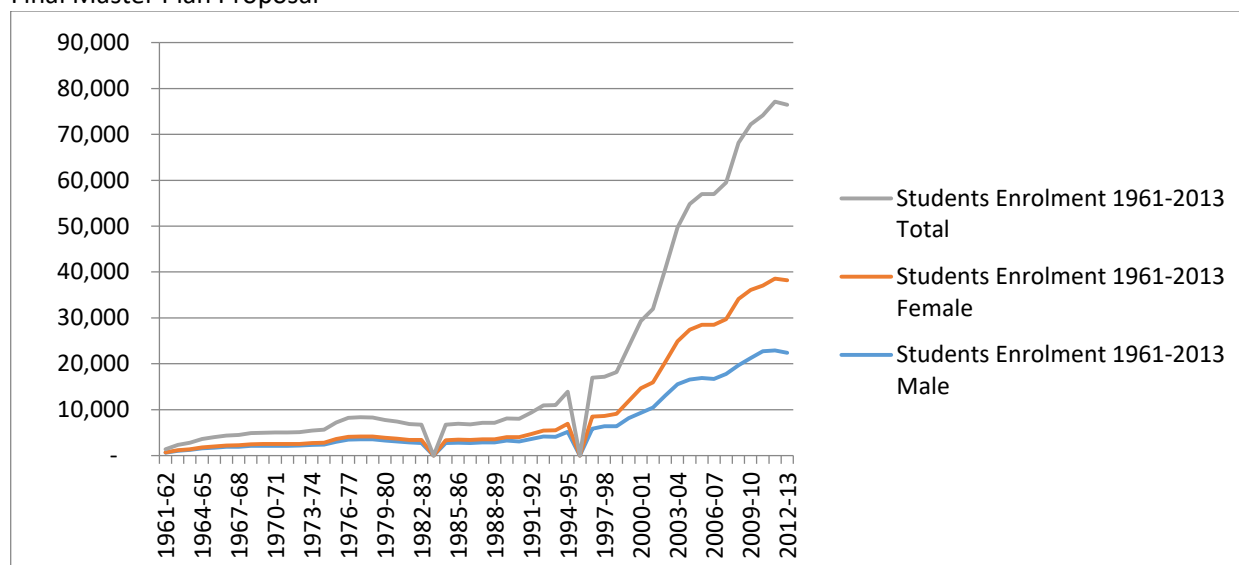
The University College of Gold Coast started in 1948 with a total student population 90 at the Achimota School. The student enrolment at the permanent site in Legon increased to 2,252 in 1968. In 2015 the total population of University Ghana stood at 39,386 out of which 22,853 were regular students on the Legon Campus. The number of regular undergraduate students was 19,311 as against 3,542 regular graduate students for the Legon Campus only.

Staff Population

In 1968 the University had a Student: Staff ratio of 4:1. Currently the Student: Staff Ratio is about 1:17.

The estimated staff population including their families on campus in 2015 was about 8,000 based on estimated average household size of five persons per household

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Existing Student Population in 2015

In 2015 the total population of University Ghana stood at 39,386 out of which 22,853 were regular students on the Legon Campus. The number of regular on Legon Campus included 19,311 undergraduate students as against 3,542 regular graduate students.

Academic, Administrative and Service Staff

The Student/Faculty Ratio in 1968 was 4:1. Current ratios for the Colleges are provided in Table...? The population of Academic, Administrative and Service staff on the Legon Campus in 2015/16 stood at 6052.

The academic and administrative staff increased to about fifty percent of these lived on the campus with their families. The average household size of staff resident on the campus was 5 persons per household.

Proposed Future Student Population on the Campus (2014 – 2024)

UG under its current Ten Year Strategic Plan (2014 – 2024) targets a Student enrollment of 40,000 by 2024. About 50% of this student population is to be undergraduate.

1.3.4 CAMPUS BUILDING INFRASTRUCTURE AND MUNICIPAL SERVICES

General

The initial construction of buildings in support of the movement from the Achimota School Compound to Legon was undertaken in phases. The first phase was between 1950 and 1968 when the decision to move was undertaken in 1948 with

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the preparation of the 1949 Master Plan. The first campus master plan prepared by Epstein and Hubbard Plan contributed immensely to the existing planning order and design of building infrastructure on the campus. The second phase of the development of the Legon Campus started from 1968 with the Review and Updating of the 1949 Master Plan and has continued to date.

To date about 1,060 buildings for both academic and non-academic use have been constructed for various uses on the Campus.

Some of the initial building were provided as temporary structures and were supposed to be replaced as funds were made available. These buildings include the Estates (PDMSD), Department of Social Science Buildings, Archeology, the Old Law School Building, and the Old Faculty of Social Science Building Complex, among others. These buildings are yet to be replaced by the University. These temporary structures constitute only a small proportion of buildings on the campus.

Existing Building Styles and Forms (1950 – 2015)

The Campus building infrastructure has been expanded under various managements since 1950. The Legon campus therefore consists of a wide range of building styles, types and forms that reflect their functions, the attitudes of architects, university administrators and the popular styles at the time of building construction.

The existing buildings on the campus include those designed for Academic, Research, Academic Support, Student and Staff Residential Accommodation and Sports among others. Buildings on the campus vary greatly in size and form according to their intended uses, but all have been well constructed and have distinctive visual qualities and characters.

The earlier buildings are Mediterranean in style and character built around court yards. The court yard concept and red roof tiles were widely used and have become land marks on the campus. The finest buildings of Mediterranean style on campus are characterized by the following elements;

- Sloped roofs with red terra cotta tiles which cover virtually all portions of the buildings;
- Deep roof overhangs which shelter the walls;
- Traditionally proportioned windows, hardwoods screens and ventilating louvres;
- Facing stones bases complete the traditional designs;
- Rooms built around large courtyards/quadrangles.

While historic building patterns and styles have continued to be recognized and appreciated on the campus, some of the recently constructed buildings share little continuity in architectural character. The modern movement in architecture have dominated later periods, resulting in the emergence of widely varied

building forms on the campus. The use of red roof tiles and court yard concept however have remained a common element in some of the modern buildings. The phase II of the campus development which started under the 1968 Master Plan could be associated with the modern movement on the campus. Buildings constructed in this period include the New Law Faculty, The Jones Quartey Building, Kwame Nkrumah Complex, the International Block, the New N Block, New Halls of Residence and Hostels among others.

Building Densities

There are various types of buildings on the campus which have been provided to meet various functions and uses. These building types vary from single storeys to multiple storeys, and include detached and semi-detached buildings.

Building densities have remained generally low on the campus, especially in the core academic zone despite the fact that the University has a policy of not permitting structures below four storeys to be built in the core academic area. Currently the highest building in the core academic area is 6 Storeys. Over 82% of the buildings on the campus are single storey types. Majority of the single storey buildings are in staff residential building use categories. Average residential plot for senior staff housing is about 0.75 acres gross. Flats for residential use comprise only 9 structures providing 54 units of flats on the campus.

The tallest buildings on the campus currently consist of six storey residential annexes to the old halls.

Meeting Disability Standards

Majority of the old buildings on the campus are not sensitive to the physically challenged or persons with disabilities. This situation which has created needs that have to be corrected to the meet needs of persons with disability. Almost all the student halls of residence except one is disability sensitive. The same applies to the academic buildings which rise above one Storey.

Existing Building Conditions and Building Maintenance

Existing permanent buildings were well constructed to last. Considering the average age of buildings on the campus which is about 50 years, buildings on the campus are generally well maintained by the Service Staff on the campus. The PDMSD has a maintenance program for all physical infrastructure on the campus and plays an important role in the maintenance of buildings on the campus.

1.3.4.1 CURRENT BUILDING USE

Buildings on the campus could be categorized under various uses. Table 1.3.2

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 presents buildings on the campus assigned by current use category.

Table 1.3.2 University Building Space Assignment by Use Category

ITEM	USE CATEGORY	NO. OF BUILDINGS	PERCENTAGE	TOTAL FLOOR SPACE	FLOOR SPACE/ STUDENT
1	Academic Buildings	57	5.30	N/A	N/A
2	Research Institutions	18	1.69	N/A	N/A
3	Academic Support Buildings (Library, Bookshop etc)	3	0.56	N/A	N/A
4	Administrative Buildings (Group of Buildings)	25	2.35	N/A	N/A
5	Halls of Residence	19	1.78	N/A	N/A
6	Staff Houses	876	82.40	N/A	N/A
7	Sports Buildings	3	0.28	N/A	N/A
8	Utilities	13	2.16		
9	Social Infrastructure – group of buildings (University Basic School, Hospitals, Police Station)	31	2.91	N/A	N/A
10	Culture (Worship)	8	0.75	N/A	N/A
11	Economic Infrastructure	7	0.65	N/A	N/A
12	Security	5	0.47	N/A	N/A
	TOTAL	1,063			

Source: 2015 Campus Field Survey

1.3.4.1.1 Academic Buildings Infrastructure

As an institution for teaching and learning, academic building infrastructure are among the most essential buildings on the Campus required to ensure the realization of the University's vision and implementation of its core mandate. This is because the University cannot function without adequate academic infrastructure on the campus.

Academic buildings on the campus currently constitute about 5.30% of the total University building stock. The academic buildings are assigned to various colleges for their use though some building are classified as Common Lecture Halls which are for use by all Colleges on campus.

The Legon campus academic sector is currently organized into four colleges. These are:

- College of Health Science;
- College of Humanities;
- College of Applied Science and;

- College of Education;

a. Buildings in the Core Academic Zone on the Campus

Under the 1968 Master Plan, the academic infrastructure were to be expanded to meet the proposed enrollment of 11,000 students including the 2,000 Medical Students to be enrolled within the plan horizon. A new Medical center was proposed to be constructed south of the core academic zone for the Medical School. In Addition the academic buildings provided as temporary structures were to be replaced. These buildings which are still in use and yet to be replaced include the following:

- The Faculty of Social Science;
- The Archeology Building;
- Building for Institute of Continuation and Distance Education;
- Institute of African Studies;
- School of Performing Arts;

Currently academic building infrastructure are located in three sectors on the campus with two on the main campus and a relatively new one located in the Staff Village.

Majority of the academic buildings are located in the Main Campus in Sector H identified as the Core Academic Zone. A supporting Academic Zone serving the Medical Center and Noguchi Memorial Research Institute among others is located south of the Core Academic Zone in Sector L. The UG Graduate School for Business is located in the Staff Village in Sector R.

b. Existing Floor Area for Academic Infrastructure

It is was not possible to obtain available information on total floor space for the academic buildings on the campus. This was despite the fact that the Consultant was assured by PDMSD that there is available data on floor areas for all academic buildings on the Campus. The availability of this information could have helped with the analysis of academic space available to students currently enrolled on campus. Despite this setback, information received from the Vice – Chancellor Professor Ernest Aryeetey in a Development Committee Meeting revealed that the existing academic floor space has been increased by 60% (133,490m²) to meet the required standards through the ongoing construction of academic facilities for the four colleges on the campus.

Field data collected shows that current average class size on the campus is over 100 students with some lectures recording over 300 students per class. This figure is well above that recommended standards for tertiary institutions.

c. On-going Construction of Academic Infrastructure

The University is currently in the process of constructing and expanding

infrastructure for Academic use. These academic infrastructure include:

- Four multi-storey buildings to provide a total of 145,376.50m² of administrative and academic space for the four colleges on the campus to alleviate shortage of academic space on the campus.
- Offices, Conference Rooms and Lecture Halls for Earth Science;
- Department of Economics Building;
- Examination Hall;
- Department of Nutrition Building;
- Drama Studio, Auditorium for School of Performing Arts;

d. Some Weakness in the Existing Academic Infrastructure

Though existing academic infrastructure are well maintained there are some important problems associated with them. These are:

- Existing shortfall in space for academic activities;
- Poor design consideration and standards for persons with disability on campus;
- Low building densities resulting in mis-use of available lands in the core academic zone;
- Poor parking facilities for the older academic buildings;

1.3.4.1.2 Research Building Infrastructure

Buildings infrastructure for research purposes currently constitute 1.69% of the existing stock of buildings on the campus. The Research Infrastructure are all located on the main Campus in sectors H and L. Unfortunately there is also no information on total floor space for research activities to enable the Consultant to make meaningful analysis on available floor space per student.

The University under its Current 10 year Strategic Plan (2014 – 2024) aspires to become a world Class Research Intensive University and to achieve this vision would require more building space for research on the campus. Unfortunately there is also no dedicated sector on the campus for research activities. A dedicate sector may be required to allow construction of research building infrastructure to support the collaboration between the University and the Private Research Institutions.

Though existing research building infrastructure are well maintained there are a few important problems associated with them. These are:

- Lack of a defined zone reserved for Research Institutions
- Poor design consideration and standards for persons with disability on campus;
- Low Building Densities associated with research building infrastructure;

1.3.4.1.3 Academic Support Infrastructure

The University Bookshop and Library fall under this category of building use on the

campus. These infrastructure are located in Sector H in the core academic zone. Currently both the University Bookshop and the Library are undergoing renovations and restructuring to improve their service delivery to the campus community.

Though existing academic support infrastructure are well maintained there are a few important problems associated with them. These are:

- Poor design consideration and standards for persons with disability on campus;
- Poor parking facilities for these buildings;

1.3.4.1.4 Campus Administration Infrastructure

The campus administrative building infrastructure serves as the nerve center of the campus administration. The building infrastructure that provides office accommodation for the administration of the University is located on Legon Hill in Sector H. The existing administrative infrastructure on the Legon Hill consist of the Convocation Group of Buildings popularly known as the Registry on the campus. This group of buildings provides office accommodation to the Vice – Chancellor and the Pro Vice – Chancellors, the Registrar, the Director of Finance, the Legal Counsel, Public Affairs among others.

These existing central administration infrastructure have not seen much expansions over the years therefore allowing for the dispersal of administrative offices on the campus. The central administration is supported by the Physical Development and Municipal Services Directorate which is located on La Road. The Physical Development and Municipal Services Department which falls under the Central Administration is located in sector J and still occupies buildings classified under the 1968 Master Plan Proposal as temporal structures. The PDMSD is also far removed from the Legon Hill administrative complex.

Currently the well maintained central administration building infrastructure on the Hill is being expanded to include a canteen.

Problems associated with existing central administration infrastructure are:

- Over-crowded offices;
- Poor design consideration and standards for persons with disability on campus;
- Low building densities and
- Poor parking facilities.

1.3.4.1.5 Students Residential Infrastructure

As a residential institution, student's residential accommodation is one of the most essential buildings required on the Campus. The initial student residential policy which was free boarding and lodging led to the design of all-inclusive Halls of Residence which provided accommodation, central kitchen and dining facilities and Junior Common Rooms, chapels, reading rooms to meet the social needs of the students in their respective halls. However with the revision of free boarding and feeding policies, recent Student Housing Infrastructure have been designed

to encourage self-catering in the Halls.

The Halls of residence constitute about 1.78% of the building stock on the campus and are located on the main campus in sectors are G, I, A and N.

Verification of all the habitable rooms within the University's Halls of Residence disclosed a total number of 4,197 rooms and 13,946 beds. These exclude rooms currently in used for other purposes such as offices, National Services Personnel and Commercial Tenants.

The Private Hostels have a total number of 1998 rooms and 5,370 beds. Table 1.3.3 presents analysis of available student's accommodation.

Table 1.3.3 UG Traditional Halls of Residence

ITEMS	HALLS	NUMBER OF ROOMS	NUMBER OF BEDS	TOTAL FLOOR AREA	FLOOR AREA/ STUDENT	REMARKS
1	Jean Nelson Aka	414	1583	N/A	N/A	provides enhanced facilities
2	Elizabeth Sey	424	1682	N/A	N/A	Provides enhanced facilities
3	Alexander Kwapong	414	1562	N/A	N/A	Provides enhanced facilities
4	Hilla Liman	419	1426	N/A	N/A	Provides enhanced facilities
5	Commonwealth	312	995	N/A	N/A	
6	Volta	220	634	N/A	N/A	
7	Legon	418	1347	N/A	N/A	
8	Akuafu	470	1632	N/A	N/A	
9	Mensah Sarbah	526	1837	N/A	N/A	
10	Jubilee	136	444	N/A	N/A	Provides enhanced facilities
11	International Student Hostel 1 & 2	254	424	N/A	N/A	Provides enhanced facilities
12	VALCO 1 & 2	190	380	N/A	N/A	Provides enhanced facilities
	TOTAL	4,197	13,946			

Source: 2015 Campus Field Survey

Table 1.3.4 Private Hostels

ITEMS	HALLS	NUMBER OF ROOMS	NUMBER OF BEDS	TOTAL FLOOR AREA	FLOOR AREA/ STUDENT	REMARKS
	African Union	1111	2917	N/A	N/A	Provides enhanced facilities
	United Nations	363	837	N/A	N/A	Provides enhanced facilities
	Kwame Nkrumah	208	656	N/A	N/A	Provides enhanced facilities
	James Topp Nelson Yankah	316	960	N/A	N/A	Provides enhanced facilities
	TOTAL	1,998	5,370			

Source: 2015 Campus Field Survey

Data on total floor space for student's accommodation is not available for a meaningful analysis to be made on current trends and standards. However there is evidence of overcrowding of rooms in the Old Halls of residence and their annexes where three and four students share accommodation respectively. Services and facilities in the relatively newly constructed halls and hostels have been provided to support self-catering by students and differ from the old hall in terms of provision of facilities and services available. Enhance facilities in the New Halls and Hostels include kitchenette on each floor, single rooms and suites among others.

a. Current Short Fall in Numbers of Beds Available

In its present situation, UG which is a residential institution currently experiences a short fall of 3,535 beds. Though existing student residential infrastructure are well maintained there are other problems associated with them. These are:

- Over-crowded rooms in the UG Old Halls and annexes
- Poor design consideration and standards for persons with disability on campus;
- Shortfall in availability of beds;
- Imbalance of available facilities and services;

1.3.4.1.6 Staff Housing Infrastructure

As an institution, with a policy for providing residential accommodation for Staff on the campus, staff residential accommodation is essential requirement on the Campus.

Staff Houses are located in five sectors on the campus. These sectors are A, I, K,

G, and Q. Four of the sectors (A, I, K, G) are on the main campus while only one (Q) is in the Staff Village. House types include bungalows, semi-detached buildings and a few flats.

While Staff Houses on the main campus cater for Senior Members and Senior Staff, those located in the Staff Village cater for Intermediate and Junior Staff.

The 1968 Master Plan proposed the construction of 750 units of accommodation on the campus for staff. However as a result of financial constraints the University was able to construct only 420 units of staff accommodation on the campus.

The staff housing forms the largest number of buildings on the campus. They constitute 82.40 % of the total building infrastructure on the campus and covers the largest developed land area on the campus.

The staff houses are well maintained and those for senior members of staff are set out in lush landscape areas. Though existing staff housing infrastructure are well maintained there are a few important problems associated with them

Table 1.3.5 Current Housing Stock Available to the University

Category of Staff	Houses on Campus	Achimota	Rented Premises
Senior Members	596	11	700
Senior Staff	36	52	
Junior Staff	244	90	
Total	876	153	700

Source: 2015 Campus Field Studies

Though existing staff housing infrastructure are well maintained there are a few important problems associated with them. These are:

- High patronage of private residential accommodation outside the campus for the use of staff. Currently 700 units of accommodation is rented outside the campus.
- Low building densities associated with existing staff housing on the campus and;
- Very large plot sizes allocated for senior staff houses on the main campus.

1.3.4.1.7 Sports Infrastructure

The policy of building a strong and healthy campus community which could effectively participate in national development was embedded in the 1949 Master Plan. This policy has ensured that sports facilities are always available for use by students and staff in sufficient quantities. This policy led to the building the

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first sport infrastructure consisting of an athletic field, a football field and Oval in Sector IA. The 1968 Master Plan recommended the construction of a new sports complex equidistant from the faculties, the Halls of Residence and the Medical Centre and the replacement of the old sports fields with two Students Halls of Residence. The replacement of the old sports field was not implemented but a new sports complex was built. Despite funding bottleneck, the University maintains an impressive array of sports facilities on the Campus due to increased health awareness within the University community. Table 1.3.6 presents existing sports facilities on Campus.

The University is in the process of integrating sports into its academic programs to ensure that all students have good balance between academic work and recreational activities as integral part of the University experience.

Buildings available for sports use constitute 0.27% of the total building stock on the campus. These buildings include the UG Sports Stadium, the Swimming Pool Complex including Changing Rooms, the Pavilions and Offices for the Sports Directorate/Indoor Gymnasium. The buildings are located in Sector Ks and IA. Analysis of existing building use revealed that the UG Stadium is yet to be completed and the University is looking for a Strategic Investor to complete the sports stadium. The existing sports infrastructure when completed will be enough to meet the needs of the University Community for a long time.

However the location of the existing sports facilities does not favor the private hostels which are far removed from these hostels and there is the need to correct this imbalance as access to sport infrastructure is a necessary learning experience.

Table 1.3.6 The Sports Facilities as Existing on the Legon campus in 2015

No	Facility	Location	Remarks
1	Sports Stadium	Next to the Sports Directorate	Partly Completed
2	Football fields	Six are located near PDMSD in the Zone for Sports	
3	Main Soccer Field	Opposite University Basic School	
4	Athletic/Oval/Hockey Pitch	Located between Legon Hall, Akufo Hall and the Central Cafeteria	
5	Basketball	The three basketball courts are located in the zone for student halls of residence at the eastern part of the	

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		Athletic Oval near Akuafu Hall.	
6	Handball and Volleyball Court	These are located at the western part of the Athletic Oval in the zone for student halls of residence	
7	Rugby	The rugby park is located in the Zone for Sports.	
8	Tennis Court	Located opposite Commonwealth Hall	
9	The University wellness and Fitness Centre	This center located next to the sports stadium is equipped with the following: <ul style="list-style-type: none"> ▪ a large size swimming pool, ▪ a tennis court complex with four clay courts, ▪ a gymnasium complex for wellness, fitness and ▪ a mini-sports hall. 	

Source: 2015 Campus Field Survey

a. Existing conditions of Sports Facilities on the Campus

The sports facilities on the Legon Campus are in fairly good shape but like every infrastructure the facilities require periodic and routine maintenance. Some of the facilities also require expansion to accommodate more users. The Sports Directorate has identified some sports infrastructure that requires immediate attention as presented in table 1.3.7.

Table 1.3.7 Existing Condition of Sports Facilities

ITEM	TYPE OF INFRASTRUCTURE	EXISTING CONDITION
1	Pavilion at Athletics Oval/Hockey Field	The physical state of the pavilion located at the Athletics Oval/Hockey Field has deteriorated such that the roof is falling bit by bit due to longevity.
2	The Tennis Court Complex	The complex requires fencing, lighting system and seating facility
3	Gymnasium	The well patronized gymnasium requires more rooms for wellness, fitness recreation, offices and storage rooms.
4	Restaurant at Sports Directorate	The well patronized restaurant at the Sports Directorate requires renovation and expansion to provide extra space for a second caterer

Source: 2015 Campus Field Studies

1.3.4.1.8 Municipal Services Buildings Infrastructure - Electricity, Sewerage and Water

The foundation for the provision of Municipal Services like electricity and water supply and sewerage treatment dates back to the early 1950 when the University had to provide its own utilities because it was far removed from the City of Accra. For these services lands were allocated and building infrastructure constructed to support the provision of these services.

UG buildings housing municipal services infrastructure constitute 2.16% of the total housing stock on the campus. These building are used to house utility infrastructure as follows:

- Electricity Transformers and Switches and;
- Sewerage Pumps;

The strategy of housing utility infrastructure protect these infrastructure from vandalism and the harmful effect of natural physical elements like the sun, rains

among others.

The field studies revealed that the tradition of housing electrical switches in buildings is being discontinued. This has resulted in erasing of writings on switches as a result of exposure of writings on switches to the natural elements.

1.3.4.1.9 Social Services Infrastructure

With a residential population of about 35,000 people on the campus, the University delivers local social services to meet the immediate needs of the campus community and these services include basic education infrastructure, health, social welfare and emergency services. Some of the local social services dates back to 1950's when the campus was built. The 1968 Master Plan made proposals for the expansion of social service infrastructure in tandem with the growth of the campus community.

Buildings used for social services constitute about 2.91% of the total UG buildings on the Campus. These are purpose built structures that support the following social services on the campus:

a. University Nursery

The University has a Nursery School Complex which is located along the Old Link Road and the Ayido Crescent in sector A. This was built recently to support Staff on the Campus.

b. University of Ghana Basic School on the Main Campus

The University Basic School which comprise of the Primary and Junior Secondary School was built in the 1950s as one of the social services on the campus. The 1968 Master Plan made proposals for its expansion in tandem with the growth of the Staff Residential Area.

The University Basic School is located in Sector O and consist of a group buildings assigned for teaching and learning. The buildings are well maintained and walled to protect the pupils. There is also enough land within the walled School for future expansion of the school infrastructure.

c. AMA Basic School in the Staff Village

The University allocated land to the Accra Metropolitan Assembly to construct a Basic School to serve the Staff Village. This School located in Sector R has grown to serve residents of Okponglo and Balawashie. The school has enough lands for its future expansion of facilities.

d. Hospitals

The operation of the Legon Hospital dates back to the 1950s when the University was first established at Legon. The Hospital was built to provide health delivery to the Legon Community. Under the 1968 Master Plan a Teaching Hospital was proposed to be built on the Main Campus to support the training of Medical Students on the Campus. The construction of the New Medical Center did not start until recently for

financial constraints among others.

The existing Legon Hospital is located in sector R in the Staff Village and the UG Medical School currently under construction is located in Sector L on the Main Campus. The existing hospital is a comprehensive facility with 130 beds. It is well maintained and has enough room for its northwards expansion.

The New Legon Medical Center is currently under construction as a 650 Bed Specialist Teaching Hospital. When completed it is expected to operate alongside the existing Legon Hospital.

e. Daily Clinic

A Daily Clinic was proposed under the 1968 Master Plan to provide daily health delivery services to students. This facility is operating from the ground floor of the Central Cafeteria located close to the Students Halls of Residence in Sector IA.

f. Police Station

The Legon Police Station is one of the social infrastructure proposed under the 1949 master Plan to provide security in the Legon Area. The Legon Police Station is located in Sector R in the Staff Village. Existing infrastructure consists of purpose built accommodation for the police and include offices and residential facilities. This facility is currently under the management of the Ghana Police Services and is in a deplorable condition.

g. Campus Security Services Unit

The University currently maintains an internal Campus Security Services Unit with a staff strength of 300 personnel. This Unit provides safety, security and law enforcement, crime prevention and emergency response services on the campus 24 hours a day and seven days a week. The Security Service also assists the Legon campus emergency preparedness efforts and provide training and presentations on a variety of topics including crime prevention, personal security and behavioral threat assessment to the campus Community.

Physical infrastructure available for the provision of these services include the main Campus Security Offices and four security gates provided at the official entries to the main campus. There is no security infrastructure at the Staff Village and this needs to be addressed.

h. Fire Service

Fire prevention is one of the most important emergency services on the campus. Prior to 1968, there was no Fire Service Station on the Campus. In the last decade a Fire Station has been located at the PDMS Directorate on Campus.

i. Social Welfare

Social Welfare is one of the essential social services provided on the campus so far as assistance to the physically challenged is concerned. The provision of social service on the campus is an essential service that is viewed in the context of

providing equal opportunity to people with disability on the campus. The University has a policy of equal opportunity in education which ensures that students with disabilities have a complete and equitable access to all facets of University life as can be reasonably provided on the Legon campus.

In fulfilling this policy, the University has established an office of Students with special Needs in Sector I on Legon campus. This office has a coordinator who is supported by a number of resource persons. They are to ensure that no student with any form of disability is disadvantaged in the pursuit of academic laurels.

1.3.4.1.10 Cultural Services Infrastructure

Prior to the formulation of the 1968 Master Plan proposals for new places of worships on the campus, worships were held in various chapels in the Halls of Residences on Sundays and the Hall Chaplains compiled schedules for various denominations.

The 1968 Master Plan proposed the construction of three places of worships for Catholics, Moslems and Protestants (Presbyterians, Anglicans and Methodist). Sites were proposed for construction of infrastructure for these activities in the existing zone for Students Halls of Residence. The locations of infrastructure in the Zone was to promote social intergration in that zone. Field studies revealed that although new places of worships have been provided on the Campus, the original sites were not used.

Buildings serving as places of the worship for Moslems and Christians constitute 0.75% of the buildings on the Campus. Eight places of worship are currently located on the Campus. Three places of worship for Christians are located in the Core Academic Zone in Sector H while the only Mosque is located commercial area in Sector O. Four other places of worship are located in the Staff Village in Sectors P and Q. the University provided the land and the respective beneficiaries built the structures. These facilities complement the Old Chapels available in the Five Traditional Halls of Residence.

The location of the three places of worship in the Core Academic Zone has not been explained.

1.3.4.1.11 Commercial Services Infrastructure

1. Background

Purposed built commercial infrastructure is one of the least developed infrastructure on the Legon Campus. This is because the 1949 Campus Layout was designed to promote student residential areas as autonomous and self-contained Halls with Senior Common Rooms as the nerve center of educating students on the Legon

Campus. This policy militated against the provision of an economic and social service zone outside the Halls of the entire College. Thus under the 1949 Master Plan, there was no identifiable zone for the provision of social and economic services on the Main Campus outside the Students Halls of Residence. The 1968 Master Plan proposals identified the need for a zone for social and commercial activities to address the unmet demand for such services on the Main Campus. Space was therefore allocated for the construction of the required infrastructure in Sector O close to the Manceple Shop and the Basic School to address the problem. Currently many commercial business both in the formal and informal sectors are operating on the Campus using all available spaces.

Dedicated building infrastructure available on the campus for the provision of commercial services constitute only 0.65% of the total stock of buildings on the campus. The low percentage could be attributed to deliberate suppressed development of a commercial area on the campus in favor of UG earlier policy of developing the Junior Common Rooms to train Students in the 1950s. There are three emerging commercial centers on the campus. These are located in sectors O on the Main Campus and Sectors R and Q in the Staff Village.

2. Commercial Service Infrastructure on the Main Campus

Four types of buildings serve as commercial infrastructure on the Main Campus. These are purpose built commercial infrastructure built by the University, Commercial Infrastructure built by private developers, converted rooms in the Halls of Residence, and temporary structures in the form of sheds and Kiosks.

a. Purpose Built Commercial Infrastructure

The purpose built commercial infrastructure on the main campus are:

- Banks;
- Bookshop;
- Supermarkets;
- Guest Houses;
- Private Hostels

These buildings infrastructure are found in the emerging commercial center around Gorge Benneh Roundabout and other sectors. The types of commercial buildings vary from single storeys to two storeys. There is no available data on commercial floor space for these buildings to undertake a meaningful analysis of floor space available.

The retail banking infrastructure consists of standalone ATM Infrastructure and Banking Halls. With the establishment of the University at Legon in the 1950s, two Banks were assigned accommodation behind the University Bookshop to provide banking services. These banks are still operating from these two premises in the Core Academic Zone. Currently about six banks are operating on the campus in Sectors

H and O. The banking building infrastructure is currently under expansion with the conversion of the old Manciple Building in Sector O into a banking complex to serve a number of banks.

The University Bookshop which dates back to the establishment of the University in the 1950s is located in Sector IA in the Core Academic Zone. The Bookshop which supports academic activities is currently undergoing renovations.

The “All Needs Supermarket” is the only supermarket operating officially on the campus. It has been in operation for over ten years and caters for both Staff and Students. The services providers intend to expand their services to include a pharmacy and other services but for the lack of space.

Other important economic services that operate from purpose built infrastructure on the campus are two guest houses, the University Guest Centre and the Yiri Lodge. The University Guest Centre was established in 1963 with funding from the Ford Foundation. It was established to provide accommodation for University's guest. The initial accommodation has been expanded from 36 to 60 rooms. The Yiri Lodge is a relatively new facility on the Campus which provides accommodation to guest and is also used for wedding receptions and banquets among others.

Private Hostels have been dealt with under Students Residential Accommodation.

b. Converted Rooms and Garages in the Students and Staff Residential Areas

Over the years, extra rooms including garages available in the Halls of Residence and Homes for Staff have provided temporary commercial spaces on the campus to meet un-met demand for commercial space. Salons, barbering shops, tailoring shops, secretarial services among others currently operating from these spaces on the main campus where kiosks are not tolerated.

c. The Night Market

The cancellation of University's free feeding policies has encouraged the emergence of food vendors on the Campus. A number of food courts operate on the campus but the most visible is the night market with 48 Food Vendors which operate from Sector O the main commercial center. Temporary sheds have been constructed to provide accommodation for Food Vendors which operate at the Night Market. The Night Market serves as a food court where all types of cooked food, fruits and other provisions are offered for sale to the campus community especially the students. This facility in its current form does not offer acceptable environment in terms of hygiene for their customers and the vendors. Available sanitary facilities like washrooms/toilet are very limited. The market has no space reserved for those who may want to eat at the place. This situation encourages students to eat in their rooms with the associated attraction of rodents to the Halls.

3. Commercial Services Infrastructure in the Staff Village

i. Purpose Built Commercial Infrastructure by the University

A market was built in the early 1950s to serve the commercial needs of the staff Village. Attached to the market is a Community Center that served as an entertainment center. The operation of the market has been abandoned and commercial services operate from temporary structures. such as corn milling, sale of provisions, dress making, radio repairs currently operate from temporary structures such individual kiosks, wooden sheds and table tops in the Staff Village.

Table tops and kiosks therefore occupy available open spaces around the Legon Police Station, the Legon Hospital and the staff residential houses. Currently a Transport Terminal is under construction to serve vehicles which operate from this zone and once completed may attract more commercial activities in this zone. According to PDMSD, attempts have been made several times to remove all kiosks from the surroundings of the Staff Village but this has not been successful.

ii. Purpose Built Commercial Infrastructure by the Private Sector

Commercial infrastructure built by the private sector in the Staff Village include the Ghana Commercial Bank, The Legon Mall, Tabs and Pill Pharmacy, Total Fuel Station, Hostels, and Private Offices.

iii. Temporary Commercial Infrastructure

Table tops and kiosks therefore occupy available open spaces around the Legon Police Station, the Legon Hospital and the staff residential houses. Commercial services operate from these temporary structures and include corn milling, sale of provisions, dress making, radio repairs.

1.3.4.2 Campus Roads Infrastructure

a. Background

The hierarchy of the existing road network on the Legon Campus has its roots in the 1949 Harrison, Barnes and Hubbard Master Plan and the 1968 Shepheard and Epstein Development Plan. The development plans provided the campus with major arterial, distributor and access roads including the Central Avenue, the Volta, Akuafu, Osu, Annie Jaggie, Hodasi, Achimota and La roads.

Among all the roads, the most prominent has been the Central Avenue which used to be the main access road to the campus and held the road network together. Entry through the Central Avenue is now a restricted and is available to only those with special passes. The road is also partly pedestrianized when the University is in full session.

Except the Core Academic Zone where commercial vehicles are restricted,

almost all roads through campus remain open to public access and provide for vehicular traffic to parking and to service destinations.

Until early 2005, there were only two entries and exits to and from the Main Campus. The location of new hostel facilities, located north of the academic zone, led to the introduction of two entry/exit accesses, one on the Haasto road and another on the Accra – Aburi Road, opposite the Presbyterian Secondary School.

The reconstruction of the Accra – Aburi road including the provision of grade separated interchange at the Main Entry to the campus resulted in the partial closure of the main entry and the construction of a new entry into the campus at Okponglo on the Accra - Aburi Road. The completed interchange on Accra - Aburi provides a grade – separated intersection at the main official entry into the University, thereby reducing the conflicting movements at this intersection.

There are now five entry/exit accesses to and from the campus but only the access located along the Legon East Road (popularly known as Okponglo Junction) access is opened to the public without using a special pass. This increased number of entry/exits has contributed to motorists trying to access their destination through the University until the introduction of the special pass for designated accesses. A thoroughfare is allowed for commercial vehicles, mostly trotros, to connect from the Legon East Road (Okponglo and its environs) to Legon West Road (GIMPA/Achimota and its environs). Laybys are located at the ends of this route and also along it to enable commuters, mostly students, to use this public transport services.

b. Commercial Transit Terminals

Two transport terminals, which serve commercial vehicles operating on the campus, are located on the Main Campus (along the Legon East Road (Okponglo Junction)) and the Staff Village, adjacent to the Legon Police Station. Other undeveloped, temporal terminals were also identified on the campus. These yet – to – be developed terminals were located adjacent the Volta Hall, at the Kwapong Hostel, Administrative Block and the Ghana Hostels Area. These yet – to – be developed terminals will have to be developed as a permanent terminal with the necessary supporting infrastructure. Also, the terminal on the Staff Village is under construction at the moment.

c. Pedestrian Walkways

Pedestrian walkways form critical links between buildings, reinforce the circulation grid, and connect campus open spaces. The network of walkways and the quads forms the primary circulation system for the university community. The existing campus' pedestrian corridors have their roots in the 1968 Sheppard and Epstein Development Plan which proposed two main pedestrian corridors on the Campus. These were the East – West Pedestrianization of the Central Avenue and the North – South Pedestrian Corridor that links the Core Academic Zone in the Northern part of the Campus to the Medical Center, in the Southern part of the Campus. The

decision in the early 1968 transport plan to restrict the vehicular movement/flow along the central avenue on the campus has resulted in an expanded available space for pedestrian movement and created a safe and more relaxed atmosphere during peak pedestrian – use periods.

The core academic zone is partly pedestrianized and the University is currently improving the north – south pedestrian corridor. The University is also constructing pedestrian walkways and laybys along selected major distributor roads to assist pedestrian movement on the campus. This pedestrian – oriented corridors allow for safe and convenient pedestrian movement and enhances the character of the campus while promoting the achievement of sustainable transportation with walking and cycling as major transport modes on the Campus.

d. Parking

Approximately there are roughly 3,600 parking spaces on the Legon Campus including service vehicle parking. These parking spaces are located at the developed and undeveloped terminals, halls of residences and hostels, departments, shopping areas, some academic blocks, quadrangle, administrative blocks, etc. Although the spaces for most of these parking areas have been defined with paving blocks and kerbs, line marking and signage at the parking areas were not identified. This implies that the parking arrangements, parking lots and aisles are not clearly defined at most of the parking areas and terminals on Campus. This has led to motorists parking at their own discretion, which could reduce the capacity and efficient operation of the parking areas. Provisions are yet to be made for cyclists and motorists on the Campus. It will be very important that parking facilities for cyclists and motorists are provided on Campus, in order to promote sustainable transportation involving walking and cycling on Campus.

e. Public Transport Facilities

Over the last decade Legon Campus has encouraged the use of alternative modes of transportation, particularly trotros, shared and chartered taxis and shuttle services. Temporary transit parking areas, laybys and/or bus stops are available on the campus. The commercial transport terminal on the main campus will require redevelopment to improve facilities in the terminals in order to ensure its efficient operations. Also, the undeveloped and temporal terminals will have to be developed to fully operate as designated terminals. Laybys for temporary parking are currently under construction along the major roads.

The routes for the various public transport services (trotros, taxis and shuttle services) will have to be clearly defined and communicated in order to ensure safe and efficient movement of people on the Campus.

1.3.4.2.1 Findings and Deductions from Campus Traffic Survey

From the reconnaissance survey, field surveys and analysis undertaken along the links and intersections within the campus road corridors, findings and deductions were made and gathered to serve as the basis for recommendation (s) to the existing transport infrastructure on the campus.

Inventory of Existing Surface Conditions of Campus Roads in 2015

The existing campus roads consist of bituminous, asphaltic and gravel surfaces at various sections. Currently the University has come out with a policy of providing asphalt overlay over the existing bituminous road surfaces on the campus and also providing line marking to appropriately delineate the driveways and this process is ongoing. This process will enhance the pavement structure of the roads on Campus, thereby increasing drivability.

Manual Classified Counts in 2015

The main objective of the Manual Classified Counts was to obtain information on traffic volume and composition of traffic along the various links on the Campus. From the analysis of the manual classified counts, the following findings were gathered:

- Cycling and Motorbikes were not highly patronized as a major mode of traffic in the institution. Cycles and Motorbikes comprised of about 0.5 - 1 and 3 - 4% of the average total traffic within the project corridor.
- The vehicle classification with the highest traffic distribution was private cars, which comprised of about 40% of the average traffic distribution within the institution. This was followed closely by taxis and pickups, which comprised of about 25 – 30 and 15 – 25% respectively. This implies that the vehicle classifications used predominantly within the project corridor were private cars, taxis and pickups, which comprised of about 85 – 90% of the average traffic distribution.
- The high patronage of low occupancy vehicles with less than 3 passengers per vehicle is not very sustainable for the existing transport infrastructure and the rapid infrastructural development within the institution.
- Small buses comprised of about 4 – 7% of the average traffic distribution within the project corridor. This was the only high occupancy vehicle that had an average traffic distribution of more than 1%. This implies that there is a low patronage of high occupancy vehicles within the project corridor, which is not very sustainable for the existing transport infrastructure.
- The other vehicle classification comprised of less than 1% of the average traffic distribution within the project corridor.
- The capacity of the various homogenous links within the project corridor had a maximum level of service of B. Also, the minimum number of lanes to satisfy the traffic flow along the various links within the project corridor was estimated for a level of service of B and it was deduced that a single carriageway could satisfy the existing traffic flow along the links within the institution.

- However, following the rapid infrastructural developments within the institution, some links will have to be upgraded into a 2 – lane dual carriageway in order to adequately serve as the major arterial lanes/routes for the institution.

Turning Movement Counts in 2015

The main objective of the Turning Movement Counts was to obtain the base information of the turning movements of traffic flows at the intersection in order to analyze the capacity of the intersection on the major Campus. From the analysis of the turning movement counts, the following findings were gathered:

- All the major intersections within the project corridor were within the stipulated volume to capacity ratio threshold of about 0.9.
- Also, the level of service for the major intersections within the project corridor were less than C, which is within the Highway Capacity Manual (HCM) recommendation for effective and efficient operations of roads. The minimum level of service expected, as per the HCM, should be a “C” over the design life.
- Appropriate turning lanes for the approaches at the major intersections will also have to be implemented to reduce impedance of left turning movements and adequately accommodate for the traffic flow demands.

Pedestrian Counts in 2015

From the analysis of the pedestrian counts, the following findings were gathered:

- There was a high movement of pedestrians within the project corridor, which required adequate provision of pedestrian facilities.
- Two areas within the institution attracted the highest pedestrian flow and/or movement within the project corridor. These areas were the night market and the Balme Library. Adequate provisions will therefore have to be provided to ensure safe and efficient movement of pedestrian flow.
- There were not enough provisions and/or facilities for the pedestrian movements, especially pedestrian crossings.
- A well – coordinated and defined pedestrian facility need to be provided within the proposed development. This should incorporate cycle lanes to ensure adequate provision of sustainable transport system.

Public Transport Inventory in 2015

From the analysis of the public transport facility survey, the following findings were gathered:

- Some public transport facilities such as bus stops, terminals were identified within the existing transport infrastructure. However, these public transport facilities were not clearly defined and did not have the adequate provisions to function appropriately.

- It was identified during the survey that passengers board and alight along the roads at their discretion and demand, which does not support efficient movement of traffic.
- Three vehicle classifications were used predominantly for the public transport services. These were shared taxis, chartered taxis, small buses and large buses. Shared and chartered taxis were the highest patronized public transport services within the institution.
- Small buses within the institution, which operated as shuttle services, were not highly patronized within the institution. From the interviews, it was deduced that the schedules for the shuttle services were not certain and organized. It could not therefore be relied on for proper planning.
- The small and large buses were used predominantly for trips outside the project corridor.
- Public transport facilities, comprising of laybys, waiting areas, terminals, etc. although designated by the passenger demands, were not clearly defined to ensure safe and efficient operation of traffic.

Parking Facility Inventory in 2015

From the analysis of the parking survey, the following findings were gathered:

- The parking provisions for some of the facilities were adequate and inadequate for some facilities. The adequacy of the parking provisions were mainly based on the parking demand for the particular facility. It was identified that the parking provisions for most of the hall of residences and/or hostels, academic areas were quite adequate whiles the provisions for the administrative and commercial areas were inadequate. Also, the parking arrangements within the parking areas were not clearly defined and marked out.
- In order not to use available lands for parking spaces, it is expedient to employ more sustainable transportation systems on Campus to reduce the high dependence on vehicles, which causes congestions and also creates parking issues.
- Also, there were inadequate signage for the parking areas and the driveway/aisle within the parking areas were not clearly defined.

1.3.4.3 Campus Open Spaces

a. Background

The Campus open spaces and landscape areas are generally characterized by large lawn expanses and wooded areas. This sustainable landscape, apart from their aesthetic effect, play important role in maintaining ecological balance on the campus.

The campus open spaces is defined as land area not covered by buildings or used for vehicle maneuvering or parking and consist of rural and urban landscapes.

Rural landscape includes shrubs, wooded areas, farms, the Sewerage Farm, and the Legon Botanical Gardens. Urban landscape are amenities such as sidewalks, public plazas, quads and courtyards, lawn and non-developed areas and other such amenities that provide the UG community with a space and opportunity to co-mingle.

b. Rural Landscape and Maintenance on the Campus

The rural landscape of the main campus consists of large portions of the campus lands covered with bush and those purposely reserved as greenbelt, as wind breakers and remnants of agricultural activities. The rural landscape areas also include steep slopes around Legon Hills, valleys and marsh lands are found in both the Main Campus and in the Staff Village.

Large portions of undeveloped campus lands that are classified as rural landscape are located in the west and northwest of the academic zone. Others areas include lands lying west and southwest of the Legon Hill, to the west of the new Halls of Residence and the New Medical School under construction.

Currently the University has no maintenance program for the rural landscape. Some parts of these lands are farmed annually by some workers on the campus and therefore the vegetation is not allowed to mature.

The most worrying situation is the dumping of construction waste materials and refuse on portion of these rural landscapes on the edges of the campus. Waste dumps are found along the Kwaabenya – Haasto road and the Accra - Aburi road.

c. The University Botanical Gardens

The Botanical Gardens which was established in the 1950s covers an area of 25 acres. Among others objectives, the Botanical Garden was to serve as teaching and research area for the Department of Botany and provide materials for planting in the grounds and gardens of the University College. Until 10 years ago the Gardens was under the full supervision of the Department of Botany. But because of lack of regular funding for both recurrent and capital development the garden was removed and placed under the Physical Development and Municipal Services Directorate.

Currently a portion of the Gardens has been privatized. The objective of the privatization was to place a portion of the Gardens in the hands of a private investor to raise the fortunes of the Botanical Gardens with infusion of capital and new ideas. However the commercial interest seems to come into conflict with the academic

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objective for the Gardens which is to serve as a teaching and research field for the Department of Botany.

Current Private Investor activities include:

- General recreation and relaxation for the adults and children;
- Individual and family picnics;
- Photo shoot for individuals and wedding couples and guest;
- Boat Rides on artificial pond/lake
- Restaurant services, etc.;

These activities require a landscaped environment that is well developed and maintained including lawns and hard landscape areas. Portions of the Gardens have therefore been cleared of bush and lawns planted to beautify the place. The pond which is used for aquatic research has been dredged and mangroves removed. It is the Consultant's understanding that a Committee has been set up to look at the ongoing activities at the Gardens to make recommendations for proper management of activities in the Gardens.

d. University Sewerage Treatment Farm

The Accra Metropolitan Authority has recently taken over the old University Sewerage Treatment Plant and re-constructed a new sewerage treatment facility on the 15 acre land which used to serve as a treatment plant for the University. About half of this land is bush while the other half is made up sedimentation ponds among others treatment facilities. This facility is currently serving the Campus and it is to be extended to the nearby communities of GIMPA, Haasto, West Legon and Papao among others.

e. Urban Landscape Development and Maintenance on the Main Campus

The built environment of the University of Ghana is also associated with both hard and soft landscapes. Almost all the open spaces in the built up portions of the Legon campus contain lawns, planted gardens, flower beds, shade trees and pedestrian walkways among others. The urban landscape development has accordingly followed the existing physical development axis on the Campus.

Lawn areas around the campus has helped to beautify the campus environment and provide for the campus community outdoor recreational needs. The lawns also provide aesthetically pleasing backdrops for other **landscape** plantings as well as many environmental benefits. The most significant of these are the ability to stabilize soil against water and wind **erosion**.

The sustainable landscape in the built areas of the campus which include avenue trees and shrubs, play an important role in moderating summer air temperatures in campus tropical environment.

Other landscaped areas on the campus include quads and courtyards in individual buildings. The urban landscapes areas on the campus that are the purposely developed and maintained are the following:

I. Open Space Development and Maintenance in the Core Academic Zone

Open spaces in the core academic zone have been developed into lawns, plaza, and quads. All courtyards in individual buildings and grounds of individual buildings in the academic zone have been grassed and well kept. However some lawns have been subjected to over use by pedestrians and vehicle owners who engage in illegal parking of vehicles on some lawns. Affected lawns have therefore lost their grass cover resulting in soil erosion in some places. These areas include lawns around the Balme Library, The Registry, and the area opposite PDMS Directorate.

The road network in the academic zone has also been planted with shade trees and provided with paved pedestrian walkways. Where there are no paved walkways connecting individual buildings, pedestrians have cut their own footpaths across the lawns to connect buildings.

Located in the Core Academic Area and the Registry are three quadrangles including the University Square and the Recreational Quadrangles located close to the Balme Library. Two of the quads have been decorated with water fountains and statues. The most important missing items in the developed open space are site furnishes like benches and trash bins. Apart from the New Law School Building, the Old Department of Social Science and the University Bookshop, site furnishes like benches and trash bins are unavailable in most open spaces in the core academic zone.

Maintenance of Open Space in the Academic Zone has been privatized. The privatization covers the Registry and the Vice-Chancellor's Residence. It also covers the teak tree plantation north of the registry which serves as a wind breaker to protect the Convocation Group of Buildings.

ii. Open Space Development and Maintenance in the Zone of Halls of Residence

The Old Halls of residence

Open spaces in the zone of student's Halls of Residence have been developed into lawns and flower beds. The internal landscapes of courtyards consists of lawns, flower beds and paved areas are well maintained. The grounds around the Halls are

also well landscaped and consist of lawns, flower beds and paved areas. However some lawns around the halls have been subjected to erosions and include the lawns south of Legon Annex C, west of Mensah Sarbah Hall, and north of Sarbah Annex A. These lawns have been subjected to soil erosion as a result of poor maintenance of the lawn and overuse by footballers and pedestrians.

The road network in this zone is also lined with shade trees and provided with paved pedestrian walkways.

New Halls of Residence

The open space development in the zone for the relatively newer halls of residence is still undergoing development. Generally site furnishes like benches and trash bins are at the moment unavailable in the open spaces in these zones.

Maintenance of Open Space in the Old Students Halls of Residence has also been privatized. The privatization covers areas around the five old halls and their annexes, the Jubilee Hall, the Graduate Students Halls and the four new Halls. However the contract covers only the open spaces outside of the halls while the internal courtyards are handled by the Halls themselves.

iii. Open Space Development and Maintenance in the Zone for Private Hostels

Open spaces in the relatively new zone for Students Halls of Residence (Private Hostel) are less developed when compared with open space development in the old student's residential zones. Among the four halls of residence in the zone, only the African Union Hall has a well-developed open space. The rest have neglected to keep their surroundings up to the existing standards on the campus. Also located in between the halls are undeveloped open space that could be described as rural landscape.

The road network in this zone is yet to be provided with avenue trees. Open spaces in Zone for Private Hostels on the campus are handled by the Grounds and Garden of the Department of the Physical Development and Municipal Services Directorate.

iv. Open Space Development and Maintenance in the Staff Residential Areas

Staff residential houses on the main campus are set in lush green areas providing effect of pleasing rural environment. Landscapes in these zones are well developed into lawns linked with well grown shade trees. These residential areas include Legon Hill, Ayido Crescent, Ayido Flats, Link Crescent and Little Legon. Other developed residential landscape areas are located in South Legon residential zone and along the La Road where other Staff Bungalows are located.

The road network in this zone are also lined with shade trees and some are provided with paved pedestrian walkways. Street lights are also available in these areas.

iv. Open Space Development and Maintenance Along Campus Edges

Wooded edges of the campus provide rural environment and atmosphere within the urban setting of the campus and its environment. This rural environment is aesthetically pleasing as they beautify the edges of the campus and provide alternative environment when compared to nearby communities without any green areas.

The lack of effort by the University to maintain the rural landscape at the edges has contributed to the dumping of waste in some areas. Currently the University has a policy of leasing lands at the Campus edges to private developers for development to stop the dumping of waste and other refuse along these edges.

Open spaces along the Campus Edges and other general areas on the campus are handled by the Grounds and Gardens of the Department of the Physical Development and Municipal Services Directorate.

v. Open Space Development and Maintenance Along Campus Entries,

There are six official entries to the Legon Main Campus. These are the GIMPA entry, the South Legon entry, the Okponglo entry, The Main Legon entry, the Pre-Sec entry, and the Haasto Road entry. Traditionally these official entries are expected to present the visitors with their first impression of the University and therefore entries/access routes are normally well landscaped and provided with street lights, avenue trees, pedestrian walkways, direction signs and information offices among others.

On the basis of current evidence only the GIMPA entry could be assessed as meeting the minimum landscape standards. The rest of the five entries do not meet the minimum entry standards expected from the premier University. However, one could say that there are evidence of on-going redevelopment of these entries. These redevelopment schemes include paving of pedestrian walkways and tree planting among others works.

vi. Avenue Trees Development and Maintenance

Almost all the campus streets are planted with shade trees, mostly mahogany. These trees connect building infrastructures on the campus and beautify the exterior aesthetic qualities of campus. The trees are well maintained and are pruned from

time to time. Occasionally some are uprooted during storms and are immediately handled by the Grounds and Garden Staff.

Open spaces along the Campus avenues/streets are handled by the Grounds and Garden Depart of the Physical Development and Municipal Services Directorate.

vii. Green Belt/Wind Breakers Development and Maintenance

To maintain the Convocation Group of Buildings from wind storms, wind breakers in the form of teak trees plantation have been planted north of the registry to offer protection to this group of buildings. The plantation apart from serving as wind breaker also offer aesthetic value to that portion of the campus and also cools the temperature in the part of the campus. Maintenance of the Teak Plantation is handled by a private contractor.

viii. Site Furnishing Development and Maintenance

Open space furniture including benches, trash bins and shelters are normally very import in Campus environment. These furniture allow the open space to be used. The campus is sparsely furnished with benches and trash receptacles. With the exception of a few benches found in front of the Legon Bookshop and in front of the New Law Faculty, existing site furnishings are not comparable to the expanse of open space available on campus. According to sources, during the 1970s and 1980s when perching was thriving on campus, these benches became sleeping places of some students without accommodation on campus.

The provision of benches and tables in selected localities on campus will encourage the use of existing open space.

ix. Exterior/Street Lighting Development and Maintenance

Exterior lights are very important fixtures of the campus open space at night as the lights provide confidence and security to pedestrians and general campus community at night. The exterior lights have been provided along streets, parking areas and at the entrances of buildings. Unfortunately the exterior lights are not available in all parts of the campus.

x. Signage

Wayfinding and signage systems are very important campus open space furniture. They help visitors to the campus to find their way to their destinations. There is an attempt to provide a comprehensive wayfinding and signage system on the campus. The University has designed a Map of the Campus which is on sale at the

Geography Department. The University and the Accra Metropolitan Assembly have also installed signage boards at junctions. This signage system is not electronic and therefore not visible in the night. The signage come with different formats so the University has to choose one format for their signage.

Signage is critically important in conveying not only necessary information but also in establishing and perpetuating the brand image of the University as a whole. The University will have to work on the signage system on the campus to improve the brand.

Urban Landscape Development in the Staff Village

Urban Landscape in the Staff Village is not well developed as that of the Main Campus.

a. Open Space Development in Staff Residential Area

The plot and building layout of the Staff Village was designed with courtyard system in mind. Both the plot and building have been grouped around the courtyard which serves as open space for households to meet and interact among themselves. Unfortunately all the public open spaces have been overtaken by wooden and metal containers which have become point of sales for commercial goods, electronic repairs shops and dress making among others. Almost all the open spaces around the houses along the main avenue in the Staff Village is taken up by kiosks.

According to the Official in charge of Staff Housing at Physical Development and Municipal Services Directorate, meetings have been held with residents at the Staff Village to remove all kiosks so as to improve the environment but the call has been ignored and the situation is the same.

b. Open Space Development around the Legon Police Station and Legon Hospital

Apart from the front part of the Legon Police Station which is free from kiosks, the rest of the surroundings of the Legon Police Station have been overtaken by Kiosks which are point of sales for provisions and accident vehicles.

One could safely conclude that the environmental conditions around the Legon Police Station do not measure up to what is expected of a police station located on the grounds of the premier University.

c. Open Space Development around the Legon Hospital

The Legon Hospital is surrounded by lawns and tress. Unfortunately the lawns have been overrun by erosion in most places as a result poor maintenance of these lawns.

Management of Campus Open Space

The campus grounds and gardens which were once under the Department of Botany has been place under the PDMS. However, maintenance of portions of the grounds and gardens have been privatized

Area under Privatization

The Sections of campus open space that are under privative maintenance are:

- The Academic Areas including the Teak Plantation;
- Grounds outside all Halls of Residence;
- The Registry and the area around Vice-Chancellor's Lodge;

Area under PDMS

The Principal Assistant Curator of Grounds and Gardens and his team are in-charge of the rest of the campus including the staff residences and general grounds in both the Main Campus and the Staff Village.

a. Ground Staff and Equipment

Staff is headed by a Principal Assistant Curator. He is in-charge of the Legon Campus Grounds and Gardens. Apart from supervising the work of Private Gardeners working on the Campus he also supervises the following workers under him:

- Pruning groups,
- Tractor crew,
- Landscape crew,
- Weeding gang,
- Formal lawn mowing gang and
- Technicians at the workshop.

Equipment available for their use include 4 tractor heads, slashers, mowers and brush cutters among others. These equipment are old and need replacement.

b. On-Going Capital Development Projects

The Grounds and Gardens department relies on its yearly budgetary allocation to operate. Because of poor funding open space development on the campus is slow or almost static. Currently there is an on- going beautification project including the provision of pedestrian walkways along the Volta Road (Language Center to Guest Center) and La Road (Basic School to School of Performing Arts), the beautification of the Noguchi Roundabout and the Restoration of the Main Campus Entrance.

c. Availability of Legon Campus Open Space Master Plan

The Principal Assistant Curator has no access to a Master Plan for Open Space Development and Maintenance on the campus. The Curator therefore operates by instincts only. This situation has to be corrected.

1.3.4.4 Municipal Services Infrastructure

a. Electricity Installation, Supply and Demand

Power distribution on the campus is at two levels; High Voltage Primary Distribution and Low Voltage Secondary Distribution. Electric power to the university is supplied by Electricity Company of Ghana (ECG) at a high voltage of 11KV. The injection substation (Reservoir) is located in a switch room within the campus and is independent of any other network outside the campus.

The H.T. Network

The H.T. network comprises two loops incorporating 11KV underground cables interconnecting high voltage switch gears (RMU's) and secondary distribution transformers at 11,000/415 volts and located throughout the campus as required by the building loads.

To date the University has about 40 transformers on the campus. The old transformer substations are mostly located in locked enclosure and are assessed by only authorized technical staff. However currently new and additional transformers that have been added to the substations are not housed but located outside the enclosures.

It is envisage that a second injection substation (Reservoir) would be built to service the new University Medical Center presently under construction, and all other future developments and some existing buildings that happen to be closer to the new substation.

Energy Demand

Over the years as a result of growth and expansion of land use activities on the campus, energy demand and efficiency has become a high priority on the campus. Since 2005 energy demand on the campus has risen as a result of many newly developed facilities on the campus that have higher than average energy needs. These buildings have been designed to accommodate the use of air conditioning and other energy intensive equipment. Energy is an important aspect of the Campus sustainability assessment.

Energy Consumption

The electricity consumption is based on electricity purchases from Electricity Company of Ghana Limited. (ECG). Noguchi Memorial Institute generates

approximately 715.8 KW from its Solar Panel Energy System also exports surplus of 400 KW electricity.

Operations and Maintenance

The Physical Development and Maintenance Services Directorate has a department that monitors operations and maintenance of power supply and distribution network on the campus. Formerly periodic maintenance was undertaken every year but that is not so at the moment.

The Department also operate and manages the electrical systems on the campus. There are over 900 units of buildings on the campus including academic, research, halls of residence and staff quarters that PDMSD monitors to ensure their functioning and smooth operations.

The PDMSD has an ongoing maintenance programs to increase energy cost savings. In addition to equipment updates since 1990, the University has worked to reduce energy use by influencing students, faculty and staff behavior through Ghana Energy Commission Program of Electricity Savings and Conservation Measures.

The University's approach to energy management in existing buildings is aggressive one to update lighting, and mechanical cooling systems and have tracked significant financial savings tied to those improvements.

Weakness in the Power Distribution System

- **Lack of Standardization of Equipment in the Distribution System**

The current electrical power distribution system is not standardized. Standardized practice has the advantage of reducing the spare parts to be held in stock, ensure that spare parts are likely to be more readily available and imposes less strain on the technical skills of the maintenance staff.

For instance three sets of transformers ratings (200KVA, 11/.415KV/500KVA, 11/.415KV and 800KVA, 11/.415K) could have been adopted for low, medium and high density areas. The ring main units should be extensible have interchangeable parts.

- **Lack of Cautionary Notice “Danger High Voltage” on Substations and Equipment**

There are no display of Danger notices on the buildings housing the transformers. Danger notices should have been displayed conspicuously on every switchgear with the inscription “Danger High Voltage” boldly written in red on a white background.

- **Missing Underground Cable Markers**

For easy identification, the route of high voltage underground cables must be marked with cable markers at intervals not exceeding 150m. Underground cables must be adequately protected when crossing roads.

- **Lack of Schedule Maintenance Program for the Underground Electricity Cables**

Currently there is no scheduled maintenance program for the underground electrical cables. These cables were laid over sixty years ago and most of the ground markers indicating the cable routes are missing. This situation poses a problem in identifying existing cables routes.

b. Campus Water Supply and Distribution System

The Installed capacity of the Water Supply System on the Campus since 1950 has not changed. The reservoir built in the 1950s and situated on top of Legon Hill is still the High Pressure Service Reservoir for the campus. What has been changing gradually is the gradual reduction of volume of water available for distribution from the reservoir.

Over the years, the University community has been served with water by the Ghana Water Company Ltd from 9,000m³capacity Service Reservoir commonly referred to as the High Pressure Zone (HPZ) Reservoir. The Reservoir's capacity was sized to serve the Atomic Energy facilities at Kwabenya as well through a 250mm (10 inch) diameter Asbestos Cement (AC) pipeline.

The Reservoir is fed by pumping from the Booster Station at the Accra Terminal Reservoir which, in turn, receives water from the Tema Booster Station. The HPZ Reservoir was also designed to be fed through three pipelines i.e. 400mm (16 inch) diameter, 500mm (20 inch) and 600mm (24 inch) diameter.

Reduced Supply to Legon Service Reservoir

Currently, the 400mm (16 inch) diameter pipeline is a dedicated line serving only GIMPA campus without water in it reaching the HPZ Reservoir. Therefore, the HPZ Reservoir receives water through the 500mm (20 inch) diameter pipeline fully and the 600 mm (24 inch) diameter pipeline partially. Partially because the 600mm (24 inch) diameter pipeline was also designed to provide water to Kwabenya.

The Top Water Level (TWL) in the Reservoir is at a depth 3.048m (10 feet). By the design, when the depth of water exceeds 2.5m (8ft) water overflows into the pipeline to the Atomic Energy facilities at Kwabenya. This arrangement worked very well when water supply exceeded water demand. As a result of current population increases in the neighborhood resulting in increase in water demand, the current situation is that water demand exceeds supply.

This has resulted to no overflow to the pipeline serving the Atomic Energy facilities at Kwabenya. Instead, a by-pass connection has been made on the incoming 600mm

(24 inch) diameter pipeline to connect supply lines not only to the Atomic Energy facilities to residents of Kwabenya and settlements in the surrounding areas. Another problem is that there is no Level Indicator installed at the Legon Reservoir. Therefore, the depth of water in the Reservoir cannot be determined accurately.

From the HPZ Reservoir, water is pumped into six Underground Tanks each with a capacity of 2.25m³ (500 gallons), thus giving a total storage of 13.5m³ (3,000 gallons) at the Convocation Ground. In 2013, a Pump with a rating of 200m³ /hour was installed to serve this purpose. It replaced the one in use then which became faulty. Pumping is stopped when the depth of water in the HPZ Reservoir is about 1m.

Provision of Boreholes

Water supply on the Campus, during the water crisis era in 2010 was supplemented by 36 Boreholes drilled at locations indicated in the Table 1.3.8. These bore now serve as backup to supply from GWCL.

Table 1.3.8 Provision of Mechanized Boreholes to Supplement Water Supply on Campus

LOCATION	NUMBER	LOCATION	NUMBER
Akuafo Hall	2	Legon Hospital	3
Legon Hall	2	LECIAD	1
Sarbah Hall	2	Faculty of Arts	1
Commonwealth Hall	2	ISSER (New)	1
Volta Hall	1	School of Pharmacy	1
Limann Hall	5	Physics	1
Kwapong Hall	2	Jones Quartey Building	1
Sey Hall	2	Law Faculty	1
Jean Aka Hall	2	International Students' Hostel	1
Sports Directorate	2	School Engineering	1
VC's Lodge	1	Earth Science/Geography	1

Source: 2015 Campus Field Studies.

Current Condition of the Distribution System on the Campus

The water distribution system is a mixture of Cast Iron pipe, Asbestos Cement pipe and uPVC pipe of different sizes. Some of the old pipes have been rehabilitated whereas others have not been rehabilitated because they cannot be located.

There is the need therefore for the University to undertake a comprehensive stock taking of the water supply distribution system including all pipes, valves, sluice valves, air valves and washouts to determine the rehabilitation works to be undertaken to improve the system.

There is no comprehensive "AS BUILT DRAWINGS" of the Water Distribution Network available. Instead, Updated Drawings are available. But these are not reliable.

Low Pressure Zones

It is also important to state that currently some parts of the Legon Campus suffer from low pressures or complete lack of water supply to those areas. These areas are:

- **The Staff Village**

During the reconstruction construction of the Tetteh Quarshie - Pantang Road, the water supply line to the Staff Village was damaged and has since not been connected to the main Campus Reservoirs. The Staff Village which hosts important land use activities like the 130 Bed Legon Hospital and 244 Units Staff Residential Houses are now connected to the Medina Supply Line which is not very reliable. The Legon Hospital therefore relies on installed mechanized boreholes as a backup supply.

- **The Main Campus**

There are also areas on the main campus that could be classified as low pressure zones. These are:

New Academic Areas

- The area been referred as relatively New Academic Zone on the main Campus include the new Law Faculty, ISSER, Department of Mathematics and Statistics, Department of Computer Science and Faculty of Engineering among others. Water supply to this zone is by PDMSD Tanker Service. This service to this zone therefore depends on the reliability of two vehicles (an old Tankers and a relatively new tanker) which provide the tanker service to the zone. Storage of water in this zone requires improvement.

The Four New Halls

- Part of the four new Halls also experiences low pressure. In fact the last Hall, Jean Nelson Aka Hall hardly receives water in this zone and relies on mechanized borehole for the supply of water.

New South Legon Residential Area

- This area also experiences low pressure in water supply. This is because it is served by a relatively small pipe.

The Registry Area

- The storage and distribution system of water at the Registry needs to be reviewed to correct frequent shortage or loss of water in the system.

Operations and Maintenance of Water Supply and Distribution System

The operations and maintenance of water supply system on the Campus is handled by the PDMSD with the Director of the Physical Development as the overall supervisor. The technical section is handled by eight number staff headed by a Principal Superintendent. They are engaged in the day to day operations of the system on the campus in general.

▪ **Operations in the Traditional Halls**

Each of the traditional halls of residence has its own internal technical staff who handle operations and maintenance of water supply in each halls of residence. Each traditional Hall is also provided with underground water reservoir. The PDMSD coordinates the operations and maintenance of the facilities.

PDMS has a maintenance program for the water section as follows:

- Pipe Lines on the Campus – These lines are checked every three (3) months;
- Reservoirs on the Campus – The Reservoirs are maintained annually

▪ **Logistics for Operations and Maintenance**

The technical department lacks the requisite logistics to function efficiently. The PDMSD has only two water tankers, of which one is very old and not reliable.

▪ **Periodic Assessment of Existing Water Supply System on the Campus**

Since the water supply and distribution system was put in place in the 1950, there has been no general review of the operations and efficiency of the water supply and distribution system except when a committee was put in place in 2003 to review the water supply and distribution system. In 2003 there was an acute shortage of water on the campus and a Committee was set up to review the water supply situation and make recommendation for the immediate solution to the problem. The Committee then came up with proposals for the provision of Mechanized Boreholes to augment water supply.

c. Sewerage Collection and Treatment

Human excreta management on the Campus is based on Water Dependent System using Water Closet (WC) which is connected to a Sewerage Treatment System or Septic Tank System. The Sewerage System covers the "old Legon" campus including the Vice-Chancellor's Lodge, Old Halls of Residencies as well as the Lecture Blocks and the Balm Library. Sewage from these areas is pumped for treatment in an Oxidation Pond or Waste Stabilization Pond.

The 1968 Master Plan assumed that the total sewage flow will be about equal to the water supply and on that basis a new sewer would eventually be constructed along the western side of the main road, running north to the sewage works which would require enlarging.

Sewage from residencies of the members of both the Academic and Non-Academic Staff is treated using On-Site Septic Tank System. These areas include Lower Hill, South Legon, Staff Village, Ayido Crescent, Ayido Valley, and Link Gate.

Under the 1968 Master Proposals an extension to the sewer line was proposed to serve the proposed new Halls of Residence and the Medical Centre. The proposed line was also expected to serve residential areas to be developed on the East Side of the Accra Road. This new sewer would require pumping because of the rise in the elevation of the land.

Human Excreta Management as Existing in 2015

No new sewer was constructed as proposed in the 1968 Master Plan. Seventeen years ago the old sewerage treatment plant failed as a result raw sewerage was pumped into drains until the Accra Metropolitan Assembly's Treatment Plant was built on the treatment site previously used by the University. Part of the University was connected to the new treatment plant in 2014 when it was completed. However the new academic/faculty area is not connected to the campus central sewage system. Sewerage from these facilities are dislodged when the septic tanks are full into a chamber and pumped into the AMA Treatment Plant.

Furthermore sewage from the four newly constructed Halls of Residence is handled on site using a Bio-Digester Treatment System which has currently failed.

The Campus Central Sewerage system is maintained daily as a result of old age. The Sewerage section is currently equipped with two Septic Tank Emptier but only one is functioning.

The Sewerage Section lacks working tools like an excavators to access sewer lines, hydraulic rams to unblock sewer lines, additional septic emptier and transportation to operate efficiently.

d. Solid Waste Management

The University's Environmental Health and Sanitation section under the PDMSD is in charge of Solid Waste Management on the campus. Traditionally each of the halls has engaged their own cleaning staff who collect and store their waste skips for collection by the University's Environmental Health and Sanitation section.

Prior to 2005, The Campus Environmental Health and Sanitation Department was the sole collector of all solid waste from the various part of the campus to a holding area before being sent to the final disposal sites outside the campus. Union upheavals on

the Campus in 2005 which left garbage uncollected for days resulted in the engagement of private contractors to lift garbage on the campus. The University since 2005 has a private sector engagement contract for the collection and disposal of solid waste by two (2) private sector entities on the campus. The service providers provide solid waste removal service on the campus.

Volumes of waste generated on the campus has increased from 8 units of 12m³ waste containers to 17 units of 12m³ waste containers.

Current mix of waste generated, collected and sent to the disposal sites which are not sorted include both organic (household waste) and non-organic waste. And because disposal charges are based on weight, the University is paying more for unsorted waste. The University should have a policy of sorting out and separating organic waste from non-organic waste before disposal.

1.3.5 Current Land Use Structure/Pattern

The review of existing physical development of the campus has revealed that the University has continued to develop along two axis on the main campus and one axis in the Staff Village over the years.

a. Development Axis on the Main Campus and the Staff Village

The 1949 Master Plan prepared by Messer Harrison, Barnes and Hubbard proposed two development axis on the Campus which to a large have been maintained with some modifications. The main development axis is along the central avenue which rises gently to the west up to Legon Hill which is the visual climax of the central avenue. Development along this axis was started in the 1950s by Messer Harrison, Barnes and Hubbard and this has been maintained to date. Along this axis are located some Faculties, Departments, the Bookshops, Lecture Theatres the Traditional Students Halls of Residence.

A secondary development axis also proposed by Messer Harrison, Barnes and Hubbard and revised by Messrs Shepheard and Epstein in the 1968 Master Plan has also been maintained with modifications. The secondary axis (North-South Axis) has been developed southwards from the University Square which lies in front of the Balme Library and crosses the main avenue at a roundabout towards the Mensah Sarbah Hall. This axis links the Noguchi Memorial Research Institute and the New Medical School. Unlike the symmetrical development plan proposed by Messer Harrison, Barnes and Hubbard, in the 1949 Master Plan, buildings along these two axis have not followed the symmetrical concept and therefore have allow for progressive extension of existing infrastructure along these axis.

The East West development axis along the central avenue has been extended to the Staff Village. Recent land use policies introduced to stop encroachment of University lands along the edges of the campus boundaries has led to the lease of land along the Trinity Avenue and UPSA Road in the Staff Village.

b. Existing Land Use Pattern in 2015

The existing structure identified on the campus comprises identifiable homogeneous land use in various sectors on the campus. The land uses which require future extensions are:

- Academic and Research;
- Central Administration;
- Students Housing;
- Staff Housing;
- Sports;
- Civic and Culture;
- Commercial;
- Municipal Services;
- Roads;
- Parking facilities;
- Urban Open Space and Pedestrian Corridors.

1. The Academic and Research Zones

The first campus master plan (Epstein and Hubbard Plan of 1949) to a large extent created the existing planning order for the physical development of the core academic zone on the campus. This planning order was complemented by the 1968 Master Plan Proposals prepared by Shepherd and Epstein which made modification to the rigid symmetry of the Epstein and Hubbard layout for the academic zone and also introduced a secondary development axis for the Medical Center to the south of the campus. Two academic zones are therefore identifiable on the main campus. These are the core academic zone to the north of the Central Avenue and the Medical Center to the South of the Core Academic Zone

2. The Core Academic Zone

The academic zone extends along the Central Avenue on the east – west development axis. It also expands north of the central avenue towards the University Botanical Gardens. This zone has the highest concentration of physical infrastructure for the academic and research institutions and contains infrastructure for the

Colleges, Faculties and Departments including Lecture Halls, Laboratories and Theatres.

This zone also includes two Students Halls of Residences the Volta and Commonwealth, three places of worships, two banks and a Post Office which are all none academic infrastructure. The zone also includes some academic support infrastructure like the Balme Library, the University Press and the University Bookshop.

Current building densities in the core academic zone are generally low. Low building densities are associated with building constructed before the 1968 Master Plan was launched.

The 1968 Master Plan recommended that the Core Academic Zone should expand northwards and currently the academic infrastructure has reached its northern boundary which it shares with the Legon Botanical Gardens and will require new direction of growth.

3. The Secondary Academic Zone

The 1968 Master Plan recommended a secondary academic zone to the south of the core academic zone. This zone was meant for the construction of the Medical Center. Apart from the Medical School which is under construction, the area contain infrastructure for Noguchi Memorial Research Institute, and other science related institutions. There is enough space for expansion of infrastructure in this zone.

4. Central Administration

The Central Administration infrastructure is located on the Legon Hill at the western end of the east – west development axis. Administrative infrastructure include the Convocation Group of Buildings which houses the Universities Administrative Offices, the Great Hall and Offices for the Vice – Chancellor, the Pro – Vice Chancellor, the Registrar and Finance among others. The 1968 Master Plan found the location of the central administration as remote and recommended its relocation eastwards to occupy the premises of the Social Science but this was not implemented. Lands for future expansion of central administrative infrastructure are limited at the present location and may require new direction of growth.

5. Traditional Halls of Student Residence and Private Hostels

Located across the University Square are the old sports fields surrounded by three Traditional Halls of Residence and their six Annexes (Legon, Akuafu and Mensah Sarbah Halls) and two Valco Hostels. Further south, seven new Halls of Residence have been constructed beyond the Achimota Road as recommended by the 1968

Master Plan but not according to the layout provided by the 1968 Master Plan. There is still enough space near the four new halls for expansion of halls of residence.

A new zone for student residential facilities has been introduced outside the 1968 Master Plan proposals. This is a zone for private hostels where four Private Hostels have been constructed in the north-eastern part of the campus close to the Atomic – Kwabenya Road and are well removed from the Traditional Halls of Residence. There is space for future extension of student residential facilities in this zone.

6. Staff Residential Zone

The location of the staff residential area has remain intact on the main campus. The bulk of the staff residential accommodation on the main campus is located on the lower spur in the southern side of the campus while a few are located in the south-eastern part of the main campus. There is space in both the main campus and the staff village for further expansion of the staff housing infrastructure.

7. The New Sports Complex

The University has sports infrastructure located in two zones on the main campus. The two zones are the old sports fields surrounded by the three traditional halls and the stadium complex. The Sports Complex consisting of a sports stadium, a swimming pool, a tennis court complex, a gymnasium, offices, a restaurant eight playing fields comprising football and ruby fields is located on the south-eastern side of the main campus. Originally, the complex was one entity. However the construction of the Okponglo Access Road divided the area of the sports complex into two. Except for the Private Hostels which lack sports infrastructure in their zone, the current sports facilities do not require further expansion.

8. University Basic School and the Campus Commercial Area

A shopping and a social center comprising of the University Primary School, a Supermarket and others commercial infrastructure were recommended by the 1968 Master Plan to be located close to the Staff Housing Area to meet the needs of the University Community. The original layout provided by the 1968 Master Plan was not followed. The space for commercial infrastructure which is not well defined is developing close to the George Benneh Round about. There is a high demand for purpose built commercial and social infrastructure on the campus and this zone needs to be expanded to offer space for commercial and social infrastructure.

9. Campus Roads and Parking Infrastructure

To a large extent the first campus Master Plan prepared by Epstein and Hubbard created the existing planning order for the physical development of campus road infrastructure. This planning order for the roads infrastructure was complemented by the 1968 Master Plan Proposals prepared by Shepherd and Epstein which recommended the central avenue to be turned into a pedestrian walkway and introduced a north-south pedestrian walkway. The 1968 master plan also introduced new north-south road network in support of the southward expansion of student's halls of residence and the proposed medical center. The 1968 Master Plan also made recommendations for the provision of parking infrastructure for academic and other important campus building infrastructure.

An undeveloped transit terminal for commercial transport is currently operating from the Okponglo entry point to the campus. The site has no infrastructure facilities at the moment.

10. Open Space and Pedestrian Corridors

The Campus open space comprises rural and urban landscapes and the development of the campus open space has followed the two development axis on the campus. The campus open space is defined as land area not covered by buildings or used for vehicle maneuvering or parking. The open space includes shrubs, wooded areas and agricultural fields defined here as rural landscape, the Sewerage Farm and the Legon Botanical Gardens. The urban landscape include amenities such as sidewalks, public plazas, quads and courtyards, lawn and non-developed areas and other such amenities that provide the UG community with a space and opportunity to co-mingle. The urban landscaped will continue to expand along future development axis.

11. Development Axis in the Staff Village

The 1949 Master Plan created the existing planning order for the physical development of campus health infrastructure, civic and residential Infrastructure in the Staff Village. This was along the east – west development axis for the staff village. However the University over the years has given out lands for a basic school and other mixed use development (Shops, banks, a transport terminal, ECG substation) in the Staff Village especially along the University boundaries which have been under threat from encroachment.

a. Civic and Health Infrastructure

Across the Accra – Aburi Road from the main University Gate is the Legon Police Station and the University Hospital which lies east of the Legon Police Station.

b. The Junior Staff Housing Infrastructure

The Junior Staff Residential Area lies along the east-west development axis in the Staff Village.

c. Commercial and Social Infrastructure

As a result of remoteness of the Staff Village at its inception, the 1949 Master Plan provided a commercial/social center comprising of community center and a mini-market for the Staff Village. This facility is still available but in a deplorable condition. The unmet demand for commercial infrastructure has encourage the construction of kiosks for commercial use.

Land was allocated by the University to the Accra Metropolitan Assembly for the construction of a basic school to serve the Staff Village Community and to meet the needs of the residents of the neighboring Okponglo.

d. Mixed Uses

Over the years, the University has leased out lands for other mixed use development (Shops, institutional offices, banks, a transport terminal, ECG substation) in the Staff Village especially along the University boundaries which have been under threat from encroachment.

1.3.5.1 Introduction of New Land Use on Campus outside the 1968 Master Plan Proposals

Over the period between 1968 and 2015, the University introduced new land uses outside the 1968 Proposals on the campus to meet specific demands. Some of these land uses are:

- The introduction of a new Student Residential Zone built by Private Investors in the North-eastern part of the campus.
- The lease and development of campus lands along the edges of Atomic – Haasto Road, Trinity Avenue, the UPSA Road and Accra – Aburi Highway by private developers into mixed uses in other to stop encroachment by squatters;
- The construction of three new entries into the campus.

1.3.5.2 Existing Sectors on the Campus

Further analysis of the existing campus structure revealed that the campus has been developed in sectors. About 19 sectors defined by roads and physical features have

been identified on the Campus. These sectors contain identifiable homogeneous zones and land uses.

Figure 1.1 presents 20 identifiable sectors on the campus while table 1.3.9 presents identifiable homogeneous land use in the sectors.

Almost all the major academic and research infrastructure, infrastructure for University administration the New Sports Complex, student's halls of residence, sports infrastructure and some of the staff residences are located on the main campus. Currently only 49.65 % of the land on the Main Campus is developed.

On the other hand development in the Staff Village consists of mainly of civic and social infrastructure like the University Hospital, a Primary School and Legon Police Station, a new academic infrastructure for University Business School, staff houses and some commercial infrastructure. Currently only 13.55% of the land on the Staff Village is developed.

The main campus is therefore normally regarded as the Legon Campus as it is where teaching and learning takes place.

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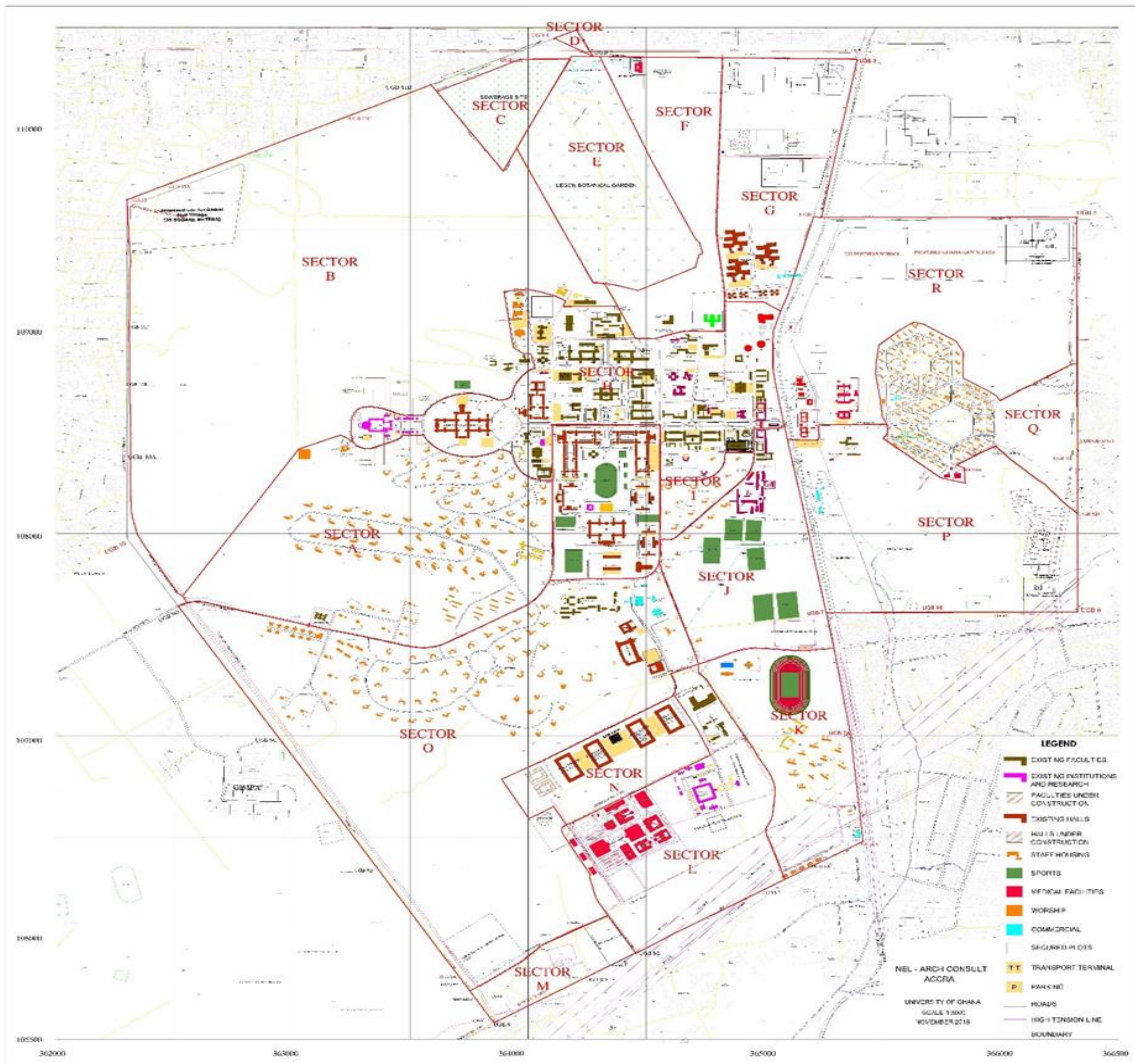


Fig 1.1

Table 1.3.9 Existing Sectors on Legon Campus in 2015

SECTOR	PREDOMINANT LAND USE	TOTAL AREA (M²)	UG BUILDINGS IN EXISTING SECTORS	REMARKS
Sector A	Staff Housing (Lower & Upper Hill, Ayido Crescent and Ayido Flats)	783,581.86	126	
Sector B	Rural Landscape	1,874,303.12	1	Undeveloped Lands
Sector C	Sewerage Farm	100,862.20	0	AMA Facilities
Sector D	Encroached Land beyond Haasto - Atomic Road	5,186.00	0	Encroached land
Sector E	UG Botanical Gardens	336,750.30	2	
Sector F	Rural Landscape/Animal Hospital	278,925.44	4	
Sector G	Student Housing (Private Hostels)/Commercial plots	364,350.41	17	
Sector H	Core Academic & Research Area	599,377.42	78	
Sector I	Staff Residence	52,095.74	10	
Sector IA	UG Traditional Halls of Residence	198,375.809	20	
Sector J	Sports Infrastructure (Playing Fields)	345,193.72	5	
Sector K	Sports Infrastructure (UG Sports Stadium)	309,620.97	29	
Sector L	Academic and Research/Medical Center	435,427.54	6	
Sector M	Utilities (GWC Water Storage and pumping station)	99,347.22	0	
Sector N	Student Housing – New Halls	177,142.41	4	
Sector O	Staff Housing/UG School/Halls/Commercial	1,410,948.28	88	
Sector P	Rural Landscape/Private	593,135.94	0	

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	Development			
Sector Q	Staff Housing (Medium and Junior Staff)	299,520.94	244	
Sector R	Social Infrastructure/UG Business Sch./Mixed Uses	683,583.72	5	Academic, Mixed use

1.3.5.3 Weakness in the Existing Campus Land Use Structure

Weakness in the existing structure are:

- The division of the Legon Campus into two by the Accra – Aburi Highway thereby hampering contiguous development of the two portion of the Campus. This has contributed to the poor physical development and the neglect of the Staff Village when compared to the Main Campus.
- Poor connectivity between the Main Campus and the Staff Village. The only direct connection between the two sections of the campus is through the access road linking the Central Avenue on the Main Campus to the Legon Police Station. This particular access however is restricted to those with E-cards.
- Another weakness in the existing structure is encroachment and dumping of refuse on lands on the edges of the campus boundaries especially lands on the Staff Village.
- Low building densities on the campus;

1.3.5.4 Analysis of Present Land Situation on the Campus

Available reserved lands within the boundaries of the Legon Campus is 1,815 acres. This is made up of reserved lands of 1,261 acres on the main campus and 554 acres on the Staff Village;

Table 1.3.10 presents analysis of current land situation on the Campus

Table 1.3.10 Analysis of Present Land Situation on the Campus

CATEGORY	A. MAIN CAMPUS	B. STAFF QUARTERS	C. POWER	TOTAL
	2,497 acres (1,010.54ha)	644 acres (260ha)	47 acres (19.02ha)	3188 acres (1,290.18ha)
Built Up Area	580	80	35	695
Botanical Garden, Sports Grounds, Sewerage Farm	450	0	0	450
Unserviceable Areas, Steep Hill Sides,	210	10	8	288

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Main Roads, High Tension				
Total Land in Use	1240	90	43	1373
Available Reserve within Present Boundaries	1257	554	4	1815

Source: 2015 Field Data Collection

Analysis of existing land situation indicates that there is enough land within the present boundaries for further extension of existing infrastructure on the campus without extending the existing boundaries of the campus. Out of a total land area of 3.188 acres (1,290.18 ha) only about 43.06 % has been developed to date.

1.3.5.5 Integrity of the Existing Land Use Structure

From the foregoing analysis of the existing land use structure as presented in figure 1.1 except for a few deviations, to a large extent the existing land use structure of the Legon Campus had been developed in accordance with recommendations made by the two previous campus development plans prepared in 1949 and 1968.

1. 4 University of Ghana History

THE UNIVERSITY OF GHANA was founded in 1948 as the University College of the Gold Coast on the recommendation of the Asquith Commission, on Higher Education in the then British colonies. The Asquith Commission, which was set up in 1943 to investigate Higher Education, recommended among other things, the setting up of University Colleges in association with the University of London. The British Government accordingly agreed to the establishment of the University College of the Gold Coast.

The University College of the Gold Coast was founded by Ordinance on August 11, 1948 **for the purpose of providing for and promoting university education, learning and research**. Its first Principal was the late Mr. David Mowbray Balme. Mr. Balme was farsighted, courageous and dedicated to the promotion of scholarship. By his vision, industry and single-mindedness of purpose, he built a college and laid the foundations for a sound University which is now a source of pride. In his ten years of Principalship, he created an institution whose key-note was orderly living with dignity in a community of scholars.

From its inception, the University College of the Gold Coast was admitted to the Scheme of Special Relationship extended by the University of London to certain English and overseas University Colleges. Under this scheme, the University College was allowed to teach for the external degree examinations of London University. It also allowed the College to modify the London syllabuses to suit local conditions and to take part in the setting and marking of examinations. But London University gave final approval to courses and examinations since the degrees given were those of the University of London.

In the 1960-61 academic year, the College Council made a request to the Government of Ghana for legislation to constitute the University College into a University with the power to award its own degrees. The Government appointed an International Commission to examine the problem. On the recommendations of that Commission, the University of Ghana was set up by an Act of Parliament on October 1, 1961 (Act 79). The then President of the Republic of Ghana, Dr. Kwame Nkrumah, became the first Chancellor of the University, with Nana Kobina Nketsia IV, *B.Litt. DPhil (Oxon)*, Omanhene of Essikado, as the (Interim) Vice Chancellor.

1.5 University of Ghana - Legon Campus Planning History

a. Early Physical Development

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The University College of Gold Coast was opened in 11th October 1948 on the Achimota School Campus which served as a temporary site for the College. The University College which needed rapid expansion of its enrolment was restricted by space available in Achimota School. However the need for the University College to train personnel for the then Gold Coast Civil Service pushed for the need for a relocation to a permanent site. This resulted in the setting up of the College Council's Committee Responsible for the Implementation of the Building Programme. This Committee was given technical support by the College Estate Organization. A Site Selection Committee was set to look for a permanent site for the University College.

The Committee confirmed Legon Hill as the permanent site of the University College. The Legon Hill site was acquired through the Government 's Lands Department and the Lease period appeared later in a Government Gazette as 500 years for part of the land and 250 years for another part. The area acquired for the Permanent Site for Legon was 5 sq. miles.

The Legon campus is about 13 kilometers (8miles) from the center of Accra and the site is divided into two by the Accra - Aburi road which is the most prominent road connecting the campus with the rest of the metropolitan area.

The University Campus at Legon which is the subject of the study is located at the north-eastern part Accra with strong road connections to the Central Accra grid and surrounding neighborhoods of Haasto, Achimota, Medina and Okponglo residential areas.

b. Preparation of Legon First Physical Development Plan

The current distinctive atmosphere of the campus, the tree lined central avenue — the campus historic and iconic buildings with their tiled red roof, built around courtyards, tree-lined roads, a spacious and inviting campus core, and a network of pedestrian paths — is largely the result of the 1949 campus plan created by Messer Harrison, Barnes and Hubbard of Cyprus.

In 1949 Messer Harrison, Barnes and Hubbard was appointed as architects for the University College Project at Legon. The architect had considerable experience in the Middle East and the Mediterranean area. Messer Harrison Barnes and Hubbard were supported by a consulting chartered quantity surveyor, Reynolds and Young of High Holborn, London. Their work is imbued with a distinctly Mediterranean character

Though the Consultants contributed to the final Legon Plan it was said that it was the then Principal David Balme, who took the initiative to develop the conceptual plan for the layout.

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The Principal based the plan on the idea of the Halls of Residence developing as centers of undergraduate corporate life, very much like the colleges of Oxford and Cambridge. The idea of a residential area encompassing autonomous and self-contained Halls and Senior Common Rooms as the nerve center of the University College militated against the provision of a central social service outside the Halls for the entire college.

The University College Council on 25th November 1949 discussed the main layout which was later approved for construction.

The Development Plan located the Central administrative buildings on top of the Main Hill. Secondary, the main avenue run from the Hill to the Dodowa road, east of which was established the junior Staff Village. The Arts and Science and Department located east of the main avenue were separated by Library, and the residential areas for undergraduate and some senior members located on the low spur west of the avenue.

By 1952 the structures regarded as the most important on the Legon Plan included 5 Halls of Residence (with one already completed) most of the Faculty, Library, Registry, Principal's Residence and Convocation Hall and ancillary buildings for services, such as the Police Station, Post Office, Shopping Centre and University Hospital.

The provision of playing fields, sports buildings, and athletic center was started in December 1959. Pressure on accommodation led to the development of the north side of Legon Hill as a housing area. The development of the grounds and gardens and Botanical Gardens were left till after 1960. The Legon campus was planted and beautified with carefully selected trees, shrubs and flowers but an Assistant Curator of Grounds and gardens Reginald Vaughan. Mr. Vaughan also worked on the Botanical Gardens making them one of the best units in the College. Figure 1.2 presents the first Master Plan

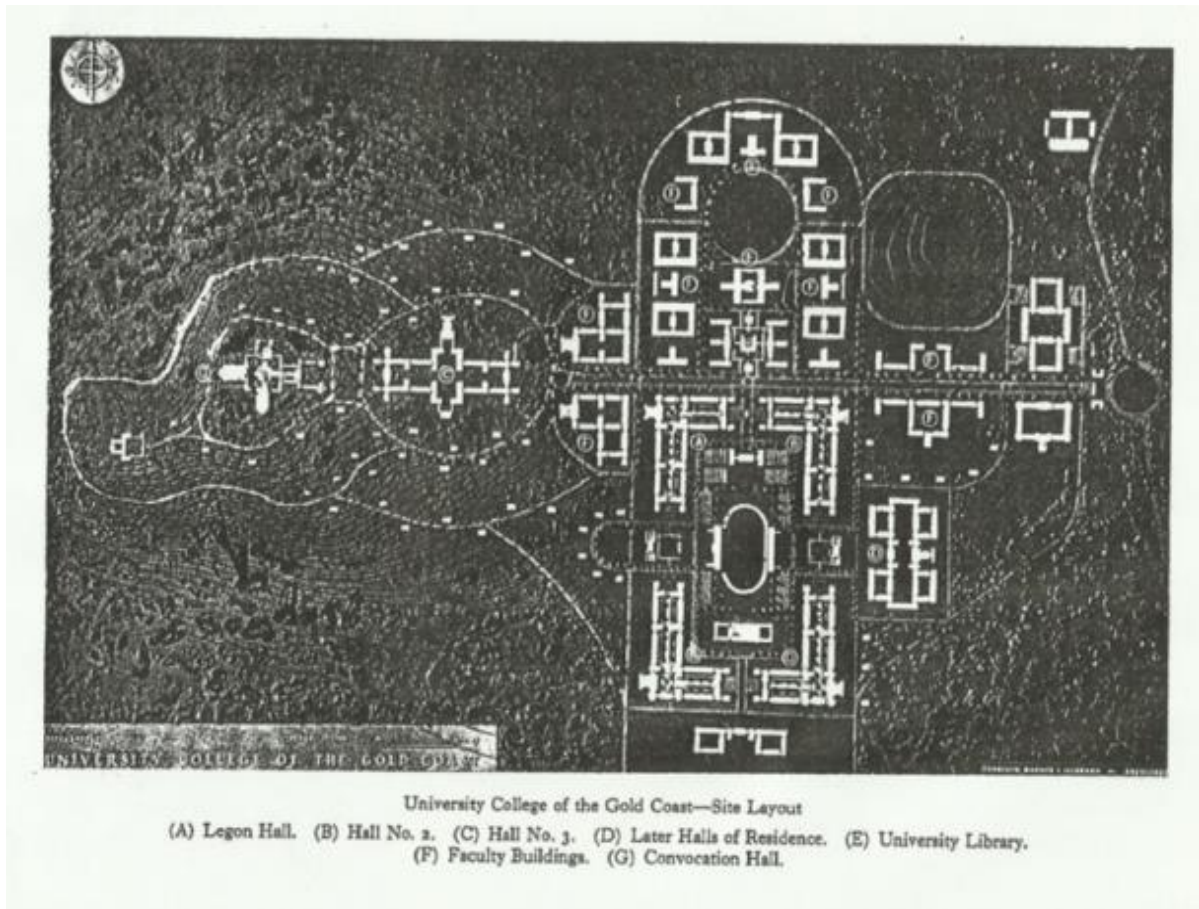


Figure 1.2 1949 Master Plan

c. Preparation of the Second (1968) Long-Range Physical Development Plan

Nine years after the preparation of the first Development Plan, Messer's Shepherd and Epstein a firm of Architects, Town Planners and Landscape Architects were appointed early in 1968 to prepare a plan for the extension of the campus facilities. Their brief was based on the "Report on the Requirement of the University for the Preparation of the Master Plan" which was prepared by a working party in 1967.

The objective of the preparation of the 1960 Master Plan was to allow for further extension of the existing campus infrastructure to accommodate more students and staff. The student population on Legon Campus in 1968 was 2,400. As a result of demand for graduates for key positions in the country's civil service and the economy in general, the University proposed an increment of enrollment from 2,400 in 1968 to 11,000 within the plan horizon of 15 years. Supporting infrastructure requirements were:

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- To provide space for a new Medical School to be built on the Campus. The Medical School was to add additional 2000 Medical Students to the Campus;
- To provide further extensions of existing campus infrastructure for academic, students and staff housing, sports, utilities and social and cultural activities to meet the proposed increase in student enrolment. .
- Provide academic infrastructure for the Law Faculty, Faculty of Social Science, Institute of Continuing Education, Institute of African Studies among others which were housed in temporary structures;
- Provide more students infrastructure for additional 8,600 beds;
- Provide additional infrastructure for Staff Houses at student: Staff Ratio of 1:4;
- Provide new Sports Infrastructure to replace existing ones.

a. Existing Campus in 1968

The implementation of this objectives required the review and update of the 1949 Master Plan in order to provide a holistic the plan. Major findings from the review of the existing campus land use structure were summarized as follows:

- The 1949 master plan was found to be a rigid symmetry and was deemed not appropriate to the requirements of a modern University;
- The formal pattern of parallel roads and clear alignment was far preferable as the basis for progressive development of the campus;
- Two development, axis, from east to west along the central avenue and north to south from the Balme Library through the Existing Halls of Residence were identified and enhanced;
- Building densities on the campus were identified as too low allowing the sprawl of building infrastructures on the campus;
- The existing land use zoning did not offer protections for pedestrian against vehicular traffic;

Figure 1.3 presents the exiting campus in 1968

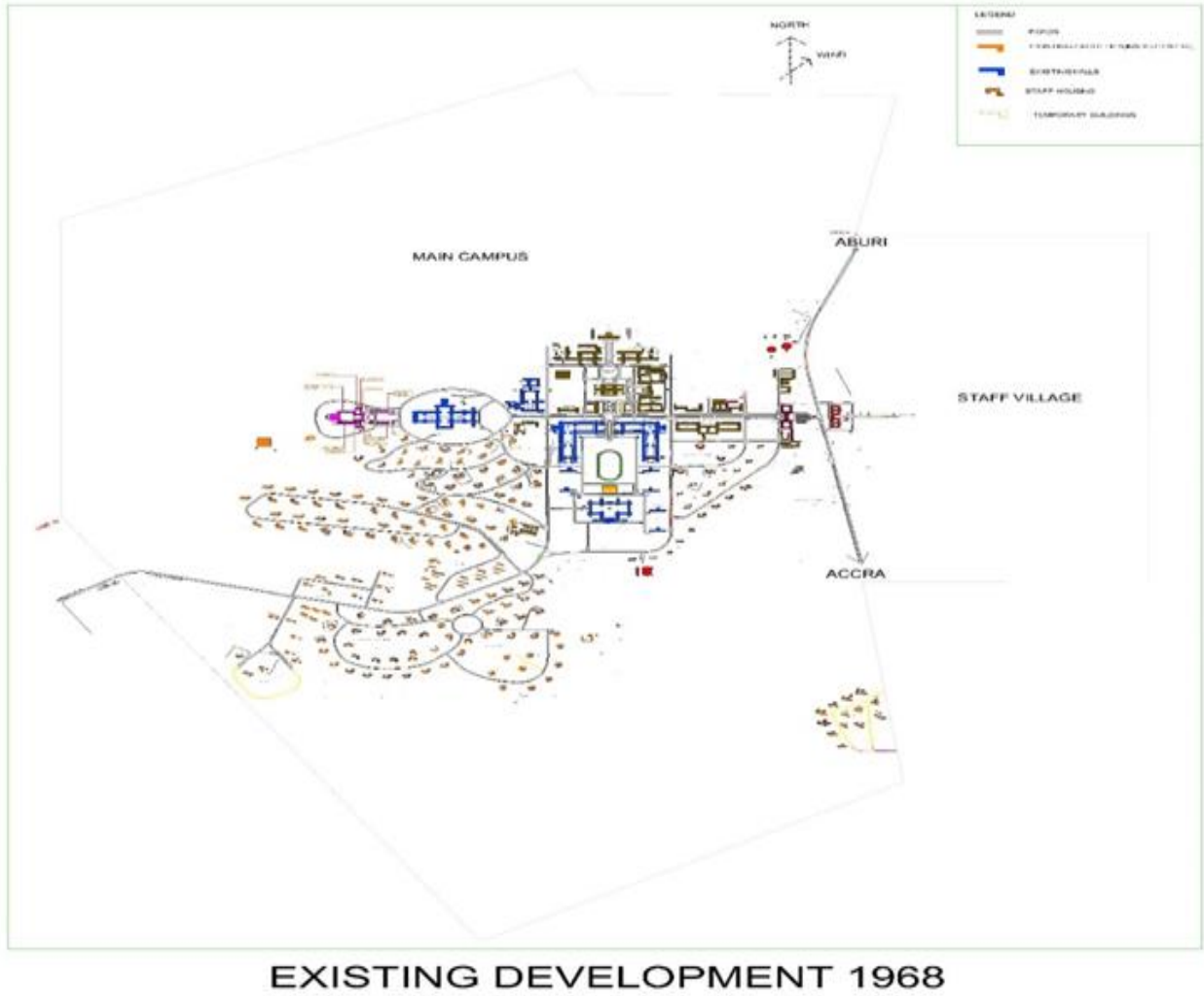


Figure 1.3

i. Assumptions for the Updating of the 1949 Master Plan Review

The 1949 plan were updated based on the following assumptions:

- The Government could fund the infrastructure requirement for the increase enrolment of 11,000 and other infrastructure within the plan horizon.
- The kind of growth envisaged for students on the campus under the free tertiary education meant that Ghana's economy was doing well and could cope with the envisage financial outlay on the campus;
- The effect of increasing wealth in the country meant that more students would live outside the campus and motor traffic in the University will increase to a point where it was essential to separate vehicular and pedestrian traffic in critical areas on the campus.

ii. Highlights of the 1968 Master Plan

With these assumptions in mind the basis of the existing plan were changed as follows:

- A new Medical Center for training of medical students was located south of existing academic zone;
- Existing Academic Zone was to expand northwards towards the Legon Botanical Gardens;
- Increased in building densities both horizontally and vertically were recommended to reduce the sprawl of infrastructure on the campus to and to reduce walking distances to these infrastructure;
- A north-south and east-west pedestrian walkways along the existing development axis were proposed with the conversion of the Main Avenue into a pedestrian walkway among others;
- Future Halls of Residence were to expand southwards to meet the proposed Medical Center and to be placed within 10 minutes walking distance from Faculties and Departments including the proposed Medical School;
- The unsatisfactory patterns of Annexes to Halls of residence were to be corrected by providing the Annexes with complementary uses like Junior Common Rooms, Kitchen and Dining facilities available in other Halls of Residences;
- A new Sports Complex was proposed east of the students halls of residence and within 10 minutes walking distance from Faculties and Departments including the proposed Medical School;
- A commercial and social center was proposed to be built next to the University Primary School to serve the Community;
- Three places of Worships for Moslems and Christians were proposed outside the existing Halls of Residence;

Figure 1.4 presents the updated 1968 Master Plan

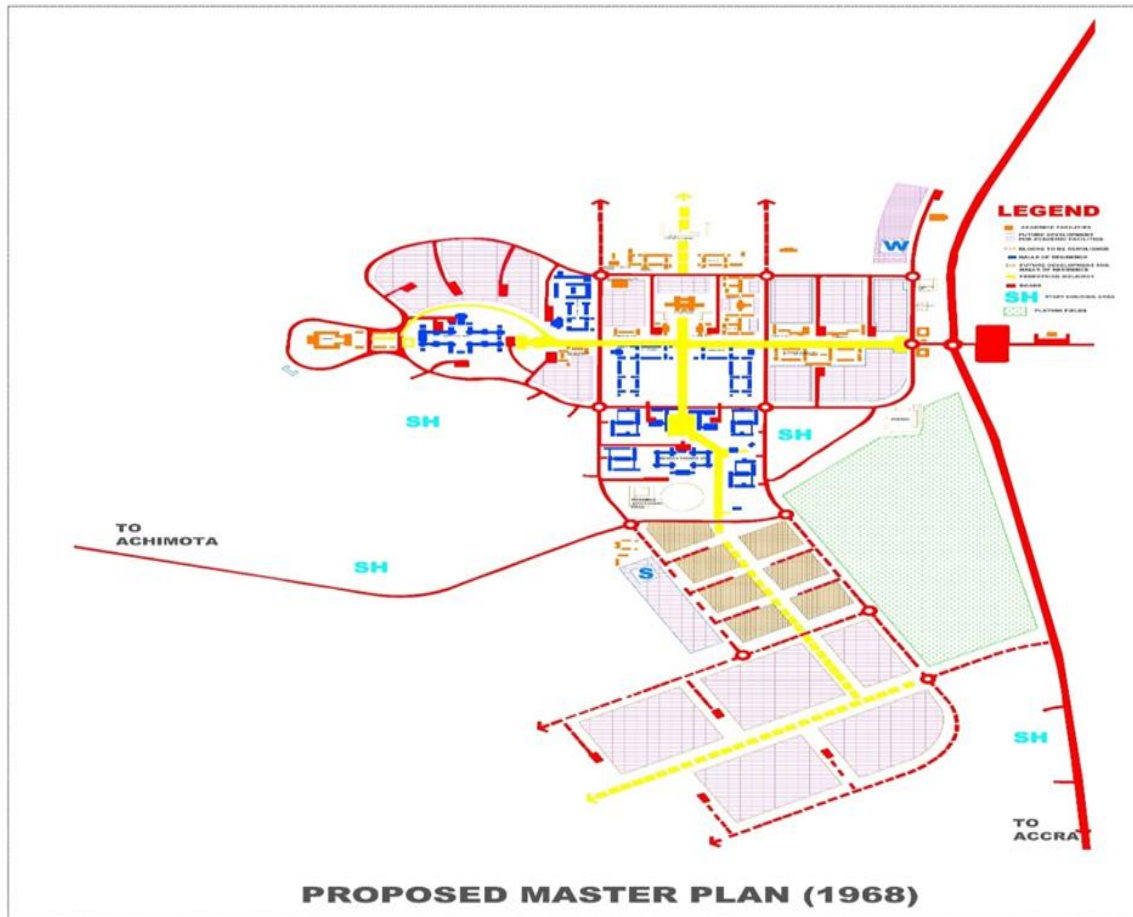


Figure 1.4

d. The 2015 Master Plan

The 1968 Master plan identified locations for new buildings as well as expansions of existing buildings. It also established a new University of Ghana Legon Campus zoning district. The zoning district included development standards for building setbacks, height, parking, and landscaping.

Thus, the 2015 - 2030 Campus Master Plan (CMP), attempts to draw from the

integrity of past planning efforts and incorporate their concepts to meet today's demands for tertiary education infrastructure and services/

Many planning issues are timeless: balancing human-built and natural environments, creating a pedestrian-oriented campus, creating facilities that meet current and anticipated academic and research needs, and minimizing traffic and parking impacts. And while the university faces circumstances similar to those that inspired earlier plans, it also recognizes that today's competition for academic and research funds and programs places an ever increasing demand on facilities to provide the latest in technological advances and opportunities.

The Legon Campus Master Plan establishes a conceptual framework in which the inspiration of past plans and the ideals of those eras are incorporated into the present expectations of the UG community and the anticipated needs of tomorrow's students, staff, and faculty. This conceptual framework is based on a design strategy that employs the following objectives: longevity, cohesiveness, collegiality, functionality, and connectivity. These objectives are outlined in the next section.

1.6 University of Ghana Legon Campus Master Plan Objectives

a. Longevity

The Legon Campus should be designed for longevity, i.e., the ability to continually attract students and faculty. Factors that contribute to the campus' longevity include the use of durable building materials such as brick and cement blocks and incorporation of design considerations such as building scale and mass. These elements promote a pedestrian-friendly campus, establish inviting landscape settings, encourage campus community interaction, and create an element of character or sense of place that visitors and students will remember for years to come.

A simple, open, and orderly planned development process can help the campus achieve an image that unifies the past and the present. The Legon Master Plan's sector approach continues the tradition of longevity by identifying anticipated development throughout the sectors in order to meet the needs of today and of the future.

b. Cohesiveness

The Legon Master Plan outlines design elements and implementation actions that establish visual continuity and consistency for campus development over time. Campus architectural and landscape development creates an identity that reinforces the relationship between the built and natural environment. The

basic massing, vertical organization, structure spacing, use of the building proportion and location, and organization of plant material should foster a sense of place and a cohesive framework.

Cohesiveness is an ongoing challenge because each new project must accept and embrace plan objectives while responding to an array of functional and budgetary opportunities and constraints. The Legon Master Plan will help continue the cohesiveness of the campus by offering general design guidelines along with sector-specific guidelines and policies.

c. Collegiality

The ultimate success of any university is measured by how well it prepares students for their future professions. Similarly, the success of a campus master plan is measured by how well it creates a functional campus that supports academic and research excellence.

To this end, the Legon Master Plan provides for communal spaces to encourage social interactions and support different programs to stimulate academic collaboration. Clustered developments that reflect program function not only add personality but also nurture the intellectual environment. Such public and semi-public spaces should be consistent and connected both visually and physically to the existing quad arrangement.

d. Functionality

The Legon Master Plan provides guidelines for future development within each sector while also establishing minimum amounts of open space. This will ensure that a solid foundation for campus growth and expansion is achieved through well-designed, functional structures, and attractive open space. Unique requirements of some research facilities or other special use buildings will necessitate creative design approaches to ensure that they retain the campus character.

e. Connectivity

The Legon campus is primarily pedestrian-oriented. Clear physical and visual connections are necessary to facilitate movement across the campus. Where practicable, vehicular and pedestrian circulation should be separated. When vehicular and pedestrian circulation is shared or crossed, traffic calming devices such as ramps, tree-lined streets, changes in paving materials, and narrow street widths should be used to ensure pedestrian safety. A physical network of interconnected paths and walkways intermingled with open spaces and quads is essential to linking buildings throughout the campus. Visual connectivity also helps pedestrians establish a line of sight and orientation through landmarks

1.6.1 Legon Master Planning Process

The Legon Master Plan was instituted at the request of the University of Ghana. The planning team analyzed the physical characteristics of the campus buildings and grounds, evaluated the long-term program needs of all campus components, and developed planning goals. The Legon Master Plan's conceptual framework evolved from input by representatives of the academic community (Provosts, Deans, Department heads, etc.), the University Physical Development and Municipal Services Committee, Campus Staff, Students, Faculty, and Members of the Legon Community.

The Legon Master Plan planning process encompasses five stages:

1. Data Collection and Analysis

Data from desk studies, Development and Technical Committee meetings, field surveys, and independent interviews with provosts, deans, registrar, department heads, staff, and students provided the basis for understanding academic program, research, and enrollment growth and operational needs.

2. Concept Development

Campus long-term development needs were assessed, and conceptual approaches, policies, and guidelines were developed to establish a framework to meet those needs.

3. Documentation

The most acceptable planning solutions for the conceptual approaches, policies, and guidelines were documented in a preliminary Legon Campus as built document and Draft Proposals.

5. Review and Approval

The Draft Master Plan is presented to the University Council through the University Development Committee for approval. Following that an implementation strategy should be developed to allow the campus to expand and to ensure that key elements of the Legon Campus Master Plan are carried out.

1.8 Organization of the Campus Master Plan

The Campus Master Plan is organized into the following chapters:

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Chapter 1 – Introduction

Campus Master Plan (CMP) purpose and overview, UG mission, history, and Campus Master Plan planning objectives, processes, and organization.

Chapter 2 – CMP Principles and Policies

Principles and policies to direct future campus development.

Chapter 3 – Projected Facility Needs

Enrollment growth potential and development facility needs.

Chapter 4 – Campus Development

Campus sectors and sector development policies.

Chapter 5 – Design Guidelines

Site and building design guidelines and preservation of natural resources.

Chapter 6 – Implementation

Legon Campus Master Plan implementation proposal

Chapter 2 - Campus Master Plan Principles and Policies

2.0 Campus Master Plan Principles and Policies for the Future

This chapter identifies the guiding principles that provide direction for the long-range development of the University of Ghana Legon Campus for the next fifteen years. The principles and policies set forth here are intended to help maintain and enhance Legon's status as the preeminent collegiate settings in the country. The principles and associated sets of policies are based on input from Colleges, Faculties, Schools, Research Institutes, Staff, Administrators, Students and the Campus Community as a whole. The guiding principles also support those policies within University and its 2014 – 2024 Strategic Plan Vision and other applicable plans and special studies that address issues such as community well-being, land use compatibility, transportation, protection of natural resources, and public safety.

2.1 Student Enrolment and Academic Focus

The development strategy of University of Ghana for achieving its strategic vision over the next plan horizon is to concentrate work in some priority areas for which it has developed strategic objectives and is pursuing a coordinated set of actions in the priority areas. One such priority area is to maintain a regular and a stable student residential enrolment within its strategic plan period. Currently the Legon Campus has a population of 22,853 regular students. The regular undergraduate students is 19311 as against 3,542 regular graduate students (Legon Campus only). Current enrolment projection is target at increasing graduate enrolment. It is important for the University to learn from the past to ensure that within the plan horizon, there will be funding to provide infrastructure to accommodate the proposed enrolment. It is heartening to know that the University is currently constructing academic and student accommodation under the Africa Integral Project.

Policies

2.1.1 Enroll majority (60%) of Science and Technology Students in conformity with the national plan;

2.1.2 Grow the number of graduate students, especially at PhD level, engaged in intensive research activities to ensure a ratio of 50:50 (undergraduate/graduate) within the next decade, but this should be implemented with availability of the required infrastructure in mind;

2.1.3 Maintain a total number of regular residential students on Legon Campus at not more than 40,000 by 2024;

2.1.4 Expand the total number of Distant Education and Accra City Campus

students to not more than 20,000 by 2024.

- 2.1.5 Expand significantly the number of faculty members to ensure a decent teacher: student ratio in conformity with national norms and standards;
- 2.1.6 Beyond 2024, revise the Strategic Plan to cater for national population increases and possible revision of the University enrolment strategies.
- 2.1.7 Ensure that student enrolment at all times is driven by availability of the required infrastructure and services for both academic and non-academic use.

2.2 Academic and Research Excellence

The University of Ghana 2014 -2015 Strategic Plan aspires to transform the University overtime to become a world class research-intensive university serving the growing needs of Ghana and the rest of the region. UG therefore seeks to enhance, redefine, and establish educational programs that benefit students and colleges. By improving existing academic and research facilities and developing new and technologically advanced facilities, UG will continue to attract a high caliber of students and faculty. To realize this vision, UG should first overcome current unmet demand for more academic and research building infrastructure so as to reduce current stress on existing academic and research building infrastructure and to expand academic and research building infrastructure to meet future needs on the Legon Campus.

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Policies

- 2.2.1 Continue to support teaching and research programs unique to the University.
- 2.2.2 Expand academic and research building infrastructure for the delivery of new academic and research programs and also to reduce overcrowding in Lecture halls, laboratories and seminar rooms among others.
- 2.2.3 Locate academic and research infrastructure at sites that have been identified by the Master Plan as suitable and desirable for their function and contribute to the campus environment;
- 2.2.4 Equip all colleges and their constituents units to develop a strong research focus reflected in their incentive structures;
- 2.2.5 Maintain and/or upgrade existing academic and research facilities to

- the extent practicable. When replacement becomes more viable than retention, encourage reuse and/or recycling of materials;
- 2.2.6 Create facilities that address current and anticipated needs and are adaptable to future academic and research initiatives and activities;
 - 2.2.7 Provide universal access to academic and research buildings and sites consistent with Ghanaian Disabilities Standards;
 - 2.2.8 Create and develop an exclusive zone for research activities in collaboration with the private industrial sector and to the benefit of the University;
 - 2.2.9 Continue to pursue public/private collaboration in the provision of new academic infrastructure;

2.3 Student Life and Services

UG recognises that the student's campus social life is organised around the Student's Halls of Residence which provides lodging facilities and other amenities for social interactions, among others facilities on campus. UG also recognizes that there is serious short fall in student accommodation on the campus resulting in overcrowded Halls of Residence which require addressing. Over 4,000 students are non-residential as a result of lack of beds.

To this end, UG encourages the provision of additional student housing infrastructure to reduce overcrowding in the Halls or residence. It also encourages the provision of recreation, social interaction, and various other programs that provide students with a safe, enriched, and diverse campus.

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Policies

- 2.3.1 Continue to provide and expand on-campus student housing that is safe, accessible, stress free and promotes academic and social interaction;
- 2.3.2 Continue to pursue public/private collaboration in the provision of new student housing infrastructure;
- 2.3.3. Locate student accommodations at sites that have been identified by the campus master plan as suitable and desirable for their function and that contribute to the campus environment;
- 2.3.4 Continue to provide universal access to these student residential buildings,

consistent with Ghanaians Disabilities Standards.

- 2.3.5 Continue to promote the campus as a pedestrian-friendly environment. Safe and direct access among buildings, parking areas, and other destinations shall be maintained or enhanced with new development.
- 2.3.6 Provide adequate and accessible Social and Commercial infrastructure that encourage social interaction interactions among the Campus Community.
- 2.3.7 Create new social and commercial centers with improved dining facilities for the night market, provide restaurants, coffee shops, gift shops, improved supermarkets, meeting and leisure facilities including cinema and drama halls at major sites on campus within easy walking distance, which will create vibrant environment during the day and evenings;
- 2.3.8 Continue to support student health services and related programs to ensure that students have access to proper and efficient health services.
- 2.3.9 Continue to provide adequate recreation areas, facilities, and programs that promote physical health activities and intramural sports.
- 2.3.11 Provide adequate security measures across campus to ensure the safety of the campus community. Such measures should include exterior lighting along walkways and parking areas, properly landscaped building grounds, visually accessible doorways, and programs such as safe ride;

2.4 Staff Life and Services

UG also recognizes that staff life and wellbeing are also crucial to the university's lasting success. To this end, UG encourages provision of staff housing and social amenities, recreation and sporting facilities for staff and their families. Social interaction, and various other programs provide Staff with a safe, enriched, and diverse campus.

Currently, not all staff are accommodated on the campus as there is a serious shortfall of Staff Housing on the Campus. This has resulted in the rental of 700 private houses outside the campus for staff. This private rentals need to be reduced not only to save funds for the University but to allow staff to enjoy campus life. The University to conserve land should build more flats and reduce

Policies

- 2.4.1 Continue to provide adequate on-campus staff housing that is safe,

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- accessible, stress free and promotes academic and social interaction on the campus;
- 2.4.2 Locate staff housing at sites that have been identified by the master plan as suitable and desirable for their function and that contribute to the campus environment;
- 2.4.3 The University should conserve land and improve housing densities by focusing on building more flats instead of bungalows on the campus. Where it is necessary to build bungalows, plot sizes should be reduced for individual buildings;
- 2.4.4 Continue to provide universal access to staff housing, consistent with Ghanaians Disabilities Standards.
- 2.4.5 Continue to promote the campus as a pedestrian-friendly environment. Safe and direct access among buildings, parking areas, and other destinations shall be maintained or enhanced with new development.
- 2.4.6 Continue to provide adequate and accessible communal spaces in the staff residential areas to encourage interactions and outdoor living among staff and families.
- 2.4.7 Continue to support staff health services and related programs to ensure that staff have access to proper and efficient health services.
- 2.4.8 Continue to provide improved shopping facilities, leisure facilities including cinema and drama halls, recreation areas, and programs that promote physical health activities and intramural sports. Provide access to restaurants, coffee shops, recreational, meeting, and other facilities at major sites on campus.
- 2.4.9 Provide adequate security measures across campus to ensure the safety of the campus community. Such measures may include exterior lighting along walkways and parking areas, properly landscaped building grounds, visually accessible doorways.

2.5 Sports

UG sports have helped shape the campus and enhance UG's national and international reputation as a dynamic university. UG since 2005, has integrated sports into the academic programs and taken steps to focus more on wellness, health and wellbeing of students, faculty and staff. The University has ensured that all staff and student have a good balance between academic work and

recreational activities as an integral part of the UG experience. UG would continue to support its sports programs by completing the construction of the UG sports stadium that is expected to provide the necessary facilities to ensure competitiveness. Sports facilities should be provided close to the private hostels which currently use informal facilities.

Policies

2.5.1 Explore strategies to complete for use the uncompleted sports complex infrastructure on the campus.

2.5.2 Rehabilitate all sports infrastructure that have been identified for rehabilitation;

2.5.3 Support the provision of football, netball, basketball fields and a tennis court for the hostels located in the northern part of the campus and are outside the ten minutes walking distance from the existing sports infrastructure.

2.5.4 Explore opportunities for new partnerships with the private sector to bring greater exposure and opportunity to the Sports Directorate on the campus.

2.6 Campus Economic Development

The University of Ghana is heavily dependent on Government subvention for its recurrent and capital expenditure which officially stands at 70% of the inflows. As a public institution the inflow of government subvention is unlikely to change in the near future. What is likely to change is the size of the inflow, its frequency and reliability. Government has introduced policy measures to allow Universities to engage in economic activities outside their core business to raise funds for campus infrastructural development.

Government policy also allows the leasing of parts University lands to private developers as a source of income. Currently the University is in the process of implementing some economic ventures including investment in a Shopping Mall and a mixed use development known as the Legon City Project. Other projects include the development of a Research and Technology Park on the campus and the leasing of lands for mixed use development including hotels, sports and leisure infrastructure on the edges of the campus. These measures are to increase internally generated funds for the University. The Goal of the campus economic development under this master plan is to prepare the existing hard and soft infrastructure to provide a sound base to support sustained economic development on the campus and a favorable climate for investment on the campus.

Policies

- 2.6.1 Develop adequate institutional structures in the Physical Development and Municipal Services Directorate to coordinate and manage the economic activities and infrastructure on the campus;
- 2.6.2 Provide physical infrastructure where possible, regulatory and promotional resources to encourage investment in wealth creation on the campus for the University bearing in mind the primary purpose of the University as an academic institution;
- 2.6.3 Define types of investments that should be allowed on campus and promote these activities in the media;
- 2.6.4 Consolidate all existing formal economic activities on the campus including banking, ATM infrastructure, retail shopping facilities, laundries among others by housing them in purpose built infrastructure facilities;
- 2.6.5 Recognize the contribution of the informal sector activities on the campus, organize these activities by providing purpose built infrastructure facilities to support their growth and development so that they pay realistic rents;
- 2.6.6 Re-activate the old market at the staff village as a means of organizing the informal sector in the Staff Village;
- 2.6.7 Invest and promote emerging social and economic centers on the campus to promote unmet demand for services that are lacking on the campus, e.g. cinema, drama halls, coffee shops, general retail shops, ice-cream parlors etc.
- 2.6.8 Promote new economic activities suitable for campus environment including Convention Businesses;

2.7 Campus Development, Operations, and Management

It is projected that within the proposed 15 year plan horizon (2030), the population of regular students on Legon campus would have passed the 40,000 benchmark. The increase in student population on the campus would create demand for further land for campus development. This development will include new academic and non-academic infrastructure with the requisite supporting engineering and social services. Given the current level of resources available to the University for Development, the University will be hard pressed to meet the needs of its population

in future. Urgent measures are therefore required to establish more efficient management systems to address the problems facing the development of Legon Campus.

The preparation of the Master Plan is an important step in providing management framework to guide and encourage sustainable development and create a better future for the population of the Legon Campus.

The Legon Campus Structure is currently organized in twenty (20) Sectors. Located in the Sectors are zones such as the Core Academic and Research Zones, Student and Staff Residential Zones, the Zones for Sports, Social and Cultural zones among others.

Successful growth and development of the existing zones in the sectors on the UG campus depends on cooperation among its administrators, faculty, staff, students, and the greater Legon community. The development of facilities, student and staff residence, optimization of land use, organization of space, and management of traffic are all aspects of growth that need to be addressed from an understanding of how such development and management benefits the UG community and advances the university's mission.

Policies

- 2.7.1 Update campus master plan for the long term development of the campus;
- 2.7.2 Update of the existing plan with the campus image, purpose, organization and symbolism in mind;
- 2.7.3. Update the existing plan to improve efficiency for carrying out university and individuals business on the campus;
- 2.7.4 Update the existing plan to provide flexibility for accommodating growth and change on the campus;
- 2.7.5 Establish land use policies which will direct development in accordance with the plan;
- 2.7.6 Prepare a zoning plan to separate out incompatible and conflicting land uses and the traffic they generate;
- 2.7.7 Maintain strong planning regulations to influence the location of new development and to control access managements and parking;
- 2.7.8 The updated plan should minimize travel and maximize accessibility by public transport and walking on the campus;

- 2.7.9 Activities which generate substantial traffic should be located adjacent to roads most suited to the types of traffic expected.
- 2.7.10 Ensure that all future development is consistent with the UG Development Plan, Land Development Code, and other adopted local plans (e.g., utility, transportation, etc.).
- 2.7.11 Arrange the campus layout and building placement to reinforce academic and operations relationships by locating functionally related programs near each other and consolidating activities with similar physical requirements. To the extent practicable, site major academic buildings within the core campus area and within a 10-minute walk of other academic buildings.
- 2.7.12 Design new buildings and renovations to be compatible with existing structures, cost effective to operate and maintain, and supportive of student, staff and faculty academic and research interests.
- 2.7.13 Improve existing building densities among single storey buildings in the core academic zone;
- 2.8.14 Adopt infilling where possible as a strategy to optimize the use of campus lands;
- 2.8.15 Evaluate the feasibility of renovating existing buildings to meet current code and seismic standards.
- 2.8.16 incorporate sustainability concepts in decision-making with regard to construction, operations, and management.
- 2.8.17 Avoid significant building additions that overpower the existing structures and pedestrian scale of surrounding spaces and uses.
- 2.8.18 Orient building entrances toward streets. Landscaping, building mass, and height should be similar to that of surrounding buildings.
- 2.8.19 Design buildings following the architectural guidelines set forth by the university.
- 2.8.20 Maintain space between buildings to ensure adequate areas for landscaping and circulation for pedestrians, service vehicles, and bicycles.
- 2.8.21 Develop a system that assesses and monitors campus space needs within buildings and facilities through clear and objective standards. Evaluate the

effectiveness of this system and, as needed, and make adjustments.

2.8.22 Reduce the visual impacts of new development by using similar building materials and scale, landscaping, and by siting buildings to maximize open space and maintain view sheds as much as practicable.

2.8.23 All development proposals prior to implementation must be reviewed and approved by University Council;

2.8.24 Implementation of all physical development on the campus shall be approved by the University Council and monitored by PDMS on behalf of UG.

2.6 Transportation, Circulation, and Parking

UG recognizes the importance of a well-organized campus transportation system that integrates with the local's system. UG also recognizes its role in contributing to the traffic and parking impact within the campus.

The further expansion of various infrastructural developments within the institution will result in a re – definition of the land uses within the campus. The different land patterns within the University's road corridors will place differing traffic demands on the existing transport infrastructure within the campus. There are significant effects of motorization safety. The control of both land use and traffic is therefore very essential for successful planning because the land use determines the traffic patterns and composition. Based on the land use planning and zoning, the transportation network will have to be appropriately planned to ensure safe and efficient movement of traffic. The major factors considered include:

- Development of zoning plan to separate out incompatible and conflicting land uses and the traffic they generate;
- Strong planning regulations to influence the location of new development and control access managements and parking;
- The planning of land use should be aimed at minimizing travel and maximizing accessibility by public transport and walking;
- Activities which generate substantial traffic should be located adjacent to roads most suited to the types of traffic expected.

The careful planning of the difference types of roads and their environments will create an efficient and safe movement of road users within the project corridor.

Transport Policies

2.7.1 The university's transportation system must provide all members of the campus community with safe and convenient access to UG. It must also provide a seamless connection to the local, regional, and nationwide

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- transportation system. This necessitates diverse multi-modal transportation improvements, including sidewalks, multi-use paths, bike lanes, roads, transit, and shuttles. Because transportation improvements can negatively impact the campus environment and surrounding land uses, careful and coordinated planning efforts are required. To this end, UG will make improvements to limit transportation impacts through the campus and to surrounding residential neighborhoods. At the same time, improvements need to provide a convenient, multi-modal, campus-wide transportation network.
- 2.7.2 Continue to promote the campus as a pedestrian-friendly environment. Safe and direct access among buildings, parking areas, and other destinations shall be maintained or enhanced with new development.
 - 2.7.3 Consider improvements to sidewalks, multi-use paths, street alignments, intersections, turn lanes, and road striping as part of the physical development of campus, constructing the improvements as needed or as conditions warrant.
 - 2.7.4 Design the transportation system to emphasize and encourage walking as the primary form of transportation in the campus core area.
 - 2.7.5 Encourage alternative modes of transportation (e.g., walking, bicycling, and transit).
 - 2.7.6 Organize the campus core such that academic uses are within a 10-minute walk to facilitate student travel between classes.
 - 2.7.7 Consider pedestrian amenities (lighting, sidewalks, bench placement, planters, courtyards, quads, transit stops/shelters, recycling receptacles, etc.) as part of typical street improvements.
 - 2.7.8 Continue to maintain the transportation system of streets, roads, paths, sidewalks, and bicycle lanes for safety and good operating conditions.
 - 2.7.9 Continue to support the campus shuttle service and provide bus stops for the shuttle buses;
 - 2.7.10 Continue to take actions to improve campus accessibility from highways and major streets, and by public transportation. Coordinate campus transportation planning and improvements with local government transportation plans and area transit providers that service UG. Where possible, locate new facilities to take advantage of public transit systems.

2.8 Parking

The university has spaces for approximately 3,500 cars on campus which are mostly located in the core academic zone where the greatest demand for parking are concentrated. The academic zone also shares the greatest demand for new and expanded facilities. The existing parking facilities on the campus are for individual buildings and there are no shared multi-storey parking facility available at the moment in the on the campus especially in the core academic zone and major demand areas. Even the PDMSD which manages the University fleet of vehicles lacks parking for its fleet of vehicles.

Where parking facilities are available on the campus, some are not well marked to provide efficient use of the spaces.

Finally over the last decade Legon Campus has encouraged the use of alternative modes of transportation, particularly trotro, taxis and shuttle travel and temporary transit parking areas are available on campus. These temporary transit terminal especially on the main campus will require redevelopment to improve parking facilities.

Parking Policies

- 2.8.1 Provide parking facilities to meet the needs of the campus community and this should include shared multi-storey facility in the core academic zone;
- 2.8.2 Where possible, provide adequate parking convenient to the area or site it serves or develop satellite or remote parking facilities with adequate shuttle service;
- 2.8.3 Provide parking improvements for vehicles including the reconstruction of the transport terminal for commercial vehicles;
- 2.8.3 Properly demarcate the parking areas to appropriately show the parking arrangements and aisle for circulation within the parking areas;
- 2.8.4 Consider parking improvements as a component of the physical development of campus.
Parking improvements may be constructed as part of the on-going operation of the university as well as with new construction or expansions of existing buildings.
- 2.8.5 Develop future parking facilities based on usage of existing parking facilities;
- 2.8.6 Locate parking improvements in accordance with the general locations identified on the Future Parking Facilities Map. Parking improvements associated with a particular development project, however, may be provided in the vicinity of that project.

- 2.8.7 Manage parking such so that all parking improvements on campus are used. This will require the use of a shuttle to transport people from more distant parking areas into the core of campus.
- 2.8.8 Enforce parking regulations on the campus;
- 2.8.9 All parking demands for any facility should be accommodated within the facility to prevent spillback onto the adjoining roads.
- 2.8.10 The Ghana Highway Authority/Department of Urban Roads design guide should be used as the reference for all parking arrangements and designs.
- 2.8.11 All new and upcoming facilities should provide traffic assessment report to PDMSD outlining clearly the parking demand and provisions for the development.

2.9 Pedestrian Corridors and Campus Open Space

Pedestrian systems and open spaces must provide safe and well-defined corridors for the movement of thousands of people on the campus. Any expansion or improvement to a pedestrian system should adequately provide for cross-campus movement with convenient locations for exiting and entering the campus. Currently there are five of such entry/exist. Some of these accesses have pedestrian walkways.

Pedestrian Network

The travel survey noted that walking to and from campus is the most popular mode of travel. Sidewalks along major roads are currently under construction on the campus. There are also walkways between buildings and across open space areas but most of these walkways are unauthorized and not paved. Authorized walkways needs to be defined and provided to save existing lawns which are under threat. New construction shall include pedestrian improvements to ensure connectivity.

Pedestrian Policies

- 2.9.1 All facilities should have clearly demarcated pedestrian pathway. This pedestrian pathways should be disabled – friendly.

- 2.9.2 The pedestrian walkways/pathways on the Campus should be coordinated together to ensure that there is continuity, with little disturbance, to the movement of pedestrians on the Campus.
- 2.9.3 Appropriate pedestrian crossing facilities should be provided at all the desired pedestrian crossing lines along the roads on the Campus.
- 2.9.4 Pedestrians should be given the maximum priority in the design of the transport infrastructure on campus to encourage walking

Open Space

The existing open space system provides a framework for future development. New buildings and streets should be designed to encourage communal spaces through the use of plazas, courtyards, atriums, or other such areas that allow people an opportunity to co-mingle.

Open Space and Pedestrian Policies

- 2.9.1 Retain a minimum of 50 percent of the campus as open space, which includes landscape areas, parks, recreation fields, and agricultural fields; hardscape amenities such as sidewalks, public plazas, quads, and courtyards; and non-developed areas.
- 2.9.2 Retain the open space areas within each development sector consistent with the minimum established open space sector standard. Open space shall provide the framework for campus development and shall be integrated into development plans.
- 2.9.3 Continue to maintain and enhance pedestrian walkways throughout the campus, especially with new development. New construction shall include pedestrian improvements to ensure connectivity.
- 2.9.4 Provide open spaces such as public plazas, quads, courtyards, atriums, etc. as an element of each building site design.
- 2.9.5 Reinforce the pedestrian nature of campus by minimizing the need for private automobiles for cross-campus travel. This shall be done by locating parking areas on the campus perimeter and by maintaining a street system that directs traffic to nearby collectors and arterials, to the maximum extent practicable.
- 2.9.6 Continue to maintain and enhance open spaces such as lawns, planting beds, courtyards, sidewalks, plazas, quads, and other landscape areas through the adequate funding of grounds and gardens maintenance. This will require injection of extra capital funding and the provision of unmet

logistics;

- 2.9.7 Identify all unauthorized pedestrian walkways on the campus that cut across lawns, identify those for improvement and block out those that should not be used;
- 2.9.8 Repair and/or replace unsightly and unsafe walkway surfaces, and expand walkways that do not adequately accommodate pedestrian traffic.
- 2.9.9 Establish a pedestrian network of paths and sidewalks for safe and convenient access to sites on and off campus.
- 2.9.10 Develop a campus-wide bicycle route system that uses a combination of on-street bike lanes and off-street multi-use paths.
- 2.9.11 Preserve edges of the campus by discourage the dumping of refuse at the campus edges.

2.10 Lighting and Site Furnishings

Lighting and site furnishing contribute to the university's overall aesthetics and identity. The university's selection and placement of these fixtures should draw attention to the major axis of campus, instill a sense of identity, define campus boundaries, and create safe, well-lit corridors for pedestrian movement. UG shall install lighting fixtures that cast illumination downward to reduce potential light pollution on the night sky.

Policies

- 2.10.1 Create a sense of identity in the campus core by installing light fixtures and by using a cohesive design for benches, trash receptacles, and signage. Similar finishes, colors, and materials should be used to create a sense of cohesiveness.
- 2.10.2 Define the perimeter and major cross axis of campus through the use of street signs, building name signs, and special light fixtures. Building name signs shall be located in front of buildings. Light fixtures should be placed in straight, linear rows that emphasize the axial layout of the campus.
- 2.10.4 Continue to seek and install energy-efficient light fixtures that provide adequate illumination but are designed to cast the illumination downward.
- 2.10.5 Use contemporary light fixtures for parking lots, utility areas, and remote locations outside the historic core of the campus.

- 2.10.6 Develop “portals” for major campus entry points through special attention to lighting, site furnishings, and signage.
- 2.10.7 Enhance selected areas of the campus including major gathering areas, building entries, and/or lawn areas with appropriate amenities such as benches, trash receptacles, signage, and wayfinding kiosks.

2.11 Environmental Impact Assessment

One of the principal project objectives for updating the existing campus master plan is to provide a framework to guide the University to undertake extension of existing infrastructure on the campus to meet future needs. The proposed extension of physical infrastructure are expected to have impacts on the campus environment during the construction phase, operational phase or post operational phase and therefore an environmental impact assessment is required for this project.

Environmental impact assessment (EIA) is defined under this project as the systematic identification and evaluation of the potential impacts (effects) that may result from implementation of the master plan proposals. And therefore the primary purpose of the EIA process under this project is to encourage the consideration of the campus environment in planning and decision making and to ultimately arrive at actions which are more environmentally compatible on the campus.

To ensure the continued use of environmentally responsible and responsive development practices, UG recognizes its responsibility to the environment on the campus and has a policy in place that ensures that Environmental Impact Assessment (EIA) Studies are undertaken for all physical construction projects on the campus. These practices, defined as “sustainability,” shall be incorporated into the design, construction, renovation, expansion, and operation of facilities and structures under the master plan proposals. UG encourages other sustainability efforts including improving current environmental conditions and reducing impacts on known natural resources.

Policies

- 2.11.1 Minimize environmental impacts from construction and on-going maintenance and operations through the use of Best Management Practices including the undertaking of EIA studies for each project.
- 2.11.2 Undertake inventory and assessment of existing trees to determine potential impacts to those trees during future development projects. Develop protocols and standards for tree protection during construction and maintenance activities.

- 2.11.3 Encourage the use of sustainable materials and design principles that preserve natural resources and minimize negative impacts to the environment.
- 2.11.4 Locate wastewater sites and facilities for receiving, processing, and storing hazardous materials so they will not impact natural resources or residential areas.
- 2.11.5 Provide landscape regeneration in all aspects of site development that reflects the micro and macro environments of the campus.
- 2.11.6 Promote sustainability when setting policies and making administrative decisions.
- 2.11.7 Seek and implement efficiencies in resource consumption. Consider incorporating energy conservation techniques, such as siting of buildings for energy savings, integration of natural lighting, installation of ventilation systems, and other improvements that increase energy efficiency.
- 2.11.8 UG shall proactively and strategically incorporate sustainable design and techniques in its planning and construction projects;

2.12 Utility Infrastructure

The campus utility infrastructure (e.g., electric distribution, water distribution, sewer collection, etc.) were installed across campus spans over sixty four (65) years of the university's existence. Even though the Accra Metropolitan Assembly has constructed a Sewerage Treatment Plant on the campus to serve the nearby communities including Legon, the existing sewer lines on the campus are old and require rehabilitation. The need for upgrade also applies to water and electricity distribution systems on the campus.

The campus utility maps are obsolete and require review and upgrades to locate all buried cables, identify all manholes and inspection chambers among others. Within the Legon Master Plan horizon (over the next 15 years), significant expansions and upgrades to the support infrastructure will be needed. These improvements will need to be planned and coordinated to meet anticipated needs and to ensure that interruptions to services are minimized. It is imperative that utilities are maintained, upgraded, and expanded in a manner that provides needed services to support activities on campus.

Policies

- 2.12.1 Undertake comprehensive studies and rehabilitation of all utility systems on

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the campus by injection of new capital inputs. These utility infrastructure systems for water, sewerage and electricity supply and distribution are over sixty five years old.

2.12.2 Maintain an inventory and drawings of all utilities on campus. The university shall routinely update its utility drawings to reflect additions or expansions to the system that result from new development, building remodeling, and renovations.

2.12.3 Require that all contractors submit a complete set of “as built” drawings prior to closing the construction project.

2.12.4 Encourage and support cogeneration, as much as practicable, as a means of supplying UG’s own primary power (Noguchi’s Solar Power Generation).

2.12.6 Develop comprehensive storm water management, sanitary sewer, and telecommunication plans for campus consistent with statutory regulations and applicable plans.

2.10.7 Coordinate new construction with the Campus Master Plan and PDMSD to ensure the efficient and orderly extension of utilities.

2.12.8 Design building utilities that are readily accessible for incremental expansion or modification.

2.12.10 All development shall comply with the Campus adopted utility and facility master plans and Storm water Master Plan.

2.12.13 any vegetation disturbed within a buffer through the installation and/or maintenance of existing or newly installed utilities shall be replaced and/or restored.

2.13 Design Standards - Allocation of Lands

The UG has planning, architectural and engineering design guidelines that are meant to ensure a consistent campus look and to help provide direction for future building and expansions. Previous land use proposal have been very generous for the provision of large track of lands for university infrastructure and on lease to private developers. Currently there is the realization that space should be allocated conservatively to ensure that about a minimum of fifty percent of available lands are left as open space on the campus.

Policies

2.13.1 Improve building densities on the campus by ensuring compliance of existing building density standards are implemented.

3.0 Projected Facility Needs

The University of Ghana is determined to stay as the top-tier university in Ghana. Toward this end, UG is focused on providing a compelling learning experience through an array of academic, research and non-academic activities. These activities require facilities that offer advanced technological capabilities and adequate support space for lecture rooms, laboratories, graduate student offices, conference rooms, classrooms, and work-study areas. Other physical

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infrastructure facilities crucial to maintaining a balance campus atmosphere include adequate support space for student and staff residential accommodation, sports development, lifestyle support facilities and social and economic activities.

To meet the projected facility needs of the Legon Campus Master Plan's planning period (2015 through 2030), new development and renovation of existing facilities will be required. The new facilities and renovations will expand learning and research opportunities consistent with the University's Strategic Plan to become a World Class Research-Intensive University by 2024.

University of Ghana's facilities need to support the learning and research efforts of faculty and students and allow them to compete on the national level. This requires additional campus facilities that are compatible with existing campus building scale and appearances.

The additional space is not expected to spawn growth beyond the identified projected enrollment.

3.1 Legon Campus Population Projections

UG's student population has grown substantially over the years, from just over 91 students in 1948 to around 22,583 today. Higher growth is expected to continue during the Legon Master Plan's planning period. Table 3.1 shows historical student enrollment in 1-year increments from 1961/62 to 2012/2013.

Table 3.1: Historical Student Enrollment

Students Enrolment 1961-2013							
Year	Male	Female	Total	Year	Male	Female	Total
1961-62	620	62	682	1986-87	2,758	658	3,416
1962-63	1,061	113	1,174	1987-88	2,876	692	3,568
1963-64	1,242	155	1,397	1988-89	2,847	717	3,564
1964-65	1,584	209	1,793	1989-90	3,264	788	4,052
1965-66	1,749	252	2,001	1990-91	3,092	925	4,017
1966-67	1,888	300	2,188	1991-92	3,589	1,110	4,699
1967-68	1,950	302	2,252	1992-93	4,129	1,328	5,457
1968-69	2,136	309	2,445	1993-94	4,088	1,402	5,490

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1969-70	2,155	346	2,501	1994-95	5,205	1,746	6,951
1970-71	2,135	390	2,525	1995-96	School out of session		
1971-72	2,148	382	2,530	1996-97	5,853	2,642	8,495
1972-73	2,185	371	2,556	1997-98	6,383	2,223	8,606
1973-74	2,303	428	2,731	1998-99	6,403	2,692	9,095
1974-75	2,399	437	2,836	1999-00	8,173	3,692	11,865
1975-76	3,011	609	3,620	2000-01	9,340	5,334	14,674
1976-77	3,465	643	4,108	2001-02	10,497	5,494	15,991
1977-78	3,539	653	4,192	2002-03	13,110	7,293	20,403
1978-79	3,516	622	4,138	2003-04	15,545	9,331	24,876
1979-80	3,294	587	3,881	2004-05	16,601	10,813	27,414
1980-81	3,098	607	3,705	2005-06	16,927	11,555	28,482
1982-83	2,744	640	3,384	2006-07	16,732	11,748	28,480
1983-84	School out of session			2007-08	17,759	11,995	17,759
1984-85	2,766	586	3,352	2008-09	19,655	14,443	34,098
1985-86	2,797	665	3,462	2009-10	21,275	14,814	36,089
1986-87	2,758	658	3,416	2010-11	22,711	14,353	37,064
1987-88	2,876	692	3,568	2011-12	22,911	15,651	38,562
1988-89	2,847	717	3,564	2012-13	22,388	15,834	38,222

Source: University of Ghana Computer Centre

Potential Growth

UG as part of its ten year Strategic Plan, intends to maintain a regular student enrolment of 40,000 on the Legon Campus by 2024. According to the ten year Strategic Plan, UG enrolment within this period will consist of 50% graduate and

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50% undergraduate students.

Accordingly, the University of Ghana Institutional Research and Planning Office (IPRO) has prepared a draft enrollment projections for its 2014 – 2024 Strategic Plan. Below is the enrollment projection for UG Legon Campus prepared in July 2015.

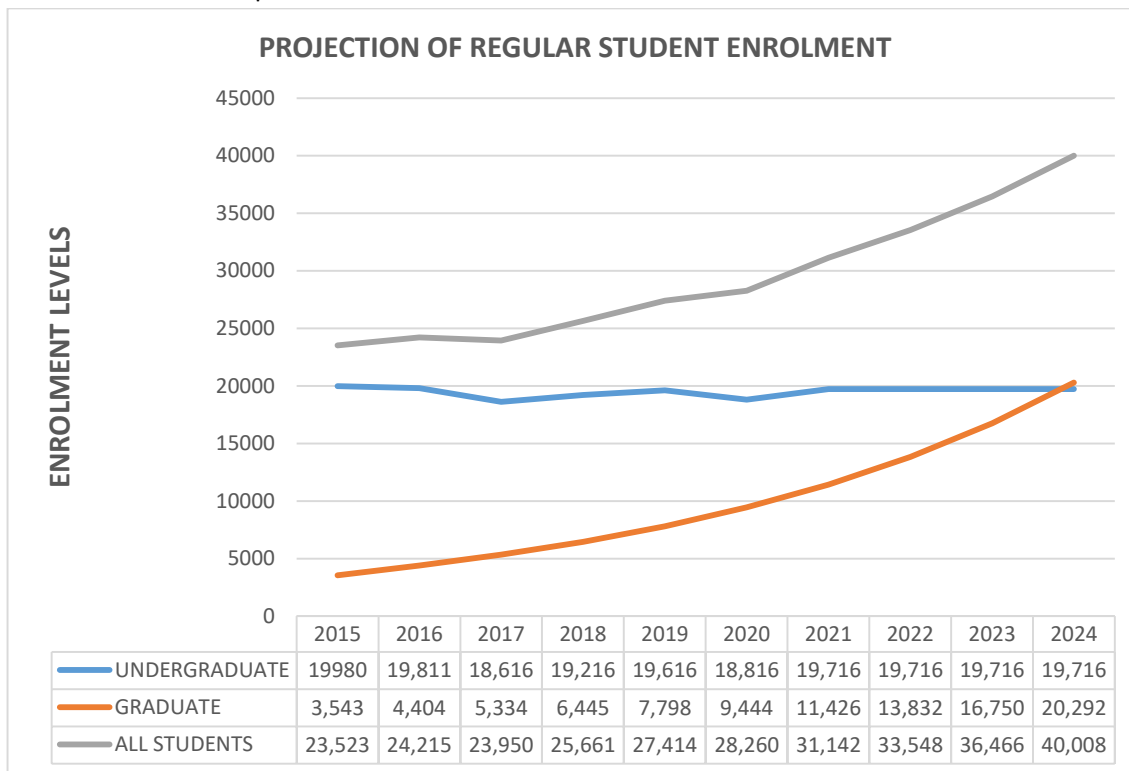
Projection by the University’s Institutional Research and Planning Office (IPRO)

The IRPO was tasked to project staff and student numbers for a period of ten years as part of the New University Strategic Plan using 2013/2014 as the baseline. The exercise focused on improving graduate enrolment to enable the University of Ghana achieve the status of a Research University. It will also help Management to appreciate the level of infrastructure, staff and other resource needs of the University as envisaged in the Strategic Plan. The projections focused on only regular students of the Main Legon Campus. Projection of Distance Education Student Enrolment was also done separately.

Student Projections

The total student population of the University stands at 39,386 out of which 22,853 are regular students from Legon Campus. The number of regular undergraduate students is 19,311 as against 3,542 regular graduate students (Legon Campus only). The projection targeted the graduate students by increasing their enrolment over the 10-year period. Undergraduate enrolment was, on the other hand, held fairly constant.

The result was that the undergraduate students were increased marginally to 19,716 while graduate students hit 20,292 by 2024. The faculty were also projected based on the projected student enrolment. The total number of faculty currently is 1,299. This figure has been projected to 2,802 by 2024. The trend of student enrolment over the planned period is depicted on the graph below.



Projection of Students Intake

The intake of students into various Colleges was also projected. The projections in table 9 in the Annex were based on the baseline data of 2015 which resulted in holding figures for under-graduate students constant throughout the planned period with the exception of College of Education where new courses have been introduced.

In tables 10 and 16 (part of the Annex) however the figures in tables 9 and 14 in the Annex were increased by 30% across board. This was done to cater for admitted students who do not register and enroll in the University. Over the years it has been observed that about 30% of the admitted students failed to enroll.

Academic Staff Projections

Staff need of the University was projected using the National Council of Tertiary Education Faculty Student Ratio. The faculty projections were based on all students of the University namely; Main Campus, Korle Bu, Distance Education, City Campus, Executive MBA and Weekend Programs as well as Sandwich. The faculty projection is depicted on table 16 in the Annex.

Potential growth in faculty has also been anticipated and incorporated into the analysis of future facility needs. In 2015, the UG faculty and staff population was 1,299. This population is approximately 5.6 percent of student enrollment which is

well below the recommendation of National Council for Tertiary Education Faculty Student Ratio. This ratio has been improved as stated in table below.

The Faculty projections were based on all students of the University namely, Main Campus, Korle Bu, Distance Education, City Campus, Executive MBA and Weekend Programs as well as the Sandwich.

Table 3.2 Projected Increase in UG Student Enrolment and Faculty/Staff

Group	2015 Population	2024 Population	Increase in Population
Students	22,853	35000	12,147
Faculty/Staff	1,299	2899	1503

Source: UG IPRO 2015

3.2 Campus Overview

3.2.1 Campus Boundaries

The Legon Campus which consist of the Main Campus and the Staff Village is well defined along its boundaries. Though the Campus land mass is divided by a public highway, the Accra – Aburi/Dodowa Highway, the University’s boundaries are marked with huge pillars indicating the boundary lines to warn off persons intended to encroach on the Legon Lands. The Legon lands are bordered and defined by public roads along all its boundaries except the boundary it shares with Okponglo Table 3.2 presents the current campus lands situation.

Table 3.3 Analysis of Present Land Situation on the Campus

CATEGORY	A. MAIN CAMPUS	B. STAFF QUARTERS	C. POWER	TOTAL
	2,497 acres (1,010.54ha)	644 acres (260ha)	47 acres (19.02ha)	3188 acres (1,290.18ha)
Built Up Area	580	80	35	695
Botanical Garden, Sports Grounds, Sewerage Farm	450	0	0	450
Unserviceable Areas, Steep Hill Sides,	210	10	8	288

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Main Roads, High Tension				
Total Land in Use	1240	90	43	1373
Available Reserve within Present Boundaries	1257	554	4	1815

Source: 2015 Field Data Collection

The current stock taking of undeveloped lands on the campus shows that growth can be accommodated by available lands through the focused development and redevelopment of existing land within the campus boundary.

3.3 Existing Facilities on the Campus

3.3.1 General Facilities

There are 987 buildings on the Legon Campus within the Legon Master Plan Area. These buildings house activities for instruction, research, sports, student and staff services and housing and dining, social and economic. The campus have been developed in sectors/zones which contain buildings which are typical to functions they perform. These sectors contain homogeneous land uses.

The land use pattern of the campus therefore consist of the Academic and Administrative sector/zones, Sectors/zone for Student's Hall of Residence, sectors/zones for Staff Residence, sectors/zones for Sports, sector/zones for Social Infrastructure and sectors/zones for Economic Infrastructure. These sectors/zones contain buildings which are typical to functions they perform.

For instance the zone for Academic Activities contain buildings for instruction, research, while zones for Student and Staff Housing contain residential buildings. The oldest of these buildings were constructed in the early 1950. Physical construction of infrastructure for the University is still on going on the Campus.

Each building has a certain assigned use or uses. Table 3.4 shows the assigned space for the five predominant use categories within the Campus Master Plan area.

Table 3.4: University Building Space Assignment by Use Category

ITEM	USE CATEGORY	NUMBER OF BUILDINGS	PERCENTAGE
1	Academic Buildings	51	5.16
2	Research Institutions	18	1.87
3	Academic Support Buildings (Library and Bookshop)	2	0.20
4	Administrative Buildings (Group of Buildings)	2	0.20
5	Halls of Residence	15	1.51
6	Staff Houses	876	88.75
7	Sports Buildings	3	0.30
8	Social Infrastructure (Basic School, Hospitals, Police Station)	4	0.40
9	Culture (Worship)	8	0.81
10	Economic Infrastructure	7	0.70
11	Security	1	0.10

Source: 2015 Campus Field Survey

3.3.2 Buildings Recognized as Historic

Some buildings on campus are identified as “historic” by the Department of Archaeology and Heritage Studies. Inventory of campus Historic and Archaeological Assets of UG lists the following facilities as some of the Historic and Archaeological Resources of importance:

- The Convocation Group of Buildings;
- The University Tower;
- The Great Hall;
- The University Square;
- The Open –Air Theatre with a Grecian Style Auditorium.

The Master Plan implementation program will therefore have no negative impact on these buildings.

3.4 Future Growth on Legon Campus

The general concept for growth assumes that student enrollment on the campus will increase slowly over time, as projected by University’s IPRO, with a proportional increase of building area for each student. It again should be noted that comparable institutions average 500 gross square feet (GSF) or 47 gross square meter per student; if resources were available, UG could add approximately 3.1 million GSF of buildings without enrollment increases

3.4.1 Academic Infrastructure, Research and Technology

By early 1952 the construction of few of the academic physical infrastructure for teaching and learning had been completed. Completed buildings were for the faculties of Arts, Social Studies, Science and Agriculture.

Permanent accommodations had been provided by 1963 for the Ghana Business School, the Departments of Botany, Animal Science, Chemistry, Economics, Physics and Geography.

The 1968 Master Plan which was prepared to support further extension of academic and non-academic physical targeted the provision of the following academic physical infrastructure which were either using temporary accommodation or were located outside the campus. These were:

- The Medical School;
- The Faculty of Law;
- Institute of African Studies;
- Institute of Public Education
- Faculty of Social Science.

Among the academic infrastructure outlined above the following infrastructure have been constructed to date:

- The Faculty of Law;
- The Faculty of Social Science.
- The Medical School is currently under construction.

Currently academic space is over stretched by high enrolment. Inventory of available space for academic activities revealed that all available space for academic activities are overcrowded with average class size of 150 students.

Apart from overcrowding of lecture halls and laboratories, some of the available academic infrastructure on the campus are considered temporary and are not suitable for modern day University use. In fact some were recommended under the 1968 Master Plan to be replaced. These structures include those housing the following Departments and Institutes:

- Department of Social Science,
- Institute of Continuing and Distance Education,
- Institute of African Studies,
- School of Performing Arts.
- Department of Archeology among others.

Expected Growth in Student Enrolment

The general concept for growth assumes that student enrollment will increase slowly over time, as projected by UG, with a proportional increase of academic building area for each student.

The Student enrolment under the current 10 year Strategic Plan (2014-2024) is expected to increase by 12,147 in the 2024. If the current shortage of academic space on the Legon Campus is not addressed immediately this anticipated increase in enrolment would compound the existing shortage of academic space on the Campus.

Academic Space Projection and Proposals for Delivery of New Academic Infrastructure on Campus

The academic space projection is calculated based on net useable academic area for both undergraduate and graduate arts and science students. A net useable academic space requirement of 8.36m^2 has been assumed for both undergraduate and graduate students (excluding library and administration) to this has been added a "balance area" (Circulation, Stores, Departmental Offices, WCs., etc) at 53% of net useable area, i.e. 48m^2 per student. Therefore the average total area of academic building averaged over students of all disciplines is 137.7m^2 .

Space projection for expected increase in enrolment in the next ten years is therefore $137.7\text{m}^2 \times 12,147$ students which is equal to approximately $12,284\text{m}^2$ of academic building space. This figure does not take care of the existing overcrowding of academic space on the campus.

On Going Academic Space Expansion Projects for Four Colleges on Campus

To address academic space needs the University in collaboration with Africa Integral have undertaken academic space projections to provide additional administrative and academic infrastructure facilities in support of the four Colleges located on the campus under the current 10 year Strategic Plan. The space projected was based on academic space inventory undertaken by PDMS Directorate to determine the unmet demand for academic space. A total of $45,690\text{m}^2$ of administrative and academic space is to be provided as presented in table 3.7. The additional academic space to be provided would support the University's vision of becoming a World Class Research Intensive University in the next few years

The following Academic Infrastructure are currently under construction on the

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Campus and when completed will improve space availability on the campus.

- I. Construction of Offices, Conference Rooms and Lecture Halls for Department of Earth Science
- II. Construction of Offices and Lecture Halls for Old Faculty of Arts
- III. Construction of Drama Studios, Auditorium- School of Performing Art
- IV. Examination Hall
- V. Department of Nutrition Science
- VI. Climate Change and Sustainability Resources Centre and Graduate Building
- VII. School of Pharmacy Building
- VIII. LECIAD Car Park
- IX. PhD Building
- X. Department of Economic Building

Funds have been sourced for four new Storey buildings that will provide Administrative Offices, Lecture Halls, Executive Offices, Laboratories, Meeting Rooms among others spaces. The additional academic space plus the existing academic space will go a long way in addressing issues of large class sizes on the campus.

Table 3.7 Proposed Academic Facilities for Four Colleges on the Campus

College	Number of Storeys	Total Floor Area	Beneficiary Institution	Types of Space to be Provided
College of Health Science	5 Storeys	21,950m ²	School of Medicine and Dentistry (2 Floors), Pharmacy (1 Floor), School of Nursing (1 Floor), Executive Floor for College Administration (1 Floor)	Offices for Lecturers, and Technical staff, Offices for Administrative Support, Laboratories, Lecture Rooms, Meeting Room, Executive offices, Utilities, and Wash Rooms
College of Humanities	4 Storeys	13,400m ²		Offices for Lecturers, and Technical staff, Offices for Administrative Support, Lecture Rooms, Meeting Room, Executive offices, Utilities, and Wash Rooms

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College of Applied Science	3 Storeys	5,240m ²		Offices for Lecturers, and Technical staff, Offices for Administrative Support, Lecture Rooms, Meeting Room, Executive offices, Utilities, and Wash Rooms
College of Education	3 Storeys	5,100m ²		Offices for Lecturers, and Technical staff, Offices for Administrative Support, Laboratories, Lecture Rooms, Meeting Room, Executive offices, Utilities, and Wash Rooms
TOTAL FLOOR AREA		45,690m²		

Source: 2015 Field Studies

To support the University's vision of becoming a World Class Research Intensive University in the next ten (10) years a total land area of 100 ha has been set aside for a research and technology Park for the University.

3.4.2 Development of Student Housing

Student housing facilities provide students with the opportunity to experience campus-focused lifestyle. For many students, the facilities also serve as a transition between dependent and independent living. Over the years, Legon campus accommodation have been over stretched because not enough has been provided to meet demand on the campus. This trend is due in part to the University's inability to obtain adequate funding for such capital projects.

The pressure on student housing started way back in 1962 when the singly occupied rooms in the student's halls of residence were converted into double rooms to meet demand. Currently rooms in the old halls are occupied by three students while four student share a room in the annexes.

The pressure on the campus accommodation eased a bit with the construction

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of Jubilee Hall by the University Alumina 1998. This was a donation to the University to celebrate the University Golden Jubilee.

Since then the University has embarked on construction of new student accommodation with support from the University and Local Banks, benevolent institutions, private investors and the private sectors in general. The following student's accommodation have been provided since 1998.

- The Jubilee Hall;
- Graduate Hostels
- Valco Trust Hostels
- International Student Hostels
- Hilla Limann Hall;
- Alexander Kwapong Hall;
- Elizabeth Frances Sey Hall;
- Jean Nelson Aka Hall

Private Hostels constructed on the Campus in the past 10 years include the following:

- James Toff Nelson Yanka Hall (TF)
- African Union Hall (SNNIT)
- United Nations Hall (Evandy)
- Kwame Nkrumah Hall (Bani)

In response to current trending of students catering for themselves the basic designs of student accommodation provided on the campus has changed. The new designs offer communal kitchens on each floor and en-suites rooms are offered.

The private hostels offers suites that include individual rooms and bathrooms set back from a central living area. This housing designs and styles provide students with both shared living accommodations and autonomy. As new facilities are constructed, University Housing and Dining Services will further attempt to diversify housing choices through a variety of living accommodations including, single- and double-occupancy dormitory rooms, suites, and apartments.

These projects will contribute additional beds to the campus housing supply and help ensure that adequate facilities are available for every freshman and all others who desire to live on campus.

Current Number of Beds Available on the Legon Campus

Currently a total of 19,316 beds are provided by the University and the Private Hostels on the Campus. This is against enrolled regular students of 22,853. A deficit of 3,537 beds are therefore required to accommodate all regular students enrolled on the campus as at the moment.

Future Growth of Student's Residential Accommodation

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The general concept for growth assumes that student enrollment will increase slowly over time, as projected by UG, with a proportional increase of accommodation for each student in the next ten years.

The Student enrolment under the current 10 year Strategic Plan (2014-2024) is expected to increase by additional 12,147 in the 2024. To meet the University's Vision of enrolling 35,000 residential students additional 15,684 beds are required to address the accommodation requirement.

The current average space standard being used by the University to provide accommodation for each student is 5.5m². This figure includes all common areas. It also include a range of final allocation for 4-bed, 2-bed and single rooms.

Residential space projection for expected increase in enrolment in the next ten years is therefore 5.5m² x 15,684 students is equal to approximately 86,262m² of student residential building.

To meet the University's Vision of enrolling 35,000 residential students additional 15,684 beds.

On-going Student Housing Projects

The University currently is undertaking the construction of two additional halls of residence for students in collaboration with African Integral. The hostel development will consist of low rise, rectangular block buildings that will house a mix of residential units serving graduate and undergraduate students in the configuration of 4-person, 2-person, and single rooms. These projects will contribute additional beds to the campus housing supply and help ensure that adequate facilities are available for every freshman and all others who desire to live on campus.

3.4.3 Staff Housing Infrastructure

Existing Development

UG recognizes that staff life and services are also crucial to the university's lasting success. To this end, UG encourages provision of staff housing and amenities for recreation for themselves and their families, social interaction, and various other programs that provide Staff with a safe, enriched, and diverse campus.

Existing Staff Housing Facilities both on and outside the Legon Campus is summarized as follows in table3.8

Table 3.8 University's Staff Housing Stock

CAMPUS ACCOMMODATION	ACHIMOTA	RENTED ACCOMMODATION	TOTAL
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	No.		No.		No.	
Senior Members	596	Senior Members	11			
Senior Staff	36	Senior Staff	52			
Junior Staff	244	Junior Staff	90			
	876		153		700	1,507

Source: 2015 Campus Field Survey

Currently the University faces staff residential accommodation deficit of 700 which is met by rental of private accommodation outside the Legon Campus. The amount paid for the rental of staff accommodation outside the campus could be used as capital to invest in new staff accommodation on the Campus.

Future Growth of Staff Residential Accommodation on the campus

The general concept for growth assumes that staff engagement will increase slowly over time, as projected by UG, with a proportional increase of staff accommodation for eligible staff.

The academic staff engagement under the current 10 year Strategic Plan (2014-2024) is expected to increase by 1,503 in the 2024. The available data on staff strength including academic, administrative and service staff stood at 6,203 in 2011/2012. Out of this 5,078 belonged to the administrative and service staff. Assuming that the engagement of the service and administrative staff who may require campus accommodation is increased by 10% in the next 15 years, a total of 2,011 new staff would be engaged 2030

The current average space standard being used by the University to provide staff accommodation is 0.75 acres (0.30 ha) per house. This gross area includes space for roads and landscaping among others. Considering existing lands available, this figure is rather on a high side. It is suggested that the University should look at providing flats for its staff on the campus as flats need less land. The University has designs for four storey flats. The gross area for a flat is about 0.55 ha.

3.4.4 Sports Development

Existing Sports Facilities

Sports development has been integrated into the academic programs and the University has since 2005 taken steps to focus more on wellness, health and

wellbeing of students, faculty and staff. The campus sports infrastructure are currently located in two zones. These are those located within the Legon, Akuafu and Mensah Sarbah Halls of Residence, and those located in the zone reserved for sports infrastructure.

There is adequate sports infrastructure to meet the needs of students and staff located close to these sports infrastructure. However, the standards used in the 1968 Master Plan does not favor students living in the private hostels who are far removed from the existing sports facilities.

The 1968 Master Plan Standards for the location of new sports infrastructure was based on a location which was equidistant from Faculties, Halls of Residence and the Medical Centre. This standard does not serve students in the private hostels. Needs assessment studies have confirmed that students in that locality have created their informal playing fields near their hostel of residence and these facilities need support from the University.

Future Growth of Sport Infrastructure

The University has adequate sports infrastructure to meet the future students and staff requirements in the next 15 years. However the private hostels should be provided with a social center made up of a football field, two basketball courts, a volley ball court and two tennis courts. A food court, coffee shops and a supermarket is recommended to be added sports facilities to create social center for the four hostels.

A total of 3 ha of land has been allocated within that enclave for this venture.

3.4.5 Economic Infrastructure Development

Inventory of Existing Situation

Currently there are emerging economic activities on the campus. These activities could be grouped under the informal and formal activities. Informal activities have emerged to meet unmet demand for their services and are taking place in temporary infrastructures. The formal economic activities have been planned for and provided with formal space resulting in the collection of grounds rents.

Under the 1949 Master Plan, infrastructure development for economic activities were suppressed for the development of the Junior Common Rooms on the main campus. The only economic infrastructure facilities on the main campus were accommodation for Barclays and Standard Chartered Bank and the Manciple Shop. In the Staff Village a small market was provided to serve the community in view of their isolated location.

Consequent to the stoppage of free catering and laundry services in the 1980s and the introduction of the privatization of these services, a lot of informal and formal economic activities have emerged on the campus. The formal economic activities include those purposely located on the edges of the campus which serve the campus community and the general public as well as providing incomes in terms of ground rents to the University. The others are those located on the campus including banks, restaurants, and photo copying and secretarial services among others.

The informal ones are those that have emerged spontaneously and include food vendors, among others.

Future Growth of Economic Activities and Infrastructure on the campus

The general concept for growth assumes that economic activities on the campus will increase slowly over time to meet the proportional increase in demand for these services.

i. Proposed Legon Mall

The University has recognized the needs of these services and has already taken a policy decision to build a Shopping Mall on the Campus on build, operate and hand over to the University. The University is currently in discussions with prospective developers with a view of selecting a developer for the project.

A total of 9 acres (3.6 ha) of land has been approved and set aside by the University for the development of the University Shopping Mall. However the site initially given out by the University has not been well received because it is said to be not visible enough to the general public.

An alternative sites adjacent to the Haasto – Atomic Road and covering an area of 7.1 ha has been proposed for the consideration of the University.

ii. The Legon City Project

A further 40 acres (16.10ha) in the Staff Village has been set aside to be developed into a mixed activities. The University has already engaged a Consultant for the design and construction supervision of the Site and Services Project.

iii. Redevelopment of Existing Business and Commercial Zone on the Main Campus

Currently on the Campus is an emerging business and commercial center close to the Noguchi Round About. This zone was proposed in the 1968 Master Plan as a shopping center. Located in this zone are three financial institutions with more to be added on. Also located in the zone are the All Needs Supermarket and the Campus Night Market or a Food Court.

These zone are is also an import pedestrian corridor as over 10,000 students pass through to access their Six Halls of Residence and the Rest of the Campus. It will be more pedestrianized when the Medical Center is completed in 2016.

It is recommended that this zone be redeveloped into a Business, Commercial and Social Center. Activities recommended for the area should include, the design of affordable structures for the following:

- A Food court for the night market operators,
- A formal building for group of restaurants with facilities for a coffee shops, drinking bars, shopping and
- A Business building that will provide accommodation for gift shops, salons, barbering shops, secretarial services,
- A Cinema and a Drama Hall

The whole zone should be pedestrianized. An area of 1.5 ha has been proposed as an additional land for these infrastructure.

iv. Redevelopment of the Staff Village Lorry Park

This project is on-going and it is expected to re-organize and regulate activities of commercial vehicles operating in this zone. Unfortunately the redevelopment does not include facilities for small shops or commercial activities. It is unfortunate because the informal commercial activities will be attracted to the terminal to meet unmet demand for their services. If it is not too late some structures should be included to take care of these activities.

v. Construction of Transport Transit Terminal at the Okponglo Entry Point on Campus

An informal Commercial Transport Terminal is currently operating next to the campus Security Post on the Okponglo Entry to the Campus. This temporary terminal has no shelter for passengers, no sanitary facilities and the area is not paved.

For its redevelopment an area of 1.0 ha has been proposed for its redevelopment into a modern transport transit terminal.

vi. Redevelopment of the Staff Village Market

The Staff Village is gradually been overtaken by informal activities operating from table tops and kiosks especially around the Legon Police Station and the Legon Hospital. The PDMSD intends to revive the old market in the Staff Village. Whether the retailers will use the facilities is another matter.

Table 3.9 Proposed Allocation of Lands for Business and Commercial Activities on the Campus

TYPE	OF ECONOMIC	SPACE ALLOCATION	REMARKS
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ACTIVITY	APPROVED SPACE	PENDING	
Legon Mall	9 acres(3.64ha)		
Legon City Project	40 acres (16.18ha)		
Staff Village Transport Terminal	0.8 ha		
Night Market & Business Center	0.0	yes	
Legon Transit Terminal	0.0	yes	

i. Lease of Business and Commercial Plots On Campus

Existing Situation

The University has a policy of leasing some of its lands to developers in return for payment of Ground Rents. Over the years lands for five Fuel Stations, a Pharmacy, Cooking Gas Refill Point, two Banks and a Mall have been leased to private developers. Other developers include Ghana Institute of Accountancy, the Accountancy Training School, Ghana revenue Authorities, Association of African Universities and places of Worships are among those who have benefitted from this policy.

Some plots on the campus have also been leased out for a Hotel, for a Basket Court and for a Tent City. These plots are yet to be developed.

Future Growth in Private Development on the Campus.

The general concept for growth assumes that economic activities on the campus will increase over time to meet the proportional increase in demand for lands commercial infrastructure development.

Request for land keep coming in so it is prudent at this stage to recommend University lands at the edges for long term leases. Some of these lands have been encroached upon while some have become dumping ground for building waste and refuse.

A total of 12.20 Ha have been allocated for lease to the sector for future development on the campus.

3.4.6 Social Infrastructure

Social services infrastructure on the campus include those for University Basic School, the University Hospital, and emergency Services like Legon Police Station, Campus Security and the Campus Fire Services.

i. University Basic School

The University Basic School which was established on the campus in 1956 now has an enrolment of 1900 pupils. The former primary school now has a junior secondary school. The basic school is walled with a large expanse of undeveloped land within the compound.

Future Growth

The basic school will therefore not require additional space within the plan horizon.

ii. The Legon University Hospital

The Legon Hospital was also established in the early 1950s to serve the University. It has since expanded into 130 bed facility with outpatient department. Currently the Legon Medical Center is under construction on the main campus and will become a referral Medical Centre to the Legon Hospital when completed.

Future Growth of Health Services

The University Hospital has a large expanse of land for its northward expansion. No space projection has therefore been projected for its expansion.

iii. The University Fire Service

The Legon Campus has a Fire Station located at the PDMS Directorate. The fire station is manned by full-time Fire Prevention officers.

Future Growth

The PDMS Directorate complex which is located on a large compound has existed since the establishment of the Legon Campus in 1950 was identified as consisting of temporary and was recommended in the 1968 Master Plan to be relocated in modern structures at a site located for Works next to the Electricity Station on the campus.

This proposal was never carried through and the PDMS Directorate Complex is going through a gradual reconstruction of its units. It is therefore anticipated that the reconstruction will finally cover the premises of the Fire Station within the plan horizon. No extra space was therefore projected for the fire station.

iv. Legon Police Station

The Legon Police Station which was established in the 1950s to provide security to the Legon Community currently has become a District Police Station in the locality. Its role has been undertaken by the University's own security and therefore the growth of the Police Station is of no relevance to the University.

v. Campus Security

Existing Infrastructure

The Campus has its own security with a force of about 300 personnel. Their main office is located in the Main Security Gatehouse on the Central Avenue. Other security infrastructure include the four security post located on the other entries to the campus.

Future Growth

A total land area of 0.20 ha has been proposed for a gate house for the Okponglo Entry Point should include an information center for first time visitors to the campus.

3.4.7 Places of Worship

Existing Infrastructure

Currently there are eight (8) places of worship on the Campus apart from those operating in the halls of residence. Out of the eight places of Worships, 4 are located on the Main Campus and 4 in the Staff Village

Future Growth

No new lands have been allocated for new places of worship because eight is enough.

3.4.8 Engineering Services on the Campus

The provision of safe water supply, disposal of liquid and solid waste and good drainage are essential services to maintain public health and sanitation on the Legon Campus. Electricity, Telecommunication and delivery services are essential for carrying out basic day to day activities in the campus environment

In the last forty years, the campus has faced challenges with access to reliable engineering services on the campus.

Both the Electricity Company of Ghana and the Ghana Water Company of Ghana both have been allocated lands on the Campus and are expected to expand their infrastructure within the lands allocated.

Future Growth of Engineering Services on the campus

The general concept for growth assumes that campus population will increase slowly over time, as projected by UG, with a proportional increase of engineering services for the Telecommunication Companies water and electricity distribution. The distribution of electricity and water will require additional lands. However the distribution lines for electricity, water and sewerage will occupy the right of way of various roads on the campus.

Cell sites on the campus are expanding and will require land for their Cell Sites. A total of 4 ha of space have been proposed for the expansion of these cell sites on the campus.

3.4.9 Road Parking and Walkway Infrastructure

Existing Road Infrastructure

The University is well resourced with a hierarchy of road network connecting all built up sectors of the campus. Currently there is an ongoing project to provide asphalt cover for some selected roads on the campus to improve driving comfort.

Pedestrian walkways are also under construction along selected roads on the campus to provide safety for pedestrians.

However there is a shortfall in space for parking of vehicles on the campus as demonstrated by parking of on lawns. Currently all the buses previously parked on the premises of the PDMSD are now parked on lawns outside the directorate.

Future Growth

The general concept for growth assumes that campus roads, walkways and parking infrastructure will expand over time, as projected by UG and with a proportional expansions of campus land uses. The land use proposals made to expand building infrastructure on the campus will require the construction of roads and drainage, walkways and parking facilities to service these lands. Therefore various land use projections for academic, research and none academic infrastructure have factored in space for roads, walkways and side drains.

3.4.10 Campus Open Space and Walkways, Street Lights

Existing Condition

The University of Ghana has a well-developed open space and landscape areas on Campus. The University from its inception employed a professional Curator of

Grounds and Gardens to design and implement the landscape design. Existing landscape include Rural and Urban landscape consisting of bush, lawns, quads among others. Campus roads are lined with shade trees and grounds of buildings are planted with grass and trees, flower beds among others.

Street lights have also been provided along streets on the campus however some are not working.

Future Growth

It is expected that design and construction of new infrastructure will include the provision of landscape areas. Provisions have therefore been made for the inclusion of open spaces as part of the land use projection.

3.5 Existing Condition of Facilities

Many buildings on campus are in need of physical upgrade and maintenance. As noted earlier, the average age of the older buildings on campus is about 60 years. Buildings of this age typically require continual maintenance to ensure that they provide an adequate environment for research, academic, students and staff residential activities.

The PDMS has guidelines for routine and periodic maintenance of physical infrastructure on the campus. The problem of timely availability of funding has always been the issue.

The issue of deferred maintenance will continue to be a challenge for UG over the Legon Campus planning horizon and well into the future. UG will continue to work to ensure that facilities on campus receive the maintenance they require to address living, safety, and/or functional concerns.

In addition, to promote a clean image UG will prevent buildings and structures from falling into disrepair.

3.6 Capital Construction

The capital construction budget process originates with the Government of Ghana through the GET Fund, Internal Generated Funds, Research Institutions, Private Institution among others. Every year, the state determines the amount of state funding that will be available for higher education capital construction projects, and approves the budget for the Country's University Education Programs.

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The various individual faculties and departments also receive grants from outside the campus for specific projects;

The Capital Construction Budget that UG prepares includes:

- New building construction proposals,
- Upgrade of deteriorating general-purpose instructional and non-instructional facilities on the campus,
- Replacement of academic and non-academic facilities that do not meet the current or anticipated needs of the students, and
- Maintenance and repair of facilities.

a. Capital Construction Program

Additions and Renovations

Various departments request building additions and renovations to meet their current and anticipated space needs. Additions and renovations are important to growth because they allow the departments to update or expand in their current locations.

Major Renovation

Many buildings currently undergoing deferred maintenance and improvements require major renovation to maintain the initial investment and meet program needs.

New Construction

Most requests for new building construction seek to consolidate program locations and meet the demand additional space and for high-tech instructional facilities. New construction typically focuses on providing better student and staff services and learning centers or expanding research needs. They also include

Campus Infrastructure Improvements

The growing student population combined with location of an increasing propensity of students to drive to campus has increased the demand for campus parking facilities.

Infrastructure improvement including roads, electricity, power generation, water, and storm water and sanitary sewer systems will be upgraded and expanded as development dictates and in coordination with the overall development plan for

UG will continue to repair and maintain its existing system to ensure that operational deficiencies are corrected. In addition, UG will continue to study the feasibility of expanding the use of solar system on the campus that would be capable of providing part of the campus's electrical needs. Noguchi Memorial Institute currently is the only institution on the Campus that currently operates a solar energy system on the campus.

b. Capital Construction Projects

During the Campus Master Plan period, it is anticipated that capital construction projects will be necessary in the following areas:

i. Research and Academic Facilities

Research and academic facilities must be developed and operated in a manner that attracts and retains a high caliber of students, faculty, and staff. These new facilities will offer ample research areas and state-of-the-art telecommunications, and serve as an interface between UG and businesses for collaborative research and knowledge-based learning. A total land area of 100 ha has been proposed for the new projects.

ii. Student Housing

Improvements to student housing will include renovation of existing residence halls to meet current student demands and an increase in the number of beds to meet expanding student enrollment. UG has been updating, renovating, and remodeling its existing residence halls. Currently UG is in the process of adding two new halls to its housing portfolio and anticipates the need to construct housing for additional students over the planning horizon. This will supplement the renovation/construction projects currently in the planning or construction stage. New construction of student's halls of residence will be required to increase students by 15,684 by the year 2030.

iii. Staff Housing

Improvements to Staff Housing will include renovation of existing homes to meet current staff demands and increase the number of housing units to meet expanding staff engagement. UG has been updating, renovating, and remodeling its existing staff houses. UG will add more staff houses to its housing portfolio and anticipates the need to construct housing for additional Staff over the planning horizon. It is expected that the construction of flats will be promoted to reduce demand of lands for staff housing.

iv. Sport Infrastructure

Within the planning horizon it is hoped that the Legon Stadium will be completed and put to full use. Improvements to sports infrastructure will include renovation of existing sports facilities to meet current demands and an increase in the number of sports facilities to meet expanding demands. For instance there is a proposal for the provision of a playing field consisting of a football field, basketball and tennis courts and a netball court to serve the residents of the private hostels.

Student recreation and intramural sports programs continue to grow in response to student demand and increased student enrollment. Sports facilities serve three individual but related programs on campus: Intercollegiate Athletics, Physical Education, and Recreational-Intramural Sports. Most of the facilities are located in the sports zone.

One new private sector initiative is the proposed construction of a basketball Complex on the Campus for which land has been allocated

v. Business and Commercial Infrastructure

Proposals have been made in the planning horizon to expand business and commercial activity infrastructure on the campus. These capital construction projects will include:

- Legon Mall;
- Legon City Project;
- Redevelopment of the Campus Night Market and Business Zone;
- Construction of Commercial Transport Transit Terminal on the Okponglo Entry Road;
- Redevelopment of the Staff Village Market;
- Proposed Hotel on the Gulf House Road; (Private Sector Initiative)
- Proposed Global Tent Village (Private Sector Initiative)

vi. Campus Security Infrastructure

It is hoped that the Temporary security gate on the Okponglo Entry will be replaced with a permanent one to improve the beautification of that entry to the campus.

vii. Campus Transport Infrastructure (Roads, Parking and Walkway Infrastructure)

Proposals have been made for the expansion of land use for various activities on the campus. Expansion into undeveloped areas will require extension of roads and drains, provision of carparks and walkways.

viii. Utility Infrastructure

The expansion of land use into undeveloped areas will require extension of water, electricity, sewerage and drainage facilities into these new areas.

ix. Open Space Street lights

The expansion of land use into undeveloped areas will require landscape development of these new areas.

Table 3.11 The University's Proposed Capital Construction Projects 2015 – 2030

Item	Building Category	Use	Expansion of Infrastructure	Upgrade of Existing Infrastructure	Replacement of Infrastructure	Maintenance and Repairs of Infrastructure
1	Academic Research	and	Collegiate Buildings	Yes	Yes	Yes
2	Administration		Yes	Yes		Yes
3	Students Housing		Yes	Yes		Yes
4	Staff Housing		Yes			Yes
5	Sports Infrastructure		Indoor Basket Ball Courts	Yes		Yes
6	Business and Commercial		Legon Mall Legon Project Night Market Banks			Night market Area
7	Social			Yes		Yes
8	Cultural			Yes		Yes
9	Utilities (Water, Electricity, Sewerage)		Yes	Yes	Yes	Yes
10	Telecom		Yes			
11	Transport Terminal		Okponglo Entry Terminal	Yes		Yes
12	Roads and Drains		Yes	Yes		Yes
13	Walkways		Yes	Yes		Yes
14	Open Space		Yes	Yes		Yes

4.0 Campus Development

4.1 Strategies for the Update of Existing Land Use Plan

Future development on the Legon campus will primarily support the enrichment, enhancement, and improvement of academic, research and non-academic facilities and activities.

For planning purposes, the Campus Master Plan has divided the campus into twenty (20) development sectors. The sector approach allows for new development based on an area's existing development and the anticipated needs of the campus as a whole. Each sector is allotted a maximum square footage development allocation and a minimum open space amount to ensure that future development preserves the sector's open space character. This approach also provides flexibility in that exact building locations can be established at the time of development.

The maximum future allocation was determined based on interviews with university officials about future needs, trends in academic, research and other facilities, and an assessment of known or pending expansion opportunities and development projects.

Strategies adopted for the meeting additional space requirement for infrastructure development in the next plan horizon include:

- Consolidation of development through “infilling” of existing sectors that have space available so as to take advantage of existing services in those sectors;
- Decentralization of some activities to new sectors within the existing boundaries of the University to reduce congestions in built areas, improve the University's revenue generation through the lease of lands to private developers, to secure lands from encroachers and to open up new areas on the campus for development and;
- To use the multi city concept to strengthen development and viability of the Staff Village which has been neglected over time.

The update of the existing master plan has involved examination of these alternative concepts for the future development of the Legon Campus. On the basis of needs assessed and evaluation of strategic options, it was possible to identify elements in each concept which could be incorporated into the preferred campus land use structure.

The campus consolidation strategy has significant economic benefits for the Legon Campus as it would enable much of the underutilized capacity of services available to be used in all the sectors with low building densities at a minimum cost.

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The decentralization of some land use activities including academic, research, business activities among others would allow the Staff Village and parts of the Main Campus, especially those sectors under threat from encroachers to be developed to reduce pressure on existing activities on the Campus. The concept would improve the University's revenue generation through the lease of lands to private developers and open up new areas on the campus for development.

The concept of multi city strategy has significant benefits of expanding campus infrastructure to the Staff Village for the benefit of the Campus Community and the general public. The concept will also support the generation of more income for the University through the leasing of plots, serviced or unserviced to private research institutions and other investors. Another benefit is ensuring that these lands are not taken over by encroachers.

The elements of the alternative master plan concepts provide framework for the master plan. The preferred master plan sets out the long term physical land use strategy for the development of the Legon Campus

Regarding open space, the Campus Master Plan Policy 2.9.1 establishes that a minimum of 50 percent of open space shall be maintained on campus. Open space can consist of lawn areas, landscape beds, and pedestrian amenities such as plazas, courtyards, decks, sidewalks, and recreation fields, agricultural fields, or other non-developed areas. Both "green" spaces and hardscape areas such as pavement are considered open space because they allow the community to co-mingle or provide an area of respite. Green and hardscape areas can be a building amenity or a point of interest on campus.

4.2 Establishing Future Directions of Growth

Sectors for extension of have been identified based on following criteria:

- Availability of space to accommodate new infrastructure;
- Promotion of contiguous expansion of existing infrastructure;
- Creation of homogenous land use zones;
- Reclaiming areas subjected to abuse through encroachment and dumping of refuse;
- Types of land use and their traffic generations;
- Infilling of serviced land use zone with low densities;
- Development of areas requiring new development among others.

4.3 Description of the Updated Master Plan

The alternative concepts were examined from the point of view of policy implication, implementation at University Campus scale and effect on various

urban sectors on the campus. None of the sectors investigated was envisaged as being acceptable in itself as they were primarily established to highlight the advantages and disadvantages of policy directions in each. From the analysis various principles were derived for identifying the preferred campus structure. No single master plan concept could fulfil all requirements of the Legon Campus. Therefore elements from the three alternatives are to be found reiterated in the preferred master plan proposals.

a. The Main Campus

In view of the University's vision of becoming a research intensive University Institution in the next ten years, a consolidated development of growth system with its main thrust towards the north - westerly, and northern parts of the main campus has been proposed to create a zone for research, technology and academic development. The existing core academic zone and the registry are expected to expand in future to this area identified as Sector B. The areas comprising the Sewerage Farm and the Botanical Gardens has been excluded from urban development. These two areas will form the boundary of north - westerly of campus development and are designated as green belts. The land area in sector B is 187 ha.

The plan also proposes a commercial zone for the development of the Legon Mall in the northern part of the campus to meet the needs of the campus community. The land proposed for such development is in Sector G and shares a boundary with the Botanical Gardens. This proposed area has visibility along the Haasto – Atomic Road and could be accessed from this arterial road and will not be expected to pose traffic problems on the Campus. This decentralized concept will reduce pressure on the growth of the night market areas and will be able to accommodate a wide range of commercial services to be provided in the Mall Complex.

The plan incorporates all the area under the currently approved planning schemes though it is thought that some of these commitments on the main campus will have to be abandoned or amendment in order to make structural adjustments.

The land area, consisting of some 508.70 ha on which campus development is to take place on the main campus includes the zone for private hostels, the core academic zone, the zone for the four new Halls, Little Legon, South Legon, the Manciple and Night Market Area among others.

The proposed and existing transportation network provides the basic structural formation of the Main Campus Area. The proposed arterial road linking the Annie Jaggie road to the GIMPA – Achimota road and associated road network divides the new panning areas into different components which can be treated as

elements for planning and development purposes wherever possible.

The positioning of the emerging business center at the night market area and the proposed site for the Legon Mall are of significant importance to the Campus commercial and business development. The campus from its inception was denied a business center because the University wanted the Junior Common Rooms to be the focus of social life. The collapse of concept of free catering and other services encourage the emergence of informal activities without the proper structures for their growth on the campus. It is intended that these two zones on the campus will be developed into viable commercial and business centers to provide the unmet services required by the campus community with a population of over 30,000 people.

b. The Staff Village

A consolidated development of growth system with its main thrust towards the south central part of the Staff Village has been proposed to create a zone for mixed uses and academic development. The most prominent proposal for the staff village apart from expansion of Staff Housing is the implementation of the Legon City Project which is a mixed use development. The released of plots on the edges of the Staff Village will continue with the view of ensuring that University lands on the edges are put to good use.

In summary the key elements of the Updated Master Plan are:

- Consolidating development within the existing Campus boundaries and promoting the orderly expansion of new urban areas;
- The extension of academic, research and administrative infrastructure to Sector B;
- The designation of special facilities zones for research and technology parks;
- The provision of a mixed development sub-regional center (Legon City Project) in the Staff Village to serve a sub-district center to service the La – Balewashie, East Legon and Medina Area among others areas;
- Encouraging the development of sector Q the Manciple and Night Market area as a viable business and social center of the Campus;
- The development of the a portion of Sector G with access from Haasto – Atomic road as Legon Mall to provide additional commercial services for the campus;
- The expansion of Students and Staff Housing and recreational facilities on the Campus;
- The allocation of lands on campus edges for mixed use development to improve the environmental conditions on the edges;
- Development of campus Open Space for recreational activities

- consistence with the landscape and environmental objectives;
- Provision of adequate transportation network including a proposed arterial road network to service the sector B area so as to improve the access of students living in the private hostels in Sector G and those living in the New Halls in Sector O to these new areas;

4.4 Land Use Allocations

The overall land use requirement of the master plan has been calculated on the basis of population growth provided by the University. Current regular student population is 22,853 which is expected to increase to 35,000 by the year 2024. The calculations do not include plots already given out and approved by the University. These lands include lands allocated to the Legon City Project, Indoor Basket Ball Court, the Global Tent Village, The New Law School, and The Proposed Hotel among others.

Table 3.10 Summary of Existing and Proposed Land Use on the Legon Campus

ITEM	LAND USE	EXISTING		PROPOSED		
		MAIN CAMPUS	STAFF VILLAGE	MAIN CAMPUS	STAFF VILLAGE	
	Academic & Research	64.94 ha	5.35 ha	73.51 ha	0.0	Including 29 ha for Technology Park
	Campus Administration	6.00 ha	0.0	4.0 ha	0.0	
	Student Housing	128.77 ha	0.0	24.31 ha	0.0	12.20 ha exiting
	Staff Housing	95.42 ha	17.24 ha	20.61 ha	13.61 ha	
	Sports		0.0	3.0 ha	0.0	
	Commercial & Business	6.16 ha	2.38 ha	23.67ha	9.34 ha	Excluding Legon City Project
	Private Institutions	0.0	11.21 ha	0.00	0.0a	
	Transport Terminals	0.6	0.5 ha	1.0 ha	0.0	Okponglo Transport Terminal
	Basic School	3.91 ha	1.20 ha	0.0	0.0	
	Social	2.94 ha	3.22 ha	3.1 ha	1.00 ha	Basic School, Health, Police

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						etc
	Cultural		0.75 ha	0.0	0.0	Worship
	Open Space					
	▪ Rural	739.38	188.20	662.778	176.23	
	▪ Urban	228.0 ha	36.00 ha	76.60 ha	11.97 ha	

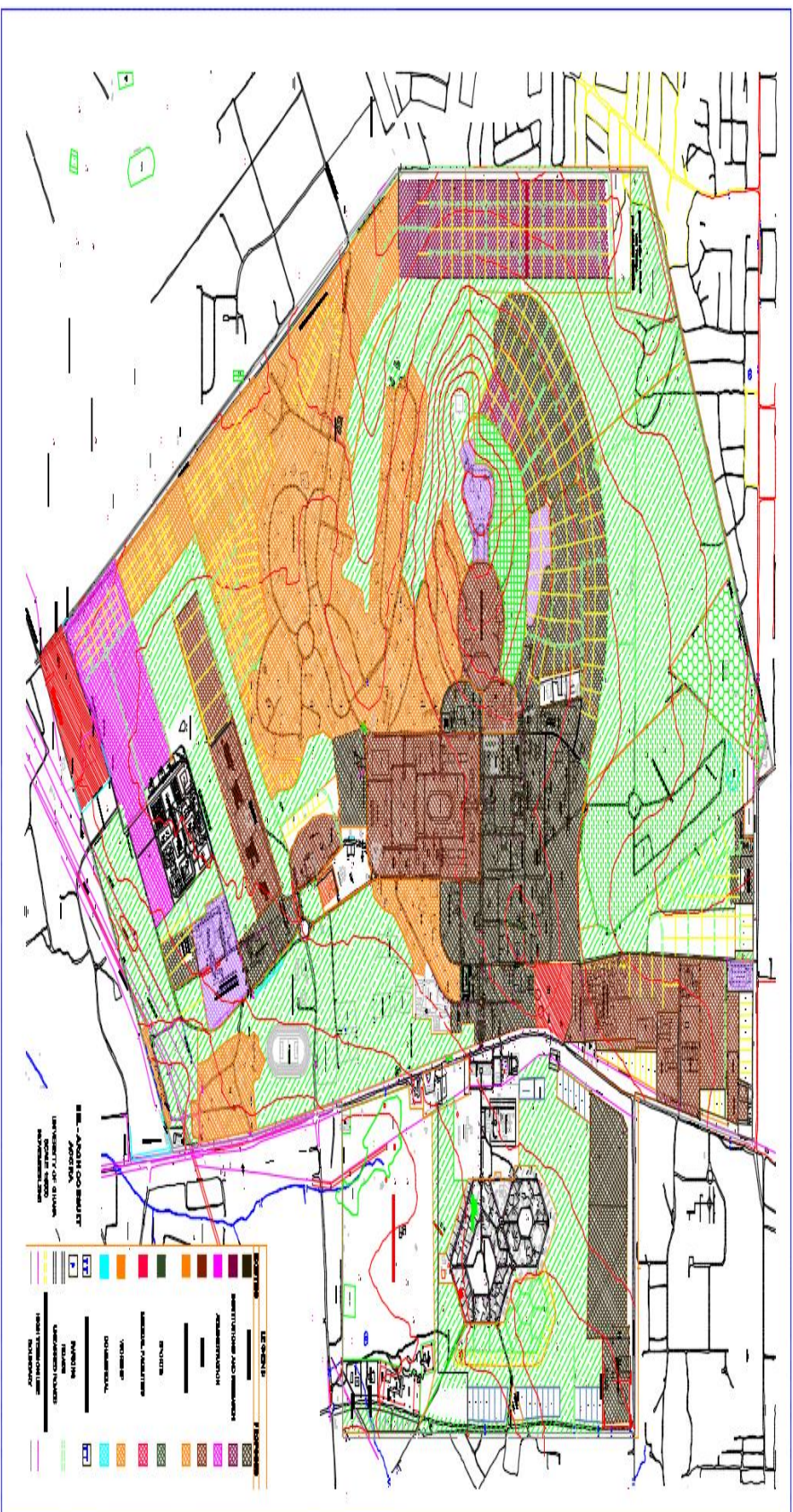


Fig. 1.5 Proposed Development Plan 2016-2030



Fig. 1.6 Proposed Development Plan 2016-2030

Table 3.11 Existing Sectors on Legon Campus in 2015

ITEM	SECTOR	PREDOMINANT USE	LAND	TOTAL AREA METERS SQ	NUMBER OF GROUP OF UNIVERSITY BUILDINGS IN EXISTING SECTORS	REMARKS
	Sector A	Staff Housing		783,581.86	126	
	Sector B	Rural Landscape		1,874,303.12	1	
	Sector C	Sewerage Farm		100,862.20	0	
	Sector D	Encroached Land		5,186.00	0	Encroached land
	Sector E	Botanical Gardens		336,750.30	2	
	Sector F	Rural Landscape		278,925.44	4	
	Sector G	Student Housing		364,350.41	17	
	Sector H	Core Academic Research	&	599,377.42	78	
	Sector I	Staff Residence		52,095.74	10	
	Sector IA	Student Housing		198,375.809	20	
	Sector J	Sports Infrastructure		345,193.72	5	
	Sector K	Sports Infrastructure		309,620.97	29	
	Sector L	Academic Research	and	435,427.54	5	
	Sector M	Utilities (GWC Storage)	Water	99,347.22	0	
	Sector	Student Housing		177,142.41	4	

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	N					
	Sector O	Staff Housing	1,410,948.28	88		
	Sector P	Rural Landscape	593,135.94	0		
	Sector Q	Staff Housing	299,520.94	244		
	Sector R	Social Infrastructure	683,583.72	2		

Table 3.11 Existing Development in Sectors on the Campus in 2015

Item	Sector	Academic and Research	Administration	Academic Support	Students Halls	Staff Housing	Sports	Social & Cultural	Economic	Open Space	Others
1	Sector A	0%	0%	0%	0%	50%	0%	0%	1%	50%	0%
2	Sector B	0%	0%	0%	0%	0%	0%	0%	1%	99.5%	0%
3	Sector C	0%	0%	0%	0%	0%	0%	0%	1%	99.5%	0%
4	Sector D	0%	0%	0%	0%	0%	0%	0%	30%	70%	0%
5	Sector E	80%	0%	0%	0%	0%	0%	0%	20%	100	0%
6	Sector F	10%	0%	0%	0%	0%	0%	0%	0%	90%	0%
7	Sector G	0%	0%	0%	60%	0%	1%	0%	10%	50%	0%
8	Sector H	40%	5%	1%	20%	0%	0.05%	0%	0%	34%	0%
9	Sector I	0%	0%	0%	0%	50%	0%	0%		50%	
10	Sector IA	0%	0%	0%	50%	0%	20%	0%	0%	40%	0%
11	Sector J	10%	5%	0%	0%	10%	30%	5%	0%	40%	0%
12	Sector	0%	0%	0%	0%	20%	20%	0%	5%	55%	0%

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	K																		
13	Sector L	55%	0%	0%	0%	0%	0%	1.0%	0%	0%	0%	0%	0%	44%	0%				
14	Sector M	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	98%	0%				
15	Sector N	0%	0%	0%	0%	50%	0%	0%	0%	0%	0%	0%	50%	0%					
16	Sector O	5%	0%	0%	0%	10%	30%	0%	0%	1%	5%	49%	0%						
17	Sector P	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	83%	15%						
18	Sector Q	0%	0%	0%	0%	0%	70%	0%	0%	2%	0%	28%	0%						
19	Sector R	10%	0%	0%	0%	0%	0%	0%	0%	20%	10%	50%	10%						

4.1 General Policies for Land Use Development on the Campus

Overall Master Plan Area is 1,290.18 ha (3,188 acres) out of this about 734.53 (1815 acres) is available for extension of facilities under this Master Plan.

The following general development policies provide additional direction for future development of the campus. These general development policies supplement the Campus Master Plan Principles and Policies in Chapter 2.

General Policies

- 4.1.1 Campus development are in homogeneous sectors therefore ensure that future campus development follow this trends in each sector.
- 4.1.2 To meet projected space requirement adopt infilling in sectors with available space to take advantage of the use of existing infrastructure facilities in those sectors;
- 4.1.3 Improve building densities on the campus by ensuring that academic, research, students and staff houses are not less than four (4) storey high;
- 4.1.4 Develop existing campus edges and other spaces especially in the Staff Village that are threatened by encroachment and have also become dumping grounds for refuse.
- 4.1.5 Ensure the development of the Staff Village to generate incomes from available lands in the area which are under threat from encroachment.
- 4.1.6 Create three important social centers on the campus to improve social interaction among the campus community;
- 4.1.7 These centers should be located in the following Sectors:
 - a. Academic Zone - Recreational Quadrangle
 - b. Student's Area - The Night Market Area and
 - c. Private Hall - between Africa Hall and United Nations Hall
- 4.1.8 Establish a maximum development allocation and a minimum open space standard for each sector.
- 4.1.9 Ensure that sector development is consistent with the sector-specific policies in this Campus Master Plan.

- 4.1.10 Preserve the historic character of existing buildings and incorporate historic values into each building renovation or expansion project as much as practicable.
 - 4.1.1 Organize buildings along streets and develop quadrangles or other usable open space. Each building should have a unique identity whenever possible. Buildings shall be connected via links (e.g., sidewalks, bridges, etc.) that are at grade, or above grade. The connecting links should not be the dominant feature.
- 4.1.12 Ensure that development along the campus boundaries is compatible with existing adjacent uses. Design new buildings and uses such that architectural continuity is provided across campus.
- 4.1.13 Design buildings that are used for academic and research activities for long term use (100 years or more).
- 4.1.14 Ensure that development projects are consistent with the principles, policies, and development and design standards in this Campus Master Plan. To this end, PDMSD and its departments shall oversee and coordinate development and construction projects.
- 4.1.15 Design and construct new arterial roads to provide access to proposed land use activities in sectors with limited or no access to improve connectivity on the campus.
- 4.1.16 Design transportation, pedestrian and bicycle connections consistent with the campus transportation plan, and the Department of Urban Roads Standard Construction Specifications, and the Campus Master Plan TIP to promote safe and convenient access into and across campus.
- 4.1.17 Develop and implement architectural and landscape architectural guidelines to reinforce the relationship among buildings, streets, and open space. Create continuity in the mass, scale, materials, and surrounding landscape of campus buildings.
- 4.1.18 Extend utility infrastructure like water, electricity and sewerage facilities to new developmental sectors.

a. Sector Descriptions

Sector A - Upper and Lower Hill and Ayido Crescent

Sector A is a well-developed sector on campus. This sector is dominated by residential houses situated on the slopes side of Legon Hill and down in the Ayido Valley and Crescent. It covers an area 783,581.96 ha.

Sector A currently supports residential accommodation for Senior Management Staff of the University. The sector also accommodates the University Guest House and a Kindergarten. Building densities are very low as each house occupies 0.30 ha (0.75 acre gross). The whole sector is well landscaped with trees.

Future development in Sector A will continue to provide accommodation for senior management of the University. Fifty percent of the land area will be reserved for open space.

Sector A Policies

- 4.2.1. Develop sector A as a residential area for senior Staff of the Campus;
- 4.2.2. Recognize that the sector's building densities should be low;
- 4.2.3. Minimize development-related impacts on the landscape in the area. Preserve the lush green area in the sector.

- 4.2.10. Ensure that a minimum of 68 percent of land in Sector A remains as open space.

Sector B— Virgin Land North of the Registry

Sector B is one of the least developed sector on campus. This sector is dominated by rural landscape made of bush and farms. Part of the Sector is made up of the Teak Plantation that acts a wind breaker protecting the Registry. Sector B covers an area of 1,874,303.10 ha. Part of this sector occupies Legon Hill on its northern part and slopes gently down towards the Sewerage Farm and the Botanical Gardens. Sector B shares boundaries with the Registry, the Core Academic Zone, the Sewerage Farm and the Botanical Gardens.

Sector B is expected to accommodate future expansion of the Academic and Research Infrastructure, and the Registry. A large space has been allocated for the development of a Technology and a Research Park. It is expected that Technology and Research Park will be a joint venture between the University and the Private Sector.

Forty percent of the land area will be reserved for open space.

Sector B Policies

- 4.2.1 Ensure that new buildings in this Sector are designed so that each building has an individual identity, is oriented toward the street and, where possible, situated along quads. Areas within the proposed academic core extension will provide a pedestrian zone free of major automobile traffic.
- 4.2.2. Provide instructional and Research related facilities in this Sector B. This should include classrooms, teaching laboratories, faculty and administrative offices, libraries, research institutions, and recreational and performance facilities with instructional functions.
- 4.2.3 Ensure that buildings in this Sector are not less than four (4) Storeys in height;
- 4.2.4. Locate related instructional facilities such that they can be reached within a 10-minute walk (approximately 670 meters).
- 4.2.5 Extend arterial road infrastructure, water and electricity supply and sewerage distribution and collection network to the sector,

Sector C – Agriculture Faculty Demonstration Farms

Sector C is currently used as demonstration area for the students in the Faculty of Agriculture. There are a few buildings in this zone which are used to support the agriculture activities in the area. About ninety percent of the sector is bush.

Sector C Policies

- 4.3.1 The Sector should be used for the current activities – agriculture demonstration activities. And the current open space conditions should be maintained.

Sector D - The Accra Metropolitan Assembly Sewerage Farm

Sector C is the new Sewerage Treatment Plant that has been constructed by the Accra Metropolitan Assembly. This treatment plant was to replace the old University Sewerage Treatment Plant that broke down. The site is laid out with a number treatment ponds and few buildings. This treatment plant has a big capacity as it was built to treat the liquid waste of surrounding communities of Haasto, West Legon and North Legon. The Sector C covers an area of 10.08 ha

and will continue to offer space for the treatment of sewerage from the Campus and other nearby Communities.

Ninety (90) percent of the land area will be reserved for open space.

Sector D Policies

4.4.1 Ensure that the Sector is used for the treatment of sewerage only and no other development.

4.4.2 No building structures other than those related to the treatment of sewerage should be built in this sector.

4.4.3 Ensure the vegetation cover remains rural and urban landscape;

Sector E – The University Land beyond the Haasto – Atomic Road

The Sector E which is part of the University's acquisition but is situated beyond the Haasto – Atomic Road is about 5.18 ha. This land has been encroached upon by the private sector and should be reclaimed by the University and leased out to a developer.

Sector E Policies

4.5.1 The piece of land should be leased to a private developer and developed into a mixed use.

4.5.2 Business and Commercial Buildings to be constructed in this sector should conform to the University's Design Standards.

Sector F – The University Botanical Gardens.

Sector F is the University Botanical Gardens. The sector shares a boundary with the Sewerage Farm and the Core Academic Sector. As a Botanical Gardens the Sector's vegetation cover is predominantly vegetation. The Botanical Gardens was established as field laboratory for the Department of Botany and has an aquatic pond for fisheries and research activities. It covers an area of about 33.67 ha.

About ten years ago, to improve the management of the gardens part of it was commercialized through the engagement of a private partner. Currently the Gardens is going through a redevelopment program to provide services like boat riding on a pond, areas for picnics, photo shoot, restaurants among others to the public. But some of the commercial activities appear to come in conflict with the academic objectives for setting up of the Botanical Gardens. The

University is trying to review the activities of the private partner to ensure that the core academic objectives for the setting up of the Gardens are not lost.

This Botanical Garden still provide Space for research activities of the Botany Department. Ninety percent of the land area will be preserved as open space

Sector F Policies

- 4.6.1 The Sector F will continue to perform its function as a Botanical Garden for the University and the Department of Botany.
- 4.6.2 The existing agreement between partners should be reviewed to ensure that the primary objectives for the University setting up of the Garden are met.
- 4.6.3 Physical development of the gardens should be consistent with the gardens research development objectives.

Sector G – The Small Animal Hospital Area.

Sector G is a sparsely developed sector. Importantly infrastructure in this sector include ISSER Conference Center, Faculty of Engineering, the Small Animal Hospital and the Goil Fuel Filling Station. A plot has been reserved for the Veterinary School which intends to construct an Incubator Project near the Animal Hospital. A large portion of the sector is currently made up rural landscape. The Sector shares boundaries with the Botanical Gardens, the Private Hostels and the core Academic Sector.

The Edges of Sector G along the Haasto – Atomic Road has become dumping grounds for refuse so it is recommended for the land to be leased to private developers. This space has a lot of visibility and could be developed into the Legon Mall. The total available land in the Sector is 7.0ha. Forty percent of the land area will be reserved for open space.

Sector G Policies

- 4.7.1 Ensure that portion of the Sector close to the Core Academic Zone is developed into academic and research related infrastructure;
- 4.7.2 Part of the Sector with close proximity and visibility to the Haasto – Atomic should be developed as mixed commercial, business, social and recreational use;
- 4.7.2 Business and commercial Buildings to be constructed in this sector

should conform to the University's Design Standards.

Sector H – The Private Halls.

Sector H is a developing zone for private hostels for students on the campus and covers an area of 27.80 ha. The Sector currently accommodates four private hostels and provides about 5,500 beds to the Legon Campus. The construction of a recreation plaza for the sector has stalled but there is enough space to accommodate about six new hostel of sizes similar to those existing. There is also a need for a social center to serve the private hostels which are far removed from the main campus. The social center should include a playing field, coffee shops and food courts.

There is also a strong presence of commercial activities on the edges around the Atomic Junction. Located along the Atomic road near the Junction are a fuel station and two cooking gas refill depots who are operating from plots leased to them by the University. As a result of these and other activities in that enclave an informal transit transport terminal for commercial vehicles operates in this zone.

The Land between the non-functioning Goil Gas Refill Station and the James Topp Yanka Hall has become a dumping ground for waste. That piece of land has a lot of visibility and will be very attractive for commercial and business projects.

That piece of land of about 2.3 ha has therefore been zoned for mixed use and could be leased to the private sector for commercial and business activities development. Forty percent of the land area will be reserved for open space.

Sector H Policies

- 4.8.1 The larger portion of the sector should be developed into residential accommodation for students.
- 4.8.2 Social and recreational amenities including sports infrastructure should be provided to encourage social interaction among those living in that sector;
- 4.8.3 Develop the land on the edges of the University into Commercial and Business activities to stop the current waste that the piece of land has been subjected to.
- 4.8.4 The development on the edges should will take their access from the existing Haasto – Atomic Road and designs standards should conform to

those of the University;

Sector I – Core Academic Zone

Sector I is UG's campus core academic zone. The sector is characterized by academic and research buildings, quads, open space, pedestrian sidewalks, and paths. This sector also houses two of the Old Halls, namely the Commonwealth and the Volta Halls. The sector covers an area 55.93 ha.

Future development in Sector shall be compatible with the existing uses and character, and may include academic or academic-related uses, research facilities, open space areas, campus support services, recreation facilities, and other university services and facilities. Development in this sector could occur through the "in filling" in areas such as parking lots and/or redevelopment of existing buildings or spaces.

To maximize ease of use by the majority of the campus community, Sector I needs to be intensively developed. Redevelopment through building expansion, remodeling, or demolition and reconstruction will allow a more resource-efficient land use pattern to emerge.

Sector I's historic buildings pose a design challenge for the integration of new buildings. New buildings must try to capture the spirit and energy of modern construction, yet respect traditional existing building forms and contribute to a usable, harmonious, and aesthetically pleasing campus. Sector I's parking demands are an additional challenge. Despite these challenges, UG is committed to retaining the charm and attractiveness of Sector H and the campus as a whole. A multi-storey car park is proposed for sector to reduce illegal lawn and street parking.

New development should be designed with pedestrians in mind by providing good connectivity and open space enhancements such as courtyards, atriums, and porches. To the extent that new development projects remove existing parking stalls or lots, the project sponsors will be required to provide a commensurate amount of parking. This most likely should include multi-storey parking, parking within structures, or parking in areas outside of Sector I.

Other redevelopment efforts in Sector I should include the eventual removal of buildings deemed as temporal and space used for construction of modern institutional buildings.

Sector I Policies

- 4.9.1 Ensure that buildings in the campus core are designed so that each building has an individual identity, is oriented toward the street and, where possible, situated along quads. Areas within the campus core will provide a pedestrian zone free of major automobile traffic.
- 4.9.2. Concentrate on providing instructional and related facilities in Sector I. This includes classrooms, teaching laboratories, faculty and administrative offices, libraries, and recreational and performance facilities with instructional functions.
- 4.9.3. Locate related instructional facilities such that they can be reached within a 10-minute walk (approximately 670 m/2,200 feet).
- 4.9.4. Increase the density of the campus core when the supply of available building sites in the core is exhausted. Ultimately, this can be accomplished by replacing parking areas with new buildings and pedestrian quads.
- 4.9.5. Ensure that a minimum of 40 percent of land in Sector I remains as open space.
- 4.9.6 Develop the Recreational Quadrangle located in the Academic Core as a center for Students and Staff socialization in the academic zone

Sector J – Core Student Housing Area

Sector J accommodates three of the Old Halls in the University. These Halls, are the Legon, Akuaffo and Mensah Sarbah Halls. Apart from student housing, the zone is characterized by a Student Union Building, a Language Center, the Old Playing fields, open space, pedestrian sidewalks, and paths. This sector also houses the old Central Cafeteria Building. The sector covers an area of 19.83 ha.

There are no plans for future development in Sector J except enhancement of the athletic facilities and other improvements such as sports field night lighting, updated signage, paved parking, and fencing, along with construction of other university facilities and services. This sector is very attractive to all UG students because it is located in the heart of the campus and is easily accessible to all the major infrastructure on the campus.

Sector J Policies

- 4.10.1 Evaluate the feasibility of developing an Intercollegiate Athletic sports complex and recreational facility for educational and intramural sports. Such a facility would unify and consolidate athletic opportunities on campus.

- 4.10.2. Continue to upgrade and improve athletic and other facilities with night lighting, seating area, signage, fencing, paved parking, etc.
- 4.10.3. Monitor safety of pedestrian travel from the Balme Library and other campus venues. If safety issues arise, work with the appropriate agencies to promote safety.
- 4.10.4. Ensure that a minimum of 50 percent of land in Sector J remains as open space.

Sector K – Staff Housing Area

Sector J covers a residential area for ten (10) staff bungalows. The Sector covers an area of about 5.2 ha. The sector could accommodate additional staff houses through infilling to improve the building densities in this enclave. The infilling will pose a design challenge for the integration of new buildings in this small enclave. The infilling will also disturb the size of current open space in the sector which is about fifty percent of the land.

Sector K Policies

- 4.11.1 Explore the possibility of adopting infilling to improve building densities in this sector;
- 4.11.2 Ensure future development in Sector J is compatible with the existing uses and character,
- 4.11.3. Ensure that a minimum of 50 percent of land in Sector IA remains as open space.

Sector L – Sports Zone

Sector L is part of the sports precinct of the campus and is visually dominated by six playing fields including those for football and Rugby. Other infrastructure in this sector include the Institute of African Studies and School of Performing Arts, the Directorate of Physical Development and Municipal Services and are six (6) Staff Bungalows.

Future development in Sector L shall be compatible with and complimentary to the existing sports facilities. Development will include the proposed Indoor Basket Ball Court.

The sports venues in this sector create a window through which the outside world can view UG and therefore the overall quality and attractiveness of the campus and the view of the surrounding area has the potential to leave visitors with a

positive impression of UG. Further development in the area could include the addition of an information/visitor's Center on Okponglo Entry to the campus. The Construction of a Commercial Vehicle Transit Terminal is also proposed for this Sector.

Sector L Policies

- 4.12.1 Continue to promote UG intercollegiate sports and provide facilities that allows UG to be competitive on national and international level.
- 4.12.2 Support sports expansion projects and other enhancement projects of sports facilities.
- 4.12.3 Construct the Security Gate and Visitors Reception as part of the improvement of the Okponglo Entry Way;
- 4.12.4 Ensure that a minimum of 70 percent of land in Sector L remains as open space;

Sector M – Legon Sports Stadium

Sector M is part of the sports precinct of the campus and is visually dominated by the uncompleted Legon Sports Stadium. Other sports infrastructure in this sector include the swimming pool, tennis court complex a gymnasium and a restaurant.

Other non-sports infrastructure in this sector include the South Legon Staff Housing, a Guest House and a Fuel Filling Station. A small portion of the area falls under a high tension electricity line which renders that portion sterile.

Future development in Sector M shall be compatible with and complimentary to the existing sports facilities and housing infrastructure. Other future development close to the boundary of the Campus will include the Staff Housing. Such development will protect lands at the periphery from encroachment.

Sector M Policies

- 4.13.1. Continue to promote UG intercollegiate sports and provide facilities that allow UG to be competitive on a national level.

4.13.2 Support sports expansion projects and other enhancement projects of sports facilities.

4.13.3 Ensure that a minimum of 60 percent of land in Sector K remains as open space;

Sector N – The Medical Center

Sector N covers the Medical Center and covers an area of about 43.54 ha. The Medical Center includes the new 650 Bed Legon Hospital, the Noguchi Memorial Institute of Medical Research, the School of Allied and Health Science, School of Public Health among others. The new Collegiate Building for College of Health Science is also located in this Sector. Part of the sector falls under the high tension electricity distribution line and therefore cannot be developed.

Future development in Sector N shall be compatible with and complimentary to the existing Medical Science and related facilities.

Sector N Policies

4.14.1. Continue to promote infrastructure for Medical Research and Treatment

4.14.2 Support research expansion projects and other enhancement projects for medical facilities.

4.14.3 Ensure that a minimum of 50 percent of land in Sector N remains as open space;

Sector O – Ghana Water Company Underground Reservoir

Sector O is part of the Legon land that has been allocated to the Ghana Water Company limited for development of its water infrastructure facilities. A large section of this sector has been developed as underground storage tank. Currently it has been noted that GWCL has started the construction of a block of flats which goes against terms in their lease. The remaining portion of the sector has been allocated to the private sector for the construction of a Hotel to keep away squatters who have been operating in that portion of the sector. The sector covers an area of 9.93 ha.

Sector O Policies

4.15.1 Ensure Ghana Water Company develops its allocated portion of the land into water related infrastructure;

4.15.2 Ensure that a decent hotel is built on the land allocated for that purpose;

4.15.3 Ensure that fifty percent of the sector is left as an open space

Sector P – Four (4) New Halls

Sector P is dominated by the four New Halls, Hilla Liman Alexander Adum Kwapong, Elizabeth Frances Sey and Jen Nelson Aka Halls. Two additional halls are in the progress of being constructed in this Sector. The Sector covers an area of 9.93 ha. Currently the sector has about 6,253 beds for students and this is going to increase with time as this Sector will continue to be developed as a Sector for Students Housing.

Sector P Policies

4.16.1 Develop facilities to promote student housing, recreational and cultural activities in this sector;

4.16.2 Provide new campus housing facilities in this sector;

4.16.3 Ensure that a minimum of 50 percent of land in Sector P remains as open space;

Sector Q – University Primary, Jubilee Hall, International Student Hostel, the Night Market and the Banking Center

Sector Q covers an area that is emerging as the core commercial center on the campus. The site caters for about four important land uses. These are Students Housing, Cultural (Mosque), Social (University Primary), Business and Commercial (Banks, Shopping and Night Market). In fact located in the Sector is an emerging commercial, business and social enclave whose development must be encouraged so that it is developed properly.

The sector is one of the two areas within the institution that attracted the highest pedestrian flow during the pedestrian studies. Adequate provisions will therefore have to be provided to ensure safe and efficient movement of pedestrian flow. The master plan therefore proposes the redevelopment of part of the Jubilee Link road into a cul-de-sac and redeveloping of facilities to turn the night market area into a social center that will include a redeveloped food courts, coffee shops, redeveloped supermarkets, a cinema hall and recreational gardens among others.

Sector Q Policies

4.17.2 Develop facilities to promote recreational, social, commercial and cultural activities in this sector;

4.17.2 Pedestrianize part of the Jubilee Road Link to provide safety in the redeveloped social/commercial center;

4.17.3 Ensure that a minimum of 50 percent of land in Sector O remains as open space;

Sector R – Staff Residences,

Sector R currently supports residential accommodation for Senior Management Staff of the University and the sector covers Little Legon. Sector R covers a large area with a total area of 141.09 ha. Building densities in this sector are very low as each house occupies 0.30 ha (0.75 acre gross). The whole sector is well landscaped with trees.

Future development in Sector R will continue to provide accommodation for senior management of the University. Fifty percent of the land area will be reserved for open space.

Sector R Policies

4.18.1 Develop facilities to promote staff housing in this sector and staff housing should include flats;

4.18.2 Ensure that a minimum of 50 percent of land in Sector O remains as open space;

Sector S – Site for Legon City Project

Sector S is relatively an undeveloped land located in the Staff Village. The site is covered with farms, and rural landscape, a Basic School for the Accra Metropolitan Area, few private development which are located along the edges of the Sector. The private developments in this sector are Commercial (Fuel Station and a Pharmacy) and Institutional among others.

The sector covers an area of 59.31 ha. Out of this about 20 ha. has been reserved for the development of the Legon City Project.

The Legon City Project is a mixed use site and services project which when completed the serviced lands will be leased out to interested private developers. The Legon Mall could be sited in this sector to provide the Mall with visibility.

Sector P Policies

4.19.1 Ensure that the land allocated for the Legon City Project is used as designated;

4.19.2 Ensure that about thirty percent of the land area is left as open space;

Sector T – The Staff Village Housing Area, The Legon Police Station, Legon Hospital and University of Ghana Graduate Business School

Sector T is dominated by Staff Housing and social infrastructure including the Legon Police Station, Legon Hospital. Other infrastructure in this sector are the EPP Shopping Mall, the UG Business School, and the ECG Substation among others. On the edges of the sector are the Ghana School of Languages, a Hostel for University of Professional Studies Accra Hostel, and an Office Building for the Association of Vice-Chancellors and land reserved for the construction of infrastructure for the Ghana Law School. Also located in the sector are three places of worships, a community center and a market which is not functional at the moment. The market will be redeveloped to reduce the invasion of kiosks in the Staff Village.

The available lands in Sector Q will in future be developed into staff houses and related infrastructure. The Sector covers an area of 29.65 ha.

Sector Q Policies

4.20.1 Ensure that Sector Q is developed into Staff Houses;

4.20.2 Ensure that the old market in the Sector is redeveloped to help regulate the invasion of Kiosks in the Sector;

4.20.3 Ensure that about forty percent of the land area is left as open space;

4.20.4 Adopt strategy of building flats to increase residential

accommodation for staff.

Sector R – The Legon Police Station, Legon Hospital and University of Ghana Business School

Though Sector R has a large expanse of undeveloped lands notable development in the sector are the Legon Police Station, Legon Hospital, the EPP Shopping Mall, the UG Business School, and the ECG Substation among others. On the edges of the sector are the Ghana School of Languages, a Hostel for University of Professional

Studies Accra Hostel, an Office Building for the Association of Vice-Chancellors and a land reserved for the construction of infrastructure for the Ghana Law School.

Future development in this sector will include expansion of Staff Housing infrastructure, and commercial infrastructure along the edges of the Sector. The covers a total land area of 97.31 ha.

Sector R Policies

- 4.17.1 Ensure that part of space in Sector R is reserved for the expansion of the Legon Hospital;
- 4.17.2 Ensure that the undeveloped edges of Sector Q are leased out to private developers to stop the dumping of rubbish and encroachment by private developers;
- 4.17.3 Ensure that about forty percent of the land area is left as open space;

5.0 Design Guidelines Overview

This Campus Master Plan (CMP) includes architectural design guidelines to ensure a consistent campus look and to help provide direction for future building and expansions.

The design guidelines described in the Campus Master Plan (CMP) and within the UG campus include provisions to create a cohesive development across campus and to create compatible development along the campus edge where it abuts adjacent neighborhoods. UG acknowledges that its development has the

potential to adversely impact adjacent neighborhoods. It is therefore crucial for the character, vitality, and function of those neighborhoods to be reviewed during any subsequent update to the CMP to ensure adequate provisions in the form of CMP policies, design criteria, or UG campus code language are maintained or developed.

Over time, construction should visually and physically reinforce campus organization and unity. The predominant style of campus architecture is generally defined as the Mediterranean Type of Architecture. These design guidelines are an attempt to ensure that new buildings reflect the vitality of modern construction, yet maintain unity with existing older architecture. Note that this is not to imply that the appearance of older buildings should be recreated in new construction. Rather, the new buildings should reflect the spirit of a modern institution within the architectural pallet of the existing elements on campus. This presents an interesting architectural challenge.

The Campus Master Plan requires that associated site development, such as landscaping, utility extensions, required parking, etc., is provided at the time of construction and adheres to the design guidelines in this chapter.

5.1 The Design Process

a. **The Coordination Process**

New construction, remodeling, or renovation projects must be coordinated with PDMSD. This coordination will allow PDMSD (e.g., planning, engineering, operations, and construction management) to evaluate the project proposal and provide input with regard to CMP plan policies, maintenance requirements, or other such details that can assist the project sponsors in developing building and site plans that effectively incorporate and address applicable plan policies and zoning requirements.

b. **The Review Process**

The University Development Committee (UDC) will review all proposals for new construction, significant remodeling, and renovation projects that visually alter the exterior appearance of the campus. To this end, the UDC shall have, at a minimum, the representation from University Council, Academic and Research faculty, Academic affairs, among others.

The project's sponsor shall provide information including a statement of the project's intent, project scope, design, size, height, location, and materials. As

appropriate, graphic materials of additional project details shall be provided. Projects that involve a new building or significant additions shall also include a conceptual plan of the surrounding area (typically the sector). The conceptual plan shall demonstrate how the proposed building or addition is compatible with the anticipated growth for the surrounding area or sector. In addition to the conceptual plan and other required plans, the proposal shall include a discussion on the proposed use of the area and outline any foreseeable expansion.

The UDC will review the proposal for site layout, building design, construction materials, and compatibility with surrounding buildings and uses. The UDC will also consider how the proposed construction is consistent with the Campus Master Plan, zoning regulations, and related issues. It will then present and review the materials at a meeting; those directly involved with the project are encouraged to attend.

Design Guidelines

a. Code Compliance

All development shall be in compliance with the UG Zoning Campus and Land Development Code, The development proposal shall also comply with all other applicable adopted codes, including the Uniform Building Code, Fire Code, and Mechanical and Electrical Specialty Code.

b. Site Design

The campus is a collection improvements such as buildings, streets, sidewalks, open space, parking areas, etc. that have been constructed for diverse purposes over a period of time. New development must fit within the existing environment.

The most densely developed area of the campus is the core, identified as Sector H. The campus core is pedestrian-oriented with closely grouped buildings that create a harmonious streetscape. Landscape and site furnishings serve as unifying elements. Vehicular transportation routes are provided along with pedestrian routes and connections to the remainder of campus.

Future development shall continue the pedestrian-oriented tradition and the location of buildings in a harmonious streetscape. To the maximum extent possible, major instructional facilities shall be located such that they can be reached within a 10-minute walk. Site design shall incorporate internal circulation routes and connectivity.

1.0 Site Development

Each project shall provide site improvements. These include street improvements along the site's frontage, lighting, curbs, gutters, curb cuts, sidewalks, landscaping, signage and utilities. The project shall also provide off-site improvements as required by the CMP, or other approving authority. Off-site improvements shall be developed to reflect known or anticipated future street widths, bicycle lanes, sidewalks, or other planning efforts that have identified future requirements. Handicap access shall be provided so multiple points of ingress and egress are available, in conformance with the Ghana's Disabilities Standards.

2.0 Site Access and Parking Entrances

Each building shall have a primary entrance oriented toward the street or public access way. This primary entrance must be accessed by a direct pedestrian connection (sidewalk, porch, courtyard, etc.) from the street or access way. If parking facilities are constructed with a new building, the parking shall be located such that it does not create a barrier between the street and the primary entryway. This will generally orient parking facilities to the side or behind the building. Where existing development patterns limit or otherwise make this orientation unattainable, efforts should be made to provide, to the maximum extent practicable, direct pedestrian access to the street or access way.

3.0 Campus Roads

Campus development may require an upgrade to adjacent streets and/or intersections. Such improvements shall be consistent with the CMP and may include construction of paved travel lanes, on-street bicycle lanes, sidewalks, planting strips, curbs, gutters, and drainage improvements. If an intersection needs to be upgraded to increase capacity or mitigate unacceptable levels of service, the functional requirements of the street and the potential upgrade shall be incorporated into the project. When pedestrian crosswalks are needed, they shall be clearly defined through paint marking, raised crosswalk, or other changes in pavement style or detail. Generally, crosswalks shall be at intersections. When mid-block crossings are used, traffic-calming techniques should be employed to alert drivers of the crosswalk. Traffic-calming techniques include speed tables, speed bumps, warning lights, and signage.

Future Road Developments

The future expansion of various infrastructural developments within the institution may result in a re – definition of the land uses within the project corridor. The different land uses within the project corridor may place differing traffic demands on the existing transport infrastructure within the institution. This implies that the transportation section of the general master plan will have to take into consideration the land use patterns, social and academic activities of the project corridor. The careful planning of the difference types of roads and their environments will create an efficient and safe movement of road users within the project corridor.

The major principles that may be associated with the planning of the transportation network within the institution may include the following:

Land Use Planning and Zoning

There are significant effects of motorization on land – use and traffic flow and safety. The control of both land – use and traffic is very essential for a successful planning because the land use determines the traffic patterns and composition. Based on the land use planning and zoning by the Consultant, the transportation network have been appropriately planned to ensure safe and efficient movement of traffic. The major factors that were considered include:

- Development of zoning plan to separate out incompatible and conflicting land uses and the traffic they generate
- Strong planning regulations to influence the location of new development and control access managements and parking
- The planning of land use should be aimed at minimizing travel and maximizing accessibility by public transport and walking
- Activities which generate substantial traffic should be located adjacent to roads most suited to the types of traffic expected.

Road Hierarchy/ Network Design

During the field reconnaissance survey and traffic studies, it was identified that there was no defined road hierarchy for most of the existing transport infrastructure. This results in conflicts between pedestrian traffic and vehicular traffic, temporary congestion along links and intersections, etc. The road hierarchy/network design therefore seeks to ensure that roads are assigned to the appropriate level of hierarchy based on their proposed or desired function and not just their existing function. Some key factors have been considered in the planning of the road network within the project corridor. These include, but not limited to,

- Networks have been planned such that zones/ areas are separated into self – contained zones, cells or environmental areas. The type of road bounding these zones are based on the size and scale of the zones. All non – essential traffic shall, as much as possible, be excluded from a particular zones based on the self – imposing traffic management schemes implemented to enable the road within a particular zone to function appropriately.
- Every class of road clearly convey to the road user its role in the hierarchy based on its traffic volume and attainable speeds. The design standards for the roads is used to adequately ensure that every road function according to its hierarchy.
- Each road, within the road network, intersects with only roads in the same class or one immediately above or below it in the hierarchy. This is to assist the road users of the clear impression of graduation of changes in conditions between the low speed access roads and the higher speed through routes.

The various road in the hierarchy/network design are as follows:

1. **Major Arterial Roads** – These roads are fast moving long distance traffic roads and the most important and best known roads within the project corridor. The characteristics of this road shall include:
 - No frontage access
 - Development set back from this road
 - All accesses to developments provided through the minor arterials and collector roads
 - Minimized Number of Intersections
 - Suitable at – grade channelized intersections for minor flows
 - On street parking are greatly discouraged and/or disallowed
 - Laybys are located at regular intervals.
 - Limited pedestrian movement across it.
 - The right of way for the road is about 45m. This reservation should be able to allow for expansion of the road infrastructure into a dual carriageway

2. **Minor Arterial Roads** – These roads are identified as main traffic routes and operates in similar characteristics as the major arterial road but in a reduced importance of traffic route. The characteristics of this road shall include:
 - No frontage access
 - Development set back from this road
 - All accesses to developments provided through the collector roads
 - In exceptional cases, large individual developments are given direct access with a high standard of intersection provided
 - Minimized Number of Intersections
 - All intersections will normally be provided at – grade
 - Turning traffic are separated from the through traffic
 - Pedestrian crossing points are clearly defined and controlled
 - On street parking are greatly discouraged and/or disallowed

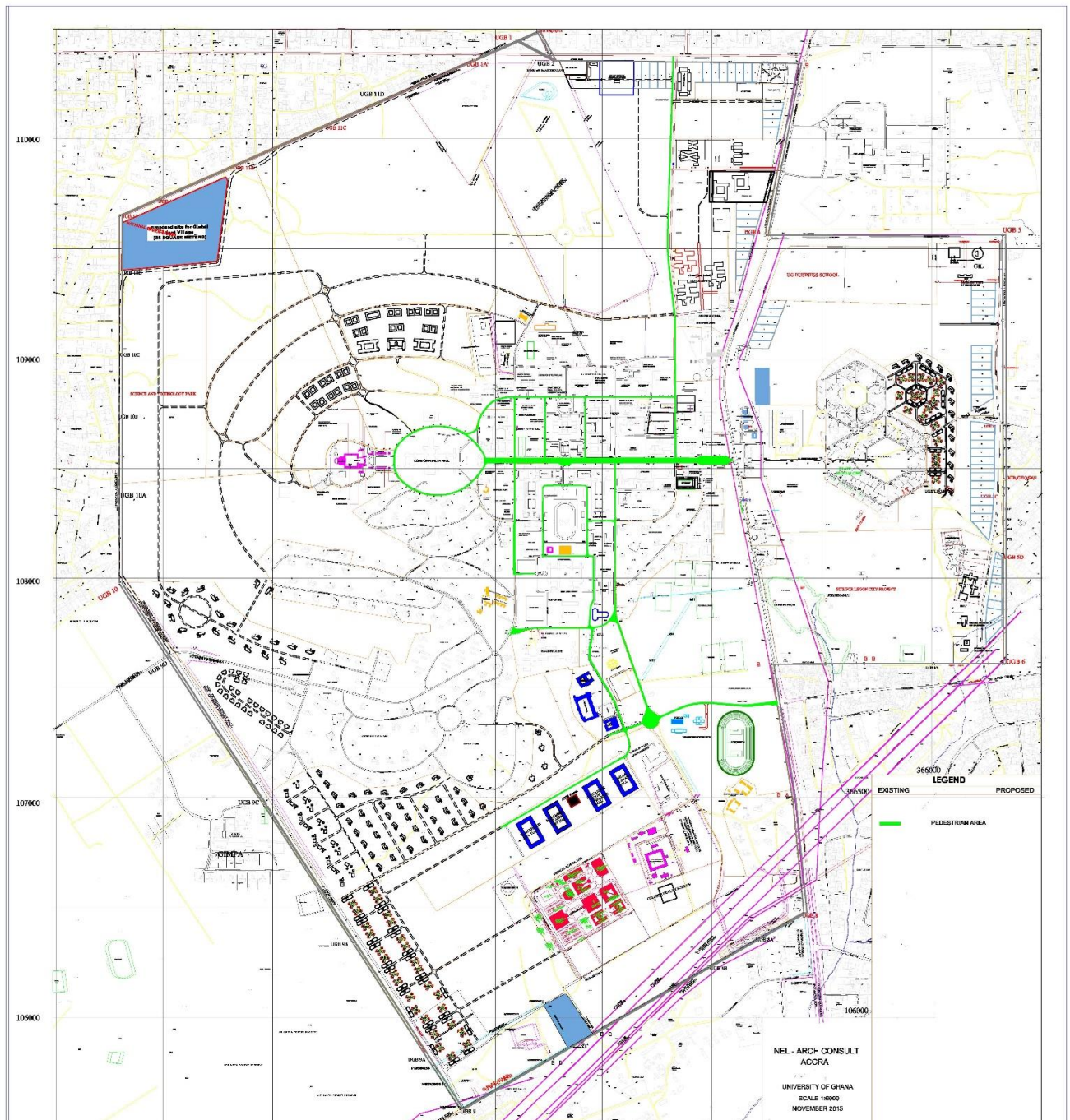
- Separated well designed laybys, permitted in exceptional circumstances, are provided.
 - Limited pedestrian movement across it.
 - The right of way for the major arterial road is about 30m. This reservation should be able to allow for expansion of the road infrastructure into a dual carriageway
3. **Collector Roads** – These roads are mainly used for access and vehicle speeds are kept low. These roads are within the residential and/or pedestrianized areas and therefore vehicular traffic needs to be aware of this. Traffic calming measures are therefore implemented to alert vehicular traffic of pedestrian movements. The characteristics of this road shall include:
- The road is mainly for local traffic and vehicle speeds should be kept to the low. Traffic calming measures will therefore have to be implemented on such roads that are straight.
 - Parking is allowed along this road but adequate provision needs to be implemented in order not to impede traffic flow.
 - Non – motorized traffic are predominant along this road and therefore adequate provision will therefore have to be provided along this road.
 - Bus stops can be located on this road and should be near well-defined crossings points
 - Through – movements should be made awkward and inconvenient to discourage them from using them.
 - The right of way for the major arterial road is about 25m.
4. **Access Road** – These roads are predominantly for access and primarily for residential uses only because these are the streets where the students/lecturers live. Access roads are therefore provided for essential access and designed to cater for minimum traffic. Also, the needs of non –

motorized traffic needs to be considered and incorporated into the design.

The characteristics of this road shall include:

- Vehicle flows to be kept to a minimum
 - All unnecessary traffic are eliminated
 - Vehicle speeds are kept low by careful and deliberate inclusion of obstructions to reduce speeds.
 - Cul – de – sac and loop roads are to be incorporated in the design to deter through traffic
 - The width of the carriageway should be reduced as much as possible to emphasis the pedestrian priority
 - Entrances and exits to developments should be clearly identified by all road users
 - The use of non – mountable kerbs should be incorporated in the design to define the restricted road width.
 - The right of way for the major arterial road is about 15m.
5. **Pedestrian Street** – These are streets/routes where motorized traffic are excluded and non – motorized traffic have the sole priority. This implies that a purpose – built walkways and cycle ways are developed along this route and segregated from the vehicular traffic. Adequate pedestrian crossing facility should be provided for the intersection between pedestrian streets and vehicular routes to ensure safe and efficient movement of pedestrians. Pelican crossings shall be implemented at these locations. Figure 5 shows the predominant pedestrian routes within the project corridor.

Figure 6.1 Predominant Pedestrian Routes within the Project Corridor



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The road hierarchy for the project corridor have been presented in Figure 6.

Figure 6.2 Road Hierarchy for the Project Corridor

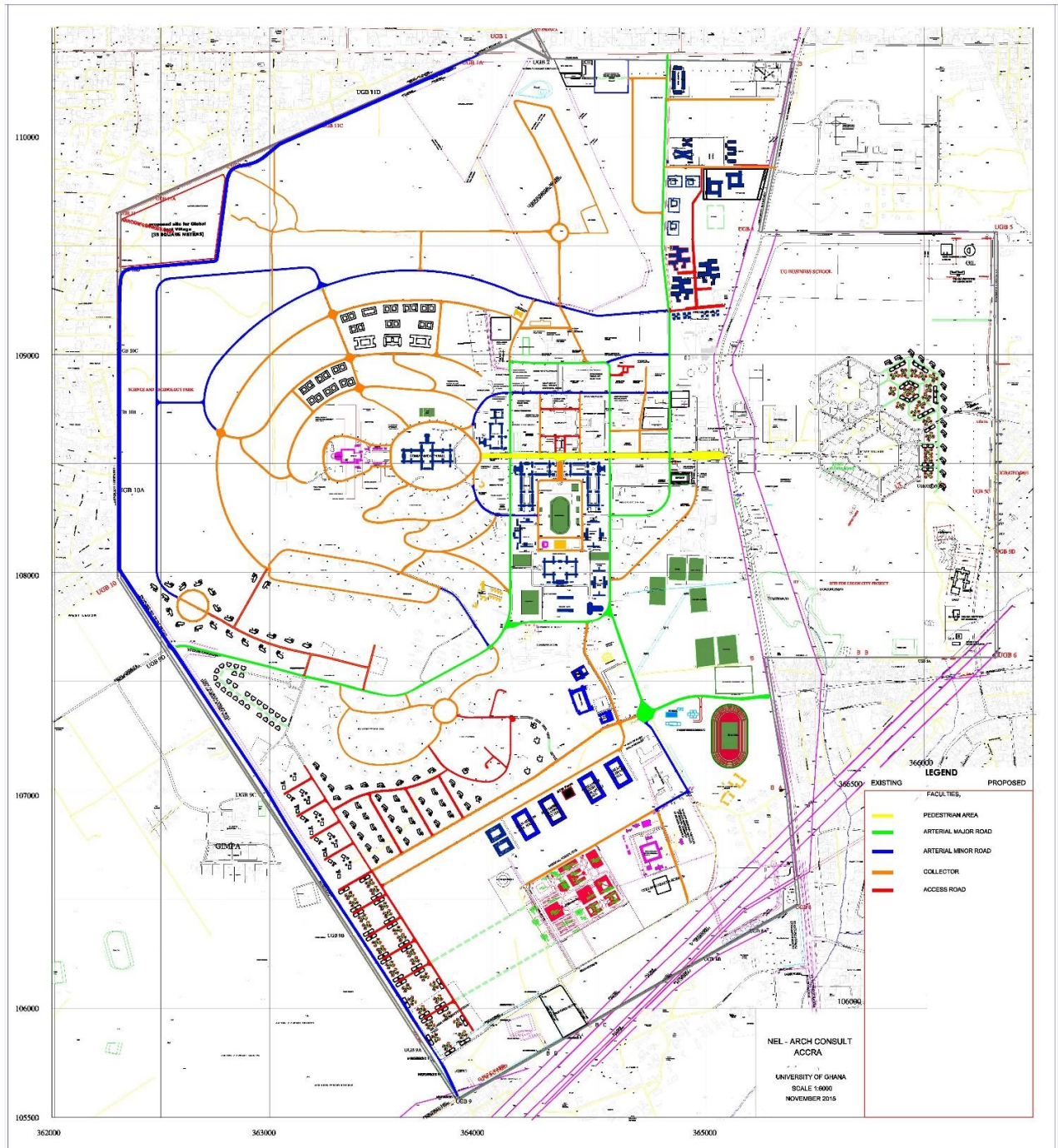


Figure 6.2

Route Planning

New roads and rehabilitated schemes should be made to remove through traffic onto bypasses or segregated routes other than local traffic routes. This thereby reduces delays and congestions to the road users and creates a safe environment for traffic flow.

Route planning will have to be considered greatly in order to separate traffic that intends to use the campus as a detour. Such traffic, which intends to use the campus as a detour, should be as much as possible separated from the local traffic within the institution. This will ensure safe and efficient movement of traffic along the transport infrastructure within the project corridor.

Access Management

It is important that the institution have complete control over the accesses of the upcoming infrastructural development and these accesses are limited primarily to movement to the developments. The access to development should be restricted as much as possible to access roads. The major characteristics/policies of the access management shall include:

- Careful planning of new developments to ensure that varying needs for access do not conflict unnecessarily and are catered for by suitable designs.
- Traffic from an access road should connect to a collector road and then a minor arterial road before joining a major arterial road within the project corridor.
- All developers wishing to have an access should be required to provide a written approval and/or no objection from the physical development directorate.
- Access roads to parking areas of major developments should be at least 50m from any street intersection.

Public Transport System

Well – designed and operated public transport can contribute to the operating efficiency and safety of the campus road transport network. A well – organized and scheduled shuttle services will have to be implemented as this is a major transport option for most students, aside walking. The route for this service should be planned in order to serve all the major needs and demands. Laybys, boarding points, waiting areas, enquiry/information areas should be provided to appropriately serve the institution. This transport mode is the most sustainable and efficient transport system aside walking and cycling. Subsidies can be given to students that fully patronize the use of the shuttle services. The major characteristics and considerations for the provision of public transport services are as follows:

- Interchange areas should be close to the users. Bus stops and transit stops, if required, should be near to the residences or academic areas to minimize the walking distance of pedestrians.
- There should be direct pedestrian links to motorized traffic along the routes of the public transport services.
- The public transport routes will generally follow the main traffic routes and boarding points shall be located adjacent to and beyond intersections and linked with the other transport infrastructure
- As much as possible, the shuttle services should be run by the institution or recognized transport providers to ensure that the services and schedules are equal to international standard of operations.

Traffic Management Scheme

This is the scheme where the existing transport infrastructure is adjusted to function appropriately in the shortest time to improve the traffic operations within the campus without resorting to major new construction. This scheme seeks to improve the traffic flow, improve the environment and provide better access for people and goods.

Some congestions and road safety challenges around the campus can be attributed to inefficient use of road space, poor enforcement, uncontrolled conflicts and poor design of traffic and pedestrian facilities. It is therefore important that traffic management schemes implemented within the campus are designed to be self – enforcing and maintenance free as possible. Among the areas that need considerations in the short term as the general master plan is implemented are as follows:

- Road signs – These are required to communicate with the road users and guide him safely through the road network. Feasible, reflective signs should be implemented to ensure that the carriageway is clearly delineated, especially at night.
- Road Line Markings – These play very important role in guiding and providing the road users with the necessary information to negotiate a conflict point within the transport infrastructure. The road line markings should be implemented along the existing transport infrastructure as it plays very significant role in ensuring safe and efficient operation of the road network.
- Speed Limits (with traffic calming measures) – Speed is a common contributing factor to accidents and the reduction of speeds, especially at the residential and academic areas of the institution, should be enforced. Unfortunately, speed limits are commonly abused and can only be effective if they are implemented to a high level of enforcement, such as speed tables, rumble strips, constrictions, etc.
- Defined parking areas – Parked, parking and un – parking vehicles cause obstruction, interference and potential danger to road users. Provision of off – street parking with clearly defined entry and exit points/tapers will ensure safer conditions by increasing conspicuity of pedestrians and removing parking and moving vehicle conflicts.

- Walkways – They have great implications for the safety of the most vulnerable road users, pedestrians. Therefore, all efforts should be made to ensure that they are segregated from motorized traffic. In areas where there are high pedestrian activities, it is important to give more road spaces to pedestrian than vehicles.

Parking

Parking proposals for the campus shall include multi-storey car parking facilities for areas like the Core Academic Zone, the Medical Center and the commercial Zone, surface communal parking facilities for playing fields, halls, etc, transport terminals for commercial vehicles and parking for individual buildings'

Parking lot entrances shall be designed to provide adequate sight distances. Stacking area and other design considerations should be incorporated to ensure that the entrance functions properly. Other improvements required for access to and through the site may be required to ensure safe and adequate site access.

Parking shall be managed on a campus-wide basis to ensure that overall utilization remains at 95 percent or less. Projects shall be responsible for providing the required amount of parking as calculated by the AMA Land Development Code. The required parking spaces may be constructed (pavement, landscaping, curb, gutter, drainage, etc.) on campus.

Individual projects that displace parking through development shall replace any displaced parking. In Sector H, this shall be provided as near as possible to the location of the displaced parking. Displaced parking shall be replaced at a one-to-one ratio, to the maximum extent practicable. This may entail providing parking within a portion of the building.

Parking improvements may be in the form of parking structures or in lots. Parking lots should be paved with asphalt or concrete and should be landscaped. New parking lots shall adhere to code standards with pavement, landscaping, and other improvements. Over time, existing gravel lots shall be upgraded. When a building is present, the parking lot shall be located on the side of or behind the building. On corner lots, a parking lot on the side of the building could be located at a street intersection. In these instances, the site design shall consider visual impacts to the intersection, to street circulation (e.g., parking lot entrance distance from intersections, parking stacking requirements), and to pedestrian circulation.

For redeveloped sites, relocation of parking lots away from the front of the building is encouraged. Sidewalks adjacent to parking lots should be designed so that the overhang of the car bumper does not reduce the sidewalk to a width that hinders adequate circulation. Sites, buildings, and parking lots shall be designed to provide universal access in accordance with the Ghanaian Disabilities Act regulations. An adequate number of parking spaces shall meet disability requirements and be incorporated into campus parking lots

c. Open Space

Just as building design and character are important to the UG image, so are the open spaces and the visual relief these areas provide. Open space is defined as land area not covered by buildings or used for vehicle maneuvering or parking. Campus open space includes lawn areas, agricultural fields, recreation fields, sidewalks, quads, plazas, courtyards, and other such amenities that provide the UG community with a space and opportunity to co-mingle. Open space creates a framework for development and offers areas for respite, exercise, and social interaction.

Open space is an important component in future development on campus. To ensure that open space is retained throughout campus, the CMP establishes minimum open space requirements for each development sector. As future development occurs, existing parking lots may be redeveloped and used as building sites. This allows for new development without displacing existing open space areas.

d. Pedestrian Access and Circulation

Development should be pedestrian-oriented rather than vehicle-oriented. Buildings should have multiple points of access with provisions made for pedestrian and bicycle traffic (i.e., sidewalks, on-street bicycle lanes, multi-use paths, etc.). Pedestrian safety should be considered in the design of all buildings, traffic, and parking areas.

Pedestrian connections and sidewalks should be unobstructed to provide convenient linkages to specific destinations and across campus. The parking of service and vendor vehicles should be prohibited on sidewalks or in bike lanes.

e. Landscape

All new construction shall incorporate landscaping as part of the site plan. Landscaping shall be provided consistent with the established campus landscaping standards as included in the Facilities Services Landscape Design Standards and any updates.

Plant materials used on campus shall be a mix of trees, evergreens, shrubs, groundcovers, etc. Efforts shall be made to use native plant species adapted to local conditions. Where possible, plant materials that are drought resistant or require little water should be incorporated into landscape areas

All new landscape areas shall be irrigated. Ease of long-term maintenance should be included in the landscape design. Lawn configurations and tree and shrub locations should allow for the use of riding mowers. Plant materials that are damaged or die shall be replaced.

Landscaping shall be placed around buildings to soften the bulk and mass, establish a human scale to the space, and as appropriate establish a focal point. Plantings shall not be placed so close to the building that, at maturity, they prevent adequate building maintenance. Additionally, plant materials shall be maintained so as not to visually obscure building entrances or interfere with sight lines from a building to the adjacent street. Plantings shall not create hazardous conditions to personal safety.

Landscaping shall be located along the perimeter and the interior of parking lots to provide visual relief and shade. Each parking lot shall meet the minimum landscape area requirement with the plant material being a mix of trees and shrubs, as per the Land Development Code requirements. A minimum 5-foot-wide landscape strip should serve as a buffer or transition between the parking lot and the adjacent site or use. Street trees shall be planted to create and maintain a uniform street concept.

f. Utilities and Site Furnishings

All signage, site furnishings (i.e., lights, benches, bicycle racks, etc.) shall comply with UG standards and be consistent with CMP and other established regulations.

Lighting shall be installed to provide safe conditions for access and circulation. Light illuminating from the fixtures shall be cast downward. When the "historic" type fixtures are used, internal louvers or other appliances to direct the light cone downward shall be used. UG will also explore replacing existing fixtures with more energy efficient fixtures.

Storm drainage shall be within a piped system. As needed, on-site detention to maintain historical peak flows may be incorporated into the project design. A separate storm drainage system shall be provided to convey storm water flows. All other utilities shall be developed consistent with established standards.

The CMP's goal is to ensure that utilities are sized and placed in a manner that will serve the campus today and tomorrow. Any upgrades to utilities required as a result of development should be included in the cost of the project.

Power Supply

All areas of future development including existing structures in the university would have a certain level of dependence on the availability of energy, specifically electrical energy. A key objective of the Master Plan will be to deliver an integrated campus system incorporating sustainable resource design solutions for buildings and other structures.

Renewable energy strategy coupled with energy efficient buildings and innovative building design could result in savings of 15% or more of building energy consumption.

Campus systems to be considered shall as far as is reasonably practicable be:

- i) Principally powered by energy available from within the campus environment.
- ii) Expected to be serviceable beyond the economic payback period of working plant.
- iii) Capable of substantial degree of automation and programmable control.
- iv) Expected to minimize the level of energy related emissions.
- v) Able to re-direct surplus energy from one system (or building) to another.

The long term objective is to minimize the impact of campus development activities on its environment, control building running costs and maximize the amount of onsite renewable energy generated to augment the buildings requirement (emphasis on new buildings) – Designs would incorporate possible systems for heating cooling and lighting and consideration would be given to building orientation and facade design to achieve suitable levels of day lighting whilst minimizing unusable solar gain. Sustainable energy systems shall be integral parts of the building and shall not appear as add-ons.

Campus wide renewable energy systems to be considered shall include

1. Bioma Boiter Plant
2. Wind Turbines
3. Solar Generation / Water Heating
4. Combined Heat Power Plant.

H.T. Network

The H.T. network comprises two loops incorporating 11KV underground cables interconnecting high voltage switch gears (RMU's) and secondary distribution transformers at 11,000/415 volts and located throughout the campus as required by the building loads.

Transformer substations are mostly located in locked enclosure to be assessed by only authorized technical staff.

It is envisage that a second injection substation (Reservoir) would be built to service the new university teaching hospital presently under construction.

Recommendations

It is recommended that the electrical power distribution system be standardalized. This practice has the advantage of reducing the spare parts to be held in stock, ensure that spare parts are likely to be more readily available and imposes less strain on the technical skills of the maintenance staff. It is therefore strongly recommended that three sets of transformers ratings (200KVA, 11/.415KV/500KVA, 11/.415KV and 800KVA, 11/.415K) be adopted for low, medium and high density areas. The ring main units should be extensible have interchangeable parts.

Danger notices shall be displayed conspicuously on every switchgear with the inscription "Danger High Voltage" boldly written in red on a white background.

For easy identification, the route of high voltage underground cables must be marked with cable markers at intervals not exceeding 150m.

Underground cables must be adequately protected when crossing roads.

Low Voltage Distribution

The final connection of electricity to buildings is at 415 volts, 3-phase or 220V, 1-phase and neutral depending on each building load. From the low voltage side of the transformer, feeder cables shall be connected to the distribution feeder pillar fuse boards.

In the present dispensation, the distribution panel is of the bus bar chamber/switch fuse arrangement while distribution cables are laid underground with tapping made along the length of the cable. This system of distribution should be avoided. The type of distribution panel described subject is to misapplication of fuse rating and multiple underground jointing would create many weak points along the line and creates very difficult maintenance challenges which has led to certain cable lines being completely abandoned.

It is recommended at the transformer substation, the distribution boards be replaced with mixed capacity mccb distribution panels feeding weatherproof feeder pillar fuse boards aesthetically placed to serve areas such as staff quarters while larger structures take their load directly from the mccb panel. The loop-in and out system may be applied where more convenient and /or more cost effective.

Since the university receives its power supply at one point, the energy used at the various sections will be metered at the point of supply. Each staff house is expected to have its own energy meter for billing while Academic, Administrative, Hall of residence etc. may have energy meters installed for record purposes and also help in future planning of load growth. Consideration would also be given to determination of the load by installing energy meters at the various transformer stations. It should be noted at this stage that staff houses have prepaid meters installed but it's not clear how this impacts on the bills sent to the university i.e. the university could be paying either wholly or part power consumed and paid for by staff.

Standby Generators

In this advent of load shedding currently taking place nationwide, the university has tried to provide standby generators on an almost building by building basis. This results in the consumption of about 100,000 liters of diesel annually. Apart from the huge cost implication associated with back-up system, the resulting

greenhouse emission and its effects on the environment is unacceptable. The alternative sources of power generation originally proposed would go a long way in cutting both costs and carbon emissions significantly.

Furthermore, where the need for diesel generator is inevitable, those should be larger, more efficient models with facilities for removing most of the greenhouse gases from the exhaust. These should be centrally placed (e.g. near transformers). This would help reduce overall diesel consumption and subsequently greenhouse gas emissions as well.

Introduction of prepaid meter for each room in the halls of residence should be introduced to curtail excessive use of various domestic appliances.

The Noguchi Solar Panel Generating plant needs to be upgraded to enable the university derive optimal benefits from its operation. Efforts would be directed at ensuring minimum wastage at peak generation while exploring the possibility of installing storage equipment.

Energy Management

System modelling and comparison with design parameters is essential for efficient running of the entire system. All energy systems will incorporate energy management equipment capable of displaying and recording system performance data in terms of energy availability and demand to be monitored by a responsible person (e.g. direct representative of the head of the institution). Renewable energy management systems will be integrated with utility services to provide a seamless transition according to availability and demand.

Lighting

Most activities require a good level of natural illumination. This must be provided while at the same time protecting rooms from direct sunlight by the use of louvres, sun breakers, overhangs etc.

Excessive brightness of a light source in the field of vision causes glare, a source of discomfort which must be avoided.

The effectiveness of the light source, measured as a unit of light energy in lumens per Watt, determines to a large extent how energy efficient the whole lighting system will be.

The university under the guidance of the PDMSD replaced most incandescent luminaires with the more energy efficient fluorescent luminaires. With the improvements in the quality and availability of LED luminaires. We recommend all future electrical designs should specify LED luminaires which have a still higher efficacy than the fluorescents. A gradual replacement of the fluorescent with LED's is also recommended.

The following further recommendations are made for interior lighting:

- i Limit the variety of lamps and fittings within a building and on the campus.
- ii Do not use sophisticated fittings where a simple one would do.
- iii Use the smallest number of lighting fittings consistent with the design criteria e.g. do not use many low-wattage lamps where a few powerful sources are more logical.
- iv A scheme that is difficult to install and expensive to maintain should be avoided.

Illumination Levels

All accommodation will require artificial lighting. The level of illumination will depend on the type of task to be performed in that environment.

Security Lighting

Adequate external security lights shall be provided at:

- i. All residential Areas
- ii. All academic buildings
- iii. Administrative buildings
- iv. Student hostels (especially all – female)
- v. Other important and regularly used building

Street Lighting

Street lighting is to be installed along major traffic/pedestrian routes using underground cables street light shall use 50W LED lamps and shall be planted at 30meter intervals and at a height of 9m

I.C.T.

I.C.T. services engineer shall be appointed to oversee the following:

- i. Improve upon existing internet / communication systems.
- ii. Ensure ready internet access (through router, wall sockets etc.) in all areas of academic and administrative activity with a view to expanding learning and research opportunities.
- iii. Make provision for the installation of all necessary electronic gadgets to enhance campus security.

Fire Alarm

Fire alarms are to be installed in individual buildings. The fire signals must be audible to everyone in the building. The apparatus for seconding the alarm shall be automatic and also manual types distributed within the path of escape and other location.

Fire alarm systems shall be of the addressable model with the option of networking where feasible.

Water Supply

Following the improvement of water supply in the northern part of the city, the use of Groundwater to supplement water from the Ghana Water Company Ltd., network has been curtailed. According to the Chief Manager of Accra East Region of GWCL, the average monthly water consumption for the University Community has shot up to 150,00m³ (33.33 million gallons per month or 1 million gallons per day).

Future Demand

According to the planning proposal up to the year 2030, four new Halls of Residences each with a population of 1,500 students (i.e. accommodating a total of 6,000 students) will be put up. Assuming per capita water consumption of 30 gallons per day by the students, additional water demand will be 24.3m³ (5.4 million gallons) per month. Thus, water consumption will increase to about

175,000m³ per month in the year 2030. GWCL has the capacity to meet this demand.

To improve water supply to the four newly built Halls of Residencies as well as the Teaching Hospital, a 250mm diameter pipeline is to be connected to the 375mm diameter pipeline at the Pond Area and laid towards the Teaching Hospital site.

h. **Building Design**

The campus generally reflects the Collegiate Mediterranean Style. Common design elements, materials, and colors can provide a unified appearance and create a harmonious link to the existing physical environment.

1.0 Style

The finest buildings of Mediterranean style on campus are characterized by the following elements;

- Sloped roofs with red terra cotta tiles which cover virtually all portions of the buildings;
- Deep roof overhangs which shelter the walls;
- Traditionally proportioned windows, hardwoods screens and ventilating louvres;
- Facing stones bases complete the traditional designs;

Generally, new buildings shall be consistent with the established masonry theme. However, there may be instances when other building styles are appropriate such as for storage among others. These buildings may consider the use of different building materials and styles, provided that the materials are consistent with overall development within the vicinity, are not in the core campus, and are not readily visible from the entrance street corridors.

2.0 Proportion

A key ingredient in the composition of existing historic building facades is the proportional relationship between the parts of the structure. If elements of the facade such as windows, wall areas, bays, and entrances are diagrammed to show the proportional relationship of height to width, the composition of architectural parts becomes apparent. If drawn in a diagram, a diagonal line indicates the relationship of height to width and equally angled diagonals indicate equal proportions. Often in the composition of an historic facade, a few proportionally consistent parts are repeated and combined to form the whole,

which itself reflects the same proportional relationship. In multi-story buildings, a belt coursing at the floor line has helped downscale the buildings.

3.0 Modulation

Large exterior masonry wall areas shall be visibly broken down into more human-scaled sections with jigs and jogs, offsets, shadow lines, and belt courses. Modulation is required horizontally as well as vertically. Modulation by providing recesses and/or extensions (entrances, floor area, etc.), with offsets as little as 12 inches are acceptable if the overall impact creates a visually effective modulation of the facade that is acceptable to the CPC.

General Standards

1.0 Floor Area Ratio (FAR)

The amount of building square footage to land square footage is known as the floor area ratio (FAR). A FAR of at least 2.0 should be encouraged, but preferably ratios above 3.5 should be attained in sector H to maximize available buildable land and to preserve open space.

2.0 Site Building Coverage

All new construction shall be in accordance with minimum open space requirements and maximum impervious surface cover provisions identified for the development sector in which the building is located.

3.0 Setback and Building Heights

Setbacks and building heights shall be consistent with the CMP and the provisions identified for the development sector in which the building is located.

Chapter 6 – Implementation of the Plan

6.1 Introduction

Implementation is the most difficult part of planning. It requires commitment and most plans fail for this reason. Commitment involves agreement on what should be done, which department should do it, how and when actions should be taken. Unless these commitments are clearly understood and acknowledged then the prospect of the Updated Master Plan being successfully implemented are low. The following section describes the mechanism and instruments for the plan's implementation. It is recognized that there are still many issues which cannot be resolved at this stage in time, but the plan provides the framework for addressing these later.

There are 4 components to implementation of the Updated Master Plan.

6.1 Adoption of the Updated Master Plan

For the plan to become official and binding it must be adopted by the University Council. This will go through the University Development Committee for initial acceptance as a draft plan, a consultative process, a second review and final adoption. To meet the University's Mandate the University Development Committee

6.2 Instruments of Plan Implementation

The objectives and strategies outlined in this plan documents provide the framework for implementation over the 15 years. However, more specific plans are required to identify projects and programs to be undertaken in the medium and short term. The following planning instruments will be used to assist with the implementation of the Updated Master Plan. These plans should be prepared, updated and reviewed on an annual or regular basis of not less than 5 years.

6.2.1 Five Year Development Plan

The University must develop a Five Year Development Plan which must be adopted by the University Council. The Five Year Development Plan will outline all ongoing and new prioritized projects and programs for the Campus, time schedules and financial inputs and college, faculties, departments, organizations and institutions involved in their implementations. A programmed release of funds through a financial plan is essential.

The following on-going and proposed projects could form part of the content of the Five Year Development Plan.

Table 6.1 The Five Year Development Plan Projects for the University

Item	Project	Beneficiary	Cost	Funding Source	Status
1	Construction of Offices, Conference Rooms and Lecture Halls for Department of Earth Science				
2	Construction of Offices and Lecture Halls for Old Faculty of Arts				
3	Construction of Drama Studios, Auditorium-School of Performing Art				
4	Examination Hall				
5	Department of Nutrition Science				
6	Climate Change and Sustainability Resources Centre and Graduate Building				
7	School of Pharmacy Building				
8	Registry Canteen				
9	Fencing of ISSER				

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	Conference Facility				
10	Asphaltic Overlay of Roads				
11	Beautification of Noguchi Roundabout				
12	LECIAD Car Park				
13	PhD Building				
14	Department of Economic Building				
15	Restoration of the main entrance				
16	Legon City Project				
17	The Legon Mall Project				
18	Construction of Transport Terminal at the Staff Village				
19	Banking Square (Manciples Building)				
20	Construction of Road to University Teaching Hospital				
21	Development of Walkway from Language Center to Guest House				
22	Development of Walkway from basic School to School of Performing Arts				

6.2.2 Action Plan

The Action Plan is a 1 (one) year plan, whose contents are extracted from the five year development plan. It should be prepared concurrently with the review of the five year plan. The draft plan should be completed each year before the financial year. It will become the basis of budget submission to the University Council for commitment of University funds either internally generated or from the

Central Government. The plan will be published after the Central Government budget release in November each year.

The Action Plan will be very detailed, defining the full extent of projects and project components for the year and the budget for expenditure and contributions from development agencies.

6.2.3 Financial Plan

In order to ensure the timely release of funds for implementation of the annual action plans, a financial plan should be prepared prior to and finalized after the release of the budget. The Financial plan should indicate monthly instalments to be paid on all projects and programs in the budget for the year. In additions to outlays, the plan should also detail anticipated revenues and other sources of funds anticipated on a monthly basis.

Incomes and expenditure should be carefully monitored to ensure that there is not an over or under commitment of funds.



DECLARATION OF AUTHORSHIP

Form of submission document (authorship and partnership declaration)

Entry for Limited Design Competition on Prototypes
STUDENTS EXPERIENCE CENTRE (SEC), UNIVERSITY OF GHANA, LEGON

ENTRY FORM Please complete the form in BLOCK CAPITALS

Unique Registration Number (URN):

Name of Firm:..... Name of Firm Rep.:.....

Other Team Members (If Applicable)

.....
.....

Address:

.....

Email: Contact Number:.....

Declaration *Delete as applicable

1. I/we have complied with and accept the regulations and conditions which apply to this competition
2. I/we agree to accept the decision of the judging panel as final and I/we agree to permit free publication and exhibition of my/our design.
3. I/we agree to honour the request of confidentiality, to prevent information being leaked to the press before an official announcement is made.
4. I/we declare that the design ideas are my/our intellectual property, prepared either myself or in my /our office under my/our direct supervision for the express purpose of entering this competition.
5. The design is as a result of team collaboration by those listed above.

Signature:.....

Date:.....

This form should NOT accompany your design submission BUT should be submitted digitally through the online entry system

- To arrive on **Tuesday 15th October, 2024 not later than 9:00am**. Please allow sufficient time for uploads as the system will automatically shut down at 9:01am on Tuesday 15th October, 2024
- Late entries will therefore not be accepted
- Hard copy submission will not be accepted

Students Experience Centre (SEC), University of Ghana, Legon

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27th August, 2024

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