

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

COLLEGE OF ARCHITECTURE AND PLANNING

FACULTY OF ARCHITECTURE AND BUILDING TECHNOLOGY

DEPARTMENT OF ARCHITECTURE



DESIGN THESIS TOPIC:

MIXED COMMERCIAL AND RESIDENTIAL DEVELOPMENT-
SWITCHBACK ROAD, ACCRA

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AUGUST 2009

DECLARATION

I SOLEMLY DECLARE THAT THIS WORK WAS DONE PERSONALLY AND THAT
IT HAS NOT BEEN SUBMITTED BY ANYONE ELSE FOR THE MASTER OF
SCIENCE HONOURS DEGREE (MSC)

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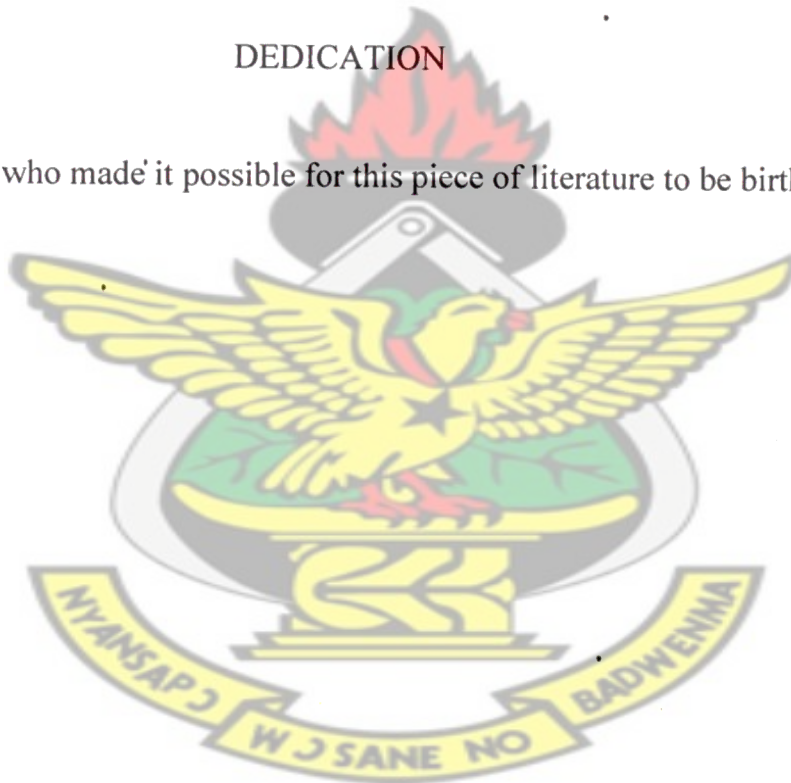
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DEDICATION

To all those who made it possible for this piece of literature to be birthed.



ACKNOWLEDGEMENT

My most profound gratitude goes to God in whose mercy I live. Unto Him be glory, and honour, and praise in my life.

I thank my supervisor Mr. G. F. A. Olympio for his patience and for availing himself when I needed him the most.

I acknowledge my parents, Dr and Mrs. Abban. They have done for me what many parents do not easily do for their children.

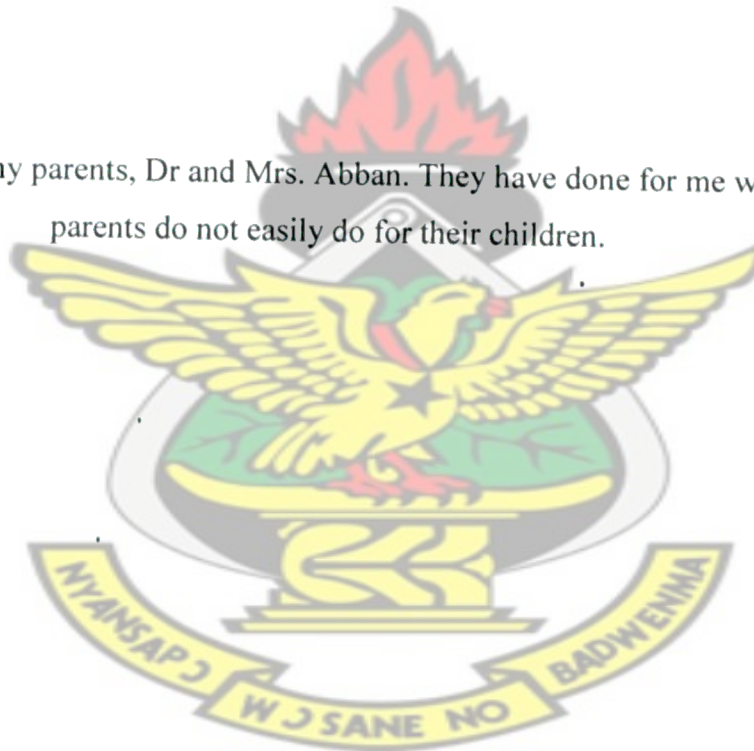


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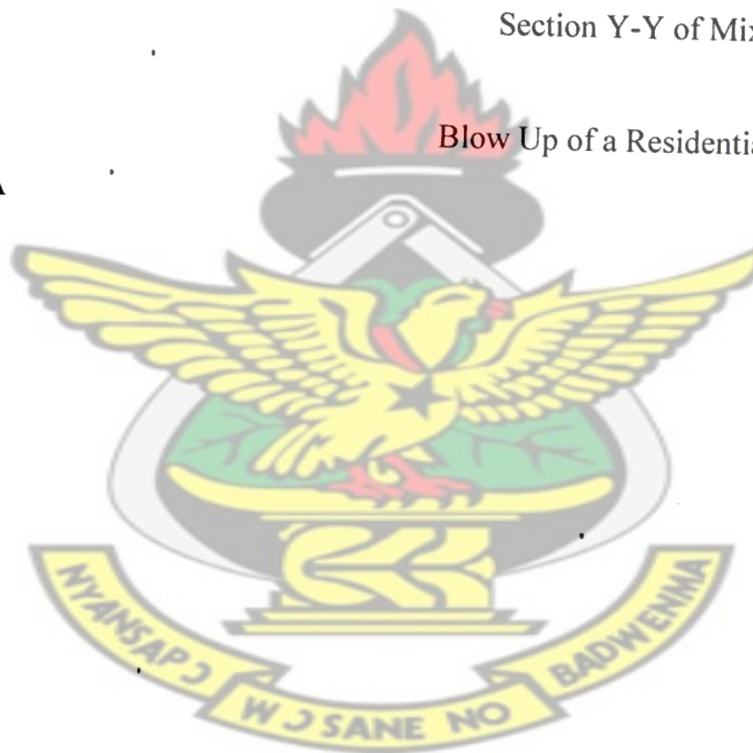


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CHAPTER ONE

1.0 INTRODUCTION

1.1 Overview

Through the architecture undergraduate studies and even the postgraduate, one of the lessons learnt is that, to ensure sustainability in the growth of the Ghanaian urban community, commercial and residential activities are not to be detached totally. Urban studies showed that, in the cases where they were separated, people soon converted their garages, halls and other lower rooms into shops to bring the commercial setting into their residential areas. Shops also in the commercial areas also sometimes double as sleeping places in the night for some of the work hands or employees.

Sustainability is key in the design of any urban community. That is, the ability of a community to adapt and adjust to the growing and changing needs of the inhabitants. It is this phenomenon that has driven in recent time investors to go into building communities that combine residential and commercial activities in harmony so that the community's quest to adapt in the future does not cause them to cross paths.

1.2 Problem Statement

Precedence has been set with a place such as the airport city, but with the growing population of the middle and high class income earners, there is a demand for more of such comprehensively designed communities. Not just for now but also for the future. However there are not enough of such communities designed to meet the demand.

The lack of properly designed communities with residential and commercial activities fused thoughtfully, has created a scenario whereby in most of our residential communities, individuals have brought in containers, some built sheds, other opened up or made extensions to their garages etc to start commercial activities such as supermarkets, drinking spots, food joints, office spaces and the like. This afterthought to the original design may destroy any architectural character the planners and designers might have had in mind. The aesthetic quality of individual buildings and the community as a whole is also sacrificed. This in effect causes many of the cities communities to look disorganized and unplanned.

1.3 Justification

Urban planning as an organised profession has existed for less than a century; however most settlements and cities around the world have over the years displayed various degrees of forethought and conscious design in their layout and functioning.

Since the twelfth century (Middle Ages), planning of settlement and cities has been of great importance for many reasons. During the Middle Ages for instance, where there were a lot of migrations resulting from wars which were quite rampant and also famines, there was the need for the inhabitants of any town to protect themselves if they were to have any form of civilized lifestyle. This was because of the abundant neighbours who could easily take over their territory if they did not prevent it. It was also to protect them from noise and odors from surrounding areas.

Ur, a city located near the Euphrates, Tigris Rivers in modern day Iraq and some ancient cities of the Indus Valley in modern day India are perhaps the earliest examples of deliberately planned and managed cities in history. In Harrapan settlements, archaeological evidence suggests the

houses were laid out to provide protection from noise, odors, and thieves. It also showed that they had their own wells, and sanitation. Ancient cities often had drainage, large granaries, and well-developed urban sanitation.

It is realised that not only did they recognise the need for protection but also the provision of infrastructure that helped them to live their lives within their territory and still have a clean environment.

The idea of an ideal city arose during the renaissance along with the use of the money for payment instead of the payment in kind economy, the growing consciousness of commoners of their independence of both temporal and spiritual powers amongst other developments. This idea has remained and grown through time and even now in the 21st century, there are many thoughts as to what an ideal city should be like.

Urban commercial structure comprises of a hierarchy of business centres, from isolated convenient stalls to regional shopping centres to serve urban needs. These centres display spatial patterns that conform to the geographic distribution of consumers. The ideal urban commercial structure is thus to have commercial facilities from the local, to the neighbourhood, to the community, to district and finally the regional levels with varied degrees of sizes, composition, form, among others. This helps to prevent the situation where everybody (consumer) has to travel to the Central Business District (CBD), of a city to transact business and thereby reduce traffic, overcrowding, and its associated problems.

The case of Accra's commercial structure contrasts the ideal situation described above, as there are less or no commercial activities at the community levels but all commercial activities are concentrated at the CBD of the city leading to the a lot of major problems. Most of the suburban areas are service deficient and as a result, many people still depend on the CBD for various

services. About 44.3 percent of all trips in the city have either their origin or destination in the CBD compared with 65 percent 25 years ago. This figure may be due to the development of commercial activities in various residential areas.

Efforts to develop such services (mostly by private developers who lack adequate knowledge of urban design consideration) are not controlled or regulated and as a result, development is taking place in haphazard manner, especially along major roads within the city. If our cities are to be planned and developed according to the needs of man and ruled by reasoning rather than by interest, then, the provision of commercial activities at all levels of the urban city structure as identified above becomes very important.

There is, therefore, a high demand for an alternative and diverse commercial system to take care of growing problems within the CBD. The crude responds to the current situation can be seen in the proliferation of wooden and container kiosks and other unauthorised shanty commercial structures within the city enclave. Shopping activities, which used to be the preserve of Accra central, are now springing up in areas such as Osu and other adjoining suburbs.

1.4 Objectives

This project seeks to

- design a residential facility with adequate supporting commercial facilities
- design commercial facilities which are close enough to the residential facilities for easy access but buffered enough not to infringe on its functionality.
- design an easily accessible recreational facility as an ancillary with the complex.
- design an environmentally and pedestrian urban friendly community with the basic facilities, thus building infrastructure to make it self-sustaining.
- design a pedestrian friendly urban community.

1.5 Target groups

- The general public
- Local and international traders or exhibitors

1.6 Clients

The client and financier will be the Social Security and National Insurance Trust.

1.7 Funding

Funding for this design is going to be provided by the above mentioned clients and through other investors and donor agencies that would lend their support to the program.

1.8 Research methodology

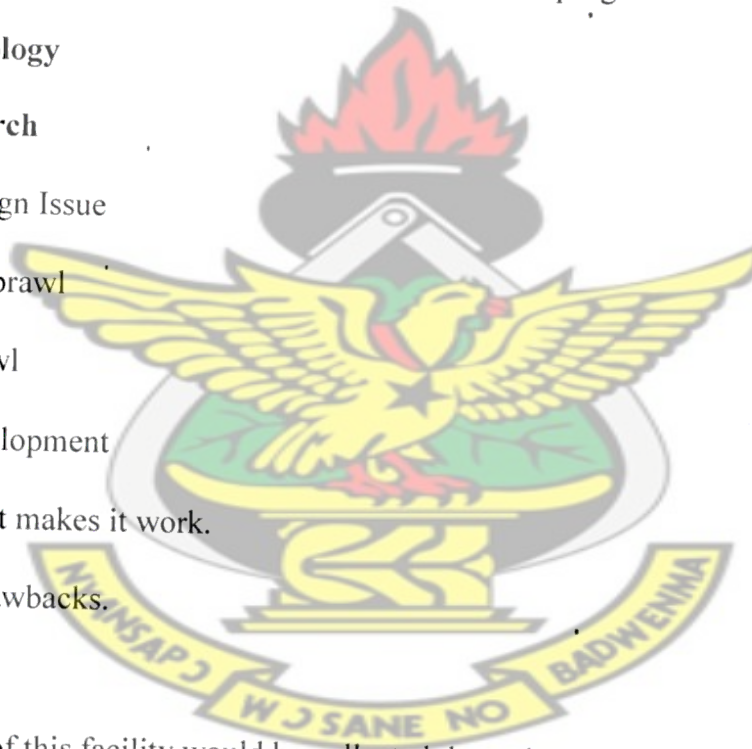
1.8.1 Literature research

- The Urban Design Issue
- What is urban sprawl
- Impacts of sprawl
- Mixed-use Development
- History and what makes it work.
- Benefits and Drawbacks.

1.8.2 Data Collection

The data for the design of this facility would be collected through:

- Primary sources
 - Measured drawing and sketches
 - Interviews
 - Visual survey



➤ Secondary sources

- Physical study of site and its environs
- Photographs
- Library
- Internet research
- Case studies

1.8.3 Data Analysis

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Interview

Resource persons in the field of urban design in the country would be consulted and interviewed in order to know the situation on the ground.

Photographs

Photographs of existing or prevailing situations of mixed use facilities in the country would be taken to aid the research.

Case studies

Regular visits to some residential and commercial facilities would help have an idea of what exists and what happens each day.

Visual survey

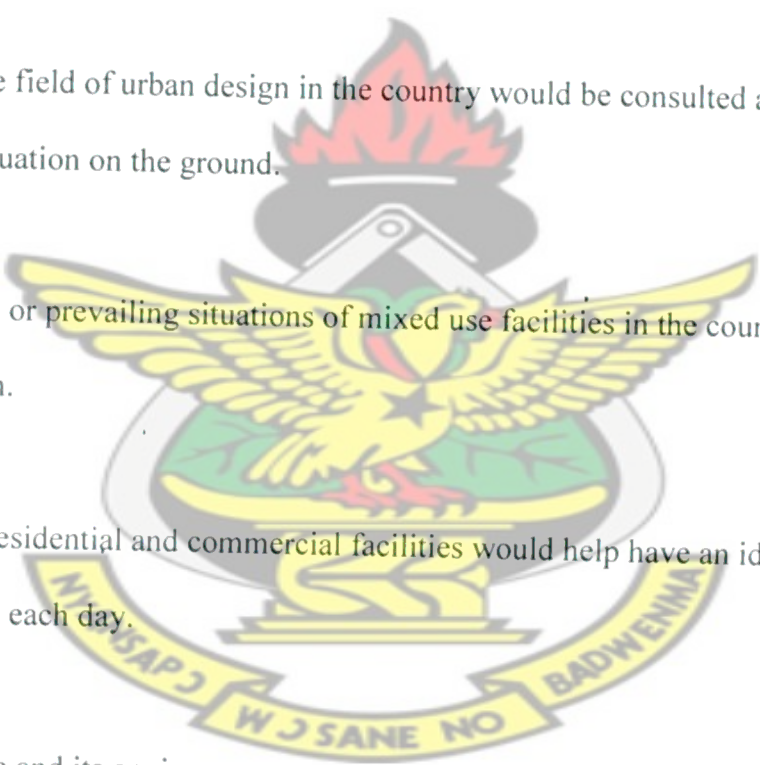
Physical study of the site and its environs

Bibliography

Reports, journals and relevant information from books written on urban design in general and mixed use facilities to be specific would serve as a guide and a reference point.

Internet

Information from the net would also be used.



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CHAPTER TWO

2.0 LITERATURE REVIEW

The purpose of the literature research is to establish a contextual frame of reference on the area of urban design and mixed-use developments.

2.1 THE URBAN DESIGN ISSUE

Urban design concerns the arrangement, appearance and functionality of towns and cities, and in particular the shaping and uses of urban public space. It has traditionally been regarded as a disciplinary subset of urban planning, landscape architecture, or architecture and more contemporary linked to emergent disciplines such as landscape urbanism.

While the two fields are closely related, 'urban design' differs from 'urban planning' in its focus on physical improvement of the public environment, whereas the latter tends, in practice, to focus on the management of private development through planning schemes and other statutory development controls.

Urban design draws together the many strands of place-making, environmental responsibility, social equity and economic practicality, into the creation of places of beauty and distinct identity. It can therefore be said that Urban design is creating a vision for an area and then deploying skills and resources to realize that vision.

It is derived from related matters such as planning and transportation policy, architectural design, development economics, Landscaping and engineering.

It is on the architectural and landscaping aspect of it that this thesis report seeks to explore.

Over the year many problems have plagued urban cities all over the world. Especially, in developing countries such as Ghana these problems range from environmental, to economics, to socio-cultural. Some of the issues are

Excessive production and lack of management of refuse, air pollution as a result of the population of motor vehicles, inadequate greenery in public spaces, urban sustainability, urban sprawl to name a few. One of the most notorious and common in many urban areas is urban sprawl.

Here, the project would examine briefly this issue.

2.1.1 What is urban sprawl?

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Although there are many definitions of sprawl, a central component of most definitions and of most people's understanding of sprawl is this:

Sprawl is the spreading out of a city and its suburbs over more and more rural land at the periphery of an urban area. This involves the conversion of open space (rural land) into built-up, developed land over time.

Traditional cities were compact and efficient, but over the past 30-50 years, the density of land used per person has declined drastically. In the United States, for instance, although the population grew by 17 percent from 1982 to 1997, urbanized land increased by 47 percent during the same 15 year period. The developed acreage per person has nearly doubled in the past 20 years, and housing lots larger than 10 acres have accounted for 55 percent of land developed since 1994, according to the American Farmland Trust. It can be derived that a country such as Ghana with its ever increasing middle and upper class income earners would have similar or even worse statistics.

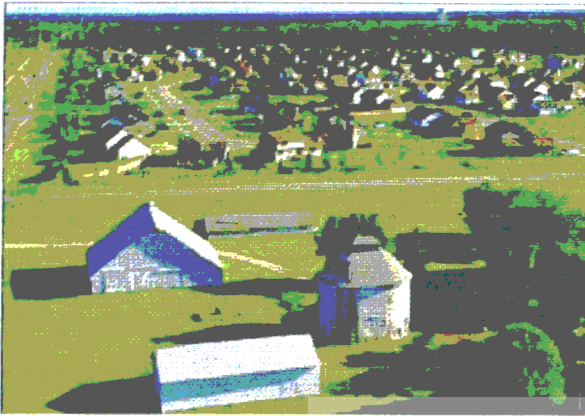


Fig 2.1 (Farmland in Wisconsin) Between 1950 and 2002, the number of acres of farmland in Wisconsin dropped by 32.6%, from 23.6 million acres down to 15.9 million.

Source: Wikipedia, the free encyclopedia- Land use and Urban sprawl.

2.1.2. Impacts of Sprawl

1. Loss of Farmland:

Large portions of land which were and could have been used to grow more food and timber for the use of the country and even perhaps export to gather some revenue are instead used to create new highways, and sprawled housing developments. Farmers now sell their lands for financial security to developers.

Wisconsin, for example in 1950 had 23.6 million acres of farmland, but 32.6% of this farmland has disappeared, leaving us with only 15.9 million acres in 2002, according to the Wisconsin Agricultural Statistics Service.

2. Loss of Wildlife Habitat:

Wild forests, meadows, and wetlands are also disappearing, replaced by pavement, buildings and sterile urban landscaping. The remaining habitat is smaller, degraded and more fragmented, making survival of certain wildlife species very difficult as they try to reach breeding ponds, hibernation sites, feeding locations, or to establish viable nesting areas.

3. Increased Tax Burden:

The costs of providing community services have skyrocketed as homes and businesses spread farther and farther apart, and local governments are forced to provide for widely spaced services. Owners of these dispersed developments seldom pay the full government costs of serving them, forcing the rest of the population to subsidize them with higher taxes at the state level.

4. Increased Air Pollution:

Sprawl increases car and truck traffic, leading to major increases in air pollution and smog. Vehicles are the number one cause of air pollution in many urban areas, and a threat to public and wildlife health.

5. Increased Water Use and Pollution:

Sprawl increases air pollution, which falls out to become water pollution. In addition, urban activities create water pollution directly, through land run-off of construction site erosion, fuel spills, oil leaks, paint spills, lawn chemicals, pet wastes, etc. Sprawled, low-density development produces more than its share of this runoff. In addition, more water is consumed for lawn watering and other landscape activities, straining local water supply systems.

6. Increased Energy Consumption:

At a time when we desperately need to reduce our energy use, sprawled developments increase our energy consumption per person, for increased gasoline, and electricity use.

7. Social Fragmentation:

Old-fashioned neighborhoods with compact housing, front porches, a corner store, and a school two blocks away were much more conducive to social interactions. It was possible to feel a sense of belonging and community. Now, in sprawled generic housing tracts, many people

never meet their neighbors as they pass them in their cars. It's rare for neighborhood events to occur. Families are more isolated and those living alone are marooned in a hostile environment.

8. Loss of Time:

People are forced to spend more time commuting longer distances to reach their jobs, homes, schools and shopping areas. In a compact, efficient city these travel times are often minimal, but sprawled cities take time to navigate. Suburban tract and country dwellers also spend more time maintaining large, empty residential properties: mowing the grass, plowing long driveways, raking leaves, weeding, etc.

9. Loss of Exercise:

Sprawled communities force people to drive their cars if they need to get groceries, go to school, or get to work. In the past, cities were structured so many of these destinations were within walking distance. Now, many neighborhoods lack even sidewalks for pedestrians, forcing residents to walk in the street next to the traffic whizzing by. In the past it was normal for kids to walk to school, but now their parents often drive them or they take their own cars. Is it any wonder that an epidemic of obesity is plaguing our country? Walking is the best form of life-long exercise, yet our development patterns actively discourage walking.

10. Degraded, Noisy Surroundings:

Helter-skelter sprawl is not attractive, yet many of our transportation corridors are now edged with jumbles of residential, commercial, and industrial developments (and their enormous parking lots), which have no sense of beauty or order. This adds to the stressful, disconnected

feelings which urban residents often express. We're losing the "green space" we need as part of our natural heritage. Large areas of noisy, speeding traffic are also not conducive to peaceful communities. Many people want to live in the country to escape this stress, but urban escapees are helping to create these problems instead, as they commute back to the city for work, school and shopping.

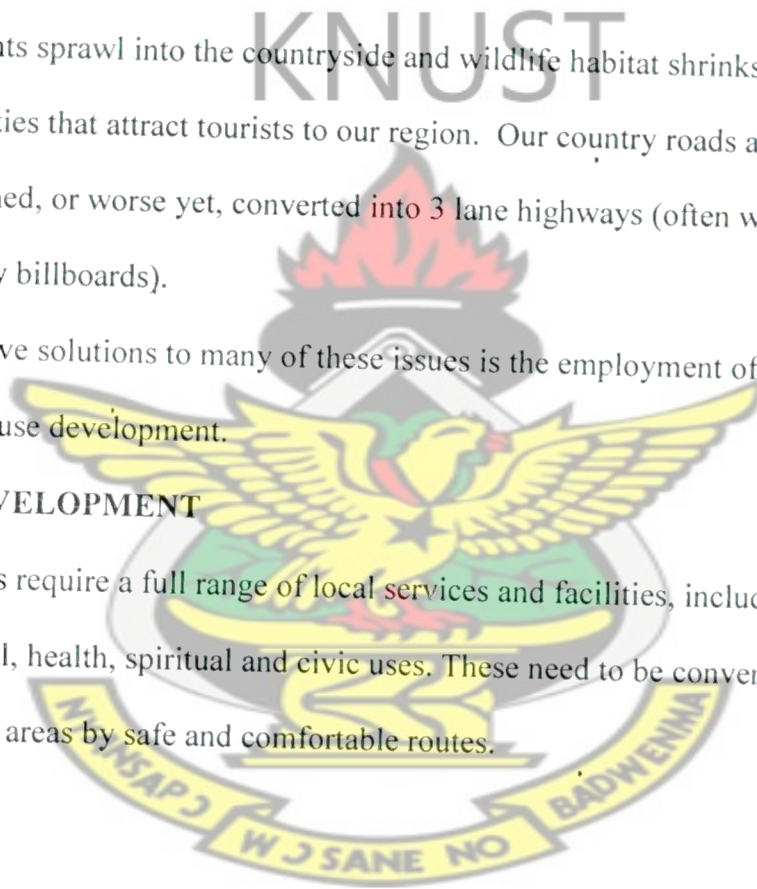
11. Tourism Industry Damage:

As human developments sprawl into the countryside and wildlife habitat shrinks, we're rapidly losing the scenic qualities that attract tourists to our region. Our country roads are being straightened and widened, or worse yet, converted into 3 lane highways (often with additional frontage roads and ugly billboards).

One of the most effective solutions to many of these issues is the employment of the phenomenon of mixed use development.

2.2 MIXED-USE DEVELOPMENT

Successful communities require a full range of local services and facilities, including commercial, educational, health, spiritual and civic uses. These need to be conveniently sited and connected to residential areas by safe and comfortable routes.





In designing new places, what role is the centre to have when all the potential 'mixed use elements' are sucked to the edge?

Fig 2.2 Functional relationship diagram for an urban area

Source: Urban Design Compendium, Llewelyn- Davies

2.2.1. History

You see them all over town -- neighborhood buildings with two to five stories of usually wood-framed apartments over a base of retail and parking housed in a concrete structure. Concrete high-rise versions are creating a livable downtown.



Fig 2.3 Madison Crossing, at 16th Avenue East and East Madison Street, features 24 residential units, a 15,000-square-foot ground-floor grocery and a parking garage on the second level.

Source: Urban Development by Doug Hofius

The concept is nothing new. This typology with shops at street level, and apartments above, can be found in cities throughout history. The rediscovery of this building type might be seen as a critical point in the recent urban response to freeway congestion and sprawl.

Development of the freeway facilitated "suburban" development and the separation of work and residence became a characteristic of city growth. Classic planning in the past 100 years, with its notion of separation of uses may have also contributed. This made sense in an era dominated by heavy industry. Similarly, development of the mall contributed to creating cities without night life, organized around the workplace. Unfortunately, the cities made in this era were lifeless, drab places, mainly because of this forced separation.

Closer examination of the life of cities found that people thrive on spontaneous and circumstantial interaction. At the same time, the economic shifts of the last 40 years seemed to erase the need to separate work, shopping and home life. Complex, multifaceted urban spaces bring people together in different ways, creating the kind of interaction and synergy. Cities thrive on the need for people to come together in so many ways, which cannot be strictly planned. Only recently have planners seen the value to be gained in enhancing this spontaneity and mix of urban uses.

The rising cost of housing, traffic congestion and the need to ensure the long-term economic viability of city centers/downtowns also helped to contribute to increased multi-use development. Growth and methods to manage that growth, such as Washington State's Growth Management Act, combined to increase densities in urban centers.

Mixed-use development was a partial solution. An effort on the part of city planners, seeking to create “urban villages” helped to bring about much of the recent mixed-use development in Seattle, a good deal of which occurs in Neighborhood Commercial zones.

While a mixed-use character pre-existed in many neighborhoods, it was a viable mode of development, which had been neglected, and as a planning tool, could help to foster interesting growth, while providing an opportunity to preserve a neighborhood’s unique characteristics. If done correctly, both planners and developers realized that mixed-use development made sense. Increased density has not come easily or painlessly, however. Seattle’s legacy of single-family neighborhoods and neighborhood-friendly system meant change in the city was often met with an endless series of challenges and appeals. At some point the choice became clear, either allow endless sprawl in the suburbs or allow increased density inside the city.

Increased density does not mean simply switching houses for apartments, however. People need places for all their activities, including recreation, entertainment, and learning.

2.2.2. What makes it work?

As any retail landlord knows, getting the right tenant mix is crucial to a project’s success. In multi-use, the same maxim holds true. Successful developers assess and form the retail to support both the neighborhood and associated residential use. It is essential for all uses to be viable. This may require identification of key commercial and retail tenants, if possible, before design begins in order that the building’s program and design can be responsive to tenant requirements.

Commercial and retail tenants, knowledgeable about their specific tenant improvements, systems etc., often participate along with the developer in providing necessary input for the architects to assist with project design and development. No simple formula works in all places, and mixed-

use development does not cure all the ills of a city. As a tool for the development of a more civil urban life, mixed-use development holds great promise. One need look no further than the Pearl District in Portland and Yaletown in Vancouver, B.C., to see viable, vibrant neighborhoods comprised of developments, often in former warehouse buildings, combining residential, commercial and other uses.

Formulaic design without appropriate accommodation for proposed tenant needs, lack of attention to which uses will work for a particular location, and/or myopic focus on the residential portion of a development is often less successful. Any major development happens only through the combined efforts of many parties; developers, the community and public agencies. The city of Seattle has developed tools, incentives and has allowed for creative trade-offs for development. For example, provisions in the zoning code allow for more flexibility in the building envelope to better serve a particular situation. Similarly, the city has identified certain streets as 'green streets' and requires developers to be responsive in their plans for sidewalks and street amenities to create a green quality.

Implemented properly, such policies can benefit both owners and the public, and help create successful mixed-use development.

Design review has proven to be an asset to the community and developer and has helped significantly in shaping good mixed-use residential development.

2.2.3. Benefits

- More convenient access to facilities
- Travel-to-work congestion is minimised

- Greater opportunities for social interaction
- Socially diverse communities
- Visual stimulation and delight of different buildings within close proximity
- A greater feeling of safety, with 'eyes on streets'
- Greater energy efficiency and more efficient use of space and buildings
- More consumer choice of lifestyle, location and building type
- Urban vitality and street life
- Increased viability of urban facilities and support for small business
- (such as corner shops)

A successful and sustainable local neighbourhood is a product of the distances people have to walk to access daily facilities, the presence of a sufficient range of such facilities to support their needs, and places and spaces where a variety of activities can take place.

These are exemplified by the traditional Victorian and Edwardian suburbs which were built on the assumption that most movement would be pedestrian. Other travel needs were serviced by a suburban rail line – the station providing the focus of retail, commercial and civic activity. Such spatial and use patterns are often difficult to replicate in modern development due to current transport planning regimes, the dispersal of movement patterns facilitated by the car and the trend towards ever larger retail, educational or healthcare buildings in order to achieve efficiencies of scale.

Often the planning system does not help. To illustrate, if we take a typical large site, land uses may include housing, a primary school, shops, offices and some industry. Planning generally zones these uses and gives them relatively fixed boundaries before any serious design work is undertaken. On occasion, sites are carved into development parcels around a rudimentary road

system without a clear urban design structure in place. At this stage, it is not unknown for densities to be decided upon, as well as other fixed requirements - open space provision, for example. This approach frequently involves routing the main road round the site rather than across it and locating the traffic generating uses such as retail and employment areas close to entrance junctions and along the main road. The road is used as a boundary to segregate uses. Such attempts to create a sense of place around a focal point often fail because the very uses that generate activity are on the edge of the site or beyond, in a nearby business park or out-of-town centre, and tend to be internalised in 'big boxes'.

This tendency can be reversed by promoting diversity in terms of:

- Development forms;
- Land use;
- Density;
- Tenure;
- Market segments.

2.2.4. Drawbacks

Mixed use development is seen as too risky by many developers and lending institutions because economic success requires that the many different uses all remain in business. Most development throughout the mid to late 20th century was single-use, so many development and finance professionals see this as the safer and more acceptable means to provide construction and earn a profit. Christopher B. Leinberger notes that there are 19 standard real estate product types that can obtain easy financing through real estate investment trusts. Each type, such as the office park and the strip mall, is designed for low density, single use zoning. Another issue is that short term discounted cash flow has become the standard way to measure the success of income-producing

development, resulting in "disposable" suburban designs that make money in the short run but are not as successful in the mid to long term as walkable, mixed use environments.

Mixed use commercial space is often seen as being best suited for retail and small office uses. This precludes its widespread adoption as the trend to ever-larger corporate and government employment accelerates.

Mixed use residential buildings and neighbourhoods are best suited to those who prefer public amenities to private, regulated personal space. The lack of private outdoor space for kids and pets is anathema to some, particularly in some North American and Australian cultures.

Construction costs for mixed-use development currently exceed those for similar sized, single-use buildings. Challenges include fire separations, sound attenuation, and ventilation. Leinberger explains,

“ Good urban architecture costs upward of 50 percent more than typical suburban buildings. In urban areas, residents and businesses demand a higher quality of building, since you are walking past them, not driving by at 45 miles an hour with the buildings set back 150 feet.



Additional costs arise from meeting the design needs. In some designs, the large, high-ceilinged, columnless lower floor for commercial uses may not be entirely compatible with the smaller scale of walled residential space above. Often the parking space requirements for businesses exceed those of residential development. Thus, mixed use projects that are not sited close to public transit are likely to require a large number of parking spaces that may be difficult to finance. It should be noted however that in mixed-use developments in some denser areas, owning an automobile might be considered a luxury rather than a necessity. A notable example in the United States would be Manhattan, though this is an atypical case.

2.3 Case Studies

The purpose of the case studies is to identify both positive and negative aspects of the urban set-up resulting from environmental valuables in the design of mixed residential and commercial developments taking place, their quality on residents and stakeholders with the objective to reach an environment that will stimulate the senses, livability and optimization of operational aspects and well-being of stakeholders.

The structure of the case studies will comprise:

1. Adequacy of functional spaces in mixed commercial and residential areas and development and how this impact on new facility such as the one under studied
2. Ventilation of functional spaces in and around mixed- commercial and residential residents' accommodation in compliance with standard urban practice and safety of residents. The positive outcome of the studies will be incorporated in the process of new design of mixed- commercial and residential development.

- **SSNIT Flats Community 3, (Tema)**

Location

The site is off the coast along the road which connects Sakumono to Tema community two. The Ramsar site (a bird watching post) and Sakumo lagoon are also in close proximity to SSNIT flats.



Fig 2.4 Street Perspective of the B Block

Source: SSNIT Flats Community 3, (Tema)



Fig 2.5 Perspective View of the A Block

Source: SSNIT Flats Community 3, (Tema)

Across the street from the site is also the Cocoa Shed owned by Ghana Cocoa board.

2.3.1 Reasons for the study

The decision to study the SSNIT flats at Tema community 3 in the bid to design of a Mixed commercial and residential development at switchback road Accra was influenced by the following

- A very major part of a mixed use development to be designed would be made up of residential facilities, and it is therefore essential to know how a residential neighborhood functions on their own to know how to integrate it with commercial facilities.
- The subsequent addition of commercial facilities to this neighborhood after the design (although not included in the original plan) and its influences.
- The scale of the residential neighborhood at the Tema SSNIT flat is similar to the scale of the residential neighborhood to be designed.
- It makes for a good place to compare the management of residential neighborhoods which have been let out and those that have been bought.
- The target group in terms of the class of income earners is the same as that of the neighborhood that is to be designed for.
- Some supporting facilities have been provided so as to make the neighborhood self sufficient to an extent and this is an essential aspect in the project to be designed.

2.3.2 Main Features

The neighborhood covers a very large expanse of land. The use of the land varies from area to area on the site. There are the purely residential areas within which are some open areas which are used for different purposes. Some of the outer areas were used for supporting facilities also. There are no. of blocks in the entire site.

The main features of the neighborhood are as follows:

- An extensive outdoor parking space. That is, a shared parking space allocated for the various blocks.
- Residential blocks
- Allocated spaces within the blocks for commercial activities.
- An open spaces for recreation.
- A nursery school.
- A junior secondary school
- A church.

2.3.3 Management

The management of the neighborhood, in the past was the sole responsibility of the developers, which is SSNIT. Then, all the residential facilities, that is the various households were on lease to the occupants. However, for various reasons including, a better management system, the developers decided to offer the individual households for sale to the tenants. This has left a situation where some of the blocks are owned by the inhabitant and others are still on lease to the people who live in them.

Some of the blocks that are privately owned, have elected one person from amongst themselves who is in charge of management of the block as a whole. This system has however not proved very effective in the sense that, there are still cases of individuals taking matters into their own hands and doing things to their portion of the block without consideration of the effects on the entire block. Example, choice of color for painting the exterior walls.



Fig 2.6 Different color paints on the exterior walls.

Source: SSNIT Flats Community 3, (Tema)

2.3.4 Architectural consideration

There is no distinct architectural style or character running through the structures currently in the neighborhood. One of the contributing factors could be because of the various repairs and changes that individuals have undertaken on the building.

2.3.5 The Residential Blocks

Although the blocks do not follow any particular style of architecture, the glass casement windows (which some occupants have changed) give the building a slightly different look from other blocks in the area. The main building material employed was sandcrete blocks. Flat concrete roof was used for these blocks also.



Fig. 2.7 Typical Block

Source: SSNIT Flats Community 3, (Tema)



Fig. 2 8 Block from close up

Source: SSNIT Flats Community 3, (Tema)

The schools

The primary and junior secondary school:

It is a two storey block with four class rooms on each floor. At the ends of the floors on the first and second floor have the office, a common room for staff and also the sanitary

spaces. The predominant color used for the block is light brown. There are however some interesting additions of white and red strips.

A simple gable roof was used for the building. This however has been divided into different sections which gives it a more interesting look aesthetically. There is also a parapet that goes round the whole block. Interestingly, the glass casement windows used in the residential blocks is also used in the school. This feature ties the buildings together to a certain extent.

There is large playing field in front of the school where the children can play after school. The sitting of the school makes this possible.



Fig2.9 The primary and junior secondary school.



Fig2.10

Source: SSNIT Flats Community 3, (Tema)

Source: SSNIT Flats Community 3,

The nursery

The nursery school is right next to the primary and junior secondary school. It also has a gable roof with a parapet all around it. The glass casement windows are also used in this building. The corridors on both sides of the block go a long way to shield the children who inhabit it from the direct rays of the sun.



Fig. 2.11 The Nursery



Fig. 2.12 (Tema)

Source: SSNIT Flats Community 3, (Tema)

The church

Although the building is not yet painted, the system of fins, honeycomb walls and overhangs create an overall look that stands out from all the other blocks.

This block is also sited around the schools. There is also much space around the school but it is not landscaped and therefore very dusty.



Fig.2.13 The Church

Source: SSNIT Flats Community 3, (Tema)

Waste Management

There is a refuse collection point in front of every block. These bins are however too small to cater for the whole block and hence they are most of the time overflowing.



Fig2.14 Refuse Collection Point

Source: SSNIT Flats Community 3, (Tema)

Since gutters are not covered, rubbish has choked the drains in many areas. This breeds mosquitoes and amongst many obvious results, night life in the open areas is not encouraged.

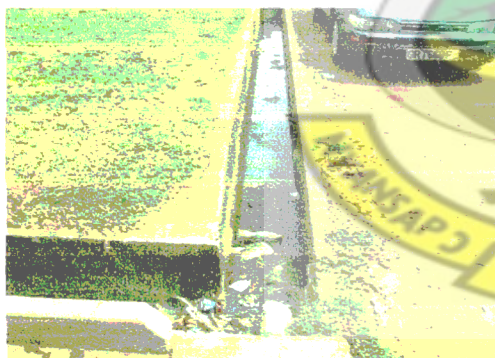


Fig 2:15 Uncovered and Choked Drains



Fig. 2.16

Source SSNIT Flats Community 3, (Tema)

One other major waste management issue is the incineration of refuse which some inhabitants of the neighborhood have decided to do on the compound. The usual effect is appalling visually not to mention the air pollution.



Incineration of refuse on the compound

Fig. 2.17

Source: SSNIT Flats Community 3, (Tema)

Services

A few people in the neighborhood employ the use of artificial ventilation. That is split air condition units and in most cases it because of the function of the space in question.



Fig 2.18 A Split air condition unit

Source: SSNIT Flats Community 3, (Tema)

Since the introduction of the new regulations, the Government has been working to ensure that all the relevant stakeholders are aware of the new regulations. At the same time, the Government is also working to ensure that the relevant stakeholders are aware of the new regulations.



Figure 1: KNUST Main Building

Source: SSNIT (2019) and the author.

When on the site for the first time, the author was struck by the large number of people who were working on the site. For the sake of better focus and to ensure that the work was done in a timely manner, the author decided to work in a more appropriate place, such as a library. The author was also able to find a lot of information about the site and its history. The author also found out that the site was put in a very good location, close to the water and the road.



Figure 2: KNUST Main Building

Source: SSNIT (2019) and the author.

A post box is provided for every apartment at their entrance. This allows for door step delivery of all postage.



Fig 2.21 Post box mounted at entrance of apartment

Source: SSNIT Flats Community 3, (Tema)

Security

There is no wall around the community and this absence allow for unrestricted entry into the area by residents and non residents alike.

The tenants on the lower floor especially the ground floor feel more threatened in terms of security. This has led some to use burglar proofing railings on their windows, which the original designer did not provide.



Fig2.22 Burglar Proofing over Window

Source: SSNIT Flats Community 3, (Tema)

Most of the outside lights have been used for long periods without maintenance and because of that most of them are out of order. There are as a result many dark streets during the night and it is inevitable that security will be compromised.

Merits

- The proximity of two supporting facilities (the schools, church and the recreational park) blocks is a major advantage in the community
- Spaces were created for commercial activities from the design stage.

Demerits

- The overall maintenance of the residential blocks is non existent.
- Uncovered and chocked drains create a some what poor sanitary condition
- Although commercial spaces were provided, they are not adequate.

2.4 Cases Study 2- Amakom ('New York')

Location

A corner building at Amakom (a sub-metropolitan area in Kumasi) being used both for commercial and residential purposes. Thus, making it a mixed use facility. The site is located of the main Accra-Kumasi road across the SSNIT office block (Asafo). The site

is labeled /demarcated as Plot No. 1 Amakom



Fig.2.23

Source: Corner Building at Amakom ('New York')

2.4.1 Reasons for study

- It is a typical purpose built mixed use facility with commercial activities (shops) on the ground floor and many residential facilities.
- The facility is surrounded by similar buildings and also pure residential facilities.

This makes the study of the block very relevant concerning the intended design.

2.4.2 Architectural consideration

This some what U-shaped building has a court yard which forms the centre of all activities. Chores such as washing, drying, cooling and all forms of recreational activities go on in the court yard.



Fig 2.24 Courtyard used for drying clothing

Source: Corner Building at Amakom ('New York')

The court yard which also serves as a place for cooking has small circular platforms which the mortar is mounted on to prevent the cement floor from developing cracks.

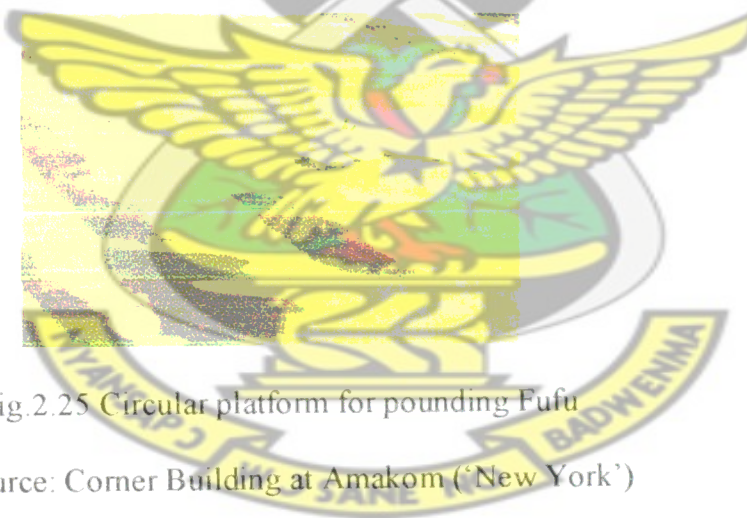


Fig.2.25 Circular platform for pounding Fufu

Source: Corner Building at Amakom ('New York')

The building houses /shelters 98 people in all and there is total room density of 3 people per room. There is an average room size 3.5m * 4m.

On the ground floor there is a lot of commercial activity and the bedroom number difference from floor to floor is good evidence. For example, there are ten bedrooms on the first floor, while there only five on the ground floor.

Fig 2.26



Source: Corner Building at Amakom ('New York')



Fig2.27

Source: Corner Building at Amakom ('New York')

The circulation spaces are well ventilated because of their proximity of the courtyard

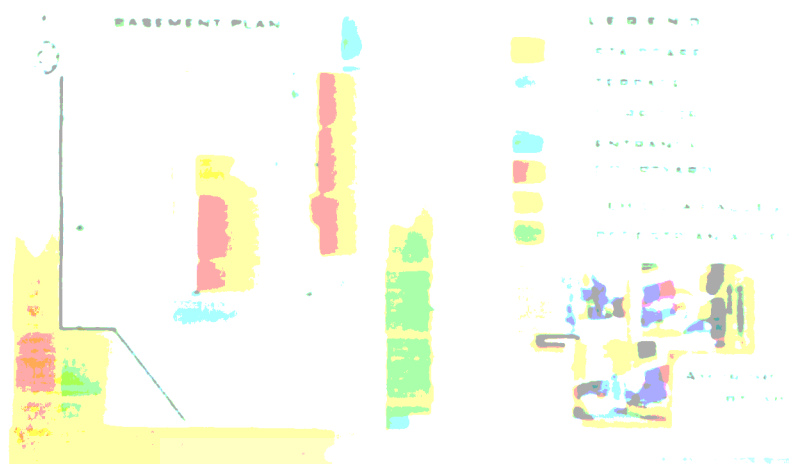


Fig. 2.28 Circulation spaces

Source: Corner Building at Amakom ('New York')

Screen walls/honey comb walls are used a lot to allow for sufficient natural lighting and ventilation to get into the building

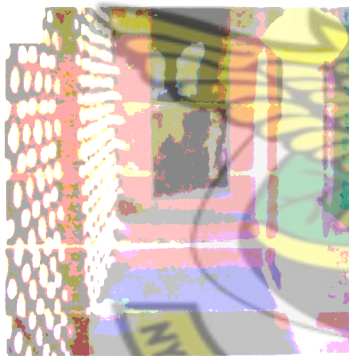


Fig. 2.29



Fig. 2.30

Source: Corner Building at Amakom ('New York')

Conclusion

- Most of the rooms are well ventilated, in that they have cross ventilation
- Terraces and corridors were used to prevent much solar ingress
- Because storage spaces were not provided, some courtyard space is used for storage

2.5 DEVELOPED BRIEF

- **MIXED USE BLOCKS**

- RESIDENTIAL FACILITIES.

Two Bedroom Apartments

Three Bedroom Apartments

- COMMERCIAL FACILITIES

Retail shops

Post office

Pharmacy

Laundry

Hairdressing saloon

- LETTABLE OFFICES

- **SUPPORTING FACILITIES**

- Nursery school

- Bank

- Open space.

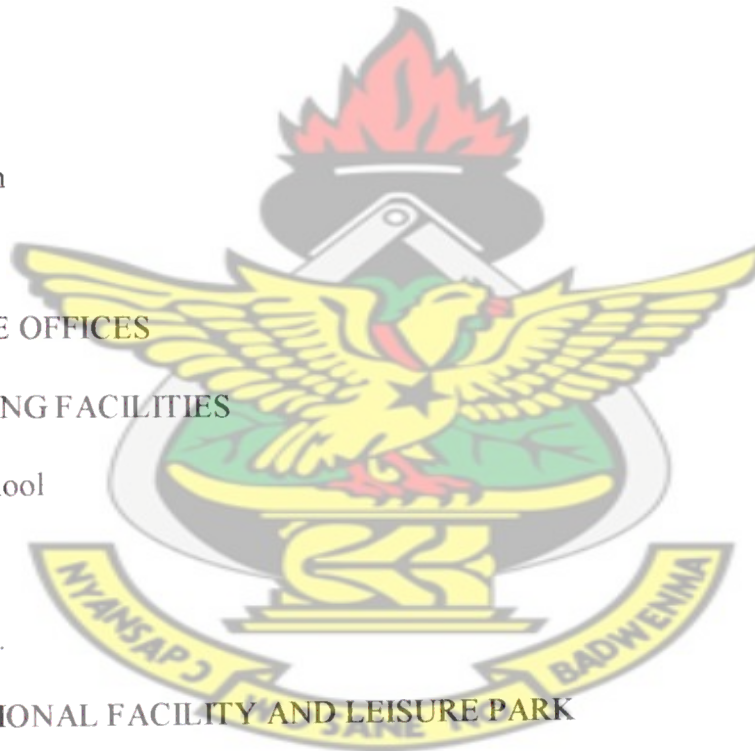
- **RECREATIONAL FACILITY AND LEISURE PARK**

- **OFFICE BLOCKS**

- LETTABLE OFFICES

- **SHOPPING AREA AND TRANSPORT LINKS.**

KNUST



2.6 TECHNICAL STUDIES

Security system

Security is one of the most critical indicators for the success of a residential and for that matter, a mixed use facility. A study on security was made under two broad systems namely electrical and mechanical security systems.

- Alarm equipment

Protective switches

Used for unlawful opening of doors and windows. There are two types, mechanical and magnetic. The mechanical ones rely on physical force to operate the mechanism. The magnetic switches contain contacts what are held in closed position by the permanent magnet. Opening the doors removes the magnetic field and the contact opens to create the alarm situation.

Wired panels

These are suitable for doors, windows, walls and eve ceiling. Magnetic protective switches are fixed to the door and window frames and the plunger magnet in the jamb. An unlawful removal of the plunger activates an alarm.

- **Mechanical security devices**

Security devices considered under these include;

- Roller grills
- Collapsible gates
- Burglar bars
- Ironmongery
- Glazing

For security of vehicles

- Strict management policy
- Strict internal planning

Environmental Services

- **Lighting**

Light is an important element in mixed use facility. Light is used mainly for aesthetics and vision. It is used to augment visibility in residential facility and in addition to visibility, it is used to attract customers in shops and the like. The following point will discuss these considerations. There are two major types of lighting that is natural ventilation and artificial. Effective use of the two can lead to an efficient lighting system.

- **Day lighting**

Day lighting had to be studied mainly for the concept of making the neighborhood an energy efficient one. As much as possible adequate day lighting is required for efficiency in the use of the space. While day lighting can be employed to conserve energy and can enhance visibility, the principal values of day lighting are more intangible. The use of daylight in buildings include the following:

- **Aesthetics** the play of light from windows on surfaces and textures casting interesting shadows the endless variety of mood and appearances due to the movement of the sun
- **Psychological responds** the sense of well being associated with day light and the sense of orientation that comes with being "connected" with the exterior
- **Health** improved resistance to infections, skin disorders, and cardiovascular impairment

- Energy/cost: reduction in electricity and related air conditioning loads from electric lighting
- **Artificial Lighting**

In an office design for instance, artificial lighting must not be regarded solely as alternative to day lighting but as one of the essential features of good interior design. The main purpose, which artificial lighting should fulfill include the following:

- To show goods on display as clearly and attractively as possible in a way that will attract customers' attention to merchandise in a shop.
- To employ colour in a manner that suits and compliments the display.
- To be flexible enough to accommodate changes in display or layout.
- To use the right illumination level for each task and avoid the uneconomical use of electricity.
- To avoid glare. Particularly in an office space.

Emergency lighting

Two types will be considered. They are escape lighting and standby lighting.

Escape lighting: this is needed to enable the building to be evacuated quickly and safely in case of a disaster. They should be fed from power sources independent on the main lighting system. The following factors must be considered for the design of such lights:

- All escape routes and exit doors should be clearly visible.
- All changes in level such a stairs, ramps etc should be clearly illuminated.
- There must not be interference with the ventilation and sprinkler system.

Stand-by lighting: this is needed to allow activities to continue during p power failure and its usually suitable commercial spaces.

Deductions

- The need for natural lighting will be emphasized.
- Artificial lighting will compliment day lighting in some areas.

Ventilation

Ventilation systems will be installed to control temperature and humidity, provide adequate supply of oxygen, efficient extraction of smells and smoke, and in shopping spaces prevention of deterioration of merchandise. The design will utilize the provisions laid down by Institute of Heating and Ventilation Engineers.

Ventilation Systems

Ventilation may be natural or mechanical. Natural ventilation requires effective temperature difference or wind to induce air movement. With mechanical ventilation, air movement is induced by power driven fans. These can be either axial or centrifugal type and may be mounted on walls, glazing including shop front or roofs. The methods which can be used for ventilation can be classified as follows:

- Natural inlet and extract: this applies to small shops where occupancy is low.
- Natural inlet and mechanical extract this method is supply for supplying fresh air but not for extracting smoke unless the supply of air is adequate to balance the volume, which has to be extracted.
- Mechanical inlet and extract: this method is capable of the widest application because distribution, pressure and temperature must all be controlled.
- Mechanical inlet and natural extract: this method delivers air to the interior through ducted systems, allowing extracted air to pass through door and openings. Facilities for filtering and heating air are usually in cooperated.

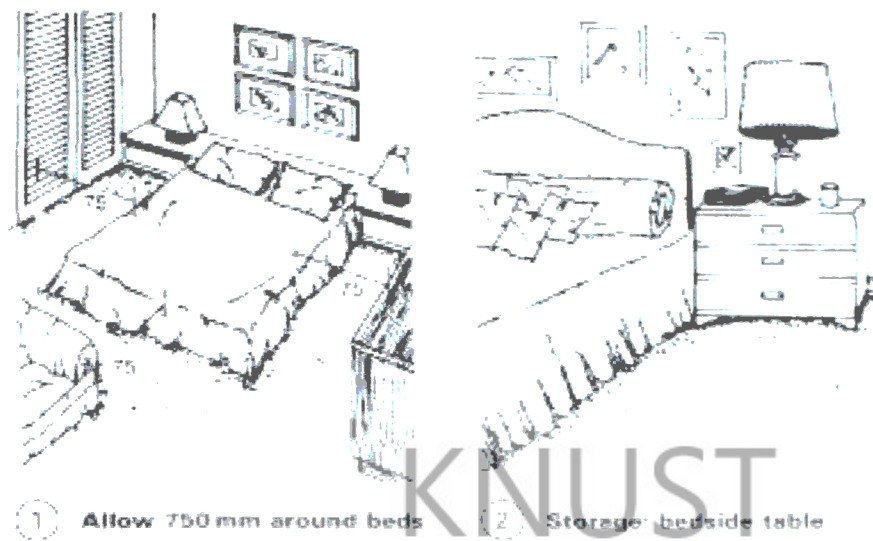
- **Air conditioning**

Air conditioning systems aims at delivery of air which has been warmed or cooled and has had its humidity raised or lowered. In the tropics, the requirement is the supply of fresh air which has been cleaned and cooled: as the cooling increases the relative humidity of the air, a dehumidifying process is required. This may be achieved by exposing the air to cooled surfaces or cold spray whereby the excess moisture is condensed. Air conditioned may be suitable for use in any of the following building types:

- Offices where large crowds of people congregate at a time.
- Conference rooms
- Exclusive offices within the commercial building where the comfort of the customers is a major priority.

Deductions

- Functional spaces will be ventilated through the use of opening and glazing.
- The aim is to achieve the required air changes as stipulated above.
- A central plant is to be used for air conditioning
- Self-contained systems will be provided for some specific spaces.



Source: Ernst and Peter Neufert, Architects Data.



Source: Ernst and Peter Neufert, Architects Data.

CHAPTER THREE

3.0 SITE

3.1 Site selection

The options of sites to use were either on a virgin land outside the capital (Pokuase) or inside the capital on a state owned land. For the purposes of curbing urban sprawl, the state owned land which is within the capital was preferred. Also for the simple reason that it will be more of an example to follow in the capital, the pilot project is also in the capital.

3.2 Site Location

The site is located north-east of the central business district (CBD), some few miles from the town center. The site is bounded on the north by the independence avenue by a dual-carriage road which connects the Ako-Adjei interchange and the golden tulip hotel. On the north-east it is bounded by the switchback lane which connects the independence avenue and the switchback road. The site is also bounded on the south-west by the british embassy residence and some other private residences.



Fig 3.1 The site. Source: Google Earth

3.3 Site Justification

- The site is 17 acres in size. It only has nine blocks on it though. This leaves lots of land on the site undeveloped. In terms of densities, the site as it is has a density of about 20.2 per acre which is quite small for an urban area.
- Considering the current price, which is quite high, and also the rate of urban sprawl, these vast undeveloped spaces are a very big waste of urban land.
- The presence of the large undeveloped spaces, has invited squatters to come and occupy the wide gaps.
- They create their own makeshift shelters with various (unsightly) materials and also use the outside spaces, (mostly under trees) as storage spaces.



Fig 3.2 Storage space for a squatter

Source: Switchback road site. January 2008

- The sanitary facilities that have been put up by the squatters pose environmental risk, because they are not adequately sheltered. They are also less than desirable visually.

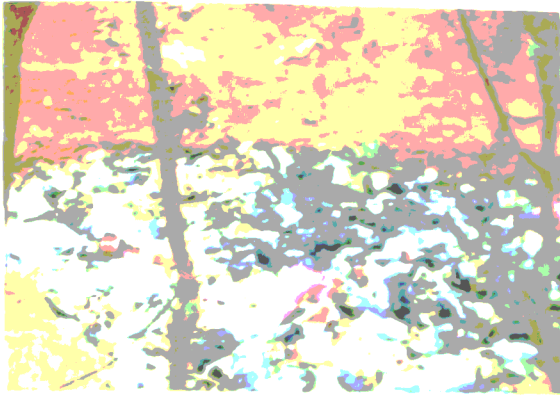


Fig 3 3 Refuse pit dug by squatters

Source Switchback road site January 2008

- Most of the existing blocks are not in the best physical condition. Their aesthetic value has been compromised to an extent with the inclusion of the sun shading devices
- Much of the land has also been encroached upon by basket weavers. The process however produces some amount of waste



Fig 3 4 Basket weaving and making place

Source Switchback road site January 2008

3.4 SITE INVETORY

Vegetation

There are quiet a number of trees on the site. There is also a fair amount of grassland also.

Rainfall pattern

The is an average annual rainfall of about 730mm. Usually during the two main raining seasons. May to mid July and mid August to October.

Soil type

There is a large presence of laterite soil and also gravels.

Temperature range

It ranges between 24.7 and 28 degree Celsius in august (the coolest time). And 26 and 32 degree Celsius in march.(warmest Season)

Orientation

The Site is oriented toward the North-East

Direction of natural drainage

The direction of natural drainage is in the southward direction.

Slope of land

The gradient of the site is 1: 100. Thus, the is a height difference of about one meter in ever hundred meter distance.

3.5 SITE PERIPHERAL STUDIES

On the south periphery are a couple of private properties. This residential facility also serves some commercial purpose also.



Fig 3.5 A private residence

Source: Switchback road site. January 2008

Recommendation

In the planning of the site, facilities that are potential noise creators should be sited away from this area or buffered.

There is a basket making and selling place located across the street that forms the South-east border.



Fig 36 Basket making and selling area.
Source: Switchback road site. January 2008

Hospital on the north will also have much pedestrian activity. Much of the land across the boundary road is yet to be developed.

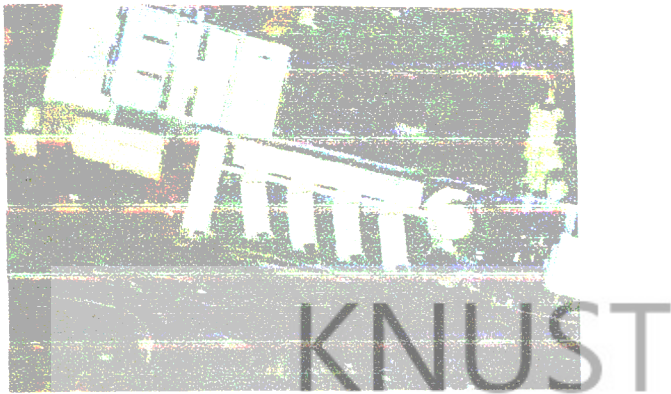


Fig 3.7 The 37 Military Hospital

Source: Google Earth

Recommendation

Heavy traffic on that side calls for the most interesting facades to be located in that area. There is an officer's mess on the north-east of the site is a very private facility and should be considered carefully in the new design.



Fig 3.8 Officers Mess

Source: Switchback road site, January 2008

Residential flats are situated across the north-east road.



Fig 3.9 Residential Block

Source : Switchback road site. January 2008

Recommendation

Much opportunity for shops that need to be accessed by the general residential public.
(outside the site)

3.6 SITE PLANNING CONCEPTUALS



Fig 3.10

CHAPTER FOUR

4.1 SCHEDULE OF ACCOMMODATION

NB; All Area Measures stated against spaces are in Square Metres (m²).

- MIXED USE BLOCKS

- RESIDENTIAL FACILITIES.

One Bedroom Apartment	- 98
Two Bedroom Apartments	- 127.5
Three Bedroom Apartments	- 225

- COMMERCIAL FACILITIES

Retail shops	- 25
Post office	- 110
Pharmacy	- 110
Laundry	- 49
Hairdressing saloon	- 36
Sanitary Areas	- 13.5

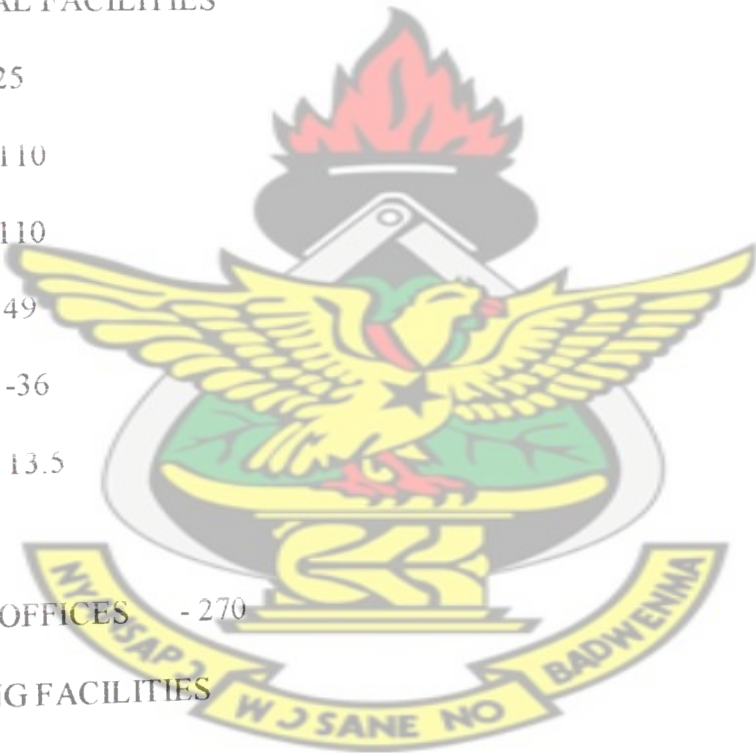
- LETTABLE OFFICES - 270

- SUPPORTING FACILITIES

- Nursery school - 250
- Primary and Junior secondary school - 400
- Church - 500
- Open space.- 420

- RECREATIONAL FACILITY - 2400

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- LEISURE PARK - 900
- OFFICE BLOCKS
- LETTABLE OFFICES - 150 per office
- MARKET AND TRANSPORT LINKS.

4.2 DESIGN PHILOSOPHY/ CONCEPT

4.2.1 Philosophy

The philosophy is to create

A new urban community of beauty and order.

4.2.2 Concept

- By the inclusion of much greenery in the development.(lawns, shrubs and trees)
- By creating a pedestrian friendly urban space using large enough walk ways
And also avoiding pedestrian vehicular conflict.
- By eliminating parking congestion which characterize many urban spaces,
- Creating an energy efficient urban space, by designing spaces that require
Minimum use of artificial ventilation and lighting.
- By recycling the liquid waste to produce water which can be used for some
purposes such as flushing the water closets.
- By including purpose built shops and other commercial spaces to avoid residents
improvising with the inclusion of commercial spaces.

4.3 THE DESIGN

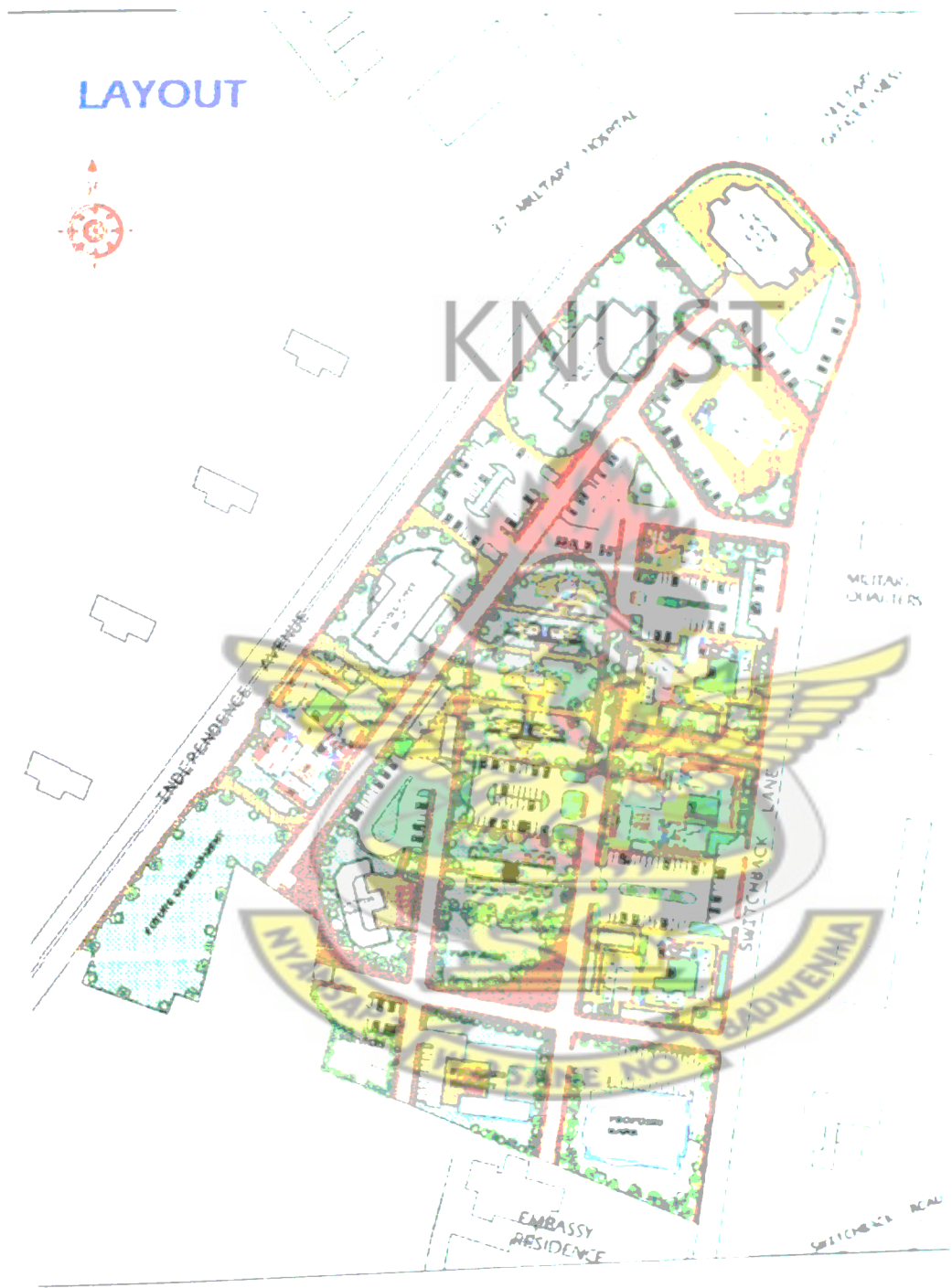
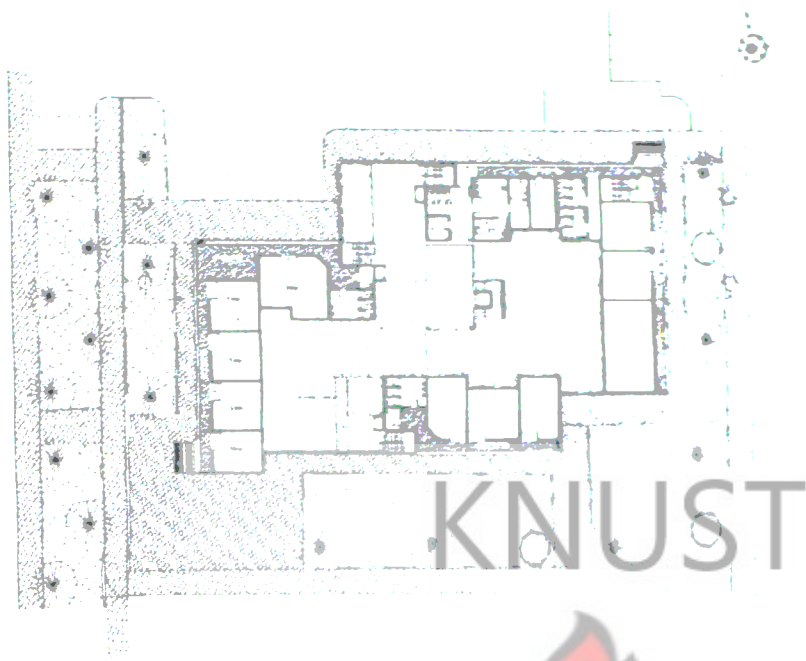
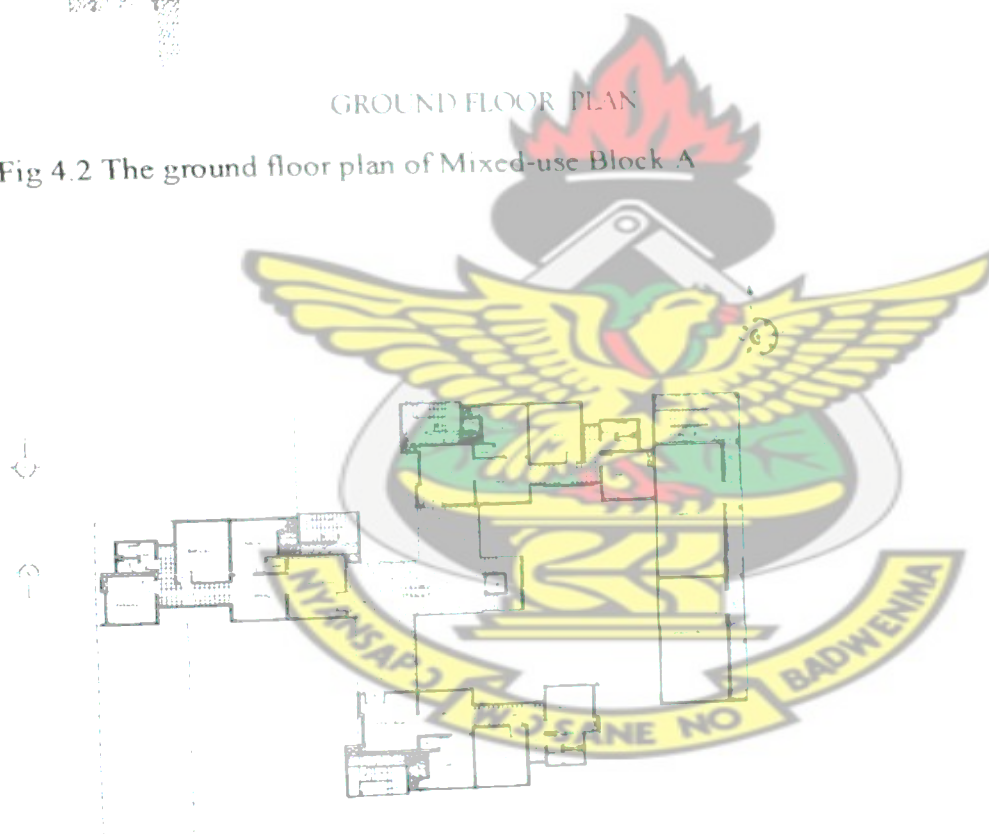


Fig 4.1 General layout



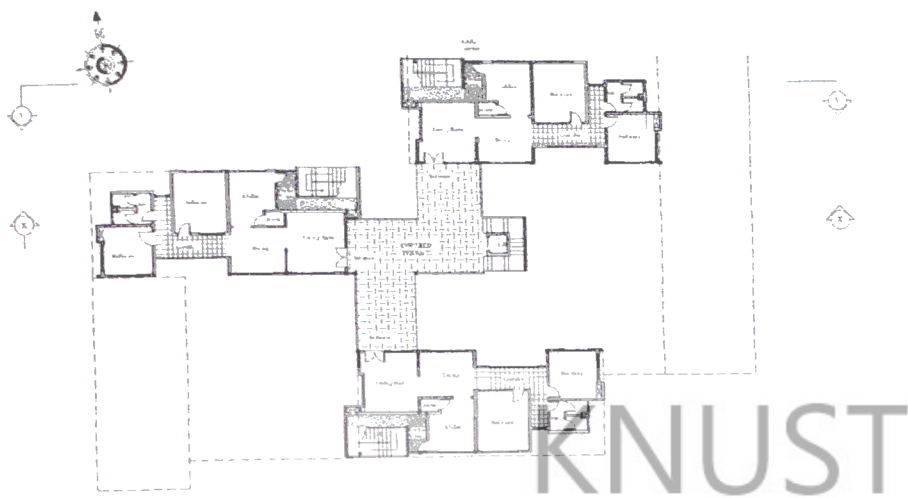
GROUND FLOOR PLAN

Fig 4.2 The ground floor plan of Mixed-use Block A



FIRST FLOOR PLAN

Fig 4.3 The First floor plan of Mixed-use Block A



SECOND & THIRD FLOOR PLAN

Fig 4.4 Second and Third Floor Plan Mixed Used Block A

(CIRCULATION)

LEGEND

	RESIDENTIAL MOVEMENT
	COMMERCIAL MOVEMENT

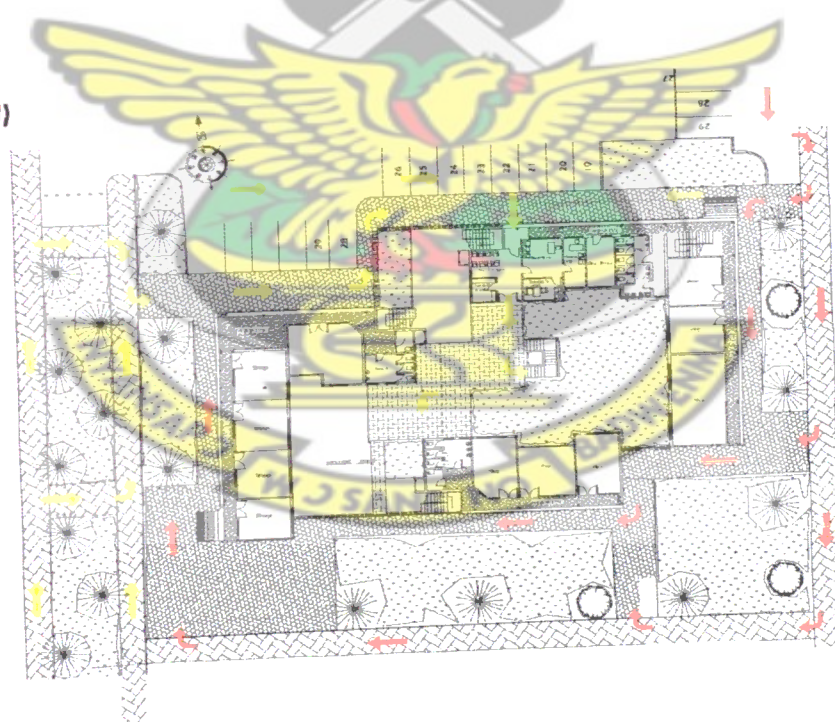


Fig 4.5 Ground floor Plan with commercial and residential Circulation arrows.

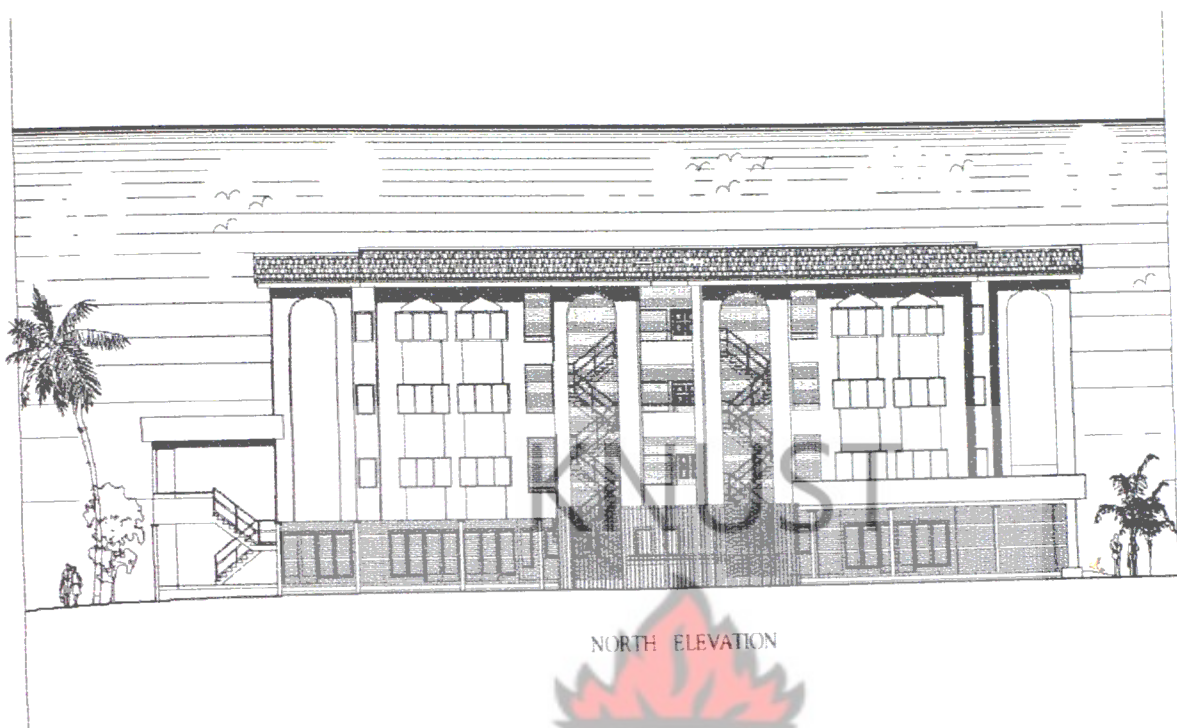


Fig 4.6 The North Elevation of the Mixed-use Block A

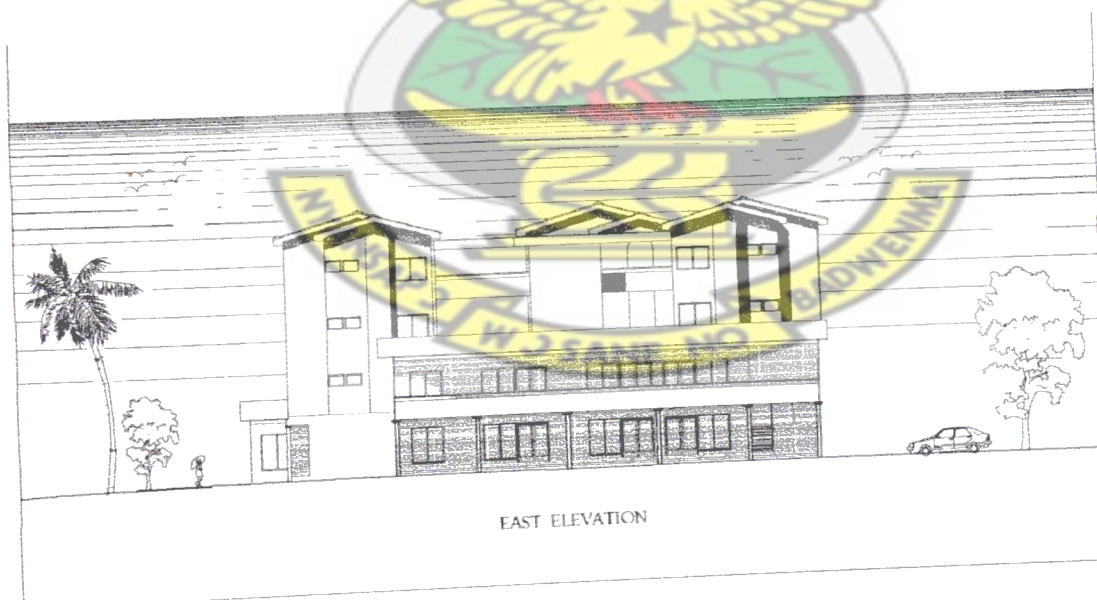


Fig 4.7 The East Elevation of the Mixed-use Block A



Fig 4.8 the south elevation of mixed-use Block A

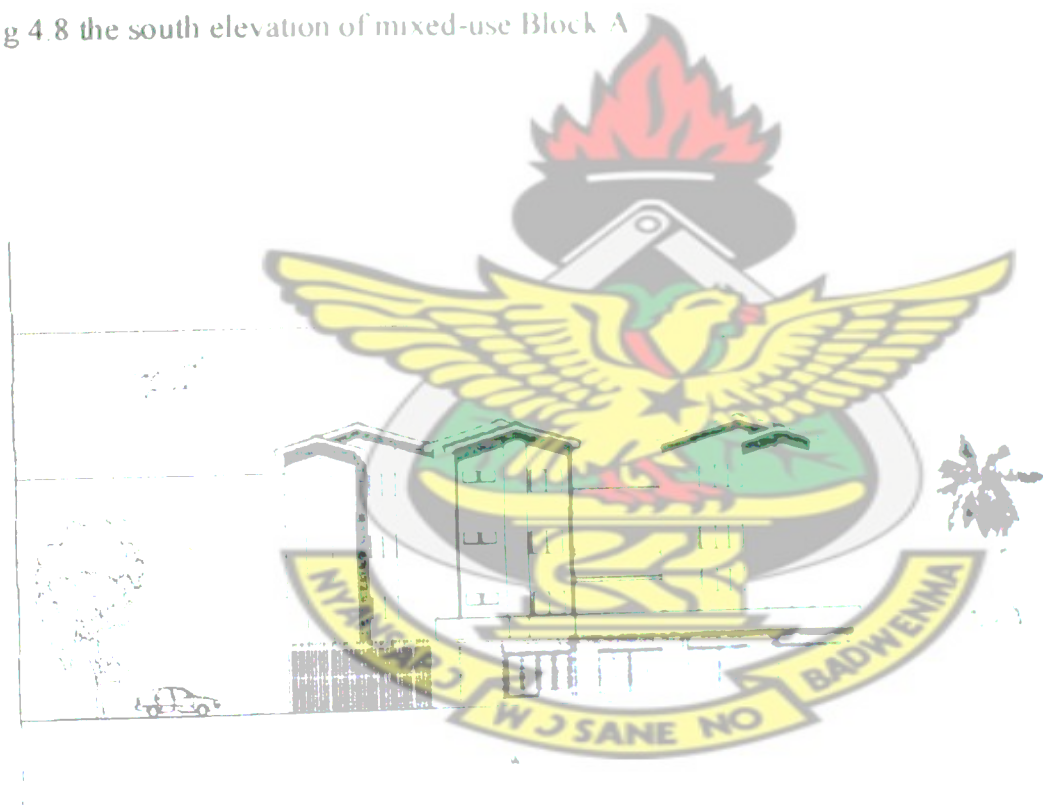
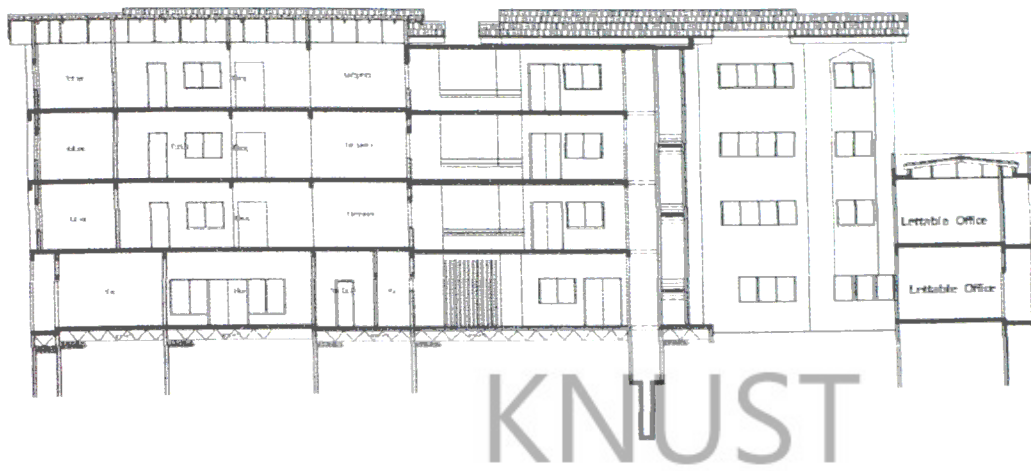
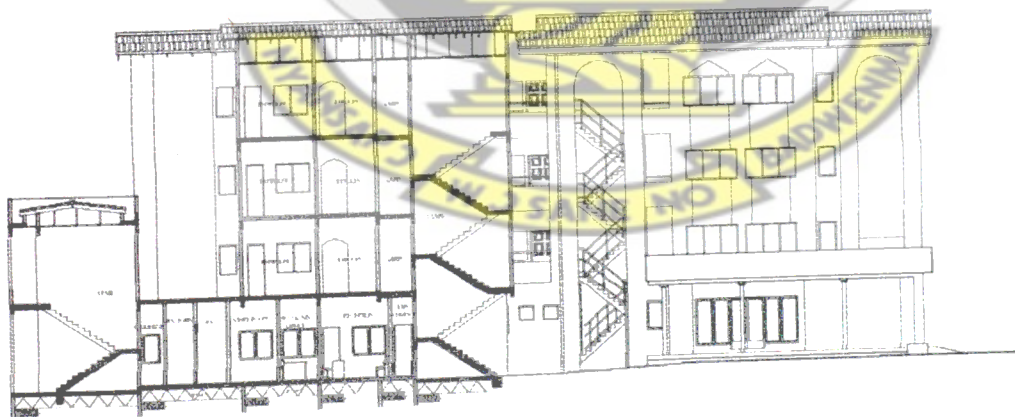


Fig 4.9 the west elevation of mixed-use Block A



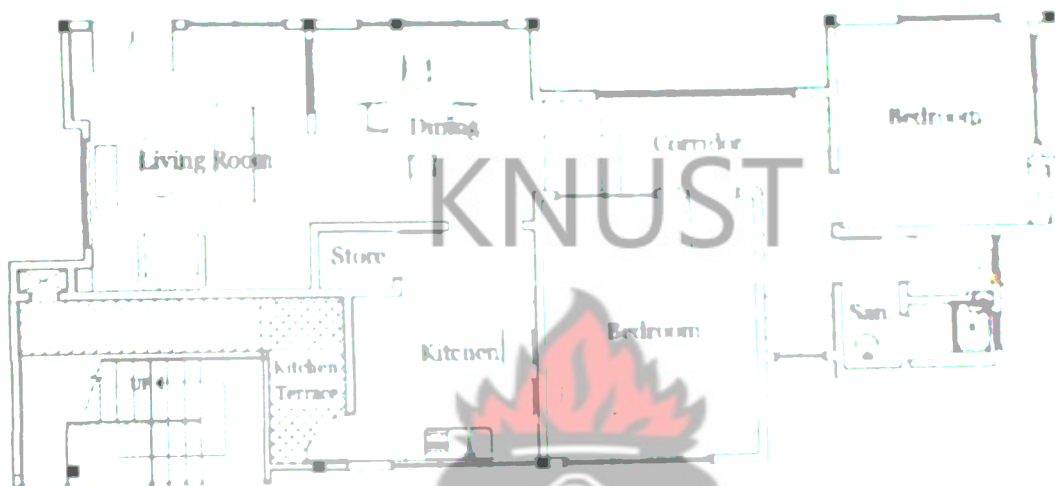
SECTION X - X

Fig 5.0 Section X-X of Mixed-Use Block A



SECTION Y - Y

Fig5.1 Section Y-Y of Mixed-Use Block A



BLOW UP- 1:100

Fig5.2 Blow Up of a Residential Space in Mixed-Use Block A



CHAPTER FIVE

5.0 Landscaping

The use of both hard and soft landscaping are employed in and around the facility. These are done to create an aesthetic effect as well as perform its functional role. Much of the hard landscape will be used to facilitate movement/circulation on the site. Shady trees are also employed to shade open areas from direct sun and by so doing create a cooling effect.

- **Hard Landscape:**

With the introduction of hard landscape, pavement blocks and asphalt finish are employed for car parks and driveways. Concrete blocks of varying shapes and colours and stone finish are used for pedestrian walkways.

- **Soft Landscape:**

Various plants with varying size, colour and height are used to give an aesthetic touch to the facility. These plant also go a long way to modifying the climate. That is, cooling the environment to more comfortable temperatures. The lawns or grass also add some greenery to the environment. The road net work will be lined with royal palm trees with lawns on the sides of the pedestrian walkways. The courtyards would be landscaped to a garden effect.

5.1 COSTING

This costing is an estimate to give the client an idea of the financial investment the project will need. The cost per square meter is \$350 (GH ₵ 343)

- **MIXED USE BLOCKS**

- RESIDENTIAL FACILITIES

One Bedroom Apartment	98 x 343 = GH¢ 33614
Two Bedroom Apartments	127.5 x 343 = GH¢ 43732.5
Three Bedroom Apartments	225 x 343 = GH¢ 77175

- COMMERCIAL FACILITIES

Retail shops.....	25 x 343= GH¢ 8575
Post office	110 x 343= GH¢ 37730
Pharmacy.....	110 x 343= GH¢ 37730
Laundry	49 x 343= GH¢ 16807
Hairdressing saloon.....	36 x 343= GH¢ 12348
Sanitary Areas.....	13.5 x 343= GH¢ 4630.5

- LETTABLE OFFICES..... 270 x 343= GH¢ 92610

• SUPPORTING FACILITIES

- Nursery school 250 x 343 = GH¢ 85750
- Primary and Junior secondary school 400 x 343 = GH¢ 137200
- Church..... 500 x 343 = GH¢ 171500
- Open space..... 420 x 343 = GH¢ 144060

• RECREATIONAL FACILITY..... 2400 x 343 = GH¢ 823200

• LEISURE PARK 900 x 343 = GH¢ 308700

• OFFICE BLOCKS

- LETTABLE OFFICES 375x 343 = GH¢ 128625

• MARKET AND TRANSPORT LINKS.

Grand total..... GH¢ 2,163,987

5.3 CONCLUSION

This design was undertaken to address the very present problems of urban sprawl and the gradual but progressive deterioration of the functional and aesthetic character of our urban spaces. Should this project be embarked on, it will go a long way to create an urban environment where facilities are more conveniently accessed, where travel-to-work congestion is minimized some. Also to create, a socially more diverse community with greater opportunities of interaction. The use of different building types in close proximity will also create good visual stimulation which is worthy of the central business district of a developing country like Ghana.

Safety, which has always been one of the basic needs of man, will be very much appreciated by the inhabitants of the new community. It will also be a more energy efficient urban community where spaces are more effectively used. The support that this design will also provide for small businesses such as corner shops can also not be understated.

5.4 Recommendations

For the successful implementation of this project, active participation must come from all involved, from the client to the inhabitant of the community. All procedures from inception to completion must be followed to the letter.

It is also recommended that the project be carried out in phases.

Phase 1: the mixed-use blocks along the switch-back lane

Phase 2: the purely residential buildings

Phase 3: the office blocks along the independence avenue

Phase 4: the recreational and other supporting facilities

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