

**MIXED-USE DEVELOPMENT**  
**AN URBAN DESIGN APPROACH TO CITIES IN DEVELOPING COUNTRIES**

**By**

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## DECLARATION

I hereby declare that this submission is my own work towards the M.arch and that, to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

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Student Signature Date

Certified by:

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Supervisor Signature Date

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Head of Department Signature Date

## **DEDICATION**

This design thesis is dedicated my parents for their support and inspiration throughout my educational life.

## **CHAPTER ONE**

### **1.0 INTRODUCTION**

#### **1.1 Definition of Mixed-used Development**

One of the Urban Design Principles which cuts across many urban areas around the globe is the principle of mixed- use development. Mixed-use development is the practice of allowing more than one type of use in a building or set of buildings. In planning terms, this can mean some combination of residential, commercial, industrial, office, institutional or other land uses<sup>1</sup>. This tends to create shorter distance between work, residence and recreation and goes a long way to enhance the livelihood of the inhabitants.

#### **1.2 Problem Statement and Justification**

Accra, the capital of Ghana, has a land area of 453 km<sup>2</sup>. It has a population of about 1.7 million for Accra and 3 million for the Greater Accra Region. The population in Accra is growing at a rate of 3% per annum which is greater than the national growth rate of 2.6% <sup>2</sup>.

Most cities in the developing countries are urbanizing at a very fast rate. According to world research urbanization rate in most cities in developing countries is about 2.6% and Accra is

even higher. The Ghana Statistical Service states that “The country is urbanizing at an increasing rate and by 2010 the urban population will be in the majority. By 2025, the overall population is expected to double reaching approximately 38 million, of that number, Accra is projected to increase from approximately 3 million to 6 million <sup>3</sup>.

With a population density of 3,300 per km<sup>2</sup>, and a growth rate of 3% per annum, Accra has a relatively low density, compared to other cities with similar geographic and economic characteristics like Mumbai, India (land area 484km<sup>2</sup>, Density= 29000 per km<sup>2</sup>); Bogotá, Columbia (land area=518 km<sup>2</sup>, Density= 13500 per km<sup>2</sup>); Kinshasa, DR Congo (land area= 469 km<sup>2</sup>, Density= 10650 per km<sup>2</sup>) <sup>4</sup>.

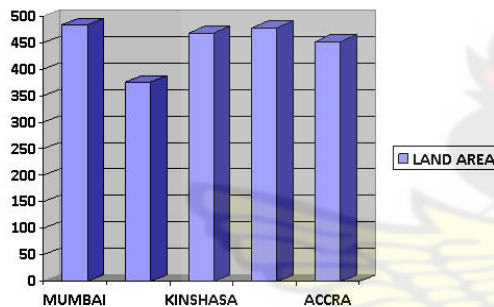


Figure 1 (three cities and their respective land area)

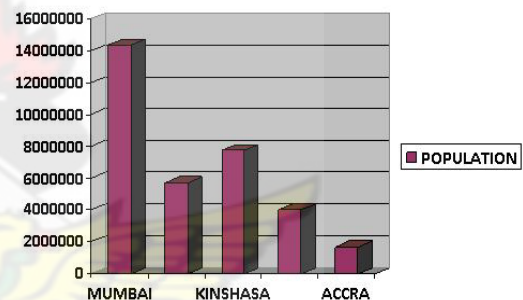


Figure 2 (three cities and their population)

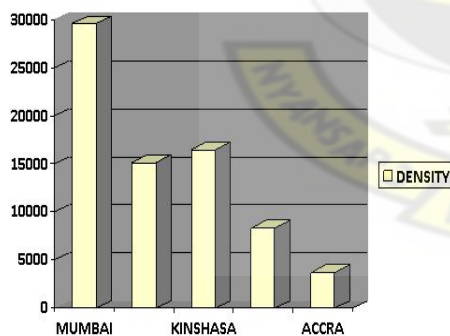


Figure 3 (three cities and their population density)

Source: [www. citymayorsstatistics.com](http://www.citymayorsstatistics.com)

From the comparative analysis of the three cities; Mumbai, Kinshasha and Accra, it can be deduced that Accra has a relatively low population density. Despite its relatively low density,

Accra suffers serious congestion (human and vehicular), urban sprawl, housing shortages, sanitation and infrastructural problems.

If Accra is to accommodate this increased population it must have a comprehensive and long-term plan to manage the population growth and the accompanying strain on city services including housing, infrastructure, education and health to name a few.

### **1.3 Analysis and Evaluation**

According to the The Planning Institute, a California corporation, "The modern city is a complex organism. It is a great human enterprise serving the material and spiritual needs of man. It is a segment of land on which the people have selected their places to live and to work, to learn and to trade, to play and to pray. It is a mosaic of homes and shops, factories and offices, schools and libraries, theatres and hospitals, parks and playgrounds, meeting places and government centres, fire stations and post offices. These are woven together by a net-work of streets and transportation routes, water, sanitation and communication channels". Therefore the city, its design and form needs to be continually modified to adapt to the continuous change in its inhabitants and use. Urban restructuring and planning is a term used to describe this continuous modification and design of the city and its form. This trend can be seen the world over as cities such as Tokyo, London and New York are continually changing to accommodate their growing urban population in order to enhance the well being of its inhabitants through carefully crafted urban planning and design.

Should Accra sit and wait till it grows, gets over populated and collapse due to a break down in infrastructure, services, law and order or should professionals in the building industry and government take up the mantle and attack the rising urban issues objectively?

## 1.4 Proposals

Accra's urban problem of human and vehicular congestion, pollution, environmental degradation and infrastructural inadequacies is not due to overpopulation but inappropriate planning as stated earlier.

There can be two approaches or schools of thought to these urban issues.

1. Direction of traffic (human and vehicular) out of Accra, through the creation of sustainable Satellite Towns. An example of this is the city of Tema, east of Accra, which was built by the late Dr. Kwame Nkrumah to act as a satellite town of Accra in the 1960s.
2. Densification of Accra through,
  - urban re-planning and structuring
  - Multi Storey Structures to increase density
  - Mixed used building and development.

As seen from the comparative analysis of the three cities in Table 1, 2.3, pg 2, it can be deduced that Accra as well as most of the cities in developing countries, is not congested. Therefore, most of the urban problems facing these cities can be solved by a gradual but structured densification through a systematic urban structural planning and adjustment.

This might mean that several underutilized properties (buildings, land etc) will have to be upgraded or developed into high density single or mixed-use facilities. (Preferably mixed-use)

Though not all residents may live and work in the development, a great balance can be achieved through careful research into the target population of a particular development.

## 1.5 Objectives

- To identify some of the urban design principles used in solving the urban design problems of congestion (vehicular and human), urban sprawl, etc.
- To conduct a research into the concept of mixed-use developments as an urban design approach
- To identify the various types and functions of mixed-used developments.
- To show how the concept of mixed-use development can be used to solve some of Accra's urban problems.

## References

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- <sup>2</sup> *Ghana Demographic and Health Survey*
- <sup>3</sup> *Ghana Statistical Service and Macro International Inc. (GSS and MII).1994*
- <sup>4</sup> [www.citymayorsstatistics.com](http://www.citymayorsstatistics.com).

## CHAPTER TWO

### 2.0 LITERATURE REVIEW

#### 2.1 Historical Development of mixed-use developments

Throughout human history, the majority of human settlements developed as mixed-use environments. People lived in close proximity to their work. Walking was the primary way that people and goods were moved about, sometimes assisted by animals such as horses or cattle. Most people dwelt in buildings that were places of work as well as domestic life, and made things or sold things from their own homes. Increase in population and civilization led to the creation of markets and market towns. Most buildings were not divided into discrete



functions on a room by room basis, and most neighbourhoods contained a diversity of uses, even if some districts developed a predominance of certain uses, such as metal workers, or textiles or footwear due to the socio-economic benefits and natural endowments<sup>1</sup>. People lived in close proximity to each other and at times at very high densities because the amount of space required for daily living and movement between different activities was determined by walkability and the scale of the human body. As population increased leading to the rise in towns and cities, several modification were made between domestic and occupational life. For example, in some places the ground floor of buildings was often devoted to some sort of commercial or productive use, with living space upstairs.



**Figure 4 A fisherman's residence indicating relationship between residence and work.**

## **2.2 The decline of mixed-use living and the emergence of zoning**

This historical mixed-used pattern of development declined during industrialization in favour of large-scale early capitalist-style manufacturing in single-function buildings. This period saw massive migration of people from rural areas to cities drawn by work in factories and the associated businesses that grew up around them. These migrant workers needed to be accommodated and many new urban districts arose at this time with domestic housing being their primary function<sup>2</sup>. This led to the creation of land use with specific areas being assigned to specific activities.



Furthermore, many factories produced substantial pollution of various kinds. Distance was required to minimize adverse impacts from noise, dirt, noxious fumes and dangerous substances. Even so, at this time, most industrialized cities were of a size that allowed people to walk between the different areas of the city.<sup>3</sup> These factors were important in the push for Euclidian zoning premised on the compartmentalization of land uses into like functions and their spatial separation.

In Europe, advocates of the Garden City Movement were attempting to think through these issues and propose improved ways to plan cities based on zoning areas of land so that conflicts between land uses would be minimized. Modernist architects such as Le Corbusier advocated radical rethinking of the way cities were designed based on similar ideas, proposing plans for Paris such as the Plan Voisin, Ville Contemporaine and Ville Radieuse that involved demolishing the entire centre of the city and replacing it with towers in a park-like setting, with industry carefully sited away from other uses.

In the United States, another impetus for Euclidian zoning was the birth of the skyscraper. Fear of buildings blocking out the sun led many to call for zoning regulations, particularly in New York City. Zoning regulations, first put into place in 1916, not only called for limits on building heights, but eventually called for separations of uses. This was largely meant to keep people from living next to polluted industrial areas. This separation however, was extended to commercial uses as well, setting the stage for the suburban style of life that is common in America today.<sup>4</sup> The introduction of mass transit systems; the private automobile, bus, rail systems, highways and motorways, led to the creation of dispersed, low-density cities where people could live very long distances from their workplaces, shopping centres and entertainment districts.

### **2.3 The return of mixed-use development as urban design concept**

There was a rapid increase in population and urbanization patterns in most town and cities during the 20<sup>th</sup> century. The population and urbanization growth rate was more than the rate of infrastructural development. This led to severe urban issues such as vehicular and human congestion, urban sprawl, slums, pollution and pressure on the available infrastructure and services. Considerable amount of time could be spent in commuting to and from work. There were environmental and sanitation issues because towns and cities developed without the necessary infrastructural and services layout. Large amount of fuel was needed by commuters for their vehicles hence, considerable portions of their incomes was spent on transportation. The health of individuals was also affected since due to the stress involved in commuting to and from work. Carbon emissions from vehicles also polluted the environment.

In order to alleviate these urban issues and its associated problems, people started looking for employment close to where they live<sup>5</sup>. Also, large residential neighbourhoods served as a source of market for commercial activities. Hence, residential activity gravitated towards commercial activity and vice versa. Also, the advent of information and telecommunication technology made it possible for people to live and work from the same location. The mixed-use building type is not only aggressively reappearing in our cities throughout the world as high-density, urban in-fill mixed-use developments but is also beginning to emerge as a critical component of large commercial developments<sup>6</sup>.

### **2.4 Related Theories**

Proponents of mixed-use developments as an urban design approach such as James Howard Kunstler also advocates certain related theories and concepts. These theories were derived from research into efficient old and new cities.

They are:

- Transit-oriented development (TOD)
- Smart growth
- New Urbanism
- Intelligent Urbanism.

#### **2.4.1 TRANSIT ORIENTED DEVELOPMENT (TOD)**

A transit-oriented development (TOD) is a mixed-use residential or commercial area designed to maximize access to public transport, and often incorporates features to encourage transit ridership. A TOD neighbourhood typically has a center with a train station, metro station, tram stop, or bus station, surrounded by relatively high-density development with progressively lower-density development spreading outwards from the center. TODs generally are located within a radius of one-quarter to one-half mile (0.4 to 0.8 km) from a transit stop, as this is considered to be an appropriate scale for pedestrians<sup>7</sup>.

Some of the characteristics of TOD's include:

- mixed-use development that will use transit at all times of day,
- excellent pedestrian facilities such as high quality pedestrian crossings,
- narrow streets, and
- tapering of buildings as they become more distant from the public transport node.

- Another key feature of transit-oriented development that differentiates it from "transit-proximate development" is reduced amounts of parking for personal vehicles.

#### **2.4.2 SMART GROWTH**

*Smart Growth* is an urban planning and transportation theory that concentrates growth in the center of a city to avoid urban sprawl; and advocates compact, transit-oriented, walkable, bicycle-friendly land use, including neighbourhood schools, streets that work for everyone, mixed-use development with a range of housing choices<sup>8</sup>.

Smart Growth values long-range, regional consideration of sustainability over a short-term focus. Its goals are to achieve a unique sense of community and place; expand the range of transportation, employment, and housing choices; equitably distribute the costs and benefits of development; preserve and enhance natural and cultural resources; and promote public health.

##### **Rational for Smart Growth**

Smart growth is an alternative to urban sprawl, traffic congestion, disconnected neighbourhoods, and urban decay. Its principles challenge old assumptions in urban planning, such as the value of detached houses and automobile use.

##### **a. Economic**

Locating people near each other, near jobs, and near shopping, reduce travel time and transportation infrastructure costs. Policy-makers sometimes try to provide financial incentives to developers to encourage different land use choices, often in combination with changing legal requirements.

Smart growth considers the total long-term economic costs of development decisions, rather than merely the short term profits. Engineers often use life cycle cost analysis to evaluate trade-offs, while investors and proprietors may be more interested in the "bottom line" of profitability.

### **b. Climate and Environmental protection**

In this age of global warming, cities must make structural adjustment and policies which aims at protecting and reducing climatic and environmental impact. Environmentalists promote smart growth by advocating urban-growth boundaries, or Green belts.

### **c. Public health**

Transit-oriented development can improve the quality of life, and encourage a healthier, pedestrian-based lifestyle with less pollution. The United States Environmental Protection Agency suggests smart growth to reduce air pollution.

## **Elements of Smart Growth**

### **1. Compact neighbourhoods**

Compact, livable urban neighbourhoods attract more people and business. Creating such neighbourhoods is a critical element of reducing urban sprawl and protecting the climate. Such a tactic includes adopting redevelopment strategies and zoning policies that channel housing and job growth into urban centers and neighbourhood business districts, to create compact, walkable, and bike- and transit-friendly hubs. This sometimes requires local governmental bodies to implement code changes that allow increased height and density downtown as in the case of Accra and Kumasi where attempts are being made to increase the density in the CBD by introducing series of mid-rise buildings. Most of the old buildings in the CBD are demolished and replaces with mid-rise buildings

of about four to eight storeys. This practice when coordinated effectively will lead to the gradual densification of the CBDs.

## **2. Transit-oriented development**

Despite the fact that this is an urban design principle on its own it can also be a feature in other related theories such as Smart Growth. Transit-oriented development (TOD) is a residential or commercial area designed to maximize access to public transport, and mixed-use/compact neighbourhoods tend to use transit at all times of the day. For example, places like UTC and Kantamanto in Accra and Kejetia, Asafo and Adum in Kumasi could be designed as highly efficient transit-oriented developments due to the fact that, these places have a range of public transport facilities (railway stations and bus stations). These transport facilities and the residential and commercial areas surrounding them can be developed into TODs.

## **3. Pedestrian- and bicycle-friendly design**

Biking and walking instead of driving can reduce emissions, save money on fuel and maintenance and foster a healthier population. Pedestrian and bicycle-friendly improvements include bike lanes on main streets, an urban bike-trail system, bike parking, pedestrian crossings, and associated master plans.

### **2.4.3 NEW URBANISM.**

**New urbanism** is an American urban design movement that arose in the early 1980's. Its goal is to reform all aspects of real estate development and urban planning, from urban retrofits to suburban infill. New urbanist neighbourhoods are designed to contain a diverse range of housing and jobs, and to be walkable.<sup>9</sup>

### **Historical Background of New Urbanism**



Through the first quarter of the twentieth century, cities in the United States were developed in the form of compact, mixed-use neighborhoods, as in European cities. That pattern began to change when cheap rapid transit enabled the emergence of streetcar suburbs, modern architecture, zoning codes, and the ascension of the automobile.

A new system of development with a rigorous separation of uses, known as suburban development arose after World War II. This led to rapid urban sprawl. The majority of U.S. citizens now live in suburban communities built in the last fifty years. Suburban development consumes large areas of countryside for a relatively small population, and automobile use per capita has soared. The suburban working poor must spend a large portion of their incomes on cars, and the mobility of those who cannot drive is significantly restricted in areas without good public transportation.

### **Defining Elements of New Urbanism**

According to the Charter of New Urbanism, new urbanist neighbourhoods have the following characteristics.

1. The neighborhood has a discernible center. This is often a square or a green and sometimes a busy or memorable street corner. A transit stop would be located at this center.
2. Most of the dwellings are within a five-minute walk of the center, an average of roughly 1/4 mile or 1,320 feet (0.4 km).
3. There is variety of dwelling types — usually houses, row houses, and apartments — so that younger and older people, singles, and families, the poor, and the wealthy may find places to live.
4. At the edge of the neighbourhood, there are shops and offices of sufficiently varied types to supply the weekly needs of a household.



5. A small ancillary building or garage apartment is permitted within the backyard of each house. It may be used as a rental unit or place to work (for example, an office or craft workshop).
6. An elementary school is close enough so that most children can walk from their home.
7. There are small playgrounds accessible to every dwelling — not more than a tenth of a mile away.
8. Streets within the neighbourhood form a connected network, which disperses traffic by providing a variety of pedestrian and vehicular routes to any destination.
9. The streets are relatively narrow and shaded by rows of trees. This slows traffic, creating an environment suitable for pedestrians and bicycles.
10. Buildings in the neighbourhood center are placed close to the street, creating a well-defined outdoor room.
11. Parking lots and garage doors rarely front the street. Parking is relegated to the rear of buildings, usually accessed by alleys.
12. Certain prominent sites at the termination of street vistas or in the neighbourhood center are reserved for civic buildings. These provide sites for community meetings, education, and religious or cultural activities.

These defining elements serve as guide in designing new neighbourhoods and also re-planning or restructuring existing ones. When adhered to, these defining elements help to create quality and pedestrian friendly neighbourhoods.

#### **2.4.4 PRINCIPLES OF INTELLIGENT URBANISM (PIU)**

Principles of Intelligent Urbanism (PIU) is a theory of urban planning composed of a set of ten axioms intended to guide the formulation of city plans and urban designs. They are

intended to reconcile and integrate diverse urban planning and management concerns. These axioms include <sup>10</sup>.

- environmental sustainability,
- heritage conservation,
- appropriate technology,
- placemaking, (social access),
- infrastructure efficiency,
- human scale,
- Opportunity Matrix
- regional integration,
- balanced movement-transit oriented development
- Institutional integrity.

Charles Benninger (2001-“Principles of Intelligent Urbanism,” Volume 69, Number 412, pp. 39–65, Athens), outlines the ten axioms as follows:

### **Principle One: A Balance with Nature –Environmental sustainability**

According to proponents of Intelligent Urbanism, balance with nature emphasizes the distinction between utilizing resources and exploiting them. It focuses on the thresholds beyond which deforestation, soil erosion, aquifer depletion, siltation and flooding reinforce one another in urban development, saving or destroying life support systems. The principle promotes environmental assessments to identify fragile zones, threatened ecosystems and habitats that can be enhanced through conservation, density control, land use planning and open space design (McCarg: 1975). This principle promotes life cycle building energy consumption and pollutant emission analysis.

The principle states that blatant "acts against nature" include cutting of hillside trees, quarrying on slopes, dumping sewage and industrial waste into the natural drainage system, paving and plinthing excessively, and construction on steep slopes. Thus, the principles operate within the balance of nature, with a goal of protecting and conserving those elements of the ecology that

nurture the environment. *Therefore, the first Principle of Intelligent Urbanism is that urbanization be in balance with nature.*

### **Principle Two: A Balance with Tradition- Heritage conservation**

**Balance with Tradition** is intended to integrate plan interventions with existing cultural assets, respecting traditional practices and precedents of style (Spreiregen: 1965).

This urban planning principle demands respect for the cultural heritage of a place. It seeks out traditional wisdom in the layout of human settlements, in the order of building plans, in the precedents of style, in the symbols and signs that transfer meanings through decoration and motifs. This principle respects the order engendered into building systems through years of adaptation to climate, to social circumstances, to available materials and to technology. It promotes architectural styles and motifs designed to communicate cultural values.

Embedded in the principle is the concern for unique cultural and societal iconography of regions, their signs and symbols. Their incorporation into the spatial order of urban settings is promoted. Adherents promote the orientation and structuring of urban plans using local knowledge and meaning systems, expressed through art, urban space and architecture.

### **Principle Three: Appropriate Technology**

**Appropriate technology** emphasizes the employment of building materials, construction techniques, infrastructural systems and project management which are consistent with local contexts. People's capacities, geo-climatic conditions, locally available resources, and suitable capital investments all temper technology. Where there are unemployed craftspeople, labour intensive methods are appropriate. Where there is surplus savings, capital intensive methods are appropriate. For every problem there is a range of potential technologies, which can be applied, and an appropriate fit between technology and other resources must be established. Proponents argue that accountability and transparency are enhanced by overlaying the physical spread of urban utilities and services upon electoral constituencies, such that people's representatives are interlinked with the urban technical systems needed for a civil society.

### **Principle Four: Conviviality- Place making**

The fourth principle sponsors *social interaction through public domains*, in a hierarchy of places, devised for personal solace, companionship, romance, domesticity, "neighborliness," community and civic life (Jacobs:1993). According to proponents of Intelligent Urbanism, vibrant societies are interactive, socially engaging and offer their members numerous opportunities for gathering and meeting one another. The PIU maintain that this can be achieved through design and that society operates within hierarchies of social relations which are space specific. The hierarchies can be conceptualized as a system of social tiers, with each tier having a corresponding physical place in the settlement structure.

### **Principle Five: Infrastructure efficiency**

The principle of efficiency promotes a balance between the consumption of resources such as energy, time and fiscal resources, with planned achievements in comfort, safety, security, access, tenure, and hygiene. It encourages optimum sharing of public land, roads, facilities, services and infrastructural networks reducing per household costs, while increasing affordability, productivity, access and civic viability.

Intelligent Urbanism promotes a balance between performance and consumption.

A major concern of urban planning is transport. While recognizing the convenience of personal vehicles, it attempts to place costs such as energy consumption, large paved areas, parking, accidents, negative balance of trade, pollution and related morbidity on the users of private vehicles.

Good city planning practice promotes alternative modes of transport, as opposed to a dependence on personal vehicles. It promotes affordable public transport. It promotes medium to high-density residential development along with complimentary social amenities, convenience shopping, recreation and public services in compact, walkable, mixed-use settlements. These compact communities have shorter pipe lengths, wire lengths, cable lengths and road lengths per capita. More people share gardens, shops and transit stops.

### **Principle Six: Human Scale**

Intelligent Urbanism encourages ground level, pedestrian oriented urban arrangements, based on anthropometric dimensions. Walkable, mixed use urban villages are encouraged, over single-functional blocks, linked by motor ways and surrounded by parking lots.

An abiding axiom of urban planning, urban design and city planning has been the promotion of people friendly places, pedestrian walkways and public domains where people can meet. These can be gallerias covered with glass, arcades, courtyards, street side cafes and a variety of gardens and semi-covered spaces.

Shops, amenities, day care, vegetable markets and basic social services should be clustered around public transport stops and at a walkable distance from work places, public institutions, high and medium density residential areas. Public spaces should be integrated into residential, work, entertainment and commercial areas. Social activities and public buildings should orient onto public open spaces.

Human scale can be achieved through building masses that “step down” to human scale open spaces; by using arcades and pavilions as buffers to large masses; by intermixing open spaces and built masses sensitively; by using anthropometric proportions and natural materials. Traditional building precedents often carry within them a human scale language, from which a contemporary fabric of build may evolve.

### **Principle Seven: Opportunity Matrix**

The PIU envisions the city as a vehicle for personal, social, and economic development, through access to a range of organizations, services, facilities and information providing a variety of opportunities for education, recreation, employment, business, mobility, shelter, health, safety and basic needs (Sen:2000).

Intelligent urbanism views the city as an opportunity system. Yet these opportunities are not equally distributed. Security, health care, education, shelter, hygiene, and most of all employment, are not equally accessible.

Proponents of Intelligent Urbanism see the city as playing an equalizing role allowing citizens to grow according to their own essential capabilities and efforts. If the city is an institution, which generates opportunities, intelligent urbanism promotes the concept of equal access to opportunities within the urban system.



Intelligent urbanism sees an urban plan, not only as a physical plan, but also as a social plan and as an economic plan.

Intelligent urbanism promotes opportunities through access to:

- Basic and primary education, skill development and knowledge about the urban world;
- Basic health care, potable water, solid waste disposal and hygiene;
- Urban facilities like storm drainage, street lights, roads and footpaths;
- Recreation and entertainment;
- Transport, energy, communications;
- Public participation and debate;
- Finance and investment and investment instruments;
- Land and/or built-up space where goods and services can be produced;
- Rudimentary economic infrastructure;
- Intelligent urbanism provides a wide range of zones, districts and precincts where activities and functions can occur without detracting from one another.

#### **Principle Eight: Regional Integration**

Intelligent Urbanism envisions the city as an organic part of a larger environmental, socio-economic and cultural-geographic system, essential for its sustainability. This zone of influence is the region. Likewise, it sees the region as integrally connected to the city. Intelligent Urbanism sees the planning of the city and its hinterland is a single holistic process.

Intelligent Urbanism recognizes that there is always a spillover of population from the city into the region, and that population in the region moves into the city for work, shopping, entertainment, health care and education. With thoughtful planning the region can take pressure off of the city.

#### **Principle Nine: Balanced Movement- transit oriented development**

Intelligent Urbanism advocates integrated transport systems comprising walkways, bus lanes, light rail corridors, under-ground metros and automobile channels. A balance between appropriate modes of movement is proposed. More capital intensive transport systems should

move between high density nodes and hubs, which interchange with lower technology movement options. These modal split nodes become the public domains around which cluster high density, pedestrian, mixed-use urban villages (Taniguchi:2001).

The PIU accepts that the automobile is here to stay, but that it should not be made essential by design.

### **Principle Ten: Institutional Integrity**

Intelligent Urbanism holds that good practices inherent in considered principles can only be realized through accountable, transparent, competent and participatory local governance, founded on appropriate data bases, due entitlements, civic responsibilities and duties. The PIU promotes a range of facilitative and promotive urban development management tools to achieve appropriate urban practices, systems and forms (Islam: 2000). None of the principles or practices the PIU promotes can be implemented unless there is a strong and rational institutional framework to define, channel and legalize urban development, in all of its aspects.

### **Conclusion**

From the urban design theories of Transit Oriented Developments, Smart Growth, New Urbanism and the PIU, it can be concluded that, these are sound, practical and well intended urban design theories which when applied to existing and emerging town and cities, will lead to the creation of highly efficient and sustainable urban environments.

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## **CHAPTER THREE**

### **3.0 RESEARCH METHODOLOGY**

#### **3.1 Study Definition**

Mixed use developments vary in variety and scale. In terms of scale, they range from mixed use spaces, mixed-use buildings and mixed-use developments. They vary from the seamstress who uses her living room as her workspace (mixed use spaces) to the shopkeeper who lives on the first floor and operates a shop on the ground floor (mixed use buildings) right through to huge mixed use developments covering several acres of land. Also in terms of variety, they range from the transit oriented development (TOD) right through to the satellite towns. Hence the research was conducted from facilities of various scales and typology in order to come up with a comprehensive and adaptable conclusion.

#### **3.2 The Purpose of the Study**

The purpose of the study are outlined below

- to determine the factors that lead to the creation of the various mixed-use development
- to determine the various factors affecting peoples decision as to where to live, work, play and learn
- to study certain planned mixed-use development and their effects on its residents and the urban environment as a whole.

- To determine whether the deliberate creation of several types of mixed-use development will help alleviate some of Accra's urban problems such as traffic congestion etc.

Note: for study questions pls refer to appendix 1

### 3.3 Geographical Area of Study

Most of the study areas were chosen within Accra due to following reasons:

- Accra is the capital and largest city in Ghana with the population of the city proper estimated at 1,963,264 as of 2009. (Ghana Statistical Services)
- Accra also doubles as the capital of the Greater Accra Region and of the Accra Metropolitan Assembly with which it is coterminous
- As a primate city Accra is the administrative, communications, and economic centre of the country.



Figure 5 The Greater Accra Metropolitan Area

### **3.4 Sampling Method**

Because of the variations that exist in the various mixed use developments, it will be unfair if measures were not put in place to handle the various ways information was collected. In the light of this various sampling were employed in the collection of data. Specific sampling techniques were used to select the various mixed use developments. This was done through holding interviews with occupants of mixed used developments and developers, studying movement patterns of residence of single use suburban developments, conducting vehicular traffic analysis, and thereafter doing critical analysis of the information gathered.

### **3.5 Survey**

A survey questionnaire was used to collect data from people in various parts of Accra. Specific areas were selected due to their peculiar function within the urban environment. The survey was conducted in the following areas

- Residential areas ; East Legon, Community 18, 19, 20, Spintex Road, Adabraka, Cantoment, Taifa, Mamprobi.
- Commercial areas: Ridge, Asylum Down, Spintex Road.
- Recreational Areas; Accra Mall, Osu Oxford Street, Ridge (the Efua Sutherland park, National Theater and Conference Centre area)
- Educational Area; University of Ghana, Legon (Okpoglo, Haatso, etc)

It took the researcher two weeks to collect data randomly from people within these areas.

### **3.6 Case Studies**

Studies were also conducted over the internet and journals on three planned mixed used development. These are:

1. The Greenwich Millennium Village, London. United Kingdom
2. Rapallo, Coconut Point, Estero, Florida, U.S.A
3. Magarpatta City, Pune, India

These were chosen to enable the researcher see the practical implementation of some of the urban design theories discovered in the literature review (Chapter Two). In addition to that these case studies were relevant because they were intended and designed as planned mixed use developments. Also, studies were conducted into certain developments which acted as a catalyst to create large scale mixed use developments. Examples of these are:

1. The Spintex Road, Accra, Ghana
2. Ayeduasi Township of K.N.U.S.T, Kumasi, Ghana
3. Okponglo and Haatso Town, near University of Ghana, Legon, Accra, Ghana.

### **3.7 Ethics**

The various occupants and participants were made aware of the understanding that, the research is purely academic and findings will be used solely for the purpose for which this research was carried out. This is to study the relevance of mixed use development and how they can be beneficial as an urban design tool to create practical and efficient urban environments.

### **3.8 Search Engines**

Material on the various development were retrieved from the internet, Urban design Compendium by English Partnership, Encarta World Encyclopedia, books and journals such as Architectural Record and personal observation and analysis.

### **3.9 Limitations**

Although most of the data was successfully gathered, it was not without several hindrances.

The prominent ones are outlined below:

- Due to the nature of this research, a vast study area needed to be studied in order to come up with a comprehensive conclusion. This was a very arduous exercise requiring vast amount of time and energy.
- The researcher initially encountered problems collection information from some of the high end residential neighbourhoods at Cantoments, East Legon etc.
- Scepticism about the purpose of the study resulted in hesitation from some of the interviewees.

Despite the above mentioned problems, information from the internet and relevant journal provided useful information on the subject matter.

## **CHAPTER FOUR**

### **4.0 FINDINGS AND DISCUSSIONS**

#### **4.1 Overview of research findings.**



ed development from which the practical a  
nsit Oriented Development, intelligent urba  
nts a rich variety of uses and users blended  
ch peninsula site, the Greenwich Millennium  
£250 million residential developments, in  
ranging from one bedroom apartments to  
designed to set the national standard for f  
developments.

Together with the development of homes, leisure space and community facilities, 12 previously used land was cleaned up and began for a new major quarter for London.

Reference (English Partnership's Urban Design Competitions)

- 2500 homes

2500 HOMES,

[29]



- High quality health centre
- Educational centre
- A modern, low energy Sainsbury Supermarket,
- 162 bedroom, hotel
- Underground railway station,
- Bus terminal,
- 3 main parks



**Figure 6b Greenwich Millennium Village, Uk**

### **Site History**

The site has been used for a range of industries, manufacturing munitions, chemicals, steel, submarine cable, rope and soap, but these uses were dwarfed by the gasworks which opened in 1887 and expanded to become the largest gasworks site in Europe.

By the mid- 1980s, Greenwich Peninsula was left largely derelict and contaminated by industrial waste.



**Figure 7. Greenwich before the project**

## Remediation

In 1996, British Gas, the previous landowners, commenced remediation works across the whole site.

At this stage of the project new infrastructure was installed across the site to serve the planned community.



Figure 8. Greenwich showing the stages of remediation

## Outstanding Features of the Project

### TRANSPORT:

Public transport is one of the key elements of the regeneration of Greenwich Peninsula and one that will ensure that the area will thrive in the future.

Greenwich Peninsula now has one of the best, fully integrated, public transport networks in the capital.

Also a network of footpaths and cycle ways make car-free transport the easy options when making local journeys.



Figure 9 Transportation facilities at Greenwich Millennium Village

### LANDSCAPING AND RIVERSIDE:

The natural environment is an important part of the urban landscape at Greenwich Peninsula. Almost a sixth of the entire site has been given over to parkland and public open spaces and over 2km of riverside has been enhance and improved.

Over 12, 000 trees and thousands of shrubs have been planted to create three main areas of parkland:

- **Central park**, - a formal park which acts as a spine for the area.
- **Southern park** – lies in the heart of the Greenwich Millennium Village and many of homes look out onto this traditional park.
- **Ecology parks**. - recreates and builds on elements of the Peninsula's original marshland heritage. It has a freshwater area that includes two lakes, connected by streams and seven different environments each tailored to the needs of certain sets of wildlife.

Each has a different function and feel and through careful planting and the reintroduction of native flora the parks are attracting wildlife back to the area.

### SCHOOL AND HEALTH CENTRE

English Partnerships has built a two-form entry primary school, integrated with a seven GP practice health centre on the Millennium Village site.

Both the school and the health centre have been designed to provide more services to the village and the neighbourhood communities.



**Figure 10. School and Health centre at Greenwich Millennium Village**

## **The School**

The Millennium Primary school has a capacity for up to 420 children and includes an Early Years Centre. It is also equipped to include children with disabilities and special needs within mainstream schooling and benefits from state-of-the-art information and communication technology (ICT) cabling and equipment.

The school is fully designed for use outside of school hours, including community use and adult education, providing facilities for all ages with the Greenwich community.

The school benefits from an all weather sports pitch which is also used by community groups outside school hours.

## **The Health Centre**

The health centre is equipped to be able to treat many minor complaints within the practice that would have otherwise required outpatient treatment.

## **Character and Sustainability Features**

The original Village masterplan, drawn by world-renowned architect Ralph Eskine, was for a high-quality, mixed tenure development, initially for, 1377 mixed tenure development, and is now planned to expand to over 2,500 homes.

The homes are being developed around a number of squares, all linked by the Peninsula's green corridors.

The Village accommodates a range of different property types at different densities, from stunning riverside apartments to family homes close to the school, and from live/work units to homes specifically designed to accommodate people with disabilities.

20 per cent of the originally planned homes in the Village have been designated as affordable. One of the key criteria for allocating affordable homes has been to provide much needed accommodation for London's key workers (teachers, nurses, etc)



The Village's Developers have set themselves ambitious targets to be achieved over the lifetime of the project, for minimising the impact on the environment, including:

- 80 percent reduction in primary energy consumption:
- 50 percent reduction in embodied energy:
- 30 percent reduction in water demand: and
- 50 percent reduction in construction waste.

These targets are being achieved through a number of different means, including

- the use of combined heat and power,
- high levels of insulation and natural light,
- energy and water efficient appliances
- The careful selection of materials at the design stage.



**Figure 11. The residential area at the Greenwich Millennium Village. Uk.**

### **Commercial and Private Sector**

The private sector developers already attracted to Greenwich Peninsula have invested 400 million pounds and created over 1000 jobs.

The retail area is linked by public transport, footpath and cycle networks and in an aim to reduce car use the units share one 1500 space car park.



**Figure 12. Greenwich Millennium Village, Uk. Hotel and Cinema**

### **Commercial Activities**

**Sainsbury's** – Greenwich Peninsula is home to the first low energy food store in Britain. The Sainsbury's store, which opened in 1999, has proved itself to be 50 per cent more energy efficient than a traditional supermarket. Coupled with two adjacent non-food retail stores, also built by Sainsbury's but operated by B&Q and Comet, over 800 jobs have been generated by the three retail units.

**UCI Cinema-** the FilmWorks circular cinema was the first of its kind in Europe. Based on a central projection core, the 14-screen cinema utilises new technique in air conditioning, which pre-cools auditoria according to the number of seats sold.

**Express by Holiday Inn Hotel-** the 162 bedroom Express by Holiday inn provides guests with impressive views of Greenwich Peninsula and the Millennium Dome.

Parking is provided, but a reduced rate is offered to guest arriving by public transport.

**Royal Mail Sorting Office-** Situated on the Edge of the Peninsula, close to Sainsbury's, the new Royal Mail Sorting Office has taken the place of three smaller sorting offices.

### **4.3 CASE STUDY TWO**

RAPALLO, COCONUT POINT, ESTERO, FLORIDA, USA

*Reasons for study*

This development represents a high income mixed use development. It once again lays emphasis to the fact that, residences should not be planned without the accompanying commercial and recreational activities in relatively fair proportions.

## Introduction

The Art District at Rapallo is located in the North Village of Coconut Point; a 488 acre mixed-use community of 1,400 homes, 1.4 million square feet of retail, over 160 shops and restaurants and an extensive healthcare and medical complex.

Residents of The Art District at Rapallo have easy access by walking, biking and car to all of Coconut Point with its network of internal roads, sidewalks, pedestrian gates and walking/biking paths. It is truly a "connected" pedestrian-friendly lifestyle

### The North Village

- **The Art District at Rapallo:**  
256 homes, 36 live/work studios plus the 506 seat Rapallo Theatre and 32 Restaurants, Galleries and Shops.
- **The Club at Rapallo®:**  
A "Members Only" resort lifestyle club, including the Tennis Center, the fitness center & Olympic lap pool, The Clubhouse & Lagoon Pools, the Arts & learning center, Walking/biking paths, the parks & preserves and 450 homes.
- **The Enclave at Rapallo:**  
90 Coach homes.

### Wildlife Preserve



Figure 13 Master plan for Rapallo



## **The Town Center**

- **Marketplace:** Mediterranean promenade of "famous brand" homestyle, fashion, entertainment and other superstores
- **Lakefront:** boutiques, restaurants, and entertainment around a lake
- **Mainstreet:** Dillard's, Barnes & Noble, Muvico and over 100 stores and restaurants in an open-air, pedestrian village.

## **The South Village**

- Healthcare facilities and future hospital
- Medical office complex
- Specialty stores and restaurants
- Assisted living facility

## **DESIGN FEATURES**

### **Residences of The Art District at Rapallo**

The urban village lifestyle appeals to a diversity of people of different ages, careers, and preferences and pocket books. The Art District at Rapallo has homes for just about everyone within a wide choice of plans, sizes, prices and neighbourhoods. From mixed-use neighbourhoods with Terrace Homes, where you're just a step away from restaurants and shops, to Park Lofts, to Live/Work Studios, where you can live, work and play in one place, to more traditional residential neighbourhoods of Courtyard Villas.

### **LIVE/WORK STUDIOS & PARK LOFTS**

1-3 bed/1½-3 bath  
home/work space.  
1306-4412 sq. ft.



### **TERRACE HOMES**

3 bed/2 bath homes  
above shops and  
restaurants.  
1666-2474 sq.ft.

### **VILLAS**

3 bed/2-3 bath  
Courtyard or  
Pieds-a-Terre Villas  
2266-4086 sq.ft.



**Figure 14 Pictures showing the various house types at Rapallo.**

### **Live/Work Studios and Luxury Park Lofts**

A completely unique offering in Southwest Florida, the Art District Live/Work Studios offer the creative professional and artist the ultimate in live/work/play connectivity. A workspace is placed adjacent to a living space with complete flexibility for the owner. You can choose to use the studio for work and live in the same space or upstairs or, in another neighbourhood.

The luxurious second floor Park Loft residences include private elevators, front and rear terraces for entertaining and optional guest studios.

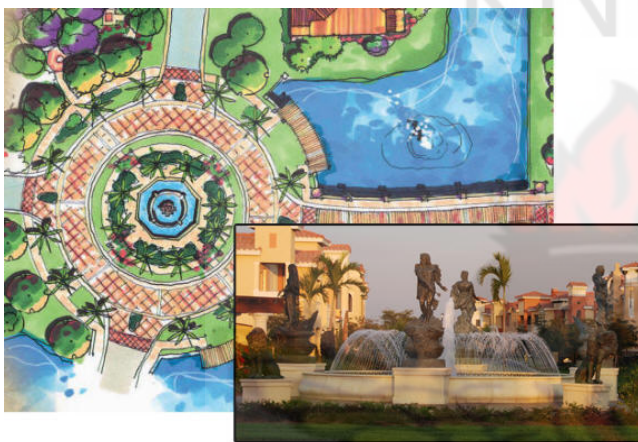
### **Walking/Biking Path and Halfway Creek Wildlife Preserve**

Undoubtedly the best way to keep in shape and meet your neighbours is a morning or evening walk. Two miles of walking/biking path weave through the lush perimeter of The Club At Rapallo and along the quarter-mile waterside boardwalk overlooking the Halfway Creek

Wildlife Preserve. And for your convenience the five pedestrian gates along the walking/biking path link you to your home or the town center.

### **Piazza Doria**

The Centerpiece of The Club at Rapallo is this cobblestone, round-a-bout with its four bronze Roman gods and classic fountain inspired by the Palazzo Doria. The trellised piazza is surrounded by quaint bridges, boardwalks, fishing levees and a beautiful botanical garden, a tribute to the romantic heart of the Mediterranean.



**Figure 15 the Roman Gods of Piazza Doria are the center of the Club at Rapallo**

### **Mainstreet Restaurants, Galleries and Shops**

The urban village is where life, in all its faces, lives, works, plays, shops... and eats. The Main Street Promenade is the source of energy for the village. Four terrace buildings, designed like a Mediterranean coastal town built over hundreds of years, host shops, galleries and restaurants on the ground floor. A covered pedestrian promenade offers haven from the rain and hot sun so you can stroll from shop to shop to restaurant in dry shade.

The second and third floors of mainstreet are Terrace Homes, with stealth parking in the rear, a magnificent central courtyard nestled amongst the shops and an open-air promenade on the second floor. Best of all, everything is just downstairs or down the street.



**Figure 16 Main Street- site plan**

#### **4.4. CASE STUDY THREE,**

**MARGARPATTA CITY, PUNE, INDIA**

##### *Reason for this study*

In my opinion, Magarpatta City represents in reality the theory of *self sustaining mixed use development*. The core or catalyst for this development is the office park at the centre of the development. Accommodation, recreation and education needed to be provided for the workers and their dependents, thereby creating a self sustaining mixed used development.

*Material for this study was obtained from [www.magarpatta.com](http://www.magarpatta.com) and from Architect Tony Asare who visited the development.*

#### **Introduction**

This is a 400-acre integrated township with residential, commercial & IT development along with proper emphasis on Environment, Education, Healthcare, Fitness, Recreation, Security. Large floor plates are provided for office space with high efficiency and offer seamless



scalability options. Buildings are designed as per international norms, with state-of-the-art amenities like multiple Internet Service Providers and telecommunication, 100% Power back-up, ample parking space, high-end security system etc.

The core of the scheme consists of an IT park and several residences to the peripheries.

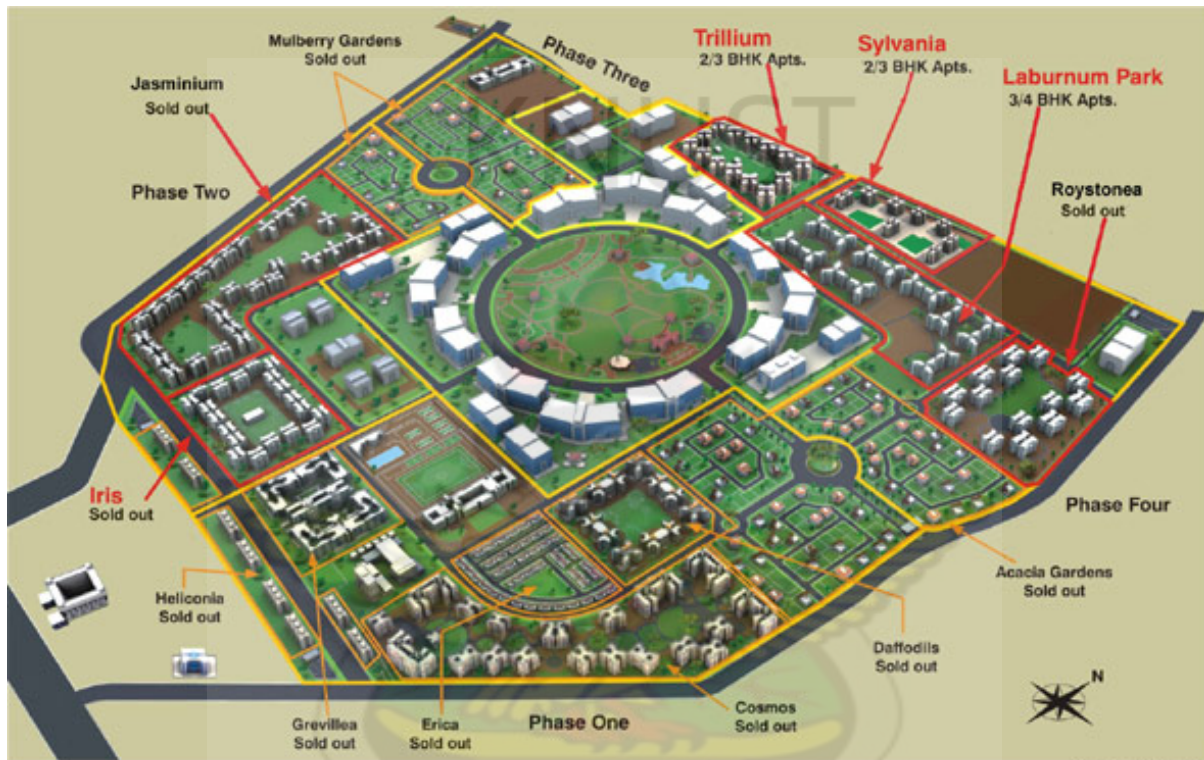


Figure 17 Computer generated aerial view of Magarpatta City.

## Objective of Development

The Vision was to create a new way of life for the networked society of the new millennium. With emphasis on proper environment control, good living standards, modern educational system and state-of-the-art working conditions with total security.

## General Amenities at Magarpatta City

### General



1.	<b>Garden City</b>	Central Garden of 25 acres along with separate internal gardens for every neighbourhood ranging from 0.5 to 2 acres.
2.	<b>Cybercity</b>	Hi-tech commercial area for information technology enabled Services.
3.	<b>Shopping</b>	Convenient shopping & other essential services.
4.	<b>Internal Roads</b>	Broad asphalted roads with landscaped footpaths on either sides.
5.	<b>Jogging/Cycle Tracks</b>	Extensive network of jogging & cycling tracks throughout Magarpatta City.
6.	<b>Security</b>	Round-the-clock Centralised Security System.
7.	<b>Garbage Disposal</b>	Eco-Friendly sustainable garbage disposal system.
8.	<b>Property Management</b>	Maintenance and upkeep will be looked after by Magarpatta Property Management Division.
<b>Restrictive</b>		
1.	<b>Education</b>	Education Facilities from primary school to higher education with large Playgrounds.
2.	<b>Sports</b>	Wonder Golf, Swimming Pool, Tennis Academy and Gymnasium.
3.	<b>Health Facilities</b>	Well equipped hospital for medical aid round-the-clock
4.	<b>Broadband Connectivity</b>	The city is Broadband enabled with Tata Indicom Broadband from VSNL
5.	<b>Cable Services</b>	Cable services are provided by the Property Management Services Division



**Figure 18 Model of Magarpatta city**



**Figure19 Model of Magarpatta city**

### **Design Concepts of Magarpatta City**

#### **Integrating mankind with nature**

Ingrained in every aspect of this venture is the objective of integrating mankind with nature and technology, thereby restoring life's harmony, completeness, balance and fulfillment in the living process. The first step is to create a clean pollution-free environment, where life can co-exist with nature in complete harmony, thus offering the complete living experience.

#### **The Rutuchakra concept - for an evergreen city**

In Magarpatta City, life revolves around the Rutu Chakra - the eternal Time Wheel of Nature. The entire city will bloom into a rhythmic splash of colours based on the six seasons - Vasant (Spring), Grishma (Summer), Varsha (Rainy), Sharad (Autumn), Hemant and Shishir (Winter). Perennially in bloom the gardens will be a sight to behold. Aditi Garden the 25-acre central garden will abound in a variety of trees and neatly laid out lawns. With a green cover of this expanse, Magarpatta City offers nature at her ever best.

#### **'Walk-to-work, walk-to-school' concept**

Today life in any city means the ordeal of long distances. All the members of a family have to travel great distances in different directions daily. But this is not the case at Magarpatta City. All the vital amenities and institutions that any family needs like Schools, office space,

shopping centres, entertainment centres and more are provided within walking distance from home. Which means children can walk to school, their parents can walk to work and the family can enjoy their evenings at any of the recreational facilities provided.

### **"A Complete City within a City"**

In consonance with its vision, Magarpatta City is an effort to restore life's harmony, completeness, balance and fulfillment in the living process. To achieve this, a mere neighbourhood won't suffice. A larger canvass is needed. That is why, with life as the central focus, a completely new city has been created, just 7kms from the Pune station.

A 400-acre project to be completed in phases, Magarpatta City was conceived to curb sporadic development of mini townships in the city. And ensure a better quality of life by providing all the vital amenities and facilities that a family needs right around their home.

### **Design Features**

#### **Maximum security and safety**

Magarpatta City is a walled city, with fortified gates and guarded entrances. No stranger can enter the city, without security clearance. Added to this, the city will be intensively patrolled day and night by security professionals. All the safety norms for fire fighting, electricity, in-city traffic will also be enforced by professionals.

#### **Environment**

1/3rd of Magarpatta City's area, about 120 acres are gardens alone. Apart from this there are trees, plantations and green sidewalks dotted alongside the roads. Declared an Oxygen Zone, the City is pollution-free. Adopting eco-friendly practices such as solar water heating, solar lighting and hygienic garbage disposal further preserves the environment.

#### **Education**

Magarpatta City also has education facilities from pre-primary to graduation. Which means

your children won't have to go far for schooling and college education. These will be available with walking distance

### **Recreation**

Recreational spots are normally located far off in any city. But at Magarpatta City you have them right around your home. Amphitheatres, Cultural Centres, Aqua Sports Complexes, Shopping and Entertainment centres, Golf Clubs and more offer you the maximum delight.

### **Health**

A family's healthcare needs are met by a 200-bed multi specialty hospital in Magarpatta City. The ultra modern hospital will provide the best in healthcare by eminent medical professionals.

### **Infrastructure**

A consistently top quality of construction procedures is maintained at Magarpatta City. Broad wide roads, traffic islands, block parks are designed in accordance with international procedures. Power & water supply too will be through systematic super safe state-of the-art engineering.



**Figure 20 Magarpatta City (residential block)**



**Figure 21 Magarpatta City ( social center)**



## **ECO-FRIENDLY PRACTICES AT MAGARPATTA CITY**

Magarpatta City practices numerous techniques for conservation and betterment of the environment. We practice various Sustainable Energy Systems on a huge scale striving to reduce Global Warming.

### **Rainwater Harvesting**

Rainwater harvesting to canalize water from terraces is planned for over 8 natural wells, 515 recharging bores, over 1.25 acres of an artificial lake body and to recharge ground water levels. Inter-locking paving blocks and cutout grass concrete pavers assist in raising groundwater levels. Waste water is recycled with three sewage treatment plants planned with a capacity of 2 million litres a day and the recycled water is used for gardening purpose via the conserving drip irrigation and sprinkler distribution system. This keeps the garden lush green and lowers temperatures in the surroundings.



**Figure 22 cutout grass concrete pavers**

### **Garbage Segregation at Source**

Eco-friendly practice of segregation of over 400 tonnes of household and commercial garbage, trash and waste per month is done at source of which 280 tonnes of biodegradable waste is used for vermiculture and bio-compost. Over 120 tonnes non-biodegradable waste is recycled in a way not hazardous to nature, disposed off safely and the re-usable scrap is sold.



**Figure 23 Recycling plant**



## **Biogas Plant**

A two tonne capacity Biogas plant is installed here wherein biodegradable waste goes through a process and the non-polluting biogas which is generated is used to generate power to operate a major percentage of the garden pumps. This saves excessive power requirements equivalent to 118 commercial gas cylinders of 19 kilograms capacity per month, which translates to a power generation of over 270 electrical units per day. Over 7,000 solar water heating panels installed on the terraces reduce heat effects on the top floors and are designed to save over 1.75 crore electrical units which potentially translates to more than 13,000 tonne of carbon emissions saved every year. An electrical vehicle is used for security. Low power consumption lights are fitted in streets and common areas.



**Figure 22 Biogas plant**

## **Vermiculture**

The nursery has vermi-culture and bio-compost pits, which generate manure from garbage segregated at source at Magarpatta City. The manure composted here provides for nourishing these saplings and shrubs. Organic pesticides like Verticillium and Trichoderma are used extensively. Not only are plants, saplings and organic vegetables sold here, a unique facility of a Plant Library is offered whereby just like a book/ video library one can enjoy the different plants here at a nominal charge for a limited period providing a refreshing and dynamic feel to ones dwelling.



[47]

**Figure 23 Vermiculture**

### **Use of Fly-ash Bricks in construction**

Fly ash which is an environmental hazardous waste produced by thermal power plants is used as a part replacement of cement and fine aggregates, is an inert material & saves energy required for production of cement. Usage of fly ash bricks helps in reduction of greenhouse gases, which are depleting the ozone layer. These bricks are better than traditional bricks because of various reasons, like controlling of pollution, cost, breakage, wastages, evenness, finish while manufacturing and more compressive strength. As fly ash bricks are produced mechanically they are economical, good for any type of masonry and absorb very less water. For every tonne of fly ash used in construction, approximately 1 tonne of CO<sub>2</sub> emission in environment is reduced. Magarpatta City is set to consume 1,30,000 tonne of fly ash by the time construction is completed here, translating into a huge saving of over the same, i.e. 1,30,000 tonne of carbon emission.

### **Solar Water Heating System**

Magarpatta City has become home to one of the largest residential Solar Water-Heating systems in the country. The solar panels have been put in all the residential apartments comprising of about 3500 flats in the Phase-I & II. On completion, the total capacity will be in the region of 7 lakh litres per day which will save power to the tune of 37 KWH per day and in monetary terms Rs.3.9 crore a year. This is one of the many environment-friendly practices carried out in Magarpatta City.



**Figure 24 Solar Panels**

## PART TWO.

Every mixed used development, whether planned or unplanned has an underlining core which acts as the main catalyst to attract other activities. In the case of the Greenwich Village, it was residential where as commercial activities (information technology) served as the main catalyst for Magarpatta City.

Hence, I conducted a research into the various factors which lead to the creation of the various kinds of mixed use developments.

### **1. Commercial**

Commerce basically implies the exchange of goods and services. (Encarta Encyclopaedia) This could take place in a particular location or quite recently over the internet. When it happens in a particular location, it leads to the creation of markets, shopping malls and street malls. The vibrant commercial activities create an attraction force which tends to attract people into and around the market centres. This leads to the creation of market or commercial towns. This is a form of mixed used development with commerce as its central catalyst. eg is Techiman, Ghana.

### **2. Civic**

Civic relates to a town or city and its administration and governance. Civic Centre is the focal land area within a community, containing one or more dominant public structures. The term civic centre has also been used more recently to refer to the entire central business district of a community. In planning this type of civic centre, special attention is usually paid to the groupings of public structures. Eminent examples include the Piazza del Campidoglio in Rome, Italy, and Saint Mark's Square (Piazza San Marco) in Venice, Italy. People tend to

draw near to civic centres thereby creating a mixed-use development with civil services being the main catalysts.

### **3. Industrial**

Industry, in a general sense, refers to the production of goods and services in an economy. The term industry also refers to a group of enterprises (private businesses or government operated corporations) that produces a specific type of good and service- for example, the beverage industry, the gold industry, or the music industry. Some industries produce physical goods such as lumber, steel, or textile. Other industries- such as the airline, railroad, and trucking industries provide services by transporting people or products from one place to another. Still other industries such as the banking and restaurant industries provide services such as lending money and serving food, respectively.

A good example is Akosombo Township (Ghana) which was created as mixed use development for the workers in the dam. It has a range of residential, commercial, educational and recreational components. Obuasi is another industrial development which came about as a result of the mining activities. Another industrial city in Ghana is *Tema*, a large well planned mixed use development with several social, cultural, educational and recreational amenities.

### **4. Educational**

Educational facilities play a huge role in the creation of mixed use development. They do not only attract people who want to teach and learn, but also other service providers in the teaching and non teaching industry such as cleaners, security agencies, as well as people in

the food and entertainment industry. A good example is the University of Ghana, Legon. The university was built as the nation's premier university; hence it was planned with several facilities. Due to its scale and the size of land needed, it was located at the outskirts of the city centre (Legon). Over time, population growth rate, urbanization and urban sprawl led to the natural growth of the city. The university acted as a pull factor and the city grew rapidly in that direction thereby increasing the population of surrounding villages such as Okponglo, Haatso, Madina, etc. Also several areas surrounding the university became prime residential areas, such as East Legon, West Legon and North Legon.

The case of the Kwame Nkrumah University of Science and Technology (KNUST) in Kumasi, and surrounding townships such as Ayeduasi, Kotei, Ayigya and Ahinsan tends to prove this theory of educational institutions acting as a catalyst in creating mixed use development.



Figure 27. Picture showing the eastern boundary of K.N.U.S.T



Figure 28. Aerial view of the Ayeduase and Kotei Township



Figure 29 Picture showing some of the hostels in the township



## Residential

This relates to human dwelling and habitation. Certain areas are designated for housing and accommodation. These are called residential areas. The primary aim of these areas is to provide accommodation. These residential areas will then require certain amenities such as schools, hospitals, churches etc. These secondary activities tend to attract more people into the area thereby creating a mixed use development with residency as the main catalyst.

Designers and planners of the *Greenwich Millennium* village studied and predicted this trend and this enabled them to create a development with rich and well proportioned variety. Failure to do this leads to what I term as the commercialization of our residential spaces, with several unplanned shops springing up on almost every residential street.

From the above examples, it can be concluded that mixed use developments can either be planned or unplanned. Also mixed use developments are created as a result primary human activities. These primary activities then tend to attract various secondary or supporting activities to create a mixed use development with a primary activity and several secondary activities. Over time, there is a gradual homogenous blend and this makes it difficult to identify the core activity of the development.

An example is the Sakumono Residential estates, which acted as a catalyst for the development of the Spintex Road.



**Fig 30. Sakumono Estates**



**Figure 31. Some of the buildings on the Spintex Road**

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1. English Partnership's Urban Design Compendium
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# KNUST



## **CHAPTER FIVE**

### **5.0 CONCLUSIONS AND RECOMMENDATIONS.**

#### **5.1 Conclusions**

From the case studies and examples cited in the previous chapter, it can be concluded that most settlement whether planned or unplanned will end up becoming some sort of mixed use development because residence will gravitate towards activity and likewise, activity toward residence. The renaissance of the mixed use building continues to revitalize our downtowns, sustains our small neighbourhood commercial areas and has become a viable component of the urban and suburban pedestrian urban village concept.

Even with the challenges inherent in mixing residential and commercial, the density impacts on our established neighbourhoods, and the continued scepticisms of lenders, this is a wonderful building type that enhances the human experience because:

- It promotes convenient urban opportunities for residents to work shop and play within a small community.
- This life style takes advantage of public amenities such as parks, green and public transport
- In addition, it provides something that has been lacking for sometime; a more secure 24-hour character of our urban areas
- Most essentially, a good mixed use design fosters a more vibrant and liveable urban environment and nothing has greater impact on improving life in the city.

#### **5.2. Recommendations**

Most cities in developing countries such as Lagos, Accra, Kumasi, etc. are facing serious urban issues such as congestion (vehicular and traffic), pollutions, infrastructural

inadequacies, environmental degradation, etc. From the research and readings conducted, it can be deduced that Accra's urban problems is not due to overpopulation but inadequate and improper planning. This conclusion is the same of most cities in developing countries. The city is allowed to grow haphazardly with little or no planning direction and restrictions. This unplanned and uncontrolled growth and sprawl is the root cause of most of the urban problems facing these cities. I will therefore like to make the following proposals;

- Local authorities such as the various metropolitan and district assemblies, the town and country planning and the statistical service should engage in a continuous study and research about the dynamics of the city. i.e. its demography, density, urbanization rate and trends. Data collected from these studies should be used to create a database which will aid in making urban policies and decisions.
- Also this database will enable local authorities to know the specific situation and need of a particular area. For example if people of a particular area, live and work in different places, thereby creating vehicular congestion, plans could be developed to promote some form of commercial development in that area. Although not all residence will live and work in the same place, this will however go a long way to reduce vehicular congestion since some of the residence will not need to commute long distances.
- Accurate data base on demographic and infrastructural dynamics will serve as a guide to investors and developers to know the investment potential of various areas in the country.
- Local authorities can use this database to make urban proposals and this will be made available to the private sector. This will ensure the planned and controlled growth of the city, thereby preventing the ongoing haphazard growth.

Also information from this research served as a basis for my design thesis. This is 100 acre mixed use development in Accra. The design took into consideration the demographic and population density statistics outlined in chapter one of this research. The urban design theories outlined in this research such as Transit Oriented Development, Smart Growth and New Urbanism were used extensively in the planning and design of this new development.

Design and planning features from the case studies conducted was also applied in the proposed development. A detail report and illustrations of the proposed design thesis can be found in the Appendix 2.





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## APPENDIX 1

### QUESTIONNAIRE

1. AGE .....
2. OCCUPATION.....
3. PREFERED OCCUPATION.....
4. PLACE OF RESIDENCE.....
5. PREFERED PLACE OF RESIDENCE.....
6. EDUCATIONAL BACKGROUND.....
7. DESIRED EDUCATIONAL BACKGROUND.....
8. COMMUTING DISTANCE AND TIME BETWEEN HOME AND WORK.....
9. DESIRED COMMUTING TIME.....
10. MEANS OF COMMUTING.....
11. PREFERED MEANS OF COMMUTING BETWEEN HOME AND WORK.....
12. RECREATIONAL ACTIVITIES.....
13. PREFERED REACTIONAL ACTIVIES.....
14. COMMUTING DISTANCE BETWEEN HOME AND VARIOUS  
RECREATIONAL LOCATIONS.....
15. DESIRED COMMUNTING DISTANCE BETWEEN HOME AND  
RECREATIONAL LOCATIONS.....

## APPENDIX 2

### Design Thesis- MIXED USE DEVELOPMENT ACCRA

#### BRIEF DEVELOPMENT:

##### Client's Brief:

It was the client's intention to redevelop the area into a high-end residential community with facilities such as:

- residences (350 detached houses and 350 town houses)
- a commercial area
- three (3)neighbourhood centers ( restaurants, health and fitness centre, bookshop and

coffee shop

- tennis courts
- 2 mini golf courses
- streams and artificial lakes



Figure 18 . Block plan of the Developer's Proposal

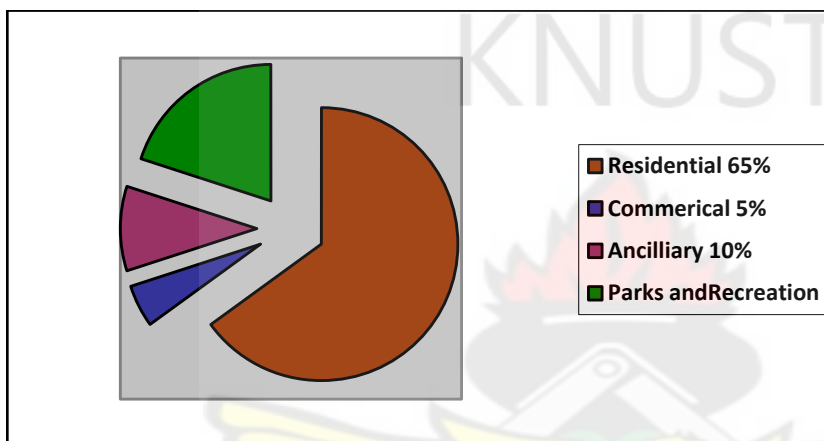


Table .Pie Chart showing the Developer's land use

## Merits and Demerits of the Developer's Brief

### Merits

Presently, the Accra's urban area population density is about 3650 persons per km<sup>2</sup> (2007). This is about 36.5 persons per hectare. Therefore a site of about 40 hectares (100 acres) should have a population of about 1460 persons.

However this population statistics vary depending on the location within an urban setting. Taking the site's location (Roman Ridge and Airport Residential area), and assuming Ghana's household average of 4 -5 persons per household (1 plot = 30meters by 24 meters), the site's area of 40 hectares (40 000meter<sup>2</sup>) should have a population of between 2000 – 2500 persons.

The developer's brief increased this figure by about 30% from 2500 persons to 3500 persons thereby helping in the overall increase in population density.



## ***Demerits***

1. Taking the Global population and Accra's population projection (3million to 6million by 2025) into consideration, the developer's density increase of 30% is a little below adequate.

If Accra is to accommodate this population increase, most new developments should aim above a 60% density increase without compromising on the quality of space.

2. Also due to the clients ambition of density increase and the used of detached house types, the required open space area for such a development was not attained.
3. The develop aim is to create a high-end residential community. This is the current trend in Accra since most developers build for an up-scale market.

**A report entitled: *Real Estate and Remittances in Accra, Ghana:***

***A Case of the Winner's Curse? By Robert M. Buckley and Ashna S. Mathema***

*April 2007*, deals with the cause and effects of this practice.

### The Approach of the Report

1. "First, we use a variant of the traditional mono-centric city model to calculate the city's housing supply elasticity relative to those of a number of other similarly sized African cities. The model suggests that housing supply responsiveness is considerably higher in the other cities – in fact almost seven times higher in Dar es Salaam, and more than twice as responsive in both Nairobi and Addis Ababa.

This muted supply responsiveness in Accra is, of course, consistent with the observed higher housing costs. It also suggests that increases in demand, such as

those generated by remittances, would have a much the larger effect on housing prices rather than housing output"

2. "Second, we estimate a number of traditional housing demand and reduced form equations for Accra and the other African cities. The explanatory power of the equations,



and the expected signs and estimated elasticities are consistent with previous findings and statistically significant.”

### The Conclusion of the Report

“Taken together our two approaches provide an answer to our first question.

Lower income families in Accra have such poor housing conditions because the market is extremely unresponsive to demand. Although the housing market outcomes we have traced in Ghana— i.e., policy restrictions which cause both very high housing prices and low housing quality for the poor— are not unusual relative to the findings for other more developed economies, they are extreme.

### The research report outlines the following observation

- "Over the past 15 years Ghana has been one of the most rapidly growing economies in Sub Saharan Africa. This growth has been aided immeasurably by Ghana’s experiencing one of the world’s higher levels of remittances, which exceed development aid and foreign direct investment, the latter by a factor of almost ten.<sup>1</sup> These remittances, in turn, have been driven largely by the country’s benign and improving policy environment, one in which the average rate of inflation fell from one of the highest in Africa to about 10 percent over the last few years.<sup>2</sup> While statistics on how these remittances are invested are not available, a number of articles, Quartey (2006), Yeboah (2000) and Diko and Tipple (1991), a drive around Accra, discussions with bankers and developers there, as well as local newspaper accounts, all indicate that real estate investments in the capital city account for a significant share of the 12 percent of GDP received in remittances.”

-At the same time, housing in Accra has become more expensive, and is increasingly pricing middle and lower income groups out of the housing market, resulting in substandard and congested living conditions for a large majority of the city’s residents.

This pattern suggests a number of mysteries:

1. First, given the high and growing level of investments in Accra's real estate, why is it the case that the housing conditions of the poor in Accra are considerably worse than those of the poor in a number of other African cities which have lower incomes as shown both by Konadu-Agyemang (1990) and our data?

2. And second, why has this sharp and unmatched increase in remittances not

contributed more to economic growth? In fact, the opposite has happened. Despite a

sharp increase in remittances economic growth in recent years has slowed relative to that of other African economies, even those which have continued to experience high levels of capital flight, see Collier et al (2004).<sup>4</sup>

3. Finally, are these mysteries related? That is, could Accra's apparent real estate boom lead to both deteriorating housing conditions for many, as well as a relative slowing down of Ghana's economy?

- housing market constraints in many ways subject the economy to something akin to what is known in economics as "the winner's curse." According to this phenomenon, the winners of auctions often pay "too much" for their purchases.

In the case of Ghana, the idea is that much of the "winnings," i.e., the large scale of remittances, won through pursuit of an effective macroeconomic policy regime, appear to feed price increases rather than increases in output because of sectoral policies which constrain the housing market.

- Finally, in addition to very high house prices, Accra also has very high sanitation costs and very long, highly congested commuting patterns, both of which have fundamental implications for housing costs and urban development, and which are indicative of the important role played by local governance.

From the report above, it can be concluded that, despite the real estate boom in Accra, the target market is normally high income local and foreigner, thereby forcing the middle and low income to live in slums or outskirts of the city where prices are relatively affordable.

This trend tends to increase urban sprawl thereby:

- increasing government expenditure on infrastructural development
- creating poor living conditions since the rate of sprawl normally exceeds the rate of infrastructural development
- Creating vehicular traffic congestion since most of them have to commute to the urban centres for livelihood.

## **Brief Development**

As an urban renewal, regeneration and compaction scheme, not only should the brief make a full use of the site, but also the developed brief should aid in the overall densification of Accra.

The developed brief was based on the following:

- **Sites location in Accra-**

The site is located about 8 km from Accra's Urban Core; hence the developed brief should aim at taking off the pressure for urban core.

- **Activities around the site-**

In order to integrate the development seamlessly into the urban fabric, the brief took into consideration the activities around the site. The site which used to be a predominantly residential community is gradually being transformed into a mixed residential and commercial area. This is due to the fact that most of the residences are being converted into offices, shops, hotels, restaurants etc.

### ▪ **Global and Environmental Considerations-**

Not only does uncontrolled urban sprawl create vehicular traffic congestions, poor sanitation in the sprawl areas, pressures on government for infrastructural development, but also it goes a long to affect the environment since it often lead to an increase in pollution and its associated issues of global warm.

Currently around the world, most cities aim at achieving *sustainability* in terms of design and management of new developments. Thereby providing quality places not only for the benefits of the inhabitants, but for the global village as a whole.

## **Design Brief**

### 1. **Residential:** high-end residential (located with the recreational precinct

Commerical Residential (for people whose primary activity is work oriented)

Typical Residential Areas (suitable for family life)

### 2. **Commerical Centre-** this will consists of:

- Shopping district
- Office parks
- Open markets
- Multi-storey parking
- Convenient shops

### 3. **Educational and Health Facilities**

### 4. **Recreational -:** lush parks for multiple activities (weddings, picnics, sports etc)

Sports and leisure centre

Mini golf course,

Multi-purpose theatre/ cinema

Auditorium

5. **Ancillary:** - bus stops

- Habitable streets and street furniture
- Service farms
- Administrative offices

## **DESIGN PHILOSOPHY**

*Urban design is essentially an ethical endeavour, inspired by the vision of public art and architecture and reified by the science of construction.*

*The “client” of urban architecture and design is not only the private or public sponsor, or the citizen in the street, but the biological system of all life.*

By Donald Watson, FAIA

I derived my concept from the Vitruvian precepts of building well,

VENUSTAS,

FIRMITAS, AND

UTILITAS –

Delight (this includes the *CULTURE*), Firmness, and Commodity.



These are further expressed in the Seattle Comprehensive Plan as principles of sustainable design.

- **ECONOMIC OPPORTUNITY** : the city (my scheme) should provide economic opportunity for its inhabitants by means of jobs, welfare, etc
- **SOCIAL EQUITY** : resources of the state ( parks, urban areas, etc) should be used judiciously for the benefit of the masses not wealthy view
- **ENVIRONMENTAL SUSTAINABILITY**: not only should the development focus on its intended primary function, but also, its design, construction and management should go a long way to ensure the sustainability of our limited natural resources and environment. ( this also includes sensitivity to *CLIMATE*)

These principles are evoked and enabled by the civic art of **URBAN DESIGN**.

### **DESIGN CONCEPT:**

The scheme was perceived literally as an **URBAN VILLAGE**, bearing characteristics of both the **URBAN AND RURAL AREAS**.

It bears the **urban characteristics**: - high density, diversity, technology and around the clock activities while maintain the **Village characteristics** of sustainability, community and eco-friendliness.

The harmonious integration of these characteristics will lead to the creation vibrant yet serene environment called the **URBAN VILLAGE**

### **PLANNING CONCEPTS**

- **Zoning Gradation**

*“A stream of different users throughout the day and evening help to make bustling, diverse, safe places”*

In most of our urban areas, with soaring land and property prices, only 50% of the property is utilized due to the fact that commercial activities is normally between 6am to 6pm( in some cases 10pm). The reverse is true for our residential areas (6pm to 6am). Not only does this lead to underutilization of the property but also, such occupancy systems create security problems especially during the non-occupied hours.

Therefore in order to make efficient use of the property and provide around the clock passive security, I resorted to **zoning gradation**. This means having more than one use in building or a set of buildings. For example, in predominately commercial precinct, a proportion of the space is allocated for accommodation, but this reduces gradually as it gets to the commercial core. Likewise in a predominately residential precinct, space is allocated for some level of commercial and other activities. This tends to ensure around the clock activity.

#### ▪ **Public realm- oriented- planning**

Several researches have been conducted revealing the importance of recreation and social interaction in the developmental and productive lives of individuals. Therefore, there's a shift from the private realm oriented planning to the public realm oriented planning, thereby sacrificing small private space for quality well planned public spaces like public parks, community centres, etc.

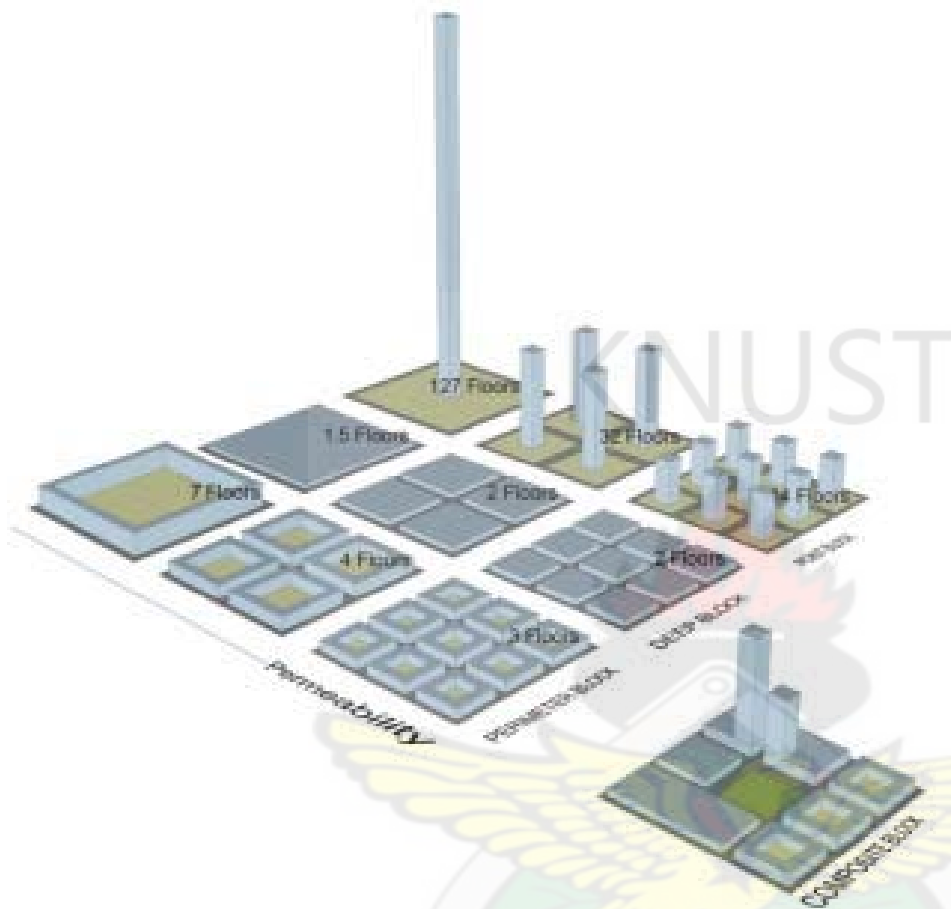
These public spaces tend to create points of interaction and recreation for the community.

#### ▪ **Peripheral Development**

Peripheral developments tend to create open spaces within the cores. These spaces serve as points of interaction for the community. They could be serve as children's play areas, parks .etc. since passive security is available from almost all dwellings.

Also the slender natures of most peripheral development tend to aid natural lighting and ventilation.

The study below proves that the used of peripheral blocks could achieve the same density as a high rise block



**Figure 20** peripheral development

**Density and urban form –  
Wembley tall building study**

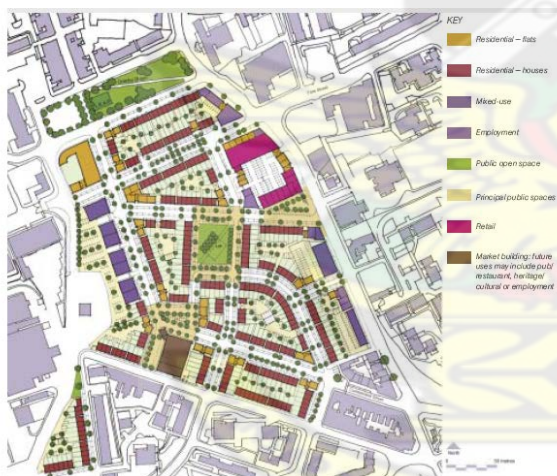
*This analysis by REAL shows how the same density can be delivered by varying building height, block size and building depth. In this example, the three-storey perimeter blocks deliver the same density as the 22-storey (check) point*

*block (7,200m<sup>2</sup> / ha).*

## EXAMPLES OF PERIPHERAL DEVELOPMENTS



**Figure 21** A mixed used development in Glasgow showing the peripheral development



**Figure 22** The masterplan for South Yard Enclave in Devonport, successfully combines over 450 high-quality homes, a community healthcare centre, new supermarket and shops, public open space, offices, managed workspace and the retention of the historic Market Hall.

REFERENCE: [www.urbandesigncompendium.co.uk](http://www.urbandesigncompendium.co.uk)

## CONCEPTUAL SITE PLANNING.

### STAGE ONE



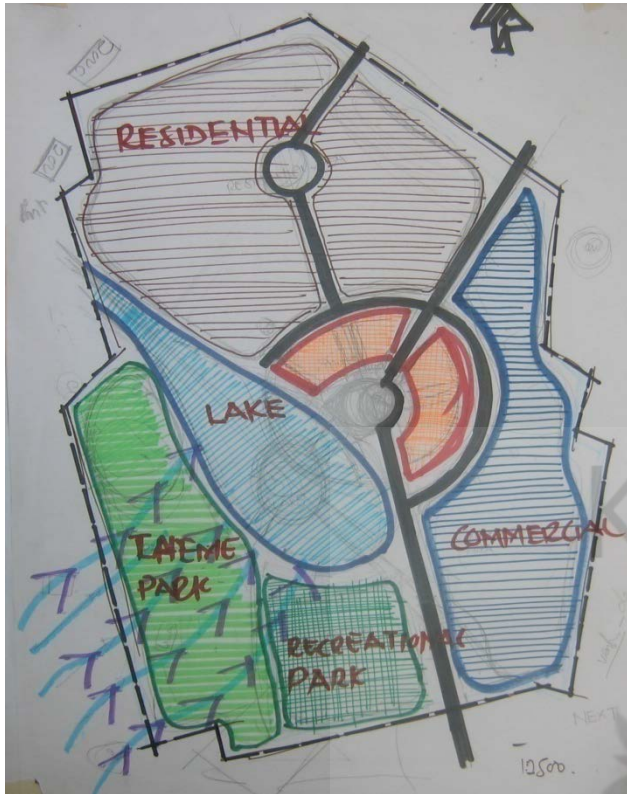


Figure 21 conceptual planning

With this initial site planning, the site was zone into predominately 4(four) main areas

1. **Residential**- this consisted variety of house type and sizes.
2. **Commercial**- this will consist of shops offices, hotel, schools etc.
3. **Recreational**- this consist of two different parks. – a theme park and a multiple use-recreational park( lawn area for picnics, sports, weddings, etc).
4. **Mixed use area**.- consists of high rise structures for the multiple use of commerce, residence and recreation. They were located towards the village core.

Also the storm drain was converted into an **artificial lake** for convective cooling and recreational purposes.

To western part of the artificial lake are the parks. This is to aid wind build-up.





**Figure 22 three dimensional massing of the proposed development**

## STAGE TWO



**Figure 23 Conceptual layout of the development**



**Figure 24 Conceptual layout of the development**

At this stage, the peripheral development and zoning gradation concepts were employed. This created peripheral blocks with series of open spaces varying in character and size.

High end dwelling were added to the parks. Hence, although the predominant activity is recreation, residences were also accommodated in that precinct.

Also, residences were added to the commercial areas to ensure around the clock activity.

To the north of the site are the predominantly residential areas. Civic buildings such as a school, health and fitness centre and Community Park was within this precinct..

The mixed use core in STAGE ONE was converted into a central open space which will act as the binding agent and point of interaction for the various precincts.



# SITE LAYOUT

## LEGEND

	RESIDENTIAL
	CIVIC
	EDUCATION
	MIXED USE
	MARKET
	SERVICE



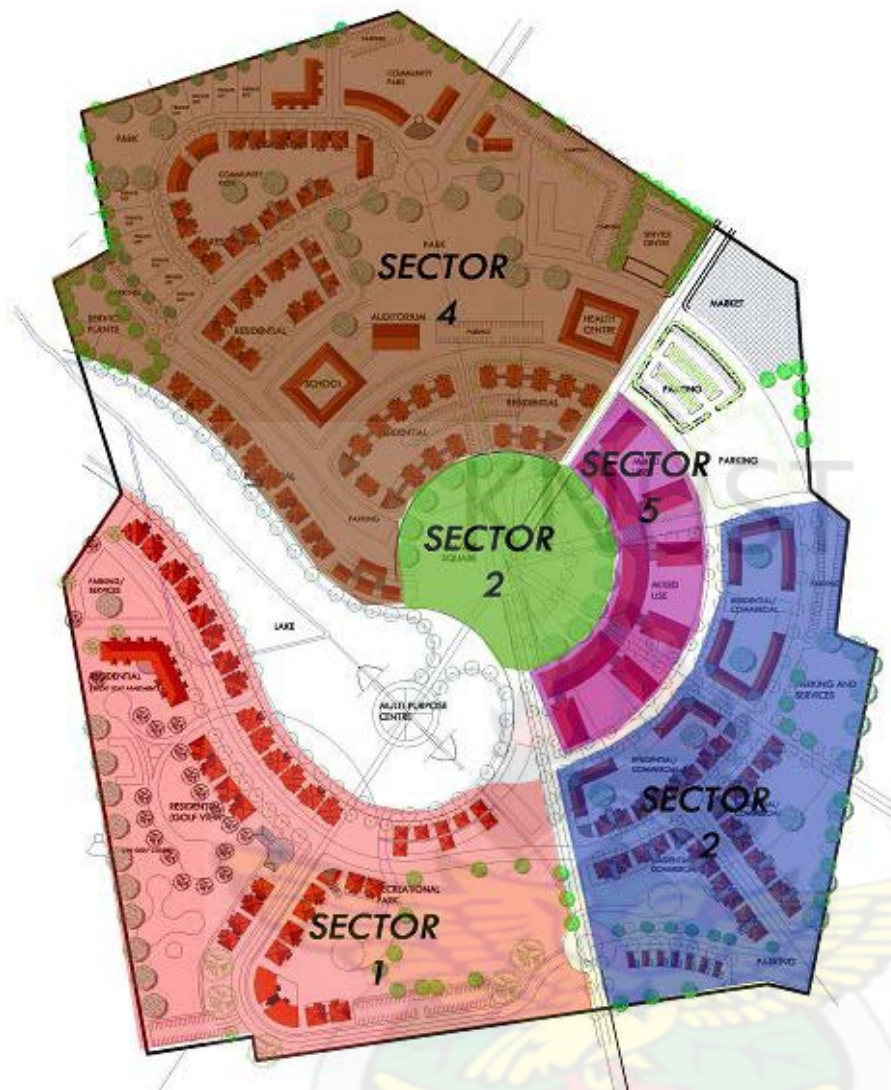
Figure 25 Land use layout of the development



Figure 26. Aerial massing of the Proposed Mixed used development







**Figure 27 Zoning layout of the development**

#### SECTOR 1

This consists of high-income neighbourhoods with recreational parks, a mini golf course and water sports activities. The apartments are designed to take advantage of views into these recreational



areas



Figure 28 Site Layout of Sector 1, Zone 1 (the high-income recreational residential area)



Figure 29 Aerial view of Sector 1, Zone 1 (high-income recreational residential area)





Figure 30,31 and 32 Perspectives showing areas of Sector One, Zone 1( Residential Recreational Neighbourhood)





**3 BEDROOM FLAT**



**2 BEDROOM FLAT**



**3 BEDROOM FLAT  
(CORNER BLOCKS)**



## SECTOR TWO

This area consists of mixed commercial, residential and recreational activities. The Zone two of sector two consists of a 5 storey building with 75m<sup>2</sup> lettable spaces and 3 storey residential units above them. This area targets the active workforce of the population. Hence one can work on the ground floor and live just on the third floor.



Fig 33 .Site Layout of Sector Two, Zone 2.





Figure 34 . An aerial view of Sector Two, Zone Two ( mixed residential and commercial area)







VIEW FROM INNER COURTYARD SHOWING THE RESIDENTIAL UNITS