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Appraisal of residential neighborhood’s planning of Omdurman town
Case study ELMulazmin residential area

A dissertation submitted in partial fulfillment for the degree of M. Sc in physical planning

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Abstract:

The basic principles of planning is the creation of integrated human communities and not just a conglomeration of houses. People live in communities where they may satisfy the great variety of their needs and desires. The community should therefore always be unit of planning and include residence, places of work, recreational facilities and all other services necessary for healthy and pleasant living. Planning is to create happy and stable human communities, which will respect human’s cultural and social requirements, within their economic status.

The research aims at identifying means for improving the residential environment of neighbourhoods in Omdurman Town. The homogeneity among the residents of old Omdurman is clearly marked in the arrangement of their living quarters. Narrow winding lanes and compacted building structure are the characteristics of these old neighbourhoods. Such organic patterns satisfies the social cultural and environmental needs of its inhabitants.

A further study is carried in ElMulazmin residential area, which enjoys a valuable location along the Nile. The planning pattern adopted in the residential neighbourhood is a rigid form of drawing board subdivisions. A study in this neighbourhood is carried to assess the satisfaction of the residents by this planning pattern and whether they are able to fulfill their social cultural and environmental requirements.

The research is carried in two parts. The first part covers the concepts of community and neighbourhood planning, beside a general review of neighbourhood planning in Omdurman Town. The second part is a study carried out in Elmulazmin residential area. The study is mainly concerned about the existing planning pattern and whether it satisfies the residents social and cultural needs.

Recommendations are issued at two levels. At the first level there is a list of recommendations for improvement of residential neighbourhoods’ environment in Omdurman Town. At the second level recommendations are for the improvement of Elmulazmin residential area.

We must build into our communities the aesthetics and cultural values of our times, just as our fore-fathers in Ancient Babylon and Egypt and through the middle ages did in their own settlements. In planning human settlements the dimension of time should be considered and catered for. Roads, water supply, sewerage systems, educational institution, libraries, shopping centers and amenities very seldom cover the needs of people five or ten years after their creation.
I hope that the recommendations issued will be of a help to planners when arranging new settlements and will be a contribution towards happy and stable communities.
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Chapter 1

Introduction

1-1 Introduction:

Shelter is considered a very basic element for the human race, regardless how simple it is. The U.N. declaration of human right in 1948 has stressed on shelter as man’s right. The problems of providing enough shelter for the urban poor of the developing world is expanding year after year by the complexity of poverty and the economic status of the governments of those countries. It should be noted that before the industrial revolution and the outcome of growth and expansion of towns and cities, homelessness was virtually unknown, because any additional population was easily absorbed in traditional communities. ref 19

Greater Khartoum, being the primate city of Sudan has received large population flow from other parts of Sudan mainly the west and the South which suffered from draught and civil war respectively. This incoming population came and settled in the fringes of the Capital forming illegal settlements. Planners are faced with the problems of providing settlements with the necessary infrastructure and social services, which satisfy the social and cultural needs of those immigrants.

1.2 Objective Of The Research:

The main objective of this research is to convince the planners to take a comprehensive study before taking decisions about settlement arrangement. The study should focus on the culture and social habits of the group to be housed. The culture includes the religion, race; ethnicisty. The social habits include the social norms and practices of the specific group to be housed. The homogeneity of a certain group might lead to clustering while the heterogeneity leads to disparity.

Satisfaction of local climate and use of local materials as much as possible will ultimately lead to successful planning and harmonious environment. The planner can use many elements, to achieve the required goal e.g. household of different ethnic groups and different religions could be housed together but separated by a shopping center for instance.

Group of the same race and religion could cluster together along narrow roads and reasonable open spaces. This study will help the
planner to decide on the appropriate plot and open space sizes, density, clustering or dispersal of building blocks and hence a successful layout.

1.3 **Identification of the problem:**

Urban design is an art and like all design it does have to consider human behavior. For Mumford, “A city is a point of maximum concentration of power and culture.” Hence urban planning patterns should respect the social practice and cultural or traditional norms of the inhabitants, the satisfaction of this will ensure the harmonious interaction of people with each other and with the built environment, unable to satisfy the socio cultural requirements will give rise to many problems. The inhabitants might tend to break the building regulations in order to attain the desirable urban arrangement or the socio-cultural requirements may be satisfied at the expense of the basic element of the physiological comfort i.e. ventilation, shading etc…

Norberg Schulz refers to Lynch that planning and design of urban environments should aim at projecting the images of its inhabitants in concrete form. To accomplish this, the districts of those environments must have a particular character; their nodes should constitute distinct places that grant the inhabitants a sense of belonging ref 22

1.4 **Actuality:**

Omdurman is the national capital of Sudan. It was developed as an Arabic Islamic State. The town inherited the richest history of the time being the capital of the Mahdia state. The town occupied the administrative and defensive quarters of the state and later witnessed the Mahdi’s death and burial. During the Khalifa reign Omdurman witnesses a large influx of population especially from western Sudan, mainly the supporters of the Khalifa. This incoming population arranged their own settlement to satisfy their cultural, social requirements and the local climate. The outcome is the vernacular patterns with narrow twisting lanes and compacted building structures. Later on, during the British rule, the planners adopted the rigid gridiron patterns for the planning of settlements. This form of planning continued even after independence. The English planners adopted the chatter board pattern in Elmulazmin residential area, which is a form of the grid iron. This alien pattern stands in contrast to the organic traditional patterns of old Omdurman. A study of this pattern is carried to evaluate its satisfaction by the residents of the area.2

1.5 **Methodology of the research:**
The method adopted is that which actually combine available spatial data regarding the neighborhood under study and personal findings through
survey and questionnaire with the local residents and officials. Through regular visits to relatives and friends in Elmulazmin area, I was able to evaluate the social relations among the inhabitants, and how it is affected by the planning pattern in the residential area.

The investigation at ElMulazmin residential area consists of an evaluation of the existing residential environment and stress on residents' satisfaction. Aspects covered include historical background of the area, socio economic aspects, general housing and environmental conditions, levels of infrastructures and social services, community participation and official contribution.

The characteristics of the planning pattern adopted in El Mulazmin residential area is the system of undefined open spaces which lead to the dispersal of the building blocks rather than unifying them. Through discussions with officials who live in the area, it was concluded that the existing planning pattern affected the social, cultural and climatic requirements of the residents.

Based on the findings, recommendations were issued for improvement of residential environments, and for planning residential neighborhoods in Omdurman Town.
Chapter 2

Theoretical background of design of residential areas

2.1 Introduction

There are two kinds of cities, in the world, the first kind is the planned or designed or created city. Its pattern determined once and for all by some overseeing authority. Until the 19th century this pattern invariably registered as an orderly geometric diagram. At its purest it would be a grid, or else a centrally planned scheme like a circle or a polygon with radial streets issuing from the center, but often the geometry is more complex marrying the two pure formulas in modulated and refracted combinations .ref 6

The other kind is the spontaneous city also called grown, chance – grown. It is presumed to develop with out benefit of designers, subject to no master plan but the passage of time, the lay of the land and, the daily life of citizens, the resultant form is irregular, non geometric, organic with an incidence of crooked and curved streets and randomly defined open spaces.

The fact is that no city, however arbitrary its form may appear to us, can be said to be “unplanned”. Beneath the strangest twist of lane or alley, behind the most fitfully bounded public place, lies an order beholden to prior occupation to the features of the land, to long–established conventions of the social contract, to a string of compromise between individual rights and the common will.

The notion of the city as an organism is not very old. It is related of course to the rise of modern biology, the science of life, visual parallels between some organisms and some town plans were hard to resist you could see the venation of leaves in Muslim, medinas, the pattern of tree rings in the ringed expansions of a town like Nördlingen. On the other hand, the pairing of human organs and elements of urban form on the basis of functional similarities satisfied a simple urge of animation; it affirmed the primacy of urban life. Open spaces like squares and parks were the lungs of the city; the center was the heart pumping blood (traffic) through the arteries (the streets) and so on.
The urban lot or dwelling-place, functions as the cell, things like the port, the banking district, the industrial plant and the suburbs are organs or specialized tissues and capital is the energy that flows through urban systems. Again cities like organisms are subjected to sickness and decay.

**Topography, land division, synoecism, are all physical determinates of irregular city-form that led to the ovulation of organic patterns. On the other hand, the social structure and the limits of public control also affect the urban form.**

In the model of the traditional Islamic city, neighborhood cohesion is based on kinship, tribal affiliation or ethnicity was strong.

The main thing to remember is that city-form was allowed to work itself out subject only the to the respect of custom ownership, and the Muslim’s right to visual privacy; the concern for privacy for example determined where doors and openings would go on building fronts and how high buildings would rise.

The minimum width for public streets – 7 cubits (10.5 feet, or about 3.5 m) was established in a saying of the Prophet: this dimension allowed two fully laden camels to pass freely, religious law agreed on a sensible minimum height of about seven cubits set by the unobstructed passage of a person riding a camel.

The planting of trees in a public right of way was disallowed. The cul-de-sac was considered to be common property – owned jointly by all occupants whose house opened into it. Standard building types for the public life of the city were the major mosque, local prayer facilities, schools, burial places of holy people, markets, merchants’ quarters, and baths. They too, like the residential tissue, locked together in interdependent systems expressive of social conventions.

The labyrinthine medina proves to be quite rational after all. Fig1

The grid:

“The Pack Donkey’s Way” Le Corbusier decreed in his 1924 book on urbanism “is responsible for the plan of every continental city”. He meant the organic patterns. Man walks in a straight line because he has a goal and knows where he is going.

Man walks in a straight line, and peels off from it at right angles when he needs to. The frequency of these cross streets is his own decision.
Topography has little to do with it, especially on a level site. This simple rational order of passing the land streets set at right angles to one another is the first step in settlement planning.

The most thoroughly worked out modernist grid of recent years is in Milton Keynes (founded in 1967). This grid system is made up of motor ways defining one – Kilometer squares, and it is far from being rigid. The lines gently undulate, at the same time that they rise and fall, in sympathy with the gently contoured land. Moreover, the roads are bordered by thick tree walls intended to absorb traffic noise. There is no specific road center and therefore the congestion of traffic is here avoided. Within the grid squares, private development has a free land. Both apartment blocks and detached houses are acceptable and some of the squares are relegated to industrial and commercial buildings, to leisure bicyclists.

The complexity of social life requires complex street systems to seek its fulfillment. The premise of the grid is that city-form, as a tissue of lines on the ground, is the inscribed set on which our lives are played. How well we play on this set, what program we register towards creating a decent and proud community is in our hands. The proof of our intentions will be in the streets and public places as we shape them in our progress.

Fig 2
Radial Organization:

The combination of concentric space and street rays that join centre to periphery made sense in terms of circulation, but more to the point in political terms.

The famous round city of Baghdad in the 8th century provides the classic example of the radial concentric scheme. Also called Madinat As Salam or The City of Peace, it was conceived by the Caliph Al-Mansur as the capital of Abbasids. In the centre of the circle was a vast courtyard that held the ruler’s palace, a mosque, and two buildings for the guard and the police. It could be entered by very few and only on foot. Surrounding this circular courtyard were the residences of Al-Mansur’s children, quarters for his servants and slaves, as well as government agencies like the treasury, the arsenal, and the headquarters of the palace personnel. A ring road separates the Khalifa’s personal domain from a broad residential belt. Here lived units of his army carefully selected to represent the ethnic and tribal elements of the Muslim domains. A double wall enclosed the city, penetrated by four gates only. The four arcaded streets that cut through the residential belt to connect the gates to the central belt were used as limited markets for the residents of the royal city. Fig 3 ref 6
2.2 General Criteria for the Planning of Residential Areas

It can be said that the physical planning arrangement of the environment is the output of the integration of the different aspects of the environment.

Residential areas particularly reflect social, cultural, economic and demographic characteristics as well as environmental conditions. Those take place jointly with the functional aesthetic quality of the buildings, open spaces and land form and natural features of the area to create the physical environment. Paul stated in his book Ecology of Planning;

“Climatic consideration, local habits, trends, needs, standards of living and population composition should also be taken as important planning criteria.”1

Moreover, residential areas are seen to maintain a good measure of communal objectives and individual aspirations, which are primarily derived from basic psychological, physical and human needs.2

2.2.1 Functional Aspects:
The residential area should cater for all the necessary social services and infrastructures, whose adequate provision and appropriate location are indispensable for the welfare of the inhabitants. In a country with such limited resources as Sudan, the integration of health, educational and
recreational facilities together with their minimum standard of provision, maximize the benefits and minimize the cost of service provision. Houses should be grouped in to clusters that provide play areas and places for social activities. Sizes of plots should be optimum and various plot sizes within the same area allow for flexibility in family sizes and economic status. Also with different plot sizes it is more probable that there will be different building heights that shade one another and create elements of interest. Plot sizes in Greater Khartoum should be reduced to economize in provision of services and infrastructure. There should be provision for alternative standard low cost house types and illustrations of appropriate technologies .ref 26

Residential areas should be located at optimum distance with regard to employment opportunities. This may be achieved by provision of land for small and medium scale establishments at service centers such as shopping facilities, handicrafts, workshops and restaurants.

2.2.2 Climatic Aspects:
The particular characteristics of the hot dry climate of Greater Khartoum impose important constrains upon the planning and management of residential areas. These characteristics, as summarized by Haywood, are mainly greater evaporation than precipitation, relatively intense solar radiation, high diurnal temperature range low relative humidity for most of the year and little rainfall. Therefore planners should aim at the creation of shade from sun, protection from dust winds and at the use of planting and water to reduce reflected heat and lower temperature through evaporation. 1 Building forms ,their shapes, dimensions and heights the orientation and location inside land plots and their pattern of distribution play a significant role in conditioning the thermal environment .Layout of buildings in hot and dry climatic zones calls for more compactness in order that building can provide mutual protection from heat of the sun ,from glare and burning winds in addition to shaded circulation among buildings As for ventilation the checkerboard layouts minimizes stagnant air zones and helps to improve smooth flow of air .fig 4 Development control policies should be designed to ensure the creation of better environmental conditions in residential neighborhoods through the development of urban forms which are more responsive to the demands of local climate.

2. 2.3 Social Aspects:
The physical arrangement of the residential area should directly reflect its socio cultural characteristics.

In planning residential areas, planners should take into consideration behavioral patterns and interaction among individuals’. Design criteria should be developed to ensure that urban forms provide for maximum human interaction. Great consideration should be paid to the allocation of outdoor open spaces, as they mainly provide for recreational, religious sport and other social activities. Planners should cater for the residents’ aspirations and for actual human needs. Consideration should be paid to the fact that needs vary greatly according to age, sex, and ethnic background. ref 29

It was suggested that there is a general agreement that the city’s social and economic life reflects the urban areas physical arrangement. This view ensures that there are important relationships between the physical plan and the social behavior.

In planning residential areas both planners and social scientist are involved considering behavior pattern and interaction patterns between the different residents as well as the service networks and building design. Here the planner can be seen as a manipulator of supply, he investigates residents’ aspirations and actual human needs. Ann Butriner (Social Space and the Planning of the Residential Areas) thinks that the study and analysis of the social behavior of residents within a residential area are to be summarized in about five levels those are: The person within the society (social–psychological level) person interaction with activities and circulation patterns (behavioral level), person’s images, (cognition, mental maps) the population characteristics (morphological level) and the inter-family life. She looks to the people’s demand for a residential area environment through their behavior and aspirations ref.24

The cultural factor is also introduced within the social aspect since the physical environment is said to be a mirror of culture. It is probably that in any settled society, environment and culture are adjusted to each other. They work together and an understanding of both is necessary in order to understand the quality of life. ref 24

Lynch (What Time is this Place) argued that we can predict the spatial environment from the culture or vice versa, and that similar cultures occupy similar environments. He continued that societies often borrow environmental features from others but without necessarily changing their own social patterns.

Hence the social characteristics and culture suggest the actual human needs of the residents of the area in question.
2.2.4 Economic Aspects:-
Financial resources available for residential projects at levels of public and private investment and at the level of individuals’ income should have great implication on the standards and technologies employed. In many cases implementation was paralyzed by application of inappropriate building and space standards. As the vast majority of the population falls within the low-income bracket, efforts should be directed towards minimization of plot sizes and phasing of construction together with the adoption of improved local techniques and materials.

Physical planning proposals usually focus on economic aspects as part of the important set of problems including social and political aspects. The type of employments of the residents determines the level of income earned by each group. The level of planning proposals, health and welfare created in a residential neighborhood are usually evaluated according to the socio-economic status of these residents. The level of income may also affect the level of affordability of the residents, level of services provided, networks, house type and size, the residential density crowd and the physical layout.
2.2.5 Environmental Aspects: -

This aspect comprises the behavioral and the climatic environmental aspects:

Behavioral Environmental Aspect:

The relation between environment and behavior can be explained as mentioned in the following “Just as our surroundings influence our behavior during childhood, as the quality of our home environment contributes to our sense of wellbeing through life. ref 5

Environment occurs within the physical framework of the urban residential area which is considered as the place for people to sleep, relax, prepare and consume meals, interact with each other and with surroundings and perform other activities. Planned environment includes certain physical factors; those in themselves constrain behavior or permit it. They help determine the human movement, location, orientation, privacy, density and proximity, all of which are influenced by the presence, absence, planning of barriers, objects and often physical elements.
The various aspects of that designed environment also provide consequences, intentional or unintentional, present or absent, positive or negative. They tend to control movement and occupancy, people go to some location or avoid it, they leave some location or stay there for some reason if it is uncomfortable, inconvenient, effortful, disagreeable, unpleasant, threatening or painful. ref 24
So planners could better create physical environment which in a sense encourages behavior which people need or simply desire to engage in.

2.2.6 Aesthetic Aspects:
About this aspect Catanese stated:
“There are two human drives that affect individual reactions to experiences that are pleasant or unpleasant. One drive is towards order and logic, and the other towards complexity and surprise. Individual responses to these factors can be affected or changed.”
Reinforcing the above statement, there is no simple definition of what is aesthetically correct because this depends upon culture, individual needs and previous conditioning.
For any single instance of the design of the city (obviously residential areas are considered included) simplicity or diversity is most important and can be determined by the context of design decision of the users of the environment becomes a factor in identifying the aesthetics of the urban area design. Ref 24

Aesthetic studies most useful for planning a residential area are those which link aesthetic satisfaction with the process of perception. It is the interaction of what we sense and our response to it. For these areas which are considered aesthetic they are frequently able to produce strong cognitive maps and this is a psychic satisfaction.1
Planners should try to create more pleasant environments which encourage positive behavior and provide peace and comfort for their residents. Massing of buildings, landscaping of roads and open spaces, harmony of boundary walls and coloring of facades all form aesthetical tools. These elements need careful detailing. Paving materials should allow for ease of circulation, walls may be used to provide enclosure articulate space and act as retaining elements. Sculpture fountains and tree planters are important design elements and act as focal points for outdoor spaces; they improve the sensory quality of these spaces and create enjoyable environments.

2.2.7 Technical aspect:
For any physical plan, it is very essential to satisfy the existing level of technology and available resources. Thus, the plan will be kept within the available building materials, the available infrastructural services, the level of construction techniques and other implementation methods and abilities. Considering these factor, more realistic plans can be created for execution.
2.2.8 Safety and legal aspects:
As for safety, residential areas should satisfy certain characteristics:
- Safe and hazard free with regard to flooding and natural drainage
- Have solid and favorable soil characteristics.
- Suitable as far as the water table is concerned
- Appropriate organization and distribution of the basic infrastructures, pedestrian and vehicular routes, surface drainage systems, refuse disposal systems and energy supply systems, provide for safety of the residents and protect them against health traffic and other hazards.

As for legal aspects there should be control of the land tenure systems and here it should be considered that people contribute positively to the development and maintenance of their surroundings when given enough incentive.
Building by-laws and regulations should be revised and monitored to guarantee development of appropriate conditions.

2.3 Residential Neighborhood:

Neighborhood is the fundamental building block of community. It is where we experience our family and friends. We shop, go to the movies and stroll in the park there. We send our kids to school there. It’s where we meet for soccer, little league and prayers. It’s where life happens. It’s interaction.

The Charter of The Congress of New Urbanism gives us insight into what a neighborhood should be. It states that neighborhood should be compact and pedestrian friendly. They should contain mixture of uses so that many of the daily activities of living can occur within walking distance of one’s home. The streets of neighborhoods should be interconnected networks designed to encourage walking. They should have a broad range of housing types and price levels so that a true mix of society is possible, which provides opportunities for strengthening personal and civic bonds essential to authentic communities. Public gathering spaces in neighborhoods should be distinctive centrally located to reinforce community identity. Neighborhoods should contain different types of open space, ranging in size from small parks to village greens: tot lots to ball fields, conservation areas and open lands to community gardens. Work places and places to shop, schools, the library, post office and other
civic buildings should be within walking or cycling distance so that residents and their children have a range of options for getting where they want to go rather than having to depend solely on their automobiles. ref 22

2.3.1 Residential density:-

In human terms, density is seen as a matter of number of people per unit area. Rapaport 1969 thinks of the density is the form of arrangements of people in space, i.e. the relationship between people and people, people and objects which will play a role in the perception of density.1 The lower the density the better the living conditions, but other factors come into play. The cost of land, the extra costs of roads and services, the reduction of accessibility to other parts of the town, the labor involved in maintaining a very big garden, all work to suggest the desirability of densities some what higher than those at which the maximum privacy and spaciousness could be obtained. Also even at a given density the form in which development is carried out generally affects its acceptability in terms of spaciousness and privacy.
The density of a particular neighborhood is decided on after a study of the social and cultural requirements of the group to be housed. ref 24

2.3.2 The spatial components:

The critical spatial components are circulation, open space and structures. They are the primary aspects of spatial design that are manipulated by the designer to create ordered contextual and unique realms for human activity. No matter what the scale, the design process consists of the conscious arranging and rearranging of these three elements in the two dimensional plane.

2.3.2.1 Circulation allows movement and mobility, enriching a static space, making it alive and fluid with ever changing experiences.2

2.3.2.2 Open space: The seemingly void zone between vertical elements can be perceived as positive, productive, planned and functionally supportive or, conversely, as negative, wasted unstructured and dexterous.

In community design, open space must be thought of as the most ethereal of the fundamental building blocks in quality design. It should never be considered as an afterthought or as just the leftovers. If the viewer can perceive open space as a part of a larger composition, one that heightens the relationship of the other elements in that composition, then that space has been successfully designed.1
2.3.2.3 Structures
The manufactured forms in which we live work, shop and play are the destinations of our daily activities. They can be either harmonious, and contextual or discordant and contrary. Open space, like water, is fluid and tends to escape unless held in place by strong elements and structures.1

2.4 Guide lines for provision of open spaces and residential roads.
2.4.1 Open spaces:-
The outdoor space in the neighborhood constitutes the open spaces and roads. They act as venues for many of the activities which bring people together. Such activities can not be performed within the boundaries of the residential plot. The activities can be social, sport, recreational or religious.

Successfully designed open spaces will enhance human interaction, provides for children playing and sport practice within the residential area. The open spaces if greened, planted landscaped will improve the macro climate and attain comfortable environmental conditions, on the other hand if they are left barren and unutilized they become a sort of nuisance to the residential neighborhood.

It is a typical Sudanese feature that the majority of human interaction is performed in open spaces such as hoshs and verandahs. With a larger number of attendants some of these activities extend to take place at the adjacent road or it the nearest open space. However there are certain activities which bring even larger number of people together of these are national and religious celebrations such as Elmoulid.
Therefore open spaces should be allocated in a certain hierarchical order which is proportionate to the hierarchy of the activities taking place within them. Three different levels may be identified.

- At the first level there is the private open space to which every residential plot should have direct access. This is usually shared between 15-30 families.
- Next comes the semi-communal open space, which serves larger groups of families. It should be located at a relatively central position to provide optimum access for all the population within its catchments area.
- Finally comes the communal open space which serves the whole neighborhood, it is usually adjoined to the primary school or the local market at the nucleus of the neighborhood, thus providing optimum access for all residents. Its size depends on the population it serves.
- Open spaces at the three different levels have different sizes according to the population served, and may have different shapes, but they should all satisfy the following criteria:
  - The boundaries should be demarcated either by landscape or fences to avoid penetration by vehicular traffic.
  - They should be greened and planted to protect against heat and dust. University of Indiana scientists found that with an air temperature of 84, the surface temperature of a concrete street was 108, where trees were planted the surface temperature dropped 20 degrees. Plants also clear the air through the process of photosynthesis and the emission of oxygen. As for noise control a 100 ft depth of vegetation can reduce sound by about 21 decibels. They should be provided with the necessary water and electrical supplies, the appropriate surface drain and with garbage collectors.

Standards for provision of outdoor spaces.ref 30

<table>
<thead>
<tr>
<th>Hierarchical level</th>
<th>Pop served</th>
<th>Allowance / unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>The private</td>
<td>15-30 families</td>
<td>5-8m2/person</td>
</tr>
<tr>
<td>The semi-communal</td>
<td>150-200 families</td>
<td>1.5m2/person</td>
</tr>
<tr>
<td>The communal</td>
<td>5000 people</td>
<td>One soccer field/5000</td>
</tr>
</tbody>
</table>

2.4.2 Road network:
Street and road way layouts have an impact on the community far beyond their cost of construction; they create the mental image one is left with after visiting a place. This being the case, they should be designed with
special attention to their appropriateness, orientation and amenity potential. A number of design principles must be followed to ensure that this occurs and that successful, functional, yet aesthetic circulation is realized.

2.4.2.1 Major roads: These carry traffic from district distributes into the residential area. A great percent of urban accidents occur on such roads, therefore great consideration should be paid for the protection against the risk accidents especially for children. Non-access traffic should be excluded. Dwellings facing these roads should have an alternative access from pedestrian routes. Pedestrian crossings should be provided at convenient intervals along the road. The use of greenery protects dwellings against dust, fumes and noise. And for safety security, street lighting, surface drainage together with the underground services should be carefully designed.

2.3.2.2 Minor roads, these constitute the main part of the circulation network within the residential area. Here special consideration should be paid to reduce vehicles flows and speed. The use of I intersections with short length of roads in between offers a device to reduce through traffic within a subdivision area and improves the safety conditions.

2.3.2.3: Pedestrian routes: These distribute movement from the dwelling to the bus stop, the school, the shops, open spaces and other social functions. The primary objectives of pedestrian circulation are safety, convenience, coherence, comfort and aesthetics locations, individuals, site level and purposes of walk govern movement pattern. Designers should aim at keeping distances minimum to the maximum of people. People tend to move in a logical manner towards what is interesting, towards change from sun to shade, towards whatever is curious towards points of entry. They are repelled by obstacles, monotony and disorder. These pedestrian routes should be segregated from major vehicles routes protected against sun and rain and well lit after dark. ref 26

The road should be wide enough to accommodate all its physical and visual functions. Major roads should have a width of 36ft (10.8m) consisting of two moving lanes and two parking lanes. Minor roads, depending on the offset parking provisions and the
density of the area they serve, should be 26ft (7.8m) wide for single family detached houses and 32ft (9.6m) wide for row houses and apartments. Short access streets such as culs de sacs or loop streets may have a minimum paved width of 20ft (6m), culs de sac should terminate in a turning circle not less than 80ft (24m) in diameter between curbs. Rights of way should be 60ft (18m) for major roads.

All roads should be laid out as to avoid steep grades excessive cut and fill to provide build able sites with good surface drainage.

2.5 Housing: Housing is the most prevalent form of structure in the residential neighborhood after all it’s where we live. Although many variations there are four primary types of housing: Single – family detached (still the most desired form of family living) single family semi detached (cluster homes), town houses (row houses usually 4 to 10 units attached) and apartments (low rise, mid rise or high rise)

2.5.1 Single family detached house:-
Single family detached dwellings are perceived by many as the ideal housing type in the modern industrial world. These consist of free standing structures with yard space on all four sides. However this form of development is the most expensive and land consuming form of housing, requiring large amounts of road construction, utilities construction, and land clearing. Fig 5

Design parameters:
- Single family houses usually range in size from 3500 square ft 315m² up to estates measured in tens of acres.
- A front yard set back of between 10ft and 50ft 3m and 15m is usually required.
- A side yard setback at least 5ft or more
- A rear yard set back generally requires 10ft (3m) or more.

2.5.2 Single – family semidetached:-
Known as cluster homes. The semi-detached single – family home is an attempt to provide affordable single-family housing to a large segment of the population. This is accomplished by eliminating one of the side yards and building the house on the property line itself. ref 22Fig 6

Design parameters:
- The plots for these units are typically 35ft (10.5m) to 50ft (15m) wide.
- They maintain both a front and a rear yard, although at least one side yard is eliminated.

2.5.3 Town houses:-
Town houses evolved as high density housing in cities, originally serving as a transitional element between the commercial / industrial districts and single – family areas. Their main advantage is that they function
primarily as a means of enhancing density while providing more affordable housing.

In most situations the town house is a two-storey unit with parking area in the front and a small fenced yard containing a storage building in the rear. However in resort areas where views are desirable 2.5 – 3 storey units are common place with attached single car garages. In urban areas they are used to cater for high land costs. Fig 7

Design parameters:-

A maximum of 6 to 8 units are build.

- The unit typically maintains a 20ft (6m) front yard set back from the right – of way, principally to provide parking space for one or two automobiles.
- An equally sized rear set back is also provides so that the owner may have a small personal space.
- Common sizes range from 14ft (4.2m) to 16ft (4.8m) minimum to 24ft (7.2m) to 30ft (9m) maximum width. 

2.4.3.4 Apartments:

Apartments can be two to three story structures. They provide starting living quarters at an affordable price. Fig 8

Design parameters:-

- Separate direct areas for each unit or shared access with another unit to enhance privacy and create a sense of individuality. Structure height is generally related to concerns for fire safety and the height that can be easily accessed by fire – fighting equipment.
- Two basic principles apply to the site layout of apartment’s complexes: internalized parking or externalized parking.

In other words, the buildings can ring the outside of the site with the parking areas internalized or they can be clustered to the center around an amenity with the parking oriented to the exterior. ref 22
2.6 The neighborhood – unit principles:-

- Size – a residential unit development should provide housing for that population for which one elementary school is required, its actual area depending upon population density.
• Boundaries. The unit should be bounded on all sides by oriental streets, sufficiently wide to facilitate its passing by all through traffic.

• Open spaces – A system of small parks and recreation paces, planned to meet the needs of the particular neighborhood, should be provided.

• Institution sites – sites for the school and institutions having service spheres coinciding with the limits of the unit, should be suitably grouped about a central point, or common court.

• Local shops – one or more shopping districts, adequate for the population to be served, should be laid out in the circumference of the unit, preferably at traffic junctions and adjacent to similar districts of adjoining neighborhoods.

• Internal street system – the unit should be provided with a special street system, each being proportioned to its probable traffic load, and the street as a whole being designed to facilitate circulation within the unit and to discourage its use by through traffic.

To its seeming rigidity, monotony and indifference to topography. It can, in fact, be relatively easy to adapt it to topography.

2.7 Basic Patterns

On a neighborhood scale, circulation patterns generally take on one of four basic forms: Grid, radial, hierarchical or looping. More typically, each neighborhood will be designed by using a combination of two or more of these basic types.

2.7.1 The Grid System:

The grid system is designed to disperse traffic as uniformly as possible by providing multiple options for both pedestrians and vehicles. It has been much maligned due Fig 9 ref 22

The success of the grid lies in its predictability of intersections which gives the traveler clues and reference points in way finding.

Exciting spaces can result when two grid systems converge. Point. In some cases, this system has been superimposed over a grid to create some very dynamic urban spaces. Washington D.C. and Paris incorporated this concept as well as most of the more organic, less-planned core areas of cities such as Boston and London.

2.7.2 Radial systems:

The radial system is a series of street emanating from or focusing on a central point or zone. From a functional standpoint, this system can usually be found to originate from old farm to market roads where
produce and livestock were transported to a central area for sale or shipment. This system works well to create a community heart or focus, thus functionally and figuratively unifying an area. It works best in combination with a set of circumferential roads that create concentric circles around the center. Radial streets allow the most direct route to and through a central. Fig 10

2.7.3 Hierarchical Systems:
The hierarchical system, also known as the branching system, is a pattern of circulation structured much like a tree in that smaller roads or branches lead to increasingly larger collector roads. This concentration of traffic on fewer and fewer roads ensures an eventual overload of the system because it creates few, if any, alternative routes of access to a particular place. Fig 11

Hierarchical systems rely heavily on cul-de-sac streets, which can be used quite effectively when you want to pull some amenity, open space, or wooded area into a residential area. Ref 22

2.7.4 Looping systems:
Like the hierarchical system, looping systems can be more readily utilized for individual neighborhoods than for community–wide applications. When used in combination with the hierarchical system, a strong sense of place can be achieved for the neighborhood – but, again not necessarily for the overall community. Neighborhoods built using this format usually are typified by a primary entrance road that leads to a central organizing roadway from which the residential streets stem. Fig 12. Looping systems have been widely used in planned unit developments because they provide a strong organizing framework, but they can also be very effective when utilized within communities limited by standard Euclidean zoning. Despite the single entry feature, this layout distributes local traffic somewhat better than the branching system, especially the farther away from the entry one travels. For this reason roadway widths can be somewhat smaller than those found in the hierarchical systems. However as in the hierarchical system, all traffic is forced to a single point with the end result being the same, traffic congestion. ref 22

Our existing neighborhoods and communities have been structured using one or more of the four basic circulation patterns. Whether this has
been in response to such things as topographic anomalies, wetlands on the
location of existing utilities, we need to evaluate the strength and weakness of these patterns to determine how they can help create the type of community framework we want.
2.8 Conclusion:
Community design is the art of making sustainable living places that both thrive and adapt to peoples needs for shelter, livelihood, commerce, recreation and social order. The nature of community design suggests some predetermined intention rather than haphazard coincidence. But it is more than the adherence to a set of rules for development or a means for implementing the political will of government. It is the merging of what we know about ourselves with what we know about our neighbors when we chose to live in proximity to one another. It is about independence and dependency. It is about architecture and landscape. It is about understanding and building on what we know — the good as well as the bad. It is about creating a better place to live.

Community is not a random accumulation of parts or sections loosely tied together by roads or waterways, nor is it the homogeneous glut of single-use interchangeable pods containing shopping centers, office buildings, housing and open spaces that can be found without much effort in many American metropolitan areas.

Community must also not be thought of as an alliance of special-interest groups all clamoring for attention and demanding their concerns be addressed. The divisiveness of this concept is the antithesis of community.

According to Merriam-Webster’s Collegiate Dictionary, tenth edition, “Community is an interacting population of various kinds of individuals (as species) in a common location or a group of people with a common characteristic or interest living together within a larger society”. Additionally it can mean the area in which a population lives and may be identified with a way of life, such as a farming or fishing community, steel town, college or university town. A community may be known for some specific trait — innovation, ingenuity, determination or traditional value and morality.

The term community also suggests a certain amount of interdependence, sometimes out of necessity, as during the colonial period when settlers in the New World banded together for mutual protection and social support.

In their book, City Lights: An introduction to Urban studies E.Barbara Philips and Richard T.Legates argue that community has no agreed upon meaning but that it usually refers to either:

1. A group sharing a physical space.
2. A group sharing a common trait.
3. A group bound together by shared identity and common culture and typified by a high degree of social cohesion.

Community as a concept can be interpreted as a sense of belonging, a way of life, and diversity with a common purpose. In modern times,
technology has made the compact community unnecessary in the purely physical sense, and our resultant mobility has eroded our spiritual and emotional connection to our civic places. This emotional disassociation has allowed us to raze, in a wholesale manner, entire sections of our cities and communities in the name of redevelopment, leading to further psychic distress. All the while, we are creating acres and acres of new housing and shopping centers. In the rush to accommodate demographic lurches subdivision layout has been substituted for community design and shopping center trips for social interaction. In other words, community planners have been reacting to frenzied pace of development, not managing or directing it. To a large extend the talent of community planning has atrophied through disuse. We must begin again to think of our communities in terms of the human scale rather than the automobile scale. Attention to the time-distance relationship between our housing, employment, shopping and recreation areas is critical if we are to achieve any realistic sense of community. Our cities and communities need to be of a finer texture, allowing more opportunity for interaction between our diverse peoples and thus enhancing our understanding of one another by identifying and focusing on the commonalities between us.

Community, therefore, is belonging, community is a common purpose. Community planners need to interpret their heritage and learn to apply it to the task of creating and recreating the communities of today. George Tobey, in his book, A History of Landscape Architecture, The Relationship of People to Environment, says we need to establish goals that guide our planning efforts.

He suggests that the value, habits and objectives of the community’s citizens must be addressed if community is to be achieved. From the physical stand point, he suggests that good communities should adequately provide the means for moving goods, people and information while allowing for the maximum freedom of choice in interaction between residents while providing for their health, safety and comfort. He further states that good communities are adaptable to future modification because their image is maintained as a unified whole. To these other goals may be added that are tailored to a community’s specific circumstances. The list is flexible and may change, but the end result should be the same: a methodology of workable parameters from which to approach the healthy growth of our communities.
Chapter 3

Analysis of planning of existing residential neighborhoods of Omdurman Town

3.1 Introduction:

Urban planning patterns throughout history have been affected by several factors. The outcome planning patterns revealed to us are as a result of the interaction between the socio-cultural factors and the physical environmental factors.

The socio cultural factors are mainly affected by the religion, costumes, habits and traditions. On the other hand, the physical factors represent the climate, topography, available building materials and the level of technology at a certain point in time.

Some philosophical views suggest that the architectural forms and planning patterns emerge from the type of social life beside the other physical factors.

This chapter aims to analyses the socio economic and physical factors of Omdurman town. There will be a review of the different planning patterns in the town, which evolve due to the political changes and successions of the Turkish, Mahdist, British and National government administrations, each with its perception regarding urban pattern.

3.2 Historical Background:

3.2.1 Evolution of Omdurman:

After fall of Khartoum in Mahdi’s hand in 1885, he and his flowers crossed the Nile seeking a simple, religious and humble life rejecting all influences of the Turko-Egyptian rule in Khartoum.

A site for the new capital was selected, north of the original camp of El Mahdi’s troops at Abu Said, and was called El Bugaa. It was said for the choice of this site that the Mahdi’s let free his camel and at the instance the camel sat on the ground the site was chosen. ref 31 A mud room (Mahdi’s house) was built in this location, on which the Mahdi’s tomb was later erected.

Mahdi’s followers started building their residents around the Mahdi’s house, Khalifa Abdullah and Omera’s to the south of Mahdi’s house, Khalifa Sheriff & khalifa Ali Wad Hilo to the north, the western part was occupied by the Masjed. The Ansar hurried and built their houses from straw skin and shikab. The area was transferred into a permanent settlement in place of the old camp. Map 1. After Mahdi’s death, shortly after fall of Khartoum
on 1885, khalifa Abdullah took over, on the same year the khalifa erected Beit El Mal and the prison, two years later he constructed the ground floor of his house and a year later Beit El Amana (large store of weapons and war instruments). The Mahdi’s tomb was erected too.

A great stone wall surrounds the heart of the town where the tomb, the Khalifa’s and Ansar’s houses and the public buildings.

The small village Omdurman experienced development during the khalifa’s reign and was developed into an Islamic state. The new state tried to purge itself of reminders of the Turkish rule, even linguistically but retained much of the machinery of the Turkiya – firearms, steamers, the printing press, gunpowder, the telegraph between Khartoum and Omdurman, the arsenal, the mint. ref 14

The population of Omdurman increased considerably during the khalifa’s reign as he ordered the evacuation of Khartoum and all his supporters moved from the west towards Omdurman.

Following is a description of some of the marked buildings in Omdurman:

3.2.2 Erection of the Mahdi’s tomb:

By far the most conspicuous structure in Omdurman is the Mahdi’s tomb. It is said that the dome can be seen three days journey from Omdurman. From here, of course, the dome rising high above the miserable mud hovels and straw huts is a most conspicuous object and it is certainly the tallest of all the buildings in the Sudan. Fig 13

Abdullah spared no expense in erecting this structure he first ordered the plans drawn out, and selected that of the engineer Ismail who was the architect of the Sidi Hassan dome at Kassala. Omer the former government architect was lent to Ismail to assist him. Laying the foundation stone was a great spectacle, and was celebrated with general rejoicing and festivity.

The work of construction was now vigorously taken in hand, Khartoum supplied the materials. Thousands of people were sent there and the work of destruction went on a pace. Walls were pulled down in order to procure the burnt bricks which were sent across to Omdurman. The corner stones of the dome, the wood work was made by carpenter Mohamed Bornawi. The masons were for the most part Egyptians who had learnt their trade in the construction of the mission house and church
in Khartoum. The dervishes workmen (Ansar) were instructed how to break down walls without destroying the bricks. Most of the dervishes worked without pay (fi shan Allah). A small quantity of durra was allowed them but the masons received pay. Lime was obtained from Omdurman itself. ref 14

Khalifa Abdullah went to the river bank and assist to carry the stones to the dome, of course the whole town followed. The khalifa promised the Mahdi’s blessing to all assisted in this work. The women carried the water required for the work; the Tomb is built much in the same style as all Mohammedan domes erected to the memory of some Holy Sheikh.

Several of the domes in Sudan were made of clay, but the kahlifa had determined that the Mahdi’s dome should be the grandest in Sudan. The mud hut in which the Mahdi had died was pulled down and a square structure about thirty feet high built round the spot with large windows, above this superstructure rose the dome some eighty feet above the ground. The foundations were laid very deep and the walls were immensely thick. On the four corners of the superstructure and just where the dome begins are four round balls supported, on the summit. Over the dome are three large balls, the center one being the largest, and above those again is a gigantic- gilt spear – head resting on the walls. The doorway is really a work of art which does credit to Sudanese labors. It is painted in bright colors, and was made in the arsenal at Khartoum, and when was finished, Yakub, the khalifa’s brother, he went to fetch it, and rewarded handsomely the men entrusted with the work. The outside walls of the building are white, at first they attempted to paint the tomb with oil colors. But as they were not properly prepared, the paint soon peeled off when it was dry, and so they had to be content with simple white wash.

The large windows admit a quantity of light into the tomb, which is decorated inside with the most glaring colors. The actual grave is not situated quite in the center of the building and is covered by a painted wooden catafalque. To reduce the glare, the windows were well curtained. The Mahdi’s tomb stands as a landmark.

Several of the Fallata who came from distant parts of Bonus, Wadai stopped at Omdurman on their way to Mecca. ref 14

3.2.3. Khalifas Mosque and Residence:
Close to the Mahdi’s tomb was a great mosque – not a mosque in its usual sense, but an immense yard, which would hold up to of 70000 men extended in long rows of 1000. It was roofed in by enormous mats held up on innumerable forked sticks which gave is the appearance of a forest.

This rukuba or kneeling – place, was capable of holding 30,000 men whose murmuring sounded like distant thunder. At first the great enclosing wall was made of mud but afterwards, Khalifa Abdullah had it pulled down and a good wall was made of burnt bricks and lime.

The Mihrab marking the direction of Mecca, in which the Mahdi repeated prayers situated a little to east of the center, and is a square in shape with mud walls and a gable roof made of iron plates from the Khartoum arsenal, gates open in the walls on the north, south, east, and west. The Mihrab is entered from the west, but is well protected by branches of trees, so as to prevent the Ansar from crowding up too close.

The floor is sprinkled with fine dust, the khalifa repeats prayers in the big mosque on Friday at noon, but he says daily prayers in the rukuba in which there is a white washed platform about six feet high on which he stands.

Close to the rukuba is a square building with thatched gable roof supported by two pillars. This is open on three sides, but surrounded by well carved and painted wooden railings, in this area there is a seat about three feet high in which the khalifa sits when he addresses the Ansar’s. As one leaves the east gate of the rukuba, the khalifa’s place gate is visible, being built quite closed to the mosque.

The khalifa place is known as the ‘BAB’ this place contains a number of different divisions all built of mud besmeared with red sand. Fig4. Just within the great gate is the only two-storied house in Omdurman which the khalifa has purposely built in order to overlook the whole town, and from here he can see as far as Kerrari to the north and as far as Omdurman fort to the south. Gordon’s ruined palace in Khartoum is also visible near the great gate, and close to the outside wall of the mosque, is a building surrounded by railings, in which the judge sits and carries on his court.
3.3 Conditions of Omdurman:

3.3.1 Consistency and territorial distribution of the population:

Omdurman is the most densely populated town in the Capital; it accommodates about 40.4% of the total population as stated in 1990 Census. This concentration of population is due to the exceptional situation of the town—forwarded by its geographical position in direct contact with western regions, which recently suffered from severe natural disasters.
<table>
<thead>
<tr>
<th>No. of Population</th>
<th>%</th>
<th>Households</th>
<th>Average size of house-hold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beit Al Mal</td>
<td>23599</td>
<td>1.9</td>
<td>3721</td>
</tr>
<tr>
<td>Al Mawrada</td>
<td>44715</td>
<td>3.5</td>
<td>7054</td>
</tr>
<tr>
<td>Abu seid</td>
<td>102045</td>
<td>7.5</td>
<td>15048</td>
</tr>
<tr>
<td>Abu Anja</td>
<td>23169</td>
<td>1.7</td>
<td>3389</td>
</tr>
<tr>
<td>Al Thawra</td>
<td>286658</td>
<td>20.8</td>
<td>41764</td>
</tr>
<tr>
<td>Wad Nubawi</td>
<td>57843</td>
<td>4.6</td>
<td>9292</td>
</tr>
<tr>
<td>Al Mahdyia</td>
<td>60073</td>
<td>4.6</td>
<td>9057</td>
</tr>
<tr>
<td>Umbadda</td>
<td>505752</td>
<td>36.7</td>
<td>73725</td>
</tr>
<tr>
<td>Al Masalma</td>
<td>32727</td>
<td>2.4</td>
<td>4755</td>
</tr>
<tr>
<td>Total of the urban area</td>
<td>1136181</td>
<td>83.4</td>
<td>167825</td>
</tr>
<tr>
<td>Rural area</td>
<td>205320</td>
<td>16.6</td>
<td>33331</td>
</tr>
<tr>
<td>The total</td>
<td>1341501</td>
<td>100.0</td>
<td>201156</td>
</tr>
</tbody>
</table>

Table 1 The population distribution in Omdurman.  
Source the population census .1990.

3.3.2 Population change 1983- 1990

The town has experienced a rapid growth of population in the period 1983-1990 especially in the urban rather than rural areas. As shown in table 2 this majority settle on the fringes of the town and in some of the sparsely occupied area in the town.

<table>
<thead>
<tr>
<th></th>
<th>1983</th>
<th>1990</th>
<th>% of change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Omdurman urban</td>
<td>526186</td>
<td>1136181</td>
<td>+ 114</td>
</tr>
<tr>
<td>Omdurman rural</td>
<td>122131</td>
<td>205320</td>
<td>+ 67</td>
</tr>
<tr>
<td>Omdurman council</td>
<td>648317</td>
<td>1341501</td>
<td>+ 122</td>
</tr>
</tbody>
</table>

Table 2 Population change in Omdurman 1983-1990 .  
Source Abu Sin And Davies, the Future Of Sudan’s Capital Region.

3.3.3 Population structure by age and sex:

In Table 3 following, the population is divided by 10 years age group and sex. The table shows that the number of male population is higher than the female population; another remarkable feature is the high level of young population and the low number of old population. This phenomenon might be due to the fact that only the young migrate while the old aged stays back in their areas.

<table>
<thead>
<tr>
<th>Age group</th>
<th>Both sexes</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-9</td>
<td>138708</td>
<td>76617</td>
<td>68691</td>
</tr>
<tr>
<td>10-19</td>
<td>126067</td>
<td>66633</td>
<td>59434</td>
</tr>
<tr>
<td>20-29</td>
<td>84740</td>
<td>65919</td>
<td>47168</td>
</tr>
<tr>
<td>30-39</td>
<td>53220</td>
<td>37613</td>
<td>27287</td>
</tr>
<tr>
<td>40-49</td>
<td>32001</td>
<td>22037</td>
<td>16953</td>
</tr>
</tbody>
</table>

Table 3 Population structure by age and sex in Omdurman 1990.  
Source Abu Sin And Davies, the Future Of Sudan’s Capital Region.
### Table 3  10 years age group and sex.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-59</td>
<td>16330</td>
</tr>
<tr>
<td>60-69</td>
<td>9122</td>
</tr>
<tr>
<td>70-79</td>
<td>6294</td>
</tr>
<tr>
<td>80-89</td>
<td>2127</td>
</tr>
<tr>
<td>90-over</td>
<td>607</td>
</tr>
<tr>
<td>not stated</td>
<td>204</td>
</tr>
<tr>
<td>Total</td>
<td>526192</td>
</tr>
</tbody>
</table>

Source  The population census 1983.

### 3.3.4 The origin of population by different regions:

Omdurman population is composed of numerous tribal groups of diverse radical origins. The available data shows that two-thirds of the capital regions populations were born in the capital. The origin of migrants in shown in table (4)

<table>
<thead>
<tr>
<th>Region</th>
<th>Northern</th>
<th>Kordofan</th>
<th>Central regions</th>
<th>Darfur</th>
<th>Other regions</th>
<th>Southern regions</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of total migrants</td>
<td>27</td>
<td>25</td>
<td>22</td>
<td>12</td>
<td>9</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 4 Origin of migrants in the national capital region .Abu SIN and Davies.

### 3.4 Physical setting:

### 3.4.1 Topography:

The land is almost flat or gently sloping over much of the Town, except for occasional Jebeles and a series of hills.
Khors, branched from the main Nile provide gently undulating topography. River terrace slopes sometimes are steep and suffer rapid erosion.1

Much of the town is covered by pediments and Pedi plains surfaces, which have been found through weathering and erosion, and covered with wind blown sediments. Certain rock types are important locally for the production of stone for constructing buildings and roads.

The position of the town on the west bank of the main Nile, together with the land form has had a profound influence on the pattern of urban development. Therefore apart from regular flooding which prevents building on the lower terraces of the main Nile, and adjoining Khors, there isn’t any obstacle for development. This has in fact led to urban sprawl in all other directions north, south and west.

The town has a slope eastwards which is considered easy for drainage but this advantage has not been utilized to have a proper public sewerage system. Also there is a problem accumulated undrained surface water during rainy reasons which threatens hygienic conditions and disturbs traffic. ref 15

3.4.2 Soil:

Following the west bank of the main Nile and extending west is an erosional plain developed on the Nubian sand—stone.

The plains are sandy alternating with stony and gravely ridges and covered by wind blown sands.

The soil is formed of reddish—brown, coarse textured materials which are neutral to calcareous. ref 2

Soil along the west bank of the Nile is not suitable for agriculture except for a narrow strip near the White Nile Bridge.

3.4.3 Climate:

The area is characterized by the noticeable seasons:

1- The cool dry winter from a mid November to March.
2- The hot dry summers form end of March to July and from mid September to mid November.
3- The rainy season from July to September.

As shown on table 5 the mean temperature rises from a minimum in January 15.6 C to a maximum in May 41.9 C. the daily variation i.e. diurnal range is higher in winter.
Table (5) points that the mean maximum values of relative humidity, appears to be in August, 49%, the month of highest precipitation. Through the period March – June relative humidity remains below 30%. This predominantly hot dry climate requires particular layout considerations to ensure satisfactory environmental conditions.

Prevailing winds are from the north in most months of the year and southwest in summer (June – September) table (5). Winds can lead to dust storms i.e. haboobs; one of the dominant climatic features is the area. Thus the lay out of the town with its compact houses and narrow twisting lanes discourage and reduce its velocity

3.4.4 Vegetation:-

The prevailing vegetation types that grow in the narrow strip along the bank of the main Nile are, acacias particularly Niloteca A, sayal and river side shrubs i.e. Tamarix and salix spp. Away from the river the trees are stunted and scattered as a result of insufficient water. North of the town there are Haraz, Heglig, Seyal and Sidr .ref 2

3.5 Land use patterns:

3.5.1 Residential areas

Residential areas are the most extensive type of land use in the town; hence the majority of the area is devoted to dwellings, which represent about 32.8% of the total residential land in Greater Khartoum as in table (6).

<table>
<thead>
<tr>
<th>Class of residence</th>
<th>1st &amp; 2nd class</th>
<th>3rd class</th>
<th>New extensions</th>
<th>Shanty/squatters</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>1.8</td>
<td>12</td>
<td>1</td>
<td>18</td>
<td>32.8</td>
</tr>
</tbody>
</table>

Table 6 Residential land use in Omdurman as a percentage of residential land in Greater Khartoum.

Source Abu Sin and Davies .The future of Sudan’s Capital region .

The pattern of development of one storey type of house together with courtyards has lead to the sprawl of the town. The housing classification
encourages this trend by providing bigger residential plots for first large. The increasing demand for housing has led to the emergence of squatter settlement which covers almost half of the town in size and population. 

Map 1.

3.5.2 Industrial area: Omdurman accommodates nearly two fifth of the total numbers of factories (39%) 1. Since the 1950s the industrial area has developed to the west of Omdurman, recently it occupies the center of Omdurman town surrounded by residential areas. This present location generates great problems to the residences as it is a source of pollution. The industrial activities comprise manufacturing of food, drinks and tobacco which are the dominant types, followed by fabricated metallic products machinery and equipments, Textile, clothing, and leather, wood and wood products, paper, paper products and printing, chemicals, chemicals products and coal non metallic minerals and lastly non-ferrous metallic industries. Labor force in manufacturing is 3% of the population of the Greater Khartoum and the share of Omdurman is about 17.7% of the total population involved in manufacturing activities.

<table>
<thead>
<tr>
<th>Total % of the capital</th>
<th>Type</th>
<th>Food, drink and tobacco</th>
<th>Textile clothing leather</th>
<th>Wood products</th>
<th>Chemical, Chemical products and cool</th>
<th>Paper products printing</th>
<th>Non ferrous metallic</th>
<th>Fabricated metallic products</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

1
Table 7 Distribution of manufacturing plants by type and size Omdurman.
Abu Sin and Davies the Future of Sudan’s Capitals Region.

<table>
<thead>
<tr>
<th>Type</th>
<th>Large &gt;25 workers</th>
<th>Medium 10-24 workers</th>
<th>Small&lt;19 workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workers</td>
<td>21</td>
<td>27</td>
<td>288</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>19</td>
<td>52</td>
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<td></td>
<td>4</td>
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<td>-</td>
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<td></td>
<td>3</td>
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</tr>
<tr>
<td></td>
<td>2</td>
<td></td>
<td>21</td>
</tr>
</tbody>
</table>

3.5.3 Commercial Areas:
The main commercial areas in the town are soug Omdurman. Having the advantage of centrality and accessibility, it accommodates most of the town commercial activities. At the western fringe of the town a commercial area is growing rapidly, soug Libya, although the commercial activities are limited in retailing (animals and goods), the areas promises a complete development to include other commercial functions and entertainments. ref 2

3.5.4 Administrative Areas:
The area devoted to administrative functions is rather limited. Most governmental ministries and administrations being located in Khartoum town.
The new administrative structure of Omdurman province will need more area for the five local councils:-
- Omdurman municipal head quarter at Omdurman.
- Al Thawra municipal council head quarter at AL Thawra
- Umbadda municipal head quarter at Umbadda.
- Abu Seid municipal head quarter at Abu Seid.
- Rural Omdurman municipal head quarter at Omdurman.

3.5.5 Open spaces.
Omdurman has small areas allocated as open spaces, except for a few gardens and play grounds the whole area is occupied by buildings. The
only recreational area of a large scale is located along the bank of the River Nile extending from El Morada to EL Mulazmin areas. It accommodates public recreational grounds e.g. Riviera Gardens. Even this recreational area has been lately invaded by public buildings e.g. the parliament and EL Nielin mosque. Other small open spaces within the neighborhoods lack greenery landscape and are left barren and dusty. Cemeteries are located at the fringes of old Omdurman at the North West Ahmed Sharfi and ALBakri cemetery. Hamad EL Neil cemetery is on the south western part of old Omdurman. The cemeteries occupy large areas, their boundaries are not defined not greened or planted and they separate old Omdurman town from the new extensions of El Thawra and Umbadda .ref 15

3.5.6 Other land uses:

Military areas occupy large sites to the north and south of the town. The military areas obstructed the expansion of the town. Other areas of the town are occupied by health, educational and religious activities. The irrational distribution of services in relation to the large population of the town is one of the main problems in Omdurman.

3. 6 The Neighborhoods of Omdurman from Mahdia to independence:

Omdurman developed as an indigenous traditional settlement, in contrast to Khartoum town which developed as a European town. McLain explained (The general scheme on which the town was developed was initiated by lord Kitcheners before he left the Sudan , and the most striking features of the plan is the diagonal streets , which appear to have been introduced , primarily for military purpose . Each crossing of these diagonals commands a considerable portion of the city) ref 32.

The small village Omdurman experienced development during the Khalifa’s reign and was developed into an Islamic State. Map 2 The new State tried to purge it self of remainders of the Turkish rule. The khalifa ordered his engineer Omer to construct broad straight roads to all the principle places. This necessiated the removal of thousands of mud huts which were immediately demolished. A broad road leads from the north gate of the mosque to the Hijra or place from which expeditions start.
The second large road leads from the west gate of the mosque to the Arda or parade place and is known as Darb El Arda. A third main road leads to the southern Hijra where expeditions leave for Kordofan and Darfur. Map 3.

In addition to these main roads there are innumerable winding streets and lanes. At this point in history Omdurman is built almost entirely of mud, the straw huts or takuls have disappeared. Every house owner surrounds his yard with a wall in order to keep out thieves and spies. ref 14

The Khalifa pays the most special attention to the requisites necessary for war and for this purpose he had a large building constructed a little to the south of the mosque, consisting of a large hall supported by pillars and built of burnt bricks, this is known as Beit El Amana and it is subdivided into various compartments in which are stored guns, powder and other implements of war. This building is entered through a large vaulted gate and no other houses are allowed to be built near it. It is surrounded by a high wall and is carefully guarded night and day by detachment of soldiers. The Khalifa surrounded the tomb, his house and Mulazmin quarter with a great massive wall. ref 14

Neighborhoods first began to mould exhibiting some typical Arab Islamic features. Their evolution took the traditional organic patterns. This evolution is seem to materialize through two processes, one of a more or less spontaneous nature seen in the informal growth of the residential fabric guided by social customs and norms, simple rules of the vernacular and basic common sense. and the other of conscious planning dictating the creation of the main routes and squares, the location of the market place, The Friday mosque, the ruler’s residential complex, defensive walls and fortress and the like. ref 3

The latter process is what gives Al Khalifa Abdullah a place as a planner of sorts; it was he who set about taking decisions and organizing the chaotic shambles of the 19th century hamlet into his new capital.

To the local residents, the individual neighborhoods then created were readily distinguishable either directly through some physical features or land mark a major road, a square, the tomb of religions figure a water course, or more subtly through the ethnic homogeneity of their residents. In those days each neighborhood was placed under the administration and control of one of the Khalifa’s lieutenants who formed a close circle, they were obliged for example to meet five times a day for prayers with him. Neighborhoods thus functioned as social as well as administrative units simultaneously. ref 3
The homogeneity among the residents of Omdurman is clearly marked in the arrangements of their living quarters. Narrow winding lanes and compacted building structure are the characteristics of neighborhoods such as Beit El Mal, Abu Rouf and Wad Nubawi.

Abu Rouf and Beit EL Mal:

These neighborhoods represent the vernacular planning pattern of Omdurman. They are characterized by narrow twisting lanes and single storey compacted building structure. The mosque being the most dominant feature.

These districts defy absolute, abstract planning classifications, such as third class areas, as this base standard neither recognizes time nor changing economic circumstances, several concurrent trends, positive and deficiencies should be moored in these areas, for they represent trends and characteristics common throughout Omdurman. Within the labyrinthine clusters of Beit El Mal, the individual house remains properly the unit of internal expansion and division and all implementations remain appropriately small and individual, this and the traditional one storey uniformity give an overall visual clarity to the physical structure, in spite of the twisted street pattern.

As in three towns generally and historic Omdurman particularly, Abu Rouf and Beit EL Mal have a chronic shortage of green open spaces, indeed any open space is at a premium in Omdurman, excepting the Mulazmin. Thus, children of Beit EL Mal have to cross the vehicular barrier of the Shambat Bridge approach road, in order to find an area suitable for football and other space demanding games. The open space along the river in Beit EL Mal and Abu Rouf is a narrow natural escarpment.

Wad Nubawi:

This neighborhood is one of the oldest traditional ethnic quarters in Omdurman. It was named after one of the Mahdist commander (Wad Nubawi) as was the custom of naming residential quarters at that time. Wad – Nubawi continues to be spiritually relevant today, as the ancestral home of AL-Mahdi, and the home of his descendants and close relatives. The followers of AL-Mahdi, known as EL-Ansar, are almost the sole in inhabitatants of this area. Their keen belief and strong loyalty to the Mahdist movement does not only reflect reverence to the Mahdi but also permits the close relationship among them, thus constitutes a strongly bonded and homogeneous community.
It is an old traditional quarter where the majority of the houses were built several decades back, during the era of the Mahdist movement, but is still well preserved, the physical mobility of the people is minimal, and most of the families in Wad Nubawi have resided in the same locations for generations. Map 3

The traditional, non-architect – designed, building are the dominant types of domestic buildings in Wad Nubawi. Ref 17

AL Morada:
One of the oldest neighborhoods of Omdurman town. The neighborhood structure is mainly in a radial form, where there is a single physical dominant metropolitan focus, centrally placed. Into it fan a series of major radial paths, including various nodes of circulation also there are a series of secondary centers along the radial paths, inter - connected by circumferential ways. They also were given a character that changes progressively with distant from the center. The road pattern semi – direct linear sequence, climaxing at the main center of residential block structure.2

The consolidated facilities are put at the center with some other facilities distributed throughout the secondary centers. ref 33

The centrally placed focus residential block structure results in major paths, with a series of secondary paths along the radial paths, these sequential rhythms of the radials result in a visual characters of the residential plot structure, around the center with some change with distant from the center. Ref 33

Visually the neighborhoods presents the normal homogeneity and modesty resulting from the prevalent building material, mud, the prevalent built form, the cube, with its classical purity, and the conservative life styles.

Remnants of a few haras (group of some 10 houses with a cul-de-sac access and gates locked at night) still stand as evidence of the intimacy of those communities and the high degree of control that an individual exercised over their environment and up to the 1940s Umm-Durman was a predominately pedestrian town, a feature which encouraged maximum human interaction.

Obviously, these are physical features common to the majority of traditional settlements in this climatic zone whether Arab Muslim or not, but here they were consolidated by the teachings of Islam which explicitly calls for community interaction and involvement. Ref 3
Souk Omdurman represented the main market place for these old neighborhoods. It was situated in the centre of the Town. (In old Umm – Durman it was and still roughly is, central and organized into specialized quarters – for gold smith, ivory and ebony shops, textile and leather shops, butcheries, groceries etc. thus facilitating the activities of customers, merchants, craftsmen and suppliers. The relevance of the market place here stems not only from its primary function, the shopping service to the neighborhoods but also from its secondary social function. It provided the natural extension to life in the neighborhoods, though almost exclusively for men, with its social gatherings, Grand mosque and later coffee shops, bars and cinemas.)

Omdurman has succeeded in creating the sympathetic, harmonious ecology for human interaction through its physical fabric.

On the negative side and but closely related to this aspect, a high regard to privacy, verging on an obsession has in variably been associated with Muslim towns and homes, and is often incorrectly stressed as a requirement not a mere feature. It is manifest here in the defensive boundary walls shielding the houses not only from street life but even from the desolate Nile bank.

That the qualities of originality and consistency in the neighborhoods of Um-durman have survived for ever a century is due to some consideration specific to the Town. The basic functions and structures of the Town have not undergone much transformation since the other two towns relieved Umm-durman of the potentially disruptive functions. Khartoum has embarrassed the major administrative functions and Khartoum North the major industrial and services ones, the outcome a remarkably stable social structure. Physical mobility is minimal; some families have resided in the same locations since Mahdist times.

Although there was a large influx of population towards Omdurman Town during El Madia there was no sign of housing problems, the reason was that people were adapted to their indigenous architecture, traditional building materials, construction technique local design and planning value.

Another great stabilizing influence, for better or worse lies in land tenure and ownership rights. Old Umm-durman is predominately freehold land which makes government intervention, even in the best public interest, tedious, slow and expensive. Umm-durman thus retained its grace, mystery and slow ferment as apposed to Khartoum’s plain, evolving character.
Omdurman during British rule:
Omdurman has remained the centre of administration, for a while as the building of Khartoum Town was not completed.
In the early stages of the condominium period 1898-1956 the town was neglected and its population dropped from 150,000 to 60,000 inhabitants, due to the reverse migration of the Khalifa’s supporters back to their homeland. As a result large residential quarters were deserted and the city experienced a complete urban blight. In a later stage of this period, after the Second World War and due to the construction of the Blue Nile and White Nile bridges and the introduction of the tramway system, Omdurman was largely expanded and its commercial center flourished and its souk became the largest traditional market in all Africa.

The little influence of the British rulers on the spatial and socio-cultural patterns of the city resulted in an indigenous environment that comprised a relatively homogenous population. Shortly after world war two El Mulazmin quarter was planned differently from the organic patterns prevailed.

By all accounts, during the first two decades of independence the vast majority of the projects were judged by the regular rigid grid iron patterns. Regions like Al Mahdia testify to this. The grid iron bring out the neighborhood very distinctly making it easily identifiable as a social and administrative unit and the simple layout is the most economical in the delivery of services and infrastructure items. All planning morphologies through history experienced by the country have resulted from different traditional and socio-cultural attitudes. As the establishment and development of the town was associated with the Mahdia, it was natural for the town to grow at a slower rate during the Condominium rule. The new era enhanced the development and growth of Khartoum town and the slow growth of Omdurman. This was reflected in the fact that the town covered quite the same area of 1898 until the late 1950’s. This means that the development of the Town during this period was only in the form of filling the gaps within the old fabric of the Town.

The northward extension Hai El Umda was planned in the early 40’s of the previous century. The grid iron was adopted in the planning there were no open spaces and social services at the neighborhood level. In 1958 EL Mahdia Township was planned and started to develop, Hara 1, 2, 4, and 5.

The principles of planning were more advanced. Small (suks) market facilities were planned at the Hara level (neighborhood level) educational, shopping, recreational and cultural facilities was grouped and was shared between different Haras.
The westward extension: During the period 1930 – 1950 the town witnessed rather an active extension on this direction to form EL Arda, Banat and the southern part of AL Abassia. In the late 1950’s the old part of Umbaddah was incorporated into the town boundary. The origin of Umbaddah was a spontaneous origin, and several preplanning schemes were carried.

Because of its spontaneous origin, Umbaddah is characterized by the lack of organization in roads, plot shapes and sizes, open spaces, in addition to inadequacy of the existing communal facilities and absence of others.

The southward extension:

The indigenous settlement of Abuseed and after its incorporation into the town continued to grow at a show rate, due to its relative distant location with respect to the other parts of the town, on the one hand, the absence of the paved roads which connects it with the rest of the town. The military area on this part of the town witnessed considerable development and as a result a large proportion of this part was covered by military buildings.

Omdurman after Independence:

Soon after independents in 1956 the local touch in planning emerged. The neighborhoods concept had already been lightly touched. Fig 16,17,18. Since late 1970 Greater Khartoum had witnessed great population movements. A large flow of displaced people to urban areas and of refugees from neighboring countries.

The civil war in the South and later the draught that hit the Western regions, were the major cause of the large population flow towards the capital.

The population Of Greater Khartoum rose abruptly from 1.55million in 1983 to an estimated 4.5 million in 1990. The government was faced with a harsh reality, it could no longer afford to provide the necessary infrastructure and service items even the most basic to its communities.

El Mahdia township continued its northward extension After 1964 EL Thawra. Hara 6,7,8,9 and 10 were planned. the northward extension of El Thawra continued even further in the early 50’s to form Hara 11,12,13,14,17,23,24,25.

The principles which were adopted in the planning of El Thawra were the same as those of El Mahdia Township. In 1970s Elshigla to the South and Elawda to the west were planned.
Marzook and Elgalaa started and continued to grow as squatter settlements (unplanned). ELgalaa is inhabited by a Muslim community. This settlement is characterized by narrow winding roads, and very large indoor courts used for private and semi private activities. Open spaces are neglected. Ref 34
3.7 The three physical development plans of Greater Khartoum:

The political changes and successions of Turkish, Mahdist, British and National government administrations each with its own perception of the use of land have had a clear impact. The result is a mosaic of land use patterns of national and indigenous represented by Omdurman, western represented by Khartoum, a mixed one represented by Khartoum North. This is the core starting point for the planning process. At present land use in all three cities is a complex blend of indigenous and western overwhelmed by an increasingly uncontrolled use of land for residential purposes by expanding squatter settlements. The colonial heritage in planning design procedures, style specifications and classifications of buildings as a general policy is still of great importance. The British policy for Omdurman to remain national, Khartoum to be western and Khartoum North as a mixing of the two is up to now guiding planning.

3.7.1 Doxiades 1959:
In its effort to tame and guide the land use in the capital, the planning Authority opted for the model of master plans. In 1959 the government of the Sudan invited Doxiades Associates consulting Engineers of Athens for the preparation of a Master programmed and a Master plan for Greater Khartoum. Their plan guided the growth of the major functional zones of greater Khartoum along the rivers. Residential areas were classified into various communities according to certain hierarchical pattern which was used as tool for provision of services and facilities which varied in their number and specialization according to the particular level. At the level of the neighborhood whose population was between 5000-8000 people the plan suggested the provision of a main market, a civic, cultural and recreational center which was in certain cases adjoined to an intermediate or a secondary school. ref 8

Also recommended were a public park and a small stadium. Within the neighborhood there were 2-4 communities each of about 300-400 families, whose focal point was the primary school and the local shopping center.

Each of those in turn was made of 3-4 communities of 75-100 families connected by a playground or a nursery school. Finally at the lowest level there was the smallest urban community which was made of 20-25 families connected by a pedestrian lane or by a small open space.

    The plan also paid great attention to transportation networks. Regarding Omdurman Town and for a population of 267,000 the following considerations were made

- The existing irregular pattern was respected as far as possible.
- Extensions of the Town are planned in the rectangular pattern.
- The areas subject to floods are zoned as open spaces, but a study should be recommended for the control of floods.
- The industrial area is extended north wards. It is suggested that only workshops and handicrafts shops should be allowed.
- The present Souk will be kept as it is, conditions should be improved without spoiling the local character of the central market. It is suggested that the whole area should be preplanned in order to separate the vehicular from pedestrian traffic. ref 8

The Doxiades project was not implemented, mainly because of the lack of the government commitment to objective planning as well as the lack of funds for realization of the plan. The anticipated growth of population and the rapid occupation of space by people for their housing in the post – plan period hindered the implementation procedure, and even led to questioning the practicability of the plan and its revenues for the capital under changing circumstances. Map 4
3.7.2 Mefit 1974:

Again in 1974, Mefit consulting Engineers of Rome Prepared its report. Khartoum Regional plan and master plan for the three Towns. This plan mainly concerned with broad classifications of land use to accommodate the inflowing population from rural areas, proposed guidelines for future planning procedure for land use and produced a land use map. ref 23

A typical layout was suggested for the residential neighborhood and the plan recommended higher levels of residential density for both the new and existing areas to reduce the cost of infrastructures. It suggested the reduction of the plot sizes to 500m2 for 1st class areas, 400m2 for second class areas, 200m2 for 3rd class areas.

The plan also set out certain long term standards for provision of social services within the residential areas they are summarized below:

Regarding Omdurman Town the proposals were:

- Relocation of the river Nile through traffic.
- Recreational facilities along the River Nile Front.
- Cultural and administrative facilities will create a sequential spinal system.
- The Tomb of the Mahdi – Mahdi Square – Khalifa’s house constitutes the generating mode from which activities radiate outward.1

The Mefit plan was not approved by the government because it recommended the abolition of the central town planning authorities in the greater Khartoum urban area. Nevertheless the proposed land allocation and broad zoning are generally followed by the planning authorities. Map 5
3.5.3 Doxiadis Khartoum structure plan (1990 – 2000):
A structure plan for Khartoum was prepared by Doxiades associations and Abdel Muniem Mustafa and Partners in 1990 for the periods of 10 years (1990 – 2000) among the main policies is the districting of the city structure, density optimization, improvement of housing transportation and services and environmental protection.
Self sustained districts with hierarchically organized services and employment center were evolved in view of reducing excessive commuting, energy overspending and to achieve levels of urban functions. The plan suggested the growth of the capital in the South direction, and along the main transportation routes.

It also suggested the expansion of transport operation through the introduction of the light rail as a high capacity mode of transportation. Each district is subdivided into a number of 15-20 neighborhoods of some 10,000 – 15,000 population and which offer a complete range of lower level services for their respective catchments population. Each neighborhood is constituted of a number of 5-8 local communities of 250-300 housing units.

The plan suggested the increase of net residential density from 220 per hectare to 280 and it called for the revision and reduction of plot sizes. It also defined certain standards for facilities provision for urban neighborhoods. Map 6
3.8 Conclusion

The settlement patterns in Sudan before the colonial era show that prior to the British government there have been disconnected reference to settlement planning.

There were no specialized cadres involved, and the only settlement planners were the ideas and concepts of the kings and rulers. Even during the Turkish government the country began to show a clear spatial functional identity of its rudimentary settlement layout and there have been some sort of responsibilities of supervision in planning and planning process.

The settlement patterns during the Mahdia era began to mould exhibiting some typical Arab-Islamic-African features with the traditional organic patterns. It was characterized by the conscious planning dictating of the main routes and square, the observable locations of the market place, the tomb of the religions features and the informal growth of the residential fabric guided by social customs and norms.

As a result the layout of the residential areas was based on a control and supervision strategy, whereby wide streets separated neighborhoods, but individual plots were more spontaneously planned. The neighborhoods themselves were identified with the religious, military or ethnic ranks of the residents.

The British government, as a result of the extreme developments in physical planning themes, has made the greatest changes in the settlement patterns and planning systems. Obviously the British government favored a policy that tends to keep a minimum interaction and interference with local social life. Accordingly the planning patterns during the British
government are the diagonal streets resembling the Union Jack, which appear to have been introduced primarily for military purposes. Undoubtedly, the diagonal streets provided useful direct communication between various points, but as a result they form awkward building plots that are inconvenient in the residential quarters.
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Table (4) Climatic Normals 1961-1990
Source: Meteorological Department
Chapter 4
Case study Elmulazmin residential area:

4.1 Introduction
The objective of the planner in El mulazmin area was to provide generous amounts of open spaces to promote the social interaction among the residents of the area. And for the residence to practice their cultural and social life, as well as to improve the residential environment.
The planning pattern adopted in El Mulazmin will be tackled by studying several case studies within the residential area.
It is worth mentioning that the plots of the Mulazmin area were allotted to high rank officials who work with the colonizer and to near relatives of El Imam El Mahdi.

4.2 Objective of the study:
The objective of this research is to study the planning of El Mulazmin area regarding the physical setting, socio-economic and physical environmental aspects.

4.3 Methodology:
The four methods employed were:
- Review of existing documents, previous studies, arial photographs, and photographs reflecting the existing environment.
- Interviews with officials and with relatives and friends in the area.
- A household survey for a sample of the population to assess their satisfaction regarding their residential conditions.
- Observation through regular visits to the residential area.

4.4 Historical background:
The Mulazmin residential area, as an identifiable place, came into existence in 1885, following the death of the Mahdi, when Khalifa Abdullahi designated this area to house his body guard – Mulazmin – taken from tribes from the western Sudan. The Mulazmin was, in effect, the Khalifa’s fortified citadel, also containing the ammunition factory and stores within the defence perimeter wall. Though mostly demolished, only as recently as the forties, portions of this Sur, including the Abdel Ghayum Gate, still stand.
The rest of the Mulazmin did not survive the defeat of the Khalifa’s armies. With the corresponding shift of the capital to Khartoum, the area was left to ruin, and it remained largely vacant until post world war II, a huge gaping hole where the heart of the city once had been.

At this time the Southern “triangle” was given over to governmental and institutional functions, a prison, police housing, the National Theatre, and various hospitals and schools – and the Mulazmin has continued to acquire similar additions, including the Television and Broadcasting quarters for the Nation and the National Center for the Arts. Beginning also in the late forties, residential plots for 1st class, red brick standard were sub-divided in the north-eastern area, in the early fifties, first and second class (drawing – board) subdivisions filled the remaining open spaces.

In a city chronically short of open space, many large undeveloped plots remain in the Mulazmin, though most are untreated. The Nile is a few minutes walk from each Mulazmin residence. The Mulazmin area contains an unrivaled collection of schools and public services which are unrelated and spread in an od-hoc fashion.

For the city of Omdurman, the three towns and the entire nation, the nascent, recreational and cultural potential of the Mulazmin is at least as great. History is still strongly felt in the Mulazmin, with the Khalifa’s house, Mahdi Tomb, Mahdi Square and Beit El Amana directly adjoining. Inside evidence of the Khalifa’s ammunition workshops remain, as the prison wall and remnants of the Sur exist in Abdel Gayum Gate and along the River Front. Ref 8

4.5 Physical setting:
The area under study, El Mulazmin residential area, is situated East of Omdurman Town, along the river Nile. It is bounded by three main roads. El Azhari road from the north, El Hijra and El. Morada from the west and the Nile road from the eastern part going south till the Riviera Gardens.

El Mulazmin residential area consists of four Haras and the area along the Nile Bank covering a total area of 1.5 Km2.

There are 364 plots in the four Haras. The width of the Nile Bank varies from 80-140m.

It is found that there has been a slight deviation from the official plan 1948.
4.5.1 Land utilization:
The Mulazmin area is mainly residential with the present of a few non residential areas occupied by institutional and governmental buildings. The area of the residential plots is about 706756m² which constitutes 40% of the total 4 Hara area.
15% of the total plots present in the area under study are residential.

In Hara 1, in the original plan, map no 6, plot no 13 and 15 were transferred into a cultural centre and Elshatti club respectively. The open space in the original plan, along Elazhari road was occupied by activities 7, 8, and 9 in the recent plan, map no 9, and these are, Eradwan mosque, a police station and El Bohaira hospital.
In Hara 2, plots 26, 27, and 28, in the original plan, map no 8, are occupied by a mosque and a religious institute. Plots 105, 108, and 112 were transferred into an elementary school no 13 in the recent plan, map no 7. The island block 113, 114, 115, and 118, 119, 120 are occupied by souq Elmulazmin.

In the original plan map no. 6, Medan Elbohaira was intended to be a recreational ground. Now it is a dump ground accumulated by garbage, and a pool of water during rainy season.
It is realized that the circulation area around the medan is distributed as residential areas. A plot is being allotted for Muntadah abna Omdurman.
In Hara 3 plots 17, 18, 19, 26, 27, 28, 29, and 30 were transferred into the Hot Region Hospital.
Plots 39, 59, 57, 62, 63, and 55 in the original plan no 6, are occupied by buildings of the Technical College. The open space is hired by the College and used as a cafeteria. Part of plot no 9 is occupied by mustaasaf Elmulazmin, no 35 in map no 7. Plot 4 and 5 in map 6 in the original proposal are occupied by Eldandera Mosque no 37 in map 7, while plots 3 and 2 are occupied by Elmerghania school no 36 map 7.
Hara 4 is occupied by governmental institutions, schools, educational institutions hostels and the university of the Holy Quran no 44, 47, 48 Map 7.
4.5.2 Historical buildings:
The Mulazmin residential area is in vicinity of important historical buildings. The Mahdi’s tomb, the Khalifa’s house and mosque.

The prison is situated within the residential area. It occupies an excellent location surrounded by three main roads. The surrounding stone wall is considered one of the important historical features standing since the Mahdia’s era.

North of the prison is the police residential area.
The houses are in a poor condition, single storey with light roofs and absence of greenery or green areas.

- Baobat Abdel Gayum:
An important historical feature. It once represented the entrance to Omdurman Town. It is not visible to passers by unless it is directly approached. Being in the center of a very busy road, there is the hazards of being affected by traffic accidents.

4.6 Results of field investigation:
4.6.1 Socio-economic Aspects:

4.6.1.1 Demographic characteristics:
The population of El Mulazmin according to 1993 census was 2,400 living in 300 households giving an average of 2 households per plot and 8 persons per household.
Some of the cases were nuclear families with a husband, a wife and children, while the majority were extended families with sons and daughters sharing the same house.

4.6.1.2 Employment and income:
Some of the surveyed household are employed in the public sectors.
The majority either worked in the private sector or have their own private work.
In most of the surveyed sample there were two or three employed members other than the household head. These naturally contributed to the household income. The income is fairly good in most cases, yet when compared to the actual current costs of goods and services they barely
cover living expenses. Khartoum central area presented the main area of employment some in Omdurman and a few in Khartoum North.

Most of the residents use public transport to reach their destination, a few own private cars.

4.6.1.3 Social interaction:–
The social interaction, cooperation and homogenity among people in the neighbourhood are generally strong. Social links are especially strong among the old residents who obtained their plots at the original housing scheme.

Most complained about the deterioration of the economic situation, they believe that this deterioration has negative effects on social relationships. Every one is so worried, so busy earning one’s living that they have less energy, time and money to share with others.

4.6.1.4: Transportation:–
The main link of the area to Khartoum and to Khartoum North is through the Nile road and Alazhari road. ElShuhada public transport center is adjacent to El Mulazmin area. Public transport is available to Khartoum, Khartoum North and other parts of Omdurman.

4.6.1.5: Health Facilities:–
ElMualzmin enjoys the proximity of Omdurman Teaching Hospital. ElDayat Maternity hospital is within the residential area. The Hot Areas Diseases Hospital, has a negative impact on the residential environment, as it is a source of spreading epidemic diseases. The residents suffer greatly from this location within their residential area, and are trying hardly to convince the authorities to transfer it to another location in the Town. Such hospitals serve an area larger than El Mulazmin. They receive patients from all over Omdurman and its peripheries as well as patients from Khartoum and Khartoum North. Most residents seek treatment at the private clinics around Omdurman hospital. Some receive treatment at the public hospital as one lady said” you receive the same treatment as in the private clinics so it is better to approach the hospital rather than going on wasting your money”.

There are a number of private hospitals:
- In Hara 1 (Mustawsaf El Bohaira)
- Mustawsaf El Mulazmin in Hara 3- and the Hot Regions hospital.

Close to the Mulazmin residential area there is the specialized children’s casualty hospital.
The health facilities are scattered in the area under study in an unplanned manner regarding location and speciality, and they serve the whole of Omdurman Town, and not the area under study.

Heavy traffic penetrates the residential area to reach the available health facilities. It is realized that the available health facilities are specialized hospitals serving a population greater than the area under study. The Blue Nile Moustasaf is adjacent to the Mulazmin residential area.

4.6.1.6 Shopping facilities:
Most of the residents in ElMulazmin area go on to Soug Omdurman or Soug Bahri for their daily or weekly shopping. A few approach the scattered canteen or corner shops in the area.
In Soug El Mulazmin, in the center of Hara 3, there is a bakery, Zariba for charcoal and several restaurants. Any attempt of providing butcheries and groceries within this soug is not a success, the prices well not compete with Soug Omdurman where the prices of meat and vegetables are fairly reasonable.
There is a concentration of shopping activity of a variety of different goods along major roads e.g. Elazhari road Elhigra roads, and these serve areas other than El Mulazmin area.

4.6.1.7 Recreational facilities:
The area has very little to offer as far as recreational facilities are concerned. There is a single social cultural club, EL Shatli club. This club is mainly approached by elderly residents and it receives visitors from other adjacent neighbourhoods of Omdurman mainly Beit El Mal.
Riviera Garden developed into a commercial area and is approached by visitors from all Khartoum.
The open spaces within the neighbourhoods provide a good ground for children playing and sports. Most of the residents, males and females of varying age groups suggested that strolling across Shambat bridge offers a satisfactory means of sport and recreation.

4.6.1.8 Educational Facilities:
The area occupies educational facilities as follows:
In Hara 1 there is a basic school, and hostels of the commercial school, Amal institute for deaf and an administration building for the technical college.
In Hara 2 there are three basic schools, a senior school and a religious institute.
In Hara 3 there is a private school and several scattered buildings of the Technical College.
In Hara 4 there are two senior schools for girls and an institute for teachers training.
The educational facilities are seen to be concentrated in the Northern part of the area under study, and they serve the whole of Omdurman and the Capital.

4.6.1.9 Worship facilities:
El Mulazmin area accommodates five mosques, one church
- 1 mosque at Hara 1.
- 1 mosque at Hara 2.
- 2 Mosques at Hara 3
- 1 Mosque at Hara 4
The church is situated on the peripheries of the neighbourhoods or Haras and not in the center. Which indicates that other users outside the area under study are using such facility.

4.6.1.10 Security:-
There is a police station in the area along El Azhari road.
The present of the police force within the residential area contributes to the safety of the area.
Most residents complain of the theft caused by the small children roaming about who come from other areas especially from ElShuhada. As one lady claimed (The small children sit under the tree shed all day and when they find a chance of a door being opened they go inside and grasp what they find in their way and vanish).

4.6.1.11 Recreational facilities:-
El Mulazmin lacks greenery and green areas.
The planned open spaces in Hara 1 has been utilized for other purposes. [Café for the Technical College Student’s Union]. On the same Hara, there is the Baladia Mashtal  along the Nile Road. Omdurman Tourist ground and the Riviera gardens are along the Nile bank.

4.6.1.12 Popular action
Services provided through self-help within the neighbourhood include, security, lighting and cleaning of streets.

Several lady groups spend their afternoons reading Quran and help in the cases of weddings and mournings.

4.6.2 Physical and environmental aspects:

4.6.2.1 Services

Water supply network:
The existing water network was constructed in 1950, and it continued with the same capacity in spite of the physical, economical and social development in the area under study.

Sewage and surface water disposal:
The residential area suffers greatly from the effects of the water table which is available in some cases to a depth of 2.5 meters especially along El Azhari road.
The problem arises when digging for the soakaway well. This necessitates the presence of large and efficient pumping machines which pump out the water while digging and building.

In areas where there is a difficulty in reaching the water table, the wells get quickly filled with water, the residents are forced to get the pumping cars on a regular basis. This cost around 7000 S.D. which might be economically tiring for the majority.

The houses using the privy system for sewers are suffering from the passage of water from the privy to the building's foundations which leads to cracks and weakness and probably demolition of the whole structure. Accordingly the officials prohibit the construction of a privy in the residential area.

There is no public sewage system. 30% of the residents use pit latrines, the depth of the hole ranges between 30 to 20 m and the diameter 1.5 m, built by one brick wall throughout the whole depth.

40% use aqua privy system. This consists of a hole $3 \times 2 \times 2$ filled with broken brick, domestic water on to this hole is connected the kitchen and bath waste.

Toilets are connected to another hole 10 meters deep and 1 meter in diameter. 30% use pit latrines. This consists of a hole 3 to ten meters deep, 1.5 m in diameter built by one brick wall throughout the whole depth covered with a concrete slab having a central hole for the waste disposal. Kitchen and bath waters are disposed manually outside the house.
Map 11 shows the rain water drainage channels. Some are constructed and others are not. All this channels end up to Maidan albohaira from there to the Nile.

4.6.2.2 Open spaces and road network:
At the communal level there is Medan Elbohaira around 240 × 20. There is an open space along Elazhari road, which is now occupied by a mosque, a police station and Elbohaira hospital. Map 8.
In Hara 2 there is Medan Alahlia around 120 × 90. The officials intend to transfer this area into a transport centre. This decision taken by the authorities, is strongly rejected by the residents. Such proposal will damage the residential area. Heavy traffic will pass through, commercial areas and other services will develop around the residential area.

Open spaces at semi-communal level serve 28 to 34 houses. They cover about half the clusters area. This system of open spaces are undefined and their boundaries are not marked.
At the private level, open spaces 9, 10, 11 and 12 serve around 8 to 10 houses. Open space 11 was hired by the Technical College, while open space no 9 is realised to be in a good condition, it is clean, irrigated and planted. It is observed that this court witness an evening gathering. Map 8.

Road network:
The north south minor roads crossing the residential area are wide. Even though are not paved, they attract through traffic from the major roads of Elazhari to the north and ElNiel road to the east. The major roads are 20m wide, paved but not in a good condition especially the Azhari road which suffers from the effects of the surface water. Map 8.

4.6.2.3 Housing Condition: The area is dominated by single story detached houses. Most are built from brick wall in cement or mud mortar multi story houses are found in Hara 3. The residential area is characterized by large plot sizes, they range from 450 meter² in Hara 2 and up to 1200 meter² in Hara 3. It is realised that shaded areas in the form of rakobas are introduced in front of kitchens. Cooking, kisra baking, washing and ironing are practised in these areas. These rakobas are multi purpose, as they serve as small gathering areas for close relatives.
4.7 Planning pattern
Different planning patterns are observed in El-Mulazmin area. The planning is seen to follow the topography in Hara3. The pattern adopted in Hara 2 (Chatter – box arrangement) is a clustering type of arrangement around a court. The centre of the court is occupied by an island block of 6-4 plots, 3-2 plots on each side. Map 7
Each cluster of houses contain about 28-34 houses. The staggering of plots at the corner of each cluster give rise to undefined open spaces. This staggering arrangement give the possibility for 6 houses of the 7 staggered houses , to have access to the open space.
The corner house is usually facing main roads on the opposite of the court. The boundary walls are staggered to give opportunity for the corner houses to have accessibility to the court. Other entrance for these houses is provided on the opposite side, not facing the court. The island blocks disperse the corner clusters from each other, increase the size of the single cluster and lead to the production of undefined open spaces.
The plot sizes are around 600m². Each house is occupied by 2 or 3 household with more than one entrance to the outside. The boundary walls are solid and high and sometimes a wire fence or broken glass are seen on top of the walls to avoid theifs. An inner dividing wall is sometimes realized on several houses.
It is realized that some houses have developed unauthorized extensions in these spaces, and utilized them for lawns greenery and car parking. Others, have just fenced the front of their houses by a hedge. In some cases the social interaction between the different household occupying the same house is practiced in these extensions.
In Hara 1 it is realized that the plots arranged around Medan El Bohaira. It seems that the planning patterns adopted was following the topography and boundary of the Medan.map 9. The Medan itself covers a large area of around m² it’s a ground
for dumps and rubbish. Dumps from all over Omdurman Town is poured in this land in an attempt to raise its level, being the lowest area in the Town. Rain water channels all end up to this Medan during the rainy season, which becomes already full of water, from there the rain water finds its way to the Nile through special water channels. The long straight roads (characteristic of the grid iron pattern), running north, south divides the neighborhood into three parts and are attractive to through traffic from El Azhari Road.

4.7.1 Cluster A
For forty years the open space (45x30) m was a recreational ground. The size of the Neim Trees planted around the court, are a clear identification that they were planted a long time ago. People from the surrounding houses and from other parts of El Mulazmin area, utilize this space as a sport, recreational and picnic ground, it is used to be an ideal ground for social interaction. Fig 20.
Ten years ago, after the residential area was invaded by several institutes of the Technical College, and aiming to acquire space for the increasing number of students they hired this recreational ground.
What use to be a lawn and a sport ground is now a barren land surrounded by a wire fence, occupied by ugly iron benches. Cold drinks boxes are seen scattered here and there. The enclosed cafeteria is serving the students and passers by from both sides. The large trees offers an excellent shade for the tea ladies. Several groups are seen sitting under the trees around the tea ladies. Students and staff cars are seen parked under these trees.
Car washers, shoe cleaners and others are seen roaming about and are a source of nuisance to the residents. Now the popular committee is working hard to get back their land and hence
return the serenity and quietness of the area. They are eager to correct this mistake which has a negative impact on the residence of the area and especially those in the vicinity of the court.

“We suffer greatly from this situation, the technical college minibuses keep crossing El Hai, several times a day, morning theft is common, our doors are closed all the time. Our residential area is safe no more.” Complained an old lady who use to play in this Genena forty years ago. This cluster is characterized by large plot sizes and multi-storey houses surrounding the court. Most have lawns within their house premises. Unauthorized extensions on the roads are absent from this cluster.

The size of the court is a real success as it unified the houses around the cluster and is an excellent recreational and children playing ground.
4.7.2 Cluster B
This cluster is situated in Hara 2. Here the effort is made by the residence surrounding the court. The outcome is a green square hedge 60cm high surrounding an area of around 150m² fig 2. The aim is to provide a green area adjacent to the houses for children to play in the afternoons. This cluster is characterized by large undefined open spaces of different sizes. The plot sizes are around 600m² (30x20)m and is realized the presence of unauthorized extension in several houses in this cluster. A children nursery has an entrance door to the inside of the cluster while the front door is facing east. The irrigation of this hedge is the responsibility of the surrounding residences.
This court when completed will be multi-purpose as it will act as a playing area for the nursery school in the mornings and playing ground for the children of the Hai in the afternoons. This effort made by the residents, if repeated in several clusters, will improve the residential environment and improve the social interaction between various age groups. In this cluster the rest of the open spaces are not defined cleared or greened except in front of the houses. One of the plots facing a main road, south of the cluster, running east west, is occupied by the Technical College diplomat section. Students are seen crossing this cluster to reach main roads as it provides a short cut rather than going around the whole cluster. A laundry shop occupies part of one of the houses. Clothes are seen hanging on the ropes. Another house has part of it built several storeys on the boundary wall. The ground floor of it is occupied by a car-seller shop. A long shaded platform along the facade of the house has cars parked under it.
The island block dispersed the building blocks from each other, they creat large undefined open spaces, which are very costy to clean and landscape. Fig 20

4.7.3 Medan ElAhlia
ElAhlia court covers a large area of about (120x90)m. This ground has a historical meaning to the residents of ElMulazmin area. They claim that El Zaim ElAzhari, has uttered an
important speech in this area after independence and hence it should be preserved in the memory of Al-Azhar and turned into a recreational ground, or else be converted into a cultural center that reflects the history of Omdurman Town and of Sudan. Fig 20.

The officials in the municipality of Omdurman Town are thinking about the court in a completely different way, unaware of the consequences, they are planning to convert the area into a transport center. Several transport routes from El Shuhada are to be moved to the area. The Shuhada area is congested with people, cars and accompanied services and this empty land was very attractive to the officials, irrespective of its spiritual meaning. This decision was met by a great protest from the residence.

Others, especially facing the Medan, have a completely different view. They think that the court is a sort of nuisance to them and to their children and it rendered the area unsafe. The Medan is a ground for dumps and carriages and roammers. During the rainy seasons it is turned into a lake and it forms an excellent breeding ground for flies and mosquitoes. Being catered by the government, is a satisfactory alternative, as the court may be paved, lighted and secured.

Commercial areas developed in the houses facing the Medan, the objective been to light it and give it life.

4.7.4 cluster D
It is realized, here, that the island block disappeared. The houses surrounding the court are 10 houses they are occupied by extended families with various household sizes. The court enclosed is of a reasonable size, well-defined and it strengthen the social interaction among the residence of this cluster. Fig 20.

An interesting feature in this cluster which is absent anywhere else in El Mulazmin residential area is that the occupants of the eastern corner
house have a small gathering in front of their house during evenings. Visitors from this cluster, other parts of El Mulazmin area and from all over the Town come and sit, interact and discuss public and political matters. Sometimes they watch important events on the T.V.

It is noticed that the main front door of the house is wide enough to move the chairs, tables and prayers mats, in and out of the house. The visitors are served with water and tea from the occupants of the house.

The entrance of the house act as storage space for the mats chairs and water flasks.

This small gathering (Sand club) as they call it, is a nuclei for a cultural and recreational center for males of specific age group of 50 and over.

The owner of the house, who died several years ago, is behind this social gathering.

He attempted to gather all his friends, relatives and neighbours each evening. His advice was that this gathering should continue and develop into a social clubs.

This cluster, in my view, offer the best arrangement of houses and open spaces. It is realized that the social relations among the residents in this cluster is stronger. The narrow roads approaching the cluster are not attractive to through traffic.

The open space enclosed is realized to be in a good condition regarding cleaning lighting and watering. Trees were planted in a raw in front of the house.

In my view this cluster offers the most satisfactory layout regarding the size of the open space and the minor roads.
4.9 Summary:
El Mulazmin residential area has an outstanding location. It is situated along the River Nile and is easily accessible from both Khartoum and Khartoum North, thus, the area was occupied by educational and health facilities which are higher than the neighborhood level, and hence receive visitors from other parts of Omdurman town. The only nursery school is in Hara 2 and is within catchment area to those children near by, others have to travel long distances or else use a mode of transport. The three basic schools are along Elazhari road. They are not evenly distributed and they receive students from other parts of Omdurman, especially Beit El Mal residential area.

The commercial areas which develop along Alazhari road are serving customers from outside the residential area. Soug Elmulazmin is not satisfactory as it does not provide the residents with their daily needs, residents have to travel to soug Omdurman for shopping, or else buy from the near canteens spreading in the area. Regarding health facilities, the residential area is near Omdurman Teaching Hospital and private clinics. Private hospitals are scattered in the residential area, and they receive patients from other parts of the Town and Khartoum City.

It is noticed that the large open spaces are barren with no greenery and vegetation except for a few trees and lawns made by the effort of the
residence. They are not lighted and are not used for the purpose they are
designed for. Such open spaces, if greened, planted landscaped and
lighted would be an excellent recreational ground for the various age
groups, will improve the social relations and will improve the residential
environment within the neighborhoods. Pedestrian roads are not defined
or paved, not lighted and are encroached by both vehicles and people.

Several households are accommodated within a single plot in most of the
houses which ultimately leads to crowding within the single plot. The
area occupied by the police residence is in miserable housing condition
and should be removed. Housing schemes can develop in this area for the
benefit of the residence which ultimately leads to a relief from the over
crowd.

The inhabitant's of El mulazmin area are of an Arabic-Muslim origin.
There cultural and social life is affected by the teachings of Islam. It is
realized that the social relations and interactions are stronger among the
households of the individual house and less interaction with other
households of neighboring houses. This may be due to the fact that the
parent household has arrived to this area from different parts of the
country and Omdurman town. There are no family ties among them. Most
settled in this area due to their fine occupations, others due to friendship.
It is realized that the social bond among the residence of the area is not as
strong as that existing in the oldest neighborhoods of Omdurman town e.g
Wad Nubawi.

Wad Nubawi is characterized by narrow winding roads, large plot sizes
and high, solid boundary walls. The courts are accommodate within the
boundary wall of the house. Social events, social interaction and even
housework are practiced in the system of courts within the single house.
The public spaces are for the performance of annual religious events as
ELeid prayer or EL mulid festivals.

A study by Farah in Wad Nubawi concluded "Its residence are a
homogeneous Muslim community who are loyal to AL Mahdia. Most of
the families indicated, no intention of moving out of the area. The
traditional non-architect designed buildings are the dominant types of
domestic buildings in Wad Nubawi. The majority of these dwellings
occupy grand parents, children and second or third degree relatives.
Hence the dwellings were designed and developed to accommodate an
extended family's way of life. Each extended family has a (hosh) consists of a number of households. Each household more or less occupies a specific section, containing one or more spatial structures (rooms).

The empirical investigation identified two main types of extended families. In the first one, all the family members (households) live as on family sharing, to different degrees the use of domestic space and the daily expenses. While in the other type some or all of the households of the extended family live as semi independent families in semi-independent sections accessible to the rest of the hosh by internal access".

The rehabilitation of the social and cultural facilities in Elmulazmin Area, the streets' landscaping and lighting will improve the social interaction and relation among the residence. Education and health services that are of a higher level than that recommended by the neighborhood level are to be transferred to other central areas.

The officials’ decision about the area should satisfy the inhabitant’s requirements and not be a source of nuisance to the residence. The officials, planners and local residence should cooperate and work together to improve the residential quality of the neighborhood.

The homogeneous population in Wad Nubawi is satisfied by the arrangement of their settlement. They are able to live together within the same boundary wall cooperate in the house work, share the same public and cooking areas and fulfill all the family commitments. Residents are able to practice their social life and social activities in the system of courts within the house all guided by the culture and teachings of Islam (separate quarters for gents and ladies.)

In EL mulazmin residential area the planning pattern is not satisfactory to the majority. The system of open spaces in the neighborhood are repelling, they are barren, dark and left to the accumulation of dumps and rubbish. The houses are crowded, as they accommodate several households, sometimes house hold activities are practiced outside the house. Unauthorized extensions are planted and greened and sometimes used for car parking.

The compact building structure in Wad Nubawi allow the units to shade each other and hence reduce the glare and improve the macro climate on the other hand the dispersed building structure in ElMulazmin accumulate the incoming heat rays, together with the absence of lawns and greenary in the outdoors, render the environment hot and uncomfortable.
Chapter 5
Conclusions and recommendations

5.1 EL-Mulazmin Residential area:

5.1.1 El Mulazmin residential area enjoys a valuable location. It occupies a beautiful natural site within Omdurman town and accommodates valuable historical features.

5.1.2 The aim of the planner in this area is the provision of generous amount of open spaces, to improve the social relations among the residents, and for the performance of major social and national events. The large plot sizes provided ample space for indoors lawns and greenery to improve the macro climate, reduce the glare of the sun and hence improve the residential environment.

5.1.3 Elmulazmin area was allotted to high rank officials who served in the government, lawyers’ engineers and managers. There were no family links among the residents and hence a minimum interaction exists among them. In fact interaction is realized to be more among the youth groups than among the old aged. Rarely do we find evening’s gatherings or sharing of meals or tea.

5.1.4 Some interaction exists among the ladies, especially in the mornings where they practice normal social visits.

"The economic standard is not as before" as one of the interviewers complained," we use to be living in a high standard but now see".

“We spend all morning in house work and there is no time to for social visits."

"We have no interest or time in evening social gatherings and this is o.k. it is enough for us to meet in the Gommaa prayer."

One resident commented.

5.1.5 The deterioration of the economic standard and the scarcity of resources for income ,is the reason behind the residents being busy all day managing there homes and life with no enough time to share with others.

5.1.6 The large-size open spaces are very difficult to manage, unutilized and not greened or landscaped and are often left for the accumulation of dumps and left over.
5.1.7 If such space were accommodated within the plots they might have been properly landscaped and well managed and will be under the responsibility of the owner. The large open space coupled by the wide roads, increase the sun glare and render the environment hot and thermally uncomfortable. The wide straight roads in contrary to the narrow meandering roads are monotonous, lack excitement and are vulnerable to through traffic. The indoor spaces intended for lawns, were replaced by buildings to accommodate the extended families.

5.1.8 The size of plots within a neighborhood may not satisfy the social requirement of a particular group, for some, large plots are a waste of land. Individuals are sometimes unable to develop their sites and hence they only build part of the plot and the rest is left undeveloped. Others require large plots to accommodate their extended families.

5.1.9 Planners should be very sensitive about the plot sizes and whether they satisfy the social needs of the group who are to be housed. Large outdoor open spaces are very difficult to manage and they lead to the dispersal of the building blocks rather than uniting them. If such spaces are accommodated within the building plot they can be well-managed and catered for by the owners. Lawns will be developed and ample of space is available for resident to practice their social activities, social events may take place within the house premises.

5.1.10 Regarding the vertical dimension, EL mulazmin area is characterized by a low profile with single-storey houses. Large plot sizes with multi story buildings have developed on the North eastern part of the residential area.

5.1.11 The main shopping area in El mulazmin area is soug EL sur which is situated in hara 2 within the neighborhood. It does not satisfy the daily needs of the residents. There is a restaurant, zariba, bakery, iron monger and a laundry. The clothes are seen on ropes and iron bits are seen scattered all over the place. Part of the resident's social habit is going to soug Omdurman for daily needs, and this is done on regular basis.

5.1.12 El mulazmin residential area contains educational and health facilities which are of levels higher than that of the neighborhood level, as a result the residential area receives visitors from other parts of Omdurman and Khartoum city. The Shatti social club, receives visitors from other near by neighborhoods especially Beit El mal.
5.1.13 The Riviera Garden is a recreational ground which serves the whole of Khartoum city. The practice of football playing in the scattered open spaces is a sort of nuisance to some residents. One resident complained. “The ball keeps jumping over my wall several times during the match and the players follow.” This in addition to the noise accomplished by the match, shouting, clapping, necessitates that special grounds are to be provided for sports.

5.1.14 El mulazmin area, as other neighborhoods in Omdurman suffers from bumpy roads which are not lighted, inefficient surface and sewerage drainage. The residential area lacks greenery, lawns, trees, and water surfaces, in spite of its adjacency to the Nile.
5.2 Neighborhoods of Omdurman town

5.2.1 After fall of Khartoum in Mahdi's hands in 1885, he and his followers crossed the Nile seeking a simple, religious and humble life, rejecting all influences of the Turko-Egyptian rule in Khartoum. A site for the new capital (ALBugaa) was selected. The Ansar hurried and built their houses, around the Mahdi's house. The area was transferred into a permanent settlement and this was the evolution of Omdurman town.

5.2.2 The settlement was erected around the Khalifa mosque and broad straight roads from the mosque to all the principal places were constructed. A great massive wall surrounds the Mahdi's tomb, Khalifa's house and EL Mulazmin quarters. This is a feature of all Early Arabic Muslim states.

5.2.3 The old neighborhoods of Omdurman were characterized by narrow winding roads, just enough for the passage of a cart, compacted building structures, large plot sizes and high boundary walls. People tend to live with others who belong to the same culture, in order to share the same values, ideas and norms, understand and respond to the same symbols, have the same life styles, manners and rules.

In such vernacular settlements dwellings are laid first and the streets come later as a left over space.

5.2.4 Such vernaculars patterns are observed in old neighborhoods as Beit El mal Abu Rouf, Wad Auru and Wad Nubawi, here there is a strong social cohesion among the residence. The large plot sizes accommodate extended families within the same boundary wall. The mosque or zawia occupies a central location and it represents the main cultural and social centre of the neighborhood.

5.2.5 The urban node of the neighborhood is represented by the minarate.

5.2.6 The strength of the social relation is clearly marked in such neighborhoods in all circumstances, weddings or mourning.

5.2.7 The compact building structure shades each other and hence reduces the accumulation of heat; similarly the narrow winding roads reduce the wind velocity and keep out dusty storm. The available building material and technology was adopted in the erection of the structures. The result is a pleasant homogeneous environment.

5.2.8 The grid iron pattern was adopted by the colonizer for the planning of the new extensions and this pattern continued even after independence. Here the street is the skeleton to which the dwellings are attached.

This pattern is monotonous and vulnerable to through traffic. The plot sizes do not satisfy the social and cultural requirements of the inhabitants.
Large open spaces are usually not utilized for the function they are designed for. Such spaces are wasteful land and if accommodated within the house block they might be much functional and will provide space for inhabitants to practice their social activities.

5.2.9 The vernacular patterns came into being after a long experience and hence they could be a source of knowledge towards a better built environment.
5.3 Recommendations for the improvement of ElMulazmin residential area.

- 5.3.1 A successfully planned residential neighbourhoods, when properly conciered, it provides for all the needs of its inhabitants within a geographically identifiable area and instills in them a sense of identity and belonging. A community must impart to all who are expensed to it a particular image of itself, a unique and individual character recognizable by others. The various elements must complement and support one another by functioning interactively. A community should find its people in a common identity, not separate or divide them.

- 5.3.2 Maximum interaction between the neighbour should be achieved.

- 5.3.3 The treatment of governments, the landscaping planning of open spaces and the introduction of trees will render the outdoors attractive to the inhabitants.

- 5.3.4 The Hot-district hospital situated in Hara within the residential neighbourhood is to be transformed into another location, as it is a source of nuisance and spread of epidemic diseases.

- 5.3.5 The open space situated within the residential blocks of Hara 2 is to be acquired and used by the inhabitants.

- 5.3.6 Medan El Ahlia is to be transformed into a sport and recreational ground for the benefit of the residents.

- 5.3.7 Any attempt made by the residents in planting and treatment of open spaces is to be appreciated and the officials may help by the provision of consultants expertise, gardeners and tools for the performance of this job

- 5.3.8 The through traffic should be prohibited from penetrating the neighbourhood, this can be achieved by narrowing the width of roads approaching the neighbourhood and introducing different paving materials.

- 5.3.9 The rehabilitation of Sug El Mulazmin so that it will provide the residents with their daily needs.

- 5.3.10 El Shatti Club, the only social and cultural club within the neighbourhood is to be upgraded to act as a recreational and educational center.

- 5.3.11 The provision of a modern public sewerage net – work for the proper disposal of human and household wastes. The treated water then should be used for irrigation.

- 5.3.12 Main roads and access roads should be paved with the provision of traffic lights at main junctions.
5.3.13 Adequate street lighting for security purposes and for the extension of social activities to the evenings.

5.3.14 Earth ditches and built drains should be cleared and well maintained.

5.3.15 Provision of buffer zones between the main traffic artery of El Azhari and the residential neighbourhood to absorb the noise of traffic and reduce pollution. Fences along the main heavy traffic roads render the neighbourhood safe and less hazardous.

5.3.16 A cultural centre is to be erected in the area occupied by the prison. The prison wall is to be preserved as a historical feature.

5.4 Recommendations for the improvement of residential neighbourhoods of Omdurman Town.

5.4.1 The patterns adopted in the planning of residential neighbourhood should address the inhabitants social and cultural requirements. Hence a social survey is to be conducted by professionals in order to study the cultural and social background and the inhabitant’s life style.

5.4.2 Planners should respect the identity of Omdurman Town and preserve its rich heritage of historical features and buildings.

5.4.3 The mosques with their high minerates should be the focal point of the neighbourhoods. The social and cultural role of the mosque is to be realized. Similarly the tombs in the Town are to be preserved and their religious values are to be respected.

5.4.4 All main roads in Omdurman town are to be made to converge to the Mahdi’s tomb, being the most conspicuous feature in the town, and has a historical meaning and value.

5.4.5 The rigidity of space standards, regarding plot sizes and building materials may prohibit the possibility of extended families to live together within the same boundary wall. For many the formation of such household type has many social obligations such as accommodation of newly married daughters, old aged and taking care of immigrant’s families who are left behind.

5.4.6 The width of roads are to be decided on according to the quality and quantity of traffic it accommodates. Similarly different materials for the road surface are to be introduced. Wide, smooth surfaces may attract through traffic while tough surfaces may prohibit traffic when recommended. The long straight roads may have variable widths. They may become narrower as they approach the neighbourhoods, allowing more space at the sides for platforms and greenary. Such platforms are ideal for social interaction.
- 5.4.7 Overlap of building block discourage the through traffic.
- 5.4.8 Planners should be very sensitive about the size and location of open spaces. The use of such spaces should be wel-studied, whether for sports, children playing or whether special social events are practiced in a particular space.
- 5.4.9 The contribution of such spaces for the improvement of the general macro-climate is to be realized and hence they should be planted, landscaped and not be left for the accumulation of dumps and garbages.
- 5.4.10 Planning patterns, should be in harmony with the topography of the town and not stand in contrast with it.
- 5.4.11 The introduction of different planning patterns within the residential area, so as to ensure that it is as much functional as possible.
- 5.4.12 Finally the courses of Architecture should include a study of the social and cultural life of the different races.
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