Urban Design Factors that Influence Women's Choice of Route of Movement:

The Case of Nairobi Central Business District

Brenda Maiba Bhoyyo

A thesis submitted in partial fulfillment for the degree of Master of Urban Design in the Jomo Kenyatta University of Agriculture and Technology

2012

DECLARATION

This thesis is my original work and has not been presented for a degree in any other university.

Signature……. Date……....

Brenda Maiba Bhoyyo

This thesis has been submitted for examination with our approval as university supervisors.

Dr. Francis M. Mburu **(Deceased)**

J.K.U.A.T, Kenya

Signature……. Date……....

Prof. Bernard O. Moirongo

J.K.U.A.T, Kenya

DEDICATION

This work is dedicated to Dumbo.

ACKNOWLEDGEMENTS

I thank Jomo Kenyatta University for according me the chance to pursue Masters Studies. I am indebted to the Norwegian Government for sponsoring the NOMA programme and to all collaborating institutions - Oslo, Trondheim, Addis Ababa, Makerere, Ardhi, Nairobi and Jomo Kenyatta Universities and the resource persons who shared their knowledge.

I thank our School of Architecture and Building Sciences, the Chairman, all teaching and support staff at the department of Architecture for their continued support. I am most grateful to my supervisors Dr. Mburu and Prof. Otoki for their guidance, support and critical insights and thoughts. Thanks to Mr. Mugwima, Bonnie Mworia, my classmates, family, friends and Dumbo for being with me through the sweat, blood and tears.

Finally, I owe all these efforts to God. The glory is His. For the interpretations, analyses and other errors of omission and commission in the work, I take full responsibility.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATES

LIST OF APPENDICES

LIST OF ABBREVIATIONS AND ACRONYMS

C.B.D	Central Business District
C.C.N	City Council of Nairobi
D / H	Distance / Height ratio
G.o.K	Government of Kenya
G.P.O	General Post Office
H.I.C	Habitat International Coalition
J.I.C.A	Japan International Cooperation Agency
K.I.C.C	Kenya International Conference Center
L.O.S	Levels of service
M	meter
M^2	Square meters
ms^{-1}	meters per second
N.C.B.D.A	Nairobi Central Business District Association
O.E.C.D	Organization for Economic Cooperation and Development
P.S.V	Public Service Vehicle
Ped / min	Pedestrians per minute
Sq. ft	Square foot
U.N	United Nations
U.N – H.S.P	United Nations Human Settlements Programme
W.I.C.I	Women in Cities International
≥	Greater than or equal to

ABSTRACT

Little consideration has been given to the issues of women in the urban environment. With the lack of provision of women friendly streets and street elements, poorly lit and unsafe streets, Nairobi Central Business District's (C.B.D) streets disregard women's needs. The research sought to establish the Urban Design factors that influence women's choice of route of movement in Nairobi C.B.D. The research was designed as a survey, using observation and interview methods. The study found that women's choice of route of movement is a product of mix of land uses, the social environment on the street, visibility of buildings along a route and transparency of spaces from the street. To a lesser degree, openness of the street, length of route and a street's complexity, are important variables determining choice of route of movement. In order to integrate women in the streets, it is desirable to incorporate building uses that generate street activity, improve visual connectedness between the street and the building as well as remedy areas where visibility is impaired.

Key words: Nairobi, women, route of movement, Urban design factors

PART ONE

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Rapid urbanization, an offshoot of industrial and commercial activity and modern planning have changed the urban scene drastically. Beginning in the 1970s a new wave of feminist writing and activism began to deconstruct the city as it had come to be understood in modernist thought. The spatial order came to be seen as profoundly patriarchal; that is an arrangement of space in which the domination of men over women was written into the architecture, urban design and form of the city (Sandercock, 1998). The study aims to particularly address the missing layer of women's issues in the urban environment. The research investigates visual cues that guide women's movement in the C.B.D. It probes aspects that their preferred route has over other routes.

This chapter introduces the study, defines the problem, and states the objectives and variables under study. It explains the significance, sets the scope and assumptions of the study and concludes with the conceptual framework.

1.2 Problem Statement

Statistically, women are smaller, have a shorter reach and are less physically strong than most men (White, 2001). The majority of clients, planners and construction personnel are able-bodied men; this tends to create an urban environment that

reflects their needs and experiences, excluding (deliberately or not) the needs of others. Women's social position has implications for urban design. They care for children and elderly relatives and are more likely to organize domestic responsibilities. They have less access to a private car. They are the greater users of public transport and form the bulk of pedestrians. However public routes are designed around the needs of commuters in order to get from one point to another and not around the needs of women (Organization for Economic Cooperation and Development - O.E.C.D, 1995).

In cases where women are accompanied by a child or elder, the street does not incorporate elements where they can rest when they are tired (Plate 1.0). Fenced off landscaped areas, pavements or porticos of city clocks and potted planters on which seating is prohibited by the C.C.N (City Council of Nairobi) are improvised as seats for brief respite. These are not designed specifically for such purposes, and do not offer comfort. The streets fall short of women's expectations.

People have five public space use rights, namely; presence, use and action, appropriation, modification and disposition (Lynch 1989). The United Nation (U.N)-Habitat's Women Safety Audit reiterates that dead-end streets (Plate 1.1), inadequately lit roads, and public parks which are typically dominated by male activities, are a few of the circumstances where the environment instigate feelings of fear for women in public spaces (Habitat International Coalition - H.I.C, 2010). It also suggests that not all of the city's inhabitants experience the same environment in the same way. This is particularly true for groups of women.

Plate 1.0: The street lacks facilities for children, by Author, 2010

Plate 1.1: Dead end street, by Author, 2010

In Nairobi's streets, when negotiating a crossing on the road, car traffic is a challenge. Traffic calming measures such as zebra crossings, speed humps and bumps do not always work for the pedestrian. Where young children are involved or those using mobility aids, the streets are less suited for their use.

In some parts of Nairobi C.B.D, women's use of streets is limited. Certain sections of streets are no-go zones unless accompanied. Many lanes in street blocks and tunnels remain unused, especially by women even when they are the shorter route to a destination. In most cases, they lack activities flowing from the building into the lanes, have blank walls and lack fenestration, they lack complexity and are extremely enclosed, littered, desolate and sometimes colonized by street urchins (Plate 1.2).

In spite of the reliance of streets for daily activities, most streets have remained unattractive places. Exposed below-street services, uneven street surfaces (Plate 1.3), unlit streets, compound the fear of use of the street especially after dark. With the growing population in the city, the streets too have become congested forcing women to sometimes walk on the road.

Plate 1.2: An unused pedestrian lane, by Author, 2010

Plate 1.3: An uneven street floor, by Author, 2010

This jeopardizes their safety and experience of the streets. Some streets have very little room for moving and stationary pedestrians. Accompanied women and those with luggage require more space which the street falls short of.

The subjects in the proposed study experience the street for a great part of their lives. However, women's views remain largely unexplored. The urban design professionals rely on their own knowledge in the design process; women as users of the street are not incorporated. They leave out gender considerations. Partly as a result, women are selective of the paths they choose to take and urban spaces they pass through. The study seeks to find out what Urban Design factors influence women's choice of route of movement in Nairobi C.B.D.

Research questions:

1. What Urban Design factors influence women's choice of route of movement?
2. What is the weight of each of the factors?
3. Is there a relation between Urban Design factors and women's choice of route of movement?

1.3 Objectives of the study

- To determine Urban Design factors influencing women's choice of route of movement.
- To list the Urban Design factors in order of priority.
- To establish whether there is a relationship between Urban Design factors and women's choice of route of movement.

1.4 Operational definitions

Urban Design factors refer to the character and constituent elements of the street which comprises of fixed, semi-fixed and non-fixed features.

Choice of route of movement refers to individuals' motion preferences in response to environmental cues, with the aim of attainment of a goal.

1.5 Theoretical definitions

Urban Design factors refer to components that aid in analyzing, organizing and shaping urban form (Okello, 2009).

Choice of route of movement refers to the process of selecting a route from a set of known routes (Bovy and Stern, in Therakomen, 2001).

1.6 Variables

Dependent Variable: This is women's *choice of route of movement.*

Independent Variable:

This refers to the *Urban Design factors*. The relevant factors in the study together with definitions are given as follows:

- '*Eyes on the street*' refers to surveillance opportunities on the street.
- *Transparency* refers to the ability of users on the street to interact with the building's spaces adjacent to the street. The degree of openings and materials on the building edge define transparency of the spaces.
- *Visibility* is the ability to draw sightlines to an object from an observer's stand point.
- *Openness* refers to the degree of enclosure of a space. It is measured by the street distance – height of building (D/H) ratio.
- *Fixed features* are permanent or slowly changing elements on the street for example buildings.
- *Non-fixed features* are elements on the street that are constantly changing such as people.
- *Linearity* is a measure of straightness or curvature of a street.
- *Semi-fixed features* are changeable elements such as signs, billboards, plants, and decorations. They are relatively easy to alter, and they may have a greater effect in communicating identity and meaning.
- *Complexity* refers to the number of elements in a street and distinctiveness between them. Complexity is the optimum information that it communicated to users in street.
- *Length* is the perceived distance of a route.
- *Perception* is how humans see and interact with the street.
- *Connotative meanings* are inferences about the quality of the environment.

1.7 Significance of the study

Given that women depend more heavily on public transport than men and, the allocation of household resources, women have less access to private modes of transport. They use transport in different ways from men because of gender divisions of labour (O.E.C.D, 1995). This research considered issues of comfort and safety for women as they use streets, bearing in mind their roles.

The research engaged women's standpoint using a bottom-up approach. It seeks their input and views on routes, which serves as a basis for addressing their concerns about the street. It thus creates a platform for their involvement in the planning process. As a result, the built environment will reflect women's activities, values and attitudes, since they are a critical composition of urban activities. The research also provides an opportunity to probe the impact of Urban Design factors on the perception of women. This research will provide guidelines for the design of streets that accommodate women's needs.

Women tend to be strongly affected by the safety implications of isolation. If urban spaces are designed to positively influence perceptions of safety, then spaces which women are likely to navigate through will be created. Consequently, other pedestrians will also perceive the place as safe and traverse them. The proposed study is thus very relevant, not only for the interests of women, but also those of the general population.

It has been predicted that the current gender role changes and new demands for family life are likely to affect our environment in the years to come (Gottdiener and Hutchison, 2000).

1.8 Justification of the study

The growing interest in pedestrian oriented urban design and questions regarding their effectiveness illustrate the need for research into pedestrian experience of urban places (Isaacs, 2000). This is one such study.

The environmental context has a profound effect on many women's use of space and this in turn affects their choices as they negotiate public space (Valentine, 1989). Urban spaces that are inclusive will be designed to provide opportunities for a wide range of people to participate in these spaces (Butterworth, 2000). For example, streets will be attractive and well-lit to promote safety and after-hours access by women. There will be places people from all walks of life to congregate, places which provide a range of leisure and learning opportunities; places where all walks will also feel welcome. If the city is not organized for each population group, then it stands the danger of being either over structured or under structured for certain groups. It might be monotonous repetitious, and authoritarian for some and confused and disintegrated for others (Canter et al., 1975). The findings from the study provide a model for the inclusion of women in the urban landscape.

1.9 Scope of the Study

The study focused on dynamic pedestrian environments. It considered the influence of Urban Design factors on route-choice in Nairobi C.B.D. Nairobi C.B.D formed the case study. The Nairobi C.B.D was defined as the area bound by Haile Selassie Avenue to the North, Nairobi River to the South, Race Course Road to the West and Uhuru Highway to the North (Fig 1.0).

The need to understand the mechanism of path choice has prompted this research. The study observed the route used by most women for their characteristics, to find out what Urban Design factors impinge on path choices.

The routes were mapped based on the women's recall map and an analysis of spaces in a street mostly used carried out.

Data for this study was collected from the following primary sources – observation (of areas in the street most used by women), survey and measurements and through secondary sources through a review of literature. The research methods which aided in the collection of data in the field are personal interviews and observation of physical traces and behavior. Various techniques were used, including taking physical measurements, pedestrian counts, photographs, analysis of annotated sketches and diagrams.

The respondents in the survey ranged from those aged 13 going upwards who live, study or work in the C.B.D.

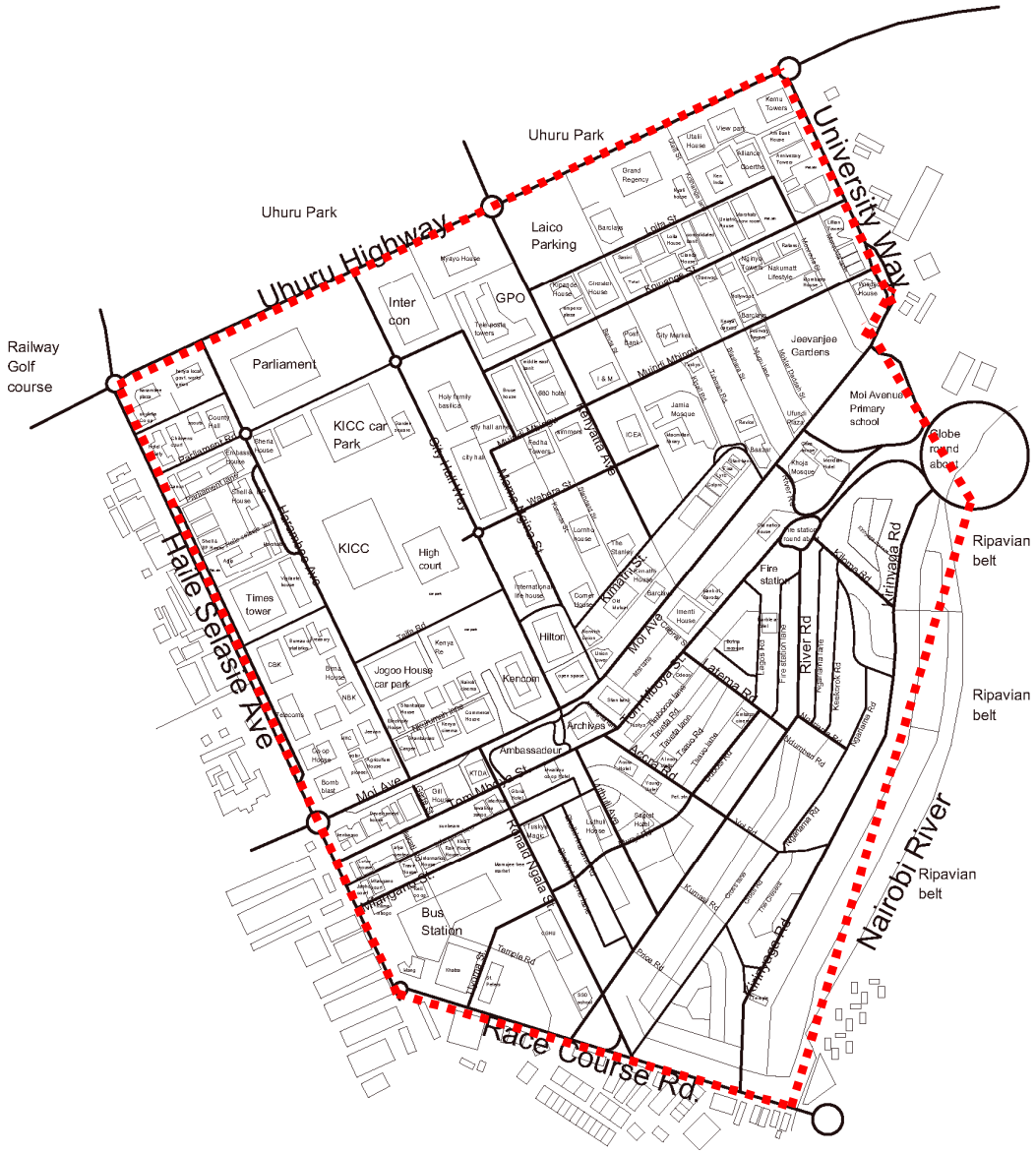


Fig. 1.0: Nairobi C.B.D map showing the geographical scope. From [Adapted from] *City of Nairobi map*, by JICA and G.o.K, 2005, Nairobi: Survey of Kenya 1000.

This age group excluded children (those who are 12 years and younger). The study was limited to Urban Design and planning theories. The study considered Aesthetic, Picturesque and the U.N safety audit theories. Feminist theory was examined with regard to planning and Urban Design aspects.

1.10 Limitations of the study

The time allocated for the research (eight months) was limiting. This did not allow for adequate data collection. It limited the scope of study and the size of the sample. The research demanded maximum treatment attainable with limited funds. This limited the choice and variety of research methods used in collection of data. Financial constraints also impacted on the study scope and sample size. Controlled access to various literature resources such as books and published journals was at times restricted. In an attempt to collect data it was difficult to get respondents who were willing to be interviewed as they were in a rush to destinations such as home or work. Other times there were institutional bottlenecks and bureaucratic procedures in accessing some of the resourceful areas of study.

1.11 Basic Assumptions

For the purpose of this study the following assumptions have been made.

- The women interviewed have adequate visual ability.
- The women interviewed can asses and interpret street scenes.

As a result, women react to the spatial environment around them as they move. Rapoport (in Nasar, 1998), notes that we respond to the sensory quality of cities. Once people observe and interprete their surroundings, there are consequences for what they do in and what they do to an environment (Ziesel, 1998). There are more women in cities today, thus there is need to incorporate them in city design.

A case study approach was used for the study. An analysis of spaces was done along the street most used by women.

1.12 Conceptual Framework

Urban spaces comprise not only of physical elements – buildings, streets, trees, but also people moving and acting on them. Any single element in an urban environment can potentially mean any number of things, depending on how it is acted upon by other elements and how it reacts to them.

The social environment of the street acts as a deterring or a welcoming feature to the pedestrian. Women respond to the street's social environment, by choosing to use streets with people and avoiding deserted streets. Desolate streets no matter how appealing they are, are not likely to attract women. Choice of route of movement is therefore an expression of how spatial behaviour is socially produced. The social environment sends cues to the pedestrian who turn reacts to it hence the direction of arrows (fig 1.1). The spatial environment also presents cues to which the pedestrian responds. In the streetscape, an individual's visual range and fixation, will determine routes to be followed and whether changes will be incorporated as they move along. Visual range will limit which buildings and other elements of the streetscape the pedestrian will perceive and potentially respond to. These are likely to vary according to the purpose of the visit to the C.B.D.

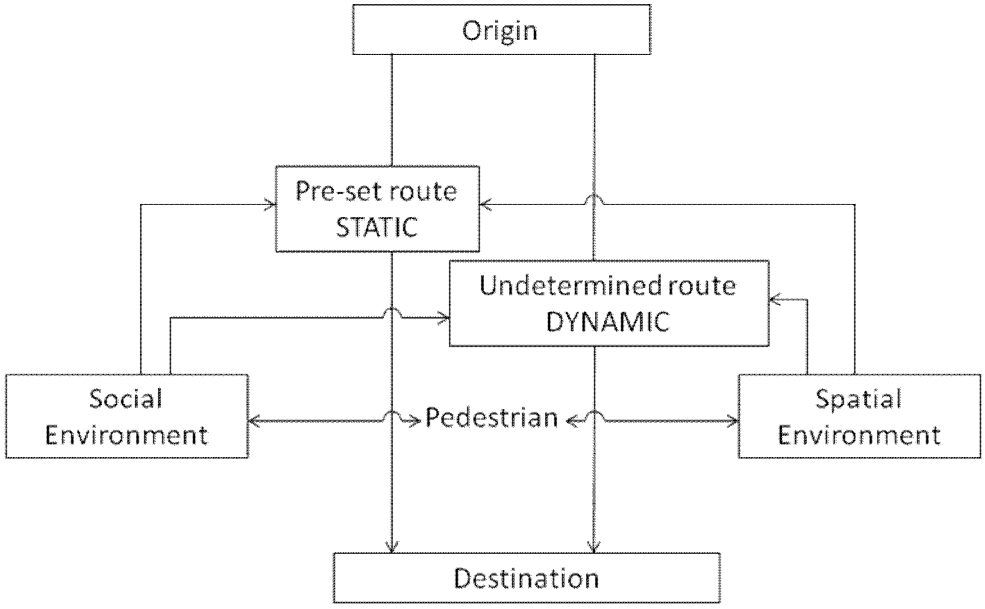


Fig. 1.1: Conceptual Framework, by Author, 2010.

1.13 Organization of the study

The thesis is divided in two parts. Part 1 covers the thesis and is divided into six chapters. Chapter one introduces the study, defines the problem, gives the objectives of the study; it explains the significance of the study and states the assumptions, scope and limitations. Chapter two presents review of literature. It presents concepts and theories relating to the problem and concludes with the theoretical framework. Chapter three explains the research methodology used for the study, data collection as well as research tools. Chapter four presents the background of the study area. In Chapter five data collected is analyzed and presented. Chapter six summarizes the findings of the study and then draws conclusions based on these and proposes areas for further research.

Part 2 forms the project report of the studio project. It comprises four chapters. Chapter seven introduces the project, defines the problem, and gives the research methodology, the significance and the scope of the study. Chapter eight presents documentation of policy guidelines for the case studies. Chapter nine presents the inventory of existing conditions of Kimathi Street. Chapter ten presents the Urban Design guidelines for the street by summarizing the problems identified, vision, mission and objectives of the program, the guiding principles then finally the policy statements. The final part presents the bibliography and appendices.

1.14 Conclusion

The study intended to investigate the Urban Design factors that determine women's choice of route of movement. The following chapter presents the literature review.

CHAPTER TWO

2.0 LITERATURE REVIEW

This chapter has reviewed theories of urban planning and design that relate to choice of route of movement. It has examined Aesthetic theory (Nasar, 1998), Picturesque theory (Sitte, 1889 in Collins and Collins, 1986) and Townscape movement (Cullen, 1971) as well as how they relate to pedestrian route-choice. The United Nations Habitat's Women's Urban Safety Audit theory (H.I.C., 2010), which deals with the aspect of fear and perceptions of safety is covered. The discussion includes studies on typology of the street with regard to complexity, linearity, length and enclosure (Nasar, 1998; Sitte, 1889 in Collins and Collins, 1986; Cullen, 1971).

2.1 Aesthetic Theory

Aesthetic Theory states that favourable affect and connotative meanings influence where people go and how to get there.

Philosophers, psychologists, geographers and urban professionals have pondered aesthetics in great detail. Their work suggests how the physical environment interacts with human perception to evoke an aesthetic experience (Nasar, 1994, 1997; Isaacs, 2000). Rapoport (as cited in Nasar, 1998) notes, "cities and parts of cities have an ambience, a sensory quality or character that we can easily feel. We respond to what appears before us" (p. 4). Gould and White (as cited in Nasar, 1998), refer to this mental landscape of meanings as an '*invisible landscape*' that shapes our behaviour. Also, Rapoport (as cited in Nasar, 1998) expresses, "the built environment is a channel of non-verbal communication" (p. 4).

For the city environment, if we multiply the individual experience by the millions of people who experience the city daily we see how visual quality has powerful effects on our experiences (Nasar, 1998). On this note, Nasar regards that city form and appearance must satisfy the public who regularly experience it; "to know about the appeal of the city form, one must measure people's responses" (Nasar, 1998, p.2) through their evaluations. In his studies, he is sensitive to different populations, scales of environment, or aspects of meaning which he admits "might reveal different evaluative images" (Nasar, 1998, p.99). He further notes that in some instances, researchers have indicated general principles guiding environmental preference (Berlyne, 1971, Wohlwill, 1976, Kaplan and Kaplan, 1989, Orians, 1986, Ulrich, 1993 in Nasar, 2001; Lynch, 1960).The following subsections expound on the aspects related to Aesthetic theory.

Lynch describes the environmental image as having three parts: *Identity*, *Structure*, and *Meaning*. This means humans recognize or identify objects - *Identity*, they see a recognizable pattern of relationships between objects - *Structure*, and they draw emotional value (or have feelings) about the objects and structure - *Meaning* (Nasar, 1998).

The meaning of a place may take a *denotative* or *connotative* form. *Denotative meaning* is analogous to *identity* (as described above). *Connotative meanings* refer to inferences about the quality and character of the place or its users. Connotative meanings are relevant to shaping urban form and are important to human behaviour (Nasar, 1998); Nasar says "where people have the capacity to act, connotative

meanings affect their behaviour, influencing decisions about whether to go somewhere and how to get there"(p. 7), "evaluation is central to our perception and reaction to the environment" (p. 8). This implies that evaluative meanings are determinants of women's movement and route-choice in a city. Different authors have presented different views on the variables and their relative quantities that would constitute 'aesthetic experience' that influences where people go, their movement and route-choice.

Beardsley (as cited in Isaacs, 2000), describes 'aesthetic experience' as a direct response on the part of the perceiver to the thing being perceived. According to Beardsley, the necessary requirements, for an aesthetic experience are: an object or group of objects upon which attention is focused; a resulting sensation; some degree of complexity and unity. The intensity of the sensation increases with a higher degree of complexity. However, unity within the complexity is essential. Aesthetic experiences vary in the dimensions of unity, complexity and intensity. Intensity and unity may be more engaging for shorter durations, while complexity may elicit affective responses over a longer time-period.

Rudolf, Gombrich and Weber (as cited in Isaacs, 2000), developed theories of aesthetics rooted in Gestalt psychology. Gestalt is a German word meaning organization. Gestalt psychology emphasizes that parts or elements do not exist in isolation rather they are organized in wholes (Barlow, 1981). The earlier Gestalt psychologists believed that the mind seeks order and recognizes it in objects and spaces. Objects or spaces hidden from view are perceived as whole with the mind

filling in the missing bits. Rock and Palmer (as cited in Isaacs, 2000) say that the theory has been revived and extended by some contemporary cognitive psychologists.

In his view, Gombrich (as cited in Isaacs, 2000), a contemporary cognitive psychologist says aesthetics is a balance of order and confusion. He explains because order is easy to perceive and remember, it can become boring, even perceived automatically. However, disruption and variation excite the mind.

Gibson (as cited in Isaacs, 2000), suggests that because of scale and context, buildings are not experienced from a single vantage point. Multiple perspectives are required. Similarly, Arnheim (as cited in Isaacs, 2000), introduces time and motion to the aesthetic experience. Since one cannot be everywhere at once, the mind needs to be able to store and assemble these multiple images. Here again the sense of order is important in the aesthetic experience of spatial environments.

Appleton, on the question: "what is it that we like about landscape", presents Berlyne's *curiosity-arousal theory*. The theory explains scenic beauty was based on exploration. Settings presenting uncertainty invite exploration and therefore arousal, which, to a point, is pleasant (Bell, in Isaacs, 2000). Appleton's *theory of prospect-refuge*, argues that hunters need to see in order to exploit their territory and to hide in order to perform other functions, like eating. Therefore settings offering places from which to see—'*prospects*', along with places in which to hide, or which can be easily

defended—'*refuges*', offer vantage points for survival purposes. For this reason humans have evolved an aesthetic sense that prefers landscapes and urban settings which offer similar features (Appleton, 1975).

Kaplan and Kaplan (as cited in Isaacs, 2000), extend the survival concept, noting that humans need to make quick decisions about the potential of a scene to provide basic survival needs. They developed a four-dimensional scale that measures aesthetic appeal in terms of coherence/complexity and legibility/mystery. The most aesthetically appealing environments would provide enough complexity and mystery to stimulate, while offering degrees of coherence and legibility to avoid the reaction of being overwhelmed.

Rapoport describes environment-behaviour relations as entailing a four-step process, using terms from cognitive science commonly applied to environmental psychology. First, an environment is sensed through perception. Second, there is the encoding process of cognition. Third, evaluations of the environment are made. And fourth, decision to use a route is taken (Rapoport, 1977). Though presented as a linear process, the model is full of constant feedback loops. Within this framework of human interaction with an environment, pure aesthetic experience occurs at the level of perception, as simple sensory input, before the thinking begins (Fig. 2.0).

After the sensory input has been absorbed, the mind begins to work on it, applying meanings, associations and prior knowledge (as described by Appleton, in Isaacs, 2000). As the sensory input is processed, assessments and judgments are made.

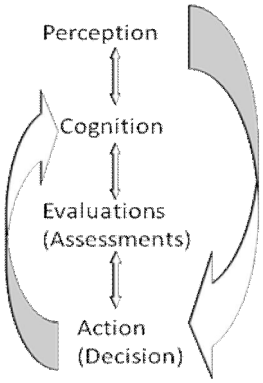


Fig. 2.0: Four-step process of environment-behaviour relations, by Author, 2010.

Once the sensory input is evaluated, a decision regarding action can be made, resulting in the acquisition of additional sensations and continuing the process of cognition. There is, then, reason, to believe that a more aesthetically appealing pedestrian environment will attract more, women than, one that is less appealing.

Nasar describes the process of building the evaluative image. He notes that it arises from the person, environment and the ongoing interaction between the two (Nasar, 1998). Refer to Fig. 2.1.

He explains that observers, depending on both internal and environmental factors, filter their evaluative response through the lens of their perception and cognition in the environment. He clarifies that although each human is unique and his /her evaluative image of a place or city will vary across we will have some overlaps in our evaluative images." Shared physical reality, physiology, and culture produce areas of agreement" (Nasar, 1998).

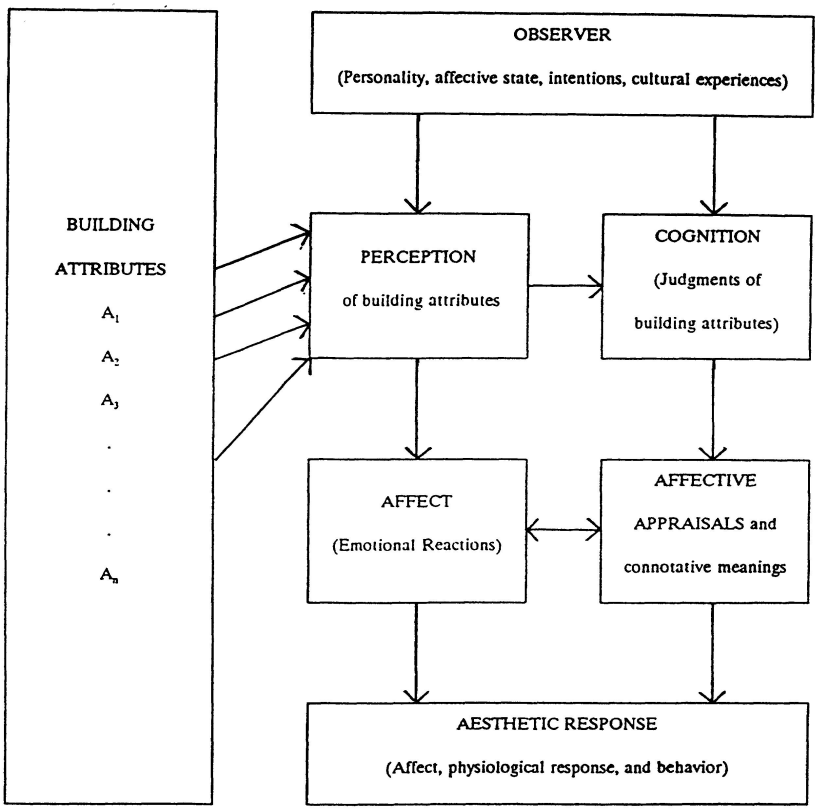


Fig. 2.1: A model of Evaluative Response to the Environment. From The Evaluative Image of the City (p. 5), by Nasar J., 1998, California: Sage Publications.

Two aspects are required to determine evaluative image; the evaluative responses important to people and the features of the environment that people notice and evaluate (Nasar, 2001). People's evaluative responses are explained in the paragraphs that follow. Research has found three important aspects of human evaluative response to places (Russell and Snodgrass, in Nasar, 2001). Nasar says that while preference is a purely evaluative dimension, mixes of pleasure and arousal produce excitement and relaxation. Exciting places feel more pleasant and arousing than boring ones; and relaxing places feel more pleasant but less arousing than stressful ones (p. 1823). His model is presented in fig. 2.2.

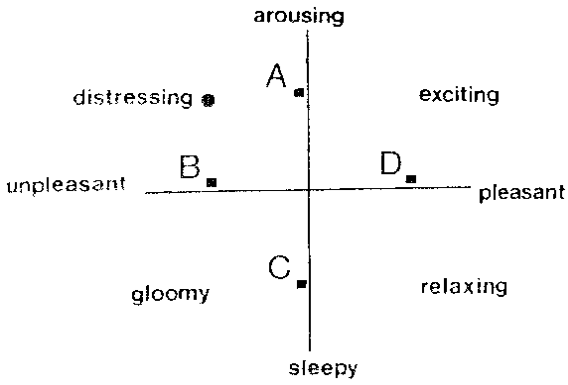


Fig. 2.2: Dimensions of affective appraisals. From The Evaluative Image of the City (p. 28), by Nasar J., 1998, California: Sage Publications.

It has been found that evaluative response to places may arise from *formal* and *symbolic* variables (Kaplan and Kaplan, in Nasar, 2001; Nasar, 1994). *Formal variables* have to do with the structure of form and include such things as shape, proportion, scale, complexity, incongruity, novelty, and order. *Symbolic* or *content variables* have to do with the connotative meanings associated with the forms (Nasar, 2001).

As noted several kinds of theories discuss the relationship between these variables and response. One set of theories view preference as dependent on arousal (Berlyne, Mandler, Wohlwill, in Nasar, 2001). Of the many variables these theories cite as affecting arousal, complexity and novelty have garnered the most research attention. Nasar, reports that these theories suggest that preference would increase with increases in complexity or novelty up to a point, after which increases in complexity or novelty would produce a downturn in preference (Nasar, 2001). This is depicted in fig. 2.3.

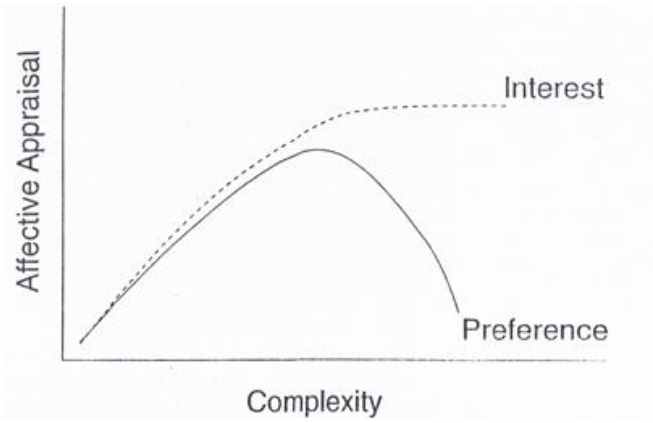


Fig. 2.3: Interest and preference in relation to increasing complexity. From The Evaluative Image of the City (p. 75), by Nasar J., 1998, California: Sage Publications.

Of the second set of theories, he offers an evolutionary model in which human survival depended on preference for involvement and making sense, and as a result, humans now prefer places that offer involvement and either make sense or promise to make sense (Kaplan and Kaplan, in Nasar, 2001). These theories posit complexity and mystery (the promise of new information ahead, as in a defected vista) as creating involvement; and they posit coherence and legibility as helping people make sense of things. Therefore, people should like a mix of complexity, mystery, coherence, and legibility.

Venturi has argued for the introduction of contradiction (ambiguity) into design (Laurence, 2006). This is in sharp contrast to legibility as highlighted in the previous paragraph. Regarding features of the environment, research shows seven environmental features as prominent in human perception and evaluation of places: naturalness, order, complexity, novelty (atypicality), upkeep, openness, and historical significance (Nasar, 1994, 1997 and 2001).

developed the concept of imageability; an ability for the shape, colour and arrangement of elements within an urban environment to evoke a strong image for an observer. Imageability is related to streetscape character in the way in which both are concerned with the visual arrangement of elements within the environment (Lynch, 1960).

While Lynch shows how a city can be expressed diagrammatically as the combination of elements that differentiate parts of the urban fabric streetscape, character analysis attempts to do this at a much finer scale (Okello, 2009). This is because streetscape character is specifically shaped by the boundaries between the elements that constitute the street wall or façade, and how those elements relate to each other in patterns that are consistent within a specific urban built environment (Okello, 2009).

Each object that occupies space in the street, defines the boundaries of zones within the street, or is made use of within the street, can be described as an element. These elements are the building blocks of the streetscape. A wide variety of streetscape elements constitute and enliven the street.

Places consist of '*non-fixed features'*, '*semi-fixed features'* and '*fixed features'*. '*Fixed features'* are permanent or slowly changing. *'Non-fixed features'*, such as people and animals, are constantly changing. *'Semi-fixed features'* are changeable elements such as signs, billboards, plants, and decorations (Rapoport, 1993). They are relatively easy to alter, and they may have a greater effect in communicating

identity and meaning to women. For community appearance then, Urban design has a special interest in the noticeable semi-fixed features in or visible from public places.

2.2 Picturesque Design Theory

According to Sitte (1889, in Collins and Collins, 1986), he is dismayed over the singularity of architectural edifices created by modern planning. To him, there was lack of artistic attention to the exterior space created by buildings. He thus suggested that the remedy could be found in a return to methods of the medieval town, what he calls ‘Artistic Principles’ envisioning "groups of public squares... forming a harmonious whole" (p. 1), transforming unbounded space into sequences of defined volumes (p.38), a way of humanizing the contemporary city. Sitte combined pictorial aspects with sequential spatial concepts. His principles were designed to ensure the spatial-temporal continuum of the urban fabric and assist in the integration of modern technology and development. These concepts are useful in tapping into women’s fixation, a route-choice behavioural characteristic of pedestrians (Schelhorn, Sullivan, Haklay and Thurstain-Goodwin, 2000). Women with high fixation are likely to follow their planned route almost exactly, whereas those with low fixation will be easily distracted, visiting shops which they never 'intended' to visit.

Sitte proposes that while straight roads with good proportion between length and width can work well and are often necessary; the curves and meanders of ancient streets are preferable where terrain or other local circumstances suggest such

treatment. Enclosed streets with varied alignments are more interesting than long straight streets crossed with endless intersections.

In Cullen's '*The Concise Townscape*' (1971), he examined the traditional artistic approach to city design found in the ideas of Sitte. He contends that vision holds for us an unlooked for surplus which we appreciate in three different ways:

- **Serial vision**: This refers to a visual experience in which in addition to the existing view there are hints of a different emerging view. A long straight road or an open square can only give us the former, whereas delight and interest are stimulated by contrasts; the drama of juxtaposition (p.17). See Fig. 2.4.
- **Place**: This refers to the sense of being in a particular location –a street; of being *'here'* with the equally strong sense that around and outside of it there are other locations which we may think of as *'there'* (p. 21).
- **Content**: This is a matter of architectural style, scale, materials and layout. Cullen cites colour, texture, character, personality and uniqueness (p. 57).

The concept of serial vision is important because it points to the dynamics involved in viewing streetscape. Our streets are not static environments perceived as isolated images; rather, their view is a composite of preceding, immediate, and anticipated images. Cullen's much like Jacobs' and Lynch's works originated from the view of the city dwellers. One topic always present in Lynch's discussions of urban form was the sequential experience of urban places.

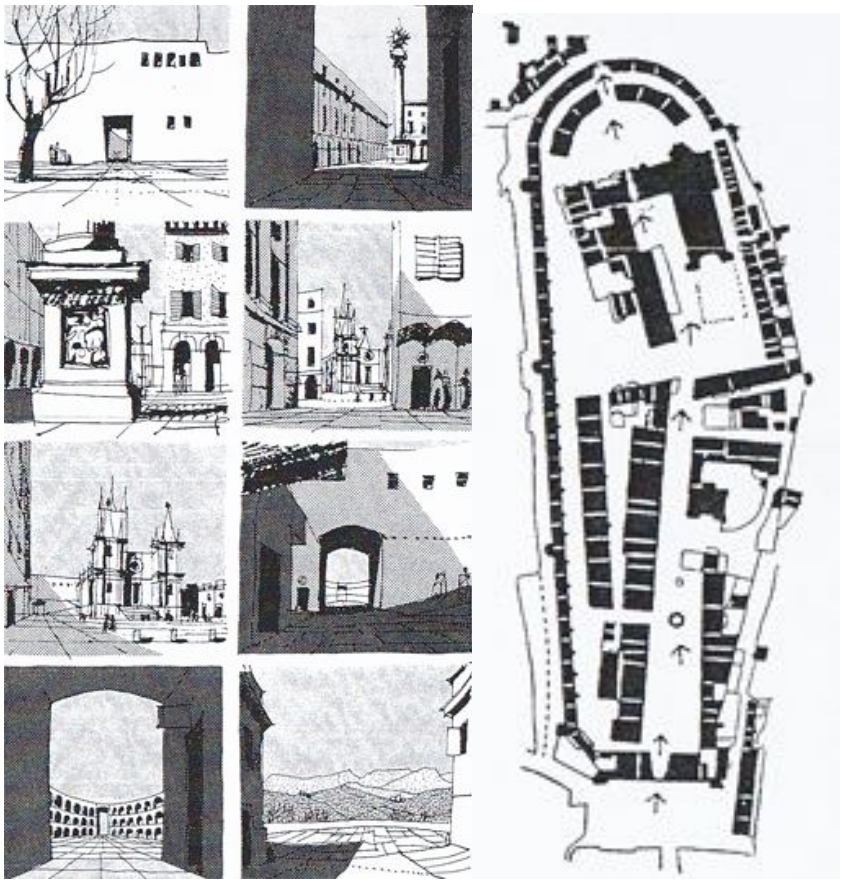


Fig. 2.4: A city of serial visions. From The Concise Townscape (p. 17), by Cullen G., 1971, Great Britain: The Architectural Press.

As he expanded his work on theories, “sensory quality” (Lynch, 1989, pp. 131-132), was taken to be at the core of the human experience of an environment, yet it was so often overlooked in planning practice. Among the many factors influencing sensory quality, Lynch insisted that “the clarity of movement, connection and approach" should be considered in concert with the "imageability of public spaces" (Lynch, 1960, pp. 113-115, 131). He considered "sequence design…a more tangible possibility, since its material is normally under public control and its effects are consciously experienced" (Lynch, 1990b, p. 508).

Lynch and others found motion within the city being one of the more significant issues. Appleyard elaborated on the theme of motion, emphasizing that pedestrians are limited in distance and speed, yet have a high degree of manoeuvrability with the added sensation of kinaesthetics (Appleyard, in Isaacs, 2000). According to Appleyard, there are two criteria for pedestrian sequences: to fulfill the aesthetic aim of multi-sensory, sensuous delight; and as sources of information about the structure and meaning of the city.

Moving through a city in this case on foot, the traveller experiences a sequence of views. The experience changes with speed, important barriers and points of decision (Appleyard, Lynch and Meyer; Rapoport; Rapoport and Hawkes; Thiel in Nasar, 1998). Different cues and different levels of complexity are noticeable with changes in speed and distance. Thus the pedestrian and motorist will have different experiences (Nasar, 1998).

The woman who is close to a building notices finer grain elements such a texture or ornament, but when at a distance they notice coarser grain elements such as shape, height or average color. Cullen speaks of “possession in movement” (Cullen, 1971, pp. 21-23), which he says is achieved by having a well defined beginning and end and with a well defined character. In general, there should be ample space for everyone, but not so much that the individual feels lost. Specifically, long, straight routes should be avoided. Winding and interrupted routes are more interesting, while routes broken into segments encourage people to pay attention to the changes along

the way and not to the overall length. However, this should be done without arbitrary meandering.

Similar ideas are also advocated by Rapoport (1990), Ashihara (1970), Cullen (1971), Le Corbusier (1929) and Sitte (1889 in Collins and Collins, 1986). Consistent design principles were present in pre-industrial, pedestrian dependent environments across a variety of cultures and points in history.

Rapoport concludes that routes that encourage walking are likely to have a high degree of enclosure, be relatively narrow and have a high degree of spatial complexity with a high degree of texture and articulation; the views along the routes are contained and generally short (Rapoport, 1990). The aforementioned aspects, can be investigated to find out if they apply to women in the study.

These qualities suggest that the ”medieval town'” (Isaacs, 2000, p.153) model of urban form as the most appropriate one for walkability, echoing Sitte, Cullen and the picturesque tradition. Other contemporary voices such as Gosling offer support for the idea. He sees a revival of interest in the Townscape movement.

Others demonstrate the pervasiveness of picturesque ideas in less direct ways, including the late Aldo Rossi. Rossi uses traditional iconic building topologies in order to re-establish both an aesthetic experience and symbolic meaning in the urban environment. Rossi adds a rationalist touch to empirical themes, influencing the

design of projects consisting of straight narrow streets which frame a view or have terminations such as a gazebo (Rossi, 1966).

2.3 Feminist Theory

Feminist theory states that:

- Social experience is gendered;
- All theory, like all practice, is inherently political;
- Theory and practice cannot and should not be separated;
- Subjects and objects are not and cannot be separated (Snyder, 1995).

According to Sandercock and Forsyth, Snyder, and Saarikoski (as cited in Larsson, 2006), feminist theory has argued for a long time that the voice of science is masculine, that women have been excluded from 'knowing' and that their life experiences have been given less value. Despite these claims, there is at present no distinctively feminist epistemology according to Snyder, Sandercock and Forsyth. Nevertheless, feminist critique stresses the need to develop knowledge which relates to those individuals, or groups of individuals, who are intended to benefit from planning.

On the implication of Feminist epistemology on Urban Design, Snyder (1995) posits:

> Urban design interested itself with the aesthetic and symbolic uses of public spaces, often ignoring issues of women's safety or the representation and access of marginal groups. These are all the concerns of private life, of those without a public face. The public face is that of those groups with power: the

> business community, men, whites, the middle class. Yet "the public," in the sense of the citizenry, is much more diverse, and has interests which span and blur the distinction between public and private (p. 102).

This implies that Urban Design of streets and public places should take cognizance of all populations, who may be overlooked by mainstream planning professionals. With regard to perception and route-choice, women as the relatively more vulnerable gender can offer input which will form the basis of redevelopment projects.

Feminist theory has revealed that there is need to incorporate the aspect of gender into spatial planning praxis. To be able to further analyze planning practice and its oversight in this respect, it is necessary to find ways to merge feminist theory and planning theory.

In a study conducted by Larsson, she explored the gender perspective in strategic planning practice in Sweden. She identified two major perspectives: top-down and bottom-up which broadly correspond to the rational planning approach and the communicative planning approach respectively. She further categorized each perspective (Larsson, 2006). See fig. 2.5.

In Position 1, the planner is the subject who plans for users in the planning process. In this context, the term 'gender neutral' means that the different experiences of men and women are not taken into consideration during the planning process. The bottom-up planning approach is practiced by those who wish to actively incorporate

the objects of planning into the planning process, thereby making them active subjects in the process.

	Top-down perspective	Bottom-up perspective
'Gender-neutral' approach	Position 1	Position 2
'Gender-aware' approach	Position 3	Position 4

Fig. 2.5: Model of perspectives and approaches of gender in practice
Note. From "From equal opportunities to gender awareness in strategic spatial planning: Reflections based on Swedish experiences," by Larsson A., 2006.

In Position 3, urban planners themselves attempt to distinguish the needs of beneficiaries, such as women and take into consideration their experiences. Inclusion of new gender knowledge for decision making in the planning process is what distinguishes position 4 from 3. Rather than merely adding the gender perspective, as suggested in position 3, to traditional planning practices, Kaul (as cited in Larsson, 2006), calls for a complete 'turnover', while and Sandercock (as cited in Larsson, 2006), uses the expressions of 'upheaval' and 'insurgent planning' to describe a similar process. Snyder (1995), shares similar sentiments.

For example, in the contemporary context, Larsson (2006) proposes the application of the 'everyday life' perspective in planning. This refers to the inclusion of local knowledge, based on people's everyday life experience which is by and large neglected in conventional planning. She argues that the concept can serve as a means of bridging the gap between the opposing ends of reproduction and production or public and private spheres of the planning continuum. Further it helps to liberate

planners from preconceived notions of what constitutes the respective duties, spaces and habits of men and women (pp. 522-524). Fechner in 1876 introduced the bottom-up approach to the study of aesthetics or meanings (Nasar, 2001).

2.4 The U.N Women's Safety Audit Theory

The U.N Women's Safety Audit Theory states that while urban designs and planning do not directly create violence; they facilitate environments that can present greater or lesser opportunities for assault. Therefore, urban designs and plans must be examined in order to fully understand why women experience threats and actual incidences of violence. By understanding these threats, steps may then be taken to change the way women experience and live in the city without the threat of violence (H.I.C., 2010). The concept of Women's Safety Audits was developed in Toronto, Canada by the Metro Action Committee on Public Violence Against Women and Children (METRAC), in 1989 and experimented worldwide. U.N-HABITAT adapted and experimented this tool within the Safer Cities Programme (U.N H.S.P., 2007; Women in Cities International - W.I.C.I., 2008).

A Women's Safety Audit is a tool for collecting information on public perceptions of the urban safety in relation to the urban design. The approach is based on the fact that fear of crime is highest amongst women, because they are more vulnerable. Therefore, if an area is considered safe by women, it is safe for everyone. Additionally, audits work on the premises that the experts on the security of a particular area are those who frequent it - its users. Several sources contend that

when safety audits lose their gendered focus, they become less successful. One possible reason for this is that women tend to use space in more varied and complex ways than men (balancing childcare, work or school, and/or elder care). Thus, if it does not consider a woman's perspective of an area, a safety audit is likely to neglect assessing all of its potential uses.

Once a place has been identified as insecure, a group of local women - preferably regular users of the space, walk through it with a checklist, observing and identifying factors such as inadequate or absent lighting or signage, or negative graffiti messages, which make them feel unsafe. These can be carried out during the day and at night. After walks have been completed, a report is produced and presented to local government officials and other key decision-makers. From this point it is hoped that the changes recommended in the report will be implemented and insecure areas will become more safe places everyone in the community (W.I.C.I., 2008). The Safety Audit for Women can contribute to modifications in the design and planning of urban space that reduce the feeling of insecurity and occurrences of assault. Recommendations formulated on the basis of the comments provided by women during the audit can assist policy makers at the city level in addressing crime and safety problems.

Moreover, by focusing on women's perspectives, the tool can identify how environmental factors cause insecurity for other marginalized populations, who may be overlooked by mainstream planning professionals. According to W.I.C.I. (2008), the audit tool is likely to delve beyond physical causes of crime and identify social

and environmental determinants. The tool can be applied in a variety of situations including public open spaces and streets.

2.4.1 Fear and perceptions of safety

A pedestrian assesses the hazards of a street before deciding whether or not to use it (Francis, 1991). Jane Jacob's says that streets and their sidewalks are the main public areas of a city - and a well used street is often safer than a park. In her book, *'The Death and Life of Great American Cities: The Failure of Town Planning'* (1961), she attacks CIAM's Modernism and advocated that the publicly unowned spaces created by "city in the park" notion of Modernists are the main generators of the crime. Instead she proposes "eyes on the street" which means the resurrection of main public space precedents, streets and squares, in the design of cities, and orientation of buildings towards the street. She proposes that sidewalks need continuous users and activity - this encourages people to watch.

The importance of circulation of people has been put forward in literature. The degree of accessibility and consequently potential of movement and presence of people in the urban space would affect the choice of path to be followed by pedestrians, since people would be attracted by spaces with people and would tend to avoid deserted spaces (Gehl, 1996; Whyte in Lay, Reis, Dreux and Becker, 2007). In Hillier's view (as cited in Lay et al., 2007), a constant pattern of movement and the presence of people, would increase the security of users of urban spaces.

Similarly, Gehl, advanced the '*theory of a probabilistic relationship between the quality of the urban environment and behavioural activities*'. He says '*Necessary activities'* will occur regardless of the quality of the environment. '*Optional activities'* will occur only when the environmental quality is good and will continue for a longer duration when the quality of the environment is better. The increase in '*Optional activities'* results in an increase in '*Social activities'*, or 'life between buildings' (Gehl, 1996). Pedestrian activity is central to the theory.

'Necessary activities' include those that are more or less compulsory, such as going to work, shopping, waiting for a bus or a person, running errands. Among other activities, this group includes the great majority of those related to walking. Because the activities in this group are necessary, their incidence is influenced only slightly by the physical framework. These activities will take place throughout the year, under nearly all conditions, and are more or less independent of the exterior environment.

'Optional activities' – that is, those pursuits that are participated in if there is a wish to do so and if time and place make it possible. This category includes such activities as taking a walk to get a breath of fresh air, standing around, enjoying life, or sitting and sunbathing. These activities take place only when exterior conditions are optimal - when weather and place invite them. This relationship is important in connection with Urban Design. These activities are especially dependent on exterior physical conditions.

'*Social activities*' are all activities that depend on presence of others in public spaces. Social activities include children at play, greetings and conversations, communal activities of various kinds, and finally – as the most widespread social activity – passive contacts, that is, simply seeing and hearing other people.

These activities could also be termed as "resultant" activities because social activities occur spontaneously, as a direct consequence of people moving about and being in the same spaces. This implies that social activities are indirectly supported whenever necessary and optional activities are given better conditions in public spaces (fig. 2.6).

On the other hand, Newman notes that physical design has been traditionally relegated the role of mechanical prevention. Rather he proposes ways to use design to achieve natural surveillance advocated in Defensible space design (Newman, 1972).

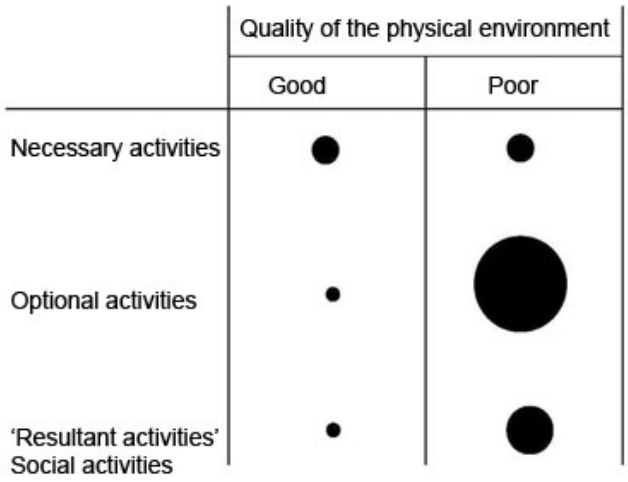


Fig. 2.6: Necessary, Optional and social activities. From Life Between Buildings: Using Public Space (p. 17), by Gehl J., 1996, Copenhagen: Arkitektens Forlag.

Newman shows that simple alterations in and around buildings can create identifiable territories instead of the anonymous spaces that are attractive to thieves and criminals. Newman's approach relies on arrangement of space in order to give occupants of a space control rather than to unwanted persons, and in this way create spaces where people can feel safe. For example, in the positioning of terrace spaces and windows to provide natural surveillance opportunities over the street; this reduces the possibility of unseen antisocial behaviour. Newman cites factors which foster feelings of insecurity for inhabitants of a particular community as:

- High building heights (greater than six stories)
- Areas that lack natural surveillance creating fear in their use
- Lack of relation between spaces resulting in unused spaces
- Poor hierarchy definition from public – semipublic – private spaces

It has been reported that disorder in the form of physical incivilities such as dilapidation, graffiti, litter, and abandoned buildings can evoke a sense of anxiety and fear suggesting a threat to survival (Nasar, 1983; Perkins, Meeks and Taylor, 1992; Skogan and Max field, 1981; Taylor, 1989; Taylor, Shumaker and Gottfredson, 1985; Warr, 1990 in Nasar, 1998). In addition, disorder also may affect rates of crime (Perkins, Wandersman, Rich and Taylor, 1993; Taylor, 1989 in Nasar 1998). Nasar is of the view that with careful attention to improving the evaluative image, we can resolve these problems (Nasar, 1998, pp. 3-4).

2.5 Movement and Route choice

Despite burgeoning research effort directed at the design and modelling of effective urban spaces for pedestrians, remarkably little is known about how pedestrians

actually negotiate urban spaces. However, a number of influential factors affecting how humans negotiate urban spaces have been found (Willis, A., Gjersoe, N., Havard, C., Kerridge, J. and Kukla, R., 2004).

Empirical literature provides some insights relating to various elements of human movement in urban spaces (Willis et al., 2004). Of these, they contend, the most fundamental include walking speed and the various distances people choose to maintain between themselves and other entities around them (obstacles, building edges, other pedestrians) while walking.

Batty (as cited in Therakomen, 2001) has noted different kinds of movement, ranging from purposive movements to more random and exploratory ones. Purposive walkers know the environment, while random and exploratory walkers do not know the local geometry of the environment.

'*Wayfinding*' is concerned with individual's exploration and orientation in environment. Two phenomena that relate to '*wayfinding*' are '*route choice'* and '*spatial search*'. '*Route choice'* indicates the process by which an individual selects a route from a set of known routes (Bovy and Stern as cited in Therakomen, 2001). They contend that '*Route choice'* does not involve active spatial exploration because the environment is known or the individual is satisfied with a currently known set of routes. '*Spatial search'* is a broader concept which encompasses the processes used by an individual to decide among alternative courses of action in spatial context (Eyle as cited in Therakomen, 2001). '*Spatial search'* can occur in a relatively

familiar environment where the locations of potential choices are known but their qualities are unknown.

On the issue of pedestrians walking speed, the reported mean in urban environments, for example, varies between approximately 1.0 - 1.1 meters per second - ms^{-1} (Polus et al., Virkler, in Willis et al., 2004) and 1.5 ms^{-1} (Knoblauch et al., in Willis et al., 2004). A number of factors may explain this variation.

i. Personal factors

- Gender: on average, males tend to walk faster than females (Boles, Knoblauch et al., in Willis et al., 2004), though this is not always the case according to Fugger et al. (as cited in Willis et al., 2004).
- Age: Walking speed tends to decline with increasing age during adulthood (Bowman and Vecellio, Coffin and Morrall, in Willis et al., 2004).

ii. Situational factors (factors that characterize context of the pedestrian)

- The prevailing density of other pedestrians has a significant effect on individual's walking speeds (Fruin, Henderson, in Willis et al., 2004).
- Group size and mobility level (Boles, Knoblauch et al., in Willis et al., 2004).

iii. Environmental factors

- prevailing temperature affects how fast pedestrians move (Rotton et al, in Willis et al., 2004). When it is hottest pedestrians tend to walk slower than when temperatures are cooler (Willis et al., 2004).

- type of facility studied: people have been found to move more quickly when crossing roads, than when negotiating a footway (Lam et al., in Willis et al., 2004)
- the volume of prevailing traffic (Fugger et al., 2000; Knoblauch et al., 1996).
- overall function of pedestrian area - leisure, transport interchange, 'route to school' (Willis et al., 2004, p. 807), will also prove significant, presumably because of the differing priorities and goals of the pedestrians who populate them (Willis et al., 2004).

Studies exploring space preferences of pedestrians in urban areas have mainly focused on establishing levels of service (L.O.S) criteria relating to pedestrian traffic in crowded / potentially crowded areas (Fruin in Willis et al., 2004; Pushkarev and Zupan, 1975).

Ciolek and Fruin (as cited in Willis et al., 2004), suggested that people prefer to maintain a buffer zone of around 0.45 meters (m) between themselves and the edges of buildings; while Habicht and Braaksma (as cited in Willis et al., 2004), say approximately 0.1m to stationary items of street furniture and around 0.8 to 0.9m between themselves and other pedestrians (Dabbs and Stokes, in Willis et al., 2004).

Burgess (as cited in Willis et al., 2004), report also suggested that people like to maintain a distance of around 0.75 m between themselves and their companion(s) when walking. Many of these preliminary findings, however, have remained largely uncorroborated (Willis et al., 2004). The above distances people maintain around

objects are likely to influence women's movement behaviour; the density of pedestrians a factor of crowding is also bound to determine route choices.

Pedestrians carrying large shopping bags, or walking with young children typically demand more space and, arguably, greater attentional resources in negotiating space than walking unencumbered by baggage or other accoutrements. Garling and Garling (as cited in Therakomen, 2001) echo that aesthetic response and human movement affect exploratory behaviour. Further to this, distractions and pleasures divert the pedestrian from plans to minimize distance and effort, although minimizing effort might be associated with carrying heavy objects.

Mobility levels for example those using mobility aids, those with visual or hearing impairments can play an important role in decisions of whether and how to walk in urban environments.

Smaller pavements may compound the physical and/or attentional demands of maintaining proximity with a companion while walking, resulting in significantly slower speeds for groups, but not singletons, in areas within which exclusive space for pedestrians is limited.

The dynamics of how pedestrians position themselves on the street has design implications which design ought to accommodate. For example, it has been found that accompanied pedestrians walk side by side one another rather than behind each other. Also questions such as whether faster walking speeds require greater spatial requirements can be addressed.

2.6 Theoretical framework

Feminist theory has advocated of a bottom-up approach where research is informed in this case by the public and not by assumptions of Urban designers. It has also voiced the inclusion of the public in the design of public spaces. This is synonymous with considering issues of women's safety or the representation and access of all groups; blurring the distinction between public and private which Modern Architecture entrenched and propagated. The U.N Women's Safety Audit Theory, through their Safety Audit tool can lead to modification of the design, planning and management of public spaces in order to contribute to reducing the feelings of insecurity and victimisation. It can be instrumental in making public spaces safer and more accessible for women. High presence of women in public areas is synonymous with safety of that precinct.

Visual aspects of the human-made environment have been found to be related to affect (Wohlwill, in Nasar, 1984). Aesthetic appeal is a desirable stimulus that will attract women. Because of the probabilistic relationship between environment and behaviour, women will linger in, and return to, aesthetically appealing urban places (Rapoport, 1977). Aesthetically appealing streets are likely to attract and retain more women than the contrary.

Recalling Gehl's proposition, '*Necessary activities'* will arise regardless of the quality of the environment whilst '*Optional activities'* will occur only when the environmental quality is good and will continue for a longer duration when the quality of the environment is better. '*Social activities'* will transpire where

'*Optional' and 'Necessary activities'* are taking place in attractive environments (Gehl, 1996). As such, women's movement will be encouraged in routes where '*Necessary and Optional activities'* are already occurring. Such routes will be pronounced for women of low fixation.

The Aesthetic experience is a product of one's evaluative image; this image is constituted by a number of variables; formal and symbolic as well as environmental features. These are required in varied proportions depending on the scale of the environment. The process of evaluation is fundamental to our perception and reaction to the environment, in this case the routes women end up following. Because of this, for example certain paths may denote cleanliness, while others clutter – such are what Lynch calls '*Identity*' (Lynch, 1960). Other routes or sections of routes may be associated with safety while others with vibrancy; Nasar calls these '*Connotative meanings*' (Nasar, 1998). Both 'Identity' and 'Connotative meanings' affect behaviour and influence women's decisions about how to get "there".

In the Aesthetic experience of urban spaces of which streets are a part, Cullen's concept of serial vision is significant because of the dynamic experience involved in viewing streetscape. The perception of the streetscape is a composite of preceding, immediate, and anticipated images. This dynamic experience also suggests that the pedestrian will perceive cues at a different level than motorists; women will notice greater detail and the scale of the elements will impact on them. Pedestrians come into direct contact with 'Fixed', 'Non-fixed' and 'Semi-fixed features'; the scale of the latter requires sensitivity, in the case of women. The 'Semi-fixed features' are

useful for women to take possession of the street as they walk. Lynch's concept of 'Imageability' was found to be one of the most important features that subjects use in way finding. Imageability is an aspect of the streetscape; it is determined by the visual arrangement of elements (Lynch, 1960). Imageability is also a key element in the evaluative image and therefore a factor in determining route-choice of women.

The Kaplans' (1982), evolutionary model in which human survival is pegged on the involvement and ability to make sense of the environment has a role to play in route-choice behaviour. The degrees of '*Complexity*' and '*Mystery*' (aspects that provide involvement) and '*Legibility*' and '*Coherence*' in streets (issues affecting ability for an environment to make sense) to some extent provide affordance. As such women in the C.B.D are likely to avoid routes where they expect hazards to exist such as in narrow alleys and deflected tunnels because it is evolutionary wise to do so. The Kaplans' evolutionary model works hand in hand with Appleton's *theory of prospect-refuge* in which people place themselves at vantage points where they are able to look out and be safe from danger. Likewise, spaces with greater potential of movement would imply spaces less frequented by criminals and, hence, would be more secure spaces; places where the lines of vision are interrupted would have less potential for choice of movement and would tend to favour the occurrence of crime.

Environmental factors such the weather, thermal comfort and the like have a bearing on comfort of the pedestrian on the street. Such factors are bound to impinge on their perception of routes for example in areas of high traffic or intense activity and consequently on their route-choice behaviour. Situational factors such as pedestrian

density, group size and level of mobility are factors that have a bearing on pedestrian waking speeds and as a result on choices of routes. Personal factors such as age and gender have been found to also affect walking speeds of individuals.

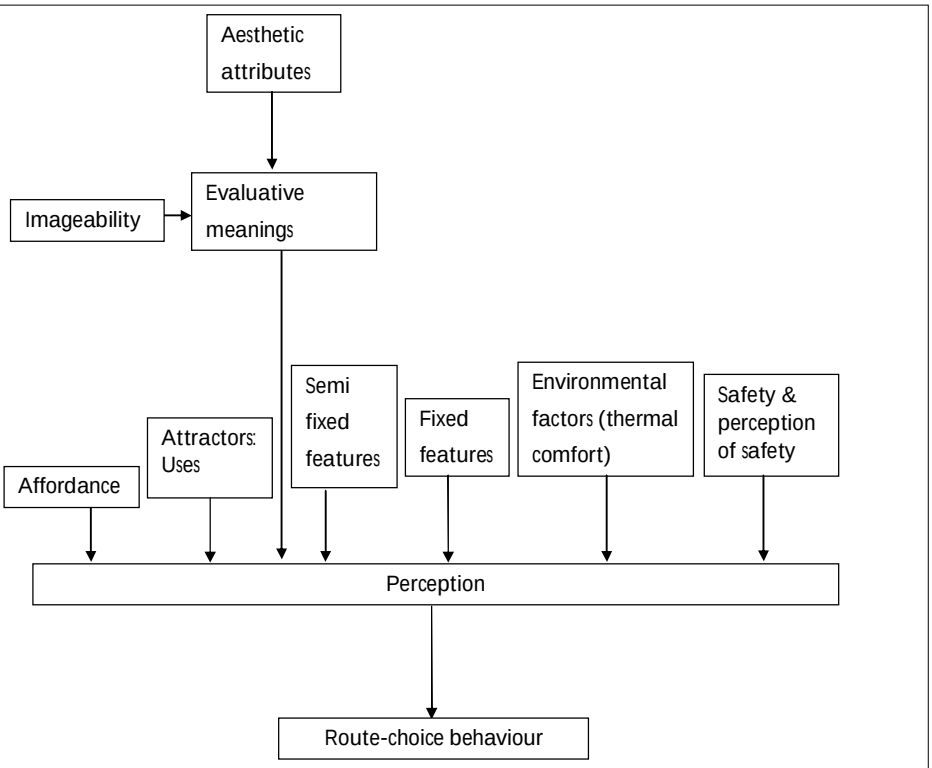


Fig. 2.7: Theoretical Framework, by Author, 2010.

2.7 Conclusion

This chapter has presented theories and concepts related to the problem as well the theoretical framework. The body of theory has shown that women's choice of route of movement is determined by visual and social aspects. These have implications on the perceived evaluative image, affordances, safety and comfort. Consequently their actions, participation and use of public spaces are affected. The following chapter presents the research methodology for the study.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

The main aim of this research was to study the Urban Design factors that influence women's choice of route of movement in Nairobi C.B.D. The following part describes the research design, the research methods and tools that were used in the study.

The study considered the following variables: choice of route of movement, 'eyes on the street', transparency of the building edge, openness, semi-fixed features of the street, length, linearity and complexity. To measure choice of route of movement, respondents were asked to draw the actual trail of movement between their last stop and the point at which the interviewer found them. To measure 'Eyes on the street', pedestrian density and flows were measured at key points on the most popular space to the subjects. Transparency of the building edge involved measuring the total area of clear glazed surface on a shop or building edge.

Openness of the street was measured by the street width distance divided by the building height. Semi-fixed features were measured by counting recording their frequency on the street. Length, linearity and complexity were measured by observing the street and rating it using the semantic differential scale.

3.1 Research Design

This is a descriptive type of study. The research sought to collect quantitative and qualitative data. Quantitative data comprised the subjects' perception of the street

and route used, while qualitative data comprised the characteristics of street that is most used by women. The data was gathered from the field and the library. Data from the field entailed a survey, observation of environmental behaviour and physical traces and measurements.

According to the Central Bureau of Statistics (C.B.S), the sex ratio of males to females is 1:1.01 for the total population for the year 2001 (C.B.S, 2007). The population of Nairobi is given as 3,038,600 (C.B.S, 2009). Assuming approximately 1 million people or 500,000 women traverse the C.B.D each day, the sample size that correctly represents the population is 50,000 (10% of the population). However, due to constraints of time and cost, 150 respondents were selected. This number ensured that the responses given can hold statistical viability since a normal population can be assumed and allowed for errors such as partially filled schedules.

For the survey, the study selected women who work, conduct business or study in the C.B.D. The age of the respondents ranges from 13 to those over 70 years. Because interviewers may unknowingly select a certain kind of person to interview, thus introducing a bias, the following controls have been applied. The subjects were selected through judgmental sampling; an unaccompanied subject who had just arrived at a bus stop or open air parking waiting to board a vehicle at prescribed gateways was chosen. *Gateways* are arrival/departure points at C.B.D; in this study they are car parks and bus stops.

The survey was scheduled to take place from 1100 - 1400 hrs and 1630 – 1930 hrs on weekdays and weekends. 17 gateways were identified through judgmental sampling (Fig. 3.0). They are split in three groups. A research assistant was assigned to each group. One interviewee was selected at one gateway before proceeding to the next. After each complete interview rotation the cycle began again. The groups were as follows:

- first group - KenCom, Railway station, Mfangano street, Gill House, Bus station and Ambassadeur termini;
- second group – Old fire station roundabout, Accra Road, Marble arch Hotel, Munyi Road, Kilome Road, Latema and Globe cinema roundabout termini;
- third group - Kenya International Conference Center (K.I.C.C), Taifa Road and Laico parking lots and General Post Office (G.P.O) terminus.

From the first two groups, subjects were selected from specific gateways to achieve a mixed socio-demographic spectrum of the population. For example from group one the following are chosen from which a subject is then picked; KenCom – Lavington; Bus station – Kayole and Ambassadeur – Buruburu.

To assist in the survey, the research selected 7 judges to rate street scenes, which are also subjected to the respondents. Judgmental sampling was employed to select the professionals who judged the scenes. Two knowledgeable persons from the C.C.N are selected to shed light on the urban design of Nairobi C.B.D. Judgmental sampling was used to select them.

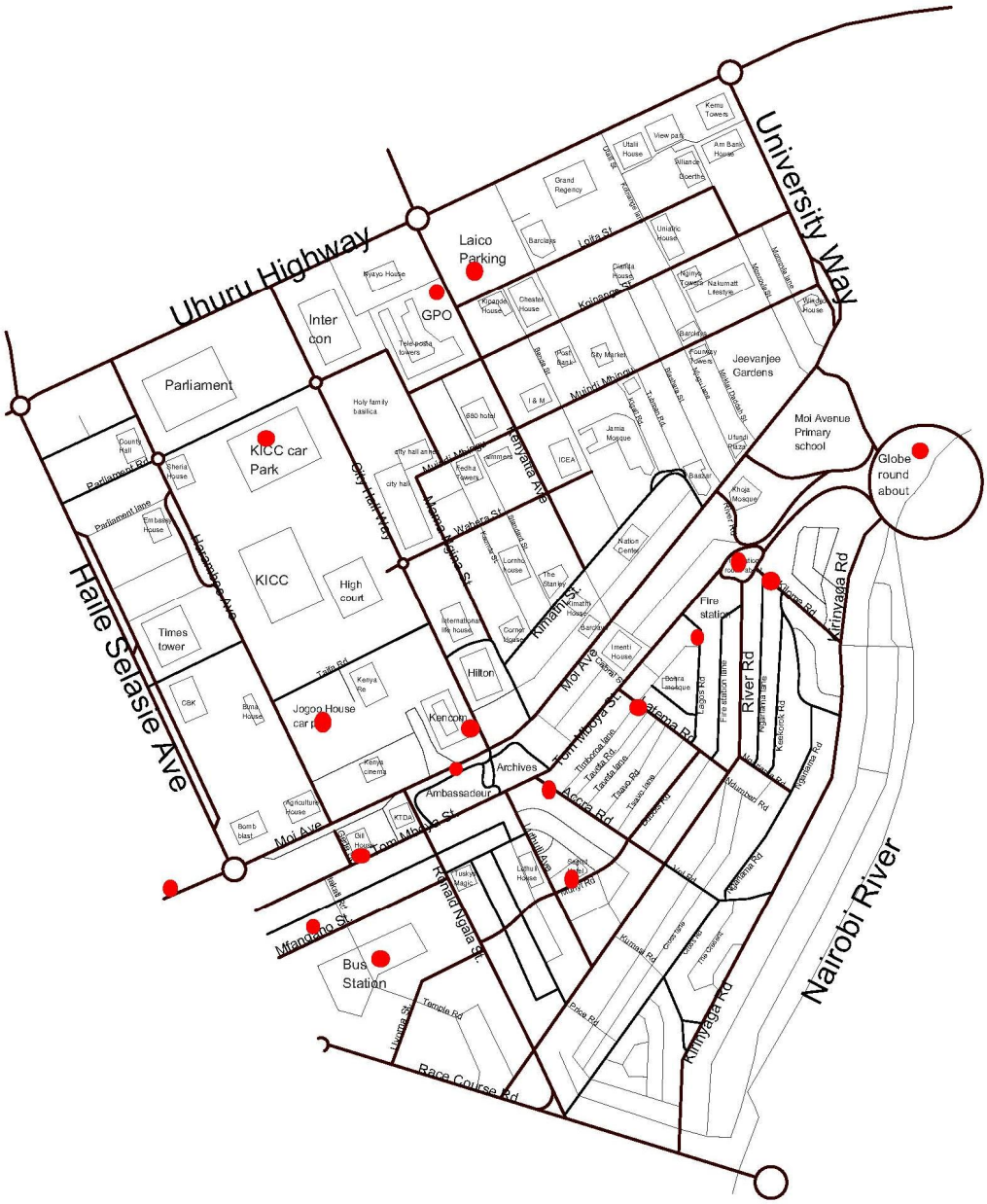


Fig. 3.0: City of Nairobi map showing interview locations. From [Adapted from] *City of Nairobi map*, by J.I.C.A and G.o.K, 2005, Nairobi: Survey of Kenya 1000.

3.2 Data collection and Research Tools

3.2.1 Interviews

Both open ended and closed interviews on a one-on-one basis were used to make known certain respondents' views. This was conducted against a pre-coded list of established questions ordered to gain relevant information regarding their thoughts, feelings, deeds, knowledge, beliefs and expectations.

Interviews were used for judges, knowledgeable persons as well as for the women. Structured interviews conducted on judges were used to rate various street scenes for their formal and symbolic attributes as well as for the environmental features central to human perception and evaluation of places (Nasar, 1994, 1997, 2001). For them, closed type interviews were adopted. Structured interview schedules are used while conducting the interviews. The photographs' rating measured qualities associated with environmental descriptors, namely; Complexity, Enclosure, Length and Deflection (Nasar, 1994, 1997, 2001; Cullen, 1971).

Similarly, personal interviews were conducted on women to obtain mapping for the routes they use. Route mapping on an area plan was done to establish paths followed by the respondents. Maps of the C.B.D on which women map their movement between the points of boarding vehicle (terminus / open-air car park) and last stop facilitated this. The sequence of movement for each respondent was then recorded. Semi-structured interview schedules were subjected to the respondents during the interviews to deduce opinions on street scenes based on formal and symbolic

attributes. Here questions involved open-ended and closed type of answers. Stimulus in the form of photographs was used to elicit responses from them.

Photographs were collected at the beginning of the research to give an initial overview of what is to be investigated. They captured ingenious or subtleties that other methods could not. These photographs were used as stimuli whilst administering interviews in the study. This tool was preferred because research shows that responses to coloured photographs accurately reflect on-site experiences rather than other simulations such as drawings or black and white photos (Nasar, 1998). In selecting street scenes, random sampling was used.

On knowledgeable persons, indepth interviews were conducted to find out their views on the research topic. An interview guide was used and the various responses from them recorded.

In order to measure the degree to which the subject exhibited a desired construct and to be able to obtain the interval data, the semantic differential scale was applied. The scale was particularly useful for the interviews for the judges and the women.

Despite relatively high cost involved, this method was chosen for this study for several reasons: it yields a relatively higher percentage of return; also, uniformity is applied for all respondents (Miller, 1991). Before the start of the personal interviews, the researcher gave disclosure on the purpose of the study and the information sought. The participants were made aware that their responses would be used for

academic purposes only and that no information given would be divulged to another entity. The study respected that each participant was capable of making an informed decision regarding participation in the survey. Only respondents who authorized their participation were interviewed.

3.2.2 Observation of behaviour and physical traces

Once courses were mapped, the streets that were preferred by women were deduced. In order to identify their how women use the street and any physical traces, it is observed and a record made using photographs.

In order to reduce instrumentation, one of the threats to internal validity, certain controls were instituted. A standardized wide angle (35mm lens) was used to capture views on both sides of the street. The street was photographed on a clear weather day. The camera was mounted on a tripod to achieve a standardized eye level view. Photographs were taken at consistent 50m intervals in opposite directions.

Observation as a method was chosen for the research because it is inexpensive and relatively straight forward to perform. Specifically, non participant observation was used, that is interactional recording involved using photographic technique.

3.2.3 Measurements

Measurement of characteristics of the street such as the widths of the street, height of canopies, heights of buildings, and any other parameters which may be used to check for scale and proportion were done.

Other measurements obtained entailed situational characteristics of the context of the pedestrian in the street studied - pedestrian walking speeds, flow and densities. Measurements were carried out using a tape counter and stop watch.

Pedestrian flow involved counting the number of people passing set points over a set period of time (Schelhorn, O' Sullivan, Haklay, Thurstain-Goodwin, 2000). Data was collected for 4 one-minute periods, and then in the fifth minute the data was transcribed to a recording sheet before surveying re-commenced (Cullen, 2007). Fruin (as cited in Schelhorn et al., 2000), devised the L.O.S indicator which quantifies congestion by measuring the flow of pedestrian per unit width of walkway. Six L.O.S are identified from A (free flow with typically less than 23 people/minute/meter of walkway) to F (extreme congestion, more than 82 people/minute/meter of pavement) where progress would be by means of shuffling. A checklist comprising a listing of the various aspects of the street that need to be considered during study of was prepared.

3.2.4 Archival Method

Statistical data such as census information aided in describing the subjects of the study as well as the deriving the sample to be studied. Non-statistical data such as area maps provided a base on which routes could be mapped. Past and existing policies guiding the Urban Design of Nairobi C.B.D were a source of data on the planning and design of Nairobi C.B.D. Books and publications provided information on past and ongoing research.

3.3 Procedure for treating data

SSPS (Statistical Package for Social Sciences) version 11.5 aided in summarizing and analysis of data. It was employed in the quantitative analysis. It aided in descriptive analysis: in ascertaining means, percentages and frequencies. The pivot table tool in Microsoft Excel was adopted in the summary of mapped routes and preparation of graphs.

3.4 Conclusion

This chapter has discussed the research design, the research methods and tools that were used in the study. The next chapter presents the background of the study area.

CHAPTER FOUR

4.0 STUDY AREA: NAIROBI C.B.D

This chapter discusses the background of Nairobi as it looks at the historical development of Nairobi C.B.D to what stands today.

4.1 General

Nairobi largely owes its present existence to the establishment of a transport depot and stables for oxen and mules by Europeans constructing the Uganda Railway in 1896. The Uganda Railway reached Nairobi in 1899 and a decision was made to make this the railway headquarters (plate 4.0).

Plate 4.0: Railway station c. 1901. From *The Urban Experience in Eastern Africa*, by Burton. 2002. Nairobi: The British Institute in Eastern Africa.

A number of factors contributed to the suitability of Nairobi as a convenient base for the continued construction of the railway. These included but were not limited to the following:

- The flat stretch of land adjoining the Western edge of Athi Plains could serve as settlement for manual, low-grade salaried employees of the railway company while the agreeable site on the foothills of the first Kikuyu escarpment could be used by higher-grade employees.
- The Nairobi River could adequately provide water for the railway staff.

- The area was somewhat mid-point between Mombasa and Lake Victoria and offered a convenient resting point before the ascent to Kikuyu country and the descent into the rift valley.
- The area lay at an altitude of about 1700 meters above sea level and hence had a climate considered suitable for European tastes.

Prior to this decision in early 1898, Arthur Frederick Church, an assistant railway engineer, was dispatched to prepare a town layout for the railway depot at Nairobi (Mills, 2006). From the railhead, Church planned two streets just wide enough for turning three-axled ox-cart transport - Victoria Street (Tom Mboya Street) and Station Road (renamed Government Road in 1901) after the government took control of the town (now Moi Avenue).

Off Station Road, he planned 10 avenues along which houses for subordinate-grade railway men would be sited. Along the rise which bordered the flat land, ('The Hill'), Church sketched in a half-dozen sites for upper-grade houses to be occupied by senior railway men. Along Victoria Street, Church marked in 13 commercial plots, which he called 'the European Bazaar' and, away in the distance he sited the Asian trading area (Biashara Street). Church's plans were based on railway requirements, not for any civic convenience (Mills, 2006). The site was considered adequate for the uses envisioned by the Uganda Railway administrators, who considered Nairobi a railway town and nothing more. At this point in time, the provincial administration promptly transferred its headquarters from its location, Machakos, to Nairobi and in the process creating considerable tension between them and the Uganda Railway. Meanwhile, the Uganda Railway had obtained authority to appropriate all land

required for railway purposes. As the civil administration moved to Nairobi, it claimed control of land leases and settlements in Nairobi.

The railway and administrative centre soon attracted a collection of traders, workmen and servants. The majority of the Indians in the town at that time were not business people but were mainly railway workers who had been brought into the country by the British for the sole purpose of constructing the railway line. At this time (1900) the railway line from the station to the West ran alongside the then Princes Elizabeth Highway (Uhuru Highway), and dominated the urban landscape till the re-alignment of the line after the 1948 Master Plan (see fig. 4.0).

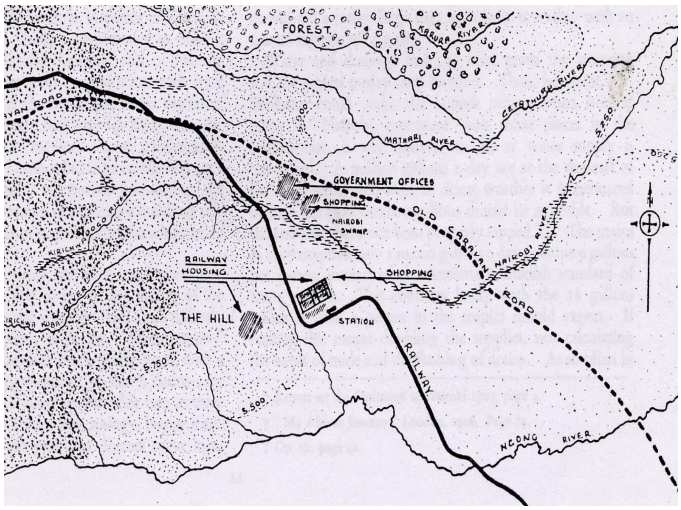


Fig. 4.0: Nairobi Layout c 1900. From *1948 Nairobi Master plan for a colonial capital,* by White, Silberman and Anderson, 1948, Great Britain: H. M Stationary Office Press.

The town soon began to grow rapidly, and for the first time there was a need to demarcate the municipal boundary. The outer borders of the town were decided arbitrarily, however the railway alignment, the Nairobi River and the Hill determined the boundary of the central area. In 1900, Nairobi became a Township. By 1906, 7

distinct areas could be identified as shown in fig. 4.1. (White, Silberman and Anderson, 1948).

:- the Railway Centre; :- the Railway Quarters;

:- the Indian Bazaar (fig. 4.2); :- the Dhobi Quarters;

:- the European Suburbs; :- the Military Barracks and

:- the European Business and Administration Centre .

Fig. 4.1: Nairobi Layout c 1905. From *The struggle for Nairobi,* by Hirst assisted by Lamba, 1994, Nairobi: Mazingira Institute.

The centre of this circular boundary was at the Government Offices and formed a radius of approximately 2.4 km or an area of 18km^2 (Morgan, 1967). The Government and European Business Centre consisted of the stretch from present day Station Road, onto Moi Avenue and through to Harry Thuku Road, Museum Hill Bridge and North into the suburban district of Parklands. This centre also consisted of commercial buildings on plots along present day Tom Mboya Street.

Fig. 4.2: The Indian bazaar c 1907. From *The History of Muthaiga Country Club - Volume 1,* 1913-1963, by Mills, S., 2006, Nairobi: Mills Publishing.

The Indian Commercial Area was composed of three streets and a cross street of one-storey buildings containing shops at the front and living quarters at the back for the traders, sub-leases and lodgers (White et al., 1948). This area is around the junction of present day River Road and Accra Road.

The railway quarters consisted of two long rows of houses providing one of two rooms for the lower class of railway workers. The dhobi quarters and houses for government subordinates ran along Ngara Road. At this point in time, no town plan existed for Nairobi. The director of public works was convinced of the defects of Nairobi and refused at that time to offer money for the development of drainage systems and other public works. Small plot owners were also reluctant to develop their plots, as they were uncertain about the future of Nairobi (White et al., 1948). It was at about this time that present day Kenyatta Avenue was laid down which was considered a major intervention and development in the young Nairobi. In 1919, Nairobi became a municipality. In 1926, Walton Jameson was called in as to give Nairobi its first plan and zoning arrangements (White, et al., 1948). The main

contents of the 1927 plan (fig. 4.3) were traffic regularization to match the increased land area, drainage and swamp clearance, density regulation and creation of a monumental administrative centre.

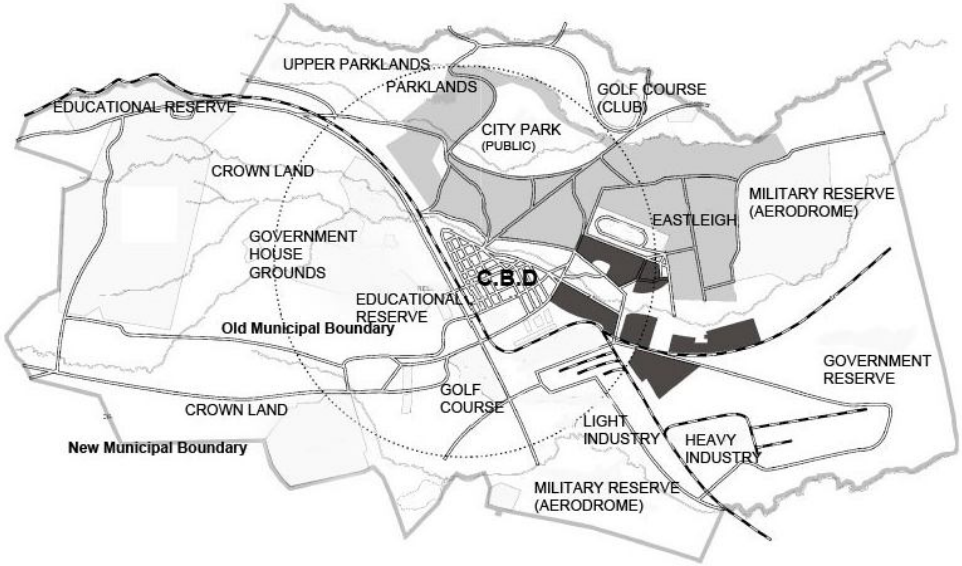


Fig. 4.3: 1927 Master Plan. From *City of Nairobi map,* by J.I.C.A and G.o.K, 2005, Nairobi: Survey of Kenya 1000.

By 1929, the town embarked on a program of macadamizing the roads - unfortunately this project was frustrated by harsh economic times resulting from the global depression of the time. A five-year plan by the municipal council was to be embarked on in 1938 but the events of the Second World War frustrated this effort and the plan was consequently put in abeyance (White et al., 1948).

4.2 The 1948 Nairobi Master Plan for a Colonial Capital

After the Second World War, the position of the settlers was gradually weakened as Nairobi got a Royal Charter to be incorporated as a city (Hirst, 1994). In 1948, a most ambitious and comprehensive master plan for Nairobi was drawn up. The

principals of the team included White, Silberman and Anderson. Theirs was a report to the then municipal council of Nairobi, conceived as a key plan to the general physical, economic and social development of Nairobi, over a period of 25 years. The very name of the plan points out that the thrust of the plan was to articulate a capital city for the ruling white class (Emig and Zahil, 1980).

The 1948 Master Plan (fig. 4.4) was designed for containment rather than growth as it aimed to confine further growth within the existing boundaries of the Municipality of 1926, at 84Km² (Hirst, 1994).

In relation to the Nairobi C.B.D and Commercial Area, the following was noted: At that time, it was projected that the principal problem of the next 10 to 20 years was to fill up the existing area of the Commercial Area - which was considered fortunate to be bounded by the swamp (Nairobi River) and the railway and hence its further spread was limited. Limiting the size of the commercial area limited land prices on adjacent plots.

The location of the commercial centre was considered appropriate as it was considered centrally situated near the districts of higher density. Emig and Zahil (1980), argue that this location was primarily to serve the interests of the white ruling class who lived near this centre as opposed to the Africans who were more populous but lived further away. It was stated in the master plan that the plan should promote anything that encourages an increased and easy circulation of money and persons in an environment that promotes efficiency and high standards of service.

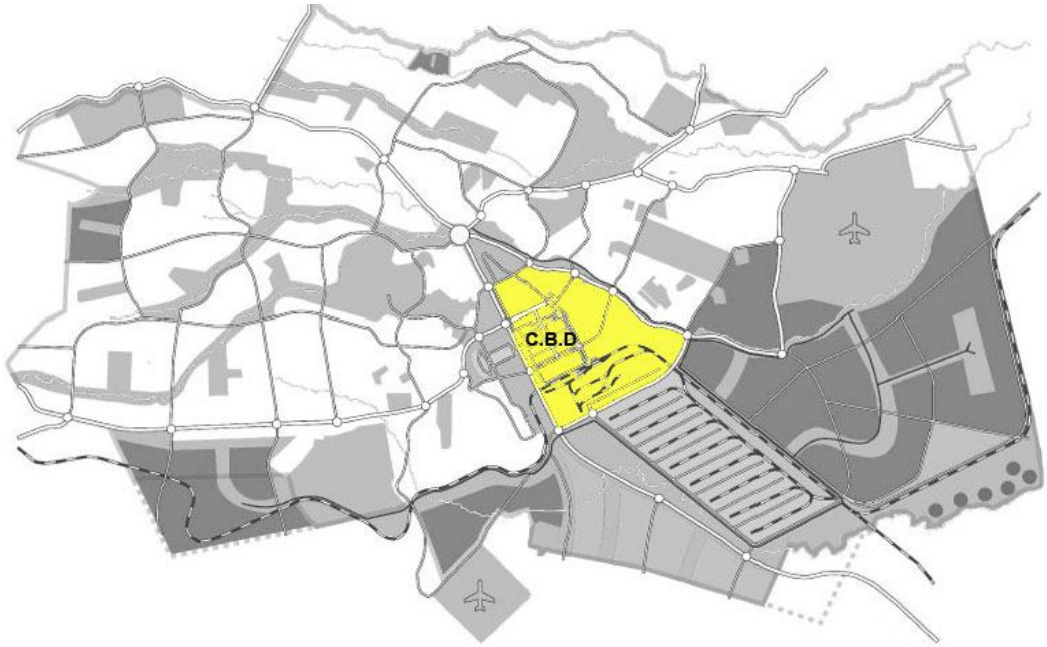


Fig. 4.4: 1948 Master Plan. From *City of Nairobi map*, by J.I.C.A and G.o.K, 2005, Nairobi: Survey of Kenya 1000.

The plan encouraged the close proximity of government offices and the rest of the commercial centre despite arguments to the contrary that had been advanced in academia at that time. The plan hoped to develop the central area exclusively for commerce and indoor recreation, ridding it off activities such as industries, warehouses and assembly shops (Emig and Zahil, 1980).

The plan advocated for the restriction of the commercial area in order to ensure that inter-building activities were a pedestrian affair, utilizing pavements and to avoid increase of distance for car traffic if it was extended much beyond its existing size (White et al., 1948).

The plan sought to ensure proper economic development of the central area and to avoid the confusion due to uncontrolled scattering of tall buildings, with their haphazard concentration of workers (Hirst, 1994). In order to realize this, the plan advocated for two principal zones in the commercial area:

- Zone 1 defined by present day Koinange Street, Banda Street, Tom Mboya Street and Haile Selassie Avenue was to be built to a maximum height of 30m. This included all the buildings with frontage onto Uhuru Highway. See fig. 4.5.
- Zone 2: The rest of business and commercial centre was to be built to a maximum height of15m (White et al., 1948). See fig. 4.5.

This was a clear indication of where the authorities wished the climax of the Central area to be, relegating the area between Banda Street and University Way and the area east of Tom Mboya Street to secondary low-rise centres.

The plan advocated for the area of the arrowhead (from Norfolk hotel to present day Museum Hill Bridge) to be reserved for higher education, cultural activities, hotels and flats. It was also intended that small blocks of flats be built on a narrow strip to the west of both Central Park and the Railway golf club for purposes of housing lower paid European workers in government and private employment in order to avoid excessive transportation costs (White et al., 1948).

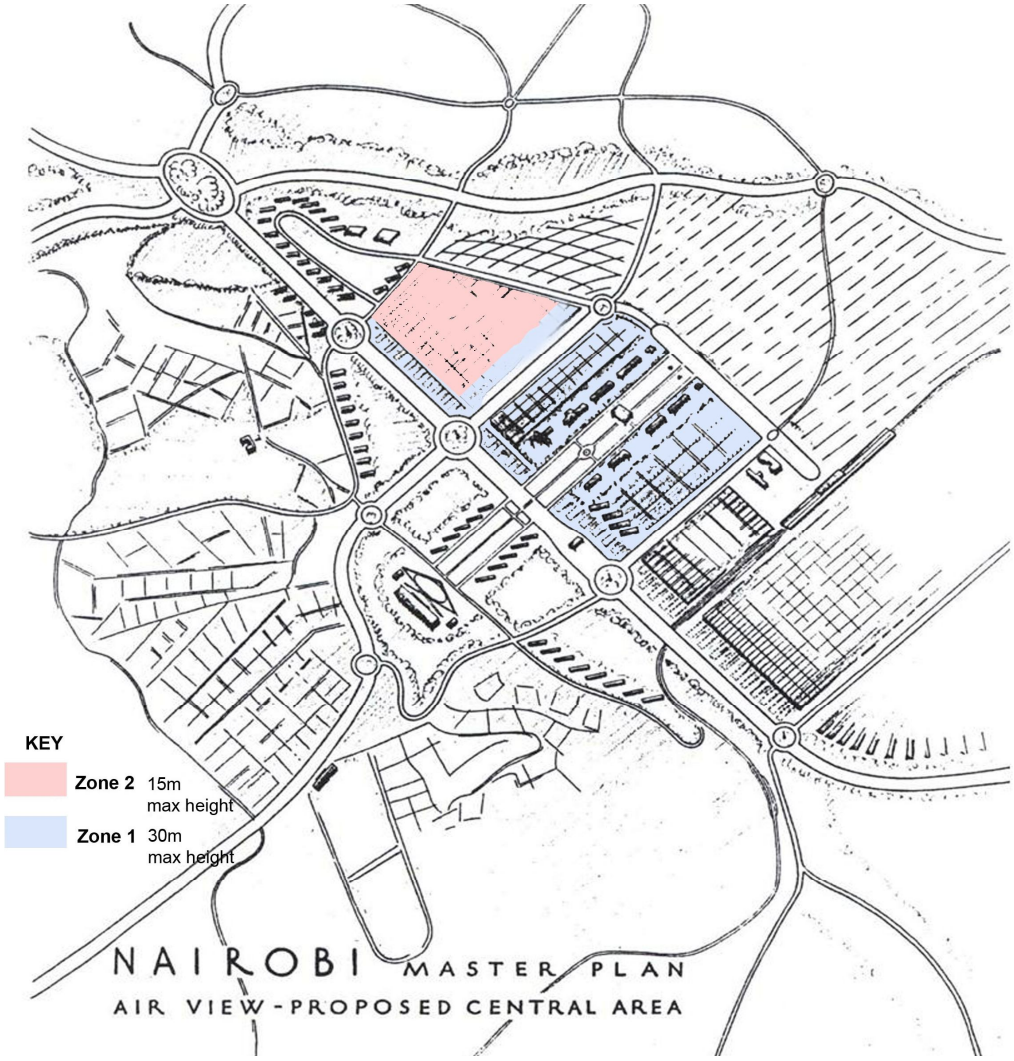


Fig 4.5: Nairobi central area - zoning of building height. From [Adapted from] *1948 Nairobi Master plan for a colonial capital*, by White et al., 1948, Great Britain: H. M Stationary Office Press.

4.2.1 The Kenya Centre

It was noted that it was fortunate that the civic centre was immediately adjacent but not to be confused with the existing commercial, business and railway centres (White et al., 1948). The plan suggested an extension of the civic centre to a widened Moi Avenue towards the east and a considerable extension for government purposes to the slopes of the hill to the west.

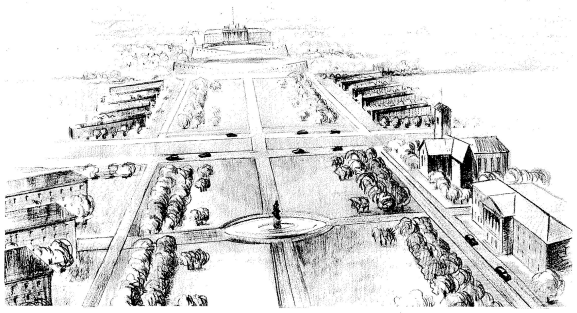


Fig 4.6: Proposed Kenya centre. From *1948 Nairobi Master plan for a colonial capital,* by White, Silberman and Anderson, 1948, Great Britain: H. M Stationary Office Press.

The plan conceptualized a ceremonial open space in the centre commanded by new government buildings at one end and with the Law courts against a background of architecturally controlled commercial buildings or entertainment buildings at the other end (White et al., 1948).

The plan considered the effect of the intersection of the civic centre by the main trunk road of East Africa (Uhuru Highway) as a considerable advantage as long as major cross circulations are avoided. It was decided that the western part of the centre should contain government activities while the east to contain civic and local activities (White et al., 1948). It was perceived that persons traveling to and through the city should become immediately aware of the centre of affairs, which was to be at the Kenya Centre as depicted in fig. 4.6.

Emphasis was placed on the planting of trees along the axis from the hill to Moi Avenue, with the trees being considered more important than the buildings flanking this axis. This was such as to provide a shaded environment in this tropical country (Mills, 2006).

4.2.2 Car Parks and Parking

The plan noted the inadequacy of car parking facilities in the central commercial and business centre at the time (White et al., 1948). The plan proposed that the widening of the pedestrian pavements be done such as to be at a minimum of between 3m to 4.5m so that pedestrians' movement would not hamper or be hampered by vehicle movement and parking.

The plan anticipated that congestion in the central area would be intense if buildings in the area rose to about 50ft to 100ft (15m to 30m or 5 floors to 10 floors) in height. At the time most of the roads in the central area were narrow with buildings averaging about 1.5 floors flanking the streets. Considering that the plan identified Moi Avenue as a particularly bad case means that the planners had not envisioned the present day dense streets especially. The plan outlined 3 groups of car parking demand in the commercial and business area - ranging from 10 to 30 minute parking, 1 to 2 hour parking to full day parking. The plan noted the provision 30 minute parking a luxury but could somewhat be met along with the provision of 2 hour parking in tree shaded parking in car-parks in the centre (White et al., 1948).

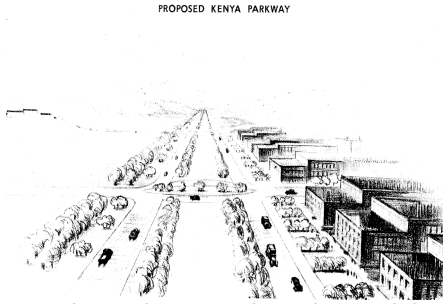


Fig 4.7: Proposed Kenya parkway (present day Uhuru Highway). From *1948 Nairobi Master plan for a colonial capital,* by White, Silberman and Anderson, 1948, Great Britain: H. M Stationary Office Press.

The plan proposed the solution to full day parking as the provision of perimeter parking facilities within a 400m average walking distance (fig. 4.7). This perimeter parking was proposed to take place on a reserve strip along the entire length of the business and commercial centre.

4.2.3 Public Road and Passenger Transport

The plan recommended strongly against the provision of a central bus station and that the inner terminal operating system should be avoided. The planners argued that no one single bus terminal could serve the central area effectively and at the convenience of the bus passengers (White et al., 1948).

It was envisioned that the number of buses entering the central area in the future will be great and the any concentration of them at a terminal station will be disastrous to traffic circulation in the main distributor roads in the area (White et al., 1948). The suggested solution in regard to public transport was a system of through bus routes supplemented by a number of routes looping in and out of the central area with a small number of bus pools immediately outside the central area to enable buses to be fed rapidly into rush hour service. The main halting places were to be inside street loops and not in the main distributor roads.

Emig and Ismail, argue that the aim of the master plan in total was to make Nairobi an attractive place for investment. The infrastructure of the city was to be built to meet the needs of the emerging industrial bourgeoisie and the interests of this group were considered above the interests of all others - this group was primarily composed

of white business persons and industrialists whose interests were considered even above those of other white settlers (Emig and Ismail, 1980).

The plan maintains an air of a technical and liberal document and by the words of its authors was to be a flexible document, which would be able to accommodate changes while maintaining its basic principles (Emig and Ismail, 1980).

4.3 The Post Independence Era

After Independence, the city experienced significant changes in its character, which can be attributed to mass urbanization in the post-colonial period. In terms of social structure, there was a dramatic alteration in the gender balance of Nairobi's population. The male to female ratio during the colonial period was as high as 4-8 males to 1 female. This decreased in the post-colonial period to a Kenyan national rate of approximately 1.38 male to 1 female in 1969 (Burton, 2002) and 1.17 to 1 for Nairobi in 1999 (C.B.S, 2001)

The concept of a comprehensive plan to direct Nairobi's growth and development emerged around 1967, arising from various sectoral pressures including an impending water shortage, an overburdened road system and spreading and deteriorating slums worsened by the rising number of low-income migrants (Nairobi Metropolitan Growth Strategy Report – Vol. 1, 1973).

The Nairobi Metropolitan Growth Strategy (1973) was the first plan to be facilitated by the African government and the principal facilitators were Mbogua (Town Clerk)

and Ng'ang'a (City Engineer). This plan was comprehensive in nature, seeking to solve immediate problems while setting forth a framework for the future of the city (figs. 4.8 and 4.9).

It made proposals for land, highways, public transport, the C.B.D, housing programmes and employment promotion. Its recommendations were based on population projections and economic analysis.

The Nairobi Metropolitan Growth Strategy (1973), identified the central area as the area bounded by Uhuru Highway, the railway and Nairobi River (para. 99). It was identified that the whole spectrum of commercial activity is concentrated in the central area, resulting in a large proportion of the population having to travel to the central area for their various needs and employment. It acknowledged a total number of about 160,000 workers employed in the modern sector which included commerce (retail and wholesale), offices, industry and storage and hotels at the time.

Offices and commercial spaces accounted for over 50% of the total built up area in the central area with the rest being taken up by residential (flats, hotels and lodging houses) industry, storage and parking (parking provided within or adjacent to the building for its exclusive use.

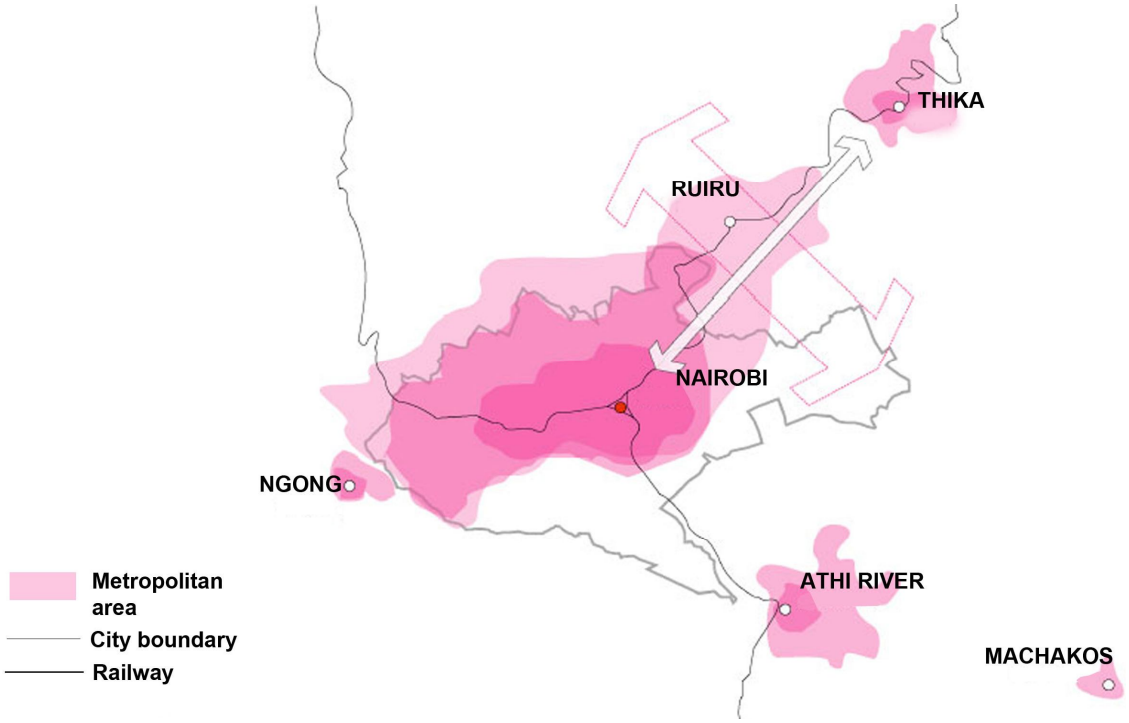


Fig. 4.8: Nairobi Metropolitan Growth Strategy 1973, Regional strategy. From *City of Nairobi map*, by J.I.C.A and G.o.K, 2005, Nairobi: Survey of Kenya 1000.

Primary growth at this time was mainly in the area between Mama Ngina Street and Haile Selassie Avenue which was taken up by prestigious commercial developments and government buildings. Areas identified as ripe for re-development included Biashara Street, Muindi Mbingu Street, Kenyatta Avenue and Moi Avenue but pressure for redevelopment was particularly strong at the relatively lower valued plots east of Tom Mboya Street.

Fig.4.9: Nairobi Metropolitan Growth Strategy 1973, secondary centres. From *City of Nairobi map*, by J.I.C.A and G.o.K, 2005, Nairobi: Survey of Kenya 1000.

It was identified that the development of secondary centres in other parts of the city (fig. 4.9) will be important in relieving the central area of some of its congestion burden by creating new opportunities in the form of higher education, shops, entertainment, commercial offices and national and government offices in these areas (para. 99). The dominance of the central area over these secondary centres was however not in question and the central area was perceived to be the premier city address with a variety and richness of activities which were considered essential for the centre of the capital city. Such shifts of functions from the centre to outlying secondary ones are a feature of growth of metropolitan cities (para. 99). Fig. 4.8

shows the envisaged regional shift for the growth of Nairobi outwards to nearby centres.

In regard to the transportation sector, a detailed study of the road network in the city was done with the following recommendations being proposed which advocated for organized mass transport systems and discouraged the ownership of private vehicles which was seen as a main contributor to congestion in the city.

- A policy of restraint on the ownership and use of private cars through increasing the importation tax on private cars and an increase in the road license fee for the same.
- Progressive reduction of public transport fares. It was proposed that the city council establish a semi-autonomous transport department responsible for controlling public transport in the city and to obtain a controlling interest in Kenya Bus Services Limited with the ultimate prospect of total ownership of that company.
- The staggering of office hours in the central area in order to spread the traffic peak over a considerably longer period.
- Immediate steps to be taken to ensure the provision of segregated bus way routes.
- Steps to be taken to ensure the provision of roads in accordance with recommended transportation plans.

The strategy estimated that the potential for employment in the central area was around 190,000 jobs and this was projected to cause severe congestion problems within the central area resulting from journey-to-work trips and demands of the

adjacent Industrial Area. Parking requirements arising from such a workforce would necessitate development of multi-level car parks in the C.B.D and conversion of parts of Uhuru Park and the University fields into car parks. The strategy suggested the employment in the C.B.D be restricted; an optimum target of 100,000 employees was set (para. 99 and 147).

Measures with regard traffic and parking policy recommended development of additional car parks, increase in parking fees and improved traffic controls, including provisions for pedestrian safety and pedestrian walks.

For the central area, the strategy proposed some radical overlays to the existing road network in the central area (refer to fig. 4.10). This included some mass transport (public transport) routes to be established as totally new links through the centre. The first one was from Valley road, through central Park and under Uhuru Highway, via Moktar Daddah Street to Muranga road. The second road was to enter the centre from the hill, through Uhuru Park and under Uhuru Highway, via City Hall Way and Accra Road through River Road area on a new street opening into the existing urban structure, across the Nairobi River to Park Road. None of these roads has since been built to date.

Some significant developments in the central area at about this time included the building of the Globe Cinema round-about which dealt with distributing traffic into the central area from the northeast and traffic leaving from the central area.

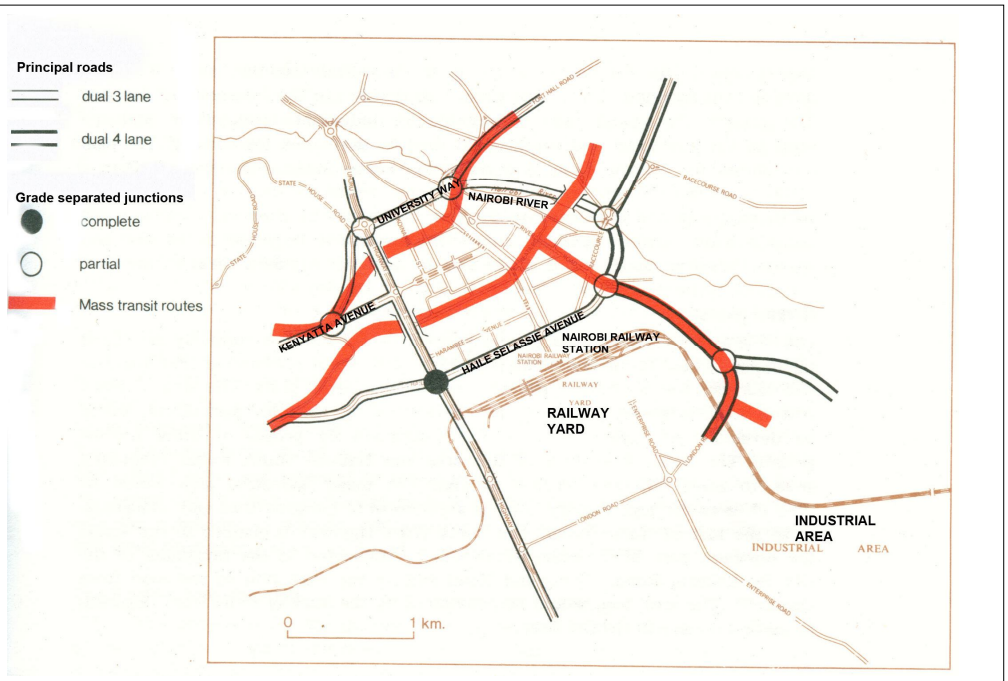


Fig. 4.10: Proposed Transport Network serving central area. From *Nairobi Metropolitan Growth Strategy – Vol. 1 Report*, by Town Planning Section, C.C.N, 1973, Nairobi: Typography Ltd.

A number of important government buildings were built at around this time – K.I.C.C, The President's office, Treasury building and Central Bank building. Several government ministry buildings were built on the hill. In the strategy by the year 2000, the city boundary is extended to encompass an area of 684Km².

Emig and Zahir, argue that the main aim of the 1973 strategy was to bring about the best possible conditions for the most advanced functions in the neo-colonial Nairobi Society - key amongst these was to accommodate multi-national companies in their pursuit for increasing surplus (Emig and Ismail, 1980).

They further argue that the highly mechanized nature of multi-national production technology helps to generate a small, relatively well paid labour aristocracy in the country, making working class political protest less likely. These arguments while relating to the wider city-plan can also be supported by design and planning attitudes seen in the central area.

The prestigious government district in the central area sits barricaded and secure from the hustle of the rest of the C.B.D and is surrounded by prestigious office developments along Harambee Avenue, Mama Ngina Street, Standard and Kaunda Streets.

Little attempt was made to regularize the streets to the east of Tom Mboya Street up to Nairobi River with concerns relating to parking problems not being mentioned in relation to this area. It became the African C.B.D while the area to the west of Tom Mboya Street and especially in between Kenyatta Avenue and Haile Selassie Avenue being the government seat and corporate capital for multinational companies, prestige shops and hotels.

Also, the African government decided to locate several ministry headquarters on the hill, an area associated with the affluent white social class and an area difficult to access by the ordinary Kenyan citizen. The strategy however recommended that it would be undesirable for the central area to serve purely prestige functions and should attempt to include low cost shopping which would serve the majority of workers in the area and serve to add richness to the central area.

Nairobi's climate falls along the highland zone and like any other tropical upland region it is characterized by high radiation, often with moderate cool air. The temperatures rarely exceed 30^0c. The hottest and coolest months, February and July conditions still fall under the comfort zone (Fig. 4.11). There are however under heated times when radiation is needed for comfort conditions to be achieved.

The psychometric chart indicates that during the hottest and coolest months conditions fall under three different zones (fig. 4.11). These include the conditions within the comfort zone, the under heated zone where passive solar is essential; and the overheated zone where various methods may be applied to achieve comfort conditions including high mass cooling and evaporative cooling.

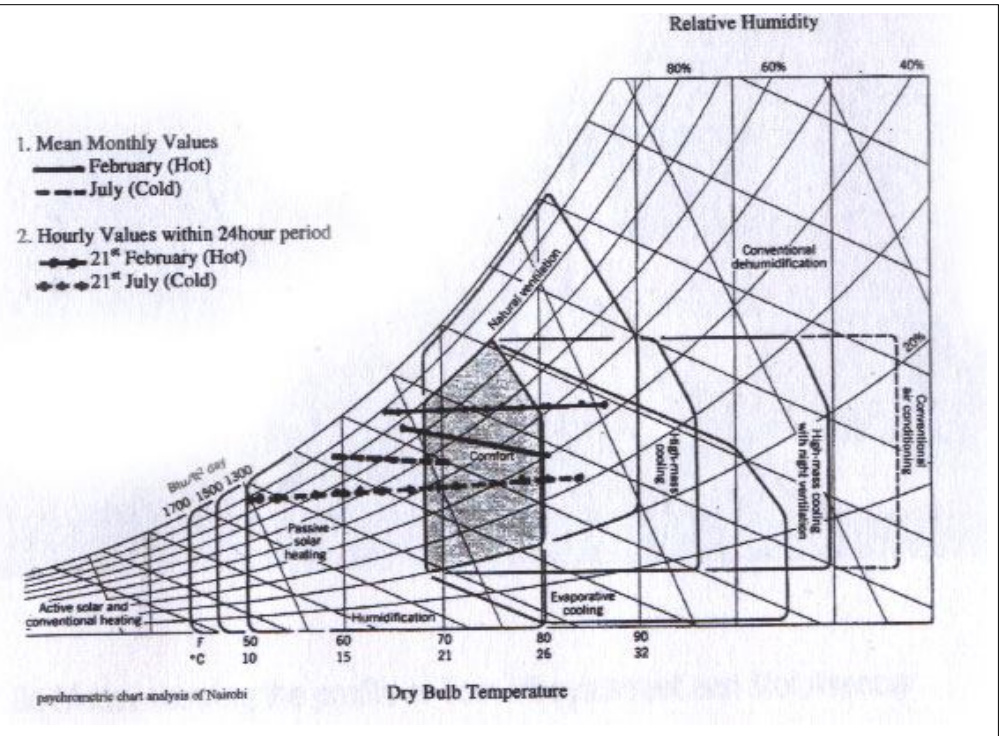


Fig. 4.11: Psychometric chart of Nairobi. From *Discerning Urban Design Elements in Nairobi's C.B.D (*unpublished thesis*)*, by Munyua, 2002, University of Nairobi.

4.4 Conclusion

This chapter discussed the study area. It presented the history of Nairobi's planning from the years 1905 to 2000. The 1905, 1927 and 1948 plans immediately related to issues that were considered important then. The plans followed a top – bottom approach as they were not informed by those whom the plans were meant for. Designing for the woman was not explored. The 1973 strategy was no different, despite the increase of women in Nairobi during the post-independence period. The next chapter presents the Urban design factors that influenced women's choice of route of movement.

CHAPTER FIVE

5.0 FINDINGS

This chapter presents Urban Design factors that were responsible for the respondents' choice of route of movement. This data was gathered from the survey and the field. It discusses the relationship between Urban Design street elements and women's choice of route. The data is presented in form of table, graphs, photographs and figures. An analysis of the reliability of the data using the Alpha scale revealed an overall value of 0.8437. The data has high reliability (Hinton, Brownlow, McMurray and Bob, 2004).

5.1 Urban design factors

The table below presents a summary of the Urban Design factors that influenced women's choice of route of movement. The first column shows the Urban Design factors. The second column represents further breakdown of the Urban Design factors. The third column indicates the respondents' tally for each of the sub-factors, while the fourth column represents the total tally of the sub-factors that relate to the corresponding Urban Design factor. The last column is the total frequency expressed as percentage. Fig. 5.0 illustrates the most used and least used streets from the route analysis.

Urban Design Factor	Sub-factors	Freq.	Total Freq.	%
Land uses	presence of School	15		
	presence of hawkers	17		
	presence of office / work	27		
	presence of Automated Teller Machine / bank	41		
	Presence of Exhibition shops	66		
	Presence of eateries and Café	54		
	presence of other shop	14		
	Presence of Park	10	244	**26.73**
Eyes on the street	hawking activities on the street	70		
	presence of other people on the street	102		
	presence of public transport along route	6	178	**19.50**
Semi-fixed features	presence of seats	29		
	signage	64		
	presence of trees and canopy shade	46	139	**15.22**
Transparency of spaces from street	-	110	110	**12.05**
Length	-	38	38	**4.16**
Visibility along route	use of landmark buildings	97		
	use of statues and monuments	33	130	**14.24**
Openness of street	-	74	74	**8.11**
Sum				100.00

Table 5.0: Urban design factors influencing choice of route of movement, by Author, 2010

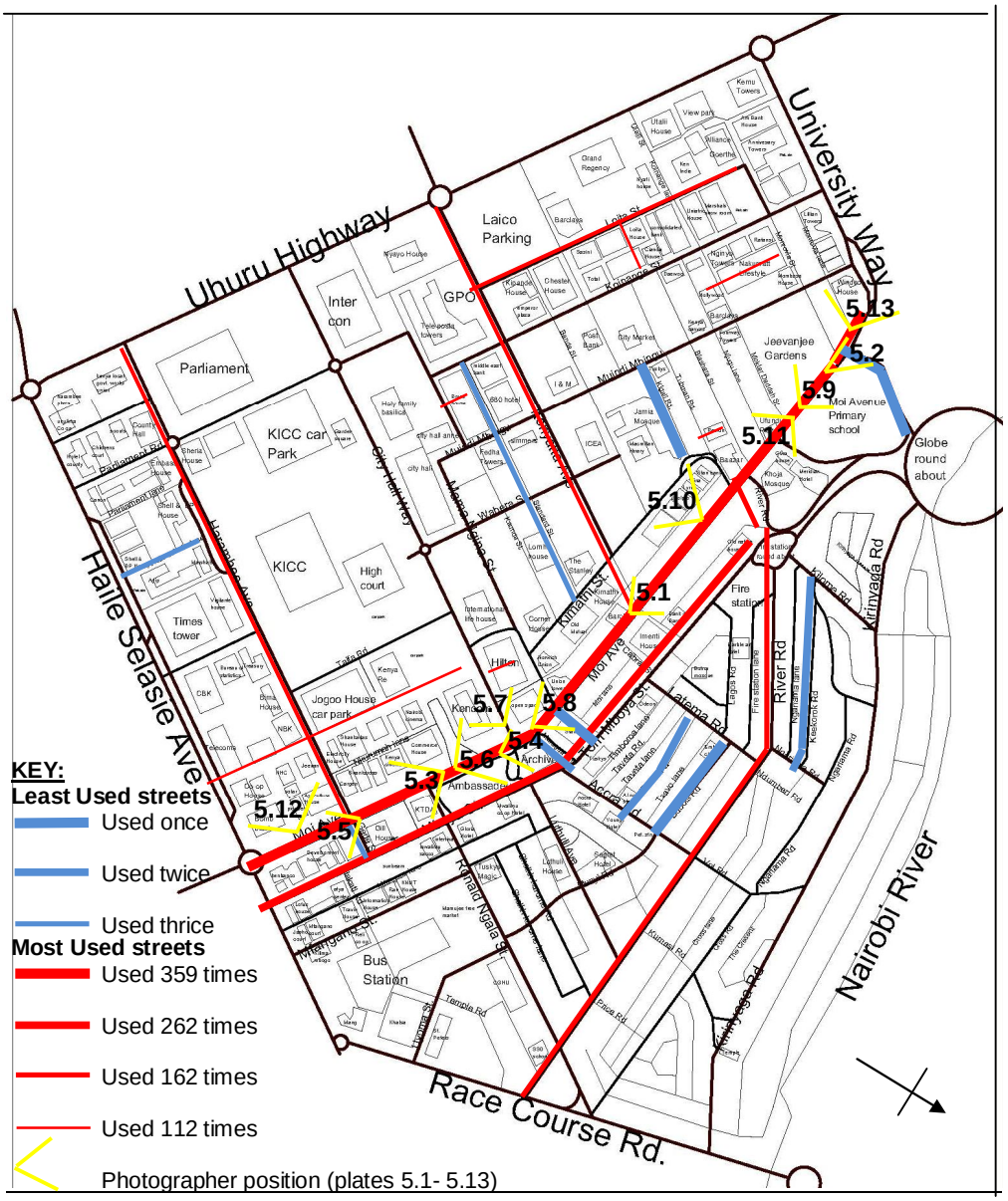


Fig. 5.0: Nairobi C.B.D map showing the 7 most used streets and streets used 1, 2 or 3 times. From [Adapted from] *City of Nairobi map*, by JICA and G.o.K, 2005, Nairobi: Survey of Kenya 1000.

5.2 Land uses

According to table 5.0, building uses along the street play an active role in determining pedestrian and women's presence along the street. 27% of the respondents were attracted to the routes by building uses. Of all building uses, exhibition shops and eateries and cafes were most predominant constituting 49% of all building uses (fig. 5.1). These uses keep the street active as they invite walk-in or walk-by traffic.

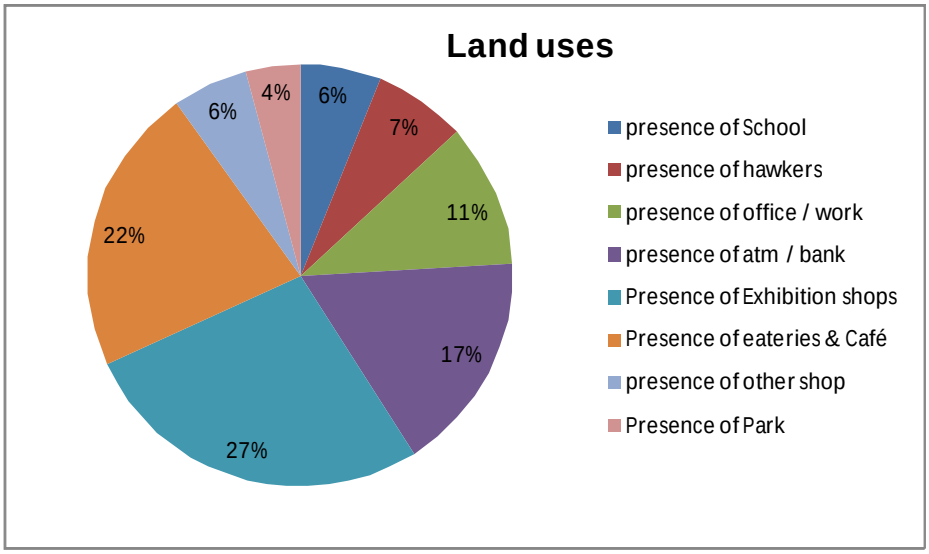


Fig. 5.1: Breakdown of building uses influencing choice of route, by Author, 2010

An observation study of building spaces along the most commonly used street (as derived from the respondents) shows that on the ground floor, uses which invite walk-in and walk by traffic including exhibition shops, eateries, clubs, fast food shops, supermarkets and a cinema hall comprise 60% of all ground floor uses (see fig. 5.2).

Incidentally, areas of the street adjacent to such spaces have high pedestrian presence and flows.

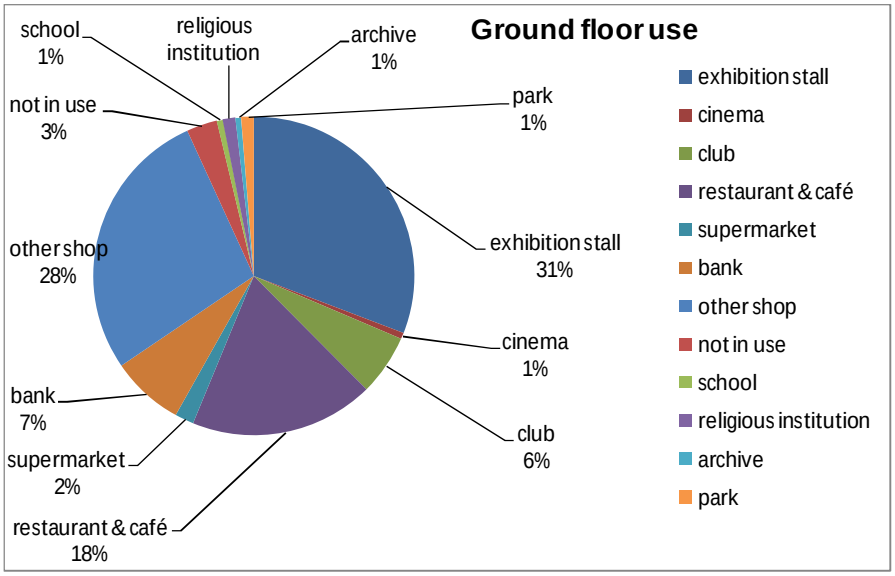


Fig. 5.2: Land uses influencing choice of route, by Author, 2010

For example, the area in plate 5.1 has an average pedestrian density of 80 women per minute during peak periods. In contrast the space in plate 5.2 which lacks activities that invite pedestrian traffic has an average of 5 women per minute during a similar period.

Plate 5.1: Vibrancy near stall along Moi Avenue, by Author, 2010

Plate 5.2: Little pedestrian presence at a section of Moi Avenue, lacks pedestrian oriented activities, by Author, 2010

A factor contributing to the thin pedestrian flow is as shown in plate 5.2 is the presence of the Central Police Station staff quarters and Moi Avenue primary school which do not offer activities immediately relating to pedestrians. The Salvation

Army building too, located in the vicinity has no activities opening to the street. In addition, the current construction along the road has reduced human traffic in the stretch.

In contrast the high pedestrian flow as shown in plate 5.1 is explained as follows. The block of which the scene in plate 5.1 is part of, depicts a section of the street in which few of the buildings having been reconstructed from the colonial days. Several buildings have been converted to stall type bazaars as opposed to the previous single-building-single-shop format that existed before - increasing the density of activities here. Many of these stalls open directly to the street. In this block of the street, 73% of the ground floor uses are those that invite walk-in or walk-by traffic such as fast food shops, restaurants and entertainment spots most of which remain open 24 hours as well as and stalls which open till about 9.30 p.m. These uses play a major role in making the street an ideal route to use.

5.3 Eyes on the street

'*Eyes on the street*' refers to surveillance opportunities on the street. 20% of the respondents attribute choice of route of movement to this factor. Eyes on the street includes the following elements; hawking activities on the street, presence of other people on the street and the presence of public transport along the route. This is depicted below.

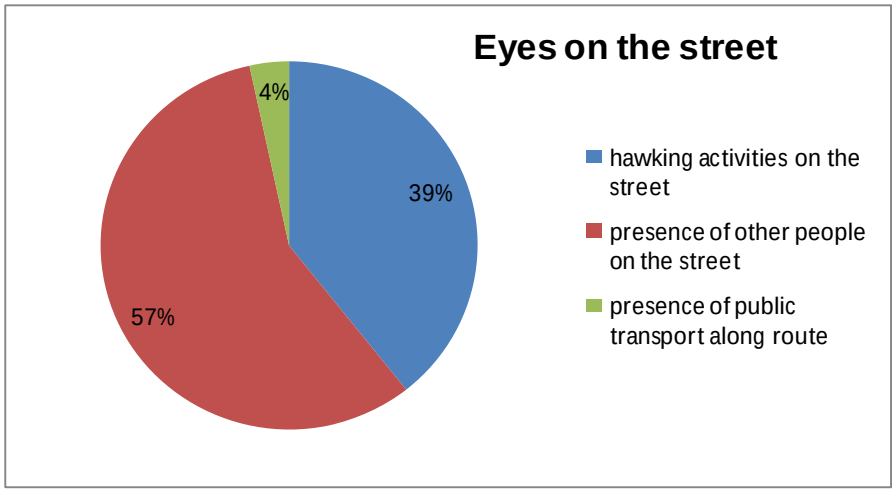


Fig. 5.3: Eyes on the street and its influence on choice of route, by Author, 2010

Observation finds that the pedestrian zone directly next to the buildings has the most women moving and window shopping on the street (Plate 5.3). This zone has the following characteristics.

i. In most cases, is sheltered by the building canopy,

ii. has spaces or shops the women can look into or interact with,

iii. has hawkers, newspaper and confectionary vendors displaying wares.

These aspects ensure higher pedestrian movement. On the other hand, the pedestrian zone directly next to the road has more women standing, chatting or waiting (Plate 5.4). The close proximity to the road for those waiting for a vehicle, the shelter offered by the trees as well as support offered by railings, provide an attractive place for bystanders in this part of the pedestrian zone. In areas where there was ongoing construction or hoarding, the pedestrian flow as well as women's' pedestrian presence was significantly low.

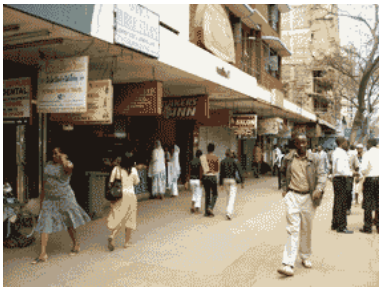


Plate 5.3: Greater pedestrian movement and window shoppers in zone next to buildings on Moi Avenue, by Author, 2010

Plate 5.4: Pedestrians cluster under a tree as they wait on Moi Avenue, by Author, 2010

Such spaces lacked opportunities women could interact with, human presence and shade from trees or the building canopy (plate 5.5).

Plate 5.5: Hoarding forces pedestrians to use road, by Author, 2010

Plate 5.6: Intense movement and activity along the Ambassadeur terminal, by Author, 2010

Directly off the street are three bus terminals; Gill house, Kencom and Ambassadeur. The three bus stages and the nearby areas have intense movement and activity, an aspect that provides surveillance to the street and encourages use as a route (plates 5.6 and5.7). The street serves as a major pick-up point for matatu passengers (plate 5.8). This makes the street convenient to use and increases the vibrancy of the street into the night, keeping its users relatively safe due to the increased surveillance.

Plate 5.7: View of Kencom terminal, by Author, 2010

Plate 5.8: Matatus along the street, by Author, 2010

The street acts as an edge between the C.B.D and downtown Nairobi. The majority of public transport termini are located in downtown Nairobi. The vibrancy the street exhibits can also be attributed to the fact that it is used as a transit route by pedestrians from the C.B.D seeking to access matatu and bus transport at various termini in downtown Nairobi.

Hawking activities play a role in providing human presence on the street. Apart from newspaper and confectionery vendors located in the pedestrian zone directly next to the building, the street also has hawkers who begin selling their wares after 5p.m. after businesses have closed. The nature of their activities enables the street to be busy during daytime and into the night. This is makes the route attractive to the women.

5.4 Transparency of spaces from the street

This factor is closely related to the previous one (Eyes on the street) and accounts for 12% of the respondents' choice of route of movement. Transparency refers to the ability of users on the street to interact with the building's spaces adjacent to the

street. The degree of openings and materials on the building edge define how transparent the spaces are.

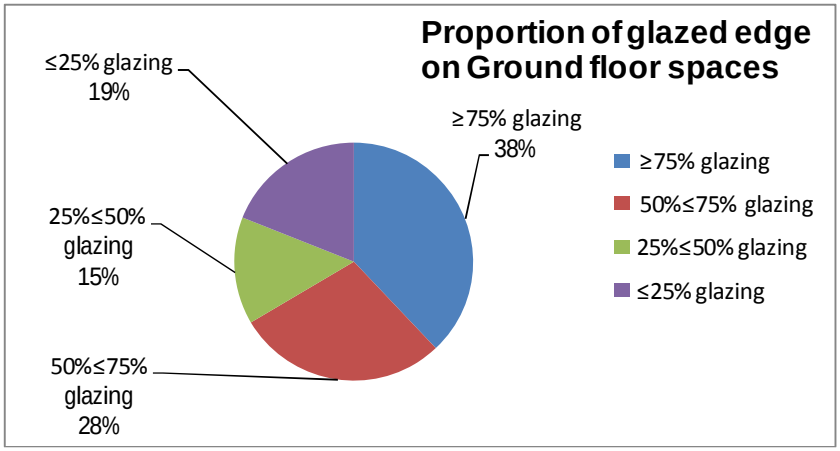


Fig. 5.4: Proportion of glazed edge on ground floor spaces, by Author, 2010

The observation study reveals the following. 40% of spaces on the ground level have 75% or more glazing on their edge. 30% have 50-77% glazing, 10% have 25-49% glazing while 20% of spaces have less than 25% glazing on their edge (fig. 5.4).

The building use on the ground floor spaces is associated with the transparency of the space. Exhibition shops, supermarkets, eateries and cafes and other shops use the most glazing and are most transparent to allow visual access to passersby in order to attract business. Some of these spaces such as exhibition shops open directly to the street (Plate 5.1). Pedestrians can window shop, inspect displays and have contact with people inside the spaces. Sections of the street lined with such uses, show much higher pedestrian flow and densities as well as presence of women.

Conversely, banks, schools, parks, religious institutions, archives, spaces that are not in use and spaces where is hoarding (plate 5.5), lack openings or use opaque

materials on their edge. Their edges are least transparent. Jeevanjee Gardens, for example is enclosed with a hedge. This limits the visibility of the park from the street. This makes the street portion outside the park as well as the park unsafe especially after dark. The same scenario is evident across the park at the Moi Avenue primary school whose fence limits visibility from the street into the spaces in the school. Both street sections and their environs record low pedestrian flow (plate 5.9). In the pedestrian lanes such as the one shown in plate 5.10, there is extremely low pedestrian flow and presence of women. Such lanes lack openings on the edges, and to compound the problem, use opaque materials. In these cases, such spaces lack interest and opportunities women can interact with hence discourage use in a route.

Plate 5.9: Low pedestrian flow outside Jeevanjee gardens, by Author, 2010

Plate 5.10: Low pedestrian flow in pedestrian lane path, by Author, 2010

5.5 Semi- fixed features

From the respondents' responses, semi-fixed features account for 15% of their choice of route of movement. The most notable semi-fixed features influencing route-choice are signage, seats, street trees and canopy shade (fig. 5.5). As noted previously, observation shows that the pedestrian zone directly next to the buildings had the most women moving and window shopping on the street (Plate 5.3).

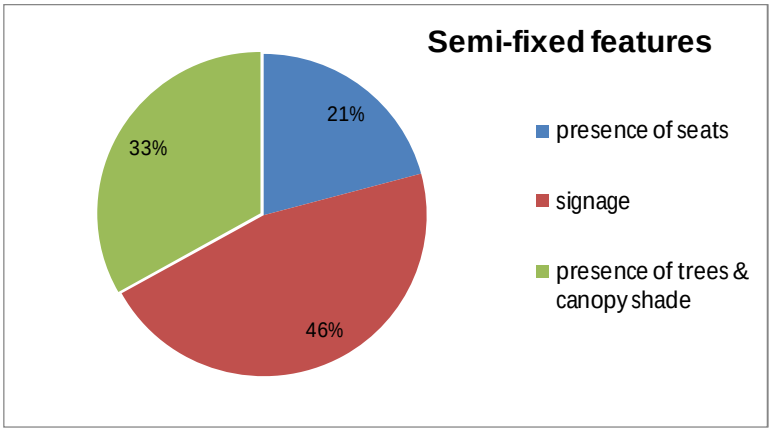


Fig. 5.5: Influence of semi-fixed street features on choice of route, by Author, 2010

Sheltered areas beneath the canopy provide shade necessary for the pedestrians' and hawkers' thermal comfort.

In the pedestrian zone directly next to the road where there are more women standing, chatting or waiting, the shelter offered by the trees provides shade for bystanders (Plate 5.4). Shaded areas along the street are in the form of canopies and street trees. Out of the total of 75 buildings located along the street, 66 of them (88%) have a canopy (fig. 5.6). Out of those interviewed, 33% of the 15% attributed presence of shade as a reason for their route-choice (fig. 5.5). However, in the case of Ufundi building with a canopy at two levels above the street, contributes little to the pedestrian sense of shelter (Plate 5.11).

The presence of street benches accounted for 21% of the responses on semi-fixed features (fig. 5.5). The use of street benches was observed in areas where pedestrian flows are higher.

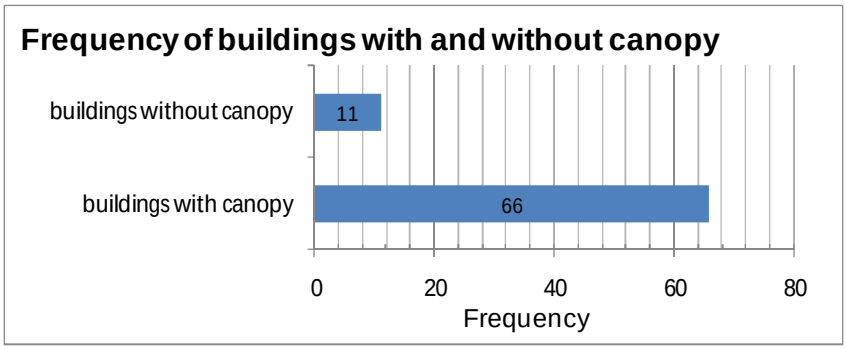


Fig. 5.6: Frequency of buildings with and without canopy, by Author, 2010

Plate 5.11: Canopy at Ufundi building fails to provide a sense of shelter, by Author, 2010

Plate 5.12: Seating around green open space near the memorial park, by Author, 2010

Along the entire length of the street there are three locations with street benches. Two such locations are high traffic areas and its benches are fully occupied for longer periods throughout the day (see plate 5.12 for example). The third located near a construction site (plate 5.13) had fewer people sitting on its benches and would do so for for a relatively shoter period of time. Fig. 5.7 shows the mean time spent by those siting in both locations. Signage along the route accounts for 46% of the semi-fixed features used to guide choice of route of movement.

5.6 Visibility along route

Visibility is the ability to draw sightlines to an object.

Plate 5.13: Benches near construction site, by Author, 2010

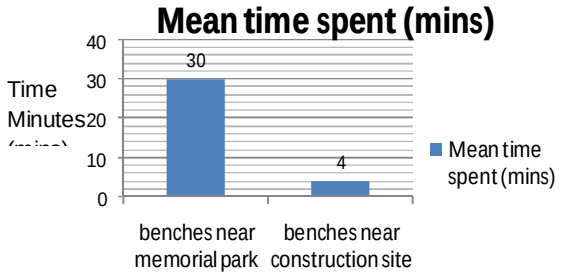


Fig. 5.7: Mean time spent sitting on benches near memorial park and construction site, by Author, 2010

According to table 5.1, visibility of landmark buildings and statues and monuments along a route accounts for 14% of the respondents' choice of route of movement. Fig. 5.8 shows the contribution of the two factors.

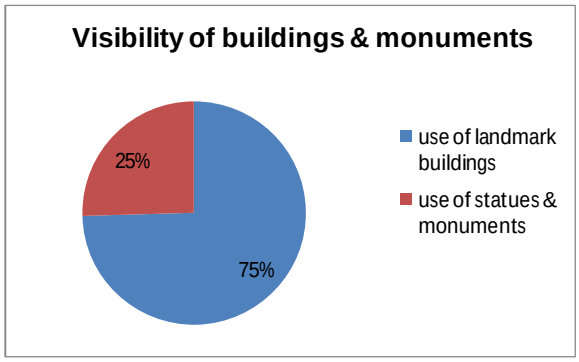


Fig. 5.8: Influence of visibility of buildings and monuments on route-choice, by Author, 2010

5.7 Openness of the street

Openness refers to the degree of enclosure of a space. It is measured by the street distance – height of building ratio (D/H ratio). Openness of the street is given for 8% of the respondents' choice of route of movement. Table 5.1 below shows the building height street width ratios along the street. The ratio varies from 1:0.6 – 1:12.8, showing some sections are tending to be claustrophobic while others are

extremely open. Most sections are within comfortable ratios of 1:1 – 1:4. Figs.5.9 - 5.15 below shows sections A-A to G-G as shown in table 5.1.

Section	Distance (width)m	Bldg Ht 1 (m)	Bldg Ht 2 (m)	D/H Ratio 1	D/H Ratio 2
Section A-A	47	72	27	0.6	1.7
Section B-B	47	18	21	2.6	2.2
Section C-C	47	18	27	2.6	1.7
Section D-D	38.5	3	9	12.8	4.2
Section E-E	24	30	6	0.8	4
Section F-F	24	6	6	4	4
Section G-G	24	48	9	0.5	2.6

Table 5.1: Building height –street width ratios along Moi Avenue, by Author, 2010

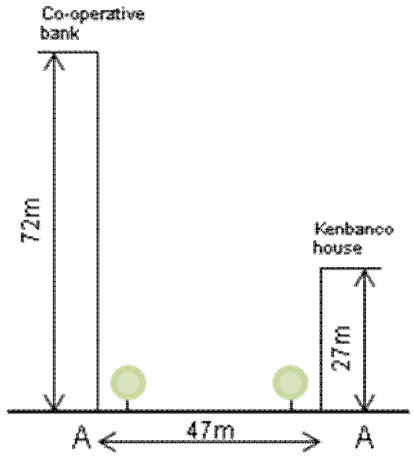


Fig. 5.9: Section A-A, by Author, 2010

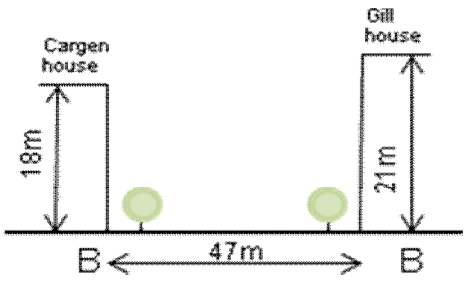


Fig. 5.10: Section B-B, by Author, 2010

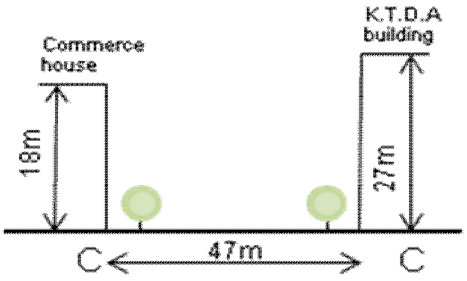


Fig. 5.11: Section C-C, by Author, 2010

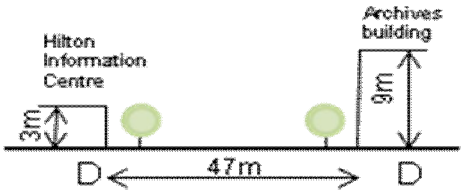


Fig. 5.12: Section D-D, by Author, 2010

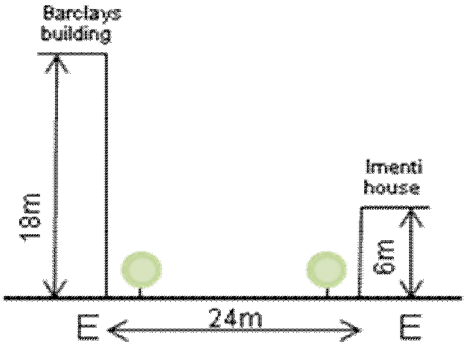


Fig. 5.13: Section E-E, by Author, 2010

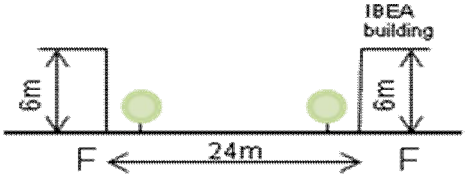


Fig. 5.14: Section F-F, by Author, 2010

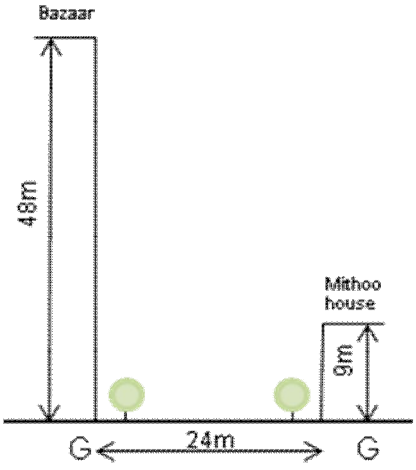


Fig. 5.15: Section G-G, by Author, 2010

Table 5.2 below shows the building height street width ratios for pedestrian lanes found off the street. More women are observed walking in the lanes with D/H ratios of 1:0.4 and upwards, whilst for those with ratios of less than 1:0.4, there is extremely low pedestrian flow and presence of women. Besides being highly enclosed, the lanes with the lowest flows and women's presence lack openings, use opaque materials and lack activities opening out to them. Such spaces are claustrophobic (Ashihara, 1970), lack interest and opportunities women can interact with hence discourage use in a route.

Lane	Width (m)	Bldg Ht 1 (m)	Bldg Ht 2 (m)	D/H Ratio 1	D/H Ratio 2
1	6	18	18	0.4	0.3
2	3	45	6	0.1	0.5
3	2.5	6	6	0.4	0.4
4	2.5	6	6	0.4	0.4
5	2.5	6	9	0.4	0.3
6	2.5	9	6	0.3	0.4
7	2.5	6	6	0.4	0.4
8	2.5	6	6	0.4	0.4
9	2.5	30	6	0.1	0.4
10	2.5	6	6	0.4	0.4
11	1.8	3	12	0.6	0.2
12	2.2	6	21	0.4	0.1
13	1.8	3	24	0.6	0.1
14	2.2	27	3	0.1	0.7
15	2	6	12	0.3	0.2
16	2	24	6	0.1	0.3
17	2	9	6	0.2	0.3

Table 5.2: Building height –street width ratios of lane paths off Moi Avenue, by Author, 2010

Concerning enclosure, the respondents preferred scenes that were quite open. The more the scenes became enclosed, the less they preferred them. The most disliked scenes are those that are extremely enclosed (Fig.5.16).

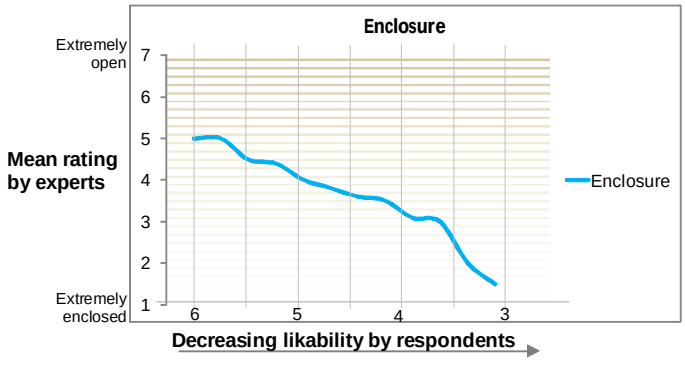


Fig. 5.16: Enclosure: Trend of likability, by Author, 2010

5.8 Length of route

4% of the respondents indicated that choice of route of movement is dictated by the length of the route with preference for the perceived shortest route. Regarding the same, all the respondents showed preference for quite short routes. As the length of the street in the scenes increased, preference also decreased, showing that extremely long streets are unpopular (Fig.5.17).

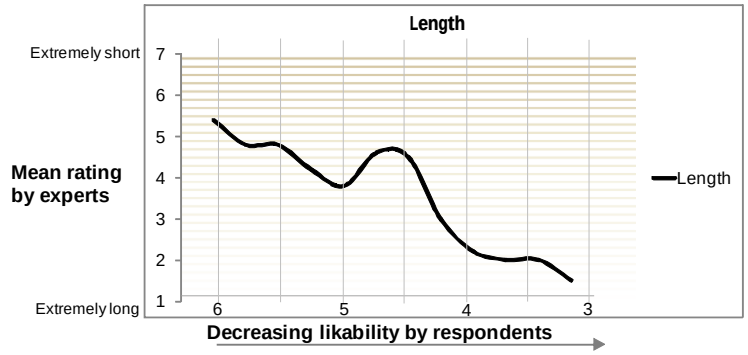


Fig. 5.17: Length: Trend of likability, by Author, 2010

5.9 Complexity, Linearity and Environmental variables

Regarding complexity, the respondents showed preference for moderately complex scenes. As complexity increased, preference also increased. However, once the scenes began to be very complex, preference for such scenes waned (Fig.5.18). The graph approaches Nasar's inverted U curve.

On linearity, the respondents prefer scenes with elements of linearity and deflection (4.0 rating). As deflection increased, preference also increased until the point where the scenes became very deflected. After this point, the likability of the scenes took a downward turn (see Fig.5.19).

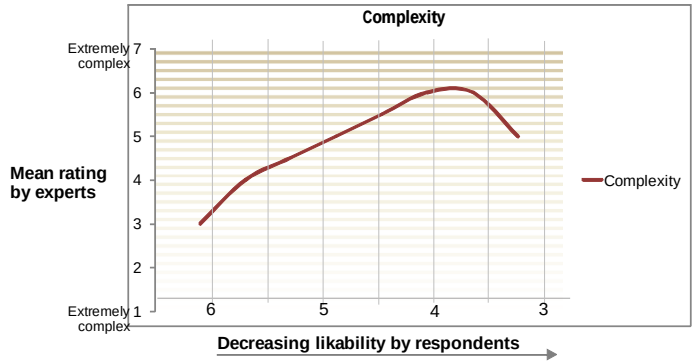


Fig. 5.18: Complexity: Trend of likability, by Author, 2010

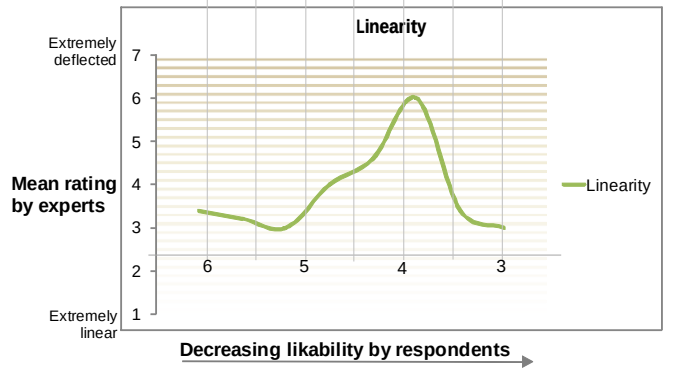


Fig. 5.19: Linearity: Trend of likability, by Author, 2010

In summary, the subjects' response to street scenes reveals that the most preferred are those that are moderately complex, moderately linear, moderately enclosed and quite short (Figs. 5.16 - 5.19). On the other hand, scenes least preferred by the respondents are very complex, very linear, very enclosed and very long (Figs. 5.16 - 5.19).

Regarding environmental variables, the streets scenes most liked by women were those with naturalness, order and upkeep. Both indoor and outdoor streets were liked. This analysis shows the respondent's appreciation of order which is as a result of upkeep as well as an appreciation of naturalness which is as result of the

incorporation of natural elements such as water and vegetation. On the contrary the scenes that were disliked most were characterized by disorder, being extremely crowded as well as extremely desolate. Disorder was in the form of dilapidated and littered areas. The respondents associated these with breakdown of social controls or fear of crime.

5.10 Conclusion

The following variables influence women's choice of route of movement in Nairobi C.B.D: the social life of the street including surveillance opportunities; the transparency of spaces from the street; the constituent land uses, the visibility of buildings along the route as well as semi -fixed features, notably, street trees, canopies and signage. Other variables are enclosure of the street, the length of the route and its measure of complexity and linearity. Naturalness and order too, impinge on choice of route of movement.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

The primary objective of this study was to investigate Urban Design factors that influence women's choice of route of movement. The findings of the study, the implications it has for theory, research and practice as well as the conclusions are discussed in this chapter.

6.1 Findings

The following factors influenced women's choice of route of movement.

- **Land uses**

Building uses along the street determine pedestrian and women's presence along routes at various times of the day and night and throughout the seasons of the year. Uses that are attractive to pedestrians are those that invite high pedestrian flows most of the time, as they offer activities immediately relating to them, thereby encouraging use. Passive uses attract lower pedestrian densities and at specific times of the day. A variety of uses is important in order to sustain both necessary and optional activities (Otoki, 2002).The reason why Nairobi C.B.D streets become desolate at nighttime is because residential functions are lacking.

- **Eyes on the street**

Pedestrians feel safe in the street when there are other people present and when there is the absence of social ills and litter. Routes leading to termini contain high pedestrian traffic providing surveillance on the route. Balconies with active uses, indoor activities with windows and doors to the outdoors, hawkers on the street and public transport along the route, provide overlook to the street, and discourage vices

on the street. This is consistent with Jacobs's as she proposes continuous users and activity in sidewalks to encourage people to watch (Jacobs, 1960). The degree of accessibility of spaces affects the presence of people in the urban space and consequently potential of movement. This agrees with Gehl, that pedestrians are attracted by spaces with people and tend to avoid deserted spaces (Gehl, 1996).

- **Semi-fixed features**

Sheltered areas beneath the canopy as well as high crown street trees provide shade necessary for the pedestrians' thermal comfort. Shaded areas encourage pedestrians' lingering presence due to this comfort and hence is a factor for women's' route-choice. Seats on the route provide resting areas for pedestrians. However, as the findings show, the vicinity where they are located matters. Environments that are repulsive to pedestrians such as dusty locations or indoor spaces with no human contact with the outdoors discourage human gathering. Much as such features influence women's choice of route of movement, their role is supportive.

- **Visibility along route**

Buildings, statues and monuments along a route aid the subjects in way finding and orientation. This is explained by Lynch's concept of '*Imageability*' which is determined by the visual arrangement of elements (Lynch, 1960). Imageability is a key element in the evaluative image and thus a factor in determining choice of route of movement of women.

- **Transparency of spaces from street**

Treatment of building shop fronts adjacent to the street influences activities and the life on the street. Pedestrian lanes which in most cases have blank walls and shops fronts treated with opaque materials, limit the contact pedestrians on the street have

with the building; resulting in loss of interest and consequently lack of pedestrians outside the building. Railings and fences around the buildings and open spaces also reduce pedestrian presence in the pedestrian zone of the street adjacent to the building or open space. A series of such spaces in succession results in an inactive street that lacks a social environment, a factor that discourages its use and is a less preferred route.

- **Openness of street**

The building height / street width ratio affects route-choice as it influences pedestrian comfort. Extremely narrow streets such as the pedestrian lane are less preferred by them. Moderate street enclosure produces feelings of comfort as one does not feel lost or overwhelmed in the space (Ashihara, 1970). Thus the proportion between the building volume and the street width are determinants of choice of route of movement.

- **Length**

A substantial number of the women's routes were used because they were perceived to be short. This concurs with Cullen, in which he discourages long, straight routes. He advocates for routes that are broken into segments so as to encourage people to pay attention to the changes along the way and not to the overall length (Cullen, 1971).

- **Linearity**

Linear streets provide certainty about information ahead and feelings of security while deflected ones add interest to the route (Cullen, 1971). The subjects preferred routes with both aspects. Berlyne, Mandler, Wohlwill, in Nasar, 2001, explain that defected vistas create involvement. Appleton's *theory of prospect-refuge*, in which

settings with places from which to see, along with places in which to hide, or which can be easily defended, offer vantage points for survival.

- **Complexity**

Moderately complex street scenes with a number of different elements and those with distinctiveness between those elements are preferred. Compared with main streets, pedestrian lanes, which in most cases have blank walls, lack complexity. This explained by Kaplan and Kaplan in Nasar, 2001 where they say complexity like mystery (as in a defected vista) as creates involvement.

- **Environmental variables**

Preference for certain routes is influenced by order, upkeep and naturalness. Order is brought about by unified elements and clarity. It is an ingredient of the evaluative image which determines route-choice behaviour. Naturalness, an aspect that requires human intervention in urban settings, provides beauty. The three factors in strengthen an environment in settings where the appropriate has already been created.

6.2 Theoretical Implications

Vibrant streets are used by different people for a variety of activities. Currently the streets are often designed primarily for one group or for a particular function such as walking or driving. However, in order to remain lively, the routes should be designed with a balanced mix of different user groups and activities. This is in line with study's results that a mix of uses attracts pedestrians and consequently women.

Fixed, semi-fixed and non-fixed elements on the street affect the physical, psychological and social environment surrounding the pedestrian. For example street trees provide a shaded environment and comfort from the sun to the pedestrian. In the design of the external fabric especially at the ground floor level, care should be taken in order to create a social connection between the street and building. Ground floor spaces of buildings designed with shops with displays and transparent glazing ensures increases building – street interaction, improves surveillance on the street and discourages unsociable behaviour thereby making it attractive to women. The higher the degree of accessibility of spaces the greater the potential of movement. Location is paramount. Prominent buildings and spaces along routes, such as landmarks and monuments provide orientation to the pedestrian and serve as nodes for human activities.

The building height to width ratio requires cautious manipulation. Pedestrians readily notice changes in spaciousness and appreciate spatial definition. As was found in study, women's avoidance of pedestrian lanes has to do partly with its D/H ratio. In instances where building height must increase, compensation must be given through the widening of the street to optimum comfort levels to the pedestrian. Also scaling elements can be adopted to reduce the impact of tall or monumental buildings and spaces. Once the appropriate environment has been created, semi-fixed features such as seats encourage people to not only use a route but remain there longer. This implies the need to provide clear signage and well designed street elements.

High vehicular traffic volume and speed are largely responsible for restricted use of routes. Such routes discourage social contact among users. As far as possible the comfort, safety and social contact should be encouraged on streets. The use, access and participation on streets by pedestrians rather than cars can be probed through design. Incorporation of soft and hard landscaping, water and other natural elements clean the air, buffer noise and add to visual relief. Pedestrians value them as was found in the study and introducing them to street environments helps create greater user comfort and satisfaction.

6.3 Research Implications

The research sought to study Urban Design factors that influence women's choice of route of movement. Survey type of research approach was applied in the research. Given that the respondents were to be interviewed just before boarding a vehicle at the termini, this posed a challenge as they were in a hurry to get to where they were going. In order to gain their interest they were introduced into the interview by mapping the route they used. Once this was done they became curious about the interview, making it relatively easier to conduct. The final part of the interview involved rating street scenes which played a significant role in sustaining their interest till the end. Non-participant observation was carried out to reinforce some of the respondents' responses, and to witness firsthand how they interacted with the street. The method allowed the process to be unobtrusive since the subjects were unaware that they were being watched.

6.4 Practical Implications

The streets in the study area are characterized by persistent domination by vehicles - traffic and parking. The situation is largely attributed to the unattractive Public Service Vehicle (P.S.V) which has largely lost to small private vehicles destined for the C.B.D. The private cars are parked from morning to evening taking up valuable ground space that would have been used by the pedestrian. As such pedestrians are congested in the paved areas, since they are secondary users of the street.

Owners of private vehicles should be encouraged and facilitated to leave private cars at designated park and ride facilities located conveniently along the key transits to the C.B.D. This will free the C.B.D of most of the low carrying capacity private vehicles. Removal of most on-street parking along the streets could be done, and where there are currently public car parks replacement with multi-storied car parks. The freed up spaces can be partly converted and utilized for dedicated bus routes and designated bus stops within the C.B.D and for the pedestrian. From the designated bus stops, pedestrian ways can be designed to different parts of the C.B.D to give a range of alternatives with emphasis on the pedestrian. With appropriate design techniques targeted to calm speed of traffic, drivers are likely to choose lower target speeds desired by pedestrians (Butterworth, 2000).

As the pedestrian walks on the street, their attention should be captured by a mix of businesses and commodities. Along the streets on the ground floor especially, shop fronts ought to have transparent windows for displaying merchandise. Buildings with blank façades, visible mechanical equipment and those with dead uses should not be

placed on the ground floor along the street but rather hidden from view of the pedestrian.

In the Nairobi C.B.D most government buildings set back from street (Fig. 6.0). Such are not able to relate to the pedestrian making the street to be detached from the building. It would be desirable to have the buildings in close proximity to, or directly contiguous with the street (Fig. 6.1).

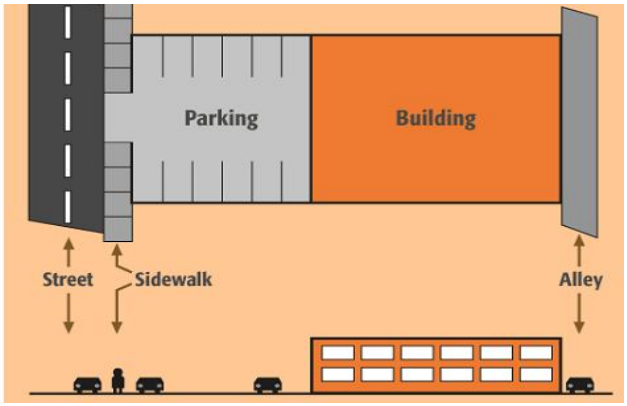


Fig. 6.0: Relation of the street to building in Most Nairobi CBD government buildings. From [Adapted from] Sucher D. (2004, September 23). City Comfort [Online forum comment]. Retrieved from http://citycomfortsblog.typepad .com/cities/ on 22 Jan 2010.

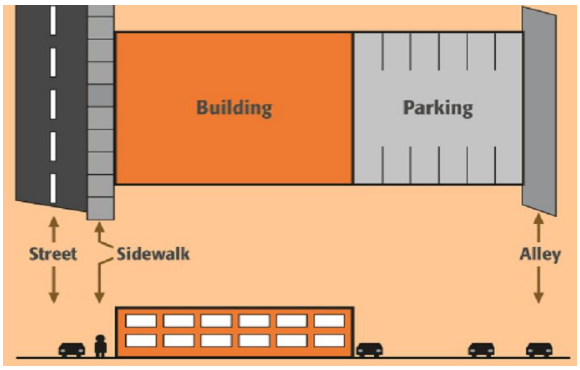


Fig. 6.1: Relation of the street to building: What is desired. From [Adapted from] Sucher D. (2004, September 23). City Comfort [Online forum comment]. Retrieved from http://citycomfortsblog.typepad.com/cities/ on 22 Jan 2010.

Focusing on pedestrian movement also implies that along the routes, surfaces with complexity and interesting elements that have an apparent ordering are to be used. Given that pedestrians have a mean walking speed of 1.2 - 1.4 ms^{-1} small details such as textures are more noticed than are large ones. Thus the scale of the elements that are introduced to the street should respect them. In addition, the streetscape amenities ought to include distinct facilities that enhance the pedestrian character.

6.5 Conclusion

The following were the objectives and research questions in the study.

Research objective 1: To determine Urban Design factors influencing women's choice of route of movement.

Research question 1: What Urban Design factors influence women's choice of route of movement?

The study found that women's choice of route of movement is a product of mix of land uses, the social environment and surveillance opportunities on the street, visibility of buildings along a route, transparency of spaces from the street and semi - fixed features including seats, street trees, canopies and signage. In addition, openness of the street, length of route, moderately complex and linear streets, upkeep, order and naturalness are important variables determining choice of route of movement.

Research objective 2: To list the Urban Design factors in order of priority.

Research question 2: What is the weight of each of the factors?

Urban Design Factor	Total Freq.	%
1. Land uses	244	27
2. Eyes on the street	178	20
3. Semi-fixed features	139	15
4. Visibility along route	130	14
5. Transparency of spaces from street	110	12
6. Openness of street	74	8
7. Length	38	4

Table 6.0: Urban design factors influencing choice of route of movement, by Author, 2010

Research objective 3: To establish whether there is a relationship between Urban Design factors and women's choice of route of movement

Research question 3: Is there a relation between Urban Design factors and women's choice of route of movement?

Uses that offer activities immediately relating to pedestrians encourage use; while passive uses attract lower pedestrian densities. Routes with other people present attract women as opposed to desolate ones. Routes leading to termini contain high pedestrian traffic providing surveillance on the route. Balconies with active uses, indoor activities with windows and doors to the outdoors, hawkers on the street and public transport along the route, provide overlook to the street, and discourage vices on the street. Shaded areas and seats encourage pedestrians' lingering presence in appropriate locations. Buildings along a route aid the subjects in way finding and orientation. Spaces with blank walls and shops fronts treated with opaque materials, limit the contact pedestrians on the street have with the building; resulting in loss of interest and consequently lack of pedestrians outside the building. Also, the

proportion between the building volume and the street width are determinants of choice of route of movement.

6.6 Recommendations

Women are more likely to visit and walk in places they judge as safe and pleasant, and to avoid places they perceive as unsafe and unpleasant. If ways can be found to make streets safer and more pleasant, then it is likely that pedestrians will enjoy walking in them.

1. To achieve the safety objective, functions and uses that generate street activity should be incorporated in the policy, planning and design of streets (plate 6.0). Creating lines of movement to termini on the routes. It also improves accessibility of blocks which make it relatively more secure.

*Plate 6.0: A*ctive functions on lower levels of buildings improves the social life of the street, by Author, 2010

2. The design of the building edge abutting the street requires visual connectedness, so that street users can communicate with the block. The building edge especially at the ground floor level should have active uses, have a high degree of openings in glazing or displays (plate 6.1). Thus people in the buildings on the block can also have visual contact with those on the street. Building uses should be

encouraged to flow into the street so that the streets become extensions of buildings wherever possible.

Plate 6.1: A high degree of openings on the lower levels of buildings visual contact between the street and the buildings, by Author, 2010

3. The projected pedestrian volume and width of the street are desirable dictates of the maximum Plot Ratio rather than economic returns as is the case at the moment. The increasingly taller buildings that are replacing the older shorter ones without corresponding increase in street width have negative consequences on perception and route-choice behaviour. Policies that incorporate the above two factors are desirable.

4. In cases where buildings must be higher the dictates of the projected pedestrian volume and width of the street, upper levels should be setback from street level façades or adopt an angular plane to minimize effects of tall buildings on the street users (plates 6.2 and 6.3).

5. Streets should be adequately lit both during the day and throughout the night, to encourage night time activities on the street. Since the perception of safety is lowest after dark, this will also encourage women to venture out after darkness sets

in. In streets where there are sections with poor visibility where danger lurks such as dark spots and blind corners, should be remedied to increase the degree of visibility.

Plate 6.2: Building setbacks and angular plane façades to reduce effect of building height on the street, by Author, 2010

In streets where there are sections with poor visibility where danger lurks such as dark spots and blind corners, should be remedied to increase the degree of visibility. For the street floor, levels should be made even and dangerous holes such as uncovered utility pits sealed. The street form should be linear with some degree of deflection incorporated where possible.

6. Physical incivilities in the form of litter, disorder, dilapidation, graffiti and abandoned buildings which function as cues to social disorder should be corrected. Understanding the underlying causes of the physical incivility which exists should be the first step. This way, the remedy measures can last.

7. Fast moving vehicular traffic is a concern for safety for women. Since streets currently incorporate vehicular and pedestrian traffic, there is greater need to reduce the impact of the vehicular traffic on pedestrians for their safety. Pedestrianizing streets can be considered (plate 6.4).

Plate 6.3: Pedestrian paths improve levels of accessibility to the street; however policy to improve their enclosure is needed. Such improvements will enhance lines of visibility, by Author, 2010

8. Fast moving vehicular traffic is a concern for safety for women. Since streets currently incorporate vehicular and pedestrian traffic, there is greater need to reduce the impact of the vehicular traffic on pedestrians for their safety. Pedestrianizing streets can be considered (plate 6.4). The scale of pedestrianization will have to be determined depending on the street in question. Also adopting traffic calming measures that will significantly reduce the speed of vehicular traffic within the C.B.D can be weighed against the previous recommendation (plate 6.5).

9. Comfort is essential to the route-choice of women. The most important comfort factors in question were the ease to move and the feeling of security. Pavement surface should be even. Materials specified for the floor surface should bear in mind the shoes worn.

Plate 6.4: Pedestrianization of street can incorporate one way movement for cars and the rest of the space previously taken up cars (other lane and parking) reverting to the pedestrian, by Author, 2010

Plate 6.5: Changes in pavement finish, material, colour and texture to signal pedestrian crossing points to motorists, by Author, 2010

10. Comfort is essential to the route-choice of women. The most important comfort factors in question were the ease to move and the feeling of security. Pavement surface should be even. Materials specified for the floor surface should bear in mind the shoes worn.

11. The location and placement of street elements should be set off the street, to ensure free pedestrian flow.

12. In streets where building uses impose greatly on the street by producing and attracting many pedestrians such as retail spaces, the pavement width should be greater to absorb greater pedestrian densities without compromising comfort level.

However care should be exercised so that the street does not lose its sense of enclosure.

13. Landscaping on the streets and incorporation of elements such as water and plants contribute order to the street. They reduce the built effect and are an ingredient that influences route-choice.

6.7 Areas for further Research

Urban Design factors strongly influence women's choice of route of movement. By carefully manipulating them, the use of certain routes can be encouraged or discouraged. The study focused on one gender. Further research on the other gender can be considered. The study found safety to be an important aspect determining route-choice. A further study to investigate safety, crime and the physical environment can be done to complement this one.

PART TWO

CHAPTER SEVEN

7.0 RESEARCH PROJECT: REMODELLING OF KIMATHI STREET

Streets are an important part of the urban landscape. It is here that people move, meet with other pedestrians, convey goods, shop and do so much more. Streets are the most prevalent of public spaces; essentially every parcel of land abuts one or more streets. Over the years, there has been a burgeoning interest in their design and that of the public realm.

Many urban planning, land use and zoning regulations have consequences for the three- and four-dimensional quality of cities and their components including streets and city inhabitants. Modernist policies, which characterize our urban space today, segregate the city into distinct zones linked by a system of motorways requiring mobility by means of the car. As a result the city has become sterile, lost its sense of scale and its cultural vitality and the pedestrian whom the city was meant for, has to contend with this situation.

Increased plot ratios, prescribed in our planning policies coupled with developers' motivation of profit have resulted in tall buildings and canyon effects being experienced on the streets. The size of the streets has not matched the growing urban population. With limited public resources, improvements to infrastructure are mainly focused on highways leaving streets to deteriorate. Policies which promote office spaces in the C.B.D make the area lively by day but desolate by night. Urban Policy Formulation can engage these and other broad issues of urban design to achieve

public benefits. The concerns are not only with controlling development but also with providing developers with incentives to build in particular ways or provide specific facilities. This report presents an intervention involving the formulation of policies aimed at improving the street. The report includes women's' issues in the street in order for it to be attractive for other users of the street.

7.1 Problem Statement

Kimathi Street sits on what used to be a part of Aga Khan Walk, a pedestrian walk that stretched all the way from the Railway Station to initially the Norfolk Hotel and later to Jeevanjee gardens. The walk cut across various roads and avenues as it meandered through the C.B.D, but was unique in that it was specifically a pedestrian walkway. However, over the years, changes in the political and economic landscape led to a series of events, the result of which is that only a part of walkway remains - the portion between the Haile Selassie Avenue and City Hall Way. The present character of the street is oblivious of the history and significance of the initial walkway.

The Kimathi Street portion of Aga Khan Walk is a stark contrast to the walk. Tall buildings have replaced the older shorter ones resulting in high volume of vehicles generated by the buildings along the street as well as by through vehicular traffic. Vehicles occupy 85% of street in form of on-street parking and moving vehicular traffic.

Pedestrians compete with vehicles on the road where they are forced to walk on due to high pedestrian densities experienced on the pedestrian pavement. The pavement size has remained the same over the years despite facing greater pressure due to increase in population and pedestrian traffic. On-street parking blocks views from across the street and are an eye sore. There is a great demand for parking spaces by taxi operators as they form a considerable share of the parking on the street. There are 7 nodes located along the street. Namely at the points where the street meets Mama Ngina, Kaunda and Standard streets, Kenyatta Avenue, Banda Street, Kigali and Tubman roads. This makes it a busy street within the C.B.D with the nodes having increased vehicular and pedestrian activity. Crowded pedestrian density is witnessed at 5 of these nodes.

Along the lower levels of the buildings along the street, there is predominance of passive building uses. These do not encourage pedestrian interest. The upper levels accommodate commercial and office uses. Lack of residential uses, has led to desolate buildings by night. Both factors contribute to the presence of long stretches of street with no activity. The use of opaque materials, blank walls and opaque corporate branding by most shops along the path at street level limits interaction between the pedestrian and the building resulting in faster walking speeds.

The pedestrian lanes along the street require intervention. They are extremely enclosed with few or no openings; they are poorly lit and filthy. This has resulted in fear of use especially by women due to their claustrophobic and unsafe nature.

Women friendly amenities are lacking along the street, for example pedestrian scaled lighting, children's washrooms and seating areas. Abandoned vending kiosks alongside the path obstruct movement and poses security risk for women especially at night.

Previous attempts by the C.C.N in 2004 to improve the street have not been successful (Mugo, personal communication, September 1, 2010). Policy changes that require densification has been the emphasis. This report documents and analyses the Urban Design factors of Kimathi Street and presents policy and design guidelines in enhancing the street.

7.2 Objectives

- To document the Urban Design elements of Kimathi street.
- To provide design guidelines and policies for the remodelling of Kimathi street.

7.3 Research methodology

Kimathi Street forms the case study of the exercise. The data is gathered from the field and the library. Data from the field is collected along Kimathi Street. Data from the library involves a review of literature. The study has applied various data collection methods. Along the street, measurements are taken to capture characteristics of the street such as the width and height along the street. Other measurements involving pedestrian walking speeds, pedestrian flow and pedestrian densities are also collected. The inquiry has involved observation of behaviour in the

use of the street and physical traces left behind after use by pedestrians. The checklist has facilitated data collection. Techniques used to record data include photographs, annotated diagrams and sketches.

7.4 Study Scope

The study is limited to Urban Design issues. The study is focused on Urban Design factors of Kimathi Street which includes its historical development, building uses, heights, material usage, street amenities, activities, circulation, typology and street morphology.

7.5 Significance of the study

Attempts were made six years ago to improve the state and functioning of Kimathi Street. The improvements were initiated by the Nairobi Central Business District Association (N.C.B.D.A), as part of their ongoing programme – 'The Nairobi We Want', and was supported and facilitated by other organizations and stakeholders including the C.C.N and property owners. Their intervention aimed at dealing with two major aspects about the street; that of security and congestion. Both aspects were never tackled fully as consensus amongst its stakeholders was not reached. This project makes a further inquiry that continues this initiative providing a way forward to improving the state and life of the street.

Presently, women have a greater say on household budgets and how money for family is utilized; decisions such as, where they shop, places they visit are increasingly being made by them and as such there are gains to be made in ensuring

women's issues in the street are addressed. Women friendly streets are bound to create streets that are comfortable and safe for women; they will be safe for other sections of the population too, thereby cater for the wider population. Such streets are likely to attract more shoppers and remain active for longer periods hence increase revenues for business owners.

7.6 Organization of the Study

The study is divided into four chapters. Chapter seven introduces the study, defines the problem, gives the research methodology, the significance and the scope of the study. Chapter eight presents documentation of policy guidelines for the case studies. Chapter nine presents the inventory of existing conditions of Kimathi Street. Chapter ten presents the Urban Design guidelines for the street by summarizing the problems identified, vision, mission and objectives of the program, the guiding principles then finally the policy statements.

CHAPTER EIGHT

8.0 CASE STUDIES

This chapter presents case studies from which lessons can be learnt.

8.1 First Street, downtown St. Charles City, Illinois

The vision of the redevelopment guidelines for First Street was to encourage the expansion of the kind of environment at the Main Street into downtown St. Charles City where activity was less intense, development along the street sparse, auto-centred and turned its back to Fox River and obstructed views to the river. On the contrary, the patterns of development along Main Street indicate rich architectural heritage, respect for natural features and sensitivity to pedestrian comfort. The goals of the strategy were to:

1. Promote development that provided for the public's enjoyment of continuous waterfront activities;
2. Preserve architectural and historical integrity;
3. Promote a pedestrian-friendly, pleasant and safe environment;
4. Promote a 24-hour environment featuring a variety of land uses;
5. Offer family oriented activities for all ages and incomes.

In order to increase the intensity of activity, mixed use for buildings along the street is recommended, with *a*ctive retail occupying the street level (fig. 8.0). A minimum of 75% of street level space is recommended for active use such as retail, entertainment and dining uses. Flexible leasehold spaces are recommended for retail use in order to have a healthy mix of businesses. Buildings that are entirely

residential are proposed for the neighboring street off First Street. For buildings with a footprint greater than or equal to (≥) 10,000 square feet (sq. ft), courtyards with active uses facing the street are to be provided (fig. 8.1). In the upper levels of buildings, a sense of activity is proposed by creating exterior spaces for occupants such as usable balconies, terrace or, rooftop gardens.

Fig. 8.0: Dining uses in Main Street, from http://www.1ststreetstc.org on 1 Sept. 2010.

Fig. 8.1: Courtyards oriented to pedestrian uses, from www.urbancincy.com on 3 Sept. 2010.

In order to preserve the small town and pedestrian character of the street, policies to create structured parking facilities for the bulk of parking needs are proposed at midpoints of blocks, using the least amount of driveway area possible, or the rear yards of new development (fig. 8.2). Such structures follow principles that apply to the human scale. Shade requirements for on-street parking are outlined and limits to the size of new parking lots set.

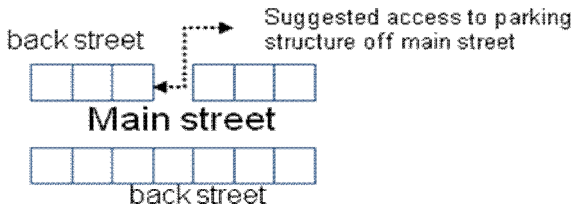


Fig. 8.2: Suggested access to parking structure, by Author, 2010

The guidelines propose policies which ensure view corridors along the street leading to Fox River terminate at the river; not at a building so as to maintain significant sight lines and protect important view sheds (fig. 8.3).

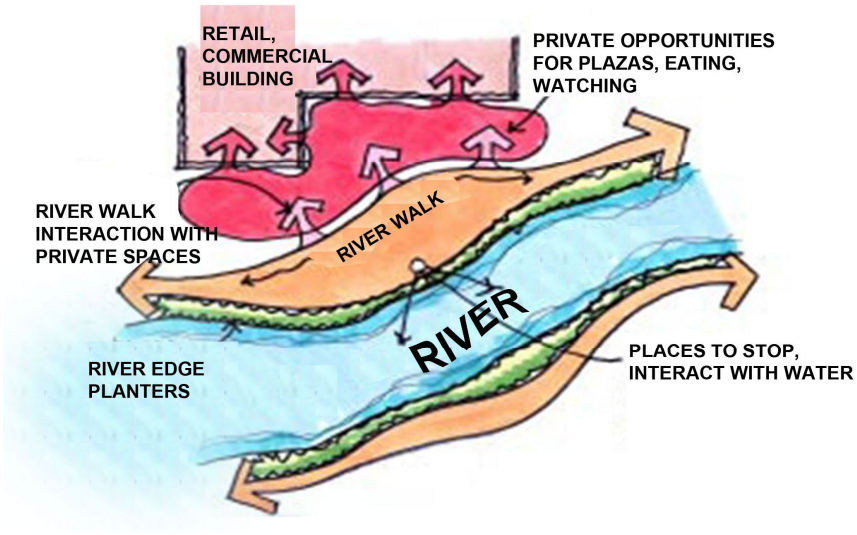


Fig. 8.3: Proposed orientation of publicly accessible side of buildings toward Fox River, from http://www.1ststreetstc.org on 1 Sept. 2010.

The policies encourage development of streetscape enhancements that blend the public and private realm such as pedestrian-scaled lighting and a series of smaller spaces as opposed to large singular spaces.

In order to foster pedestrian movement and activity, there are policies that protect the pedestrian from intrusions by cars and those that necessitate the provision of elements that offer comfort for pedestrians as they move through the First Street district. Such include:

- Reinforcing primary pedestrian movement corridors with wayfinding devices such as special pavements (fig. 8.4)., signs, graphics
- Providing protection for pedestrian zone (bollards, large planters) where parking is forbidden along a street;
- Placing utility functions underground (fig. 8.5);

Fig. 8.4: Special paving and bollards for pedestrian corridors, from www.urbancincy.com on 3 Sept. 2010.

Fig. 8.5: Utility boxes constrains free pedestrian movement, from www.commons.wikimedia.org on 3 Sept. 2010.

- Exploring pedestrianization on heavily pedestrian intersections to eliminate pedestrian-vehicle conflicts;
- Providing overhead cover (arcades, canopies) for pedestrians;
- Design lower levels of buildings with pedestrian scale;

Policies that require buildings be oriented toward zones of pedestrian activity and to First Street are specified. In keeping with the character of the river valley, buildings of 2 -4 stories are to be developed, with stepped backs at the fourth floors from street level façades. Also, the use of earth tones or muted colors in buildings, is encourages so that no building stands out of the natural landscape of the valley; as such brick and stone as dominant materials in a building are highly encouraged.

8.2 South Elm Street, Greensboro City, North Carolina

The street corridor consists of properties ranging in condition from abandoned to actively used developments. The former mostly comprised industrial uses. The vision of the urban design guidelines was to revive and integrate the street corridor into the city, develop an approach for sustainable brown field reuse and to create new business opportunities for reinvestment. Their goals included:

1. Forging connections to neighbourhoods around the area;
2. Creating safe, ecologically responsible and economically viable area.
3. Reusing historic buildings to preserve character of district, add value to new developments.

In order to enhance links of South Elm street corridor to other neighbourhoods, policies for adequate sidewalks to support pedestrians and cyclists were given; for improved crossings at street intersections to reduce barriers between neighbourhoods as well as a greenway linking the East-West areas encircling the area proposed (fig. 8.8).

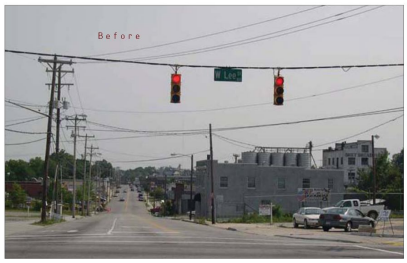


Fig.8.6: Situation of section of the street before, from http://www. southelm street.com/project-overview on 1 Sept. 2010.

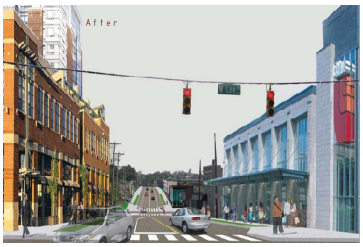


Fig. 8.7: Planned transitioning of section of the street, from http://www. southelm street.com/project-overview on 1 Sept. 2010.

South Elm Street was planned to transition to a mixed-use street, with its width modified over time to calm traffic and provide for more generous sidewalks (Figs. 8.6 and8.7). Tree planting and on-street parking to support retail, commercial, and future residential uses on the street were proposed. Appropriate screening (Fig. 8.9), dust control and paving of the gravel surfaces within the concrete plant facility were outlined to make it a “good neighbor” while still allowing it to operate profitably.

Fig. 8.8: Proposed greenway, from http://www.southelmstreet.com/project-overview on 1 Sept. 2010.

Fig. 8.9: Decorative fencing for the concrete plant, from http://www.south elmstreet.com/project-overview on 1 Sept. 2010.

Fig. 8.10: Adaptive reuse of a flour mill to a gallery, from http://www.southel mstreet.com/project-overview on 1 Sept. 2010.

A new wrought iron fence was to surround the cemetery to allow for views into the site. For industrial buildings within the corridor that were vacant or awaiting new uses or demolition, the policies recommended their preservation if they were structurally sound, iconic or if viable new uses could fit their shells. In order to contribute to the character of the corridor, offices, wholesale sales, and light manufacturing, were found to be appropriate adaptive reuses for these buildings (fig. 8.10). In case the market could not support appropriate reuse strategies, institutions were suggested in the interim, to avoid demolition.

Fig.8.11: Planned replacement of surface parking with retail structure (before), from http://www. southelmstreet.com/project-overview on 1 Sept. 2010.

Fig. 8.12: Planned replacement of surface parking with retail structure (after), from http://www. southelmstreet.com/project-overview on 1 Sept. 2010.

As upper floors of buildings are converted from vacant storage lofts into habitable spaces, additional parking was necessary for the district. As a result policies in the redevelopment strategy required removal of unsightly surface parking lots that interrupt the consistent line of shops and new retail or mixed-use structures put in their place (Figs. 8.11 and8.12). Below-grade parking was to be located where sloping sites allowed minimal excavation.

8.3 St. Lawrence Focused Area, Toronto, Canada

Situated in the downtown area along the former Toronto lakefront, a historical district, the vision of the urban design guidelines for the area was to improve the quality of the environment and to ensure that the elements that contribute to the

special character of the diverse parts of the area are retained and enhanced. Their goals were to:

1. Provide framework for appropriate relationships between buildings and the public realm;
2. Identify key opportunities to enhance, the public realm;
3. To promote a mix of uses which contribute to the vitality of the area.

For pedestrian streets, the policies propose reinforcement of the human scale, a vibrant street life including sidewalk cafes and spill-out retail activities, and pedestrian priority; also those that are predominantly commercial, transparency at the sidewalk, as well as awnings and canopies, for comfort and interest for the pedestrian. Narrower retail frontages are recommended on these streets together with signage appropriately scaled to the pedestrian.

Parking and loading areas are planned to be placed below grade where possible (fig. 8.13). As a general rule, loading and parking areas are required to be hidden from view, screened and located on roads with the least amount of pedestrian traffic. Access to parking and loading is prohibited at gateway sites and terminus of a view corridor unless they are incorporated into the design treatment of the building. Air intake and exhaust vents are to be located or screened to minimize any negative effects on the public realm. Certain blocks within the focused area consist of a significant number of commercial warehouse buildings that are slowly converting to accommodate a mix of uses. However, they often occupy their entire lot with little to no rear or side yard setbacks.

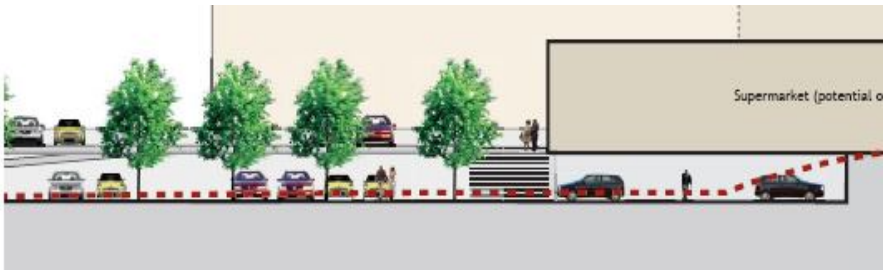


Fig. 8.13: Location of parking below grade, from http://www.toronto.ca/planning/urbdesign/st_lawrence.htm on 1 Sept. 2010.

For such, policies requiring side and rear yard setbacks are given to permit for mid-block access and greater sun penetration which creates porosity and more desirable building relationships where access and fenestration can occur. The newly created passages are to have the following qualities:

- high levels of transparency and active commercial frontages;
- sufficient width to permit sun penetration and outdoor spill-out activity;
- well lit;
- free of obstructions;
- signage and wayfinding tools to orient pedestrians;
- weather protection where possible.

The Plan requires that effective use of the physical environment and design measures which promote pedestrian safety and security be applied to the public and private realms. To facilitate physical and visual comfort of the pedestrian, the plan proposes a D/H ratio of 1:1 for optimum street enclosure, a consistent street edge height as well as above-grade setbacks to strengthen the quality of the pedestrian experience.

Higher densities and building heights within the area are directed towards areas along major arterial roads. There is an existing pattern of building heights in and around the focused area; there is a transition in the height of buildings from the

height peak zone through the Transition area down to low-rise area (up to 6 stories) where most of the focused area falls. This lessens the impact of height in the areas both physically and perceptively. Guidelines for angular planes and step-backs are given for proposed development within the focused area that exceeds the predominant height in order to have minimal visual impact from the perspective of the pedestrian.

Fig.8.14: Transition of building height from Peak area - Transition Ridge – low, from http://www.toronto.ca/planning/urbd esign/st_lawrence.htm on 1 Sept. 2010.

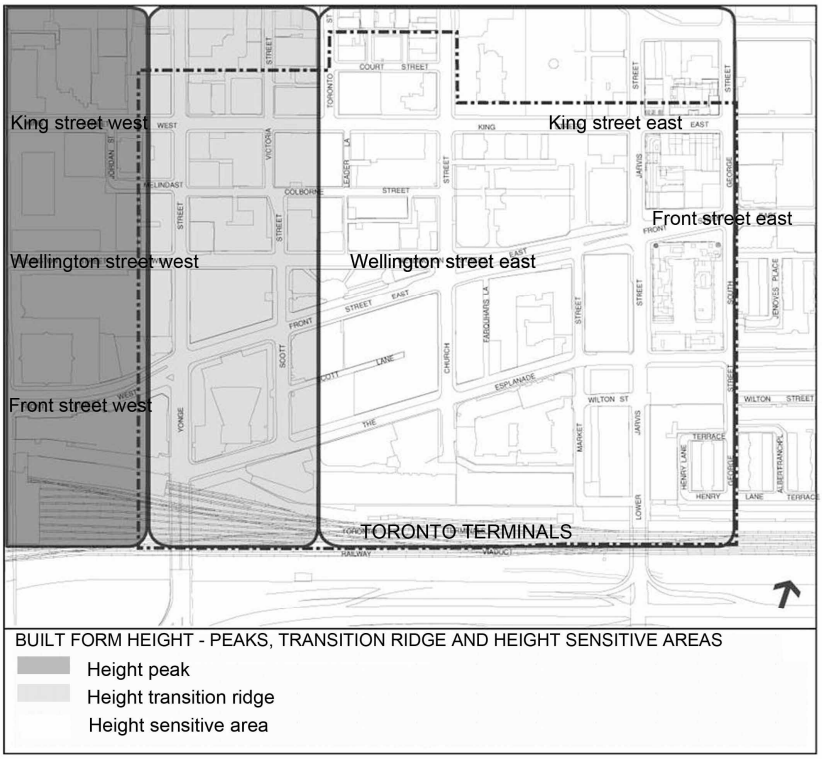


Fig. 8.15: Transition of building height from Peak area - Transition Ridge - low rise area, from http://www.toronto.ca/planning/urbd esign/st_lawrence.htm on 1 Sept. 2010.

CHAPTER NINE

9.0 KIMATHI STREET

Covering a length of about 330m, Kimathi Street, formerly known as Hardinge Street was an extension of the first class shopping district on Government Road (present day Moi Avenue). See location on figs. 9.0 and 9.1.

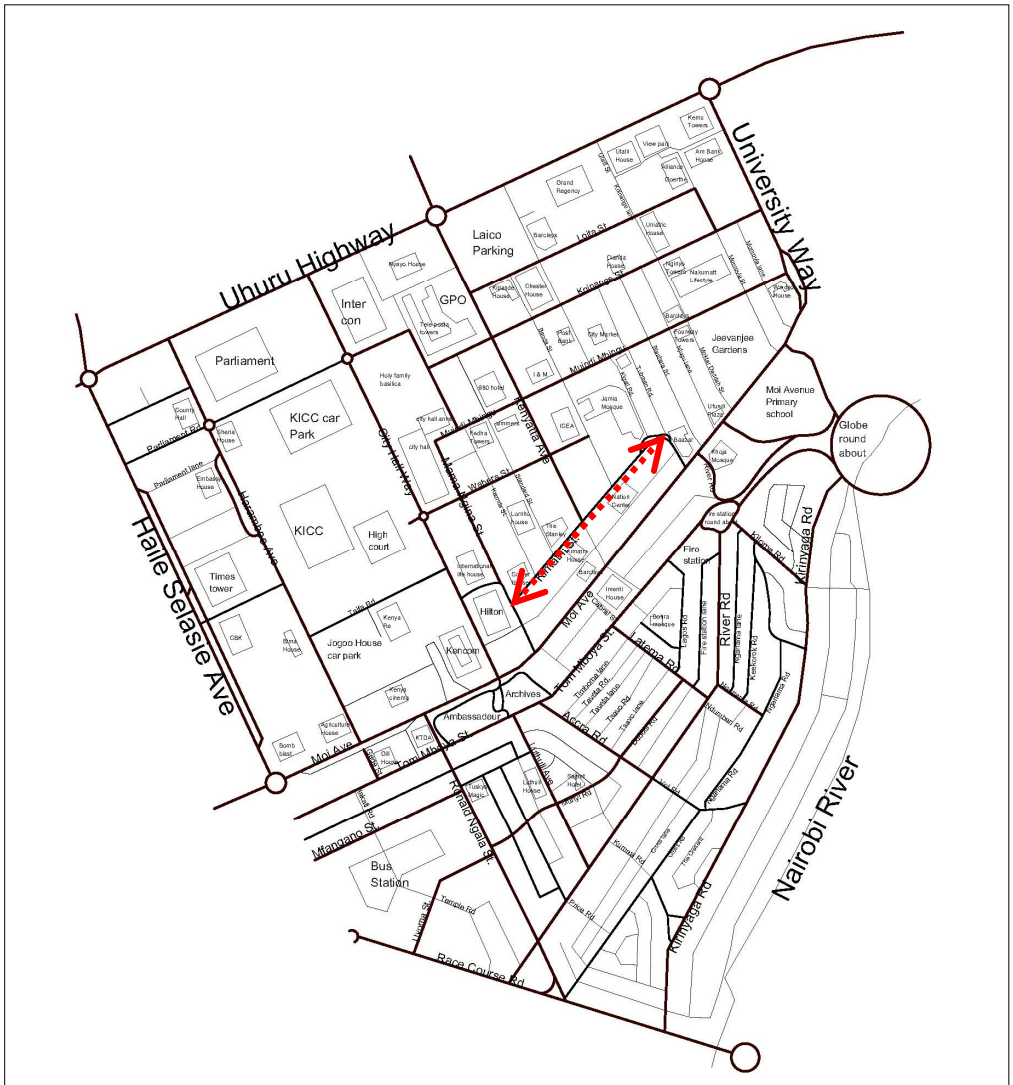


Fig. 9.0: City of Nairobi map showing Kimathi Street. From [Adapted from] *City of Nairobi map*, by J.I.C.A and G.o.K, 2005, Nairobi: Survey of Kenya 1000.

Fig. 9.1: Kimathi Street model, by Author, 2010

In addition to a full range of types of shops, this area included quality and specialty shops, selling such luxury and semi-luxury goods such as photographic equipment, gramophone records, books and imported quality clothing (Morgan, 1972). Presently, Kimathi Street it still is a shopping street with a mixture of commercial, office and recreational facilities.

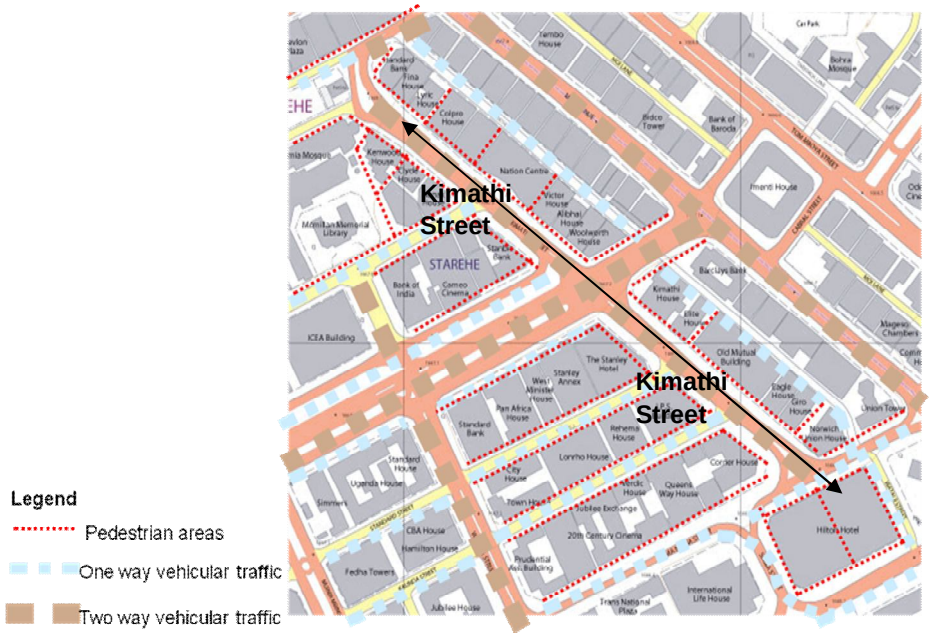


Fig. 9.2: Circulation along Kimathi Street, From [Adapted from] *City of Nairobi map*, by J.I.C.A and G.o.K, 2005, Nairobi: Survey of Kenya 1000.

The street is linear. It is clearly demarcated by two finishes: the area paved with concrete slabs and the tarmac area which accommodates the pedestrians and vehicles

respectively (fig. 9.2). The paved surface is on both side of the street and is partly covered by the building canopy. The tarmac area which is occupied by single lane two-way moving traffic and parked vehicles is centrally placed. Dividing the tarmac area in some portions of the street is a narrow raised paved island and edged with kerbs which separate vehicles as they move in opposite directions. It is also has services such as road lighting. These islands also serve as refuge spaces for pedestrians as they cross the road (plate 9.0).

From the Hilton hotel arcade (Plate 9.1) as one approaches Kimathi Street, the street feels sufficiently enclosed as the tall buildings such as Norwich Union and Canon House buildings are balanced by the neighboring lower story buildings, despite the fact that the taller buildings lack setbacks (Plate 9.2).

Plate 9.0: Aerial view of street looking towards Hilton hotel, by Author, 2010

Plate 9.1: Hilton hotel arcade looking towards the street, by Author, 2010

However, if all the buildings on the street implemented the current policy on 600% Plot Ratio as recommended by the (C.C.N), the resultant increase in building height, with building bulk concentrated in straight towers, will lead to canyon effect along the path.

Plate 9.2: View of street looking towards Hilton hotel, by Author, 2010

Plate 9.3: The Kimathi statue, by Author, 2010

The Kimathi statue located at the Kimathi Street – Mama Ngina node, is totally fenced off with a 1m high railing around it to deter pedestrians from coming into close contact with the statue, even though the artwork sits on paved island meant for pedestrians (Plate 9.3).

The blank façade and billboard on the Norwich Union building does not relate to the pedestrian, rather the driver. The right hand edge of the street leading up to the node where the street meets Kenyatta Avenue has a monotonous building line (plate 9.5). This coupled with the linearity of the street makes it comprehendible in one glance. On the left hand edge of the street, various streets joining Kimathi Street create breaks on the blocks (fig. 9.3). The IPS and New Stanley hotel buildings only have set back their upper floors from the street level.

Pedestrian movement occurs on the partly shaded pavement along the street edges. The floor finish is covered in flag stones resulting in a monotonous floorscape; the only exception is outside the New Stanley hotel building where interesting patterns

in cobble stones have been made (Plate 9.6). Moreover, women's shoes get stuck in the joints in the pavement.

Plate 9.5: View of street looking towards Hilton hotel, by Author, 2010

Plate 9.6: Change in floorscape at New Stanley hotel, by Author, 2010

Fig. 9.3: Street morphology shows streets creating breaks in the blocks, by Author, 2010

Slight increase in paved width is observed at the major nodes to cope with increased activity and pedestrian movement within such spaces. Increased pavement width ensures that increased pedestrian flow can be accommodated for pedestrian comfort. At the Kimathi Street – Mama Ngina node the average pedestrian flow was 200 ped. /min. (pedestrians per minute) while at the Kimathi Street – Kenyatta Avenue node it was 166 ped. /min. showing there is constrained movement. Vending booths at the latter node obstruct pedestrian movement. Loading and off loading of goods also takes place along the street, disrupting pedestrian use and flow along the path. Rigid buildings persist after the Kimathi Street – Kenyatta Avenue node (Plate 9.7) leading

up to the Tubman Road node. At this point the street widens to a double lane two-way street with 60^{0} angle parking.

Plate 9.7: View of street looking towards Nation centre, by Author, 2010

Plate 9.8: Sitting area at median near Tubman road node, by Author, 2010

As the street approaches the Tubman road it sharply changes direction and widens to accommodate a sociopetal sitting area at the median in the centre of the street (Plate 9.8). The sitting arrangement being at the centre makes it visible from the paved areas. The buildings around this node are low-rise (2 - 4 floors), hence gives the street a sense of open width. The sitting areas in the street are inadequate.

Plate 9.9: Use of reflective glass on recently building, by Author, 2010

Plate 9.10: Mix of tall and short building, by Author, 2010

The façade treatment of buildings along the street is predominantly paint on plaster (for 90% of buildings). The colour palette ranges mostly from white to the neutral. The most recently refurbished buildings that stand out in stark contrast to the others are those finished in glazing which in all the cases is mirror or reflective glass (Plate

9.9). As such, there is lack of interaction between the street and building at the upper floor levels due to the use of opaque materials for fenestration. The older colonial buildings on the street too have textured surfaces painted over hiding the original materials. 60% of buildings on the street have their entrances undifferentiated from the rest of the building making it difficult for pedestrians to identify them.

The street consists of a lively mix of new and older, and buildings of distinct architectural styles. However, policies on amalgamation (to increase the minimum plot size) and densification are resulting in bulky buildings which look out of place compared with the lower story and less bulky buildings that are adjacent (Plate 9.10 and fig. 9.4).The plot sizes currently range from 180m^2 to 1105 m^2. Most plot sizes are 300 m^2.

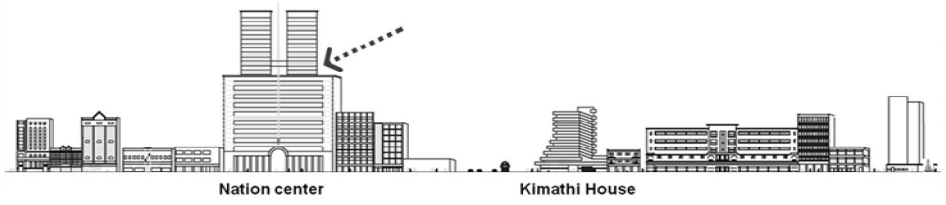


Fig. 9.4: Odd juxtaposition of Nation centre building, by Author, 2010

In general, the low rise buildings on the street counteract the overwhelming effects of the tall buildings, thus ensuring the street width – building height ratio remains comfortable (figs. 9.5 and9.6). The older buildings show attempts of scaling the building to relate to the pedestrian at street level. Notably are the Old Mutual and Elite buildings (use colonnaded canopy - Plate 9.11), Equity and CFC Stanbic house buildings (have openings that scale down the elevation) and Nanak house (horizontal slabs that scale down the elevation - Plate 9.12). The street has a number of

pedestrian paths in between the blocks providing quick access to the neighboring pedestrian Moi Avenue. The paths linking to the street had extremely low pedestrian flow. The height / distance ratio for the paths ranged from 1.5 at Giro house which is 3 levels and 29 at Nation Centre building which is 19 floors (Fig. 9.7).

The paths are extremely enclosed, making it difficult for sunlight to reach fearful to use to feelings of claustrophobia. The buildings flanking them lack openings and activities that relate to the path (Plates 9.13 and 9.14).

Plate 9.11: Colonnaded canopy on Old Mutual Building, by Author, 2010

Plate 9.12: Scaling elements on Nanak House, by Author, 2010

On the street level there is dominance of passive commercial banking uses adjacent to street level (Plates 9.15 and 9.16; figs.9.8 and 9.9). These do not offer activities immediately relating to pedestrians thereby resulting in fast walking speed. The average walking speed of a woman walking alone on the street was 1.4 m/s. The use of opaque materials, blank walls and opaque corporate branding by most shops along the path at street level limits interaction between the pedestrian and the building resulting in faster walking speeds.

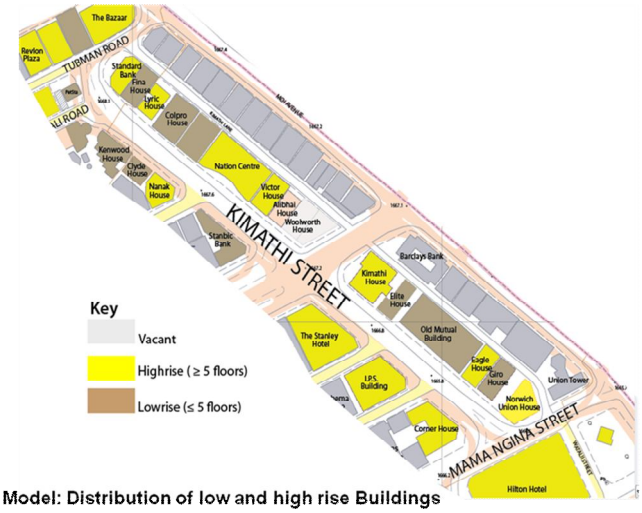


Fig. 9.5: Distribution of buildings by height along Kimathi Street, From [Adapted from] City of Nairobi map, by J.I.C.A and G.o.K, 2005, Nairobi: Survey of Kenya 1000.

Fig. 9.6: Distribution of buildings by height along Kimathi Street, by Author, 2010

Plate 9.13: No activities opening into the lane path, by Author, 2010

Plate 9.14: Extremely enclosed lane next to Nation centre, by Author, 2010

There is also lack of texture at the lower levels of buildings

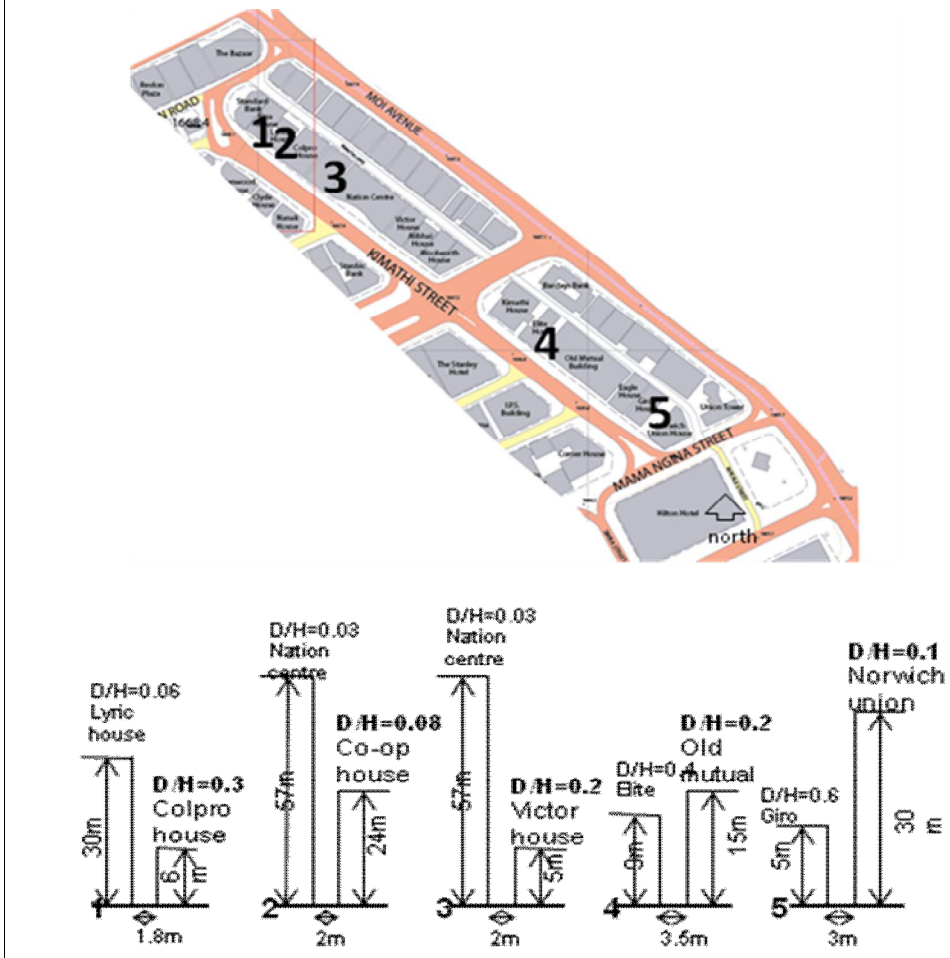


Fig. 9.7: D / H ratios of paths to Kimathi Street, From [Adapted from] City of Nairobi map, by J.I.C.A and G.o.K, 2005, Nairobi: Survey of Kenya 1000.

Plate 9.15: Lack of active uses on lower levels of buildings, by Author, 2010

Plate 9.16: Lack of active uses on lower levels of buildings, by Author, 2010

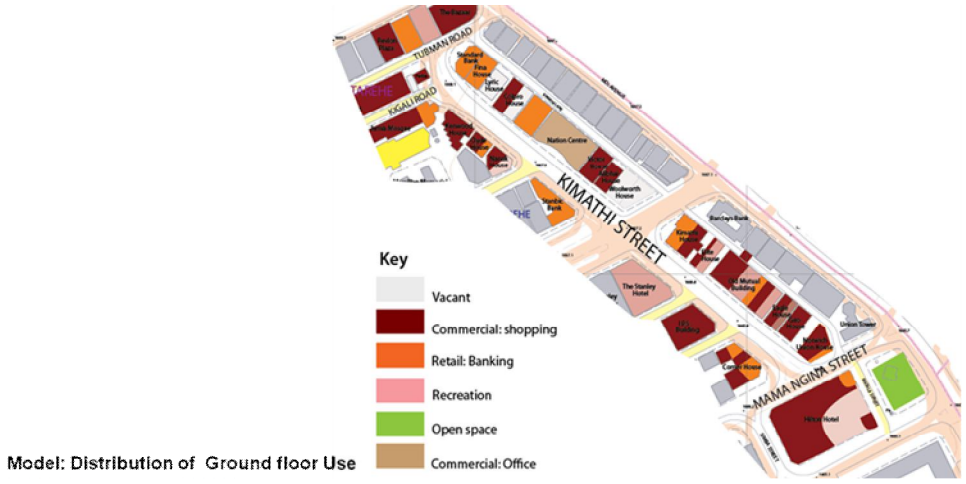


Fig. 9.8: Ground floor uses along Kimathi Street, From [Adapted from] City of Nairobi map, by J.I.C.A and G.o.K, 2005, Nairobi: Survey of Kenya 1000.

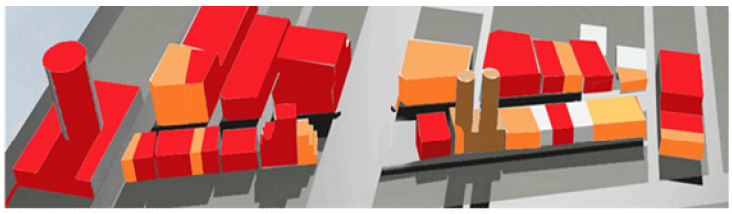


Fig. 9.9: Ground floor uses along Kimathi Street, by Author, 2010

At night from 7 - 9 p.m. hawkers selling clothing items colonize the building edges at the Kimathi Street – Mama Ngina node to take advantage of the high pedestrian flow here. This keeps the street safer as there is more social life on the street at this time of the night.

Various types of motorized vehicles use the street (fig. 9.10). These include public buses to and from Kencom and Ambassadeur bus termini, private cars, taxis, motorcycles and delivery trucks. Private cars, taxis, motorcycles and delivery trucks park along the street. There is loss of pedestrian safety and comfort from vehicular traffic at City Hall Way path as pedestrians cross into the Hilton hotel arcade.

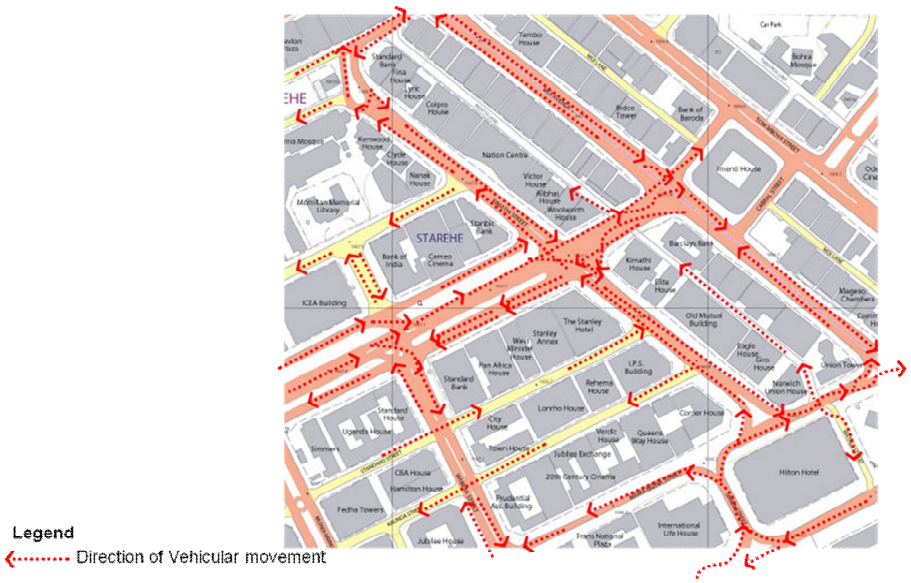


Fig. 9.10: Vehicular movement along Kimathi and adjoining streets From [Adapted from] City of Nairobi map, by J.I.C.A and G.o.K, 2005, Nairobi: Survey of Kenya 1000.

The Gross vehicular road space is 4,620 m^2 while the Gross street parking space is 2,270 m^2. In contrast, the Gross pedestrian street space 1,340 m^2 showing 85% of the street is for vehicles leaving a paltry 15% for the pedestrian, and as a consequence, congested pedestrian movement as well as vehicular congestion is evident especially at the nodes.

The Total Building Gross Floor Area for the street is 49,000 m^2. Assuming 5 cars are generated for every 100 m^2 of Building floor area, this would give a total of 2,450 cars generated by buildings on the street. If all the buildings on the street implemented the current policy on 600% Plot Ratio as recommended by the C.C.N and working with a similar ratio as above for cars generated per 100 m^2 of Building floor area, the Total Building Gross Floor Area would rise to 100,000 m^2 generating a total of 5,000 cars on the street. Greater pedestrian densities would also be

generated by the buildings, and assuming there is no corresponding increase in pedestrian spaces, this would lead to more discomfort to pedestrians due to increased number of vehicles and pedestrian densities.

Alongside the entire stretch of the street, road lights light both the road as well as the pedestrian paved areas. Pedestrian scaled lighting is void, reinforcing the notion that the street is designed primarily for the car and not the pedestrian. Plate 9.17 below shows the profile of the street.

Plate 9.17: Street profile, by Author, 2010

CHAPTER TEN

10.0 URBAN DESIGN GUIDELINES

This chapter discusses the proposed Urban Design guidelines for Kimathi Street. It lists the Urban Design problems identified, states the vision, mission and objectives of the program, the guiding principles then finally the policy statements.

10.1 Urban Design problems Identified

10.1.1 Environment

a) Streetscape and Public Spaces

1. Lack of women friendly amenities at street level, for example:
    - Lack of pedestrian scaled lighting along the path;
    - Seating and resting areas are poorly provided for along the path;
    - The same material is used continuously throughout the path's floor;
    - Joints in the street floor trap pencil heeled women's shoes;
    - Abandoned vending kiosks and police booth along the path which obstruct movement and is security risk for women especially at night.

a) Lack of natural elements or views to natural elements.

b) Poor linkages to Aga khan walk, Moi Avenue and Jeevanjee Gardens.

b) Street level Uses and Activity

1. Presence of long stretches of street with no activity.
2. Loading and off loading of goods takes place along the street, disrupting pedestrian use and flow along the path.

3. Lack of attractive street level uses or activities for women, for example child-friendly spaces lacking, lack of diverse vending kiosks along the path and rest rooms for children are missing.
4. Vending activities along the path are poorly located along the path.

c) Car Parking and Vehicular movement

1. Heavy presence of on-street car parking limits cross visual contact across the path is unsightly and causes glare.
2. High volume of vehicles generated by buildings along the path and through traffic, hence shortage in parking spaces.
3. Bicycle parking provision on the street lacking.
4. Poor flow of vehicular traffic along path e.g. at the Kimathi street – Kaunda street node near IPS building.

d) Pedestrian movement

1. Congested pedestrian movement as vehicles occupy 85% of street in form of on-street parking and road movement use.
2. Uncomfortable pedestrian density (125 pedestrians / min / m) at the 5 nodes generated from the buildings and through traffic.
3. Uncovered sections along the path leading to exposure to the elements.
4. High volume of vehicles generated by buildings along the street as well as by through vehicular traffic, hence disruption in pedestrian movement and loss of pedestrian safety and comfort from vehicular traffic at City Hall Way path and the nodes.

10.1.2 Building Uses, Design, and Massing

e) Building Design

1. Poorly defined entrances along building façade.
2. Lack of secondary entrances for most buildings along lanes.
3. The use of opaque materials, blank walls and opaque corporate branding by most shops along the path at street level limits interaction between the pedestrian and the building resulting in faster walking speeds.
4. There is lack of interaction between the street and buildings' upper floor levels due to use of opaque materials for fenestration.
5. There exists a continuous building line along the blocks therefore presenting a single view to the eye.
6. Lack of texture at the lower levels of building.
7. Buildings that use reflective glass are stand out of character in the street.

10.1.3 Opportunities

1. Presence of preserved buildings along the paths.
2. Proximity of the path to Kencom Bus station, Information Centre recreation space, Aga khan walk and Jeevanjee Gardens.

10.1.4 Constraints

1. The numerous nodes found along the path.
2. The presence of the major arterial node at the Kenyatta Avenue – Kimathi Street paths

3. The presence of three preserved buildings along the path – Stanbic building, Old Mutual Building and Elite House.
4. The presence of significant buildings given their architectural style, age and association with historical past
5. Car parking pressures

10.1.4 Research Thesis Findings

1. Women like streets that are:
    - Moderately enclosed;
    - Have a social environment;
    - Incorporate nature / natural elements;
    - Have seating and resting areas along the path;
    - Comfortable to walk on;
    - Safe from vehicles.
2. Women dislike streets that:
    - Have blank walls;
    - Have a crowded environment;
    - Are long and linear.

10.2 Program

10.2.1 Vision

Establish a framework for the public realm and what the development will be characterized by.

10.2.3 Mission

Direct development along the path to encourage human activity

10.2.4 Goal, Objective and Guiding Principles: Environment

Goal: Foster pedestrian movement and activity along the street

Objective: Promote a woman-friendly, comfortable, interesting and safe street environment so that all pedestrians enjoy use of the path as a route.

10.2.5 Guiding Principles: Streetscape and Public Spaces

1. Focus use of the Kimathi Street path on the pedestrian rather than on vehicles.
2. Streetscape amenities - seating areas, kiosks, newsstands, news racks, and drinking fountains all help to animate the pedestrian realm, support public use, and contribute to the social and economic vitality of the street (plate 10.0).

Plate 10.0: Streetscape enhancements can blend the public and private realms of the street, by Author, 2010

- Street lighting scaled to the needs of cars only reinforces the idea that pedestrians don't belong and that the street is the domain of the car.
- Street lighting can be directed at a pedestrian scale (plate 10.1).

- Areas used for active movement can be differentiated from passive areas through use of different materials, colours or textures (Plate 10.2).
- It is desirable for the paving to have shallow or minimal joints.
- Rubbish receptacles can be located near major building entrances, termini, and adjacent to outdoor seating areas. They should prevent rain from entering the container, facilitate convenient access to the user, and have the option of being anchored to the pavement.
- The height of light fixtures generally should be kept low to promote pedestrian scale and to minimize light spill to adjoining properties.
- A consistent style and size can be used to give the street unifying scheme of illumination character.

Plate 10.1: Recessed pedestrian lighting on the streets enhances and encourages night-time street life, by Author, 2010

3. Encourage seating on passive sections of the street.

- Seating can be either formal (benches) or informal (low walls, steps).
- Street furniture should generally be located in high activity areas where people can be expected to congregate.

Plate 10.2: Use of different floor materials to distinguish active and passive areas of the street, by Author, 2010

4. Abandoned booths impede flow of movement and raise safety concerns; where they occur, they should be removed and replaced with functional ones at more appropriate locations (Note: Vending booths neat the Kimathi path–Tubman path node and at Kimathi path–Kenyatta Avenue path are two such examples – plate 10.3)

   - Locate vending kiosks so that they do not obstruct free flow of pedestrian movement
   - Provide diverse vending kiosks so as to serve needs of a broad spectrum of people.

Plate 10.3: Overhead utilities should be undergrounded whenever feasible, by Author, 2010

5. The introduction of building components that offer protection to pedestrians, such as awnings, can encourage pedestrian activity (An arcade linking Kimathi street path and Jeevanjee gardens is a case in point)
6. Reinforce primary pedestrian movement corridors with wayfinding devices which can be achieved through coded pavements, signs and planting.

- Curb ramps should be provided at intersections to ensure accessibility textures (Plate 10.4).
- In terms of accessibility and safety paving must maintain smooth and level surfaces and have a non-slippery surface when wet.
- Paving should as far as possible be coordinated with siting and design of public facilities such as street lights, planters etc.

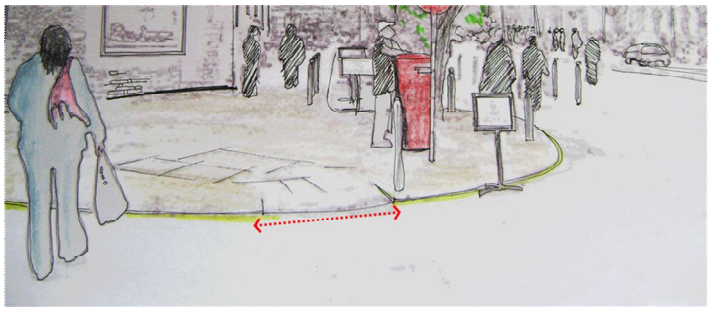


Plate 10.4: Curb cut ramp for accessibility purposes, by Author, 2010

- Retail signs can be placed on buildings on the canopy band provided they are consistent with materials of the building and legible (Plate 10.5). Signage which complements detailing or features is desirable.
- Signage that adds interest to the path but is not overwhelming.
- Provide directional and information signs that are attractive, clear and consistent in theme, location and design.

Plate 10.5: Retail signs on canopy band, by Author, 2010

8. Visual connections at street level and to unique features of the city serve a practical function of orientation in the urban landscape.
9. Reinforce the connection to Aga khan walkway.

- Better linkages to Aga Khan walk can be attained through slowing down further the vehicular traffic along City Hallway path (Plate 10.6).
- Changes in paving materials, colour or texture can indicate pedestrian crossing points to motorists to compel them to slow down
- Narrower road space at approaches to junctions can slow down cars
- Separation of vehicular from pedestrian traffic can be achieved through level separation (plate 10.7).

10. Reinforce the connection to Jeevanjee gardens.

- Buildings along adjacent to the linear path linking to Jeevanjee gardens can relinquish part of their ground floor space for creation of arcade running through the length of the building through lower ground coverage requirements.

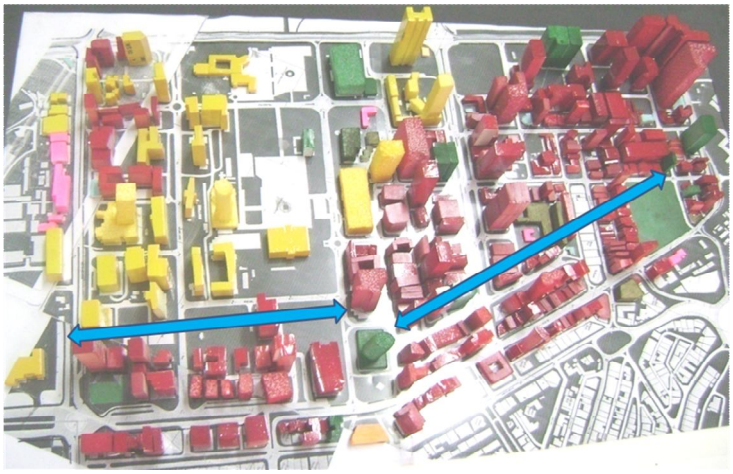


Plate 10.6: Better linkages to Aga khan walk by slowing the vehicular traffic along City Hallway path, by Author, 2010

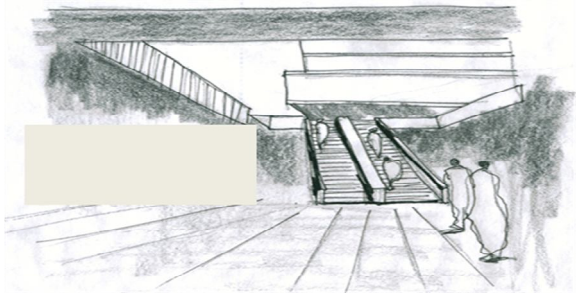


Plate 10.7: Locating the bus stop at a lower level to free up ground space for the pedestrians, by Author, 2010

- Visual links to Jeevanjee gardens can be created through the use and placement of street trees.

11. Incorporate nature in the streetscape.

- Nature can be incorporated in divisional elements in street space
- Linking of Street to Jeevanjee park can be through a green corridor
- Provide bollards, large planters, or trees where vehicles or parking is not allowed along the street.
- Removable bollards may be appropriate to balance pedestrian protection with emergency access.

- Bollard style and color should match the rest of the street furniture for consistent character of the street.

12. A series of smaller spaces or spaces that offer opportunities to view activity without being the focus of views are better than large singular spaces (plates 10.8 and 10.9).

Plate 10.8: Better access to Kimathi statue for greater pedestrian interaction by Author, 2010

Plate 10.9: Better access to Kimathi statue for greater pedestrian interaction by Author, 2010

10.2.6 Policies: Streetscape and Public Spaces

Policy 1:

Provide streetscape elements that provide human scale for the pedestrian;

Policy 2:

Encourage active use of street can be by providing adequate seating, lighting and rubbish receptacles;

Policy 3:

Improve access to and between major paths and open spaces;

Policy 4:

Preserve existing nature and introduce nature and natural elements in the street and areas of buildings adjacent to the street;

Policy 5:

Provide pedestrian scaled lighting that creates a safe and attractive setting for the community's nighttime use of the public realm;

Policy 6:

Remove obscuring elements on the path;

Policy 7:

Reinforce the identity of the street with coordinated signage.

10.2.7 Guiding Principles: Visual amenity

13. Wide pedestrian lanes can provide opportunities for pedestrian amenities and outdoor recreation.
14. Incorporate child friendly areas safe from vehicular traffic and in passive sections of the street.

- Accessible toilets and baby changing facilities off street for use by children can be provided (plate 10.10).

- They can be located near off-street stalls where there is presence of pedestrian traffic but safe from car traffic (note: Pedestrian lane leading to the Jamia community mosque is an opportune area where outdoor recreation can be explored).

Plate 10.10: Children's toilets located next to compatible uses along the street in highly visible areas, by Author, 2010

15. Service activities detract from pedestrian comfort when located along primary movement paths.

- Locate water tanks, services and other similar functions along the service lane rather directly near the main path (Plates 10.11 and Fig. 10.0).
- Screen such elements from public view;

Plate 10.11: Water tanks and mechanical equipment to be located away from the main path, by Author, 2010

16. Parking lots along the street impair street life, reduce cross visual contact on the street and dent the image of a street.

- Parked cars should not appear to “intrude” on pedestrians (plate 10.12).
- On-street parking can be limited along the street.

Fig. 10.0: Servicing activities can be accessed from the service lane rather than along main path, From [Adapted from] City of Nairobi map, by J.I.C.A and G.o.K, 2005, Nairobi: Survey of Kenya 1000.

- Structured parking facilities can be created to serve the bulk of parking needs for the street.

Plate 10.12: Parked cars should not appear to “intrude” upon pedestrians, by Author, 2010

- They can be hidden from the view of the pedestrian and treated with human scaling elements aids it to suit the character of the street.
- Basement parking avoids the visual effects caused by exposed cars.

17. Bicycle parking can be incorporated into the path so that it is an integrated feature of the streetscape (plate 10.13).

- Bicycle parking can be provided in a visible and sheltered location
- To support cycling, specific lanes identifying them as a bicycle route can be provided.
- Smaller racks distributed along the length of a block, are better than one or two large concentrations of bike racks.
- To promote alternative ways of moving around within the C.B.D, the introduction of 'light rail transit and smart cars as systems of movement in the C.B.D can be introduced (Plates 10.14, 10.15 and 10.16).

Plate10.13: Reduced number of vehicle lanes and tree-lined streets enhance use by pedestrians and cyclist, by Author, 2010

- Transit shelters should be provided at heavily used transit stops; they should incorporate seating, bus route-map, nighttime lighting, rubbish receptacles and shade.

Plate 10.14: Portions of certain streets can accommodate light-rail transit, from http://en.wikipedia.org/wiki/File:Aravacametroligero.jpg on 4 Nov 2010

18. Explore the use of traffic calming measures on heavily pedestrian intersections to eliminate pedestrian-vehicle conflicts.
19. Narrowed vehicle lanes near the busy Kenyatta Avenue node can slow car traffic and create more pedestrian space (Plate 10.17).

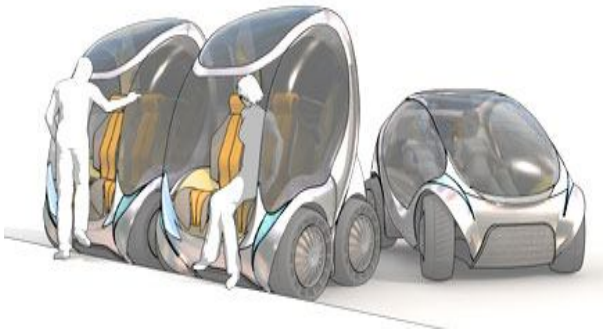


Plate 10.15: Smart cars in the future can form an alternative transit system within and around the CBD, from www.wfs.org/Jul-Aug2010/Chin.htm on 4 Nov 2010

20. Explore the use of traffic calming measures on heavily pedestrian intersections to eliminate pedestrian-vehicle conflicts.
21. Narrowed vehicle lanes near the busy Kenyatta Avenue node can slow car traffic and create more pedestrian space (Plate 10.17).

- Resultant pedestrian areas are ideal locations for streetscape elements such as informational kiosks and news paper racks.

Plate 10.16: Instead of buses, light rail transit is proposed as means of movement within the CBD, by Author, 2010

20. Changes of level can add to interest and amenity if a reasonable relationship is maintained between the levels.

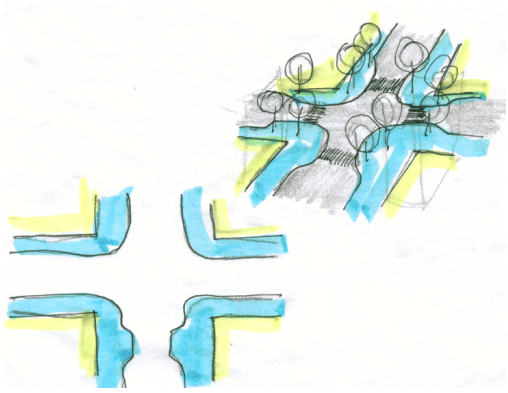


Plate 10.17: Narrowed vehicle lanes near the busy Kenyatta Avenue node can slow car traffic and create more pedestrian space from the resultant bulb out space, by Author, 2010

- A space slightly above the street gives a sense of overlook and retains visual connections
- A space slightly below the street gives a sense of enclosure and a sense of overlook

- A space too far below the street loses visual contact with the street
- A space too far above the street loses visual connections with the street

10.2.8 Policies: Visual amenity

Policy 8:

Foster pedestrian movement and activity by protecting pedestrian spaces from intrusions by cars;

Policy 9:

Prohibit service and loading facilities from an orientation that allows them to be visible from Kimathi Street path;

Policy 10:

Limit available on-street parking for emergency purposes.

Policy 11:

Provide parking structures to minimize visual effects of on-street parking;

Policy 12

P*rovide light rail transit system and dedicate one lane of traffic to light rail transit-preferential use;*

10.2.9 Goal, Objective and Guiding Principles: Buildings

Goal: Promote development and improvements that provide for the public's enjoyment of the street.

Objective: Creation of an appropriate balance between buildings and pedestrian spaces, in order to reflect a pedestrian orientation of the street.

10.2.10 Guiding principles: Building Uses

1. The point where buildings meet the street is most important in the fabric of Kimathi Street path: it is the place where the activity of the street is offered the opportunity to intertwine with commerce, housing, entertainment and dining.
2. Private development will offer the greatest impact on the experience of the path. The public realm (plate 10.19) means little if it is not supported by development that encourages human activity.
3. The use of the building near the pavement defines the public space of the street (plates 10.18 and10.20).

- A bigger proportion of a street-facing façade can be occupied by a use that invites walk-in or walk-by traffic at different times of the day/night.
- In order to maintain the continuity of the façade on a block, and ensure the character and stability of the public realm are maintained over time, buildings can be placed to meet the property line.

Plate 10.18: Spaces along lane paths such as this can have a potential where indoor activities are made to flow outwards into the space by Author, 2010

- Breaks in the façade within a development block, should employ plantings, walls, archways, fences, or other features to maintain the spatial definition of the street edge.

- Spaces of buildings near the property line can have outdoor dining or outdoor sales flowing into the street (Plate 10.21), with more passive functions located further inside.

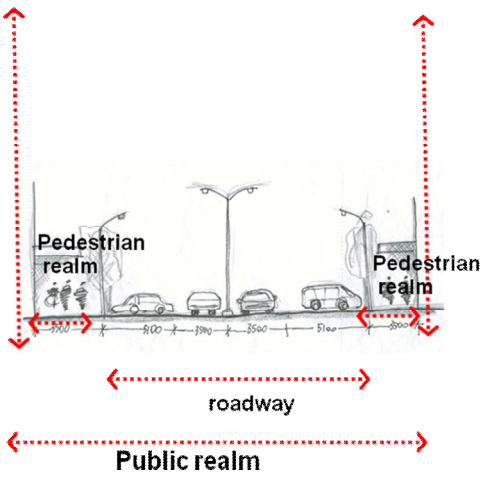


Plate 10.19: Components of the public realm, by Author, 2010

Plate 10.20: The use adjacent to the street, building placement and building's height define the public realm of the street, by Author, 2010

- Buildings with a footprint larger than 800m^2 can have:

  :- interior courtyards on ground floor space and be surrounded with uses that activate the space, such as street level retail facing onto the court or dining venues.

Plate 10.21: Dining uses on the street, by Author, 2010

:- an arcade lined with retail and active uses such as restaurants (The buildings uses should be oriented towards the street - Plate 10.22).

- Where buildings do not meet the property line, the space can be occupied by an active use (outdoor dining or outdoor sales)

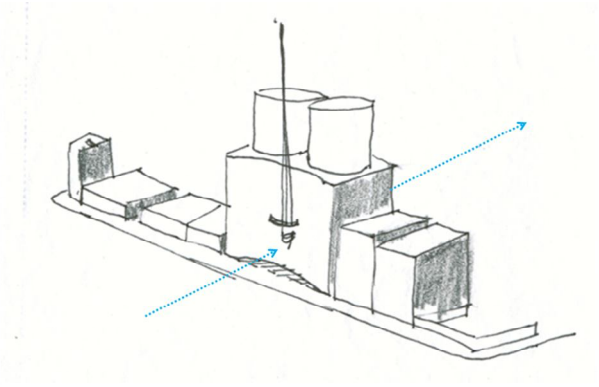


Plate 10.22: Arcades through buildings with a footprint larger than 800m2 are proposed, by Author, 2010

4. While upper levels of Kimathi Street buildings will not have the same activity as those spaces located at street level, there should be a sense of apparent activity in these spaces as well (plate 10.23).

    - Office, entertainment and residential uses along the entire length of the path encourage continuous presence of people in the street throughout the day and night.

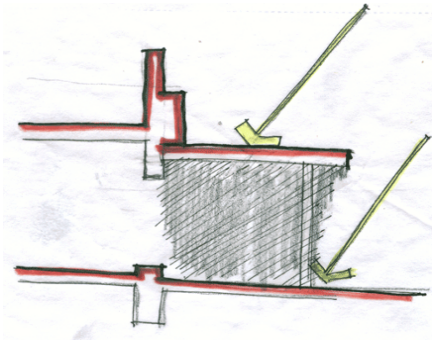


Plate 10.23: Buildings with usable balconies for gatherings are highly encouraged, by Author, 2010

- Usable balconies, terraces or rooftop gardens for use by occupants of buildings offer a similar opportunity (Plates 10.23 and 10.24).

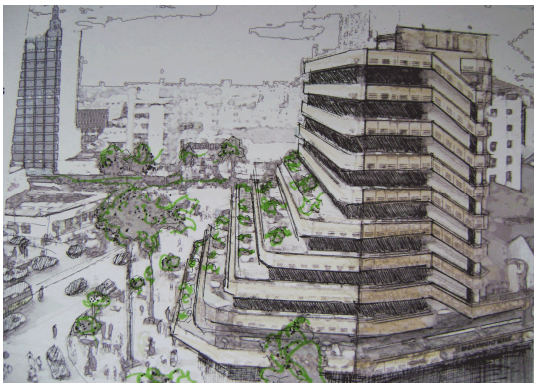


Plate 10.24: Outdoor living spaces bring life to streets as well as providing an amenity for resident, by Author, 2010

10.2.11 Policies: Building Uses

Policy 1:

Require the provision of active retail uses on building spaces adjacent to the street and lanes;

Policy 2:

Avoid building uses on street-facing façades which do not invite walk-in or walk-by traffic;

Policy 3:

Foster a sense of activity by creating upper levels of buildings with exterior spaces for occupants;

Policy 4:

Require the provision of residential spaces in upper levels of buildings;

10.2.12 Guiding principles: Height, Bulk and Massing

5. Clustering of larger, taller buildings at the civic area of the Nairobi C.B.D and allowing for gradual decrease in height as one moves away from this centre ensures tall buildings are not scattered arbitrarily in the C.B.D (Plates 10.25 and 10.26).
6. The projected pedestrian volume and width of the street are desirable dictates of the maximum Plot Ratio.

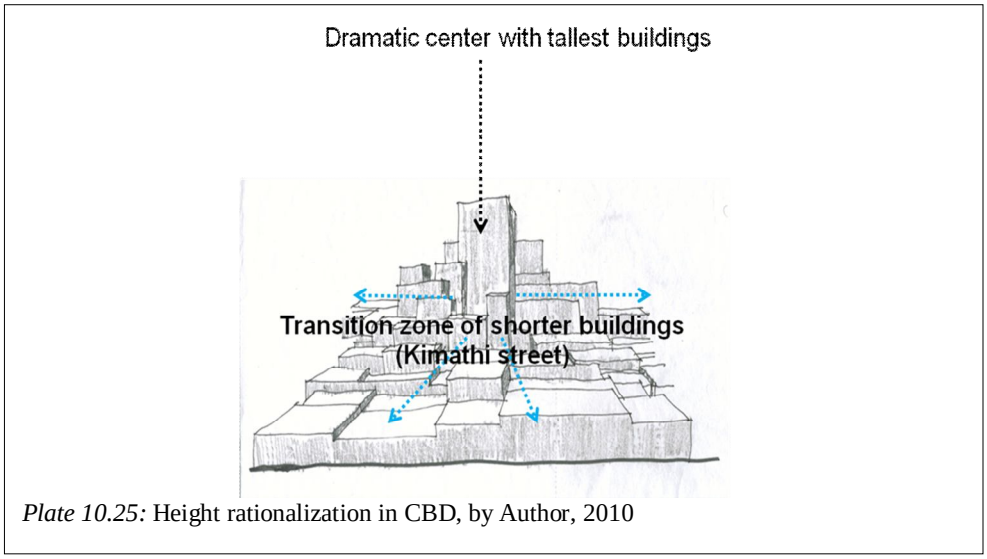


Plate 10.25: Height rationalization in CBD, by Author, 2010

7. Buildings of 18m height offer an optimum street enclosure (plate 10.27).

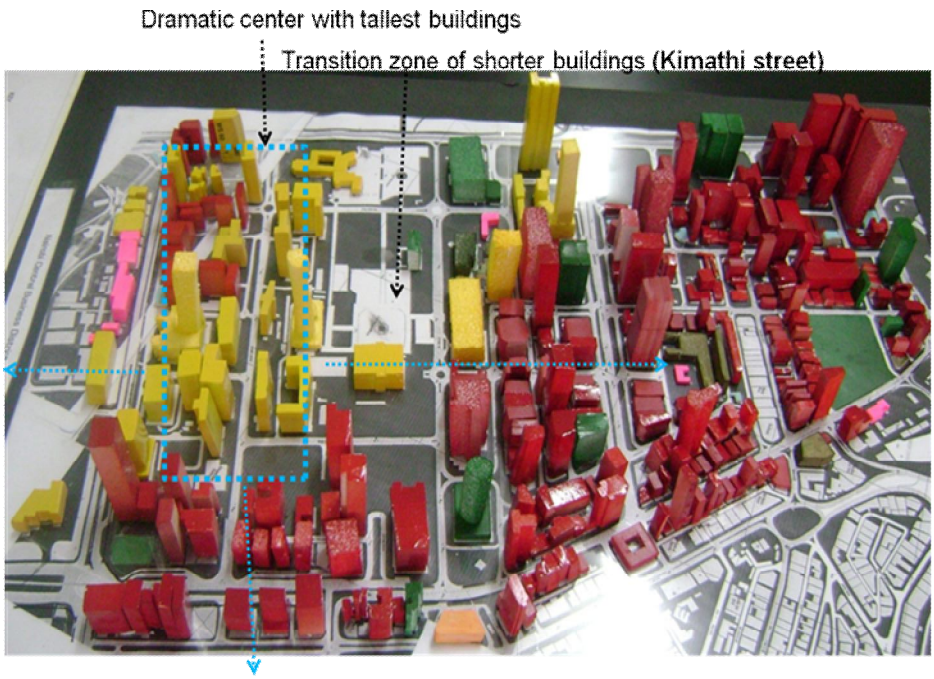


Plate 10.26: Building height regulation attempts to create a sculpted skyline silhouette that provides visual cues to the organization of the CBD and location of key activity centres, by Author, 2010

8. Buildings of 18m height offer an optimum street enclosure (plate 10.27).
9. Buildings which exceed this optimum can still offer optimum street enclosure as long as they are:

- Setback from street level façades from the seventh floor and upwards (plate 10.29).
- Do not exceed 39m height (plate 10.28).

10. Pedestrian lanes off Kimathi Street linking to Moi Avenue create usable alternate pedestrian-only routes.
11. The height and mass of buildings can be manipulated to foster use of secondary lanes.

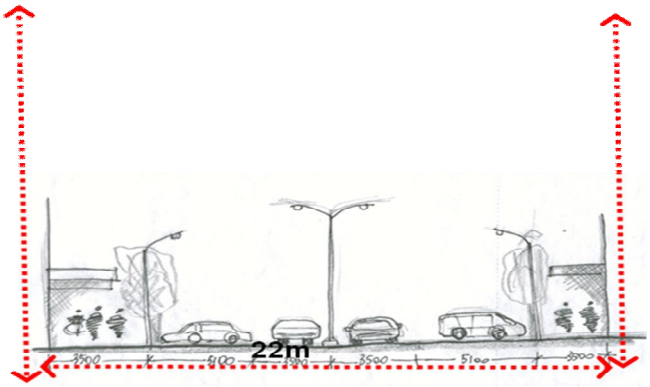


Plate 10.27: Maximum level of street enclosure is D/H = 0.5, to ensure optimum enclosure of the street, by Author, 2010

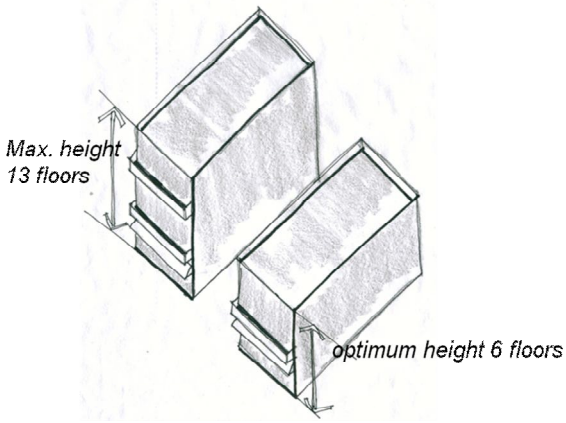


Plate 10.28: Optimum and maximum heights of buildings on the street, by Author, 2010

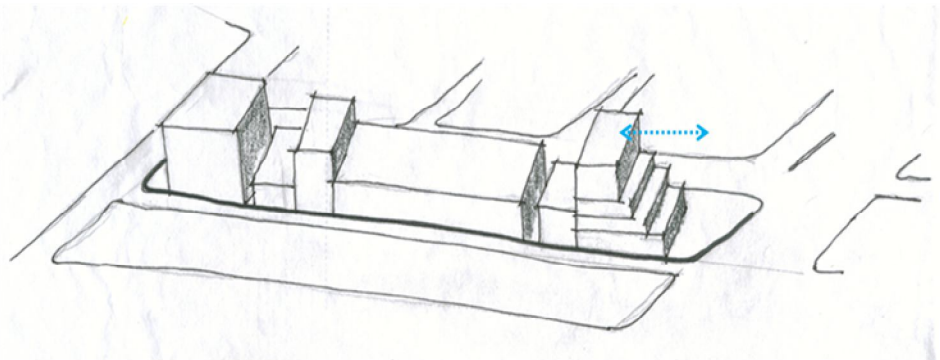


Plate 10.29: Where the Plot Ratio will violate D/H ratio, setbacks such as those for Kimathi house to be adopted, by Author 2010

12. Narrow paths lined with tall buildings do not encourage use.

- Pedestrian lanes of a minimum of 3.5m width with setbacks from the second floor (from street level façades) of buildings along both sides of pedestrian lanes offer an optimum street enclosure (Plate 10.30).
- The placement of the building reinforces the vital relationship between public and private spaces.

13. Buildings adjacent to the pedestrian lanes on Kimathi Street to Moi Avenue can be given lower ground coverage requirements with

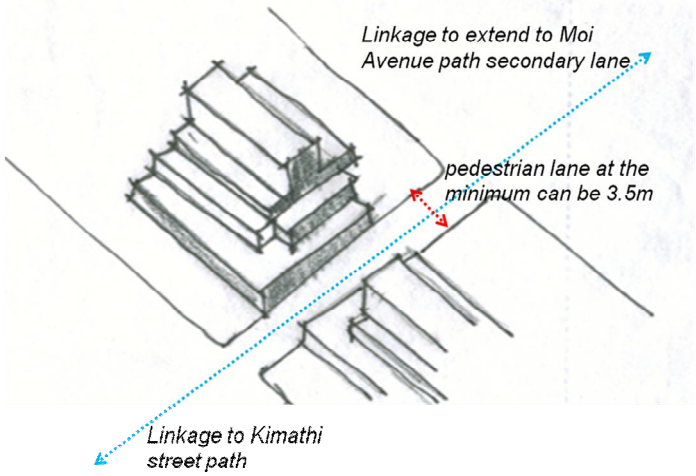


Plate 10.30: Adopting setbacks along pedestrian lanes to reduce effects of claustrophobia, by Author, 2010

development feasible after a minimum of 1.5m from the lane (Plate 10.31). Buildings adjacent to the pedestrian lanes on Kimathi street path to Moi Avenue path can be given higher plot ratio and lower land rates to compensate for lower ground coverage requirements.

- The spaces near the property line of the buildings next to the resultant widened lanes can have outdoor dining or outdoor sales flowing into the street with more passive functions located further inside.

- When buildings impose greater use on the street, setbacks at the building line at the ground level accommodates greater pedestrian volume. This can also create visual interest. (Such proposals can be considered upon expiry of leases).

Plate 10.31: Outdoor dining flowing into the street, by Author, 2010

- Buildings at nodes can have setbacks from the building line at the ground floor to accommodate greater pedestrian volume. Norwich Union House and Corner House are prime spots for setbacks from the building line at ground floor due to their location near active nodes.

14. Resulting recesses for buildings that impose greater use on the street can hold semi-public space that can be utilized for social niches, vending spaces or informal resting areas (Plate 10.32).
15. Because people move at speeds much slower than cars, their attention is directed at details and elements much different than they can experience in a car.
16. Because people move at speeds much slower than cars, their attention is directed at details and elements much different than they can experience in a car.

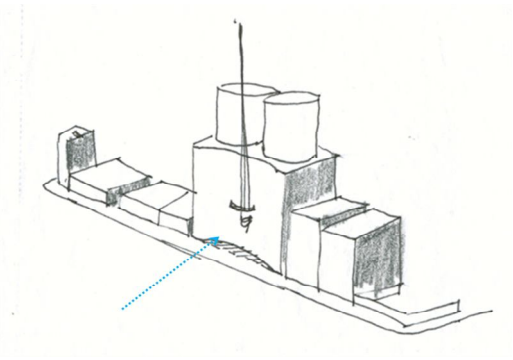


Plate 10.32: Resulting recesses for buildings that impose greater use on the street can be utilized for social niches, by Author, 2010

17. The treatment of the building near the pavement on the primary path and on secondary lanes defines the public space of the street.
18. Large windows at lower and upper levels, offer the opportunity for occupants to be seen by people on the street thereby discourage vices.
19. Buildings can be designed with the sense that street level and second stories are predominantly transparent windows (Plate 10.33);
    - street level façades can be 50% or more glass
    - Upper floors can also contain 30% or more glass

Plate 10.33: Use of transparent glass on lower levels is desirable, by Author, 2010

20. The use of natural materials such as brick and textured stone as dominant materials in a building's lower levels can be highly encouraged.
21. Currently the building on the street use one or two colours on their surfaces. In order to preserve the character of the street, the selection and use of colors should be coordinated and compatible with that of adjacent buildings (Plate 10.34).
    - The use of multiple colors may be appropriate on a building elevation; however, no more than three different colors should be used on one

Plate 10.34: Desirable colour use, by Author, 2010

    - Combinations of extremely dark colors or a monochromatic approach to painting should be avoided.
    - Bright, vibrant colors are usually more appropriate as building accents, entry points or as accent colors on signs (Plate 10.35).
22. New development which enhances the vistas along the Kimathi street path provide orientation points and increase variety along the path.
23. Large tall blocks next to short small blocks deter from the character of the street (plate 10.36). Transitions can minimize such effects.

Plate 10.35: Bright, vibrant colours on signs, by Author, 2010

24. New development which enhances the vistas along the Kimathi street path provide orientation points and increase variety along the path.
25. Large tall blocks next to short small blocks deter from the character of the street (plate 10.36). Transitions can minimize such effects.
26. The design of new buildings along Kimathi Street should respect:
    - The character of the other adjacent buildings;
    - The bulk of adjacent buildings along the street.

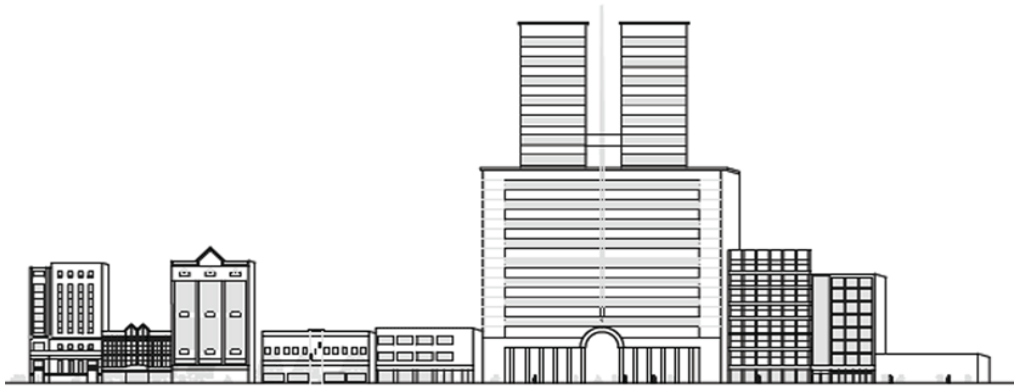


Plate10.36: Mismatch in bulk of buildings, by Author, 2010

27. Where development may result in large buildings along the Street their scaling is desirable through the use of:

- A series of repeated “modules”;
- Columns along the arcade repeated in modules helps scale the building at the level of the street creating comfort for the pedestrian
- Simple details like awnings;
- Street trees (Plate 10.37).

10.2.13 Policies: Height, Bulk and Massing

Policy 5:

Promote building forms that bear in mind pedestrian perception by restricting building height to 39m with setbacks implemented from 18m upwards (building owners can be offered incentives to facilitate for this policy);

Policy 6:

Relate height of buildings to the character and bulk of adjacent buildings;

Plate 10.37: Trees to reduce scale of the buildings, by Author, 2010

Policy 7:

Promote wider lanes with building forms that improve their integrity to foster visual linkages to nearby primary paths;

Policy 8:

Buildings next to pedestrian lanes be required to develop 1.5m from lane and observe step back after first floor on façades adjacent to lanes;

Policy 9:

Improve access to Moi Avenue path via continuous links to its pedestrian lanes;

Policy 10:

Require the provision of active retail uses on building spaces adjacent pedestrian lanes;

10.2.14 Guiding principles: Building Design

24. The sense of arrival to a building can be celebrated through the design and detailing of its entrance.
25. Distinguish building entrances from the rest of the building façade and other secondary entrances into a building.
26. Wherever possible provide secondary entrances into a building.
27. The façades of gazetted buildings along the street can be preserved to maintain their distinctive character (Plate 10.38).
28. Additional floors for Elite house can be created whilst conserving the scale and character of the openings and detailing.

10.2.15 Policies: Building Design

Policy 11:

Promote efforts to achieve additional transitional space at building lines at nodes and near buildings entrances which impose greater use on the street;

Plate 10.38: Gazetted building façades to be preserved, by Author, 2010

Policy 12:

Encourage a level of detail and material selection directed to a pedestrian level;

Policy 13:

Promote building treatment which offers interaction with pedestrians at lower levels to encourage pedestrian activity and presence of women;

Policy 14:

Promote new buildings that enhance vistas along the path;

Policy 15:

Promote the preservation of gazetted buildings and features to preserve the character of the street;

BIBLIOGRAPHY

Appleyard, D. (1981). *Livable streets*. Berkeley: University of California Press.

Ashihara, Y. (1970). *Exterior Design in Architecture*. NY: Van Nostrand Reinhold.

Barlow, A., R. (1981). Gestalt-Antecedent Influence or Historical Accident, *The Gestalt Journal, (4)*2. Retrieved from http://www.gestalt.org/barlow.htm on 22 Mar 2012.

Burton, A. (Ed), (2002). The *Urban Experience in Eastern Africa c.1750-2000*. Azania Special Vol. xxxvi-xxxvii. Nairobi: The British Institute in Eastern Africa.

Butterworth, I. (2000). *The Relationship between the Built Environment and Wellbeing: a Literature Review*. Retrieved from http://www.scribd.com/ on 18 Feb 2010.

Canter, D., Stringer, P., Griffiths, I., Boyce, P., Walters, D., and Kenny, C. (1975). *Environmental Interaction, Psychological Approaches to our Physical Surroundings*. London: Surrey University Press.

Central Bureau of Statistics, (2001). *Central Bureau of Statistics Statistical Abstracts 2000*. Nairobi: Government Printer.

Central Bureau of Statistics: *Demographic and Health Survey, Nairobi* (2007). Retrieved from http://www.scribd.com/doc/2224071/Kenya-Demographic-and-Health-Survey-2003-Preliminary-Report on 16 April 2010.

Central Bureau of Statistics*: Population Figures for Towns and Municipalities*, 2003 (2009). Retrieved from http://www.citypopulation.de/ Kenya.html on 16 April 2010.

Collins, G., R., and Collins, C., C. (1986). *Camillo Sitte: The Birth of Modern City Planning*. Random House: NY.

Cullen, G. (1971). *The Concise Townscape*. Great Britain: The Architectural Press.

Cullen, P. (2007). *Walk21 Toronto: Effective Pedestrian Surveys with Everyday Equipment.* Retrieved from http://www.measuring-walking.org/pdf_measuring-walking/Toronto%202007/w21_toronto_07_cullen.pdf on 09 Feb 2010.

Emig, S., and Ismail, Z. (1980). *Notes on the Urban Planning of Nairobi*. Copenhagen: Institute 3B.

Francis, M. (1991). The Making of Democratic Streets. In A. V. Moudon (Ed.), *Public Streets for Public Use* (pp. 23 – 39). NY: Columbia University Press.

Gehl, J. (1996). *Life Between Buildings: Using Public Space*. Copenhagen: Arkitektens Forlag.

Gottdiener, M., and Hutchison, R. (2000). *The New Urban Sociology*, 2nd Ed. NY: McGraw-Hill.

Hinton, P., Brownlow, C., McMurray, I. and Bob C. (2004). *SPSS Explained*. London: Routledge.

Hirst, T. assisted by Lamba, D. (1994). *The Struggle for Nairobi; A documentary comic book*. Nairobi: Mazingira Institute.

Immersive Virtual Environment. Retrieved from http://www.space.bartlett.ucl.ac.uk/events/sc06/proceedings/mavridou-sssc.pdf on 30 Jan 2010.

Isaacs, R. (2000). The Urban Picturesque: An Aesthetic Experience of Urban Pedestrian Places. *Journal of Urban Design (5)*2, 145-180. Retrieved from http://www.ingentaconnect.com/content/routledg/cjud/2000/ 00000005/ 00000002/art00003 on 15 Feb 2008.

Jacobs, A. (1993). *Great Streets*. Cambridge, MA: MIT Press.

J.I.C.A and G.o.K, (2005). *City of Nairobi map:* Nairobi: Survey of Kenya 1000.

Larsson, A. (2006). *From Equal Opportunities to Gender Awareness in Strategic Spatial Planning: Reflections Based on Swedish Experiences*. Retrieved from http://www.bth.se/fou/forskinfo.nsf/alfs/ff8c9ce0c7 1d17bfc12572a5003d2d69/$file/GenderarticleTPR.pdf on 28 Feb 2010.

Laurence, P. L. (2006). Contradictions and Complexities: Jane Jacobs's and Robert Venturi's Complexity Theories. *Journal of Architectural Education (59)*3, 49 – 60. Retrieved from http://www3.interscience.wiley.com/journal/118707577/ abstract on 18 Feb 2010.

Lay, M. C. D., Reis, A., Dreux, V., and Becker, D. (2007). *Urban Security and Spatial Behaviour: Syntactic and Perceptual Analysis of the Central Area of Porto Alegre*. Proceedings, 6th International Space Syntax Symposium, Istanbul. Retrieved from http://www.spacesyntaxistanbul.itu.edu.tr/papers %5Cshort papers %5C128%20-%20Lay%20Reis%20Dreux%20Becker.pdf on 09 Feb 2010.

Lynch, K. (1960). *Image of the City*. Cambridge, MA: MIT Press.

Lynch, K. (1989). *Good City Form*. Cambridge, MA: MIT Press.

Lynch, K. (1990a). Notes on City Satisfactions. In T. Banerjee and M. Southworth (Eds.) *City Sense and City Design: Writing and Projects of Kevin Lynch* (pp. 135 – 153). Cambridge, MA: MIT Press.

Lynch, K. (1990b). The Immature Arts of City Design. In T. Banerjee and M. Southworth (Eds.) *City Sense and City Design: Writing and Projects of Kevin Lynch* (pp. 498 – 510). Cambridge, MA: MIT Press.

Mavridou, M. (2006). *Perception of Architectural and Urban Scale in an Immersive Virtual Environment*. Retrieved from *http://www.space.bartlett.ucl.ac.uk/events/sc06/proceedings/mavridou-sssc.pdf on 30 Jan 2010*.

Meller, H. (1990). Planning Theory and Women's Role in the City. In R. Rodger (Ed.), *Urban History Year book: 1990* (pp. 85-97). Leicester, Great Britain: Leicester University Press.

Miller, D. C. (1991). *Handbook of Research Design and Social Measurement* (5th ed.). Newbury Park, CA: Sage Publications. Nairobi: United Nations Centre for Human Settlements (Habitat).

Mills, S. (2006). *The History of Muthaiga Country Club - Volume 1,* 1913-1963. Nairobi: Mills Publishing

Morgan, W. T. W. (Ed), (1967). *Nairobi: City and Region.* Nairobi: Oxford University Press.

Munyua, A., (2002). *Discerning Urban Design Elements in Nairobi's C.B.D* (unpublished thesis), University of Nairobi.

Nasar, J. (1998). *The Evaluative Image of the City.* Thousand Oaks, CA: Sage Publications.

Nasar, J. L. and Jones, K. (1997). Landscapes of fear and stress. *Environment and Behaviour (29),* 291-323. Retrieved from http://facweb.knowlton.ohio-state.edu/jnasar/crpinfo/research /Land scape _of_ FearE&B97.pdf on 17 Feb 2010.

Nasar, J. L. (1983). Adult viewer preferences in residential scenes, *Environment and Behaviour (15),* 589-614. Retrieved from http://facweb.knowlton.ohio-state.edu/jnasar/crpinfo/research/ ViewerPref_E&B_1983.pdf on 17 Feb 2010.

Nasar, J. L. (1984). Visual preferences in urban scenes: A cross-cultural comparison between Japan and the U.S., *Journal of Cross-Cultural Psychology (15),* 79 - 93. Retrieved from http://facweb.knowlton.ohio-state.edu/jnasar/crpinfo/ research /CrossCultural_JCCP_1985.pdf on 17 Feb 2010.

Nasar, J. L. (1994). Urban Design Aesthetics: The evaluative qualities of building exteriors. *Environment and Behaviour (26),* 377-401. Retrieved from http:// facweb.knowlton.ohio-state.edu/jnasar/crpinfo/research/ UrbDesAesthE&B 94.pdf on 17 Feb 2010.

Nasar, J. L. (2001). Images of Cities. In P. B. Baltes and N. J. Smeiser (Eds.) *International Encyclopedia of the Social and Behavioural Sciences* (Vol. 3, pp. 1821-5), E. Birch (section ed.) Urban Studies and Planning: Elsevier Sciences Ltd. Retrieved from http://facweb.knowlton.ohio-state.edu/jnasar/crpinfo/research/CityImage2001.pdf on 17 Feb 2010.

Newman, O. (1972). *Defensible Space: People and Design in the Violent City*. London: Architectural Press.

O.E.C.D (1995). *2009 World Survey on the Role of Women in Development* - Women's Control over Economic Resources and Access to Financial Resources, including Microfinance. U.N: NY. Retrieved from http://www.scribd.com/doc/26057658/World-Survey-On-The-Role-of-Women-in-Development-2009 on 19 Feb 2010.

Okello, N. (2009). *Urban Design scales: ABA 3100* [Lecture notes]. Nairobi. Kenya: Jomo Kenyatta University of Agriculture and Technology, Department of Architecture.

Otoki, B. M. (2002). Urban Public Space Patterns: human distribution and the design of Sustainable city centres with reference to Nairobi C.B.D. *Urban Design International, (7),* 205–216. doi:10.1057/palgrave.udi.9000083

Petherick, N. (2000). Environmental Design and Fear: The Prospect-Refuge Model and the University College of the Cariboo Campus. *Western Geography, (10)*11, 89–112. Retrieved from http://www.geog.uvic.ca/dept/wcag/petherick.pdf on 2 Feb 2010.

Pushkarev, B., and Zupan. J. (1975). *Urban Space for Pedestrians*. MA: MIT Press.

Rahder, B., and Altilia, C. (2004). Where is Feminism in Planning Going: Appropriation or Transformation. *Planning Theory (3)*2, 1– 12. Retrieved from http://www.urban.illinois.edu/apa-pw/acsp2004/Appro priation_or_Transformation_Rahder.pdf on 28 Feb 2010.

Rapoport, A. (1977). *Human Aspects of Urban Form*. Oxford: Pergamon Press.

Rapoport, A. (1990). *History and Precedent in Environmental Design*. NY: Plenum Press.

Rossi, A. (1966). *Architecture of the City*. Cambridge, MA: MIT Press.

Sandercock, L. (1998). The death of Modernist planning: Radical Praxis for a Post Modern Age. In M. Douglas and J. Friedman (Eds.) *Cities for Citizens: Planning and the Rise of Civil Society in a Global Age* (pp. 163-184). Sussex, England: John Wiley and sons.

Sandercock, L., Forsyth, A. (1992). Feminist Theory and Planning Theory: The Epistemological Links. *Planning Theory (7-8),* 45-49.

Schelhorn, T., O'Sullivan, D., Haklay, M. and Thurstain-Goodwin, M. (2000, June). *Streets: An Agent-Based Pedestrian Model*. Paper presented at Computers in Urban Planning and Urban Management, Venice. Retrieved from http://www.geog.psu.edu/people/osullivan /publications/articles/pdf/AnAgent.pdf on 09 Feb 2010.

Snyder, M. G. (1995). Lessons from feminist epistemologies. *Berkeley Planning Journal (10),* 91– 106. Retrieved from http://www.ced.berkeley.edu/pubs/bpj/pdf/bidl1007.pdf on 28 Feb 2010.

Stamps, A. E. III and Nasar, J. L. (1997). Design review and public preferences: Effects of geographical location, public consensus, sensation seeking and architectural styles. *Journal of Environmental Psychology (17),* 11-32. Retrieved from http://facweb.knowlton.ohio-state.edu/jnasar/crpinfo/research/designerviewjep97.pdfon 17 Feb 2010.

Steele, W. (2008). City Dreamers. *Griffith Review, 20.* Cities on the Edge. Retrieved from http://www.griffithreview.com/images/stories/edition_articles/ed20_pdfs/steele_ed20.pdf on 28 Feb 2010.

Sucher D. (2004, September 23). City Comfort [Online forum comment]. Retrieved from http://citycomfortsblog.typepad.com/cities/ on 22 Jan 2010.

Therakomen, P. (2001). *Mouse.class: The Experiments for Exploring Dynamic Behaviours in Urban Places* (M. Arch. Thesis, University of Washington). Retrieved from http://code.arc.cmu.edu/dmgftp /publications/pdfs/mouseclass/mousethesis.pdf on 28 April 2010.

Town Planning Section, City Council of Nairobi (1973). *Nairobi Metropolitan Growth Strategy* – Vol. 1 Report. Nairobi: Typography Ltd.

U.N –H.I.C. (2010). *Cities for All: Experiences and Proposals for the Right to the City*. Santiago: H.I.C. Retrieved from http://www.hic- net.org/articles.php?pid= 3496 on 20 July 2010.

U.N H.S.P. (2007). *Women's Safety Audits for a Safer Urban Design: Results of the pilot audit carried out in Centrum, Warsaw*. U.N Habitat Warsaw office. Retrieved from http://www.unhabitat.org/downloads/docs/5544 _32059 _WSA%20Centrum%20report.pdf on 20 July 2010.

U.N.H.CS. (2001). *Women and Urban Governance*. Policy dialogue series: Number 1.

Valentine, G. (1989). The Geography of Women's Fear. *Area (21)*4, 385-390. Retrieved from http://www.jstor.org/pss/2000006303 on 27 Jan 2010.

W.I.C.I., (2008). *Women's Safety Audits: What Works and Where?* Nairobi: U.N-Habitat Safer Cities Programme.

Walker, L. (2001). Home and Away: The feminist remapping of Public and Private Space in Victorian London. In I. Borden, J. Kerr, J. Rendell and A. Pivaro (Eds.), *The Unknown City: Contesting Architecture and Social Space* (pp. 297-311). Cambridge, MA: MIT Press.

White, D. (2001). *Gender in twentieth-century architectural discourse: 'Gods', 'Gospels' and 'tall tales' in architecture* (Ph.D Thesis, University of Adelaide, School of Architecture, Landscape Architecture and Urban Design) Retrieved from http://digital.library.adelaide.edu.au/theses/09PH/09phw 5834.pdf on 22 April 2010.

White, T., Silberman, L., and Anderson, P. (1948). *Nairobi Master Plan for a Colonial Capital*. Great Britain: H. M Stationary Office Press.

Willis, A., Gjersoe, N., Havard, C., Kerridge, J., and Kukla, R. (2004). Human movement behaviour in urban spaces: implications for the design and modelling of effective pedestrian environments. *Environment and Planning B: Planning and Design (31)*, 805 – 828. Retrieved from http://www.environment-and-planning.com/epb/fulltext/b31/b3060.pdf on 03 Feb 2010.

Yeoh, B. S. A., and Yeow P. L. (1997). Where women fear to tread: Images of danger and the effects of fear of crime in Singapore. *Geo Journal (43)*3 273-

286. Retrieved from http://www.springerlink.com /content/t85752631v281767/ on 27 Jan 2010.

Zeisel, J. (1998). *Inquiry by Design: Tools for Environment-Behaviour Research.* CA: Cambridge University Press.

APPENDICES

Appendix 1: Interview Schedule for Women

JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY

Declaration

I will greatly appreciate your assistance in this study which investigates the relationship between the Urban Design factors and women's route-choice behaviour. Your answers are of particular importance since you have been selected as part of a sample. Under no circumstances will individual answers be divulged. They will be used in strict confidence and in combination with answers from other people responding to the study for academic purposes only. The study is being undertaken in part fulfillment of the Master of Urban Design at Jomo Kenyatta University. THANK YOU.

Section 1

Instructions: Please respond to all questions.

1. What is your main reason for being in the C.B.D?

☐Work ☐Shopping ☐Business ☐studies ☐Other (specify)_____

2. Sketch on the map shown to you the route you followed between your work place / where you have come from and this terminus.
3. Indicate THREE most important reasons why you used this route.
   a) ☐has few people ☐has many people
   b) ☐wide enough pavement
   c) ☐has canopy shade ☐lacks canopy shade
   d) ☐low vehicular traffic ☐high vehicular traffic
   e) ☐No seats ☐has seats
   f) ☐has canopy shade ☐lacks canopy shade
   g) ☐safe
   h) ☐low vehicular traffic
   i) ☐Clean
   j) ☐Other_____
4. Did building(s) guide you on the route you used?

   _____

   intersection(s)?

   _____

5. Which THREE street feature(s) did you use on this route? For each mention the location.

☐Signs: _____☐Clock: _____
☐Statue / monument_____
☐fountain_____
☐shelter_____
☐Other _____

6. What TWO uses along the street attracted you to the route you followed?

☐Exhibition shops ☐Banks ☐ office ☐café / restaurant / hotel
☐ Theatre ☐ Hawkers ☐school /college ☐Park/garden
☐ Art gallery ☐Civic ☐Other shop (specify)_____
☐Other use (specify)_____

7. Which THREE main activities on the street did you encounter on the route you followed?

☐Hawking ☐ Resting ☐ Preaching ☐Vending ☐Walking
☐ Singing ☐ Meeting ☐Begging ☐Other_____

8. Which hazards did you notice on the route you followed?

☐Open hole on street floor ☐uneven floor ☐water leaks from canopy roof
☐Garbage ☐open sewer ☐fast moving cars ☐ Other_____

9. In your own opinion what major improvements need to be done to the route you followed to serve you better? _____

Section 2

For each characteristic below, circle the number that best fits your feelings for the route you followed.

(1) Extremely x
(2) Very x
(3) Quite x
(4) Neither x nor y
(5) Quite y
(6) Very y
(7) Extremely y

1. BEAUTY

Appealing	1	2	3	4	5	6	7	Unappealing
Pleasant	1	2	3	4	5	6	7	Unpleasant
Distressing	1	2	3	4	5	6	7	Relaxing
Common	1	2	3	4	5	6	7	Unique
Ugly	1	2	3	4	5	6	7	Beautiful
Attractive	1	2	3	4	5	6	7	Unattractive

2. CONVENIENCE

Quiet	1	2	3	4	5	6	7	Noisy
Inadequate lighting	1	2	3	4	5	6	7	Adequate lighting
Adequate seats	1	2	3	4	5	6	7	Inadequate seats
Crowded	1	2	3	4	5	6	7	Spacious
Shaded	1	2	3	4	5	6	7	Exposed

Friendly	1	2	3	4	5	6	7	Unfriendly
Boring	1	2	3	4	5	6	7	Interesting
Inappropriate floor surface	1	2	3	4	5	6	7	Appropriate floor surface
Even floor surface	1	2	3	4	5	6	7	Rough floor surface
3. NATURALNESS								
Natural	1	2	3	4	5	6	7	Built
Vehicle prominence	1	2	3	4	5	6	7	People prominence
High sign prominence	1	2	3	4	5	6	7	Low sign prominence
High prominence - poles	1	2	3	4	5	6	7	Low prominence - poles
Low prominence - wires	1	2	3	4	5	6	7	High prominence – wires
4. UPKEEP								
Dirty	1	2	3	4	5	6	7	Clean
Effective waste disposal	1	2	3	4	5	6	7	Ineffective waste disposal
Dilapidated	1	2	3	4	5	6	7	Well kept
Foul air quality	1	2	3	4	5	6	7	Fresh air quality
5. ENCLOSURE								
Narrow	1	2	3	4	5	6	7	Wide
6. BUILDINGS and ORNAMENT								
New	1	2	3	4	5	6	7	Old
Unique	1	2	3	4	5	6	7	Ordinary
Plain	1	2	3	4	5	6	7	Decorated
Dilapidated	1	2	3	4	5	6	7	Maintained
7. SAFETY								
Safe	1	2	3	4	5	6	7	Unsafe
Hostile	1	2	3	4	5	6	7	Friendly
Adequate lighting	1	2	3	4	5	6	7	Inadequate lighting
Deserted	1	2	3	4	5	6	7	People present
8. STREET ELEMENTS								
Inappropriate floor surface	1	2	3	4	5	6	7	Appropriate floor surface
Appropriate seats	1	2	3	4	5	6	7	Inappropriate seats
Appropriate street lights	1	2	3	4	5	6	7	Inappropriate street lights

Section 3

For each photo below, circle the number that fits your feelings, where: (1)Do not like at all…….(7)like a great deal

1)	1	2	3	4	5	6	7	8)	1	2	3	4	5	6	7
2)	1	2	3	4	5	6	7	9)	1	2	3	4	5	6	7
3)	1	2	3	4	5	6	7	10)	1	2	3	4	5	6	7
4)	1	2	3	4	5	6	7	11)	1	2	3	4	5	6	7
5)	1	2	3	4	5	6	7	12)	1	2	3	4	5	6	7
6)	1	2	3	4	5	6	7	13)	1	2	3	4	5	6	7
7)	1	2	3	4	5	6	7	14)	1	2	3	4	5	6	7

15) 1 2 3 4 5 6 7
16) 1 2 3 4 5 6 7
17) 1 2 3 4 5 6 7
18) 1 2 3 4 5 6 7
19) 1 2 3 4 5 6 7
20) 1 2 3 4 5 6 7

Respondent's details

Marital status: ☐Unmarried ☐Married ☐Widowed ☐Divorced ☐Separated

Religion: ☐Hindu ☐Catholic ☐Protestant ☐Muslim ☐Atheist ☐Other

Occupation: ☐Student ☐Self employed ☐Employed ☐Pensioner ☐Other

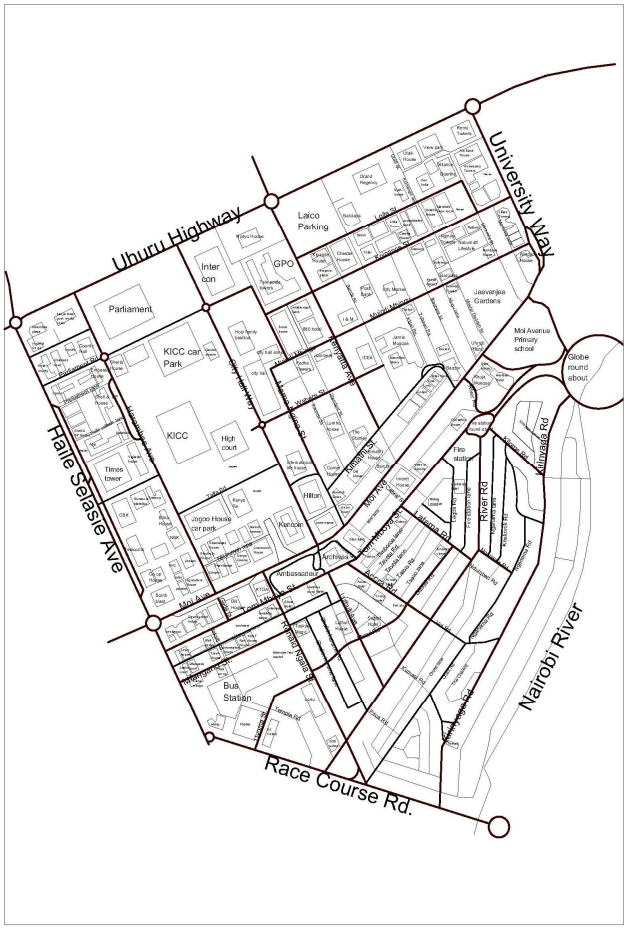
Highest Level of education reached:

☐Primary ☐Secondary ☐Diploma ☐Under Graduate ☐Graduate ☐Postgraduate

Age: ☐ 13 < 19 ☐19 < 25 ☐25 < 35 ☐35 < 55 ☐55 < 70 ☐70 and above

Number of years lived in Nairobi: ☐ < 1 ☐1 < 5 ☐5 < 10 ☐10 < 15 ☐15 < 20 ☐20+

Area of residence: _____



Appendix 2: Photographs

Picture 1

Picture 2

Picture 3

Picture 4

Picture 5

Picture 6

Picture 7

Picture 8

Picture 9

Picture 10

Picture 11

Picture 12

Picture 13

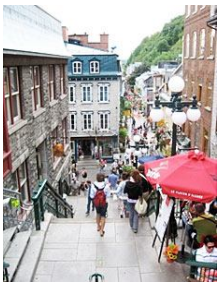
Picture 14

Picture 15

Picture 16

Picture 17

Picture 18



Picture 19

Picture 20

Picture 21

Picture 22

Picture 23

Picture 24

Picture 25

Picture 26

Picture 27

Picture 28

Picture 29

Picture 30

Picture 31

Picture 32

Picture 33

Picture 34

Picture 35

Picture 36

Picture 37

Picture 38

Picture 39

Picture 40

Picture 41

Picture 42

Picture 43

Picture 44

Picture 45

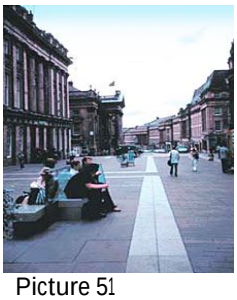
Picture 46

Picture 47

Picture 48

Picture 49

Picture 50



Picture 51

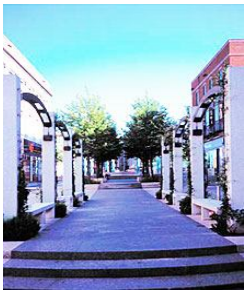
Picture 52

Picture 53

Picture 54

Picture 55

Picture 56



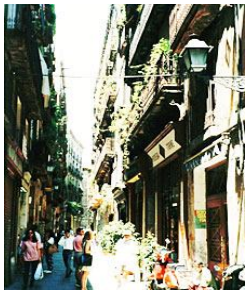
Picture 57

Picture 58

Picture 59

Picture 60

Picture 61



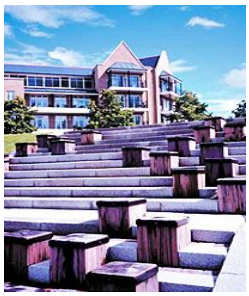
Picture 62

Picture 63

Picture 64

Picture 65

Picture 66



Picture 67

Picture 68

Picture 69

Picture 70

Picture 71

Picture 72

Picture 73

Picture 74

Picture 75

Picture 76

Picture 77

Picture 78

Picture 79

Picture 80

Picture 81

Picture 82

Picture 83

Picture 84

Picture 85

Picture 86

Picture 87

Picture 88

Picture 89

Picture 90

Picture 91

Picture 92

Picture 93

Picture 94

Picture 95

Picture 96

Picture 97

Picture 98

Picture 99

Picture 100

Appendix 3: Interview Schedule for Experts:

Declaration

I will greatly appreciate your assistance in this study which investigates the relationship between the streetscape and women's route choice behaviour. Your answers are of particular importance since you have been selected as part of a sample. Under no circumstances will individual answers be divulged. They will be used in strict confidence and in combination with answers from other people responding to the study for academic purposes only. The study is being undertaken in part fulfillment of the Master of Urban Design at Jomo Kenyatta University. THANK YOU.

Interviewee's Details

Name……..Occupation……Date.....…

The photographs shown in the album all depict street scenes. For each photo below, circle the number that best fits the four attributes below, where:

(1) Extremely x
(2) Very x
(3) Quite x
(4) Neither x nor y
(5) Quite y
(6) Very y
(7) Extremely y

Picture 1

Complex	1	2	3	4	5	6	7	Simple
Linear	1	2	3	4	5	6	7	Deflected
Enclosed	1	2	3	4	5	6	7	Open
Long	1	2	3	4	5	6	7	Short

Appendix 4: Check list

	ELEMENTS TO BE ASSESSED	OBSERVATION and MEASURE VALUE		
STREET ELEMENTS	Types of street elements present	☐ Pedestrian lamp ☐Road Lamps ☐ benches ☐Bollards ☐vending kiosks ☐ Street trees/plants ☐Railings/fences ☐Signs ☐Bins	☐Clock ☐statues ☐fountains ☐Bus shelters ☐Phone booth ☐Paved surfaces ☐bicycle racks ☐Public art ☐Other	
	Characteristics of street elements			
	Usage of street elements			
	Appropriateness of elements			
	Lighting Quality, sufficiency			
STREET TYPOLOGY and CHARACTERISTICS	STREETS	Types of street observed	☐Arcade* ☐Colonnaded* ☐open to sky*	☐Canopied* ☐Alley* ☐Other
		Deflection	☐Deflected ☐un-deflected	
		Paving material and size		
		No. of floors	☐1<4floors No._____ ☐4 floors + No._____	
		Style of Buildings*	☐ Modern Gen1: No____ ☐ Modern Gen2: No____ ☐ Modern Gen3: No____ ☐ Post Modern: No____ ☐ Other_____ No____	
		Windows visual connection to street		
STREET ATTRIBUTES		importance of balconies to street		
	Openness ☐Defined opened space ☐Wide space ☐Highly enclosed	Parking ☐N ☐Y Type: ☐Flash ☐Angle		Pedestrian street* (i)____ (ii)_____ Shopping street* (i) _____ (ii) _____ Parking width* (i)_____ (ii)_____

		Parking Length* _____No_____ Width*: <u>Motorway</u> ☐N ☐Y <u>Lanes:</u> ☐single ☐Double	(ii)____ Motorway width* (i)____ (ii)___(ii)__ Overall width*____ Length* _____ Direction*: ☐1 way ☐2way
	Order	Replication of: ☐Roofline ☐Materials ☐Shape	☐Height ☐Windows ☐ Other elements
	Naturalness	Natural aspects present (trees, water) ☐N ☐Y: List _____Count_____ Vehicle prominence Low1 2 3 4 5 6 7High	
	Complexity Activities on street	☐Eating ☐Walking ☐ Preaching ☐Vending ☐ Sitting and reading ☐Reading ☐Parking ☐ Standing and Talking	☐Waiting ☐Resting ☐ Meeting ☐Walking and Talking ☐Buying ☐Begging ☐waiting ☐Other
	Uses abutting street	☐Exhibition shops ☐Banks ☐ office ☐café/ restaurant/ hotel ☐ Theatre ☐Civic	☐Parking ☐ Hawkers ☐schools /college ☐Park/garden ☐ Other shops ☐Other_____
	Ornamentation	☐Rich surfaces ☐Surfaces lacking in texture	
	Specialization		
	Visual Richness	Signage prominenceLow1 2 3 4 5 6 7High Billboards " Low1 2 3 4 5 6 7High Litter " Low1 2 3 4 5 6 7High Traffic " Low1 2 3 4 5 6 7High Poles andwires " Low1 2 3 4 5 6 7High Upkeep Low1 2 3 4 5 6 7High	
	Typicality Elements, variation in Presence of Landmarks	☐ Size ☐Placement ☐Shape ☐Height ☐Color ☐ Angle	☐elements themselves ☐materials Scale and proportion ☐N ☐Y: Location _____
	Intensity Presence of Nodes	☐N ☐Y: Location_____	

PEDESTRIAN MOVEMENT CHARACTERISTICS	Pedestrian speed Time of day _____	Length of walk (D)_____speed (D/T):_____ Pedestrian time (T): in seconds Singleton_____Woman accompanied by man____ Woman accompanied by child _____ Woman accompanied by 1 lady_____ Woman accompanied by children_____ Woman accompanied by 2 ladies_____	
	General direction pedestrian flow*	Pedestrian density*	Effects of vehicular traffic on the street ☐Comfortable ☐uncomfortable

Appendix 5: Rating of the street scenes by women

No.	Scene	N	Mean	Std. Error
1	Street Scene 100	113	6.097	0.131
2	Street Scene 97	113	5.584	0.137
3	Street Scene 1	113	5.442	0.169
4	Street Scene 28	113	5.425	0.152
5	Street Scene 71	113	5.248	0.152
6	Street Scene 25	113	5.133	0.163
7	Street Scene 26	113	5.115	0.146
8	Street Scene 80	113	5.106	0.170
9	Street Scene 10	113	5.097	0.158
10	Street Scene 32	113	5.071	0.132
11	Street Scene 47	113	5.027	0.160
12	Street Scene 98	113	5.009	0.137
13	Street Scene 24	113	4.991	0.153
14	Street Scene 29	113	4.991	0.155
15	Street Scene 96	113	4.947	0.144
16	Street Scene 94	113	4.903	0.143
17	Street Scene 85	113	4.885	0.153
18	Street Scene 22	113	4.876	0.148
19	Street Scene 77	113	4.850	0.153
20	Street Scene 36	113	4.823	0.149
21	Street Scene 5	113	4.796	0.148
22	Street Scene 27	113	4.743	0.158
23	Street Scene 9	113	4.726	0.153
24	Street Scene 46	113	4.708	0.146
25	Street Scene 65	113	4.699	0.138
26	Street Scene 34	113	4.690	0.141
27	Street Scene 76	113	4.673	0.141
28	Street Scene 89	113	4.655	0.137
29	Street Scene 63	113	4.655	0.138
30	Street Scene 16	113	4.637	0.162
31	Street Scene 30	113	4.637	0.163
32	Street Scene 53	113	4.637	0.147
33	Street Scene 7	113	4.628	0.149
34	Street Scene 35	113	4.628	0.147
35	Street Scene 56	113	4.611	0.148

No.	Scene	N	Mean	Std. Error
36	Street Scene 75	113	4.593	0.132
37	Street Scene 52	113	4.566	0.149
38	Street Scene 42	113	4.522	0.141
39	Street Scene 73	113	4.513	0.152
40	Street Scene 51	113	4.478	0.151
41	Street Scene 57	113	4.442	0.157
42	Street Scene 6	113	4.416	0.156
43	Street Scene 82	113	4.416	0.153
44	Street Scene 66	113	4.416	0.154
45	Street Scene 95	113	4.416	0.155
46	Street Scene 45	113	4.407	0.147
47	Street Scene 67	113	4.389	0.157
48	Street Scene 31	113	4.381	0.158
49	Street Scene 21	113	4.372	0.166
50	Street Scene 87	113	4.354	0.152
51	Street Scene 4	113	4.327	0.154
52	Street Scene 11	113	4.310	0.176
53	Street Scene 68	113	4.301	0.164
54	Street Scene 20	113	4.292	0.159
55	Street Scene 39	113	4.274	0.148
56	Street Scene 37	113	4.265	0.148
57	Street Scene 90	113	4.248	0.159
58	Street Scene 84	113	4.239	0.134
59	Street Scene 58	113	4.239	0.160
60	Street Scene 81	113	4.195	0.158
61	Street Scene 72	113	4.168	0.183
62	Street Scene 83	113	4.159	0.162
63	Street Scene 49	113	4.080	0.160
64	Street Scene 43	113	4.071	0.162
65	Street Scene 17	113	4.053	0.163
66	Street Scene 93	113	4.044	0.142
67	Street Scene 86	113	4.027	0.164
68	Street Scene 99	113	4.000	0.191
69	Street Scene 79	113	3.973	0.157
70	Street Scene 64	113	3.965	0.157
71	Street Scene 69	113	3.956	0.154
72	Street Scene 54	113	3.956	0.171
73	Street Scene 18	113	3.956	0.170
74	Street scene 15	113	3.920	0.155
75	Street Scene 70	113	3.912	0.173
76	Street Scene 33	113	3.903	0.155
77	Street Scene 48	113	3.903	0.153
78	Street Scene 78	113	3.894	0.170
79	Street Scene 61	113	3.858	0.149
80	Street Scene 60	113	3.805	0.170
81	Street Scene 3	113	3.779	0.151
82	Street Scene 13	113	3.735	0.161
83	Street Scene 62	113	3.699	0.154

No.	Scene	N	Mean	Std. Error
84	Street Scene 40	113	3.690	0.197
85	Street Scene 74	113	3.690	0.162
86	Street Scene 19	113	3.690	0.152
87	Street Scene 8	113	3.628	0.178
88	Street Scene 14	113	3.619	0.154
89	Street Scene 12	113	3.602	0.158
90	Street Scene 92	113	3.549	0.171
91	Street Scene 38	113	3.549	0.150
92	Street Scene 41	113	3.522	0.171
93	Street Scene 88	113	3.496	0.175
94	Street Scene 91	113	3.469	0.161
95	Street Scene 50	113	3.345	0.183
96	Street Scene 55	113	3.301	0.160
97	Street Scene 2	113	3.177	0.151
98	Street Scene 59	113	3.177	0.180
99	Street Scene 44	113	3.159	0.153
100	Street Scene 23	113	3.044	0.161

Appendix 6: Rating of the street scenes by experts

	Picture	Averages			
		Complex	Linear	Enclosed	Long
most liked	**100**	2.8	3.4	5	5.4
	97	5	3.2	5.8	4.8
	1	3.8	2.6	4.8	4.8
	28	4.8	3.4	5.8	4.2
	71	4.2	2.6	3.2	3.8
	25	3.4	4.4	1.6	4.6
least liked	**50**	5.2	1.6	6.2	1.2
	55	4	4.4	3.2	4.2
	2	4	1.2	5.4	1.2
	59	3.3	2.8	3.4	3.8
	44	2.8	2.8	5.2	2.8
	23	5.4	3.4	4.6	3.8

Appendix 7: Interview note

Anne Mugo, Administrative Assistant, N.C.B.D.A – p.125