

INFLUENCE OF THE PHYSICAL CHARACTERISTICS
OF URBAN OPEN SPACES ON RESIDENTS
PERCEPTION AND USAGE:
A CASE OF 'OLD TOWN' MOMBASA

ALFAYO URUJI MAKDII

MASTER OF SCIENCE
(Urban Design)

JOMO KENYATTA UNIVERSITY OF
AGRICULTURE AND TECHNOLOGY

2011

Influence of the Physical Characteristics of Urban
Open Spaces on Residents Perception and Usage:
A Case of 'Old Town' Mombasa.

Alfayo Uruji Makdii

A Thesis Submitted in Partial Fulfilment for the Degree of
Master of Science in Urban Design in the Jomo Kenyatta
University of Agriculture and Technology

2011

DECLARATION

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

Signature

Date:

Alfayo Uruji Makdii

This thesis has been submitted for examination with our approval as University Supervisors.

1. Signature

Date:

Dr. Francis M. Mburu

JKUAT, Kenya

2. Signature

Date:

Dr. Susan Kibue

JKUAT, Kenya

DEDICATION

For the sacrifices they had to make, this research thesis is dedicated to my dear wife and children. Without their support, love, enthusiasm, tolerance, understanding and prayers, this academic achievement would not have been attainable under the circumstances that prevailed.

ACKNOWLEDGEMENTS

First and foremost, am greatly indebted to the Government of Kenya for the award of the scholarship through the Architectural Department of the Ministry of Public Works that enabled me to pursue the Masters of Urban Design course at Jomo Kenyatta University of Agriculture and technology. The knowledge and experience acquired in the course of the study will definitely be beneficial to the Government and the country at large.

Dr. F. M. Mburu and Dr. S. Kibue of the Department of Architecture, Jomo Kenyatta University of Agriculture and Technology deserve my special gratitude for their patience, encouragements and invaluable inputs while supervising this thesis. I also recognise the contribution by the various professors, lecturers and consultants who took me through the various course units that formed the foundation of this study. The joint effort of the entire teaching and support staff of Jomo Kenyatta University of Agriculture that created an enabling learning environment is commendable. Architect Bernard Mugwima's well balanced opinions on conservation of built environments and his feedback after proof-reading this thesis is highly appreciated.

I also owe my appreciation to the staff of the 'Old Town' conservation office, Municipal office, Central Bureau of Statistics and the Provincial Administration at Mombasa for their crucial support and information given when conducting the field studies for this thesis.

Last but not least, I register my special gratitude to the families of Mzee Zakaria John Makdii and Mzee Asser Ogo Makorani for their moral support and prayers which gave me the strength and courage to overcome the numerous challenges encountered in the course of the study.

TABLE OF CONTENTS

DECLARATION	i
DEDICATION	ii
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	xii
LIST OF FIGURES	xiii
LIST OF PLATES	xvii
LIST OF APPENDICES	xx
LIST OF ABBREVIATIONS	xxi
ABSTRACT	xxii
CHAPTER 1: INTRODUCTION	1
1.1 Background to the Study.....	1
1.2 Statement of the Problem.....	2
1.3 Study Objectives.....	4
1.3.1 Overall Objective.....	4
1.3.2 Specific Objectives.....	4
1.4 Working Hypotheses.....	4
1.5 Study Assumptions.....	4
1.6 Significance of the Study.....	5

1.7	Scope of the Study.....	6
1.8	Limitations of the Study.....	7
1.9	Study Organisation	8
CHAPTER 2: LITERATURE REVIEW.....		10
2.1	Introduction.....	10
2.2	Historical Perspectives of Squares.....	10
2.2.1	Medieval Period.....	12
2.2.2	Renaissance Period.....	15
2.2.3	Baroque Period.....	19
2.2.4	Industrial Period.....	23
2.3	Physical Characteristics of Public Urban Open Spaces.....	24
2.3.1	Edges that Define Space.....	25
2.3.2	The Floorscape.....	35
2.3.3	Urban Furniture.....	41
2.4	Perception of Open Spaces.....	51
2.4.1	Principles of Design.....	51
2.4.2	Other Concepts of Perceptual Spatial Differentiation.....	57
2.5	Uses and Activities of Public Urban Open Spaces.....	63
2.5.1	Functions in Medieval Squares.....	63
2.5.2	Demise of the Piazza.....	64
2.5.3	Vehicular Circulation in Squares.....	64
2.5.4	Grouping of Facilities in Squares.....	65
2.5.5	How People use Public Open Space.....	66
2.5.6	Factors that Affect Activities and Uses in Squares.....	67

2.6	Theoretical Framework.....	68
2.6.1	The Figure - Ground Theory.....	68
2.6.2	The Linkage Theory.....	70
2.6.3	The Place Theory.....	71
2.6.4	Principles of Urban Design.....	75
2.7	Summary to Highlight Gap in Literature.....	76
2.7.1	Summary of Literature Review.....	76
2.7.2	Gap in Literature.....	78
2.8	Conceptual Framework.....	78
CHAPTER 3: RESEARCH METHODOLOGY.....		80
3.1	Introduction.....	80
3.2	Research Methods.....	80
3.2.1	Archival Method.....	80
3.2.2	Interviews.....	82
3.2.3	Observation Method.....	82
3.3	Data Collection Techniques.....	83
3.3.1	Field Tools in Archival Method.....	83
3.3.2	Field Tools in Interview Method.....	83
3.3.3	Field Tools in Observation Method.....	85
3.4	Sampling of Public Open Spaces.....	86
3.5	Sampling of Households.....	88
CHAPTER 4: BACKGROUND OF THE CASE STUDY AREA.....		91
4.1	Introduction.....	91
4.2	Position and size.....	91

4.3	Physical features.....	92
4.3.1	Relief.....	92
4.3.2	Climate.....	93
4.3.3	Vegetation.....	94
4.4	Historical background.....	94
4.4.1	Before the Portuguese Period.....	94
4.4.2	Portuguese Period.....	95
4.4.3	Rule of the Mazrui.....	95
4.4.4	Sultans of Zanzibar.....	96
4.4.5	Twentieth Century.....	97
4.5	The Old Town.....	98
4.5.1	Development of the Old Town.....	99
4.6	The Conservation area.....	100
4.6.1	Development of the Conservation Area.....	101
4.6.2	Public Open Spaces.....	101
4.7	Conclusion.....	102
CHAPTER 5: DATA PRESENTATION AND ANALYSIS.....		103
5.1	Introduction.....	103
5.2	The Open Spaces.....	103
5.2.1	The Piggot Place.....	103
5.2.2	The Government Square.....	104
5.2.3	The Treasury Square.....	104
5.2.4	The Waterfront.....	104
5.3	Configuration of the Open Spaces.....	105

5.3.1	The Piggot Place.....	105
5.3.2	The Government Square.....	106
5.3.3	The Treasury Square.....	107
5.3.4	The Waterfront.....	108
5.4	Activities in the Open Spaces.....	109
5.4.1	The Piggot Place.....	109
5.4.2	The Government Square.....	110
5.4.3	The Treasury Square.....	111
5.4.4	The Waterfront.....	112
5.5	Circulation in the Open Spaces.....	113
5.5.1	The Piggot Place.....	113
5.5.2	The Government Square.....	114
5.5.3	The Treasury Square.....	115
5.5.4	The Waterfront.....	116
5.6	Furniture in the Open Spaces.....	117
5.6.1	The Piggot Place.....	117
5.6.2	The Government Square.....	118
5.6.3	The Treasury Square.....	118
5.6.4	The Waterfront.....	119
5.7	Lighting in the Open Spaces.....	120
5.7.1	The Piggot Place.....	120
5.7.2	The Government Square.....	120
5.7.3	The Treasury Square.....	121
5.7.4	The Waterfront.....	121

5.8	Urban Design Parameters.....	121
5.8.1	Floorscapes.....	122
5.8.2	Elevations.....	124
5.8.3	Spatial Enclosure.....	129
5.9	Residents' Perception.....	133
5.9.1	Whole Space Identity.....	133
5.9.2	Built Environment.....	135
5.9.3	Built Form of Buildings.....	136
5.9.4	Edges of the Open Spaces.....	137
5.9.5	Floorscape of the Open Spaces.....	139
5.9.6	Landscaping (Soft) of the Open Spaces.....	140
5.9.7	Urban Furniture in the Open Spaces.....	141
5.9.8	Uses and Activities in the Open Spaces.....	143
5.9.9	Vehicular Traffic and Parking.....	144
5.10	Summary of the Data Analysis.....	145
	CHAPTER 6: DISCUSSION OF THE RESULTS.....	147
6.1	Introduction.....	147
6.2	Discussion.....	147
6.2.1	Whole Space Identity.....	148
6.2.2	Built Environment.....	148
6.2.3	Built Form of Buildings.....	150
6.2.4	Edges of the Open Spaces.....	151
6.2.5	Floorscape of the Open Spaces.....	153
6.2.6	Landscaping.....	154

6.2.7	Urban Furniture.....	155
6.2.8	Uses and Activities.....	156
6.2.9	Vehicular Traffic and Parking.....	158
CHAPTER 7: FINDINGS, CONCLUSSIONS AND RECOMMENDATIONS.....		159
7.1	Introduction.....	159
7.2	Research Findings.....	159
7.2.1	Specific Objective 1.....	159
7.2.2	Specific Objective 2.....	160
7.2.3	Specific Objective 3.....	161
7.2.4	Specific Objective 4.....	164
7.3	Conclusions.....	164
7.3.1	Inadequate Public Open Spaces.....	164
7.3.2	Physical Characteristics Conducive for Recreation.....	164
7.3.3	Illicit Uses.....	165
7.3.4	Perception of Built Environment.....	165
7.4	Theoretical Implication.....	166
7.5	Research Implication.....	167
7.5.1	User Perception Survey.....	167
7.5.2	Replicate Study in Areas with Similar Characteristics.....	168
7.5.3	Professional and Students Perception Survey.....	168
7.5.4	Redevelopment Stakeholders Survey.....	168
7.6	Practical Implication.....	168
7.7	Recommendations.....	170
7.7.1	Government Legislation.....	170

7.7.2	Urban Design Policy.....	170
7.7.3	Development Plans.....	170
7.7.4	Model and Tools.....	171
7.7.5	Increasing Public Open Space.....	171
7.7.6	Linkages.....	171
	REFERENCES AND BIBLIOGRAPHY.....	172
	APPENDICES.....	181

LIST OF TABLES

Table 3.1	Characteristics of the public open spaces.....	87
Table 3.2	Sample size per administrative area.....	88
Table 5.1	Summary of data for the four open spaces (Perception of respondents in %).....	146

LIST OF FIGURES

Figure 2.1	Basic morphological and configuration characteristics of static and dynamic spaces.....	11
Figure 2.2	Church atrium in Mexico.....	12
Figure 2.3	Mosque courtyard at Cordoba.....	12
Figure 2.4	Piazza del Campo – Plan	14
Figure 2.5	Plan of San Marco Piazza	17
Figure 2.6	Piazza di San Pietro - plan	21
Figure 2.7	High sense of enclosure.....	26
Figure 2.8	Low sense of enclosure	26
Figure 2.9	Degrees of spatial enclosure that can cause agoraphobia and claustrophobia.....	27
Figure 2.10	Plan geometries of positive and negative spaces.....	30
Figure 2.11	Types of facades.....	33
Figure 2.12	Colonnade in Piazzetta San Marco.....	33
Figure 2.13	Variation of hardness of edges.....	34
Figure 2.14	Directional paving in Piazza San Marco.....	36
Figure 2.15	Various paving and soft landscape Materials.....	39
Figure 2.16	Steps defining space without enclosing it.....	40
Figure 2.17	Change in level creating two secondary spaces.....	40

Figure 2.18	Rome's plan by Sixtus V.....	42
Figure 2.19	The Arch of Septimius Severus.....	43
Figure 2.20	Formal and informal types of seating.....	48
Figure 2.21	Varying bench locations and interaction levels.....	48
Figure 2.22	Lamp post in Piazzetta San Marco.....	48
Figure 2.23	Utilitarian modern lamp posts.....	48
Figure 2.24	Asymmetrical balance – Illustrated.....	54
Figure 2.25	Directional lines and light create emphasis.....	55
Figure 2.26	Effect on perception of a viewer's distance from the object.....	55
Figure 2.27	The Golden Section.....	57
Figure 2.28	The Modular.....	57
Figure 2.29	Mass of buildings (Figure).....	69
Figure 2.30	Space between buildings.....	69
Figure 2.31	Pedestrian paths converging on public Square.....	70
Figure 2.32	Web of connections in city linking small spaces.....	70
Figure 2.33	Surface decomposed into vertical facets and flutes.....	72
Figure 2.34	Each column provides one point of contact.....	72
Figure 2.35	Fluting a column multiplies the points of contact.....	73
Figure 2.36	Complex column clusters increase points of contact.....	73
Figure 2.37	Decomposition of vertical wall into horizontal facets and flutes.....	74
Figure 2.38	Vertical undifferentiated building surface offers no points of contact above eye level.....	74
Figure 2.39	Physical characteristics and attributes that influence perception and usage of open spaces.....	79

Figure 3.1	Location of public open spaces in the study area.....	86
Figure 3.2	Distribution of plots with residential use in the study area.....	89
Figure 4.1	Location of Mombasa in East Africa.....	91
Figure 4.2	Location of 'Old Town' in Mombasa Island.....	91
Figure 4.3	Distinct areas of 'Old Town'.....	99
Figure 4.4	Organic character of 'Old Town'.....	99
Figure 5.1	Irregular shaped space with two secondary spaces.....	105
Figure 5.2	Irregular shaped square with three secondary spaces.....	106
Figure 5.3	Irregular shaped garden, amalgamation of four shapes.....	107
Figure 5.4	Three irregular shaped amalgamated secondary spaces.....	109
Figure 5.5	Pedestrian and vehicular circulation in Piggot Place.....	113
Figure 5.6	Circulation pattern when port is closed.....	114
Figure 5.7	Circulation pattern when port is operating.....	115
Figure 5.8	Vehicular and pedestrian circulation in the square.....	116
Figure 5.9	Pedestrian and vehicular circulation.....	119
Figure 5.10	Buildings do not open-up to the square.....	125
Figure 5.11	Entrances to buildings.....	126
Figure 5.12	Few elements on ground floor façade.....	126
Figure 5.13	Part of eastern elevation in playground area.....	128
Figure 5.14	height to width ratios of the Piggot Place.....	129
Figure 5.15	Ratios of building heights to widths of open space.....	130
Figure 5.16	Height to width ratios of the treasury square.....	131
Figure 5.17	Height to width ratio at various sections in the open space.....	132
Figure 5.18	Summary of perception on whole space identity.....	134

Figure 5.19	Summary of perception on built environment.....	135
Figure 5.20	Summary of perception on built form of buildings.....	137
Figure 5.21	Summary of perception on edges of open spaces.....	138
Figure 5.22	Summary of perception on floorscape of the open spaces.....	139
Figure 5.23	Summary of perception on landscaping (soft) of the open spaces.....	140
Figure 5.24	Summary of perception on urban furniture in the open spaces.....	142
Figure 5.25	Summary of perception on uses and activities in the open spaces.....	143
Figure 5.26	Summary of perception on vehicular traffic and parking in the open spaces.....	144

LIST OF PLATES

Plate 2.1	Piazza del Campo.....	14
Plate 2.2	Piazza San Marco.....	17
Plate 2.3	Floor pattern.....	18
Plate 2.4	Facades.....	18
Plate 2.5	Piazza di San Pietro.....	21
Plate 2.6	Vehicular circulation displacing other uses in Houston, Texas.....	23
Plate 2.7	Vienna, Schwarzenbergplatz looks vast and deserted.....	28
Plate 2.8	St. Marks Cathedral, Venice.....	32
Plate 2.9	Place des Victoires, Paris.....	32
Plate 2.10	Non directional paving in Campidoglio.....	36
Plate 2.11	Landscaped garden in Santa Barbara.....	38
Plate 2.12	Decorative patterning.....	39
Plate 2.13	The Spanish Steps, Rome.....	40
Plate 2.14	Steps at the Campidoglio, Rome.....	40
Plate 2.15	Obelisk, Southport.....	42
Plate 2.16	Mable Arch, London.....	43
Plate 2.17	Monumental column in Place Vendome-Paris.....	43
Plate 2.18	Double columns at Waterfront of Piazza San Marco.....	43
Plate 2.19	Tower clock in Piazza S. Carlo.....	44
Plate 2.20	Monumental clock.....	44

Plate 2.21	Reflective quality of still pool of water, Japan.....	45
Plate 2.22	Fountain in New York.....	45
Plate 2.23	Group type of statuary, France.....	46
Plate 2.24	Equestrian statue, Paris.....	46
Plate 2.25	Telephone booths in London.....	49
Plate 2.26	Kiosk integrated with stair in Runcorn New Town (England).....	49
Plate 4.1	Historic buildings in the Piggot Place.....	98
Plate 4.2	Historic buildings in the Government Square.....	98
Plate 5.1	Parked carts.....	110
Plate 5.2	Parked cars.....	110
Plate 5.3	Square-crowded.....	110
Plate 5.4	Furniture in square.....	110
Plate 5.5	Public seating in the square.....	112
Plate 5.6	Walking through the square.....	112
Plate 5.7	Middle section connecting garden to playground.....	113
Plate 5.8	Garden section of the Waterfront.....	113
Plate 5.9	Walking on road.....	113
Plate 5.10	Homogeneous floorscape surface.....	114
Plate 5.11	Weekday activities.....	115
Plate 5.12	Tourists in playground.....	117
Plate 5.13	Circulation in park area.....	117
Plate 5.14	People sitting on steps of closed shop doors.....	118
Plate 5.15	Telephone booth.....	118
Plate 5.16	Casual sitting.....	118

Plate 5.17	Public benches.....	119
Plate 5.18	Low wall seating.....	119
Plate 5.19	Bench in playground.....	119
Plate 5.20	Benches in park.....	119
Plate 5.21	Security light in the open space.....	120
Plate 5.22	Glare on the white washed surfaces.....	120
Plate 5.23	Lamp post in park area.....	121
Plate 5.24	Long bench on edge of playground.....	121
Plate 5.25	Curbs and pavement delineates floorscape into zones.....	122
Plate 5.26	Patterned paving blocks.....	123
Plate 5.27	Homogeneous floorscape surface.....	123
Plate 5.28	Mazeras paving, visually rich and natural.....	123
Plate 5.29	Landscaped, Mazeras and concrete block paved areas in park.....	124
Plate 5.30	DC's office in background.....	127
Plate 5.31	Municipal offices in background.....	127
Plate 5.32	Playground enclosed by Fort Jesus, bench & trees, Walling and railing.....	132
Plate 5.33	Sunken facility.....	133
Plate 5.34	Hedge.....	133

LIST OF APPENDICES

Appendix I	The Questionnaire.....	181
Appendix II	The Checklist.....	186
Appendix III	Residents' perception on physical characteristics.....	188
Appendix IV	Redevelopment of the Government Square – Project Report.....	197
Appendix V	Research – Schedule of accommodation.....	205

LIST OF ABBREVIATIONS

AD	<i>Anno Domini</i>
DC	District Commissioner
GLC	Greater London Council
GOK	Government of Kenya
m	Metre
MMC	Mombasa Municipal Council
NMK	National Museums of Kenya
OTM	'Old Town' Mombasa
Sq.m	Square metre
UNPF	United Nations Population Fund

ABSTRACT

'Old Town' Mombasa is a densely built up historic area with inadequate public open spaces for recreation. Nevertheless, even the few existing open spaces are profoundly underutilized by the residents for recreational purposes. This discrepancy is what prompted the researcher to establish whether the physical characteristics of the open spaces have any influence on the residents' perception and their usage. The study is based on multiple-methods approach that entailed observation, interview, archival information and measurements in Old Town Mombasa. First the physical characteristics of the sampled open spaces and the residents' perception of the same were established. Then the analysis of the results through discussion established that there is a relationship between the physical characteristics and residents' perception. Consequently, the residents' perception of the physical characteristics influences the usage of these open spaces. The study findings indicate that the residents prefer: Large open spaces with low sense of enclosure; soft as opposed to hard spaces; perforated edges with complex built forms and interesting buildings around the open spaces; natural and varied floorscapes; diverse and well maintained soft landscaping; variety of urban furniture with sheltered benches; minimal vehicular traffic and parking; and secure and serene atmosphere. The study concludes that the findings can be used to regenerate the public open spaces into vibrant appealing sustainable developments while at the same time discourage illicit use. The recommendations include: enactment of legislation to regulate redevelopment of public open spaces; develop urban design policy that will guide preparation of development plans for all urban public open spaces; and involvement of all stakeholders in the regeneration of public open spaces. The study can be

taken to be a model and tools based on community's perception that can be used to revitalise urban historic open areas to meet the residents' recreational needs.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND TO THE STUDY

From the early medieval to the present era, a lot of changes have taken place in the socio-cultural, economical and technological realms that have led to the evolution of both cities and urban space. This is evident in the richness and diversity of the legacy of public open space scattered all over the world, a product of both direct planning processes by individual residents and professionals, as cities continually adjust and adapt to the physical environment (Gehl, 1990). However, urban open spaces expected to serve as nodes within the busy street networks seem deserted and unpleasant with the exception of a few like the Piazza San Marco in Venice and Trafalgar Square in London, which are always crowded with people (Alexander, 1977; Lynch, 1960).

The same observation has been made on the public open spaces in the densely built-up historic 'Old Town' Mombasa (OTM). Despite recent efforts by the National Museums of Kenya (NMK) and the Mombasa Municipal Council (MMC) to improve the status of the open spaces, it has been noted by the researcher that residents whose population density has increased by 55% from 1958 to date are not attracted to these spaces (Dyer, 1963; King, 1990). This discrepancy is what has triggered the desire to establish the relationship between the physical characteristics of open spaces in historic areas that are under conservation and the residents' perception and usage.

1.2 STATEMENT OF THE PROBLEM

'Old Town' Mombasa is a densely built up historic area with inadequate public open spaces for recreation characterised by irregular shaped plots, and narrow streets and alleyways typical of many medieval towns. This is highlighted by the current physical development guidelines, whereby 1-2 hectares recreational space is recommended per every 10,000 people in areas with a population density of more than 50 persons per hectare. Considering the current estimated population of 27518 with a calculated population density of 375 persons per hectare, the total recreational space area required for OTM, which has an area of 72 hectares, is between 21 and 42 hectares. Since the study area's population and area coverage is about a third that of the entire old town, then the recreational space requirement for the area should be between 7 and 14 hectares. Put against the existing 1.93 hectares, this indicates that there is a critical shortage of public open space for recreational use in the study area.

Apart from the critical shortage of public open spaces that is expected to compel the residents to crave for the few and small available open spaces, there seems to be other factors embedded in the physical characteristics that attract or repel residents from using the communal spaces for their recreation. From observation there are some open spaces that attract illicit uses like garbage dumping, drug trafficking and mugging amongst others. This makes the affected spaces insecure and unpleasant as garbage collection points attract rowdy street urchins, cats, crows and vermin while at the same time being sources of unhealthy foul smell. As people avoid these spaces they become patronised by gangs and cease to be attractive for any viable use including recreation. If these open spaces are to be used for the desired intended public purpose the factors that result in the illicit uses need to be addressed. This will necessitate redesign to incorporate the right physical characteristics conducive for vibrant and pleasant open spaces.

For open spaces to be vibrant there has to be concentration of uses and activities that attract people during the day and also at night. Special amenities for recreation are a strong indicator that the public are invited to use the spaces for passive or active recreation. High concentration of communal activities like shopping, eating in restaurants and hotels, and entertainments amongst others also contribute to the success of open spaces as nodes of activity for the public. When the main use associated with a public open space is private then its public function effectively ceases. There is hence the need to package the open spaces with the right activities and uses for them to be vibrant.

People in densely built urban areas always yearn to interact with nature. In these areas there is generally inadequate greenery and natural features that the public can relate with. Soft landscaping adds value to an open space and particularly when coupled with protection from inclement weather. Covered walkways, paved pedestrian areas, covered sitting areas can be an asset to attract the public to an open space.

The above noted problems of inadequate public open spaces, insecurity, illicit uses, deserted public open spaces and lack of amenities that create conducive environment for recreation are what prompted the research to investigate and establish if the physical characteristics of urban open spaces have any influence on resident's perception and usage. The study also gives an insight on how the residents of OTM perceive their built environment which is in a conservation area.

1.3 STUDY OBJECTIVES

1.3.1 Overall Objective

To develop a model and tools based on residents' perception that can be used to regenerate urban open spaces in historic areas to meet their recreational needs.

1.3.2 Specific Objectives

1. Establish the physical characteristics of the open spaces in OTM;
2. Establish the residents' perception and usage of the open spaces;
3. Establish whether the physical characteristics of the open spaces have any influence on the residents' perception and usage; and
4. Formulate policies and guidelines for the redevelopment of urban open spaces in historic areas under conservation to meet the specific needs of residents.

1.4 WORKING HYPOTHESES

Null Hypothesis (H_0): Physical characteristics of urban open spaces have no influence on residents' perception and usage.

Alternate Hypothesis (H_A): Physical characteristics of urban open spaces have an influence on residents' perception and usage.

1.5 STUDY ASSUMPTIONS

1. Residents of densely built historic areas need public open spaces in their neighbourhoods for recreational purposes.
2. The physical characteristics of the public open spaces influence the residents' usage for recreational purposes.

3. The residents' perception of the physical characteristics of the public open spaces influences the usage.

1.6 SIGNIFICANCE OF THE STUDY

This study which focuses on the relationship between physical characteristics of public urban open space and resident's perception and usage is timely as the attempts by the NMK and MMC in improving the spaces seem not to have enhanced their recreational value to the residents. By identifying the physical characteristics that are conducive for recreation, the research offers urban design solutions that can be used to revamp the public open spaces in OTM and those in other historic towns, squatter and informal settlements that have similar characteristics.

The critical population this study will impact on are the poor and marginalised urban dwellers in urban historic areas, squatter and informal settlements in developing countries. By 1995, 50% of the urban population in Africa lived in unplanned and overcrowded settlements (Maringa, 2005). With the current rate of urbanisation which has become virtually synonymous with slum growth, the issue of open spaces in sub Saharan urban areas must be addressed now. The United Nations Population Fund (UNPF) has indicated that by 2030, the urban populations in African towns will double while 72% are currently living in slum conditions (Nation, 2007). If deliberate attempts are made to design and manage appropriate urban open spaces which will act as communal living rooms, the trauma associated with overcrowding in urban areas can be checked.

The study has diverse implications for a wide range of related practical problems. Apart from creation of appropriate urban open spaces that residents can relate with, the problem of drug gangs patronising public space will be addressed, and conflicting land uses sorted out. The boost

of activity level and usage of the public open spaces that act as neighbourhood nodes will ensure surveillance and safety. This will enhance the image of urban public open spaces and ultimately improve the quality of life of residents living in densely built historic areas.

The study also highlights the residents' perception of their historic built fabric which is under conservation. The conservation issue in OTM has been controversial. Whereas the historic character of the old town is a major tourist attraction, the owners of the old buildings that constitute cultural heritage seem not to benefit directly from the proceeds of tourism.

1.7 SCOPE OF THE STUDY

Streets and squares both constitute urban open space. This study was confined to squares which are open to the public where the recreational needs of the residents are expected to be met. Though cemeteries and private open spaces are part of the system of open spaces in OTM, they were not considered in this study due to the reason given above.

The theoretical scope of the study dwelt on the physical characteristics of open spaces that were segregated into their various components for detailed analysis. Perception of space and usage of public open space have been considered to be within the scope of the study. The elements of the open spaces studied include the:

1. Edges that define the space;
2. Floorscape;
3. Permanent and temporary three dimensional objects found in the space;
4. Activities and uses in the open space.

Due to the study limitations stated here below, the scope of the study is limited to the sampled open spaces and households. The triangulation of both quantitative and qualitative research techniques was found to be necessary for this study.

1.8 LIMITATIONS OF THE STUDY

Considering the time frame within which this Research Thesis had to be undertaken, the entire population of open spaces and households in the study area could not be covered. This necessitated the use of sampling to get the four open spaces taken as case-studies and the households to be used for the survey. For the same reason, this research is limited to the open spaces meant to accommodate the recreational needs of the public. The streets and alleys which also constitute public open space have not been covered in this study.

The funds allocated for this study was another limiting factor on account of the distance of about 500 kilometres between the study area and the location of the research office. Programming ensured that the number of trips and days spent in the study area were reduced to a bare minimum. Further to this, the sampling of both the open spaces and households, and the engagement of 12 research assistants to assist in the household survey ensured that the study fitted within the financial constraint of the budget.

One of the problems encountered during the pre-test was the reluctance of the subjects and particularly women to freely interact with the researcher and respond to the issues raised in the questionnaires. This was aggravated further by the police patrols organised to ensure security covering the world marathon event held in Mombasa when the study was being undertaken. The vetting, engagement and training of research assistants who are local to the study area covered

the religious / cultural and communication barrier. The provincial administration through the area chief's office was helpful in the identification of the most qualified research assistants and educating the ward elders in whose areas of jurisdiction the survey was undertaken.

1.9 STUDY ORGANISATION

The research report is organized into seven sections. The first chapter is an introduction explaining the problem under investigation. It covers the background to the study, problem statement, study objectives, study assumptions, significance of the study, scope of the study, study limitations and how the research report has been organized.

The second chapter is a critical review of existing literature, previous research articles, papers, journals and internet on the problem under study. The history of urban open spaces from Medieval up to post-modern movement periods is outlined. The characteristics of open spaces derived from research and existing built environments that constitute part of the variables for the study will be discussed. Special interest is accorded to restoration of open spaces in urban historic areas under conservation. This chapter is concluded with theoretical and conceptual frameworks. Subsequently, the research hypotheses are enumerated as the final summary to the chapter.

The third chapter is the research methodology. It is divided into subsections with an introduction that gives an overview of the research design. The various methods used in the study are discussed in individual subsections. Other sections cover the sampling procedures, data collection methods, interpretation and analytical techniques.

The fourth chapter covers the background of the study area. It starts with the physical features of the broader Mombasa and the influences of the rulers of the town from the Portuguese period up to the twentieth century. This is followed by the historical development of the old town before focusing on the conservation area which constitutes the area of study.

The fifth chapter covers the results of the study. The survey responses are analysed and compared with the data on the environmental behaviour studies of the four case studies gathered by the researcher using the archival and observation methods.

The sixth chapter is a discussion of the results to establish the influence of the physical characteristics of urban open spaces on the residents' perception and usage, and derive the policy recommendations for redevelopment of historic urban open spaces.

The last chapter presents the findings, conclusions and recommendations of the study in line with the stated objectives. Finally, a bibliography and appendices are annexed to the research report.

CHAPTER 2

LITERATURE REVIEW

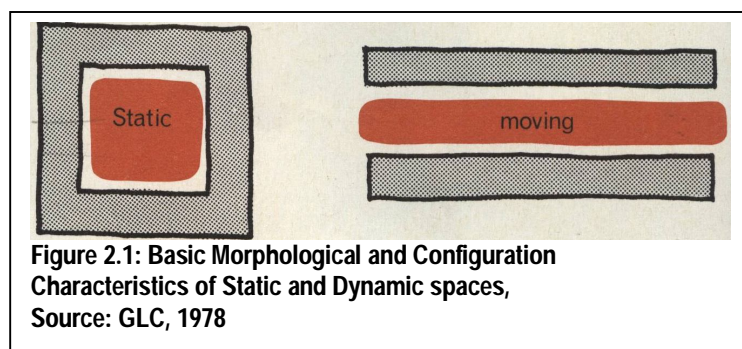
2.1 INTRODUCTION

The literature review focuses on squares which are static spaces within the busy street networks in urban areas that constitute the communal realm where concentration of activity and people is expected (Lynch, 1960; Greater London Council [GLC], 1978; Kostof, 1992). It starts with a brief synopsis of squares in the medieval, Renaissance, Baroque and industrial periods. These historical eras are periods that the changing people's culture led to the evolution of public urban space. This is followed by a critical examination of literature on the physical characteristics of squares and how they are perceived and used. The gap in literature that this study intends to fill is discussed before the theoretical and conceptual frameworks are presented.

2.2 HISTORICAL PERSPECTIVE OF SQUARES

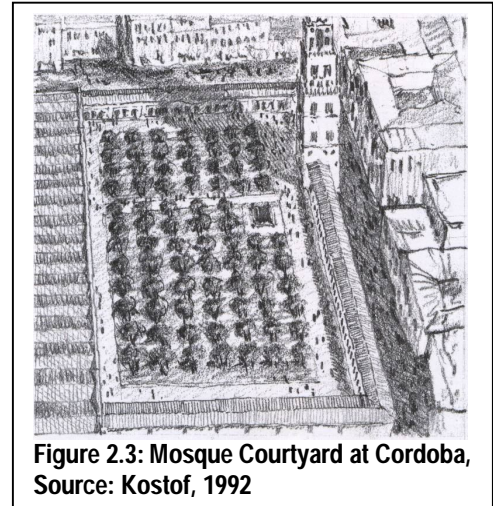
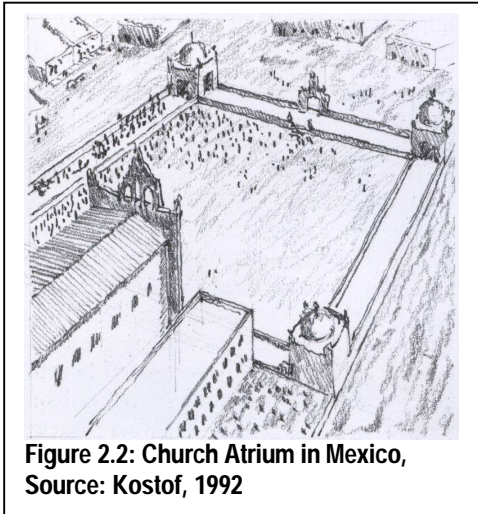
The origin of public open space provision is associated with the medieval 'common' which played an important role as a communal grazing space for local villagers (Hardin, 1995; Peake, 2005). As the human race evolved, the development of settlements with a high concentration of people and activities led to the emergence of historic towns which have been the foundation of urban developments in the world (Blumenfeld, 1967; Mumford, 1970). With this came the concept of urban space which entails any type of space between buildings and other space defining elements which are geometrically bounded by a variety of elevations (GLC, 1978; Krier, 1979; Kostof, 1992).

On account of morphological and configuration characteristics, urban space is classified into two spatial forms: the street and the square (Lynch, 1960; Jacobs, 1961; Krier, 1979; Moughtin et al, 1999). Whereas the streets are linear dynamic spaces that link up the different elements of our cities and are primarily places of transit, the squares on the other hand are static spaces (Fig, 2.1) seen as destinations ideal for ritual and interaction, within the busy street networks where concentration of activity and people is expected (Lynch, 1960; GLC, 1978).



Squares started in the private sphere with the grouping of houses around an open space to create a high degree of control of the courtyard. Krier (1979) avers that this is probably the first way man started using urban space. In Medieval towns each clan neighbourhood clustered around small family squares where the men folk met (Mumford, 1970; Kostof, 1992). This later developed into the 17th century English square that had a random pattern of private development around open spaces to accommodate a genteel clientele (Kostof, 1992).

In the public sphere, squares were the prerogative of religious architecture as illustrated by the atrium of the early Christian basilica and the *sahn* of the muslim mosque (Fig. 2.2 and 2.3). A person entered through one or more gates while the squares were surrounded by covered porticoes (Kostof, 1992). At times these courtyards would assume non-religious functions such as market places, parade grounds, ceremonial squares (Krier, 1979; Kostof, 1992). Due to the



variations in site conditions and cultures, the ensuing public squares are so diverse in nature with different qualities which give each space its specific character and identity (GLC, 1978; Krier, 1979; Kostof, 1992).

From the medieval period to date, the nature of public squares has been changing in response to man's advancement in the socio-cultural, economic and technological realms. To appreciate how squares have evolved with time, it is deemed proper to have a brief examination of squares through the Medieval, Renaissance, Baroque and Industrial periods.

2.2.1 Medieval Period

During the medieval period, from the 11th to 15th centuries, some small towns developed in Europe which were contained by heavy perimeter security walls (Mumford, 1970; Longman, 1978; Stuber, 1979). Whether organic or geometrical, the small medieval town had a central open space where the principal church was usually located, and where the town hall, the guild hall, the market and the inns, finally clustered (Mumford, 1970; Stuber, 1979). As the towns increased in size more medieval squares whose great popularity is rooted in their characteristics developed to

accommodate different specific uses like market places, parade grounds, ceremonial squares as some accommodated churches and town halls (Krier, 1979; Stuber, 1979).

Up to the end of the medieval period, towns were shaped by residents with the assistance of the master builders operating under a guild, in a direct planning process which led to an image of comprehensiveness and totality, one of the most important contributions of medieval urban design (Stuber, 1979; Gehl, 1987; Kostof, 1992; Tibbalds, 1992). This process that evolved through hundreds of years resulted in successful urban spaces that up to today are characterised by a variety and mix of uses and activities (Alexander, 1965; Tibbalds, 1992; Katile, 2006). To illustrate some of the physical characteristics of urban space developed during the medieval period, the Piazza del Campo is discussed here below.

Piazza del Campo

The Piazza del Campo is one of Europe's greatest medieval squares in Siena. The medieval town is a maze of narrow streets and alleys around the fan (Fig. 2.4) shaped piazza (GLC, 1978). The Piazza del Campo is located in a sloping semicircle at the meeting point of the three hills on which Siena is largely built. Probably this unusual topographical feature has encouraged some form of open space since Roman times.

(i) Spatial Organisation

Piazza del Campo is a distinctive large square enclosed by buildings which are detached from each other by tight, narrow and confined streets and alleys. Entering the bright large amphitheatre of the Piazza del Campo from the dark narrow streets and alleys creates a profound contrast in spatial sensation enough to evoke a feeling of exhilaration, which is a



stimulating urban experience (GLC, 1978). The piazza has no through vistas as sight lines terminate within the piazza. The design of the piazza takes advantage of the topographic condition of the sloping site with the focus being the stage of the amphitheatre. Architectural elements like the soaring Torre del Mangia (plate 2.1) add drama due to the elevation change.

(ii) Scale and Proportion

Early form of zoning established regulations regarding architectural scale and surrounding façade details which enhanced the visual unity of the piazza. The use of paving patterns, bollards and the fountain assists in scaling down the large space and particularly when it is not in use. The variety in the building designs all round the piazza sets a rhythm on account of the variations in the design of individual blocks and use of materials. However the regulations seem to have contributed to the harmony achieved in the buildings which are the primary elements that enclose the space.

(iii) Uses

Piazza del campo acquired its ceremonial function by accident according to Kostof (1992). As the main open space in the city of Siena, in front of the Palazzo Pubblico, it became the natural venue for the *Palio*, a horse-race contested each year on 2nd July and 16th August between the various *contrade* or districts. Medieval in origin, it is an affair of colourful costumes, banners, excitement, and passionate rivalries, which attracts a lot of people. The piazza is mainly used as an amphitheatre.

2.2.2 Renaissance Period

Renaissance is a historical phenomenon covering the period of time in Europe between the 14th and 17th centuries. It was during the Renaissance period when the art, literature and ideas of ancient Greece and Rome which had degenerated beyond recognition in the Middle Ages; a period associated with ignorance and decline by early historians after the defeat of the last western Roman Emperor in 476, were discovered again, examined and developed (Longman, 1978; Murray, 1978; Adams, 1999).

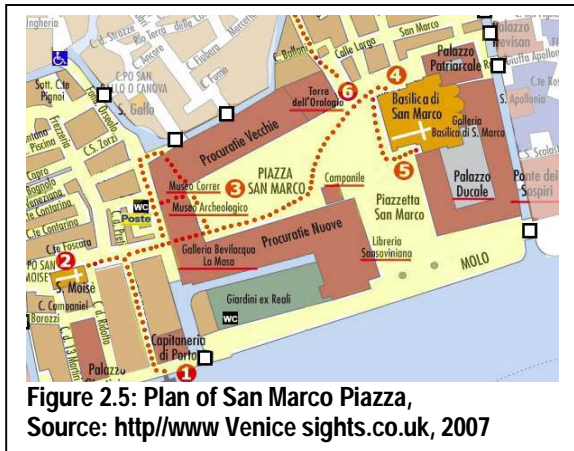
Renaissance humanists believed in the pursuit of knowledge, which led to the development of the technique of chiaroscuro and linear perspective (Adams, 1999; Getlein, 2002). Chiaroscuro was a technique used by painters for modelling mass in two dimensions through variation in value before the invention of photography. Coupled with close observation of nature, the study of anatomy, theories of beauty and proportion; architecture, painting and sculpture were established as intellectual activities allied with mathematics, science and poetry (Adams, 1999; Getlein, 2002). Artists were no longer mere craft workers, but learned persons with creative powers (Stuber, 1979; Adams, 1999; Getlein, 2002).

The Renaissance brought vast changes to the urban realm as the rulers who included kings, nobles, merchants and popes engaged artists and artisans in the reshaping of cities and particularly of their seats of power (Stuber, 1979). The growing number of professionals put an end to the direct planning processes of individual residents that had developed and been shaping cities for hundreds of years as they continually adjusted and adapted to the physical environment (Stuber, 1979; Gehl, 1990; Katile, 2006).

Formal plazas and squares were carved out of the medieval towns and given the monumental character of the Greek and Roman classical period that replaced the structural quality of the Middle Ages with a pure, symmetrically modelled sculptural form (Stuber, 1979). The exterior space was enclosed by formal facades, and their shapes were modelled like sculptured pieces isolated from the rest of the city (Stuber, 1979; Adams, 1999). To illustrate some of the physical characteristics of urban space developed during the Renaissance period, the Piazza San Marco is discussed here below.

Piazza San Marco

Piazza San Marco which has been referred to as the “Ballroom of Europe” is the most famous square in Venice whose origin dates back to the 9th century and was not completed until the 19th century (Lanar, 2007; Wikipedia, 2007). Despite the many alterations and improvements that have been done, the San Marco Piazza is an epitome of squares in the renaissance period. Highly differentiated, rich and intricate, it stands in sharp contrast (Fig. 2.5 and Plate 2.2) to the general character of the city and to the narrow twisting spaces of its immediate approaches (Lynch, 1960). The Piazza, where all the important offices of the Venetian state and the seat of the archbishopric were located has always been seen as the centre of Venice (Wikipedia, 2007).



(i) Spatial Organisation

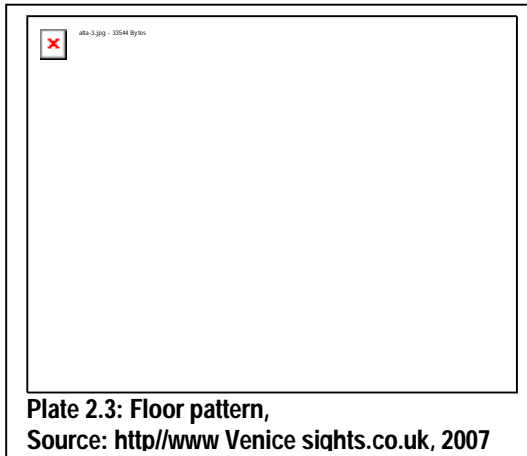
The Piazza San Marco which is defined and enclosed by buildings except at the waterfront is within itself highly differentiated and structured into two secondary spaces (Fig. 2.5), the Piazza and Piazzetta (Lynch, 1960, Wikipedia, 2007). The buildings around the Piazza are the Doge's Palace, St. Mark's Basilica, St. Mark's clock-tower, the Procuratie Vecchie, the Napoleon wing of the Procuraties, the Procuratie Nuove, St. Mark's Campanile and loggetta and the Biblioteca Marciana (Wikipedia, 2007). All the facades of the buildings have the symmetrical and geometric quality that is a feature of Renaissance architecture (Adams, 1999).

The basic shape of the Piazza San Marco is an amalgamation of two trapeziums which visually appear to be rectangles when one is inside the spaces (Kostof, 1992; Moughtin et al, 1999). The campanile, which is an architectural tower element, has been ingeniously used to hinge the two secondary spaces together (Kostof, 1992; Moughtin et al, 1999). Views into the piazza and piazzetta are caught by extended architectural elements. On account of possibly emphasizing perspective views discovered during the renaissance period, the basilica appears grandeur and the piazza deeper as a result of the converging / diverging planes (Moughtin et al, 1999). The flagpoles before the church and the two columns at the waters edge suggest transparent space

edges (Wikipedia, 2007). From the restrictive approach to the piazza, one is surprised by the regularity, light and volume encountered in the Piazza San Marco which gives a stimulating spatial experience.

(ii) Scale and Proportion

The architectural treatment of the facades and floorscape (Plates 2.3 and 2.4) in both the piazza and piazzetta has had a tremendous effect in making the vast spaces scaled for human comfort.



This has been achieved by the use of colonnades which unify the entire space and creates a rhythm in the facades which are long. The horizontal planes have been emphasised by the use of facets, flutes and roof edges which facilitate information access on the horizontal planes parallel to the ground and visually scales down the height of the buildings. The patterns on the floorscape function as elements that unify space and give it scale, while at the same time directing the eye towards the Basilica which is the main building of the composition (Moughtin et al, 1999). The spatial relationship between the height of the buildings and the width of the space is within the proportions which induce a feeling of comfort which are 1:1 below which can be claustrophobic and 1:4 beyond which can be agoraphobic (Lynch, 1960; GLC, 1978).

(iii) Uses

Piazza San Marco, as the central landmark and gathering place of Venice has been the site of countless pageants, processions, political activities, carnival festivals and executions throughout its history. On account of the variety and mix of uses in the piazza which include: shopping, sightseeing, restaurants and bars, cinema and movie theatres, live theatre, museums and exhibition galleries, hotel accommodation, vendors, feeding pigeons and gondoliers; the square bustles with activities and is regarded as one of the most famous squares in the world (Lynch, 1960; Wikipedia, 2007). Thousands of pigeons that flourish from food offered by tourists enhance the activity level of the Piazza which usually attracts a lot of people (Wikipedia, 2007). At night people just stand and watch as others dine and listen to music from the cafes and orchestras all around the square (Wikipedia, 2007).

2.2.3 Baroque Period

During the Baroque period when very decorative styles in art, music and buildings among others developed in Europe in the 17th century, the cities expanded and the dominance of the central power of the rulers intensified (Longman, 1978; Murray, 1978; Stuber, 1979; Adams, 1999). The feeling of grandeur led to unparalleled extremes in proportion, scale and size as whole cities were oriented around the palaces and gardens of the rulers (Bacon, 1967; Norberg-Schulz, 1979; Stuber, 1979).

Urban design took a new direction as the cities opened up and the focus shifted from walled-in architectural forms to those with an extension of open space (Norberg-Schulz, 1979; Stuber, 1979). Squares which were previously designed as isolated enclosed spaces became open and less confined and more oriented towards the countryside (Stuber, 1979). In many instances

squares were connected and the continuity of the open space emphasized by colonnades and tree-lined avenues as exemplified by the plan by pope Sixtus V for the revalorization of Rome (Stuber, 1979; Kostof, 1992). During the Baroque period, the space between buildings acquired a new importance as the real constitutive element of the urban totality with the facades being a function of the urban space (Norberg-Schulz, 1979).

Baroque art differs from that of the Renaissance in several important respects. Whereas Renaissance art stressed the calm of reason, Baroque art is full of emotion, energy and movement. Colours are more vivid in Baroque art than in Renaissance, with greater contrast between colours and between light and dark. In architecture and sculpture where the Renaissance sought a classic simplicity, the baroque favoured ornamentation, as rich and complex as possible. Baroque art has been called dynamic and even theatrical. To illustrate some of the physical characteristics of urban space developed during the Baroque period, the Piazza di San Pietro is discussed here below.

Piazza di San Pietro (St. Peter's Square)

Piazza di San Pietro which was curved out of the medieval town is one of the greatest squares in the world and the crown of the Baroque squares in Rome (Gallion and Eisner, 1975; Norberg-Schulz, 1979; Stuber, 1979). The square which acts as an atrium for the Vatican and St. Peter's that is considered to be the mother of nearly all catholic churches, has attained some symbolic status as a religious centre (Norberg-Schulz, 1979).

(i) Spatial Organisation

The Piazza di San Pietro is an amalgamation of three secondary spaces: Piazza retta, Piazza

obliqua and Piazza rusticucci (Fig. 2.6) which are all symmetrically organised along an axis (plate 2.5) which have the church as their main focus (Norberg–Schulz, 1979; Moughtin et al, 1999). Piazza retta and Piazza rusticucci are both trapezoidal spaces (Fig. 2.6) that look like rectangles that are linked up by the Piazza obliqua which consists of two half circles with a rectangle in between making it appear like an ellipsoid (Norberg-Schulz, 1979). The shape of the main piazza was determined by several functional demands, such as full visibility of the façade of St. Peter’s, comfortable access to the Vatican Palace, and a covered “ambulatory” for processions.

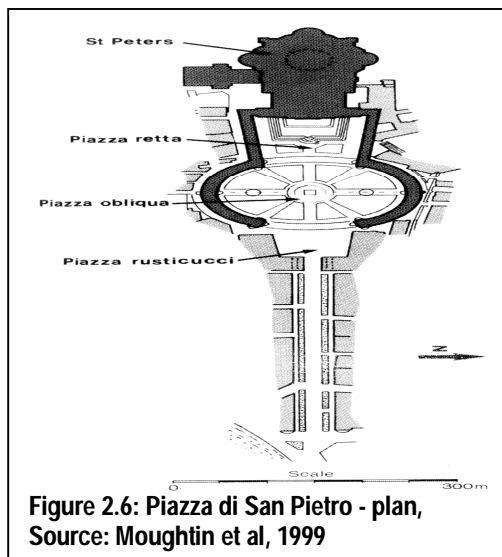


Figure 2.6: Piazza di San Pietro - plan,
Source: Moughtin et al, 1999



Plate 2.5: Piazza di San Pietro,
Source: Norberg-Schulz, 1979

What makes the Piazza di San Pietro one of the greatest squares ever conceived are its general spatial characteristics with the Piazza obliqua which can be perceived simultaneously as both closed and open. Though clearly defined the oval shape that is open where it links up with the other secondary spaces creates an expansion along the transverse axis while the “transparent” colonnade affords interaction with the spaces beyond making the piazza look like an open extended environment. The trapezoid piazza retta also forms part of this general pattern with the obelisk at the core of the Piazza obliqua unifying and connecting all the directions with the longitudinal axis that leads to the church.

(ii) Scale and Proportion

The opening between the Piazza obliqua and the Piazza retta has been designed to be narrower than the facade of the church (Fig. 2.6) but are spontaneously perceived to be equal (Plate 2.5) making the Piazza retta seem to be a rectangle. Coupled with the treatment of the lateral walls of the Piazza retta which decreases in height as one approaches the church makes the façade of St. Peters seem shorter than it is and correspondingly taller. The height of the church façade is thus “measured” in relation to smaller pilasters than the similar ones at the beginning of the piazza retta. The transverse oval of the piazza obliqua finally brings the church relatively closer to the beholder.

The ground plane has been manipulated using a paving pattern that ties the central space of the Piazza obliqua with the colonnades giving the vast space some scaling with the aid of the obelisk, the smaller statues and bollards. Apart from creating a rhythm the colonnades which uses one single element: the classical column, also act as scaling elements. Piazza di San Pietro shows that the basis of Baroque art is found in general principles rather than in exuberant detail (Lanar, 2007).

(iii) Uses

Piazza di San Pietro is used as the atrium to St. Peter's that is considered to be the mother of most catholic churches and the Vatican which is the official residence of the Pope. The square does not have diversity of use but is confined to the functions and rituals of the Catholic Church. At times vehicles are parked in the open space while the public can access the square for site seeing at certain prescribed times.

2.2.4 Industrial Period

During the industrial period which encompassed the 18th and 19th centuries, machines were invented and the first factories were established in Europe (Longman, 1978). The introduction of mechanical power and the rise of capitalism led to a new era of urban evolution with the automobile changing the function and meaning of collective space in many towns and cities (Stuber, 1979). As the towns and cities grew the problem of traffic pollution and congestion became more acute (Kostof, 1992). The use and experience of urban open spaces with time was reduced to a mere function of transportation and communication displacing other uses (plate 2.6) that traditionally used to take place in the open spaces (Stuber, 1979).



**Plate 2.6: Vehicular circulation displacing other uses in Houston, Texas,
Source: Kostof, 1992**

It is in the industrial city that public parks and greenways were recognised as a critical element of the city, while public open space was considered essential for the health and well being of residents in the 19th and early 20th centuries (Kostof, 1992). This was after most of the amenities that were existent in pre-industrial urban life were sacrificed to the requirements of industrial production which led to the proliferation of industrial slums that were added to the traditional slums (Stuber, 1979). Public and collective urban life took place in the slums by sheer necessity, caused by the extremely high densities.

Modern squares are too open and amorphous to define a positive volume of public space; and this is so because the primary consideration in the design of the modern city is to ease the flow of traffic (Alexander et al, 1977; Kostof, 1992). Sitte (1945) and Zucker (1959) criticised modern squares to be simply spaces marked as such on maps which actually are no more than plain voids, empty areas within the web of streets. The lesson of urban history was that public spaces must be viewed in three dimensions, as volumes curved out of the solid of the built fabric.

For thousands of years squares and streets had been enclosed units, and served as legitimate urban stages of social interaction (Alexander et al, 1977). That fundamental social value of public spaces was being sacrificed in the modern metropolis to the functionalist calculations of traffic engineers and the grandiloquent agoraphilia of planners (Blumenfeld, 1967; Kostof, 1992). In the empty expanses of modern squares, people missed the traditional engagement of the public citizen with the buildings and monuments of his city, and developed the modern affliction of *Platzscheu*, the fear of open spaces (Kostof, 1992).

Considering the foregoing, it was not found necessary to analyse the physical characteristics of an urban space developed during the industrial period, since the study focuses on OTM which is a historic area under conservation. The researcher has also noted that there is very little documentation done on squares in Africa and specifically Kenya.

2.3 PHYSICAL CHARACTERISTICS OF PUBLIC URBAN OPEN SPACES

Public urban open spaces are so diverse in nature with different observable characteristics which give each space its character (Lynch, 1960; GLC, 1978; Moughtin et al, 1999). The quality of each space is embedded in its elements that include the edges, floorscape and three dimensional

objects both mobile and stationary found in them (Madanipour, 1996; Moughtin et al, 1999). Since the experience of public open spaces emanates from information field from the numerous surfaces which permeates space and connects it to the human consciousness, it has been deemed desirable to discuss the various physical characteristics of the elements that constitute public open space (Salingaros, 1999). Those found crucial to this study are: the edges, floorscape, urban furniture, uses and activities, and vehicular circulation (Madanipour, 1996).

2.3.1 Edges that Define Space

Edges are the linear elements that define and enclose space which include building facades, trees, screen walls, shrubs, change in floor level, ground modelling, and shorelines (Lynch, 1960; GLC, 1978). The primary space is normally defined by some major elements which form the framework of the space (GLC, 1978). Some secondary elements can be used to scale down and humanise a big space by creating secondary spaces within the primary space (GLC, 1978). The nature of the edges determines an open spaces' connectivity or linkage, degree of enclosure, size, shape, quality of building facades, functional use, and hardness or softness amongst others. These parameters that influence the physical characteristics and hence quality of the edges to public open spaces are discussed here below.

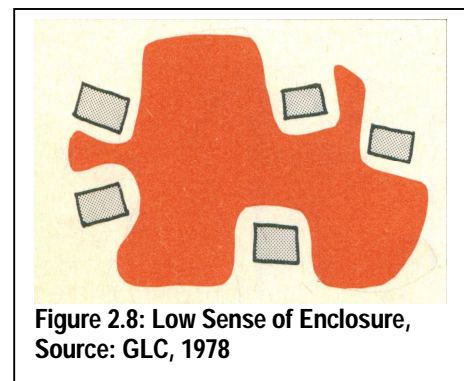
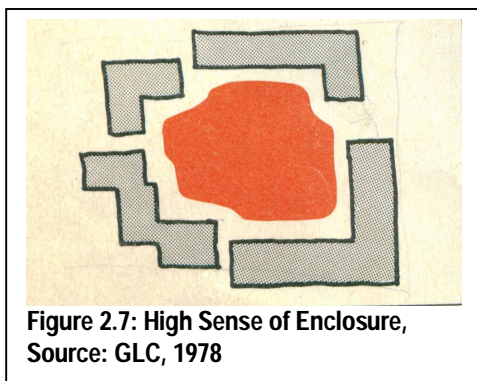
(i) Connectivity or Linkage

For a public square to be an activity node, it must have a system of connections which include streets, pedestrian ways and other open spaces that physically connect it to other parts of the urban fabric (Lynch, 1960; Roger, 1986). These linkages provide the vital access needed for both pedestrian and vehicular circulation and they determine the character of a square. The perforation of the edges to accommodate this connectivity or linkage affects the sense of

enclosure of an open space which ranges from closed to open depending on the nature of these linkages (GLC, 1978; Krier, 1979). Based on studies on pedestrian behaviour that established that people seek out concentrations of other people, a high concentration of people and activity is created when the main paths in the surrounding neighbourhood pass through a square (Gehl, 1968; Alexander et al, 1977).

(ii) Degree of Enclosure

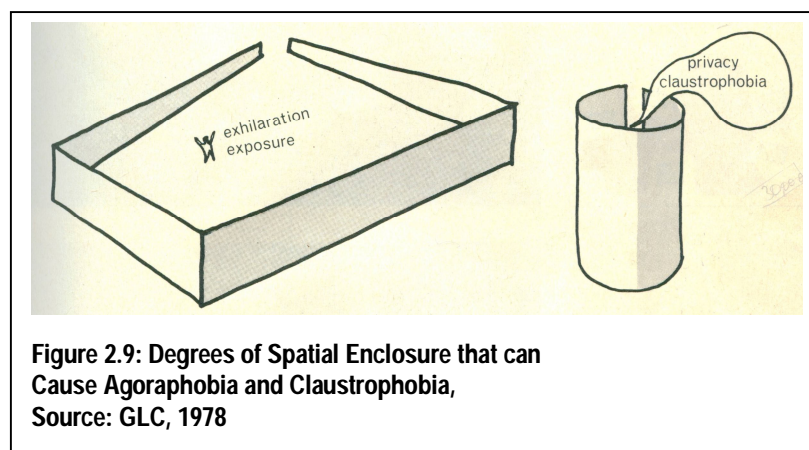
The degree of enclosure of public open spaces depends on the nature of the elements that enclose and define the space and how they are configured (GLC, 1978; Krier, 1979). One of the critical aspects of the nature of the elements is form. According to Burden (1995), form can be defined as “the contour and structure of an object as distinguished from its substance, or from the matter composing it; its distinctive appearance as determined by its visible lines, figure, outline, configuration and profile.” The form of the various elements gives them identity as they relate to each other and influences the sense of enclosure of open spaces.



For example, buildings that are closely spaced around an open space (Fig. 2.7) provide a higher sense of enclosure than those which are spaced far away (Fig. 2.8) from each other (GLC, 1978). Similarly, squares with open corners have a lesser sense of enclosure when compared to those with closed corners. The height of enclosing elements and the width of an open space also

influence the degree of enclosure of an open space (GLC, 1978; Kostof, 1992). When the height of buildings that surround an open space is increased, the sense of enclosure is increased. Conversely, when the heights are reduced the sense of enclosure is reduced.

The setting of an open space subjects a person to a psychological effect that varies with the degree of enclosure, the size and the shape of the enclosed space. The pathological manifestations of the psychological effect which is a subconscious phenomenon are psychosomatic diseases such as claustrophobia and agoraphobia which relate to the degree of enclosure of open spaces (Fig. 2.9). Claustrophobia is a strong fear of being in a small enclosed or crowded space while agoraphobia is the fear of crowds and open spaces (Goldfinger, 1941; GLC, 1978; Pearson Education Limited, 1995).



(iii) Size of Squares

The size of an open space is determined by the placement of its edges which at times is dictated by the function of the public squares which are supposed to accommodate public gatherings, small crowds, festivities, bonfires, carnivals, speeches, dancing, shouting, and mourning which must have their place in urban areas (Lynch, 1960; Moughtin et al; Alexander et al, 1977).

Previous studies undertaken indicate that, it is essential to make squares rather small, because when they are too large they look and feel deserted (Plate 2.7) due to the difficulty in concentrating activity (Blumenfeld, 1953; Thiel, 1960; Alexander et al, 1977). They established that a square of about 45x60 feet (13.7x18.3m) can keep the normal pace of public life well concentrated.



With an exception of the Piazza San Marco in Venice and Trafalgar square in London which both host thousands of pigeons, they found out that public squares work best when they have a width of about 60 feet (18.3m) but tend to be deserted and unpleasant when it exceeds 70 feet [21.3m] (Alexander et al, 1977).

The functional bases of these observations as put by Alexander (1977) and others are two. Firstly, from their studies on pedestrian density, "a place begins to seem deserted when it has more than about 300 square feet (27.9sq.m) per person. Hence, a square with a width of 100 feet (30.5m) will begin to seem deserted if there are less than 33 people in it. On the other hand, it only takes 4 people to give life to a square with a width of 35 feet (10.7m), and only 12 to give life to a square with a width of 60 feet (18.3m). Since there are far better chances of 4 or 12 people being in a certain place than 33, the smaller squares will feel comfortable for a far greater percentage of the time" (Alexander et al, 1977).

Secondly, a person's face is just recognizable at between 70 and 80 feet (21.3 and 24.4m) while under typical urban noise conditions, a loud voice can just barely be heard across 70 feet [21.3m] (Blumenfeld, 1953; Alexander et al, 1977). A person's face can be recognised as a "portrait" in rich detail, at up to about 48 feet [14.6m] (Blumenfeld, 1953). This may imply that two people with normal vision can communicate comfortably up to 75 feet (22.9m), which consciously ties up people in smaller squares.

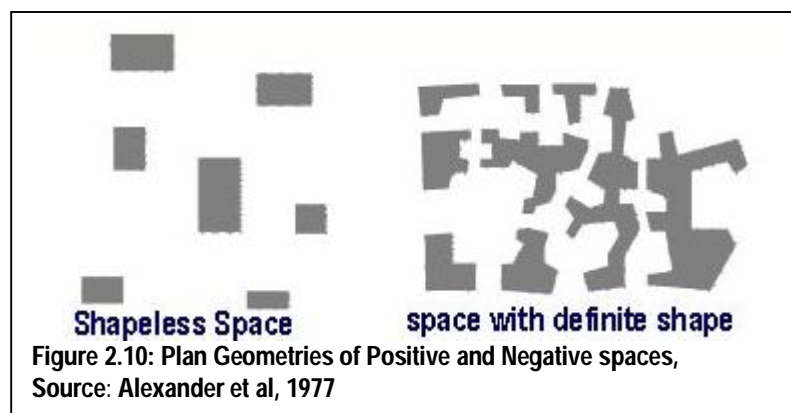
The size of squares was an important consideration noted during medieval times that necessitated the enactment of laws to regulate urban development. For example, In the *Laws of the Indies*, the size of the main square was proportioned to the number of anticipated inhabitants taking into consideration the growth of the town, with a minimum size of 200x300 feet [61x91m] and a maximum of 532x800 feet [162x244m] (Kostof, 1992). To size the square to the towns population means to have it be large enough for the uses people make for the square. In the words of Palladio: "the principal piazza ought to be made of such size, as the magnitude of citizens requires, that they may not be too small for their convenience and use, or that, through the small number of people, they may not seem uninhabited." For neighbourhood needs, additional small squares would be provided (Kostof, 1992).

The use of squares also has an influence on their size. Since maintenance of activity generated by various uses is difficult to uphold, the appropriate size of a square is ultimately a matter of appearance (Alexander et al, 1977). Single purpose squares will inevitably seem "uninhabited" without their intended crowds while multi-purpose squares if scaled to their most space demanding activities are bound to appear overlarge (Kostof, 1992).

The need to have large open spaces to accommodate natural disasters in urban areas was envisaged as early as in the 16th century. This was after the Sicilian earthquake of 1693 that amplified the need for big open space that could offer a refuge to victims with their possessions (Kostof, 1992). It was proposed then by the authorities of Catania that squares in new towns should be large enough to serve as safe camping areas when need arises.

(iv) Shape of Squares

The shape of a square is determined by the profile established by the edges that enclose the open space on the ground. There are two fundamentally different kinds of outdoor space: negative and positive space (Alexander et al, 1977; GLC, 1978). Outdoor space is negative when it is shapeless, the residue left behind when buildings – which are generally viewed as positive – are placed on the land. An outdoor space is positive when it has a distinct and definite shape, as definite as the shape of a room, and when its shape is as important as the shapes of the buildings which surround it. These two kinds of space have entirely different plan geometries (Fig. 2.10). Anti-space on the other hand is shapeless, continuous, lacking of perceivable edges or form.



In formulating a typology of urban space, spatial forms and their derivatives, Krier (1979) stated that the three basic shapes (square, circle and triangle) can produce geometrically regular or irregular shapes of all spatial type. This he asserts is achieved by manipulating the basic shapes using the following modulating factors: angling; segmentation; addition; merging; overlapping or amalgamation of elements; and distortion. Many compound forms can be created at will from the three spatial types and their modulations (Krier, 1979).

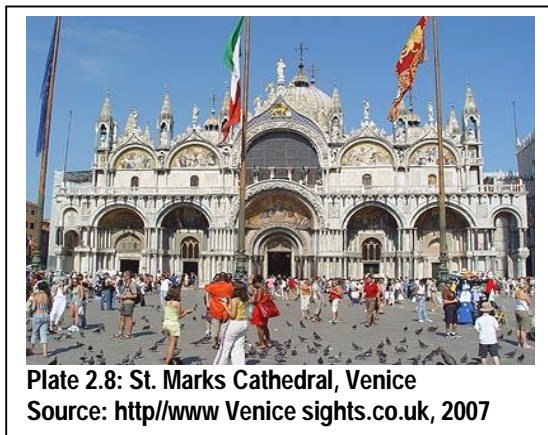
The rectangular shape for squares has also had its advocates. Sitte (1965) analysed a very large number of European city squares, distinguishing those which seem used and lively from those which don't, trying to account for the success of the lively squares. In all cases, a rectangular plaza at least one and a half times as long as it was wide was recommended, in as much as this shape is best for fiestas in which horses are used and for any other fiestas that should be held (Kostof, 1992).

This criticism is made of modern squares. Urban historian Paul Zucker (1959) states the case categorically when he claims that modern squares are simply spaces marked as such on maps "which actually are no more than plain voids, empty areas within the web of streets". Kostof (1992) concurred on the same. He observed that modern squares are too open and amorphous to define a positive volume of public space; and this is so because the primary consideration in the design of the modern city is to ease the flow of traffic.

(v) Quality of Building Facades

Most public urban open spaces in urban areas have buildings that partly or fully encompass them. This makes the facades of buildings, which are the main space defining elements play a

significant role in determining the quality of the open spaces (Alexander et al, 1977; GLC, 1978). Facades represent a variety of visual experiences to the viewer depending on their design and activities that are contained there in. As noted by Krier (1991), the popularity of medieval squares was rooted in the fact that they were surrounded by fine architecture embedded in the elaborately detailed facades (Plate 2.8 and 2.9) of the buildings (Krier, 1979).



The richness of the early medieval and early renaissance city in Italy is dependent as much on a highly decorative architecture as it is upon the wonderful urban spaces to be found in those cities (Moughtin et al, 1999). No contemporary public squares have been laid out which could be compared with urban squares like the Grande Place in Brussels, the Place Stanislas in Nancy, the Piazza del Campo in Siena, The Place Vendome and the Place des Vogues in Paris, the Plaza Major in Madrid, the Plaza Real in Barcelona, amongst others (Krier, 1979).

Flat facades create a different kind of open space as compared to projecting and recessing facades (Fig. 2.11). The use of colonnades (Fig. 2.12) both in the ancient world and today introduces some transparency in edges by creating partial enclosures that act as transition between the open spaces and the interiors of buildings (Salingaros, 1999). Venturi (1989) noted

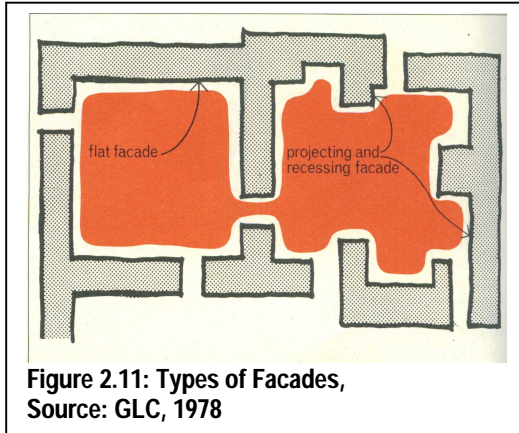


Figure 2.11: Types of Facades,
Source: GLC, 1978



Figure 2.12: Colonnade in Piazzetta San Marco,
Source http://www.Venice_sights.co.uk, 2007

the significance of the interface between interiors and exteriors which need special attention in design of public open space. The expansive use of glass in modern architecture also has the same effect by allowing interplay as the open space is allowed to flow into the interiors and vice versa.

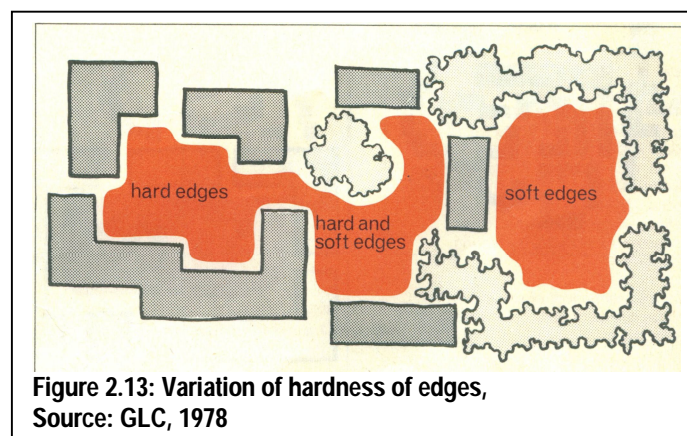
Apparently people prefer being at the edges of open spaces and when these edges are made human, people cling to them tenaciously (Alexander et al, 1977). In observing people's behaviour in outdoor spaces, Gehl (1968) discovered that "there is a marked tendency for both standing and sitting persons to place themselves near something - a façade, pillar, furniture, etc". If this propensity is to be taken seriously in the design of public open spaces, then the edges of buildings would be a realm between the inside and outside. To make the building edge lively, it should be treated as a zone with volume to it, not a line or interface which has no thickness (Alexander et al, 1977). Alexander (1977) further argues that, by creating places that have depth and a covering, places to sit and lean, and walk, then the building edges will be positively oriented to the open space and will attract activity. If not, the space adjacent to the building will be useless and blank.

(vi) Functional use

The life of a public square forms naturally around its edge (Alexander et al, 1977). If the edge does not provide people with places where it is natural to linger, the space becomes a place to walk through, not a place to stop (Lynch, 1960; Alexander et al, 1977). It is therefore clear that a public square should be surrounded by pockets of activity: shops, stands, benches, displays, rails, courts, gardens, news racks. When the pockets of activity form around the edge, it is likely that they will begin to overlap and spill in toward the centre of the square (Alexander et al, 1977). If the edge fails in terms of attracting activity, then the entire space never becomes lively.

(vii) Hardness or softness

The nature of the enclosing elements also contributes to the character of the space. By introducing some soft landscaping elements like trees or shrubs to constitute part of the edges, this tends to soften a space and creates rich organic views (GLC, 1978; Moughtin et al, 1999). This contrasts with the hard spaces created when hard elements like building walls enclose the space despite the presence of some soft landscaping elements within the open space (Fig. 2.13). The distribution and proportions of hard and soft components in the edges not only influences the softness/hardness of a space but also the sense of enclosure (GLC, 1978).



Similarly the openings on the edge of open spaces that act like windows can influence the general character of a space. Alexander (1977) observed that “when people are in places for any lengths of time they need to be able to refresh themselves by looking at a world different from the one they are in, and with enough of its own variety and life to provide refreshment”. In numerous studies on the function of windows, it has been established that rooms without a view are prisons for the people who have to stay in them and that people generally prefer meaningful views – views of city life, nature – as against views which contain uninteresting and less meaningful elements (Manning, 1965; Markus, 1967; Rapoport, 1967; Alexander, 1977). The same seems to apply to views enjoyed in open spaces through the openings in the edges.

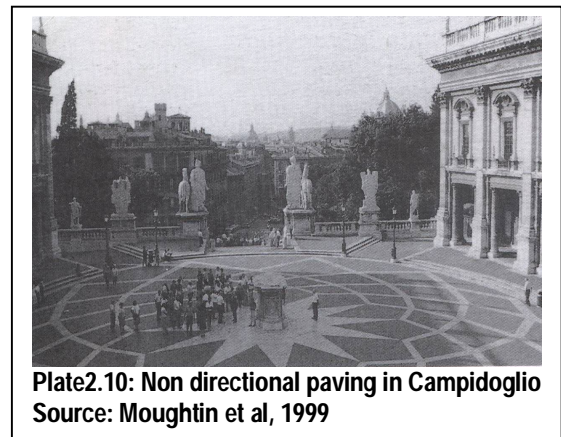
2.3.2 The Floorscape

After discussing the various characteristics of edges, this section covers the various characteristics of the floorscape as an element of public open spaces. The floorscape constitutes the entire ground surface that covers both the hard pavement and the soft landscaped area (Moughtin et al, 1999). Within these two main categories there are a lot of variations in the design of floorscapes that must fulfil the primary function of comfort to the user and be appropriate. The important aspects that have been found crucial in highlighting the physical characteristics of the floorscape are: paving, soft landscaped areas, change of material and change in level. These are explained here below.

(i) Paving

In an attempt to improve the appearance of public open spaces, the design and construction of paving developed from the renaissance times when formal plazas and squares were carved out of the medieval towns and given monumental character (Stuber, 1979). The relics of this are the

magnificent patterned pavements in the Campidoglio in Rome (plate. 2.10) and Piazza San Marco in Venice, (Fig. 2.14) which apart from offering visual and tactile experience, they unify space and give it scale (Moughtin et al, 1999). The choice of flooring must be appropriate for its use and fulfil the primary function of comfort. In urban design, apart from fulfilling the functional requirements, other dimensions on the visual and tactile experience of paving are normally explored.



Paving can be designed to provide a sense of direction or to give a feeling of repose (Moughtin et al, 1999). As explained further by Moughtin (1999) both are aspects of the same function which is to guide and give meaning to the rhythm, pace and pattern of movement. Non directional paving designed to provide a sense of repose is usually associated with squares or nodes in the city where people stop and rest as such paving is neutral and has the effect of halting people. A good example of directional paving is the patterned pavement in Piazza San Marco (Fig. 2.14) that directs the eye and movement to the main focus of the square: the Basilica. The magnificent patterned pavement in the Campidoglio (Plate 2.10) links the centre of the space occupied by the statue to the enclosing walls and beyond to views of the city.

A carefully designed floorscape can give an open space a unity which may otherwise be absent from a disparate group of buildings, soft landscape features, urban furniture, sculptural features, fountains and pools (GLC, 1978; Moughtin et al, 1999). The character of a paved area is determined partly by the materials used, how they are arranged and how they interrelate with other materials and landscape features (Beazly, 1967). The edging detail is also important in determining the character of a paved landscape. People in urban areas have been known to depend more on paths whose continuity is established by the type of paving when compared to façade and other landscaping details (Lynch, 1960).

(ii) Soft Landscaped Areas

People and particularly those living in urban areas need soft landscaped areas within walking distance where they can nourish themselves by enjoying passive recreation as they interact with nature (Alexander et al, 1977). The need for numerous small parks scattered widely and profusely within a city to satisfy this need is well recognised and established by studies conducted by Berkeley City Planning Department (1971) and Alexander (1977). It was also estimated that the area of a small park should be about 5600 square metres and at least 46 metres wide at the narrowest direction for one in the middle of it to feel in touch with nature and away from the hustle and bustle of the city.

The soft landscaped areas (Plate 2.11) in the form of lawns, colourful flower beds and neatly manicured bushes also serve a useful function in ornamenting the city while they provide a habitat for wildlife (Moughtin et al, 1999). They play an important role in the hydrological cycle of cities whose hard impervious surfaces are partly responsible for increased urban temperatures and lowered humidity.

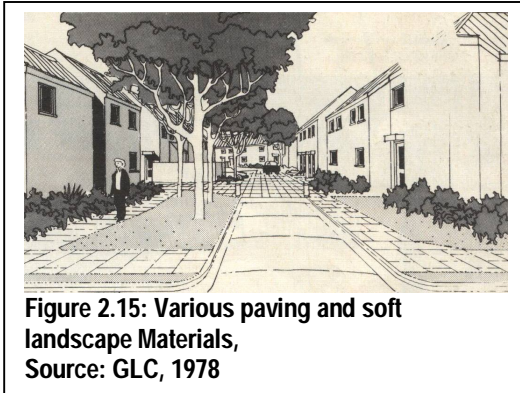


**Plate 2.11: Landscaped garden in Santa Barbara,
Source: Kostof, 1992**

As observed by Moughtin (1999), there are three types of soft landscaping common in cities. Conventional amenity landscaping consists largely of mown grass and is more expensive to maintain than the other landscape types. Native landscape, established using largely self-sown native vegetation is by far the cheapest type of landscape both to establish and maintain. Naturalist landscaping is defined as creating new habitats to simulate native vegetation: it is the most expensive of the three landscapes to establish but is cheaper than the amenity landscape to maintain (Elkin and McLaren, 1992). Areas of mown grass in the city should be large enough to absorb the effects of probable use and be accommodated by adequate paths following pedestrian desire lines. The edging or trim between lawn and footpath is important from a decorative and practical point of view (GLC, 1978; Moughtin et al, 1999).

(iii) Change of Material

Different parts of the floorscape can be separated by the use of different materials for both paving and soft landscaping (Fig.2.15). A change of paving material is often used where a restaurant spills over onto a street or square, and in front of hotels, banks and shops to indicate a change of ownership making the public know where the public realm ends and private property is being



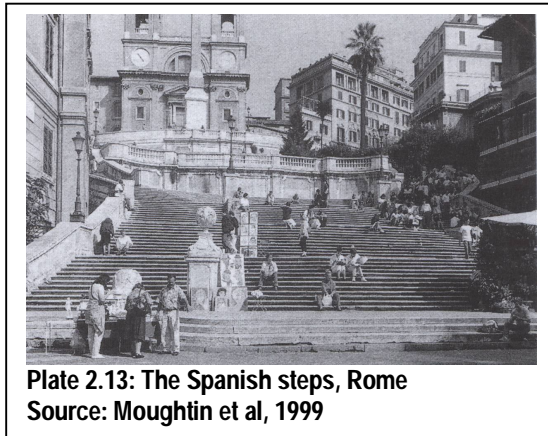
entered (GLC, 1978; Moughtin et al, 1999). Devices for changing the floor pattern introduce a necessary element of decoration into the floor plane. Decorative patterning (Plate 2.12) in pavements can perform the important aesthetic function of breaking down the size of large hard surfaces into more manageable human proportions (Moughtin et al, 1999). In general paving slabs of stone have a natural scale related to humans.

(iv) Change in Level

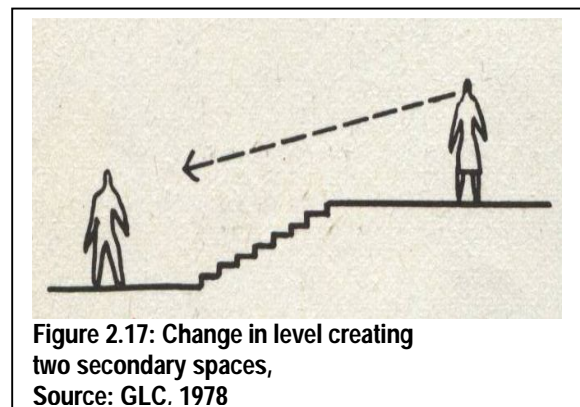
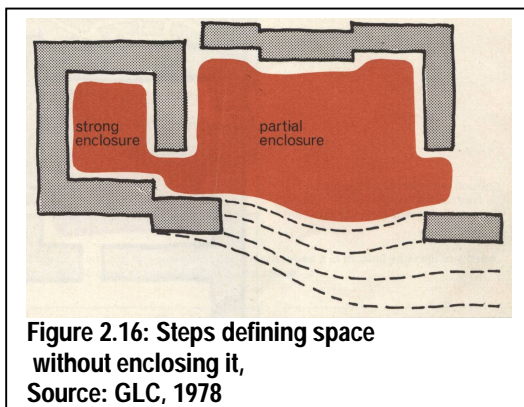
Change in level in the floorscape engages the use of steps, ramps, platforms and long sloping planes which contrast with the horizontal plane: the place of rest, conversation and meditation (Moughtin et al, 1999). Ornamental staircases and ramps have been used in the past to emphasize the variation in level which enhances the sense of drama and adds to the quality and grandeur of the urban scene (GLC, 1978; Moughtin et al, 1999). However, appropriate means have to be put in place to ensure that both able bodied people and the handicapped can traverse any change in level in the floorscape.

Tourists, beggars and street traders (Plate 2.13 and 2.14) have been known to pause for breath or ply their trade on steps. Apart from being a means of accommodating change in level steps can be used to dramatise events and create places from which to address the crowds (Moughtin

et al, 1999). However they are not always the most convenient method of accommodating change in ground level.



In his view on ramps Moughtin (1999) states that, where steps are necessary for changing level, they should be accompanied by a ramp. The ramp in addition to its utility has great potential as an ornamental feature of the city. It establishes a quite different aesthetic experience from the stair: it gives a more insistent quality of continuous vertical movement. Unlike a staircase, the ramp does not offer the same opportunity to stand, rest and look about on platforms between flights of steps. A change in level can also be used a secondary element which can scale down and humanise as well as create a space within a space (GLC, 1978). It has the advantage that it can define a space without necessarily enclosing it (Fig. 2.16). Being 'above' gives one the sense of advantage over the area below (Fig. 2.17).



2.3.3 Urban Furniture

Apart from the edges and floorscape that define open spaces, urban furniture constitutes part of the permanent three dimensional objects that enrich nodes in our cities by their capacity to create images in people (Lynch, 1960; Moughtin et al, 1999). Some furnishings in public open spaces are non utilitarian and are purely for decoration while others may also have an important practical function. The urban furniture that has utilitarian value includes seating, street lighting and telephone booths (Moughtin et al, 1999). Bollards are used to define space and mostly to separate pedestrian from vehicular circulation areas. The aspects of urban furniture discussed here below are: decorative elements, utilitarian urban furniture and placement of monuments.

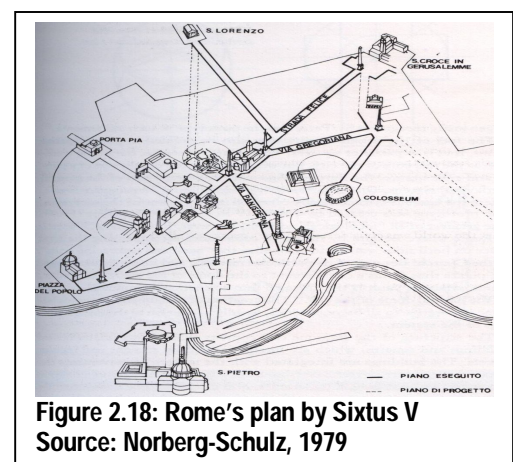
(i) Decorative Elements

The decorative elements that are usually used to create memorable urban landscapes include: obelisks, fountains, sculpture, monumental arches and columns and clocks (Moughtin et al, 1999). When a feature is large or distinctive enough it acts as a landmark (Lynch, 1960; Moughtin et al, 1999).

(a) Obelisks

The popularity of the obelisk as a special decorative element in the city is attested by those transported to Rome, Britain, New York, Paris and Istanbul, all from Egypt where they were originally made of a single piece of stone (Moughtin et al, 1999). The form of the obelisk (Plate 2.15) with its vertical emphasis has been copied in many towns and has been used to mark the centre of an axis or the crossing point of two or more axes (Norberg-Schulz, 1979; Moughtin et al, 1999). It can also be used to form a hub of a great place or support a larger conception or design (Moughtin et al, 1999).

The most notable example of the use of the obelisk in city planning was in the redevelopment of Rome by Pope Sixtus V between 1585 and 1590 (Norberg-Schulz, 1979; Moughtin et al, 1999). To create order out of the chaos of medieval Rome, the pope created a new communication network of long vistas (Fig. 2.18) with obelisks at their termination and in the important nodes along the routes where squares were later to develop. As Rasmussen (1969) states: “the obelisks became gigantic surveyor’s rods making out a system of straight lines, the plan of the future.”



(b) Monumental Arches

As noted by Moughtin (1999) there are three main types of monumental arches with the Triumphal Arch being the most common. The triumphal arch was used to record a particular account of a historical event which had provided an opportunity to decorate the city with an imposing monument. The second type of monumental arches is used as a portal while the third is a temporary structure erected to celebrate a particular event (Moughtin et al, 1999).

The earliest monumental arch had one opening (Fig. 2.19) and was later developed to the now familiar form (Plate 2.16) of a large central arch flanked by two smaller subsidiary arches (Moughtin et al, 1999). The arches are usually placed at the termination of an avenue or

important path, on the crown of a hill, a meeting place or node, and at the entrance to some great architectural or engineering construction like a bridge (Kostof, 1992; Moughtin et al, 1999).



(c) Monumental Columns

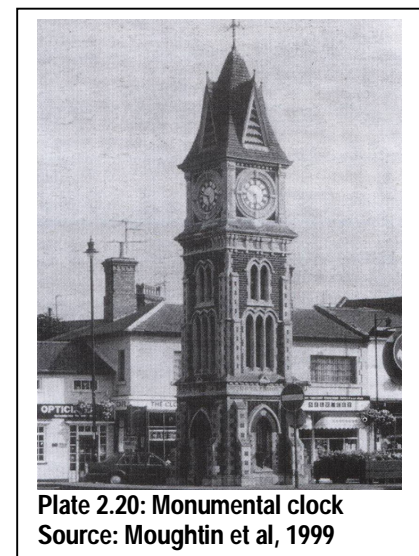
As discussed by Moughtin (1999), there are two main types of monumental columns. The first has its origins in Greece while the second type (Plate 2.17) that is a development of the first on a grander scale is associated with Ancient Rome. The Greek monumental pedestal or column was small in scale, consisting of a highly decorative shaft, fluted and carved with acanthus leaves or twisted serpents with an allegorical figure or symbol placed at the top.



Statues of great men were placed on monumental columns to raise them above statues of ordinary men that were placed on columns and pedestals of small scale (Moughtin et al, 1999). Double columns (Plate 2.18) were also characteristic of entrances on main roads or waterfronts (Kostof, 1992).

(d) Decorative clocks

Decorative clocks are not only useful but are also potential landmarks with a strong visual image if carefully sited and with sensitively designed setting (Lynch, 1960; Moughtin et al, 1999). There are four types of decorative clock used to furnish the city: (i) the tower clock; (ii) the bracket clock; (iii) the monumental clock, and (iv) the post mounted clock (Moughtin et al, 1999). Traditionally the clocks were at first fixed on church towers (Plate 2.19) before they became a feature on town halls, inns, hospitals, bus and railway stations. Moughtin (1999) explains the bracket clock as a highly ornamental piece of urban furniture cantilevered from a façade of a building. He further noted that for it to achieve maximum visual impact on those walking on the pavement, it should not be lost in a profusion of other hanging or cantilever signs and advertisements. Whereas the



monumental clock (Plate 2.20) is a development of the tower clock but standing freely in public space, the post mounted clock is a simple structure based upon the street lighting standard (Moughtin et al, 1999).

(e) Fountains

Water has an essential attribute that gives it greater symbolic meaning when used as a decorative feature in the city (Moughtin et al, 1999). It can be used as still pools, waterfalls, jets, fountains, bowls or with sculpture which all convey different moods and impressions. While quiet, still waters (Plate 2.21) place a mirror in the city, the frenetic activity of fountains, jets and cascading water recreates the sense of visual and aural turmoil of nature's waterfalls (Moughtin et al, 1999). Also important to the visual quality of water are its sounds as it splashes (Plate 2.22) and gurgles. The quality of cooling in a hot day is particularly welcome, civilizing and decorative.

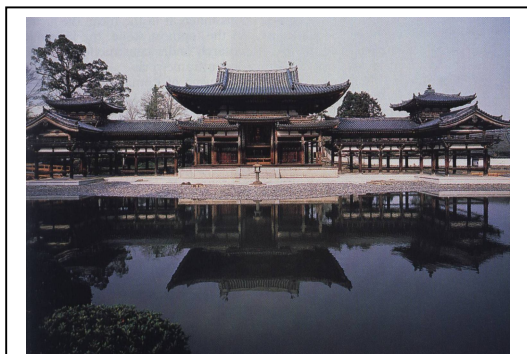


Plate 2.21: Reflective quality of still pool of water, Japan, Source: Getlein, 1998



Plate 2.22: Fountain in New York, Source: Getlein, 1998

The fountain has many forms that vary from the bowl, the simplest form of sculpture with water to the great Baroque composition with figures, jets and falls such as the Fontana di Trevi, in Rome (Moughtin et al, 1999). The fountain, as Sitte (1901) points out, should not take a central position but be on one side as in many open spaces in medieval cities.

(f) Sculpture

The use of statues for city decoration has a long and distinguished history (Moughtin et al, 1999). The three main traditional types of statuary are: the single figure, the group (Plate 2.23) and the equestrian statue (Plate 2.24) that has a long pedigree is best placed commanding an expanse of open space (Moughtin et al, 1999). When occupying favoured sites of this type they are seen to greatest advantage when placed on lofty pedestals.



(ii) Utilitarian Urban Furniture

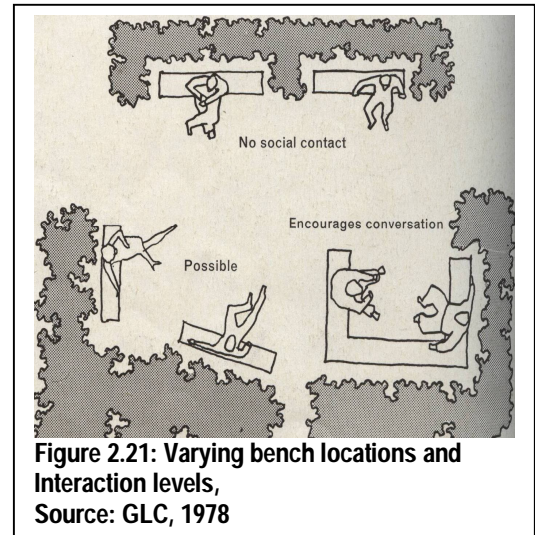
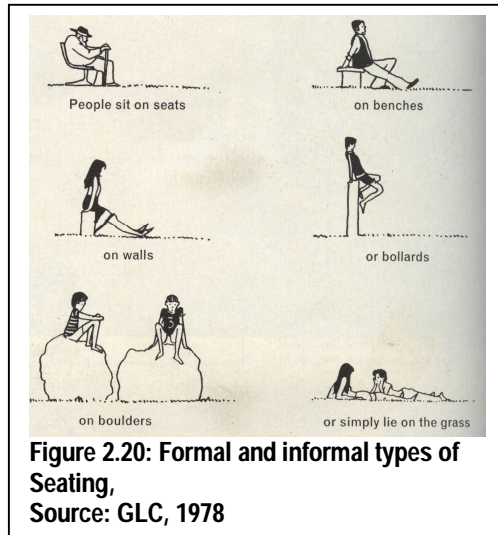
Utilitarian urban furniture covers the furnishings with a function that is primary utilitarian that include: the bus shelter, street light, bollards, telephone boxes and bench (Moughtin et al, 1999). Moughtin (1999) stated that, by the eighteenth century, most public open spaces were free from urban furniture with an exception of the occasional inn sign, local horse trough, lamp posts, bollards and chains. He further noted that modern open space is filled with the clutter of urban furniture that poses a challenge to the urban designer. Placing of town furnishings can be made a potent factor in adding dignity, formality and beauty to the public thoroughfare and square (Moughtin et al, 1999).

(a) Benches

Moughtin (1999) states that the bench which has a civilizing influence to the city is “a place for the old to sit in the sun to pass the time of day, for student to study, for the office worker to have lunch, for the young to embrace and for shoppers to rest their weary feet.” He gives the two basic types of benches to be the flat cubic mass without a back and the more anthropometrically designed bench with a back support. Whereas the first one is uncomfortable and appropriate where people require only a moment’s respite, the second one encourages the sitter to stay, rest awhile, and admire the street or square. Benches are best located at neutral resting points in a path or square with their backs in sheltered positions from where one can enjoy interesting views and activities while feeling secure (Alexander et al, 1977; Moughtin et al, 1999).

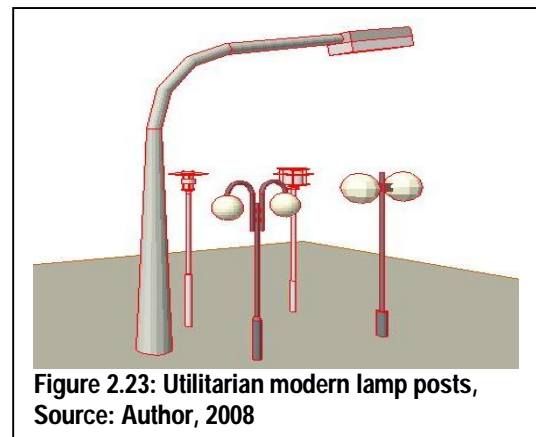
In a study conducted by the Greater London Council (1978), the following observations were made:

1. The main requirements for public seating places are comfort and interesting views of water and vegetation noted to be most restful.
2. The microclimate can be altered to create a sheltered and protected seating area.
3. The scale or size of the sitting area and the number of people it will accommodate relates directly to comfort as large spaces usually fill up around the edges first – individuals sitting in the middle of such spaces may feel exposed.
4. Formal and informal types of seating have their place for people of different ages and in different situations (Fig.2.20).
5. The design of sitting areas and the positioning of benches can encourage or inhibit conversation or social interaction (Fig. 2.21).



(b) Lamp posts

Lamp posts of various designs are used to furnish civic spaces. Adshead (1914) suggested that the Roman Candelabra is a precursor of the lamp standard or lamp post which was initially associated with gas lighting. In areas of historic interest the original Victorian cast iron gas light standard has been adapted or copied for use with electric lighting with some success (Moughtin et al, 1999). Some modern lamp posts which give a soft glow at night and lovely silhouette by day are beautifully sculptured (Fig. 2.22) while others are more utilitarian (Fig. 2.23).



(c) Kiosks

There are many types (Plates 2.25 and 2.26) and uses of kiosks that punctuate urban space. The Parisian Kiosk used for advertisements and news stands is a remarkable way of dealing with important and useful notices which if fixed on walls would appear like graffiti (Moughtin et al, 1999). Different designs of telephone booths have been used that influence the historical, social and aesthetic character of public open spaces. The band stand, often taking the form of a light circular or octagonal structure with raised platform and pyramid roof is probably the most interesting and decorative kiosk found in many European cities (Moughtin et al, 1999).



**Plate 2.25: Telephone booths in London,
Source: Moughtin et al, 1999**



**Plate 2.26: Kiosk integrated with stair in
Runcorn New Town (England),
Source. Kostof. 1992**

(iii) Placement of Monuments

The placement of monuments in civic open spaces has played a significant role to articulate, punctuate and accent the overall designs (Lynch, 1960; Moughtin et al, 1999). Their locations were principally determined by the geometric properties of the layout, particularly the primacy of, and symmetry about, the main axis of the composition (Moughtin et al, 1999). During the Renaissance and Baroque periods, there was a preoccupation with: (i) symmetry of design elements to make a balanced composition about one or more axial lines and (ii) the closing of vistas by the careful placing of monumental buildings, obelisks or suitably imposing statues.

On the other hand Moughtin (1999) noted that the location of monuments fountains and other foci of interest such as lamp standards, tall lighting standards, masks and flag poles, shelters, refuges and protection posts, and trees need not be geometrically determined. He further observed that if they are well designed and carefully placed they can add enormously to the stateliness and beauty of open spaces.

In his study of the typology of squares, Zucker (1959) noted that the placement of a monument can be sufficiently strong in its impact to create around it a significant place in its own right. This applies to squares whose perception is critically reliant upon a nucleus, a strong vertical accent such as a monument, a fountain, obelisk or a triumphal arch which are powerful enough to organise the space around it. The vertical accent ties the heterogeneous elements of the periphery into a single visual unit. Zucker also notes that "this spatial unity is not endangered by any irregularity of the general layout or the haphazard position, size, or shape of adjacent buildings" but rather "the sole determining factor in the perception of the space is the power, size and scale of the central monument. If the square in relation to the size of the focal monument becomes too large then the square loses its unity (Moughtin et al, 1999).

Generally, the principles of organic sitting of monuments are: (i) The need for a neutral background for the monument (ii) monuments should be placed in areas that do not conflict with traffic movement (iii) the centre of the squares should be kept from activities associated with the square (Alexander, 1977).

2.4 PERCEPTION OF OPEN SPACES

Perception is implicitly taken as the emotional negative or positive attachments one has for a place (Tuan, 1974, 1977; Eyles, 1985; Entrikin, 1991; Relph, 2002; Krevs, 2004). Many studies have been undertaken in humanistic geography, architecture, medicine, and urban design amongst others to provide a better understanding of human spatial perception and the characteristics of places which can be used in spatial decision making linked to spatial behaviour. (Tuan, 1974, 1977; Eyles, 1985; Entrikin, 1991; Relph, 2002; Krevs, 2004). Each person has his or her own way of seeing, understanding and reacting to the environment through the senses of sight, smell, sound, touch, kinaesthesia, sense of gravity, and perhaps of electric or magnetic fields (Lynch, 1960; Moughtin et al, 1999). However the visual sensations of colour, shape, motion, or polarization of light are core in perception (Lynch, 1960).

To appreciate how human beings perceive the physical characteristics of public open spaces, the principles of design used to organise the visual elements, and other concepts that explain perceptual spatial differentiation have been presented in this section. The visual elements are the eight ingredients - the line, shape, mass, light, value, colour, texture and space - that we perceive and respond to when we look at a space (Getlein, 2000).

2.4.1 Principles of Design

Getlein (2000) stated that, the principles of design are the guidelines used to organise the visual elements – line, shape, mass, light, value, colour, texture and space to satisfy the designer's expressive intent. To him the principles of design, which he identified as unity and variety, balance, emphasis and focal point, proportion and scale, and rhythm, are a natural part of perception whose understanding gives an observer greater insight into works in space. To

Moughtin (1999), visual order or unity, proportion, scale, contrast, balance and rhythm, are formal qualities of decoration that is a physical process that contributes to one's visual delight. As discussed by Getlein (2000) and Moughtin (1999), the principles of design are presented here below.

(i) Unity and Variety

Unity is a sense of oneness created out of a diversity of elements (Moughtin, 1999; Getlein, 2000). To Getlein (2000), unity can be achieved by holding some of the visual elements constant and varying others. Equally important for unity is the dominance of one decorative theme: the repetition of roof materials, pitch, skyline, ridge, verge and eaves details; the consistent use of floorscape materials and patterning; and the choice of street fittings of compatible form (Moughtin, 1999).

Variety on the other hand is difference, which checks monotony and provides interest and accent (Moughtin, 1999; Getlein, 2000). Unity and variety generally coexist on a spectrum in which the designer strives to find the right point at which there is sufficient visual unity enlivened by sufficient variety (Getlein, 2000). However, extreme unity or variety can also be the designer's objective at times.

In urban areas the contrast of form and anti-form of building and open space, of street and square, soft and hard landscape, or colour and texture are what create the diversity found in the public open spaces. However, whatever the form of contrasts used, there seems to be a need for a clear dominant theme with contrasts of a compatible order to produce a unified effect as extreme contrasts may produce disorder and lack of clarity.

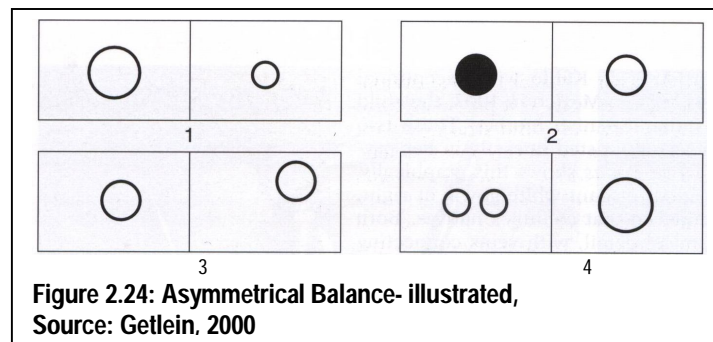
(ii) Balance and Symmetry

Moughtin (1999) stated that the concepts of balance and symmetry are mutually reinforcing and a pair of scales is often used as an analogue for balance in design. He further noted that the idea of physical balance as represented in the pair of scales is extrapolated to the world of visual forms and is important both structurally and visually. When looking at some forms in space, our eyes gauge and determine their apparent "heaviness" or "lightness" referred to as visual weight (Getlein, 2000). When visual weight is equally distributed to either side of a felt or implied centre of gravity, we feel that the composition is balanced. The two types of balance encountered in perception are symmetrical and asymmetrical (Moughtin, 1999; Getlein, 2000).

In symmetrical balance, the forms on either side of the axis correspond to one another in size, shape and placement (Moughtin, 1999; Getlein, 2000). When the symmetry is perfect the two sides of the composition are mirror images of one another. More often the correspondences are very close but not exact, a situation sometimes called relieved symmetry (Getlein, 2000).

On the other hand asymmetrical balance is the informal balance of non – axial components (Moughtin, 1999). Even though the two sides in asymmetrical balance do not march, if their visual weights are very similar, the composition will seem to be visually balanced (Getlein, 2000). This type is capable of balanced positions of great complexity compared with symmetrical balance (Moughtin, 1999). Figure 2.24 illustrates some very general precepts about asymmetrical or informal balance.

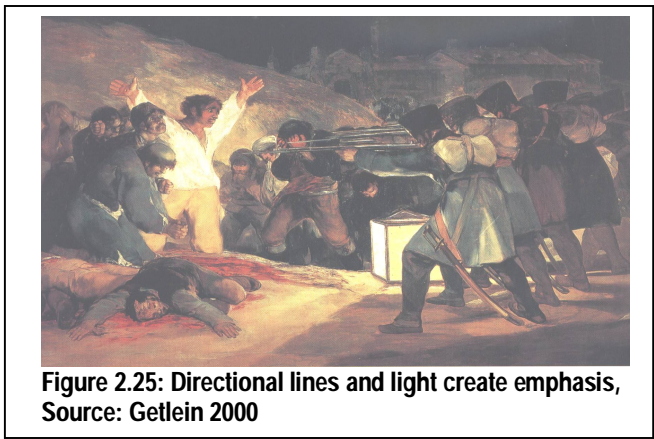
1. A large form is visually heavier than a small form.
2. A dark value form is visually heavier than a light form of the same size.
3. A form placed close to the central axis may be visually heavier than a similar form placed near the outer edge of the composition.
4. Two or more small forms can balance a large one.



As an important aspect of form, balance encourages our active participation in looking and also helps to communicate a mood or meaning (Getlein, 2000). Formal symmetrical decoration or building compositions are best appreciated while the viewer moves along its central axis (Moughtin, 1999).

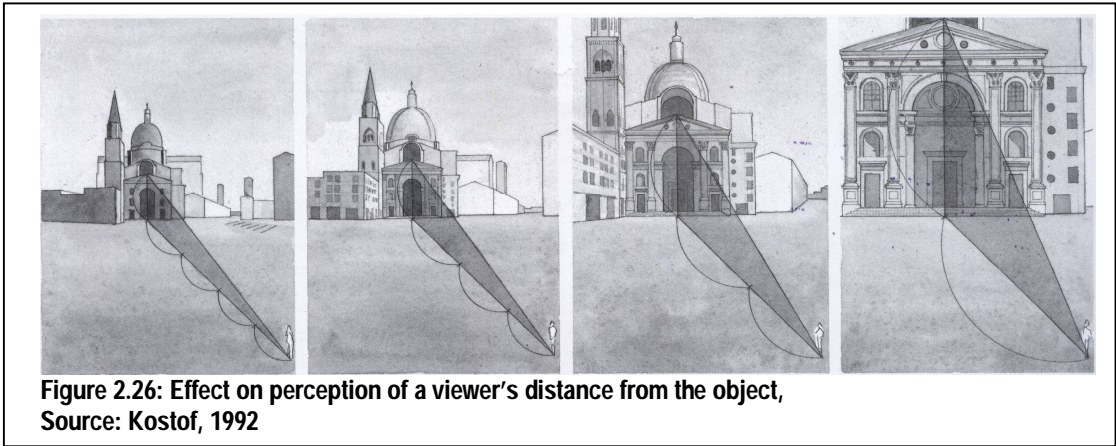
(iii) Emphasis and Subordination

Emphasis and subordination are complementary concepts discussed by Getlein (2000). He noted that emphasis is achieved when our attention is drawn more to certain parts of a composition than to others. A focal point is created when the emphasis is on a relatively small, clearly defined area. Size and placement, directional lines and light can be used to create emphasis (Fig. 2.25) Subordination is when certain areas of a composition are purposefully made less visually interesting, so that the areas of emphasis stand out (Getlein, 2000).



(iv) Scale

Scale depends upon the comparison of one set of dimensions with another set that represents a standard or “normal” size (Moughtin, 1999; Getlein, 2000). The scale of a work in space is crucial to our perceiving and experiencing it (Getlein, 2000). The visual qualities of urban space are closely related to the human scale, and hence man is therefore the measure used for the built environment (Moughtin, 1999). According to Maertens who set out to determine scientific criteria for the practice of architecture and planning in the 1870s, the experience of architectural space is primary dependent on the observer’s angle of vision which corresponded to 27 degrees (Kostof, 1992). His study established that the normal standpoint for viewing a building clearly and easily was at a distance equal to twice its height (Fig. 2.26) and when this distance is increased the observer begins to appreciate the structure as part of its surrounding.

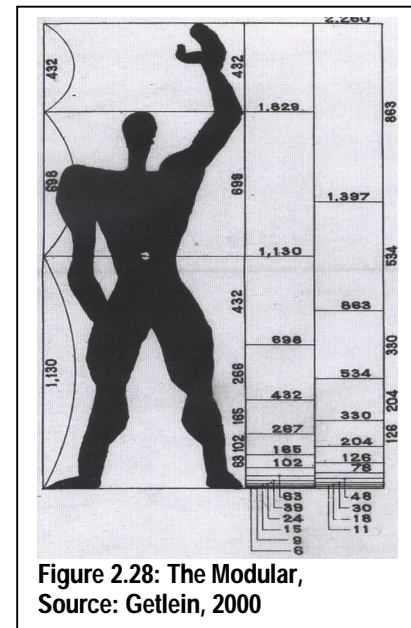
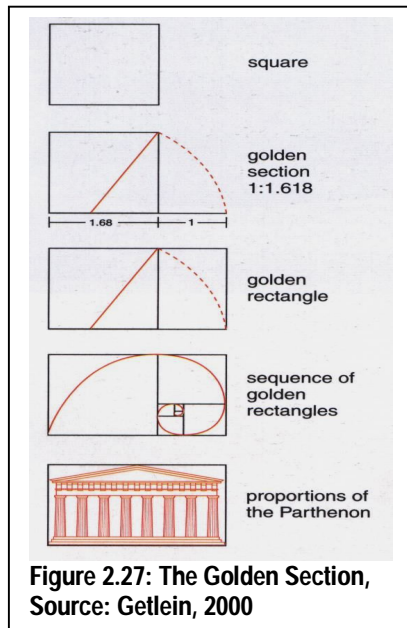


(v) Proportion

Proportion is the method by which visual order is established, giving due weight to the parts or elements which make up a composition (Moughtin, 1999). Among the many ideas from ancient Greece and Rome that were revived during the renaissance was the notion that numerical relationships held the key to beauty, and that perfect human proportions reflected a divine order (Moughtin, 1999; Getlein, 2000). This led to the development of a system of greater and lesser parts in which the small prepared one for the large by prefiguring the form of the whole (Moughtin, 1999).

As discussed by Getlein (2000), the golden section, a proportion that was discovered by the ancient Greeks has been used by many artists and architects when they sought a rational yet subtle organising principle for their work. The Greeks used it in the design of such structures as the Parthenon. The golden section divides a length into two unequal segments in such a way that the smaller segment has the same ratio to the larger segment as the large segment has to the whole. The ratio of the two segments works out to 1:1.618. One of the most interesting characteristics of the golden rectangle is that when a square is cut off from one end, the remaining shape is also a golden rectangle (Fig. 2.27) – a sequence that can be repeated endlessly and relates to such natural phenomena as the spiralling outward growth of a shell.

During the 20th century, the French architect, Le Corbusier related the golden section to human proportions in a tool he called the modular (Fig. 2.28) which is based on two overlapping golden sections (Getlein, 2000). This tool was to be used by architects to arrive at proportions that were both harmonious and practical.



(vi) Rhythm

Rhythm is a basic characteristic of our nature as depicted in the natural rhythms of the seasons, cycles of the moon and waves upon the shore (Moughtin, 1999; Getlein, 2000). Through repetition, any of the visual elements can take on a rhythm within a work (Getlein, 2000). Rhythm in architecture and urban design is the product of the grouping of elements; of emphasis, interval, accent and direction. It is the sense of movement achieved by the articulation of the members making up the composition (Moughtin, 1999).

2.4.2 Other Concepts Of Perceptual Spatial Differentiation

Perception of spaces is a wide subject that has attracted a lot of study in many disciplines which include humanistic geography, architecture, medicine, and urban design amongst others. This has been triggered by the desire to get a better understanding of human spatial perception and the characteristics of places which can be used to mould physical and social environments

conducive for different purposes. First and foremost the distinction between space and place had to be established.

Jensen (1999) and Knox and Marston (2004) noted that space is a central concept which is usually expressed and used in three different forms. Whereas absolute space is an understanding of space as a distinct, physical and imminently real or empirical entity, relative space has the location of, and distance between different phenomena (horizontal connections). The third form - relational (cognitive) space, is defined and measured in terms of the nature and degree of people's values, feelings, beliefs, and perceptions about it. Thus relational space is consciously or unconsciously embedded in our intentions and actions as we relate to other people and the physical environment.

Jensen (1999) asserts that, places are officially recognised geographical entities or more informally organised sites of intersecting social relations, meanings and collective memory. To him, the humanistic concept of place, largely drawn from phenomenology, was concerned with individual's attachments to particular places and the symbolic quality of popular concepts of place which link events, attitudes, places and create a fused whole. It was concerned with meaning and contrasted the experienced richness of the idea of place with the detached sterility of the concept of space.

Perception of a place is implicitly taken as the emotional negative or positive attachments one has for that place and various concepts have emerged which include identity, topophilia and topophobia, and perception of security that explain perceptual spatial differentiation (Tuan, 1974 1977; Eyles, 1985; Entrikin, 1991; Relph, 2002; Krevs, 2004).

(i) Identity

Knox and Marston (2004) define identity as the sense that people make of themselves through their subjective feelings based on their everyday experiences and wider social relations. To them, if places are not the clear supports of our identity, they none the less play a potentially important part in the symbolic and physical dimension of our identifications. They further noted that it is not only spaces which ground identifications, but places and dominant images of landscapes often with specific vistas also serve as icons for identity.

(ii) Topophilia and Topophobia

Tuan (1980) uses topophilia and topophobia to describe the human emotions towards a place. Topophilia describes the human love for a place which varies in intensity from individual to individual and that there is cultural variation in its expression. There is also a biological component of attachment to place. Topophilia often takes the form of an aestheticizing of a place or landscape, which suggests that aesthetics is a major way in which many people relate to their environment. Another major form of topophilia is attachment to home place which can vary in scale from the nation to the home. Tuan (1980) suggests that such attachment can be based upon memories, or pride of ownership or creation. Topophilia, therefore is not only a response to place, but actively produces places for people. Topophobia is the opposite of 'topophilia', a repulsion of place. These can be landscapes of fear (Tuan, 1980), places we might find threatening, for example, a place where something terrible happened, when you were there or a cemetery (Johnson, 2000).

(iii) Perception of Security

Perception of security of urban space seems to affect people's behaviour, since spaces perceived as insecure tend to be little used (Francis, 1987). The reasons for the perception of insecurity are related to a group of aspects of socio-economic and political nature, as well as of physical nature (Poyner, 1983; Hillier & Shu, 1999; Basso, 2002; Zanotto, 2002:). Among these are the morphological and configurational characteristics of the urban space that affect its security level, as for instance, the amount of existent visual connections between the buildings and the open spaces.

The importance of such connections has been emphasized since early sixties when Jacobs (1961) wrote "The Death and Life of Great American Cities". Several other authors (i.e. Newman, 1972; Voordt & Wegen, 1990; Hillier & Shu, 1999) ever since have supported Jacobs (1961) arguments that urban spaces with large degree of visual supervision on the part of the users of adjacent buildings tend to be more secure spaces, when compared with spaces where visual supervision is smaller or inexistent.

This relationship is also found in a study accomplished in Brazil (Zanotto, 2002). In order to quantify visual connections between buildings and people in the open spaces, physical measurements were used to register the ground floor openings as well as the buildings and other existent visual barriers. It was found that a larger number of openings visualised by children and adolescents corresponds to a larger visual connection and therefore, to a larger visual supervision of the open spaces on the part of the residents of the adjacent buildings. In general, the most used spaces were not appointed as insecure, suggesting a relationship among movement, people's presence and security.

Regarding the physical connections, that make possible the physical access besides the visual one, the situation is quite similar to that of visual connections. This accessibility optimization would bring about an increase of security of the open spaces due to a rise in the number of visible accesses from the public, semi-public or semi-private circulation spaces. Therefore not only the existence of windows that makes possible the visual supervision of open space from the building interior space as well as window visualization from the open space that can suggest for the person in such a space the existence of visually more supervised spaces and therefore more secure spaces but also the existence of doors, would tend to positively affect the security of the open spaces. The use of open spaces especially by children tends to be an indicator of the adequacy of such open spaces in terms of security. Cross culturally, there is little individualised use of space by children and it is dictated by considerations of safety, range of sight, house and compound construction and familial social requirements (Tanner, 2007).

Also the appropriate design and layout of the physical environment can reduce opportunities for criminal actions. Of particular interest are, place characteristics (land use, built form condition, visibility levels) as well as the sites access characteristics. Urban form characteristics: alley and midblock connections, landuse, residential, commercial, undesirable establishments, parking, vacant lots and buildings, built form condition, good visibility from the surrounding buildings and pedestrian presence are important variables in reducing crime (Liggett, 2001).

(iv) Balanced Open Space System

In all the visual preference surveys administered by on hundreds of thousands of participants in New Jersey over a period of twelve years by A. Nelessen Associates, the respondents indicated that it is highly valued and critically desired to have an appropriate balance open spaces system.

A proper system of open spaces provides a range of sensory and emotional pleasures; to some it is sacred, to others it is awe, to some it is fear (Nelessen, 1994).

Urban open spaces must form a continuous network of greenery accessible to all people and animals (Nelessen, 1994). Lacking a complete network of open spaces certainly limits the opportunities for the individual to interact with them. The less exposure to positive open spaces, the more neutral will be the individuals' response and corresponding well being. Places perceived as negative tend to generate negative behaviour. The most common emotional response to negative places is depression. An environment with all the basic open spaces increases the perceptual value of place. As established in previous research, the decrease in perceptual value leads to open spaces being perceived as havens for crime and drugs and as unsafe (Krevs, 2004; Tuan, 1974: 1977; Eyles, 1985; Entrikin, 1991; Relph, 2002).

(v) Building facades

As explained by Moughtin (1999) façades are important elements which represent a variety of visual experiences to the viewer. Visual richness depends upon contrast and the number of elements in the viewer's field of vision. A rich elevation is one where from any given distance between five and nine elements are distinctly seen. When an elevation contains too many identical visual elements, they coalesce and read as single object with a tendency also to bore the viewer (Moughtin, 1999). The base connecting the building to the pavement is probably the part of the façade most often noticed by the viewer.

2.5 USES AND ACTIVITIES OF PUBLIC URBAN OPEN SPACES

The uses of public urban open spaces are those activities that take place in the open air and edges of both streets and squares in our urban areas. These are the actions which a person performs outside the private spheres and for which he utilises public space that include: travelling to work, shopping, selling goods, recreation, leisure activities, sporting events, and deliveries among others (Krier, 1979). Even though there are some uses and activities that take place in both streets and squares, this section gives a brief outline of the characteristic functions of the square.

2.5.1 Functions in Medieval Squares

As stated by Krier (1979) the square that was produced by grouping houses around an open space was probably the first way man discovered of using urban space. He further noted that the courtyard arrangement facilitated a high degree of control of the inner space and defence against external aggression. This is evident in many medieval towns where each clan neighbourhood clustered around the small family square where the men folk met (Kostof, 1992). It was from this humble beginning that the clan courtyard later developed in the middle ages to accommodate private development around squares and public oriented squares that included market places, parade grounds, ceremonial squares, church and town hall squares. Squares have also served as reception areas to many public buildings such as churches and mosques making them also bear symbolic value (Krier, 1979; Kostof, 1992). No contemporary public squares could be compared with historical urban squares like the Grande Place in Brussels, the Place Stanislas in Nancy, the Piazza del Campo in Siena, the Place des Vogues in Paris, the Plaza Mayor in Madrid, the Plaza Real in Bachelona; which are all endowed with meaningful functions (Krier, 1979).

To Kostof (1992) open spaces in cities of all ages were found to be necessary “to promote social encounters and serve the conduct of public affairs”. And to him, unlike the street, “the square is a destination; a purpose built stage for ritual and interaction where structured or communal activities like festivals, riots, celebrations, and public executions take place”. Because of this squares are supposed to bear the designed evidence of a people’s record of accomplishment and ritual behaviour. He further noted that it is in the square where everyone has the freedom of action and the right to stay inactive.

2.5.2 Demise of the Piazza

The demise of the piazza where the social world of cities played itself out started more than a century ago (Kostof, 1992). This was brought about by technological advancement whereby newspapers, radio and television pre-empted the role of the piazza as the disseminator and maker of news; modern water systems killed the socializing power of the public fountain; a revolution in mass marketing and consumption drained the piazza of its pivotal role in economic life; crime which once had been a desecration of society and so required a ritual public cleansing, now spirited its consequences to the seclusion of jail; the neutralization or outright dismissal of ceremonial kings; muting the public manifestation of culture, power and faith; and the advent of the automobile all contributed to the demise of the piazza (Kostof, 1992). Today many squares have been robbed of their original functions and their symbolic content while the effort of conservationists has been crucial in the maintenance of the original uses in some (Krier, 1979).

2.5.3 Vehicular Circulation in Squares

Perhaps, of all the factors that have contributed to the demise of the piazza, the automobile has had the most profound effect. This is because the parking of vehicles in public open spaces

displaces all other users (Krier, 1979). This triggered public protests in America and Europe in the sixties and seventies due to the general realisation that the benefits of a society of car owners were countered by the adverse impact on the environment and the quality of life in urban areas. The ills associated with the automobile include danger to pedestrians, anxiety, noise, air pollution and visual intrusion. The solution prescribed for traffic in towns in England's Buchanan report of 1963 is to create areas within towns and cities where considerations of pedestrian environment took precedence over the movement and parking of vehicles (Kostof, 1992).

From empirical observations made on parking of cars, Alexander (1977) noted that environment which are human and not destroyed socially or ecologically by the presence of parked cars, have less than 9 percent of the ground devoted to parking space. This is because when the density goes beyond this limit people experience the feeling that there are too many cars which are overwhelming the environment that stops to be inviting for recreation.

2.5.4 Grouping of Facilities in Squares

As established in previous studies, people seek out the concentration of other people whenever they are available (Gehl, 1968; Alexander, 1977). To create concentration of people in squares, facilities chosen for their symbiotic relationship must be grouped densely on the edges. This ensures that the facilities function in a cooperative manner and attract the same kinds of people, at the same times of day. For example, when evening entertainments are grouped together, the people who are having a night out can use any of them and the total concentration of action increases. Conversely communal facilities that do not support each other mutually like church, cinema, kindergarten and police station will not create a concentration of activity when grouped

together. This is because different people go to them at different times with different things in mind.

Throughout man's evolution, the night has been a time to stay indoors and not move about freely. Most of the city's activities closed down at night; those which stay open will not do much for the night life of the city unless they are together. To create high concentration of activity in squares at night, it is beneficial to knit together shops, amusements, and services which are open at night, along with hotels, bars, and all-night diners to form centres of night life: well-lit, safe, and lively places that increase the intensity of pedestrian activity by drawing all the people who are out to the squares.

2.5.5 How People Use Public Open Space

In observing people's behaviour in open space, Alexander (1977) deduced that the life of a public square forms naturally around its edge and if the edge fails, then the space never becomes lively. This was after noting that people do not linger out in the open but gravitate naturally toward the edges of public spaces. He also observed that, if the edge does not provide places that are natural to linger, the open space becomes a place to walk through and not a place to stop. It is therefore clear that a public square should be surrounded by pockets of activity: shops, stands, benches, displays, rails, courts, gardens, and news racks. And once small groups form around the edge, it is likely that they will begin to overlap and spill in toward the centre of the square.

Similarly, in other studies conducted by Gehl (1968), he discovered that there is a marked tendency for both standing and sitting persons to place themselves near something like a façade,

pillar, trees and furniture among others. This tendency for people to cling to objects in space can also be used to lure people away from the edges and hence distribute activity in public spaces.

2.5.6 Factors That Affect Activities and Uses in Squares

There are factors that affect activities and uses of open spaces. These include: rules governing planning and building construction that determine the use or function of the buildings and character of the edges (Krier, 1991); human, spatial and social (including economic, political, cultural, historical and ethical) interaction related to the daily life of individuals (Avdelidi, 2004); environmental conditions imposed on people using open spaces that may encourage or discourage usage such as solar radiation, rain and wind speeds (Katzschner, 1997); and the overall function of the open space (Avdelidi, 2004).

The natural environment in open spaces not only has physiological and psychological benefits to human beings but it also affects the behaviour. As nature has restorative and therapeutic benefits, people are naturally drawn to gardens, urban parks and bucolic landscapes for contemplation, solitude, privacy and intimacy (Nelessen, 1997). Different age groups have differing requirements for their recreational needs. Young children are fascinated by the natural environment. Growing teens need recreation fields as well as parks and public gathering places. Adults require recreation spaces as well as the physiological need for nature to balance prolonged stress, particularly when they have prolonged exposure to the negative built environment. Older adults are some of the most avid walkers, realising that it is an excellent cardiovascular exercise. The best possible walking paths for this group are along, and in, the semi public, neighbourhood, and community open spaces. All appreciate flowers, water features, and places to sit comfortably.

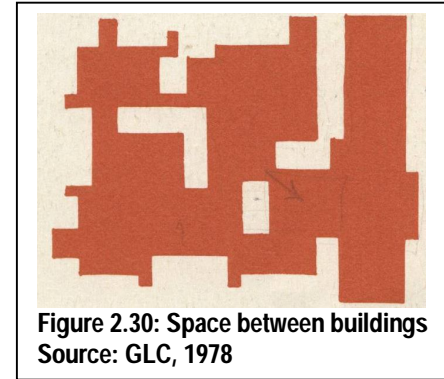
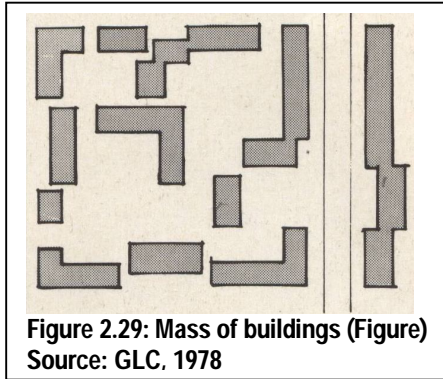
2.6 THEORETICAL FRAMEWORK

This theoretical framework shows how the problem under study is grounded in urban design theories and principles that provide a comprehensive understanding of integrated spatial design of a built environment. The theories considered relevant are those that hinge on the physical characteristics of urban open spaces, human perception and usage of public open space. The researcher identified three urban design theories that differ significantly from each other but when taken together cover the scope of the study. These are the: figure-ground theory, linkage theory, and place theory. Four principles that emerged when Sherwin (1992) reviewed prominent urban design theories have also been covered in the review.

2.6.1 The Figure-Ground Theory

The basic ingredient of architectural and urban design consists of two elements – mass and space (Bacon, 1967). Many designers are ‘space blind’ in that they take too much notice of the mass of buildings, but not the (void) space between them (Bacon, 1967; GLC, 1978). Roger (1986), illustrated in his book, that, the figure-ground theory is founded on the study of the relative land coverage of buildings as solid mass (Fig. 2.29) to open voids (Fig. 2.30).

Each urban environment has an existing pattern of solids and voids, and the figure-ground approach to spatial design is an attempt to clarify the structure of urban spaces and the generic patterns of mass and voids in a city or district. The figure-ground drawing, a two-dimensional abstraction in plan view, is a graphic tool in revealing these relationships.



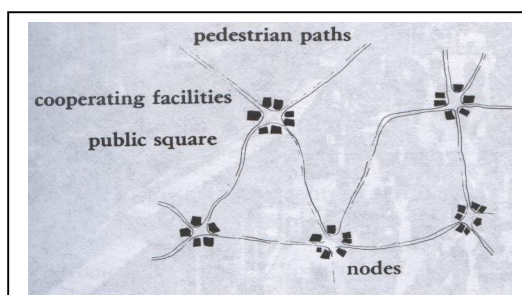
As discussed by Alexander (1977), there are two fundamentally different kinds of outdoor space: negative space and positive space. These two kinds of space have entirely different plan geometries, which may be most easily distinguished by their figure-ground reversal. If you look at the plan of an environment where outdoor spaces are negative, you see the buildings as figure and the outdoor space as ground. There is no reversal. It is impossible to see the outdoor as figure and the buildings as ground. Conversely, if you look at the plan of an environment where outdoor spaces are positive, you may see the buildings as figure, and the outdoor spaces as ground and you may also see the outdoor spaces as figure against the ground of the buildings. The plans have figure-ground reversal. Alexander also hypothesized that people feel comfortable in spaces which are positive and use these spaces; people feel relatively uncomfortable in spaces which are negative and such spaces tend to remain unused.

The Figure-Ground theory has been used to analyse the open spaces under study. It also shows the degree of enclosure and how the spaces relate to existing buildings and adjacent development.

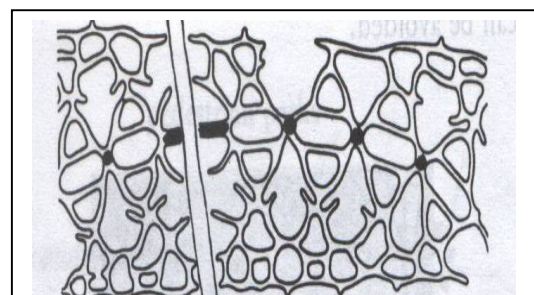
2.6.2 The Linkage Theory

Roger (1986) stated that, "Unlike the figure ground theory, which is based primarily on patterns of solid and void, the linkage theory tries to organise a system of connections, or a network that establishes a structure of ordering spaces." These linking elements can be streets, pedestrian ways and linear open space that physically connect the parts of the city. It places emphasis on the circulation diagram rather than the spatial diagram of the figure-ground theory (Alexander, 1977).

As established by Gehl (1968) in his studies of pedestrian behaviour, people seek out concentrations of other people, whenever they are available. To create these concentrations of people that make squares vibrant, the major pedestrian paths should converge on the square (Fig. 2.31) and link it up with the adjoining urban fabric. This enhances urban integration whereby the urban open spaces – be it a street, park or a square - are not perceived as isolated units but as vital parts of the urban landscape with its own specific set of functions (Urban Task Force, 1999).



**Figure 2.31: Pedestrian paths converging on public square,
Source: Alexander, 1977**



**Figure 2.32: Web of connections in city linking small spaces,
Source: Alexander, 1977**

When several nodes are linked up a web or mesh-like spatial structure (Fig. 2.32) that links together a system of smaller spaces woven into the fabric of the city in a more holistic way

emerges (O'Brien, 2004). Connectivity in the urban setup is one of the principles being advocated for by New Urbanism, which is a post-modern planning movement geared towards the creation of liveable, sustainable, compact and vibrant built environment (McKechnie, 2005). The linkage theory has been used to analyse how the public urban open spaces under study are linked to the urban fabric and whether major pedestrian paths pass through them.

2.6.3 The Place Theory

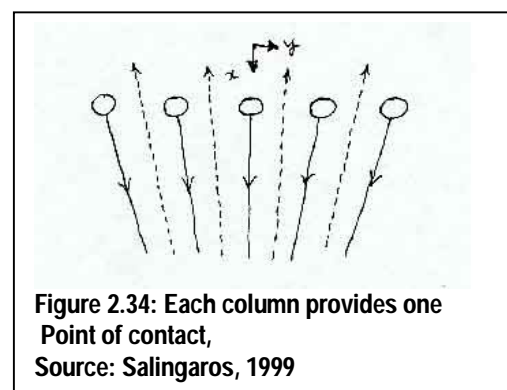
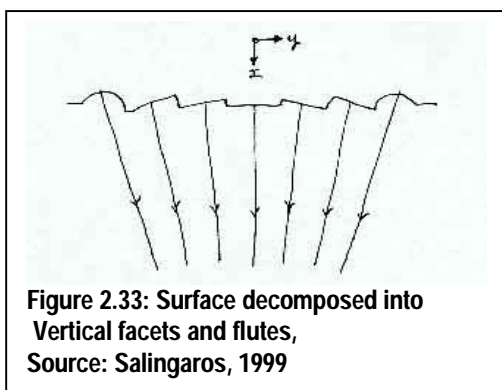
As discussed by Roger (1986), space in abstract is a purposeful void with the potential of physical contents. It only becomes a place when it is given a contextual meaning derived from cultural or regional background. While different types of space can be defined by categories or typologies based on physical properties, each place is unique, taking on the character of its history and surroundings. He further explains that a place is a space which has a distinct character, and a stable system in which people can develop their social, cultural and political values and behaviours. In order to give space an emotional content – a presence that is more than physical, some aspects need to be taken into account in spatial design: the local history, the feeling and needs of the populace, the tradition of craftsmanship and indigenous materials, and the political and economic realities of the community.

The place theory goes one step beyond figure-ground and linkage theories in that it adds the components of human needs and cultural, historic and natural contexts (Roger, 1986). It gives physical space additional richness by incorporating unique forms and details indigenous to the setting. In place theory social and cultural values, visual perception of users, and an individual control over the immediate public environment are important principles (Alexander, 1977).

The principle of visual perception in place theory is crucial in this study as it is the link between the physical characteristics of the open spaces and the usage. Salingaros (1999) proposed this principle as a new theory of urban space based on information theory and the law of optics. To him, the use of urban space depends on the interaction between the observer and the information field: more specifically, a combination of visual, acoustical, thermal, and tactile information fields. To illustrate how architectural features can maximize surface information Salingaros (1999) gave the following examples among others:

(i) Vertical facets and flutes close to the ground

To obtain visual and acoustic information looking horizontally, a surface must reflect in a variety of horizontal angles. A structure is subdivided into vertical facets – thin vertical strips, or flutes – that offer many different angles of reflection (Fig. 2.33). Non-reflective surfaces give a maximal signal when they are orthogonal to the viewer. Flat walls and protruding elements of rectangular cross-section provide only one normal contact point. Note that this mechanism is effective at or near ground level; extending the vertical facets or flutes above eye level does nothing to enhance the desired signal.

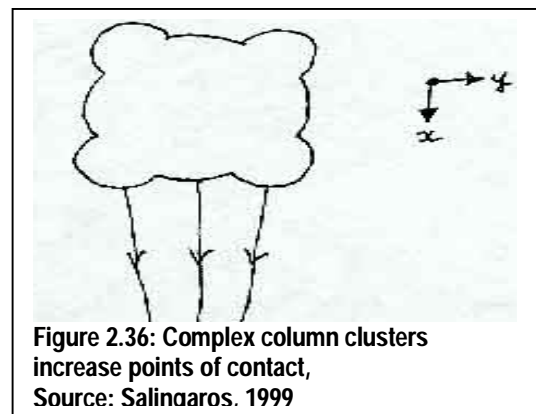
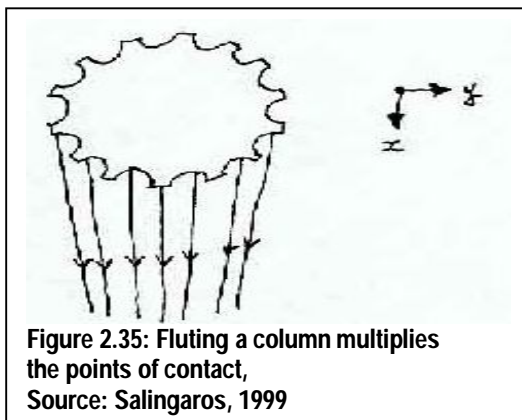


(ii) Colonnades

Colonnades gave definition to urban space in the ancient world, and continue to do so today in the few remaining street arcades. Regularly spaced columns create a partial enclosure (Fig. 2.34). Note that a colonnade has many more normal contact points than a continuous flat wall, and is thus a far more effective boundary for urban space.

(iii) Fluting on columns

An isolated unfluted column drum presents a convex surface having a single normal line of reflection. Fluting the column turns an original convex surface into a piecewise concave surface, thus multiplying the contact points (Fig. 2.35). On a larger scale, faceted or flanged minarets utilize the same effect.

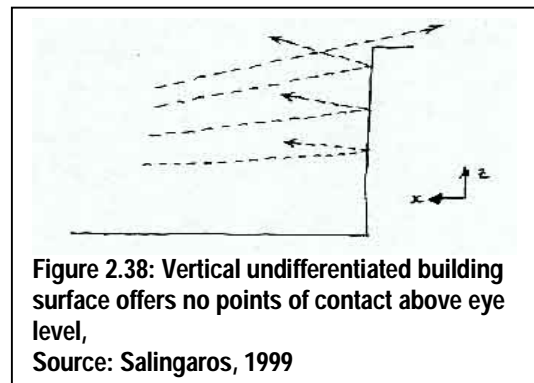
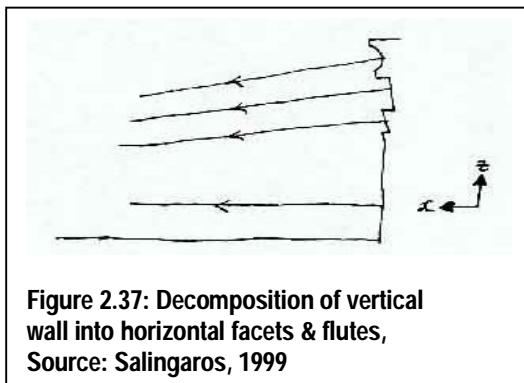


(iv) Column clusters

In the engaged pillars of medieval European cathedrals, a principal column is surrounded with four smaller half columns. The concavity is improved, which increases the reflectance properties (Fig. 2.36). This solution appears also on a scale of a cylindrical building to break the convexity of an outside wall.

(v) Horizontal facets and flutes above eye level

In order to scatter light and sound downwards towards the observer, a surface has to reflect in a narrow range of angles in the vertical plane. Horizontal strips or flutes should be defined, oriented at a variety of downward angles (Fig. 2.37). The general pattern leads to architectural features that present vertical lines around eye level and horizontal lines above eye level.



The historical architecture of India, especially the Hindu temple tradition, employs this solution very effectively. Horizontal articulations with strictly orthogonal corners do not achieve the desired signal.

(vi) Window lintels

Throughout history, windows used to have a lintel or deep exterior frame that connected visually and acoustically to a viewer outside. Making the windows flush with the exterior wall – as if they were from a “single skin” – removes this essential information, leaving no other point of contact (Fig. 2.38).

Since it is in place theory where social and cultural values, visual perception of users, and an individual control over the immediate public environment are important principles (Alexander, 1977), this theory forms the backbone of the household survey that established the residents' perception of the various physical characteristics of the public open spaces under study. The three theories of urban design have been found to be relevant to this study.

2.6.4 Principles of Urban Design

Four principles of urban design emerged when Sherwin (1992) reviewed prominent urban design theories in recent years. The four principles: function, order, identity and appeal, encompass the broad range of design considerations involved in evaluating the quality of spaces and the quality of living. They represent distinct and vital attributes, significant enough to have universal application to all environments, and broad and flexible enough to be utilized and explored in any given condition (Sherwin, 1992).

Function requires that the public open space works effectively for the convenience and comfort of all users. The corresponding qualities or sub-criteria associated with function are linkage, security, comfort, diversity. Order assures that users can become oriented to the space and understand it. The corresponding qualities or sub-criteria associated with order are coherence, clarity, continuity and balance. Identity denotes a visual image of the open space that reflects special or unique qualities. The corresponding qualities or sub-criteria associated with identity are focus, unity, character and special-ness. And finally, appeal characterises a design of the open space that gives pleasure to its users over time. The corresponding qualities or sub-criteria associated with appeal are scale, appropriateness, vitality and harmony.

2.7 SUMMARY TO HIGHLIGHT GAP IN LITERATURE

2.7.1 Summary of Literature Review

The literature review started with a historical perspective of squares and appraised the spatial organisation, scale and proportion, and uses of the Piazza del Campo, Piazza San Marco and Piazza di San Pietro that represent the Medieval, Renaissance and Baroque epochs respectively. The challenges brought by the advent of the automobile have also been captured to appreciate the impact of industrialisation on the square that has to accommodate new activities and uses.

From the literature reviewed it is apparent that public open spaces have different observable characteristics embedded in the numerous surfaces which permeate space and connects it to the human consciousness through the sense of sight, smell, sound, touch, kinaesthesia, sense of gravity, and perhaps of electric or magnetic fields. Each person has his or her own way of seeing, understanding and reacting to the environment through these senses.

The principles of design are a natural part of perception whose understanding gives an observer greater insight into works in space and can be used to mould physical and social environments conducive for different purposes. As guidelines they can be used to organise the visual elements – line, shape, mass, light, value, colour, texture and space – that we perceive and respond to when we look at space.

On account of the fact that we perceive things differently, identification and analysis of the elements that constitute public open spaces was crucial in the literature review. These elements: edges, floorscape, urban furniture, uses and activities, pedestrian and vehicular circulation, and

lighting have been identified to be the variables for this study whose attributes have been analysed.

The nature of the edges of an open space determine the size and shape of space, sense of spatial enclosure, connectivity or linkage to other parts of the city, functional use and overall character of an open space. The variations in paving, landscaping, levels and materials in floorscapes offer visual and tactile experiences over and above fulfilling the primary function of comfort and being appropriate to the user. Urban furniture, both utilitarian and non utilitarian constitute part of the permanent three dimensional objects that enrich public open spaces by their capacity to create images in people.

Apart from the permanent three dimensional objects, uses and activities constitute mobile three dimensional objects responsible for the drama in public open space which was very prominent in historic squares. The change of lifestyles on account of technological advancement has robbed most squares their original functions and symbolic content with the automobile having the most profound effect. Previous studies have established how people use public open space and how concentration of people and activity can be achieved in squares. This insight is vital when considering what uses and activities squares should be endowed with to enable them be vibrant purpose built stages for ritual and interaction. Governing planning and construction rules, and environmental conditions also have an effect on uses and activities in public open space.

Three urban design theories and four principles that emerged when Sherwin (1992) reviewed prominent urban design theories have been examined. The problem under study is grounded in the: figure – ground theory, linkage theory and place theory; whereas the corresponding qualities

or sub-criteria associated with the four principles of function, order, identity and appeal embody perception which this study takes to be crucial in the regeneration of public open spaces in historic areas under conservation.

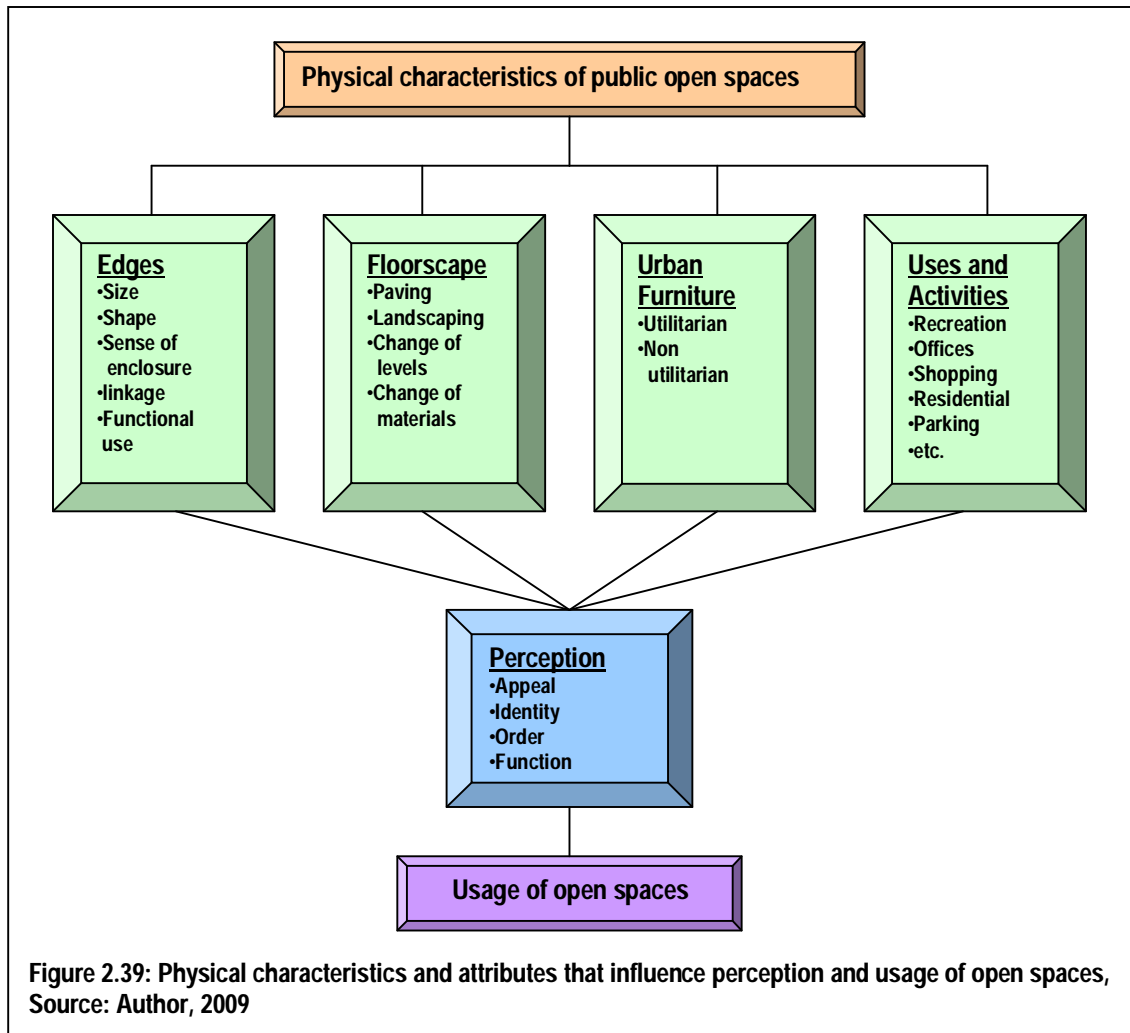
2.7.2 Gap in Literature

What has emerged from the summary of the literature review is that the physical characteristics of open spaces, their perception and usage are three disparate components that are fundamental in the design of successful public open spaces that will meet the aspiration of many who use these communal spaces. This study encompasses the three components to shed some light on the intricacies involved in conservation of historic areas and particularly the public open spaces expected to bear the designed evidence of a people's record of accomplishment and ritual behaviour.

Of great concern is the perception of residents in these areas who are disregarded by professionals and conservationists and yet they are the main stakeholders directly affected by the restrictions imposed on the development of their built environment. This study aims to bridge the gap by underscoring the importance of local community participation through perception surveys in the formulation of legal and institutional frameworks to be adopted for the development of their public open spaces as they embrace continuity and change.

2.8 CONCEPTUAL FRAMEWORK

From the literature reviewed, the conceptual framework (Fig. 2.39) for this study shows that the numerous elements that offer visual and tactile stimuli to human consciousness enables people create an overall image through perception that influences usage of the public open spaces.



The edges, floorscape, urban furniture, uses and activities are the major physical elements that constitute the public open spaces. These elements have varying attributes which through perception contribute to how people perceive the open spaces as entities. For example the varying attributes of the edges are the size, shape, sense of enclosure, linkage and functional use of an open space. All the attributes of the four identified elements influence how an open space is perceived through the corresponding qualities or sub-criteria associated with appeal, identity, order and function which ultimately influence usage.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This policy oriented research study focuses on understanding how the physical characteristics of urban open spaces influence users' perception and usage in 'Old Town' Mombasa. The research methodology discusses the various methods and techniques that have been used to collect empirical data for the study. Whereas the method is the means of collecting data, the technique is the specific procedure that is used in a given method (Miller, 1991). The advantages and limitations of the methods are also highlighted to show why they were found to be appropriate for the study. As defined by Miller, research methodology is "the body of knowledge that describes and analyzes methods" used for collecting empirical data (Miller, 1991). To realize the immediate objectives of the research and achieve high quality results, this study has used multiple-methods approach. The triangulation of methods has the advantage of checking biases and specificity of individual methods when the results from the various methods are analyzed and increases the validity, reliability and usability of the finding (Frankfort-Nachmias, 1996).

3.2 RESEARCH METHODS

The three methods used for data collection for this study are the archival, interview and observation which are discussed here below.

3.2.1 Archival Method

The archival method involves the search and content analysis of secondary data collected by other researchers and institutions for purposes that differ from the original reasons for collecting

the data (Frankfort-Nachmias, 1996). For purposes of this study, secondary data has been obtained from archives, libraries, and the internet on public urban open spaces. Secondary data collected from historical records included population census reports, drawings, photographs and previous research studies and documents in government and quasi-government institutions that were found to be relevant to the study. The conservation plan undertaken for the study area in 1990 and the Mombasa Master Plan of 1962 were used to understand the context within which the research was undertaken.

The secondary data which covers different areas and eras is vital to understand the historical context of the problem under investigation, resulting in greater scope and depth than would have been possible with the primary data collected for this study. Insights gained from the secondary data made it easier to establish the nine physical characteristics of open spaces that vary from one public open space to another and the appropriate data collection techniques to be used. The content of the archival data was analyzed and adapted for this study such that, any potential bias or errors introduced by those who originally collected the data was minimised.

For example, it was noted that the areas the open spaces given by previous studies differed from the actual areas enclosed by the edges. This discrepancy arose as some studies considered only the areas set for public recreation other than the total areas encompassed by the edges. Using the ArchiCAD programme that automatically gives areas for selected sections on scaled drawings, the researcher established the actual areas defined by the edges of the open spaces. Population statistics and the open space planning requirements highlighted the critical shortage of public open space in the study area for recreational use.

3.2.2 Interviews

To elicit how the residents perceive the public urban open spaces in old town Mombasa, the interview method was used for the main household survey. The method combined the two elements found in scheduled and structured interviews which subject all respondents to the same questions and in the same sequence. This ensures that “any variations between responses can be attributed to the actual differences between the respondents and not to variations in the interview” (Frankfort-Nachmias, 1996). The challenge with this method was the formulation of questions to give the same meaning to all respondents. To ensure that the questions had the same meaning to all respondents, the research assistants had to be trained thoroughly before embarking on the survey.

Some knowledgeable people who are conversant with the conservation plan that restricts development in the study area and influence of culture and religion on the perception and usage of public open space were subjected to in-depth interviews. Purposive sampling was used to identify the director of the Mombasa Conservation office and the renowned elder from five persons that had been identified for the in-depth interviews. Whereas the chief’s office with assistance from neighbourhood elders (Wazee wa mitaa) short listed candidates for the posts of research assistants, only those who passed the interview conducted by the researcher were engaged. The insight gained from the in-depth interviews was crucial in understanding how the old town residents operate in their historic built environment.

3.2.3 Observation Method

This method was used to observe both environmental behaviour and physical traces. The method involved the systematic watching of residents as they used the open spaces as individuals, pairs

of people, small groups and large groups (Zeisel, 1981). Since there are other activities and uses that could not be captured by observing the environmental behaviour, physical traces left behind by previous activity had to be mapped. Physical traces have been used to document private behaviour and behavior of groups which can't be interviewed (Zeisel, 1981). The sites for the observations were the: Treasury Square, Government Square, Waterfront and the Piggot Place that form the case studies sampled from the population of public open spaces in the study area.

3.3 DATA COLLECTION TECHNIQUES

Techniques are the specific procedures that are used for data collection in a given research method (Miller, 1991). Various techniques have been used for the three research methods mentioned above.

3.3.1 Field Tools in Archival Method

The preliminary groundwork that had to be done in the study was to identify and document archival data on the physical characteristics of public open spaces; characteristics of successful urban open spaces; how people perceive open spaces; usage of public open spaces; and the study area – 'Old Town' Mombasa. A reader consisting of notes, drawings and photographs was established whose content was analyzed. This enabled the researcher to have a full understanding of the context in which the study was to be undertaken while the archival data was adapted to suit the current study. It is from these background studies that the research design was established.

3.3.2 Field Tools in Interview Method

For the household survey to establish the residents' perception, aspirations, knowledge, attitudes, and intentions a structured questionnaire was developed to be used for the personal interviews.

The main analytic coding technique used for the bulk of the questionnaire is the semantic differential scale. This technique was chosen because it can be used selectively to identify the quality and intensity of meaning which is expressed more completely when people are presented with appropriate alternatives to choose from (Zeisel, 1981). Based on content analysis of the literature reviewed, nine characteristics of urban public open spaces were identified on which respondents were asked to circle the number that best represents their perception on the parameters that represent the characteristics using a series of Bi-polar terms; where x refers to the left hand column and y the right hand column.

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

The nine characteristics of urban public open spaces are: - whole space identity; overall built environment; built form of buildings; edges; ground surface; landscaping; urban furniture; uses and activities; and vehicular traffic and parking (GLC, 1978; Moughtin, 1999; Avdelidi, 2004).

After the semantic differential scales, four open ended questions were asked to establish what the respondent thinks about the open space. The response to these open ended questions were classified and coded for ease of tabulation and keying in the SPSS spread sheet. The last item deliberately set at the end of the questionnaire was for gathering respondents' personal data. This was based on the fact that people can comfortable give their personal data after having known the context of the interview and not before as was established in the pre-test. In the design of the questionnaire, apart from the few open ended questions, pre-coding was done with preset choices from which to choose from to accelerate data collection and processing.

Photographs and the layouts of the open urban spaces were also presented to the subjects to refresh their memory on the characteristics of the open spaces. It was also anticipated that not all respondents would be very familiar with all the open spaces, so the photographs and layouts were a great help in getting data from all respondents on all the four open spaces.

After several attempts failed to engage research assistants for the task of administering the questionnaires, the researcher engaged the support of the provincial administration. The area chief assisted in the identification of eleven research assistants who were trained for one day in his office premises. For any recruit to qualify as an assistant researcher they had to be residents in the study area with a form four minimum level of education. They also had to be reliable, of good conduct and acceptable to the residents and understand well the requirements of the research. After training the research assistants were grouped in twos and each had an opportunity to interview a colleague to ensure that they totally understood what was expected of them. This was followed by a pre-test on the first few sampled households.

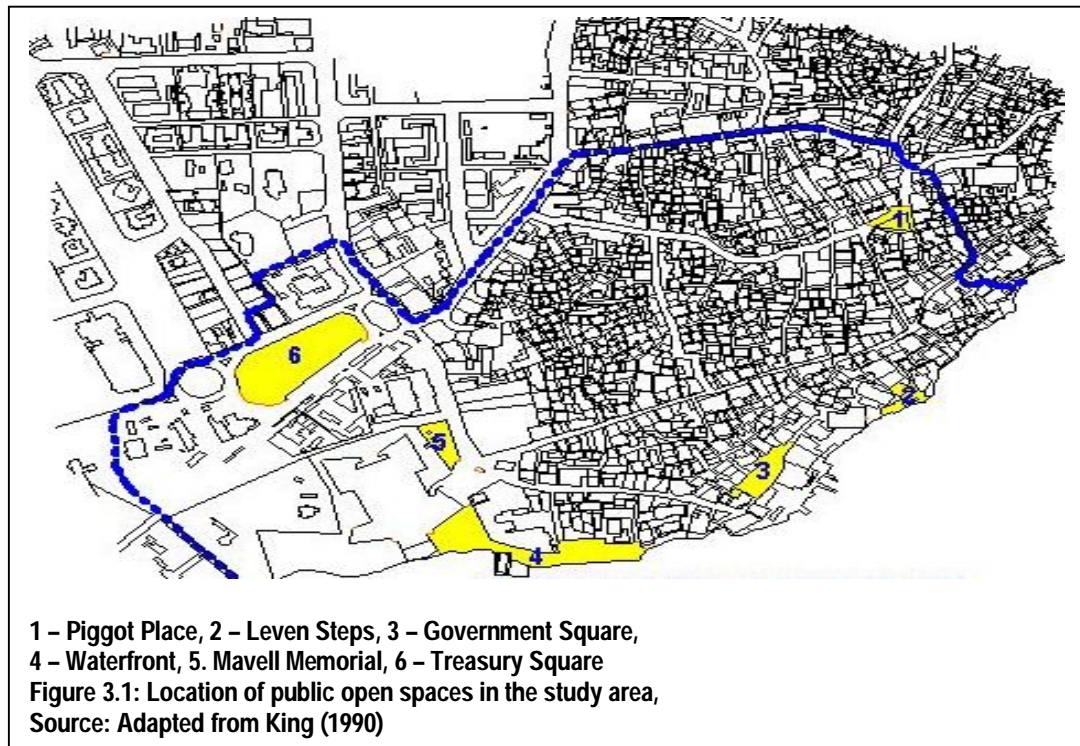
3.3.3 Field Tools in Observation Method

The field tools used to recording behaviour observations included case study checklists, floor plans, photographs and notation. The case study checklist provided a basis for systematic recording of all information on the open spaces for both environmental behaviour and physical traces. The checklist included documenting the physical environment as well as doing behavioural mapping and observing physical traces.

3.4 SAMPLING OF PUBLIC OPEN SPACES

The public open space population (Fig. 3.1) in the study area consist of the: Piggot Place; Leven Steps; Government Square; Water Front; Mavell Memorial and Treasury Square (King, 1990).

The common observable characteristics that make this population of six open spaces a complete set of cases (Mugenda, 2003) are first, they are open spaces and second, they are public, expected to cater for the recreational needs of the residents.



This population does not include vacant plots, cemeteries, streets and other urban open spaces that are for private use. Due to the limitations of the study, four out of the six public open spaces that make a complete set of cases were studied after sampling.

To secure a representative sample, the population was studied and split into three categories on account of their general characteristics. The Piggot Place and the Government Square are hard

spaces enclosed by buildings with no significant amount of greenery used mainly as parking. The Leven Steps and the Waterfront are green spaces that have the Indian Ocean as an edge on the eastern side used for recreation. The Mavell Memorial and the Treasury Square are small parks characterized by big trees with seating for passive recreation. These last two open spaces are also bound by roads and parking spaces. After identification the various characteristics were noted as indicated in table 3.1 here below.

Table 3.1: Characteristics of the public open spaces,
Source: Author, 2009

NO.	NAME	SIZE	TYPE OF EDGES	GROUND SURFACE	USES	VEGETATION
1.	Piggot Place	1140sq.m	Enclosed by buildings	Paved Hard surface	Parking, Auction, Shopping, circulation	Not significant
2.	Govt. Square	1885sq.m	Enclosed by buildings	Paved Hard surface	Parking, Garbage collection, circulation	Not significant
3.	Treasury Square	7828sq.m	Roads & Parking	Lawns & paving	Passive Recreation, Waiting	Big trees, landscaped
4.	Mavell Memorial	1332sq.m	Roads & Parking	Lawns & paving	Passive Recreation & waiting	Big trees, landscaped
5.	Waterfront	5848sq.m	Buildings & ocean	Lawns, Paving & Earth	Passive & active recreation	Lawns & hedges
6.	Leven Steps	987sq.m	Buildings & ocean	Paving & Grass	Passive recreation	Trees & Grass

This necessitated a sampling technique that would be appropriate for the research. Purposive sampling was used to enable the researcher get data on all the subgroups that constitute the population. Purposive (judgment) sampling is a non-probability sampling technique in which cases with the required characteristics are selected subjectively to make a representative sample (Frankfort-Nachmias, 1996; Mugenda, 2003). Since, bigger open spaces are more legible, the Treasury Square, the Waterfront, the Government Square and the Piggot Place were chosen. Further examination on the sample revealed that it was representative as it contained cases from all the three sub-groups identified earlier.

3.5 SAMPLING OF HOUSEHOLDS

The population of residents in old town has been estimated by the Central Bureau of Statistics to be 27,518 people (GOK, 2007). Based on the 1979 census which established that the population of the area of study (conservation area) was approximately a third of the total Old town population (King, 1990), the current target population for this study is calculated to be 9173 people. Considering the average household size of 5.8 (GOK, 2002; King, 1990), then the target population for this study is 1582 households. Since descriptive studies require 10% of the accessible population (Mugenda, 2003), 150 households were targeted for this study. Assuming that the households were uniformly distributed within the study area, the distribution of the households and sample size per administrative block were calculated as shown in table 3.2 below. The definition of a household was taken to be a unit of people who regularly cook and eat together (GOK, 1979; GOK, 2002).

SECTION	NO. OF RES. PLOTS	NO. OF HSE/HOLDS	SAMPLE SIZE (10%)
XXV/XXVI	0	0	0
XXIX	78	219	22
XXX	154	432	43
XXXI	54	151	15
XXXII	13	36	4
XXXIII	65	182	18
XXXIV	85	238	24
XXXV	49	137	14
XXXVI	44	123	12
XLII	22	62	6
XLIII	0	0	0
TOTAL	564	1580	158

The study area covers an area of approximately 31 hectares and contains a total of 774 plots with 564 residential buildings distributed in the administrative sections as indicated in figure 3.2 (King, 1990). The Swahili house, a one storey structure that is rectangular in plan is the predominant building type in sections XXIX, XXX to XLII and parts of XXXIV. The Traditional Mombasa Houses which are two and three storey buildings are located in sections XXXI, XXXIII, XXXV,

XXXVI, and parts of XXXIV. The third type of neighbourhood with radically altered, modernised and new buildings is found on the waterfront in section XXXII.

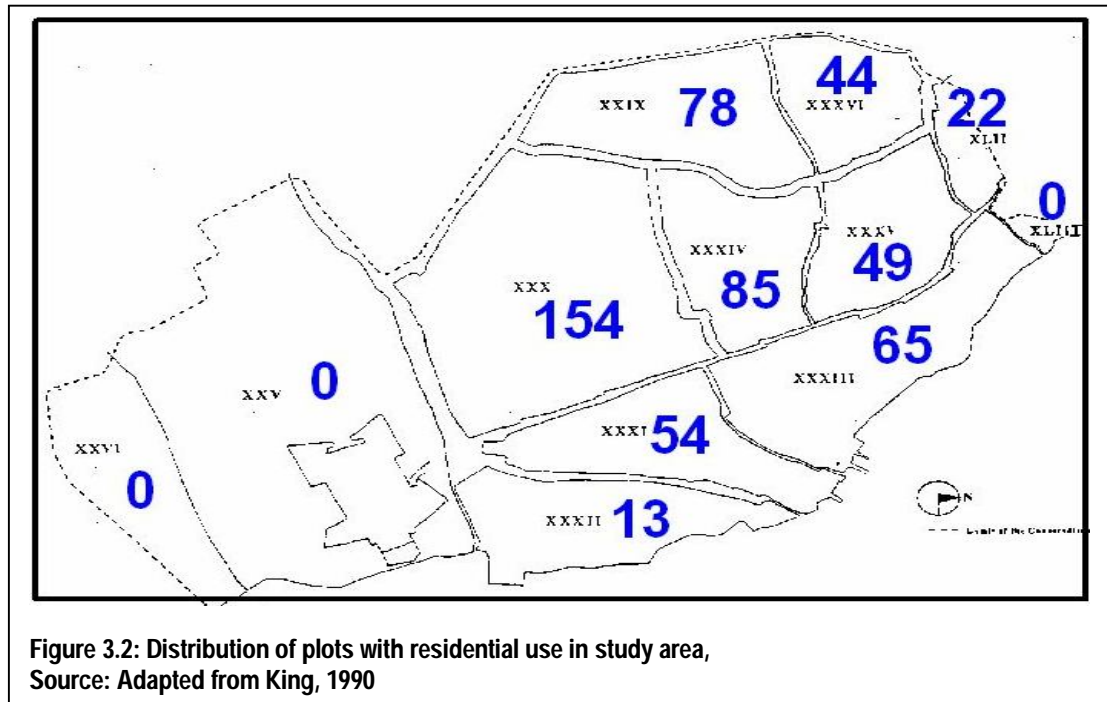


Figure 3.2: Distribution of plots with residential use in study area, Source: Adapted from King, 1990

To get the sample population a multi-method sampling technique was used. First, on account of the distribution of building types and households, the nine administrative sections whose boundaries are clearly demarcated and have dwelling units were taken to be clusters or areas of enumeration. Next all the structures with residential function were numbered and the number of households in each structure was noted in the map that shows the layout of all buildings in the cluster. The residents had to be asked to establish the actual number of households in the structures as it was found that even the single dwelling units were accommodating more than one household. This corresponded closely to the distribution of households in Table 3.2. All the households in the study area formed the sampling frame.

To select the sample households for each cluster, systematic sampling (Frankfort-Nachmias, 1996) was used. This involved listing all the households in each cluster after which the first household (sampling unit) was selected at random from a paper bag that contained small pieces of paper that represented each household in the clusters. After selection of the first households then every tenth household was picked from the lists of households to get the 10% sample units for each cluster. Since the ratio of men to women was established to be 1:1 in the 1979 census, stratified sampling (Frankfort-Nachmias, 1996) was used to pick who was to be interviewed in the households. The interviewers were asked to alternately pick men and women as they moved from one household to the next. The cumulative 10% from all the clusters gave the 10% sample households used for the study.

CHAPTER 4

BACKGROUND OF THE CASE STUDY AREA

4.1 INTRODUCTION

This chapter presents in detail the context of the broader town of Mombasa which encompasses the area of study. It starts with the physical features of Mombasa, followed by the historical backgrounds of the town, that of the Old Town and lastly focuses on the area of study which is under conservation.

4.2 POSITION AND SIZE

Mombasa is the second largest city of Kenya located along the East African coastline. It lies between the latitudes $3^{\circ} 80'$ and $4^{\circ} 10'$ South of the Equator and between Longitudes $39^{\circ} 60'$ and $39^{\circ} 80'$ east of the Greenwich Meridian. (GOK, 2007) The municipality of Mombasa whose borders coincide with those of the district covers an area of 282 square kilometres, 20% of which is covered by water (King, 1990, GOK, 2007). It borders Kilifi district to the north, Kwale district to

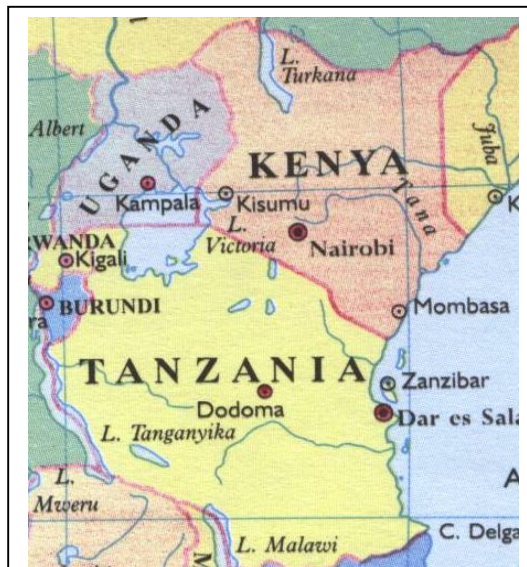


Figure 4.1: Location Of Mombasa in East Africa,
Source: Philips, 2002

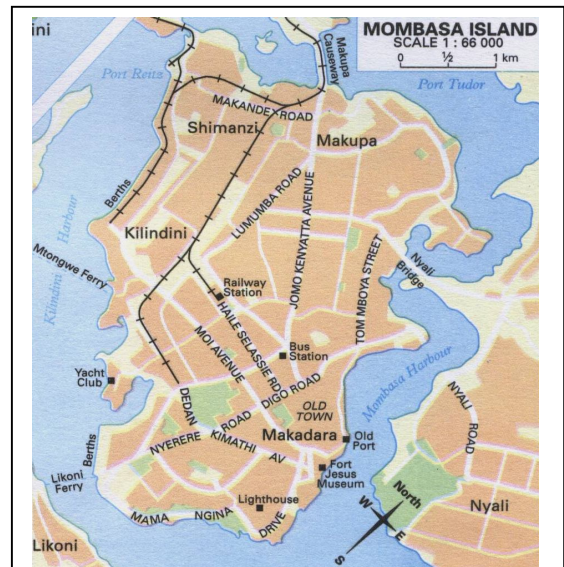


Figure 4.2: Location of Old Town in Mombasa Island,
Source: Philips, 2002

the south and west and the Indian Ocean to the east. The location of the port at Mombasa which serves the region makes the city a big and administrative centre in Kenya. The position of the study area in relation to the region and country are given in Figures 4.1 and 4.2 above.

4.3 PHYSICAL FEATURES

The physical features that have been discussed here below are the relief and climatic conditions that influence the development of Mombasa town and its environs. The relief features strongly define the boundaries of the island while the climatic conditions have an influence on the built environment. The two most important factors in relation to development and the siting of buildings are the orientation for avoiding sunlight and the need for through ventilation (King, 1990).

4.3.1 Relief

Mombasa municipality can be divided into four distinct regions due to the presence of the two main creeks of Port Reitz and Port Tudor (King, 1990; GOK, 2007). The four areas are the island; the north mainland which includes Nyali, Kisauni, Bamburi and Shanzu; the west mainland which includes Changamwe, Kipevu and Miritini; and the south mainland which includes Likoni (King, 1990).

As explained by King (1990), these creeks widening from their narrow channels through the coral in the east, spread out to form extensive inland lakes with wide spread, marginal, mangrove swamps. These water courses give rise to physical features which entail sudden changes of gradient, frequent variations in axial direction of valleys, ridges and steep slopes, all of which are completely unsuitable for intensive building developments. They thus form, together with Mtwapa creek in the north, an almost uninterrupted peripheral limit to the continuation of the outgrowth of

the city. Due to the creeks and the steep cliffs, communication between the island and the mainland is through the Nyali bridge, Mtwapa bridge and Makupa causeway while ferries link up the island with Likoni. However the deep creeks at Kilindini which accommodate big ocean vessels have made Mombasa a very important port city in the region.

4.3.2 Climate

Geographically, Mombasa lies in the coastal belt whose weather patterns are dominated by the northeast monsoon which blows from November to March and the southwest monsoon which blows from April to October. The hot season occurs during the northeast monsoon with the two hottest months being February and March when it can be uncomfortable to walk around comfortably at midday. At this time the temperatures range between 35°C and 37°C and the relative humidity reaches between 70 and 80%. The effect of the high humidity, most noticeable during the period after sunrise, is largely dissipated by the diurnal sea breeze, which does much towards making the climate pleasant. The two coolest months, July and August are more pleasant with temperatures in the range of 22°C to 27°C (King, 1990).

The rainfall pattern has two distinct seasons mainly dependent upon the changing monsoons. The long rains occur from March to June and account for more than half of the entire rainfall for Mombasa. The mean annual rainfall is about 1100mm, with the months of May and June recording the heaviest rains. The month of May has the highest precipitation with a mean monthly rainfall of about 375.44mm. The short rains are much less reliable, but usually start towards the end of October and last until December or January. Besides the seasonal rainfall, Mombasa also experiences localized conventional type of rainfall due to the land and sea breeze (King, 1990).

4.3.3 Vegetation

Vegetation mainly consists of cultivated fruit trees such as coconut palms, mango and cashew-nut trees. In the area along the creeks, a fairly dense cover of mangrove trees can be found (King, 1990).

4.4 HISTORICAL BACKGROUND

The historical background has been captured in the five eras when Mombasa was under different successive rulers. These eras cover the period before the Portuguese reign up to the twentieth century when the British established their base at Mombasa.

4.4.1 Before the Portuguese Period

Mombasa and the various towns in the coastal region are bound together by a culture, religion and background influenced by the great circle of trade that has been taking place in the Indian Ocean for thousands of years (King, 1990). As early as the 1st century AD, the yearly northeast monsoon brought ships from Asia and Arabia to the shores of the East African coast in search of natural resources found in the continent. When the wind changed direction, the southwest monsoon returned the ships to their lands of origin (King, 1990).

The coming of Islam in the 8th century brought with it an expanding interest in Africa with an increase in trade that encouraged Arab and Persian immigrants to settle along the Indian coast. Between 1066 AD and 1100 AD when the geographer Al-Idris visited Mombasa, none of the early records of this period mentioned the existence of the town. Most city-states along the coast began to flourish between the thirteenth and fifteenth centuries as evidenced by the ruins of mosques, palaces and pillar tombs constructed of coral and lime. By 1505, Mombasa was a flourishing city of 10,000 protected by a wall as high as a fortress on the land side (King, 1990).

4.4.2 Portuguese Period

As part of the Portuguese effort to explore the Indian Ocean and search for a way to India, Vasco da Gama dropped anchor in Mombasa on April 7, 1498 after rounding the Cape of Good Hope. The reception given by the people of Mombasa which forced him to sail to Malindi soon afterwards was an encounter that triggered some animosity that was to last the next 200 years. The town was first sacked and destroyed by the Portuguese in 1505. It was sacked again in 1528 and 1588 by Nuno de Cunha and Mirale Bey respectively. Bey was a Turk who had conspired with the local leaders to displace the Portuguese. The attacks on Portuguese shipping in the Indian Ocean by the Turks necessitated the relocation of the Portuguese from Malindi to Mombasa who constructed Fort Jesus from 1593 to 1597. Thereafter, a small walled town called the Gavana which was distinct from the original Swahili town to the north grew up beside the fort to cater to the traders and businessmen that were associated with Portuguese maritime trade. None of the buildings from this period with the exception of Fort Jesus, the Mandry and the Basheikh mosques remain standing today (King, 1990).

By 1635 the Portuguese power was in the process of decline and in 1650 their fort in Muscat fell to the Omanis who thereafter systematically raided most of the Portuguese controlled towns along the coast of Africa. After the great siege of Fort Jesus from 1696 to December 1698 in which most of the defenders were decimated by disease, the fort finally fell to the Omani troops ending the Portuguese subjugation of the eastern Africa north of Mozambique.

4.4.3 Rule of the Mazrui

After the fall of the Portuguese the Omanis took control of the coast and Nassir bin Abdulla, of the powerful Mazrui family was appointed governor of Mombasa. In the absence of Seif bin Sultan

who had returned to Omani, the Mazrui family began to consolidate the areas north and south of Mombasa under their power. In 1741 the Mazrui declared Mombasa to be an independent entity resulting in battles and treacheries between the Mazrui at Mombasa, the Omani Sultanate and the Nabhany of Pate who had also declared themselves independent of Oman and were rivalling the Mazrui for control of the coast (King, 1990).

Throughout the period of skirmishes, the Mazrui not only managed to maintain the independence of Mombasa, but also extended their control of the coast to include Pemba Island. In 1828 the sultanate of Oman managed to capture the town. However the Mazrui starved the Baluchi garrison out of the fort and retook it. Finally in 1837 Seyyid Said convinced the Mazrui to give control of the fort to Oman in return for retaining power in the town. The Mazrui rule of Mombasa ended shortly thereafter when the prominent Mazrui were arrested and imprisoned (King, 1990).

4.4.4 Sultans of Zanzibar

After the defeat of the Mazrui, the sultanate of Oman transferred his capital from the arid Arabian Peninsula to Zanzibar which was not only the political and business centre of the coast but also the starting point for explorers and businessmen venturing into the interior. Until 1907 when the slave trade was abolished, Zanzibar derived much of its wealth from the trade as the main outlet. After Dr. Ludwig Krapf set up the first missionary in eastern Africa in 1844, Mombasa also attracted some explorers like Burton, Speke and Joseph Thompson who spent some time there. Several of the successful businesses in Zanzibar also set up branches at Mombasa (King, 1990). In 1886, the area of jurisdiction of the Sultan of Zanzibar, of all coastal land to a depth of 10 nautical miles inland, was fixed in an agreement with representatives of the British and German governments. Thereafter, the British and Germans apportioned themselves all the land further

inland along the boundaries of present day Kenya and Tanzania respectively. Until 1963 when Kenya attained independence, the Sultan of Zanzibar still had a claim to Mombasa and indeed to whole of the Kenyan coast (King, 1990).

4.4.5 Twentieth Century

The turn of the century saw the inception of exciting public works projects. The first railway line was laid inland for 7 miles which eventually was reused for a small trolley line that ran in the town. In 1891, the first telegraph line connecting Mombasa to Malindi and Lamu was also laid. In 1895 the construction of the Kenya-Uganda Railway which reached Nairobi and Kisumu in 1899 and 1901 respectively, commenced at Mombasa (King, 1990).

Concurrently a lot of building construction was undertaken, most of which was around the old port which had become the town's centre of commerce. Most of the buildings standing today along Mbarak Hinawy Road, Government Square, and Ndia Kuu were built at this time. They accommodated businesses especially those associated with shipping opened by British, Zanzibari and Indian businessmen (King, 1990).

As Mombasa grew in importance, the built area started spreading out beyond the old port area. The first government offices, located at Government Square and Mbarak Hinawy Road, were moved to Treasury Square. The Law Courts building, the Treasury building and the post office were opened in 1902, 1906 and 1916 respectively while Treasury Square became the focus of several banks, hotels and the railway station. Housing also developed to the south of Fort Jesus in the Ras Serani area. The development of deep water berths at Kilindini Harbour in 1926 changed the business focus leading to the relocation of most of the shipping industries from old

town to the present business centre between Moi Avenue and Digo Road. The railway station was moved in 1932 from Treasury Square to its present location (King, 1990).

Since then, Mombasa has expanded beyond the limits of the Island to encompass much of the surrounding mainland. The population which was approximately 20,000 at the turn of the century has now grown to over 849,000 people. The old town on the other hand, has been reduced from the status it used to enjoy as a business centre to a relatively quiet mixed use neighbourhood. Some of the beautiful buildings and the unique Swahili culture that have characterized the rich history of the East African coast have been preserved and still stand as a reminder of Mombasa's interesting and lively past (King, 1990).



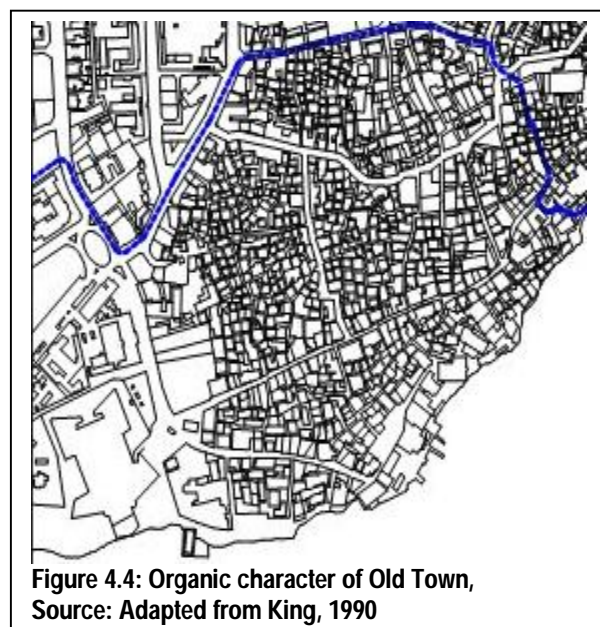
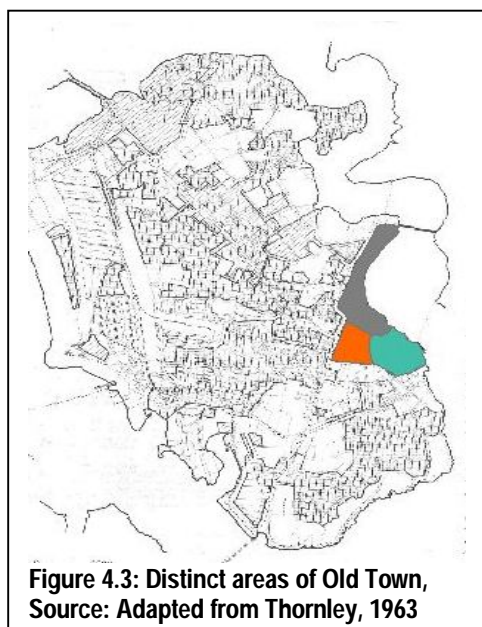
4.5 THE OLD TOWN

Within the Municipality of Mombasa, the old town takes up an area of approximately 72 hectares. It is bound on the east by the Mombasa Channel, the south by Nkrumah and Makadara Roads, and the west by Digo Road and Abdel Nasser Road which eventually converges with the waterfront at Allidina Visram High School. The development of the Old town has given rise to three semi-distinct areas (Fig. 4.3) within its boundaries whose organic nature that makes them to

stand coherently as one entity (Fig. 4.4). The first includes the area north of the Gavana and Biashara Street. The second incorporates the area bound by Samburu Road, Makadara Road, Digo Road and Biashara Street, and the third roughly corresponds to the old walled Portuguese Gavana which became the centre of commerce during the 18th and 19th centuries and is the area under conservation (King, 1990).

4.5.1 Development of the Old Town

Much is not known about the first settlement which was located where the Coast General



Hospital is today. This early dynasty which legend says was ruled by a queen named "Mwana Mkizi" was replaced by the Shirazi dynasty whose founder was Shehe Mvita. Mvita, an alternative name for Mombasa Island was derived from the Swahili word for war 'vita' on account of the many wars fought (Thornley; 1963; King, 1990). Mvita town was located slightly to the south of the first settlement on what is now the northern tip of the old town. Though its not established when this town started, its location is that of the 14th and 15th century town. By the time Fort Jesus

was built the town had expanded and reached the Mlango wa Papa area to the south (Thornley, 1963; King, 1990).

The next major development in the old town was the construction of Fort Jesus in 1593, with its associated town - the Gavana. This walled town built by the Portuguese was distinct from the settlement further north. It started at the fort and extended past the Old Port and west as far as Samburu Road. With the coming of the Mazrui, the population increased and the original walls of the Gavana were repaired and extended further north and west to amalgamate much of the northern settlement with the former Portuguese town into a single urban entity. It was during the reign of the Al-Busaidi dynasty who took over from the Mazrui that a large building boom took place and many of the buildings standing today date from that era (King, 1990).

The last phase of development in the old town was triggered by the influx of Indian businessmen that came to Mombasa under the British rule. Many of the immigrants built their shops and houses to the west of the original settlement of the Gavana, filling in the area between Samburu and Digo Roads. At the same time stone structures started gradually to replace the mud and thatch construction throughout the town (King, 1990).

4.6 THE CONSERVATION AREA

The conservation area is located at the southeast corner of the Old Town and measures approximately 31 hectares. The area roughly corresponds to the old walled town built by the Portuguese in the 16th century. In the north and south of this border small sections were added to include the Piggot Place, Treasury Square and Fort Jesus respectively. This area was found to be the most ideal place to start the conservation effort in Old Town. This was because: it was the

centre of activity Mombasa between the late sixteenth and early twentieth centuries; it has many of the oldest architecturally significant buildings as all the successive rulers centred themselves there because of its proximity to fort Jesus and the excellent harbour; the organic urban character creates a very distinctive atmosphere (King, 1990).

4.6.1 Development of the Conservation Area

The development of the conservation area historically took place around the old port and Ndia Kuu which was a foot path that linked Fort Jesus with the Swahili town north of the Gavana which with time became a major business and residential axis in the area. Much of the important building activity in the town took place along this road, Mbarak Hinawy Road and the old port. The area west of Ndia Kuu had fewer buildings, most of which were semi-permanent which had more space around them. Within the last century, the mud and thatch buildings in this area began to be reconstructed with stone and the density began to increase (King, 1990).

A system of neighbourhoods developed that generally contained a group of houses whose residents were all members of the same extended family system who depended on the neighbourhood for their social and economic development. The early pathways which separated the neighbourhoods eventually developed into a system of winding roads. In 1908, the British through the Land Titles Ordinance divided the town into administrative sections based on the existing roads and gave numbers to all the plots (King, 1990).

4.6.2 Public Open Spaces

The four main public open spaces in the conservation area are the Treasury Square, Government Square, Piggot Place and the Waterfront. The Treasury Square is a large garden with several old

trees, benches and a small pavilion. The surrounding buildings with their pediments, arches, columns and verandas give a strong air of their administrative and commercial functions (King, 1990). The Government square is currently used as a loading bay for the Old Port and rubbish collection point for the conservation area. Piggot place is used for parking cars and there is an electrical substation located roughly in its centre. The waterfront has been developed into a park. Apart from the four main public open spaces, there are two other small public open spaces in the conservation area. The Mavell Memorial is associated with Fort Jesus while the Leven Steps area needs to be developed to accommodate public use.

Despite the high population density and the acute scarcity of open space in Old Town, all the six public open spaces in the conservation area are underutilized. This discrepancy is what prompted the researcher to undertake this study and come up with recommendations that can be used to fully develop the open spaces to specifically meet the needs of the local community.

4.7 CONCLUSION

The background of the case study area covered the physical features, historical setting, the broader OTM and the study area. The physical features and historical setting are the main factors that have led to the built environment that also encompass the public open spaces under study. The many battles fought, climatic conditions and the restrictions imposed by the Conservation Plan has also had a definite effect on the character of the spaces and adjoining buildings that accommodate the residents targeted for the study. The background of the case study area was crucial to enable the researcher appreciate the forces that shaped the open spaces which influence the residents perception and usage.

CHAPTER 5

DATA PRESENTATION AND ANALYSIS

5.1 INTRODUCTION

This chapter presents the analysis of data collected on the four case studies; Piggot Place, Government Square, Treasury Square, and the Waterfront. For each case study, the analysis is split into two parts. The first part analyses data collected using the archival and observation methods based on theory and principles of urban design with regards to the urban open spaces. This is followed by the data that emanated from the household survey that encompass what the residents perceive as positive or negative in the open spaces. The data is presented in form of notes, annotated diagrams, photographs, tables and figures. The chapter is concluded with a summary of data for the four case studies presented in a table for easy of comparison.

5.2 THE OPEN SPACES

5.2.1 The Piggot Place

The Piggot Place which has an area of 1140 square metres is a very important public space that originally served as an outdoor market (King, 1990). With the construction of the Mackinnon market in 1916 in the old town, the open space lost its historic significance and gradually became a parking area as the population of vehicles increased in the area. However, on Saturdays and Sundays, the place becomes an auction yard with the merchandise to be sold spread amongst parked cars.

5.2.2 The Government Square

The Government Square that has an area of 1885 square metres is one of the most important public spaces in the study area. It served historically as the centre for business and commerce in Mombasa from 1890's when the British set up most of their government buildings within the vicinity of the old port which was thriving then (King, 1990). The square began to lose its importance when many businesses associated with the shipping industry shifted with the construction of the deep water port at Kilindini and Kipevu. However, the old port is still active serving the small wooden dhows that continue to trade along the coast of Africa.

5.2.3 The Treasury Square

The Treasury Square has an area of 7828 square metres and is a small public garden with numerous old trees which provide shade to public benches erected in this landscaped area. This open space is very important as it also doubles up as a waiting area for the District Commissioner's offices (Old Treasury Building), Mombasa Municipal offices, Municipal Education offices (Old Post Office Building), Mombasa Central Bank of Kenya and a branch of Kenya Commercial Bank which partly encompass the square. The Treasury Square gained importance when Government buildings shifted from the Government Square with the construction of the deep water port at Kilindini in the early part of the 20th. century. A statue of Alladina Visram and a small pavilion are in the garden. Of all the open spaces in the old town, it is in this square that women and children can be found sharing the public space with men in the evenings.

5.2.4 The Waterfront

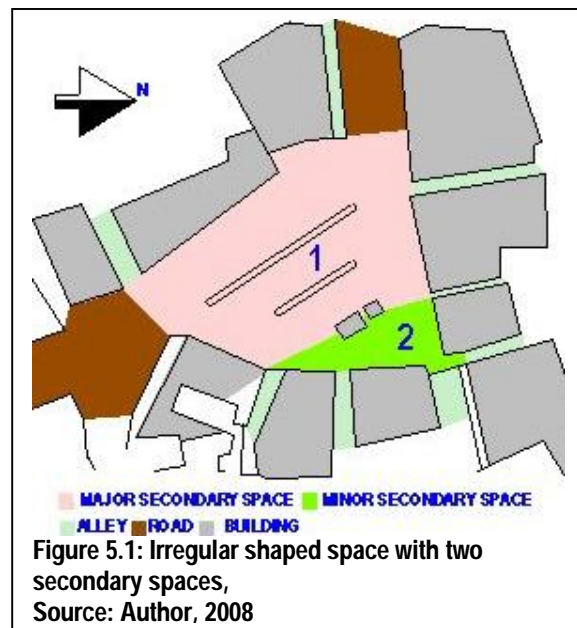
The waterfront which has an area of 5902 square metres stretches about 200 metres to the north from fort Jesus and consists of two distinct areas separated by a narrow passage between the

Mombasa club and its waterfront swimming pool. The first area adjacent to the Fort Jesus is the sports ground which is the only space in the study area where the men enjoy active recreation, particularly football. The second part is a landscaped area which serves as a public park with benches for sitting. The waterfront enjoys expansive views across the Mombasa channel and ships going or leaving Kilindini harbour can be spectacular to watch for those who use the space for passive recreation.

5.3 CONFIGURATION OF THE OPEN SPACES

5.3.1 The Piggot Place

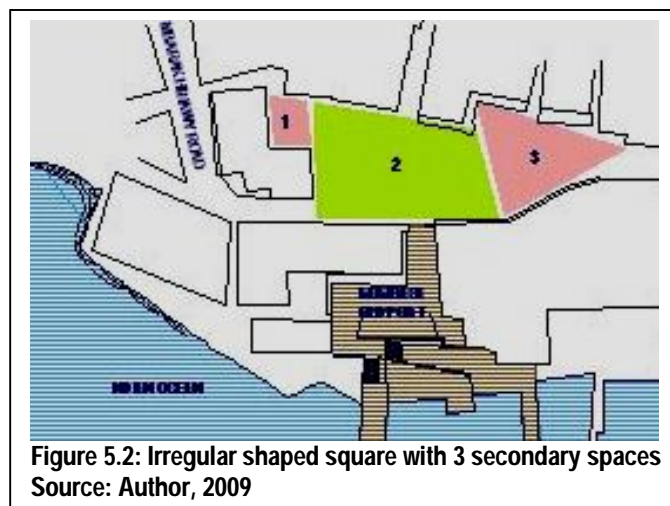
The elements that define the primary space are nine buildings that fully enclose it with narrow alleys in-between some of the buildings configured in such a manner that the space has a strong sense of enclosure (fig. 5.1). After walking through the narrow streets and alleyways one is struck by the vast scale of the open space which is more of a triangular space with the length of the sides being about 60m, 42m and 53m.



The shape of the space is irregular and has been derived from the basic triangular shape influenced by the following modulation factors: - angling, segmentation and amalgamation. The configuration of the space dictated by the buildings makes it read as one space with a concealed triangular shape (fig. 5.1). The intersection of the alleys with the square gives different parts of the square their identity and character. However the electric transformer house and kiosk located within the space interferes with the integrity of the space. Their scale, architecture and location make them not blend well with other buildings in the open space. The two split the space into two secondary spaces (fig. 5.1).

5.3.2 The Government Square

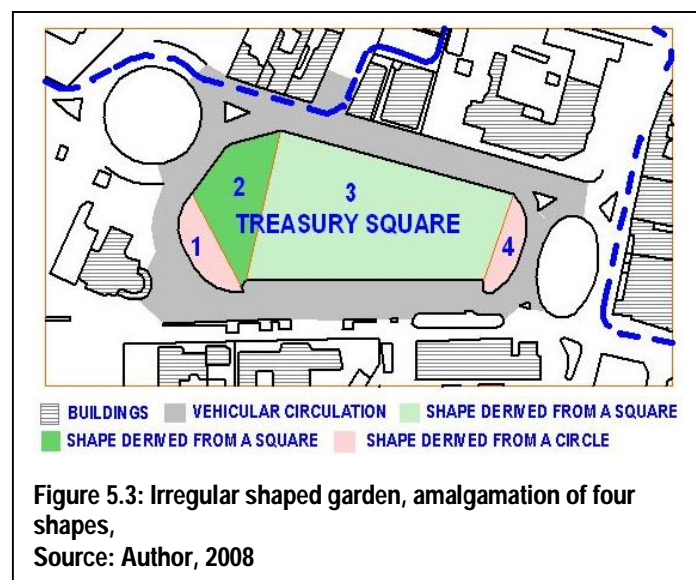
The elements that define the primary space of the Government Square are thirteen buildings that fully enclose it with narrow alleys in-between some buildings configured in such a manner that the square has a strong sense of enclosure (fig. 5.2). After walking through the narrow streets and alleyways one is struck by the vast scale of the square which is a linear space with an average width and length of about 23 metres and 66 metres respectively.



The shape of the square is irregular and has been derived for the basic square and triangular shapes influenced by the following modulation factors: - Angling, Segmentation and Amalgamation. The configuration of the space dictated by the buildings breaks it into three secondary spaces (fig. 5.2). Whereas the shapes of areas 1 and 2 are derived from the basic square shape, area 3 has a concealed triangular shape. The intersection of the alleys with the square gives different parts of the square their identity and character. As one moves through the three secondary spaces you are exposed to varying spatial experiences due to the changing scale of the space and what the eyes are engaged to perceive.

5.3.3 The Treasury Square

The elements that define the primary space are the thirteen buildings that enclose the square. The public garden is a secondary space within the square bound by vehicular circulation (fig. 5.3). From the garden, the buildings that form the edges of the square are not strongly felt due to the large distance that separates them. The average length and width of the square defined by the buildings is about 220 and 96 metres respectively. The vastness of the square which is not fully enclosed by buildings gives the garden a weak sense of enclosure.

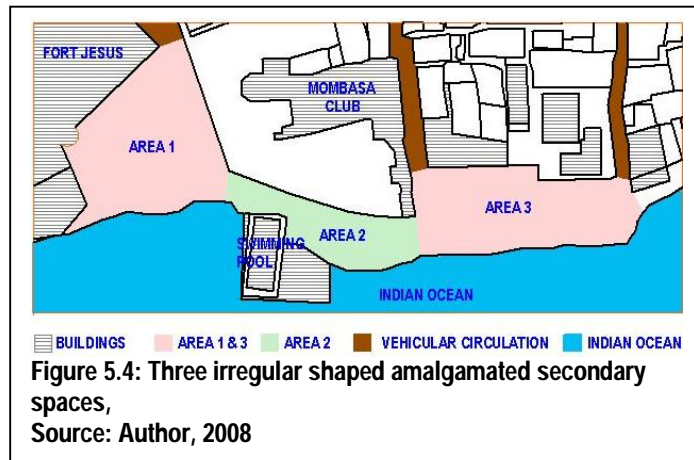


The Treasury Square is defined and enclosed by the buildings around it (fig. 5.3). Due to its vast scale and areas that are open in its periphery the open space has a weak sense of enclosure. Its shape which is irregular on account of the existing buildings is derived from the square shape which has been influenced by angling, segmentation and amalgamation. The secondary space which constitutes the public garden is the focus of the square and is bound by vehicular circulation.

The shape of the public garden is irregular and has been derived from the basic shapes of a square, and circle influenced by the following modulation factors: - angling, segmentation and amalgamation. The configuration of the garden plan is an amalgamation of four different parts (fig. 5.3). Whereas parts 1 and 4 have shapes derived from the basic circle, the shapes of parts two and three are derived from the basic square. On account of the landscaping done, the garden has been split into numerous secondary spaces with benches for seating.

5.3.4 The Waterfront

The elements that define the open space are the Indian Ocean and the Mombasa Club swimming pool to the east, Fort Jesus to the South, the Mombasa Club fence and other buildings to the west. However the space is physically enclosed on the southern and western sides where we have buildings and fencing that bound it. On the eastern side, the space is open as the ocean is not an enclosing element. The Mombasa Club swimming pool is also at a lower level. The shape of the waterfront is irregular. The configuration of the space dictated by the buildings, fencing and the Indian Ocean breaks it into three secondary spaces (fig.5.4).



The shapes of all the three spaces are derived from the basic square shape which has been modified using angling, segmentation and amalgamation. As one moves through the linear space you are exposed to varying special experiences due to the changing scale of the space and what the eyes are engaged to perceive.

5.4 ACTIVITIES IN THE OPEN SPACES

5.4.1 The Piggot Place

The activity which is predominant in the space is parking of both cars and handcarts (plates 5.1 and 5.2). Since the Piggot Place is located at the junctions of Kibokoni Road, Kitui Road, Nehru Road and Amdama Street, there is a lot of vehicular circulation through the open space on the south western edge. Other than parking, the place, being a node where eight alleys that serve the surrounding community converge, is a major transit point for pedestrian circulation in the neighbourhood.

Apart from the activities that take place in the open space, there are those uses within the buildings that encompass the place that contribute to its character. Most of the buildings accommodate both commercial and residential uses. However, the uses on the ground floor



**Plate 5.1: Parked carts,
Source: Author. 2007**



**Plate 5.2: Parked cars,
Source: Author. 2007**

include eight shops, one kiosk and electric transformer for the Kenya power and lighting company. On account of the residential use most of which is in the upper stories, children at times play in the square. On Saturdays and Sundays, the place becomes an auction yard with the merchandise to be sold spread amongst parked cars.

5.4.2 The Government Square

The major activities within the square are parking and loading and offloading of both imports and exports at the Old Port. On a normal working day the place is jammed with vehicles and workers loading and offloading the small trucks that service the port (plate 5.3). After working hours and during the weekends when the port is not operating, the square feels vast and empty, despite a few vehicles parked by a few residents and visitors (plates 5.10 and 5.22).



**Plate 5.3: Square-crowded,
Source: Author, 2007**



**Plate 5.4: Furniture in square,
Source: Author, 2008**

Other than parking, the square is a node where five alleys that serve the surrounding community converge. Hence it is a major transit point for pedestrian circulation in the neighbourhood (fig. 5.6). Besides the above activities, it serves as a waiting area for casual labourers seeking employment and also accommodates preparation and selling of food by street vendors. The municipal council of Mombasa uses the square as a major garbage collection point for the Old Town. This attracts a lot of cats and crows that spread the unsightly and smelly garbage away from the bins located near the fish market, making the space unattractive to both locals and visitors (plate 5.22).

Apart from the activities that take place in the open space, there are those uses within the buildings that encompass the square that contribute to its character. The fish market and the customs buildings on the eastern side of the square are restricted areas that don't cater for the general public. Most of the buildings on the western and southern side of the square accommodate both commercial and residential use. However, the uses on the ground floor include 2 fish shops, a curio shop and furniture shop whose business spills into the square at times (plate 5.4). On account of the residential use, children at times play in the square and particularly in the smallest secondary space.

5.4.3 The Treasury Square

The main activity associated with the square is public seating (plates 5.5 and 5.6). This is because the garden with numerous large shade trees and some benches is an ideal outdoor waiting area for the administrative offices and banks that encompass the square. As stated earlier, these include the Mombasa District headquarters, Mombasa Municipal offices, Municipal Education offices, and two banks. During the lunch break on Mondays to Fridays when offices

are operating, the garden is usually jammed with people. In the evenings and during the weekends the garden attracts all sorts of people including children and grown-ups from old town.



**Plate 5.5: Public seating in the square,
Source: Author, 2007**



**Plate 5.6: Walking through the square,
Source: Author. 2007**

Vendors located next to the offices sell snacks, soft drinks, scratch cards and other items required by visitors and officers who work in the square. After dusk, very few people use the garden despite the security personnel provided to cover the offices and banks.

5.4.4 The Waterfront

The major activity in the waterfront is recreation. Area 1 (fig. 5.4) is used for both active and passive recreation. In the evenings when it is not too hot, jogging and football take place in this area. The area also has a long platform used as a bench (plate 5.19) for passive recreation. Area 2 (fig. 5.4 and plate 5.7) is mainly a transition zone that links the area 1 to 3. However, the low walls are used as seats in the evenings to enjoy passive recreation. Area 3 (fig. 5.4 and plate 5.8) has been landscaped and has some benches that are used for passive recreation.

Passive recreation includes enjoying the sea breeze and views in the ocean as ships move in and out of Kilindini harbour, chewing miraa, smoking and taking of illicit drugs by gangs which extends into the night. Fishing and swimming also takes place in the waterfront. The buildings

and boundary walls that are on the edge of the waterfront do not contribute any activities that have an impact on the waterfront.



Plate 5.7: Middle section connecting garden to playground,
Source: Author, 2007



Plate 5.8: Garden section of the Waterfront,
Source: Author, 2007

5.5 CIRCULATION IN THE OPEN SPACES

5.5.1 The Piggot Place

There is an intricate vehicular and pedestrian movement pattern (fig. 5.5) within the space. This pattern varies with time and usage of the place. The major pedestrian and vehicular circulations are on Kibokoni Road which links the space to Nehru Road (plate 5.9). This is because the two are major roads that serve that part of Old Town.

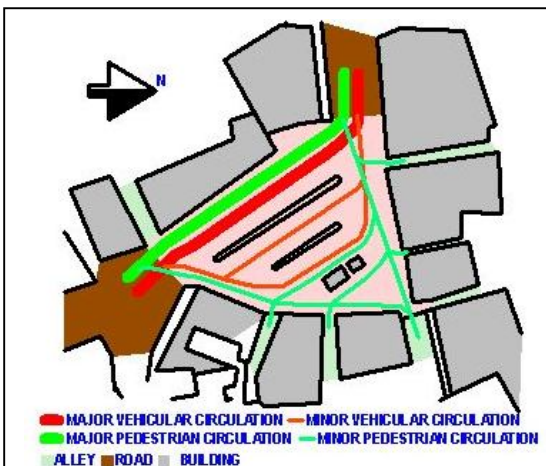


Figure 5.5: Pedestrian and vehicular circulation in Piggot place,
Source: Author, 2008

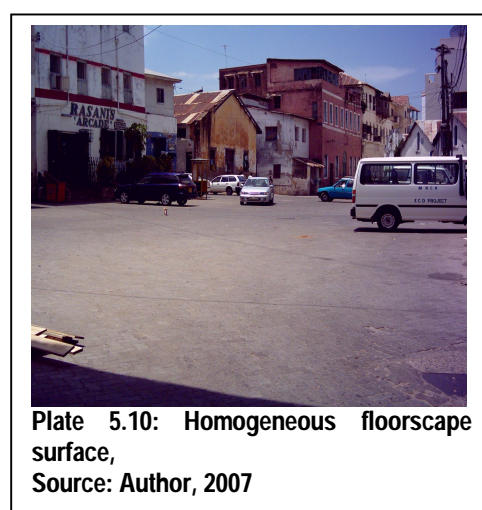
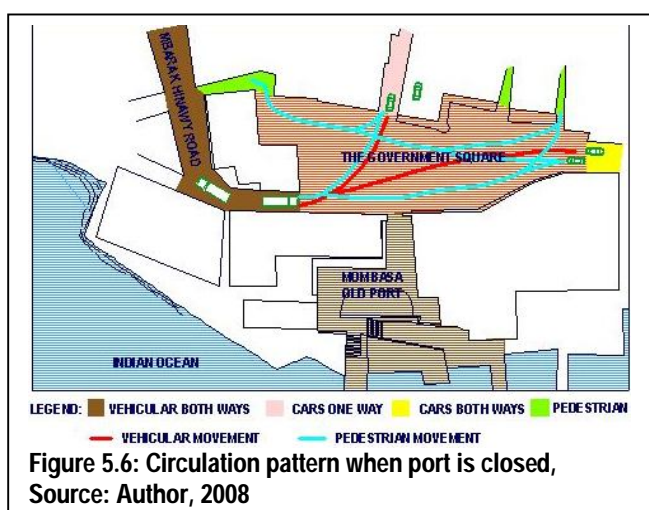


Plate 5.9: Walking on road,
Source: Author, 2007

There is minor vehicular circulation linking the two roads to the third corner of the space where Amdama street begins. Within the space itself, vehicular movement is confined to the area used for parking. Parking on the road is also common due to shortage of parking space. The minor pedestrian movement is an intricate pattern that connects the various roads and alleys as one meanders to avoid parked vehicles. On Saturdays and Sundays when the auction is on, pedestrian movement is restricted to the edges of the open space. At night both the pedestrian and vehicular traffic volume reduces.

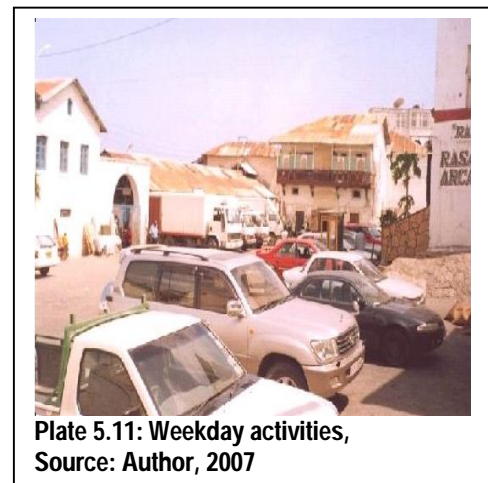
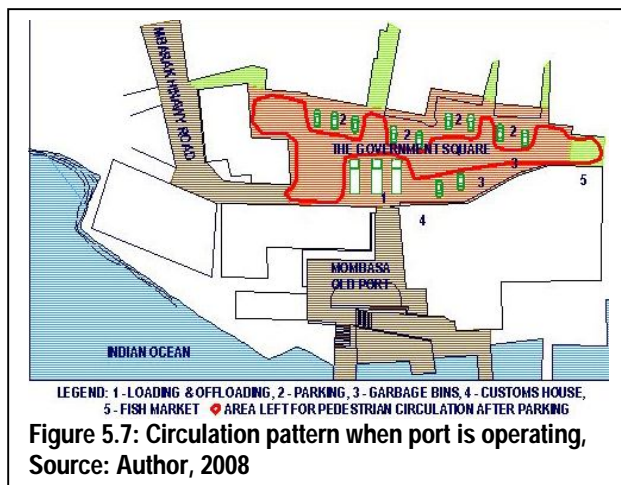
5.5.2 The Government Square

There is an intricate vehicular and pedestrian movement pattern within the square. This pattern varies with time and usage of the square. When the port is in operation, a lot of small trucks are parked at the gate to the port with Kenya Ports Authority (KPA) staff and visitors cars parked in the adjoining areas (plate 5.3). During weekends and after office hours on weekdays the square looks deserted despite the vehicles normally parked by a few residents and visitors (plate 5.10).



Mbarak Hinawy is the major access road that serves the square and its neighbourhood. Due to the narrowness of this road which is two-way, only small trucks are allowed into the square to

deliver and carry cargo from the port. From the square there are two alleys that allow cars to access other parts of the neighbourhood. One is one way while the other is two way. When there are no loading and off loading activities at the port, vehicular and pedestrian traffic flows easily through the square (fig. 5.6). However, when vehicles are parked in the square (fig.5.7), the through movement of other vehicles and pedestrians; particularly women and children is curtailed.

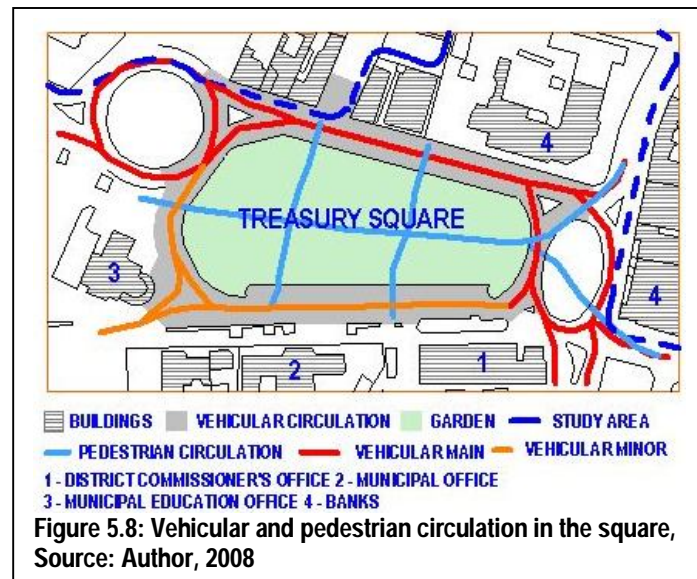


5.5.3 The Treasury Square

The two roundabouts in the square provide a major link to vehicles moving through the square to different parts of Mombasa town. Hence the intensity of vehicular traffic on the road connecting the roundabouts is high when compared to the access and parking provided to serve the offices (fig. 5.8).

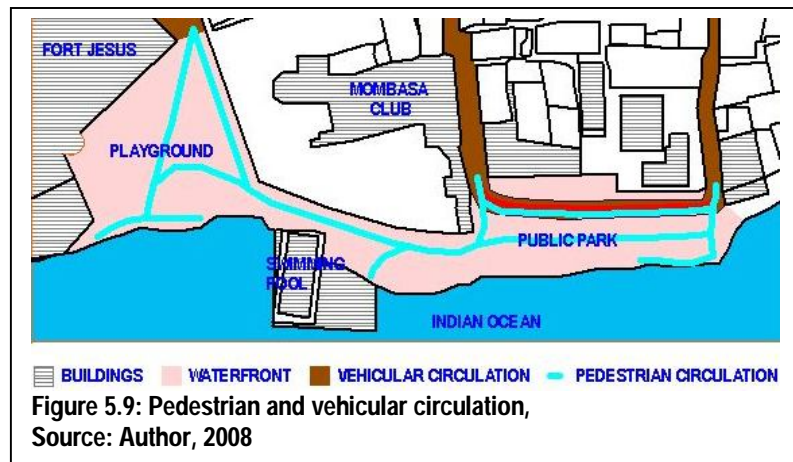
On account of this, many people seeking solitude prefer sitting in the garden away from the busy noisy road. The minor vehicular circulation loop serving the office parking accommodates fewer vehicles moving at a relatively slower speed. The square is also a major transit zone for pedestrian circulation (plate 5.6). There is a lot of pedestrian circulation longitudinally and across

the garden (fig. 5.8) which is intensified in the morning and evenings when people are going and from work. The square links the Provincial headquarters and the various public transport terminals.



5.5.4 The Waterfront

In the waterfront, pedestrian circulation patterns forms an intricate web (fig. 5.9) determined by where one enters the space and their destination. Many visitors to fort Jesus who desire to see how the fort looks like from the waterfront cross the playground as they are attracted by the sea front where there are few trees with benches. From the seafront area in the playground, the pedestrian flow pattern joins that from the entrance area of fort Jesus to the public park area from which there are two alleyways that one can leave the waterfront (plate 5.13) or access it. When the playground is being used as a football pitch, pedestrian movement to the public park area or the fort is restricted to the edge of the Mombasa club.



Tourists and locals access the seafront through the playground when it is not crowded with any sporting activity (plate 5.12). In the public park area, the pedestrian circulation has been separated from and forms the curb to the access road (plate 5.13). Vehicular circulation in the waterfront is restricted to the access road that forms a loop in the public park area which services the few houses in the area. Whereas the road is paved with concrete blocks, the pedestrian circulation areas are finished with Mazeras (flagstone) natural paving stone.



Plate 5.12: Tourists in playground,
Source: Author, 2007



Plate 5.13: Circulation in park area,
Source: Author, 2007

5.6 FURNITURE IN THE OPEN SPACES

5.6.1 The Piggot Place

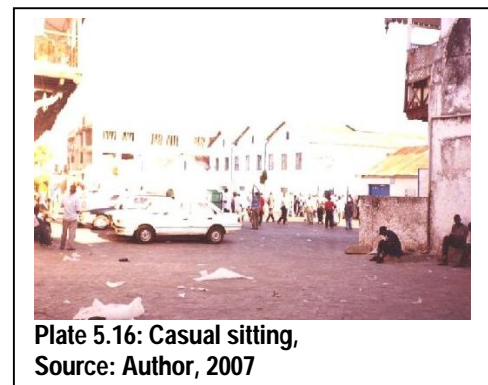
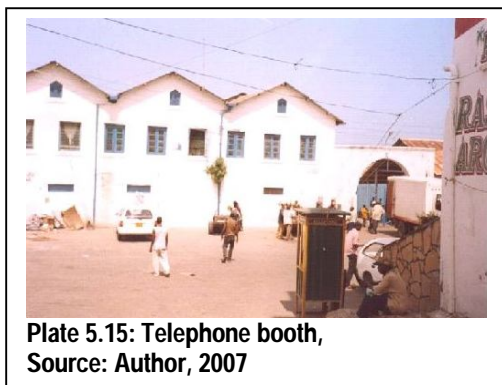
There are no benches, bollards, railings or swings in the Piggot Place. People normally sit on the steps leading into the buildings. In the afternoons, the steps which are sheltered from the sun are

more attractive to those who need to relax, chat or watch the activities in the open space (plate 5.14).



5.6.2 The Government Square

There are no benches, bollards, lamp posts, railings and swings. The only urban furniture found in the Government Square is a telephone booth which is not in use as the set has been vandalised (plate 5.15). However, the casual labourers who load and offload vehicles at the old port sit on verandas, foundation walling of the buildings or on any convenient item that is raised above the floorscape (plate 5.16).



5.6.3 The Treasury Square

Concrete benches and low walls provide ample seating places shaded by the big trees in the garden (plates 5.17 and 5.18). Whereas the trees do protect people relaxing in the garden from the direct rays of the sun, a downpour would send everyone scampering for shelter in the nearby

buildings. The furniture layouts are fixed and not flexible. Some bins have been provided for collection of garbage at strategic spots.



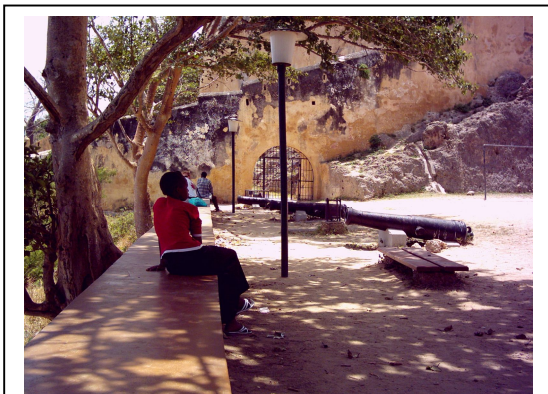
**Plate 5.17: Public benches,
Source: Author, 2008**



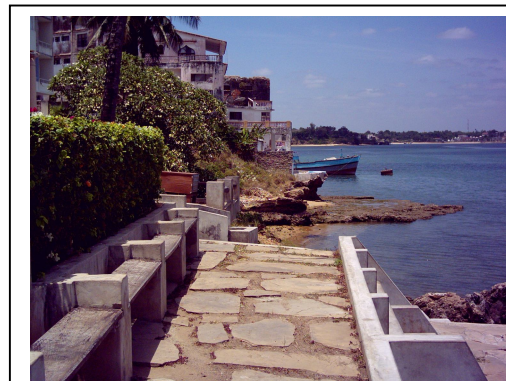
**Plate 5.18: Low wall seating,
Source: Author, 2008**

5.6.4 The waterfront

Concrete benches have been provided for seating in both the playground and the public park areas. The continuous platform in the playground forces users to focus towards the secondary space (plate 5.19) instead of the ocean with many interesting views. Benches (plate 5.20) in the public park area face the ocean and are structurally broken down into small units. In the narrow stretch that connects the playground to the public park area, the short walls delineating the circulation area from the landscaping are often used for seating (plate 5.7). The railing in the playground (plate 5.12), that serves as a protection and edge to users and visitors is also part of the urban furniture in the waterfront.



**Plate 5.19: Bench in playground,
Source: Author, 2007**

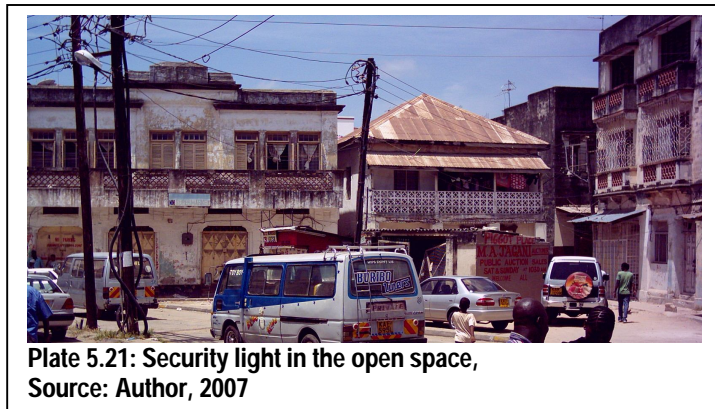


**Plate: 5.20: Benches in park,
Source: Author, 2007**

5.7 LIGHTING IN THE OPEN SPACES

5.7.1 The Piggot Place

During the daytime, the Piggot Place is usually too bright due to lack of shading elements within the space. The reflective properties of the parked vehicles and the lime washed wall also contribute to the high degree of illumination in the space. There is only one public security light (plate 5.21) which is supplemented at night by security lights from the buildings enclosing the space. At night the place is not well lit as the number of security lights put on a few.



5.7.2 The Government Square

During the daytime, the square is usually too bright on account of the lime wash finish used on most of the walls that enclose the space. In the afternoons, glare (plate 5.22) is experienced on the walls that are on the eastern side of the square not under shade.



5.7.3 The Treasury Square

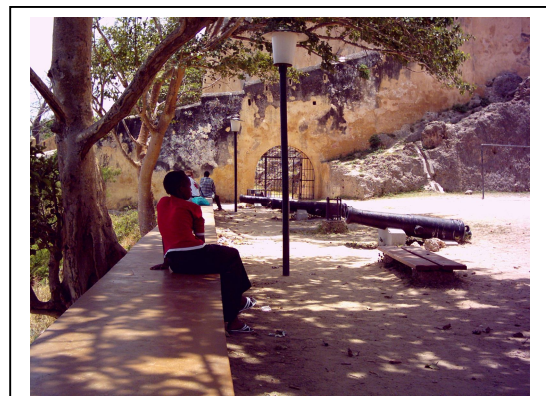
During the daytime the shade trees assist by diffusing the bright sun rays in the garden. In the afternoons, glare is experienced on the lime washed walls of buildings and furniture (plate 5.18) exposed to direct sunlight. At night the square relies on security lights mounted on the buildings and trees.

5.7.4 The waterfront

From 9am. – 5pm. the waterfront is too hot and bright. This discourages many people to use the open space which has a few shade trees. There are a few lamp posts in the waterfront which do not provide adequate light at night (plates 5.23 and 5.24). This makes the open space dangerous at night as it attracts gangs that chew miraa and take hard drugs.



**Plate 5.23: Lamp post in park area,
Source: Author. 2007**



**Plate 5.24: Long bench on edge of playground,
Source: Author, 2007**

5.8 URBAN DESIGN PARAMETERS

Observations have been made on the open spaces to see how it relates to Urban Design parameters such as visual order or unity, proportion, scale, contrast, balance and rhythm which have an influence on perception due to their contribution of formal qualities of open spaces.

These qualities are imbedded in the design and finishes of the floorscape, enclosing facades and furniture.

5.8.1 Floorscapes

(i) The Piggot Place

The floorscape which is meant for parking is a dilapidated asphalt paved surface divided into three major areas. The curbs have been used to demarcate the road, parking and pavement areas (plate 5.25). Where the curb acts as a pavement, it clearly defines pedestrian and vehicular circulation areas. This has the advantage of allowing some space in between the buildings and the parking spaces which is convenient for pedestrian traffic while at the same time ensuring orderly parking. However, it is common to see people walking on the road instead of using the pavements which are narrow. The floorscape is hard with no soft landscaping elements.



**Plate 5.25: Curbs and pavement delineates
floorscape into zones
Source: Author, 2007**

(ii) The Government Square

Only one type of concrete block and pattern has been used to pave the entire floorscape of the square (plate 5.26). The small scale of the paving block and lack of contrast in material and design of the floor pattern makes the whole floor to read as one surface that unifies and ties up

the different elevations (plate 5.27). There is no clear demarcation of parking spaces, access roads and pedestrian circulation.

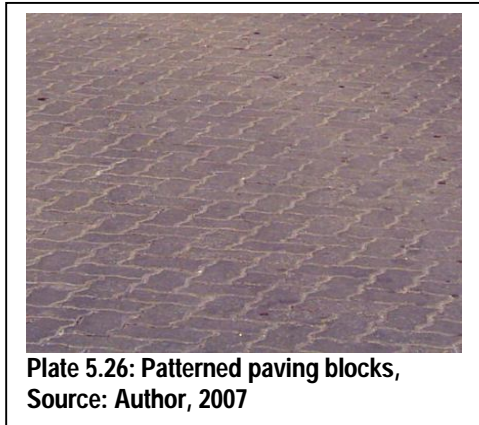


Plate 5.26: Patterned paving blocks,
Source: Author, 2007

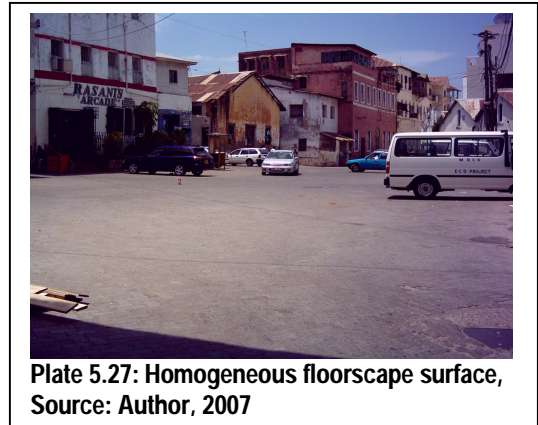


Plate 5.27: Homogeneous floorscape surface,
Source: Author, 2007

(iii) The Treasury Square

The floorscape is divided into three major areas that contrast visually. The paved area bound by low walls to act as an edge or conveniently detailed to be used for seating, covers all areas of pedestrian circulation and public seating (plates 5.17 and 5.18). The use of the Mazeras (flagstone) natural paving stone blends well with the landscaped areas with grass and flowers below the big trees. The variation in terms of size and shape makes the Mazeras paving look richer (plate 5.28) when compared to concrete paving in which the small uniform blocks coalesce and read as one item (plate 5.27). The ground surface of the landscaped areas is covered with grass and flowers which seem to have been neglected and are not well maintained (plate 5.17). The third area is the tarmacked area used for vehicular circulation and parking that encompasses the garden.

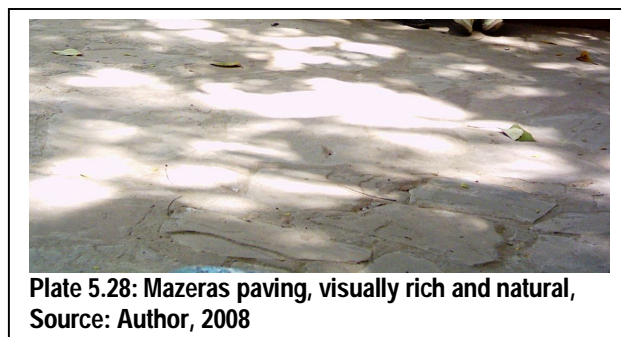


Plate 5.28: Mazeras paving, visually rich and natural,
Source: Author, 2008

(iv) The Waterfront

The floorscape of the waterfront is divided into four major areas that contrast visually. The playground is covered with sand which is ideal for the football activity that occupies the space in the evenings. The pedestrian circulation areas are paved with the Mazeras (flagstone) natural paving stone while the road that loops the public park area is paved with concrete blocks (plate 5.29). The other areas are landscaped with trees and grass. The separation of the different parts of the floorscape is accentuated by the edges provided.



Plate 5.29: Landscaped, Mazeras and concrete block paved areas in park, Source: Author: 2007

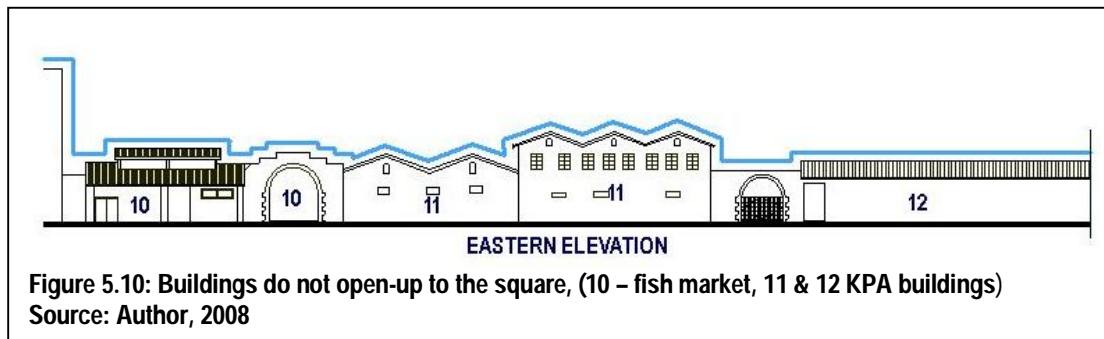
5.8.2 Elevations

(i) The Piggot Place

The Piggot place has three buildings on each of the three sides that act as edges to the open space. The northern and eastern elevations have two shop houses and one traditional Mombasa house each. The south – western elevation has a shop house, traditional Mombasa house and a contemporary commercial building. The organising principle in most of the building facades is symmetry. The alleys separating the buildings which appear distinct due to the differences in their architectural designs create a rhythm around the open space. The repetitive use of elements like doors, windows and balcony details scales the space both horizontally and vertically while at the same time introducing rhythm in the building facades.

(ii) The Government Square

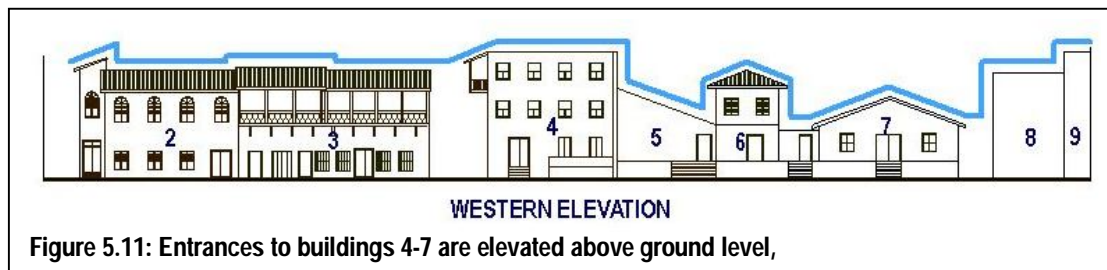
The square is completely surrounded by buildings with four narrow alleys that link it up with the immediate neighbourhood. The elevations are simple with very few elements, a characteristic that tends to unify the entire square. The extensive use of corrugated iron sheets for roofing and lime wash on the walls tends to enhance the unity of the various components that make up the square. There are two main elevations in the Government square with distinct characteristics. The eastern elevation (fig. 5.10) has an industrial outlook which is not typical to the character of the old town. Throughout its total length of 81 metres it has only two openings that contrast with the white washed blank walls at the base of the elevation where visual interaction is intense. The two openings are the gates to the fish market and the old port from where one can catch a glimpse of the activities in that restricted area.



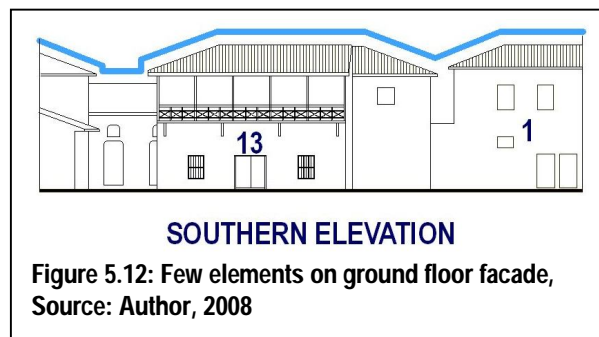
The elevation is in six parts as indicated and reflected in the interesting skyline (fig. 5.9). The six parts creates a rhythm as one moves from the fish market on the extreme left to the major access into the square on the extreme right. This is achieved by the variations in the building heights and façade designs. The elevation seems to balance with the tallest building enjoying a central position in the composition. The blank walls on this elevation, which impede positive relationship between inside the buildings and the square, have contributed to the location of the garbage collection point, which is adjacent to the blank walls (plate 5.22) and away from the loading and

offloading area. The lime wash finish also radiates heat and causes glare in the afternoon (plate 5.22).

The western elevation (fig. 5.11) has facades typical to the character of old town Mombasa. The variations in the seven buildings that make up the elevation creates a rhythm as the buildings with different designs and heights visually read as individual units. As in the eastern elevation the tallest building (fig. 5.11 - No. 4) takes a central position and separates the buildings with lean to roofs from those with gable and hipped roofs, creating some sort of visual balance.



The simplicity of the facades with very few elements unifies the different elements of the elevation. The entrances to buildings numbered 4 – 7 (fig. 5.11) is about one metre above the paved level of the square making them appear to be more private. On the ground floor, other than building No. 3 which has many doors and windows, non of the buildings seem to be appropriate for public use. The southern elevation (fig. 5.12) which encompasses only two facades fits in the character of old town Mombasa. It blends well with the western elevation as they have similar characteristics.



The proportions of door and window openings to walling on the ground floor makes the buildings appear inward oriented, which makes them unsuitable for public use. The balcony with its vertical posts are good scaling elements and create rhythm on the first floor of building No. 13.

(iii) The Treasury Square

On account of the separation of the public garden from the buildings on the edge of the square by a distance of more than 20 metres (fig. 5.8), the elevations of the buildings do not visually feature prominently to the user of the public garden, but they form a very interesting background (plates 5.30 and 5.31). The effect of the vegetation, parked and vehicles in motion further subordinate the prominence of the facades visually. The contrast in the design of the buildings with the gaps separating them creates a rhythm around the square.



**Plate 5.30: DC's office in background,
Source: Author, 2007**



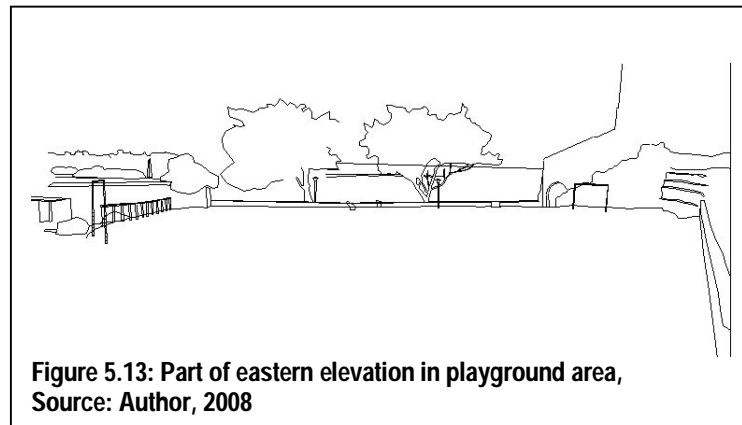
**Plate 5.31: Municipal offices in background,
Source: Author, 2007**

(iv) The Waterfront

The waterfront is enclosed on the western and southern sides by buildings and fencing that form an edge. On the northern and eastern side the edge is open as the space is bound by the Indian Ocean. Due to the expansiveness of the open space the elevations of the different parts can not be perceived at once. One is exposed to the different parts with contrasting

characteristics as you move from the playground through the middle part to the public park on the other end. However the waterfront has two main elevations with distinct characteristics.

The eastern elevation which has a total length of about 200m is characterised by landscaping. Being a major visual element the Indian Ocean contribute to the naming of the the open space as the waterfront. The only building in this elevation is the sunken Mombasa club swimming pool facility which has a low roof that does not obstruct views to the ocean. The elevation is in three



Parts which correspond to the three secondary spaces: the playground (fig. 5.13), the middle part and the public park areas. The long concrete bench and trees at the water front scale the space and define the edge of the space. The railing in the space creates a rhythm as in also defines the limit of the playground.

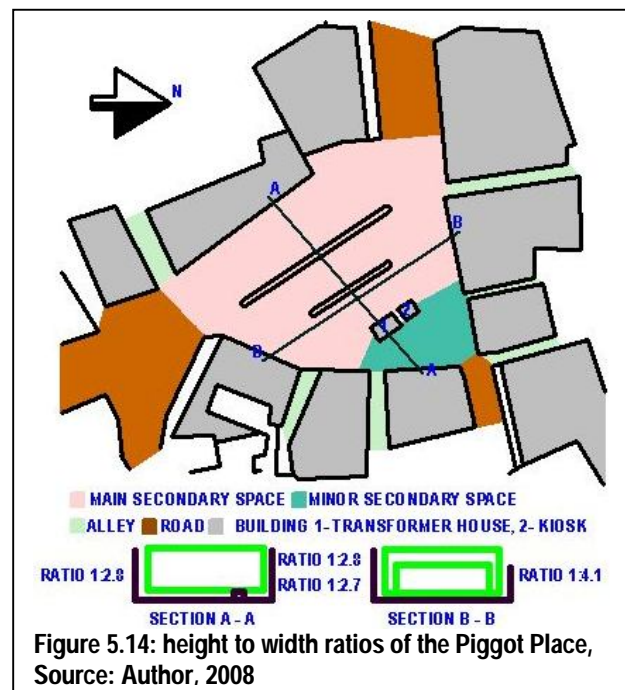
The western elevation is also split into three parts. In the waterfront fort Jesus and another building can be visually accessed. This is followed by the fence that encloses the Mombasa club which is not visually appealing. It also blocks positive relationship between the Mombasa Club and that part of the waterfront making it look like a corridor.

The part of the elevation in the public park has building facades with the typical character of OTM. The variations in the buildings in this part of the elevation create a rhythm due to the varying designs and heights that visually read as individual units. Fort Jesus covers the southern elevation while the northern elevation which is narrow has a building while the Mombasa channel take prominence as a major visual element.

5.8.3 Spatial Enclosure

(i) The Piggot Place

The Piggot Place is configured into two secondary spaces with different senses of spatial enclosure (fig. 5.14). This is a result of the location of the electric transformer house and kiosk which create a minor secondary space behind them with the main space being in front of them.

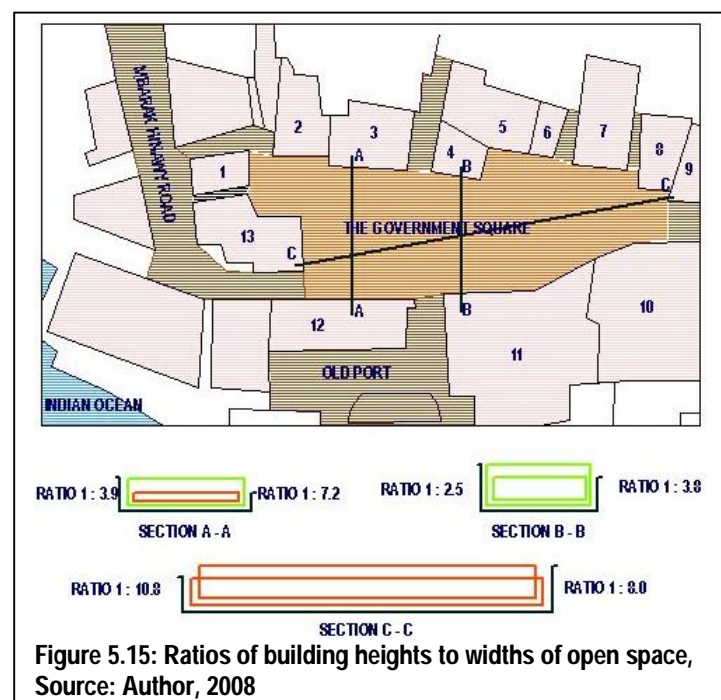


The height to width ratios of the Piggot Place are within those recommended for public squares. They do not make the space feel too exposed (agoraphobic) or too enclosed (claustrophobic). However when one is standing next to the transformer house and kiosk which have a low height

the sense of enclosure is altered as all the buildings enclosing the open space may not be visually engaged. This is because the height to width ratio changes on account of what one perceives as different images are interpreted by the brain when one moves through the space.

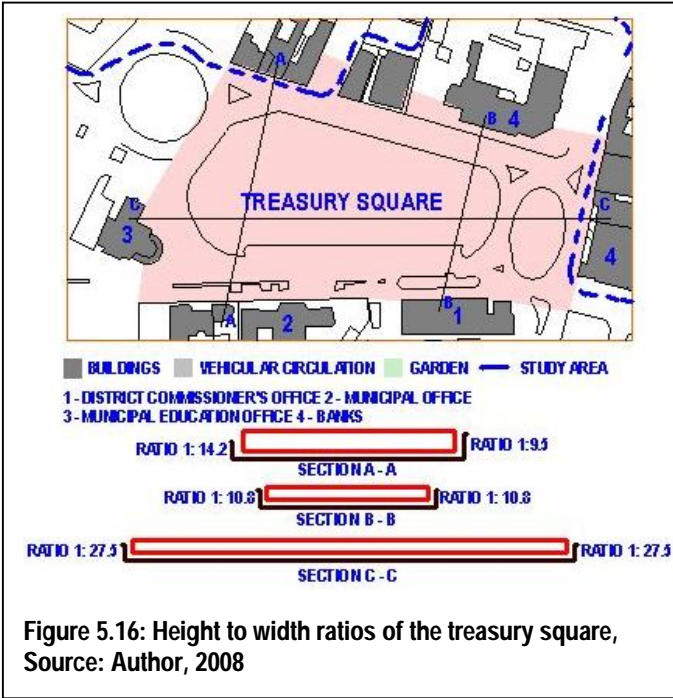
(ii) The Government Square

The square which is enclosed by buildings has a strong sense of enclosure and feels too expansive when compared to the narrow streets and alleyways that characterise the old town. The spatial relationship between the height of the buildings and the width of the space makes the space feel actually enclosed. Considering the average width of the square of 25m with the majority of buildings being one and two storeys high, the square relates well to the human scale. The ratio (fig. 5.15) of walls to the width of the square at different points shows the variation in the spatial enclosure as one move through the linear space. The green and the red boxes indicate which wall – width ratios fall within or outside the recommended ratios for squares respectively. Section C-C indicates that the length is outside the recommended limit for public squares.



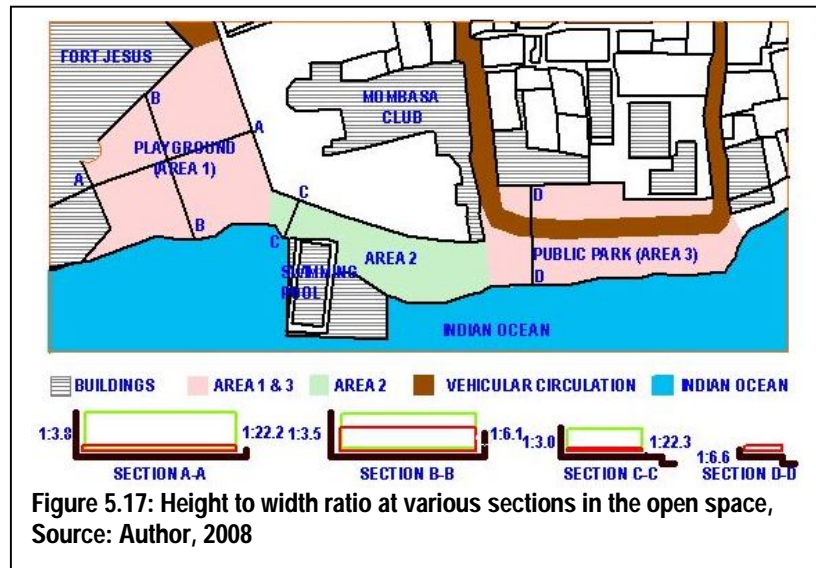
(iii) The Treasury Square

The average length and width of the square defined by the buildings is about 220 and 96 metres respectively. The height to width ratios of the various sections cut through the square go beyond the ratio of 1:4 (fig. 5.16). This implies that when considering the buildings alone as elements that enclose the square, the open space has a weak sense of enclosure outside the recommended limit. However the tree canopies and the furniture break the garden into numerous small secondary spaces which are easy to relate with at the human scale. The trees and furniture provide anchors for the users of the public space.

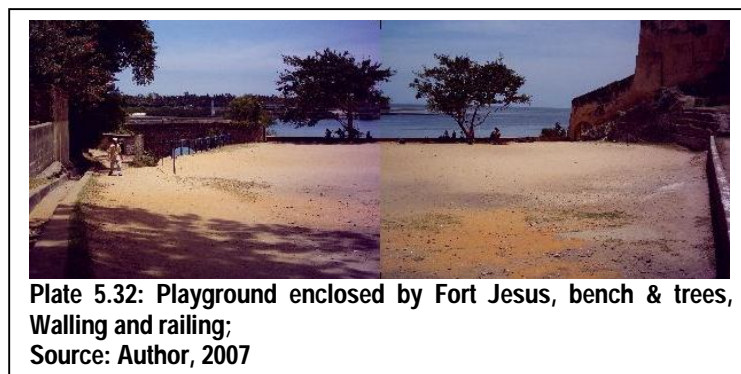


(iv) The Waterfront

The waterfront is configured into three secondary spaces with different senses of spatial enclosure. Whereas the playground and the public park have the configuration of a square, area 2 is a linear space that acts as a transition zone that links areas 1 to 3 (fig. 5.17).



The playground when compared to the other two secondary spaces has a stronger sense of enclosure. This is because the square has elements that fully enclose it. The elements are the massive Fort Jesus; wall separating the space from Mombasa Club; the continuous bench and two trees along the seafront; and the railing (plate 5.32). The imposing height of the Fort which is about five stories high has a tendency of making the space feel smaller enhancing the sense of enclosure. The two trees at the sea front provide a transparent edge that allows one to visually access the Indian Ocean. The height to width ratios indicate that the Waterfront is too exposed and is beyond the recommended limits for comfort.



Area 2 has the least sense of enclosure when compared to area 1 and 3 which are the playground and public park respectively. The space is bound on the western side by a perimeter

wall about 2m. high but is open to the Indian Ocean on the eastern side (plate 5.7). Being a linear space with an average length of 72m and width of 14m with no enclosing elements on the waterfront makes the space have a weak sense of enclosure.



Plate 5.33: Sunken facility,
Source: Author, 2007



Plate 5.34: Hedge,
Source: Author, 2007

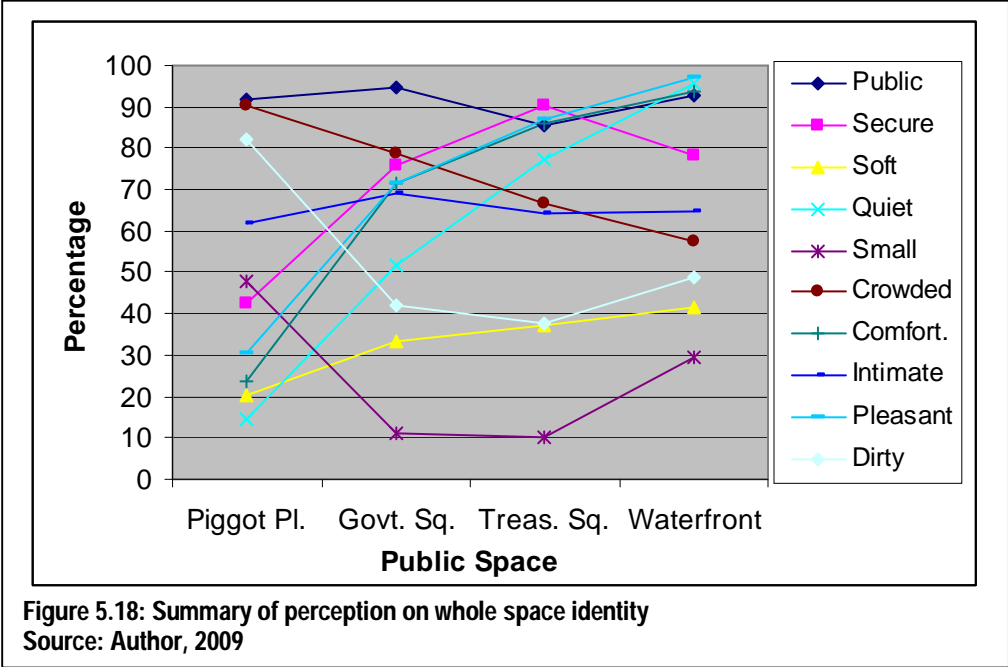
The sunken Mombasa Club swimming pool does not contribute to enclosing the space as one can visually access the ocean above its roof (plate 5.33). The public only experience the space from the paved areas meant for public circulation. No provision for seating has been made in this secondary space which makes it a transition area. The public park area is partly enclosed on the southern, western and northern sides by buildings. On the eastern side the hedges provide an edge to the seafront which also creates secondary private seating spaces (plate 5.34).

5.9 RESIDENTS' PERCEPTION

5.9.1 Whole Space Identity

Ten attributes have been used to get the respondents feelings on how the four public open spaces are perceived as individual entities using a bi-polar seven point semantic scale. Responses were sort on whether the open spaces are perceived to be: public, secure, soft, quiet,

small, crowded, comfortable, intimate, pleasant and dirty. The respondents' perception is summarised in figure 5.18 here below.



More than 61.7% of the respondents perceive the Piggot Place to be public, hard, noisy, crowded, uncomfortable, intimate and dirty. 55.5%, 47.9% and 56.2% think it is insecure, small and unpleasant respectively.

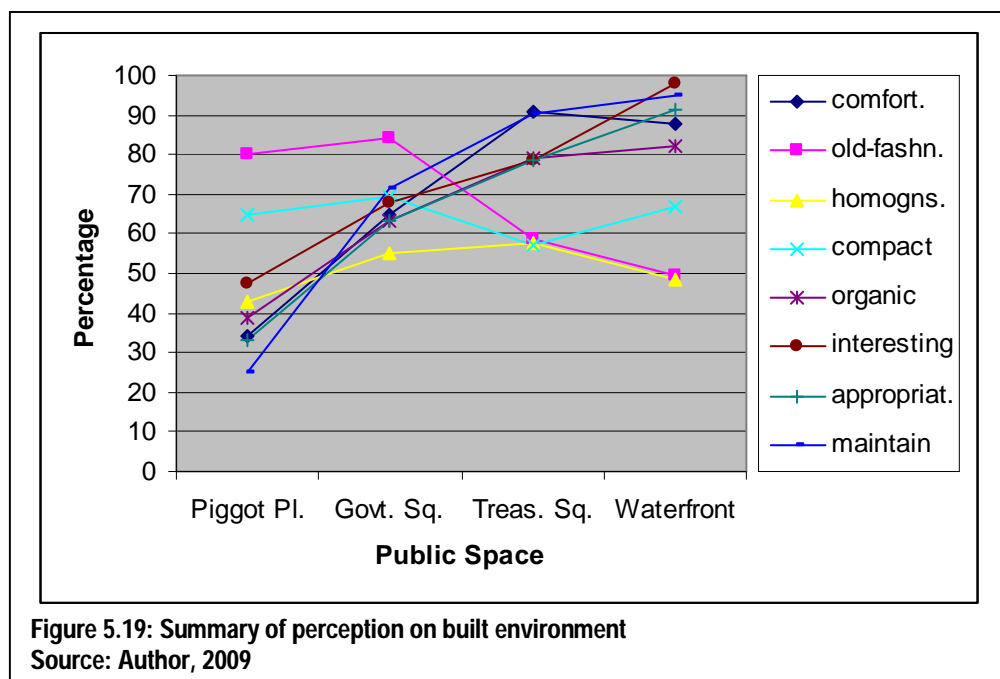
More than 66.9% of the respondents perceive the Government Square to be public, secure, hard, large, crowded, comfortable, intimate and pleasant. 51.9% perceive it to be both quiet and clean.

More than 64.0% of the respondents perceive the Treasury Square to be public, secure, quiet, large, crowded, comfortable, intimate and pleasant. 47.6%, and 56.6% think it is hard and clean respectively.

More than 64.6% of the respondents perceive the Waterfront to be public, secure, quiet, large, comfortable, intimate, and pleasant. 48.3%, 57.7% and 49.6% think it is hard, crowded and clean respectively.

5.9.2 Built Environment

Eight attributes have been used to get the respondents feelings on how the built environment of the four open spaces comprising of buildings, floorscape, services and landscaping is perceived using a bi-polar seven point semantic scale. The residents' perception is summarised in figure 5.19 here below.



More than 64.5% of the respondents perceive the built environment of the Piggot Place to be old-fashioned, compact and neglected. 59.7%, 43.1%, 44.5% and 52.1% think it is intimidating, homogeneous, inorganic and inappropriate respectively.

More than 63.2% of the respondents perceive the built environment of the Government Square to be comfortable, old-fashioned, compact, organic, interesting, appropriate and maintained. 54.9% perceive it to be homogeneous while 15.8% think it is heterogeneous.

More than 78.5% of the respondents perceive the built environment of the Treasury Square to be comfortable, organic, interesting, appropriate and well maintained. 58.6%, 57.9% and 57.2% think it is old-fashioned, homogeneous and compact respectively.

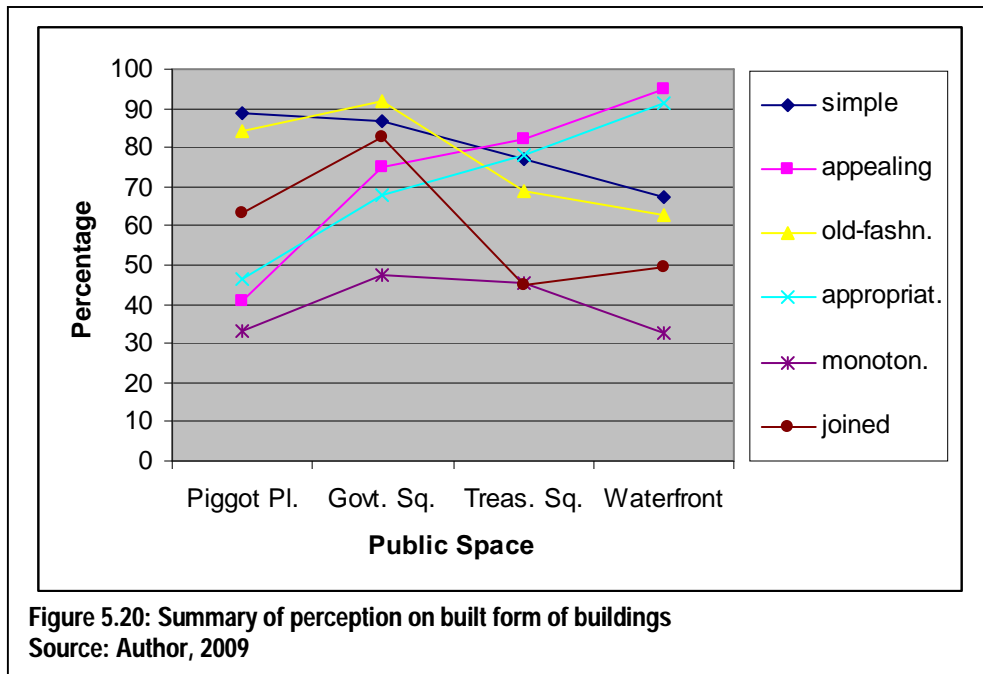
More than 66.8% of the respondents perceive the built environment of the Waterfront to be comfortable, compact, organic, interesting, appropriate and well maintained. 49.6% and 48.5% think it is old-fashioned and homogeneous respectively.

5.9.3 Built Form of Buildings

Six attributes have been used to get the respondents feelings on how the built forms of buildings around the four open spaces are perceived using a bi-polar seven point semantic scale. The residents' perception is summarised in figure 5.20 here below.

More than 63.1% of the respondents perceive the built form of buildings around the Piggot Place to be simple, old-fashioned and joined. 52.1%, 46.5% and 50.7% think it is boring, appropriate and varied respectively.

More than 67.7% of the respondents perceive the built form of buildings around the Government Square to be simple, appealing, old-fashioned, appropriate and joined. 47.4% perceive them to be monotonous whereas 38.4% think they are varied.

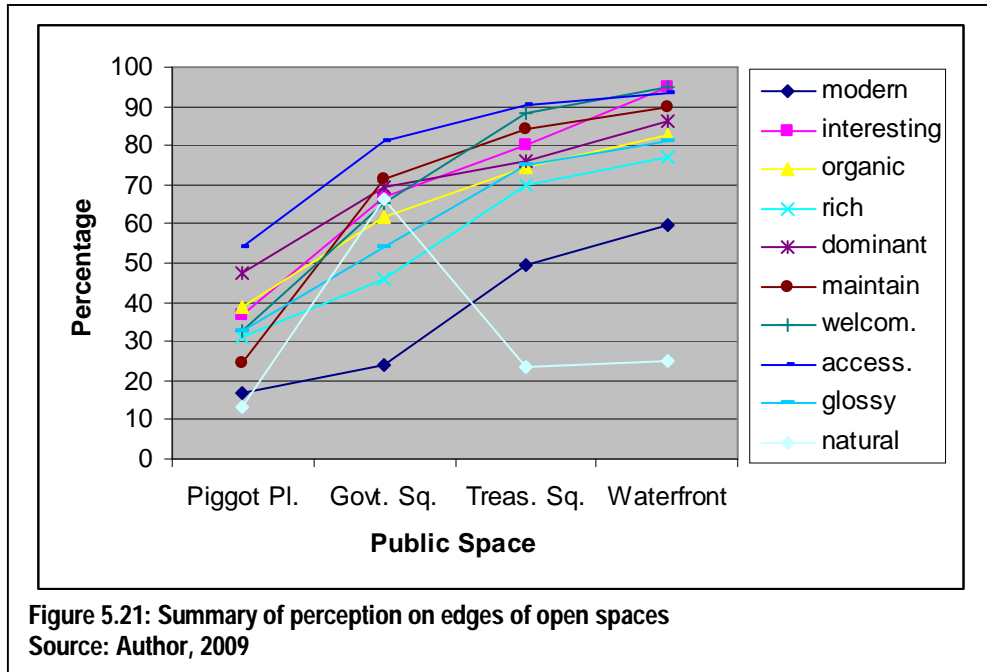


More than 68.9% of the respondents perceive the built form of the buildings around the Treasury Square to be simple, appealing, old-fashioned and appropriate. 45.5% and 44.8% think it is monotonous and joined respectively.

More than 62.5% of the respondents perceive the built form of the buildings around the Waterfront to be simple, appealing, old-fashioned and appropriate. 56.7% and 49.6% think it is varied and joined respectively.

5.9.4 Edges of the Open Spaces

Ten attributes have been used to get the respondents feelings on how the edges of the four open spaces are perceived using a bi-polar seven point semantic scale. The residents' perception is summarised in figure 5.21 here below.



More than 66.6% of the respondents perceive the edges of the Piggot Place to be old-fashioned, neglected and manmade. Between 47.2% and 59.7% think they are boring, inorganic, monotonous, dominant, unwelcoming, accessible and dull.

More than 61.6% of the respondents perceive the edges of the Government Square to be old-fashioned, interesting, organic, dominant, well maintained, welcoming, accessible and manmade. 45.9% and 54.1% think they are rich and glossy respectively.

More than 63.3% of the respondents perceive the edges of the Treasury Square to be interesting, organic, rich, dominant, well maintained, welcoming, accessible, glossy and manmade. 49.7% think they are modern.

More than 61.0% of the respondents perceive the edges of the Waterfront to be interesting, organic, rich, dominant, well maintained, welcoming, accessible, glossy and manmade. 59.7% think they are modern.

5.9.5 Floorscape of the Open Spaces

Eight attributes have been used to get the respondents feelings on how the floorscape of the four public open spaces is perceived using a bi-polar seven point semantic scale. The residents' perception is summarised in figure 5.22 here below.

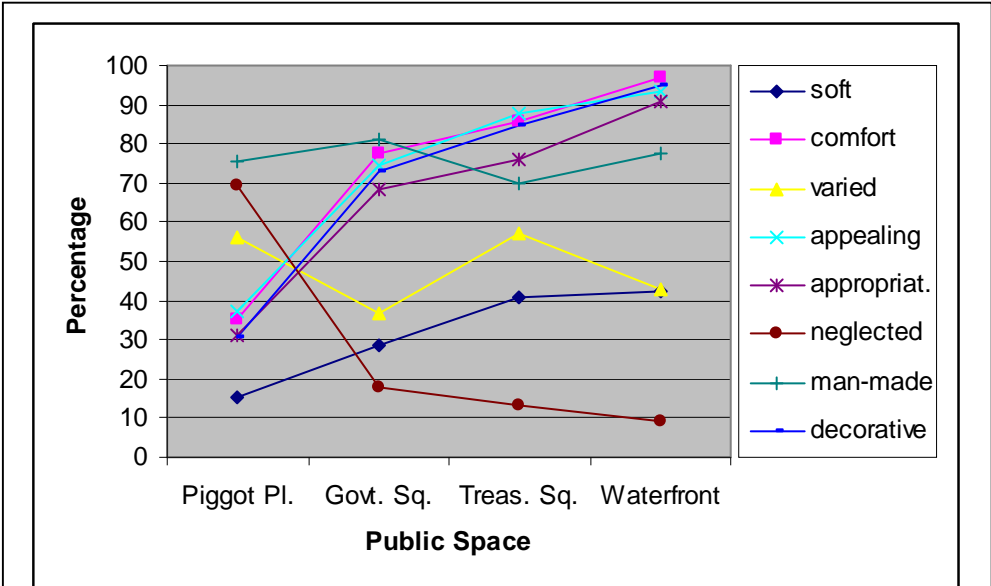


Figure 5.22: Summary of perception on floorscape of the open spaces
Source: Author, 2009

More than 69.3% of the respondents perceive the floorscape of the Piggot Place to be hard, neglected and man-made. Between 48.7% and 58.3% of the respondents think that the floorscape is uncomfortable, varied, repulsive, inappropriate and ugly.

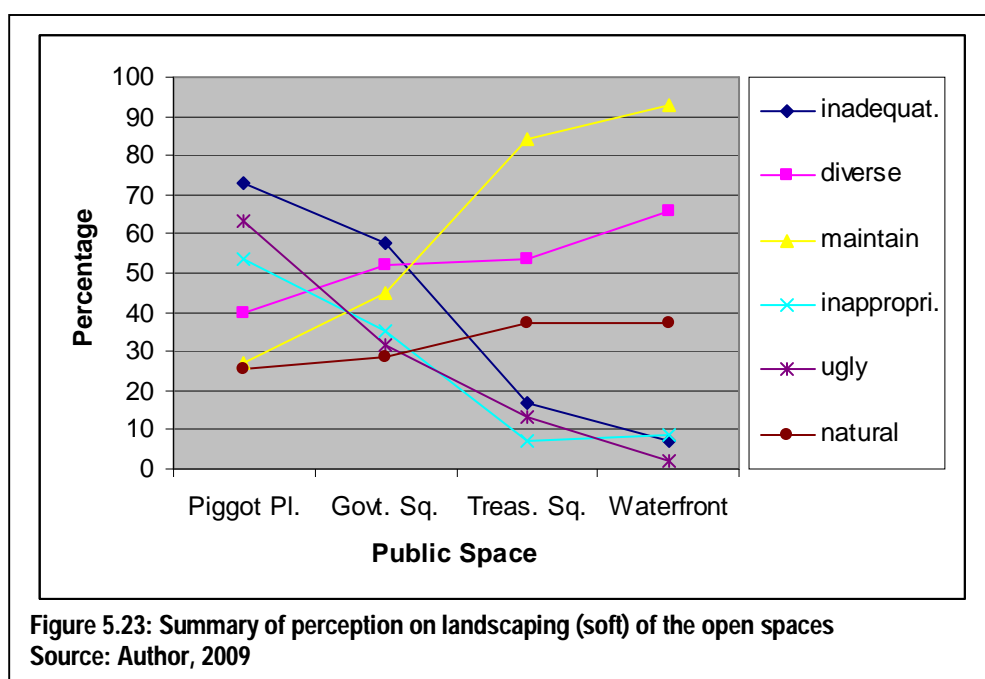
More than 68.4% of the respondents perceive the floorscape of the Government Square to be hard, comfortable, appealing, appropriate, maintained, man-made and decorative. 49.6% of the respondents perceive the floorscape to be monotonous while 36.8% think it is varied.

More than 69.6% of the respondents perceive the floorscape of the Treasury Square to be comfortable, appealing, appropriate, well maintained, man-made and decorative. 50.3% and 57.2% of the respondents think it is hard and varied respectively.

More than 77.6% of the respondents perceive the floorscape of the Waterfront to be comfortable, appealing, appropriate, well maintained, man-made and decorative. 54.6% and 46.4% think it is hard and monotonous respectively.

5.9.6 Landscaping (Soft) of the Open Spaces

Six attributes have been used to get the respondents feelings on how the landscaping in the four open spaces is perceived using a bi-polar seven point semantic scale. The residents' perception is summarised in figure 5.23 here below.



More than 63.1% of the respondents perceive the landscaping of the Piggot Place to be inadequate and ugly respectively. Between 39.6% and 56.9% think it is diverse, neglected, inappropriate and imposed.

Between 44.4% and 57.9% of the respondents perceive the landscaping of the Government Square to be inadequate, diverse, well maintained, appropriate, attractive and imposed.

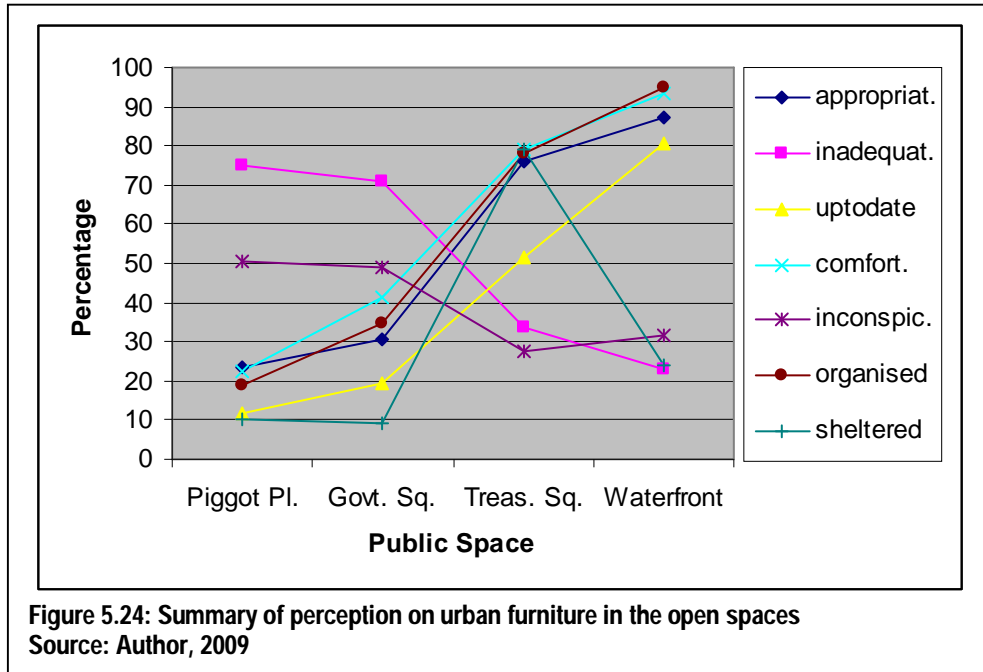
More than 73.0% of the respondents perceive the landscaping of the Treasury Square to be adequate, well maintained, appropriate and attractive.

More than 60.4% of the respondents perceive the landscaping of the Waterfront to be adequate, diverse, well maintained, appropriate, attractive and imposed.

5.9.7 Urban Furniture in the Open Spaces

Seven attributes have been used to get the respondents feelings on how the urban furniture in the four open spaces is perceived using a bi-polar seven point semantic scale. The residents' perception is summarised in figure 5.24 here below.

More than 61.7% of the respondents perceive the urban furniture in the Piggot Place to be inadequate, outdated, uncomfortable, disorganised and exposed. 58.4% and 50.7% think it is inappropriate and inconspicuous respectively.



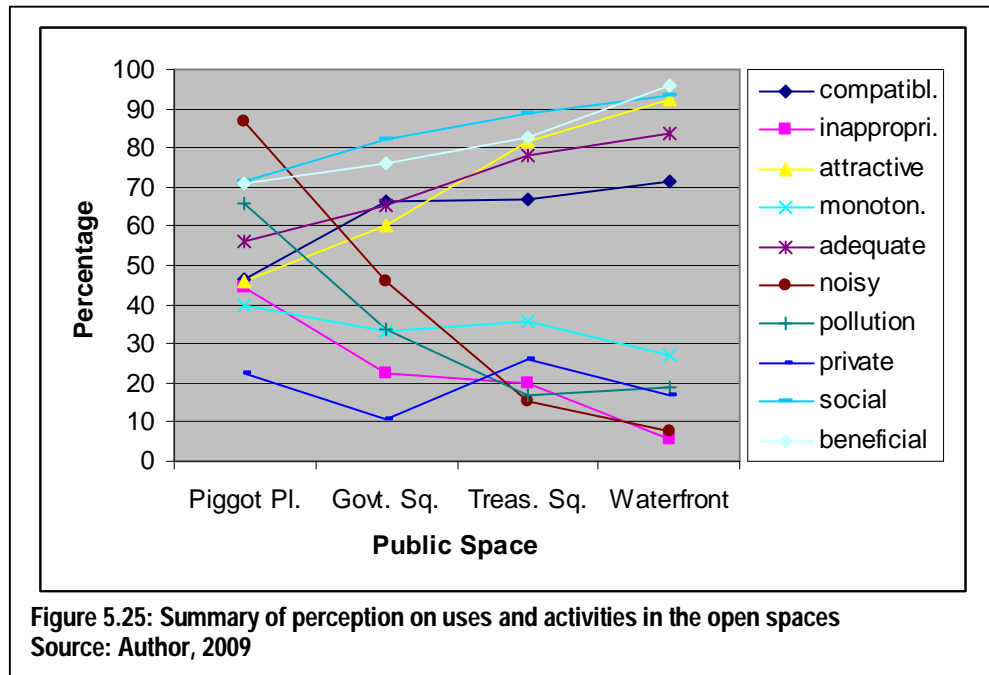
More than 66.8% of the respondents perceive the urban furniture in the Government Square to be inadequate, outdated and exposed. Between 48.1% and 56.4% think it is inappropriate, uncomfortable, inconspicuous and disorganised.

More than 60.0% of the respondents perceive the urban furniture in the Treasury Square to be appropriate, adequate, comfortable, conspicuous, organised and sheltered. 51.7% think it is up-to-date.

More than 62.0% of the respondents perceive the urban furniture in the Waterfront to be appropriate, adequate, up-to-date, comfortable, conspicuous, organised and exposed.

5.9.8 Uses and Activities in the Open Spaces

Ten attributes have been used to get the respondents feelings on how the uses and activities in the four open spaces are perceived using a bi-polar seven point semantic scale. The residents' perception is summarised in figure 5.25 here below.



More than 65.9% of the respondents perceive the uses and activities in the Piggot Place to be noisy, polluting, public, social, and beneficial. Between 43.8% and 56.3% think they are compatible, inappropriate, attractive, varied and adequate.

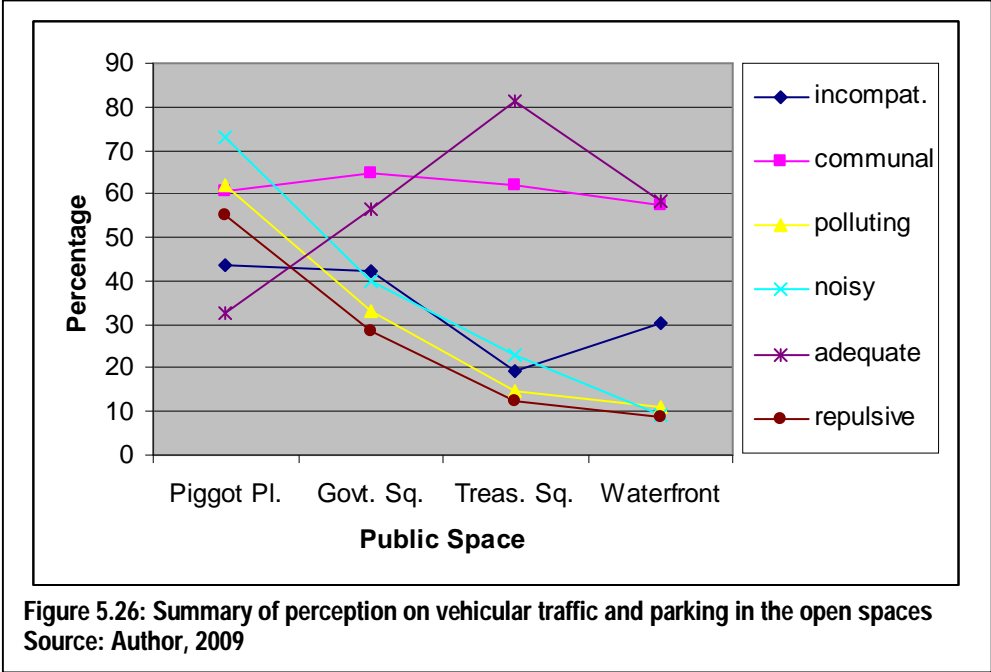
More than 60.1% of the respondents perceive the uses and activities in the Government Square to be compatible, appropriate, attractive, adequate, non-polluting, public, social and beneficial. 54.2% and 49.6% think they are varied and quiet respectively.

More than 66.8% of the respondents perceive the uses and activities in the Treasury Square to be compatible, appropriate, attractive, adequate, quiet, non-polluting, public, social and beneficial. 42.1% think they are varied.

More than 62.0% of the respondents perceive the uses and activities in the Waterfront to be compatible, appropriate, attractive, varied, adequate, quiet, non-polluting, public, social and beneficial.

5.9.9 Vehicular Traffic and Parking

Six attributes have been used to get the respondents feelings on how vehicular traffic and parking in the four open spaces is perceived using a bi-polar seven point semantic scale. The residents' perception is summarised in figure 5.26 here below.



More than 60.3% of the respondents perceive the vehicular traffic and parking in the Piggot Place to be communal, polluting and noisy. 43.8%, 59.7% and 54.9% think they are incompatible, inadequate and repulsive.

More than 62.3% of the respondents perceive the vehicular traffic and parking in the Government Square to be communal and non-polluting. Between 47.3% and 56.4% think they are compatible, quiet, adequate and attractive.

More than 62.0% of the respondents perceive the vehicular traffic and parking in the Waterfront to be compatible, communal, non-polluting, quiet, adequate and attractive.

5.10 SUMMARY OF THE DATA ANALYSIS

To summarise this chapter, analysis of data collected using the archival and observation methods, and that data that emanated from the household survey have been combined and put in Table 5.1 presented here below for purposes of comparison that is necessary for the discussion of the results. The measured area of the open spaces, characteristics of their edges, floorscape, urban furniture, dominant use, vegetation and the respondent's overall feelings on the open spaces have all been captured in the table. What was considered to be crucial after studying the characteristics of the various components that constitute the open spaces, were the overall respondents' feelings on the spaces as whole space entities. This included whether the spaces were considered to be public, secure, soft, quiet, small, crowded, comfortable, intimate, pleasant and dirty.

Attribute	Piggot place	Government Sq.	Treasury Sq.	Waterfront
Area (sq. m)	1140	1885	7828	5848
Edges enclosing space	Buildings with narrow alleys	Buildings with narrow alleys	Buildings with wide alleys	Buildings, hedges and ocean
Floorscape	Paved hard surface	Paved hard surface	Lawns and paved hard surface	Lawns, paved hard surface and earth
Vegetation	Not significant	Not significant	Big trees, landscaped	Lawns and hedges, scattered trees
Dominant use	Parking	Parking	Recreation	Recreation
Perceived public	94.7	85.5	92.8	91.7
Perceived secure	42.3	75.9	90.4	78.4
Perceived hard	70.9	66.9	47.6	48.3
Perceived noisy	84.8	42.1	17.2	2.8
Perceive large	45.8	83.4	79.9	64.7
Perceived crowded	90.2	78.9	66.9	57.7
Perceived comfortable	23.6	71.4	86.2	93.5
Perceived intimate	76.4	69.2	64.2	64.7

More than 57% of the respondents perceived the four open spaces to be public, crowded and intimate while 64% of the respondents perceive the Government Square, Treasury Square and the Waterfront to be secure, large and comfortable. Over 66% of the respondents perceived the Piggot Place and the Government Square to be hard while the Piggot Place was the only open space perceived by more than 84% to be noisy. To establish the influence of the physical characteristics of urban open spaces on residents' perception and uses, and also to derive the policy recommendations; these two elements are key to achieve specific objectives 3 and 4, the following chapter has been devoted to discussion of the results.

CHAPTER 6

DISCUSSION OF THE RESULTS

6.1 INTRODUCTION

The original purpose of this study was to establish if the physical characteristics of public open spaces have an influence on how residents perceive and use them. In the context of old town Mombasa the researcher expected a very clear relationship to emerge that would explain why the few public open spaces are not crowded by the residents despite the high population in the densely built-up urban environment. The preceding chapter met objectives one and two of the study which were to establish the physical characteristics of the open spaces and the residents' perception and usage. This chapter focuses on the third and fourth objectives of the study, which were to establish the influence of the physical characteristics of urban open spaces on residents' perception and usage, and to derive the policy recommendations. As anticipated, the results show that there is a relationship.

6.2 DISCUSSION

The discussion of the research results are presented in the order of the major research aspects covered in the household survey as presented in chapter 5. These items consist of: Whole Space Identity, Built Environment, Built Form of buildings, Edges, Floorscape, Landscaping, Urban Furniture, Uses and Activities, and Vehicular Traffic and Parking; all of which generate tactile information that triggers human feelings and sensibilities. Also incorporated in the discussion is information learnt from analysis of data collected using the archival and observation methods covered in chapter 5.

6.2.1 Whole Space Identity

The respondents perceived all the open spaces sampled to be public, crowded and intimate. They felt that the Government Square, Treasury Square and Waterfront are secure, quiet, large, comfortable, and pleasant. To them the Waterfront and Piggot Place are dirty while the Piggot Place is insecure, small and noisy. The characteristic of whole space identity that gives the overall perception of the four case studies enabled the researcher to rate them as perceived by the respondents. When arranged in the following order: Piggot Place, Government Square, Treasury Square and Waterfront; the degree of the open spaces being attractive to the respondents increases.

Considering the classification of the open spaces used for sampling, the Government Square and Piggot Place were clustered together on account of being hard spaces enclosed by buildings with no amount of greenery used mainly as parking. Comparing these two spaces, two issues have surfaced. First, the noise generated by vehicular circulation is more pronounced in smaller enclosed open spaces than in larger ones. Second, the more connections an open space has to a densely built residential neighbourhood in the form of streets and alleys, the more insecure it becomes. Despite having an area of about 60% that of the Government Square that has six connections, the Piggot Place has nine connections (Fig. 5.3 and 5.20). Some attempts of blocking some of the alleys are evident.

6.2.2 Built Environment

The respondents perceived the built environment of the four open spaces studied to be old fashioned, homogeneous and compact. They felt that the built environments of the Government square, Treasury Square and Waterfront are comfortable, organic, interesting, appropriate and

well maintained. The built environment of the Piggot Place was felt to be intimidating, inorganic, boring, inappropriate and neglected.

The study established that the residents prefer open spaces with less built fabric that harden a space while their preference increases for those with natural and soft landscaping. The strong sense of enclosure dictated by the size of the open space and the height and nature of the edges diminishes when the open spaces are arranged in the following order: Piggot Place, Government Square, Treasury Square and Waterfront.

As established in the analysis of data from the archival and observation methods, the height to width ratios of the Piggot Place makes the space fit within the comfort zone. However, the respondents think otherwise. This may be a general reaction of a people who have become claustrophobic on account of residing in congested neighbourhoods devoid of public open spaces.

Apart from the floorscape of the Piggot Place that is neglected, the general condition of maintenance of the buildings in the Government Square and Piggot Place is similar as regulated by the conservation office. The respondents' reaction against the Piggot place can be attributed to its smaller size. As the eye perceives more details when in close contact with surfaces, the design of smaller spaces has to be more elaborate for them to be interesting. This is well grounded in perception theory.

6.2.3 Built Form of Buildings

The respondents perceive the built form of buildings in all the open spaces to be simple, old fashioned, appropriate and joined. They also felt that the built form of buildings in the Government Square, Treasury Square and Waterfront are appealing. Whereas those in the Government Square and Treasury Square are perceived to be monotonous, those in the Piggot Place and Waterfront were considered to be varied. The respondents felt that the built form of the buildings in the Piggot Place was boring.

From the comparison of the respondents' perceptions this study establishes that the more complex the built forms of buildings are, the more appealing they become. Even though all the built forms of buildings in all the four case studies were perceived to be simple, their degree of simplicity was decreasing when they were arranged in the following order: Piggot Place, Government Square, Treasury Square and Waterfront. Conversely, their degree of appeal and appropriateness increased when the order is maintained with the Piggot Place being the least appealing and appropriate while the Waterfront was rated as the most appealing and appropriate. The built form of the buildings in the Government square was noted to be unusually old-fashioned and joined when compared to those in the other three open spaces.

As per observations by the researcher the built form of buildings in the Piggot place are far more interesting and richer than those in the government square. However the location of the transformer house and kiosk in the core of the space may have contributed to the respondents' reaction. Hence, siting of structures other than urban furniture in the core of public open spaces not only messes up the integrity of the space but may also not be tolerated in small open spaces by residents in densely built neighbourhoods.

6.2.4 Edges of the Open Spaces

The respondents perceive the edges to all the sampled open spaces to be accessible and man-made. They felt that those of the Government Square, Treasury Square and Waterfront are interesting, rich, welcoming and glossy. While the edges of the Government Square and Piggot Place were considered to be old fashioned, those of the Treasury Square and Waterfront were taken to be modern. The edges of the Piggot Place were taken to be boring.

As established in theory, when the elevations of buildings have very few elements, they become boring. This is true of the buildings in the Piggot Place and particularly at the ground level where most of the buildings have the same type of shop door with no window openings. This is compounded further by the scale of the space that restricts one from appreciating the elevations in totality. This implies that edges of smaller public open spaces and particularly at the ground floor level need more detailing as they perceived at close range.

Buildings with narrow alleys and streets in between them constitute the edges of the Piggot Place and Government Square. The facades of these buildings are simple with few narrow openings that make the walls some of which are decorated the dominant element that is visually perceived. The balconies found in these two open spaces are narrow, a style which has been copied in the most recently put up building in the Piggot Place for it to conform to the conservation plan.

The edges of the Treasury Square which are perforated with wider gaps in between the buildings allow the space to have visual interaction with other adjoining areas. The big trees and soft landscaping in the garden, in front and in between the buildings softens the edges and makes them more interesting. The vistas to other spaces with soft landscaping enrich the edges of the

square. The entrance porticos become elaborate as an attractive element that provides not only adequate shelter against inclement weather but also the desired transition between inside and outside. The canopies are also ideal for window shopping. The extensive use of glass in the wall openings of the modern buildings further diminishes the sense of enclosure as the facades become more complex on account of what can be perceived both outside and inside the edges.

The Waterfront which has the least sense of enclosure has only three openings, two of which accommodate vehicular traffic on the edges which border buildings. The edge to the seafront is open to the views across the Mombasa Channel and the horizon of the Indian Ocean. Of all edges in the open spaces studied, this particular one is dynamic as the ships moving in and out of the Kilindini harbour, coupled with the raging waves that create a very conducive environment for passive recreation. The extensive use of decorative hedges as a perimeter wall to the Mombasa Club facilities and in the garden have contributed to the edges been rated as the best when compared to those in the other open spaces.

It is not surprising when the residents' perception indicated that the intensity of eight out of ten variables had ascending value when the edges of the open spaces were arranged in the following manner: Piggot Place, Government Square, Treasury Square and Waterfront. The edges become more interesting, organic, rich, dominant, well maintained, welcoming, accessible, and glossy. This implies that the respondents desire to have a more natural setting for them to be attracted to use urban open spaces for passive recreation.

6.2.5 Floorscape of the Open Spaces

The respondents perceive the floorscape of all the sampled open spaces to be hard, and manmade. They felt that the floorscapes of the Government and Treasury Squares are comfortable, appealing, appropriate, well maintained and decorative. Whereas those of the Government Square and Waterfront are taken to be monotonous, those of the Treasury Square and Piggot Place are perceived to be varied. The respondents felt that the floorscape of the Piggot Place is ugly.

Lack of maintenance of the parking area in the Piggot Place has led to the proliferation of potholes. Despite the variety in the floorscape created by the curbs and pavements which are not provided in the Government square, the respondents despise the floorscape. The well maintained tarmac surface that covers over 50% of the Treasury Square was not considered to be ugly by the respondents. This means maintenance is crucial in the way the respondents perceive the various elements of the open spaces. The respondents seem to like floorscapes that are patterned. Whereas paving blocks created the patterned floorscape in the Government square, Mazeras stone provided a natural feeling in the organic patterns of the floorscape in the Treasury Square.

The floorscapes in all the open spaces can be split in to two paved areas. The first area covers vehicular circulation while the second takes care of pedestrian circulation. The extensive use of tarmac and concrete paving blocks in the Piggot Place and Government Square respectively is on account of the main use associated with the open spaces. Though the patterned concrete blocks in the Government Square are more appealing, the lack of pavements and curbs as provided in the Piggot place which breaks the floorscape into smaller units has made the

respondents to perceive the floorscape in the government square to be monotonous while that in the Piggot Place to be varied. Whereas the Garden in the Treasury Square is encompassed by a tarmac vehicular circulation area, the road in the Waterfront which covers a proportionately negligible area is adjacent to part of the edge and is finished with concrete paving blocks similar to the Government square's floorscape.

The pedestrian circulation areas of both the Treasury Square and the Waterfront have been separated from the vehicular circulation areas by a change in level and finished with Mazeras natural stone paving. When the floorscapes are arranged in the following order: Piggot Place, Government Square, Treasury Square and Waterfront, it was noted that they become increasingly comfortable, appealing, appropriate, well maintained and decorative. This study establishes that the respondents prefer floorscapes that are more natural and organic for public open spaces.

6.2.6 Landscaping

The respondents perceive the landscaping undertaken in all the sampled open spaces to be man-made and not natural. They felt that the landscaping in the Government Square, Treasury Square and Waterfront is diverse, maintained, appropriate and attractive. While the respondents consider the landscaping in the Government Square and Piggot Place to be inadequate, they take that in the Piggot Place to be neglected, inappropriate and ugly.

No provision has been made for landscaping in the Piggot Place and what the respondents noted were weeds that had grown in the potholes and cracks in the floorscape. The only greenery found in the Government Square is a flower box in front of one of the shops while landscaping in the

Treasury Square and Waterfront has been extensively done. Generally the respondents are attracted to diverse and well maintained soft landscaping in public open spaces.

Whereas all the landscaping in the four case studies are man-made, there is significant difference between the hard landscaping in the Piggot Place and the Government Square when compared to mixture of both soft and hard landscaping found in the Treasury Square and Waterfront. When the landscaping in the four case studies is compared, it was noted that they become increasingly adequate, diverse, well maintained, and attractive when arranged in the following order: Piggot Place, Government square, Treasury Square and Waterfront. The large shade trees in the Treasury Square and the bareness of the playground in the Waterfront are the two factors that can be attributed to the landscaping in the former being more appropriate than in the latter. This study establishes that the respondents prefer a greened space possibly with big shade trees and good views to natural surroundings.

6.2.7 Urban Furniture

The respondents perceive the urban furniture in the Treasury Square and Waterfront to be appropriate, up-to-date, comfortable and organised, while that in the Government Square and Piggot Place to be inappropriate, outdated, uncomfortable and disorganised. They also felt that the furniture in the Government Square, Piggot Place and Treasury Square are inadequate. To them it is only in the Treasury Square where the urban furniture is sheltered. This is on account of the big shade trees that protect one from solar radiation.

What were mainly considered as furniture by the respondents were public benches. In the Government Square and Piggot Place where there are no public benches people sit on door

steps, foundation walling and on the edge of pavements and verandas. The response indicates that the up-to-date benches are considered to be more comfortable and organised. While the benches in the Waterfront have a linear pattern, those in the Treasury Square form clusters of three focusing to a centre.

This study has established that the provision of urban furniture in open spaces is the major indicator that the general public are welcomed in the space. Since there is no provision of benches for public use in the Piggot Place and Government Square, it is common to find people sitting on the pavements, foundation walling, door steps of closed buildings or any raised object that can be used. The only urban furniture in the Government Square is the telephone booth whose set is vandalised. The Treasury Square has the highest provision of urban furniture which include: benches, railings, a fountain, short walls which double up as seating, lamp posts and two telephone booths which are rarely used. The Waterfront also has some benches, railings, short walls which are used for sitting and lamp posts.

6.2.8 Uses and Activities

The respondents perceive the uses and activities in all the sampled public open spaces to be compatible, attractive, varied, adequate, public, social and beneficial. They felt that the uses and activities in the Government Square, Treasury Square and Waterfront are quiet, appropriate and pollution free while those in the Piggot Place are noisy, inappropriate and polluting.

The Government square and Piggot Place have similar uses and activities. The vehicular circulation and parking activity seems to be more tolerated in the Government square than in the Piggot Place. This can be attributed to the difference in size of the two open spaces. This study

establishes that noisier and polluting uses like parking can be more tolerated in larger public open spaces where the nuisance is easily dissipated. The therapeutic effect of wind has been known to be more effective in cleansing large open spaces than small enclosed spaces. The reverberation of noise generated by cars is also more amplified in smaller enclosed spaces than in large ones.

This study has established that the uses on the edges of the open spaces and the activities that take place in the core of the open space influence the residents' perception and usage. The identification of the Piggot Place and the Government Square with parking as their main use has literally put off other uses. Even when vehicles are not parked in these spaces they will not attract residents due to their emptiness and lack of favourable conditions which are dictated by the ideal conditions for parking. On the ground floors, the uses on the edges of the open spaces are confined to the narrow spaces between the buildings and the parked vehicles. This scenario makes the commercial uses unattractive to customers while doors to residential units are always shut to maintain the desired degree of privacy in houses on the ground floor.

In the Treasury Square, the roads that are adjacent to the edges of the open space separate the parking spaces from the uses on the edges which make them more attractive. The vehicular circulation on the periphery of the Treasury Square not only isolates the garden which is the core of the open space, but also separates it from the uses on the edges. The gardens with benches in the Treasury Square and the Waterfront are a major statement that the public are welcome to use them. The soft setting on account of the vegetation and the low sense of enclosure in these two spaces provide relaxed environments not found in the densely built old town. The desire for greened extensive open space is hence established.

Whereas the uses on the edges of the Treasury square consist of public offices and commercial enterprises, all the uses in the Waterfront are private and do not contribute significantly to the activities in the playground and garden, except one open café on the edge of the playground. Of all the open spaces the respondents prefer the Waterfront which offers a more serene atmosphere detached from the bustle and hassle of the urban activities in Mombasa town.

6.2.9 Vehicular Traffic and Parking

The respondents perceive the vehicular traffic and parking in all the sampled public open spaces to be communal and not private. They felt that the vehicular traffic and parking in the Government square, Treasury square and Waterfront are compatible, pollution free, quiet, adequate and attractive. In the Piggot Place, the same has been considered to be incompatible, polluting, noisy, and repulsive.

This response indicates that there is a certain amount of vehicular traffic and parking that can be tolerated within public open space. The degree of tolerance may vary with a people and the size and degree of enclosure of the space. This research has established that the respondents abhor open spaces that have heavy vehicular traffic and parking. The less an open space has of this component, the more pollution free, quiet and attractive it becomes. The respondents rejection of the vehicular circulation and parking in the Piggot Place can be attributed to the fact that noise and exhaust emissions are magnified in open spaces that are small with a high sense of enclosure. The glare and visual pollution created by vehicles is also more pronounced in smaller open spaces.

CHAPTER 7

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

7.1 INTRODUCTION

This chapter presents the findings, conclusions and recommendations that have emanated from the study. To show that all the objectives of the study have been fully addressed the findings of the study are presented in the format of the objectives enumerated in chapter 1. The section also covers how the findings contribute to knowledge of the problem investigated, and the relationship between the results and past research and theory. The research and practical implications of the results are also discussed before the recommendations are finally presented.

7.2 RESEARCH FINDINGS

7.2.1 Specific Objective 1

The first objective of this study was to “Establish the physical characteristics of the public open spaces in ‘Old Town’ Mombasa.” This objective has been achieved in the first part of chapter 5 which analyses data collected using archival and observations methods based on theory and principles of urban design with regards to the Piggot Place, Government Square, Treasury Square and Waterfront.

The physical characteristics established for the four sampled open spaces include: Size, shape and how they are configured by the elements that define the primary and secondary spaces; Uses and activities; Vehicular and pedestrian movement patterns; Urban furniture; lighting; floorscapes; elevations; vegetation; and the spatial relationship between the height of the space enclosing elements and the width of the space.

The Piggot Place and Government Square are relatively smaller open spaces enclosed by buildings with narrow alleys. They have hard paved surfaces with no significant vegetation. On the other hand the Treasury Square and Waterfront are relatively larger spaces with low sense of enclosure. They have hard paved surfaces, lawns, hedges and trees. The summary of the physical characteristics of the open spaces is presented in table 5.1.

7.2.2 Specific Objective 2

The second objective of the study was to “Establish the residents’ perception and usage of the open spaces.” This objective has been achieved in the second part of chapter 5 which analyses data collected using a structured questionnaire when the residents were interviewed. Various attributes using bi-polar seven point semantic scales have been used to get the respondents feelings on nine physical characteristics of the four sampled open spaces. The analyses established the residents’ perception on whole space identity, built environment, built form of buildings, edges, floorscape, landscaping (soft), urban furniture, uses and activities, and vehicular traffic and parking in the open spaces.

All the four public open spaces were perceived by 57.7% and above to be public, crowded and intimate. The Government Square, Treasury Square and Waterfront were perceived by 57.9% and above to be secure, quiet, large and comfortable. Whereas the Piggot place was perceived to be the most uncomfortable by 76.4% of the respondents, the Waterfront was perceived by 93.5% as the most comfortable. Generally the residents prefer the Treasury Square and Waterfront to the Piggot Place and Government Square. The summary of the residents’ perception is presented in table 5.1.

7.2.3 Specific Objective 3

The third objective of the study was to “Establish whether the physical characteristics of the open spaces have any influence on the residents’ perception and usage.” This objective has been achieved in the discussion of the results in chapter 6. The discussion encompasses the combined analysis of the established physical characteristics of the open spaces and the residents’ perception and usage. The results are consistent with the study hypothesis that states that “The physical characteristics of urban open spaces have an influence on residents’ perception and usage.” The study established the following:

(i) Overall Perception

The degree of the open spaces being appealing to the residents on account of their physical characteristics increases when arranged in the following order: Piggot Place, Government Square, Treasury Square and Waterfront.

(ii) Size of Open Space

The residents have a preference for larger open spaces with low sense of enclosure for recreational purposes. Noise generated by vehicular circulation is more pronounced in smaller enclosed open spaces than in large ones. Smaller open spaces are more likely to be perceived to be crowded.

(iii) Hardness of Open Space

Residents prefer open spaces with less built fabric that harden a space while their preference increases for those with natural and soft landscaping. The nature of the edges, floorscape, urban furniture and uses like parked vehicles determine the hardness of an open space.

(iv) Complexity of Built Forms

The more complex the built forms of building encompassing an open space, the more appealing they become. The blank walls and high level windows in the Government Square made the residence to perceive it to be unusually old-fashioned.

(v) Edges of Open Spaces

Buildings that constitute edges of smaller public open spaces and particularly at the ground floor level need more detailing as they are perceived at close range. This concurs with existing theory that elevations of buildings with very few elements are perceived to be boring. Perforated edges that allow visual interaction with adjoining areas makes them more interesting and diminishes the sense of enclosure of smaller open spaces.

(vi) Floorscape of Open Spaces

Respondents prefer floorscapes that are varied, natural and organic, with vehicular circulation separated from pedestrian areas by a change in level. The use of Mazeras natural stone paving in the Treasury Square and Waterfront made the residents perceive them to be more comfortable, appealing, appropriate and decorative.

(vii) Landscaping

The residents are attracted to diverse and well maintained soft landscaping in public open spaces. The respondents prefer greened spaces possibly with big shade trees and good views to natural surroundings. This confirms the desire of urban dwellers to interact with nature as depicted in theory.

(viii) Urban Furniture

The provision of urban furniture and particularly benches in open spaces is a major indicator that the general public are welcomed. However, unless the benches are sheltered against the harsh climate conditions their use will be limited to the early mornings and evenings. The large shade trees in the Treasury Square attract more people than the benches that are not shaded in the garden of the Waterfront. The higher the provision of urban furniture the more attractive they become.

(ix) Uses and Activities

Noisier and polluting uses like parking can be more tolerated in larger public open spaces where the nuisance is easily dissipated. Parking in the core of small squares literally displaces other uses and the residents abhor open spaces that have heavy vehicular traffic and parking. The residents prefer uses on the edges that do not contribute significantly to the activities in the core of the open spaces which offer a more serene atmosphere detached from the bustle and hassle of the urban activities in Mombasa town.

(x) Security

The more connections an open space has to a densely built residential neighbourhood in the form of narrow streets and alleys, the more insecure it becomes. Due to this some attempts of blocking some of the alleys connecting to the Piggot Place are evident. Isolated areas with no complimenting public activities or doors and windows are easily patronised by gangs particularly at night if security posts are not available.

7.2.4 Specific Objective 4

The fourth and last specific objective of the study is to “Formulate policies and guidelines for the redevelopment of urban open spaces in historic areas under conservation to meet the specific needs of residents.” This objective has been achieved in the last section of this chapter under recommendations.

7.3 CONCLUSIONS

7.3.1 Inadequate Public Open Spaces

The first issue in the statement of the problem is the critical shortage of public open space for recreational use in the study area. This is highlighted by the current physical development guidelines that put the total recreational space required for the area's estimated population of 27518 to be between 21 and 42 hectares. Put against the existing 1.93 hectares of public open space in a densely built environment with an ever increasing population, the problem of inadequate public open space needs to be addressed. Whereas the residents perceive the Piggot Place to be the only small space amongst the four sampled spaces, all the four spaces were perceived by 57.7% and above to be crowded while 61.8% and above think they are intimate. These feeling may be responsible for some of the residents not using the available open spaces.

7.3.2 Physical Characteristics conducive for recreation

The second issue in the statement of the problem are the attributes embedded in the physical characteristics that attract or repel residents from using the public open spaces for their recreation. The research findings clearly indicate that there are attributes in the edges, floorscape, urban furniture, landscaping (soft), uses and activities in public open spaces that promote or discourage usage. The main challenge is to elicit those attributes that promote usage

to be used for the redevelopment of the spaces to meet the specific needs of the residents. The findings of this study can be used for remodelling the public open spaces into vibrant successful recreation areas that can be used both during the day and at night.

7.3.3 Illicit Uses

The third issue in the statement of the problem is the attributes embedded in the physical characteristics that repel residents from using the public open spaces for their recreation and instead attract illicit uses like garbage dumping, drug trafficking and mugging amongst others. As suggested in 7.3.2 above, the findings of this study can be used for remodelling the public open spaces to repel the illicit uses.

7.3.4 Perception of Built Environment

The last issue in the statement of the problem was how the residents of 'Old Town' Mombasa perceive their built environment which is under conservation. Despite recent efforts by the National Museums of Kenya and the Mombasa Municipal Council to improve the status of the open spaces using the guidelines stipulated in the Conservation Plan covering the study area, the researcher noted that residents whose population density increased by 55% from 1958 to date are not attracted to these spaces. The respondents perceived the built environment of the four open spaces studied to be old fashioned, homogeneous and compact. There is a dire need to involve the residents in reviewing the Conservation Plan to accommodate their feelings on how their built environment can be improved.

7.4 THEORETICAL IMPLICATION

Three theories have been used to provide the basic underpinning for this study that covered physical characteristics of public open spaces, perception and usage. In effect the concepts and propositions of the figure-ground theory, linkage theory and place theory have been examined to see how they apply in the four public open spaces that were analysed. In this way a better understanding of the open spaces is made available to urban designers, architects, conservationists and the public in negotiating improved public open spaces that meet the specific needs of the people.

The figure-ground theory has been used in the study to show the degree of enclosure of the four open spaces and how they relate to existing buildings and adjacent developments. The findings strongly indicate that people residing in historic densely built organic areas prefer public open spaces that are relatively more open with a low sense of enclosure. This implies that if buildings constitute the edges of open spaces they should have large gaps in between. The narrow alleys in the Government square, the wider streets in between buildings in the Treasury Square and the open seafront at the Waterfront shows the influence of the gaps in the edges on the degree of enclosure.

The linkage theory was used in the study to analyse how the open spaces were physically connected to other parts of their neighbourhood through alleys, streets and other open spaces. This was captured in the vehicular and pedestrian circulation patterns for the four open spaces studied. The findings indicate that if public open spaces are cluttered with parking and other built structures in their cores as in the Piggot Place, too many linkages undermine the security of the open space in densely built areas. The narrowness of the linkages also aggravates this problem

as wider linkages enhance surveillance. This implies that the number of linkages with their width have to be determined for open spaces that have surveillance problems like in OTM where the buildings are inward oriented with few window openings.

The household survey that established how the residents perceive the four open spaces studied was hinged on the place theory which is central in this study. The residents perception on the nine characteristics studied on the four public open spaces gives indications on what is appealing to the residents on: Whole space identity, built environment, built form of buildings, edges, floorscapes, landscaping, urban furniture, uses and activities, vehicular traffic and parking. If this knowledge is incorporated in the redevelopment of the underutilised open spaces, the products are likely to meet the specific social and recreational needs of the residents as those spaces will have been transformed to places they can emotionally relate with.

7.5 RESEARCH IMPLICATION

Taking into consideration the scope, limitations, methods and techniques, and variables studied in this research undertaking, the findings have some implications for future research. To get a better understanding of how public open spaces in densely built up organic settlements can be redeveloped to meet the social and recreational needs of the inhabitants the following suggestions could be incorporated in future research:

7.5.1 User Perception Survey

After covering the perception of the residents some of whom hardly use these open spaces, there is a need to do another research on the same open spaces to cover user perception that could be compared to what has been established in this study.

7.5.2 Replicate Study in Areas With Similar Characteristics

The same study needs to be replicated on the public open spaces in the areas under conservation in Lamu Island and Zanzibar which have the same cultural background. These could then be compared with studies that can be undertaken in the unplanned settlements which have similar characteristics to the study area.

7.5.3 Professionals and Students Perception Survey

It may also be of interest to get the perception of urban designers, architects, conservationists, lecturers and students of urban design and architecture to establish what they think needs to be done to revitalise historic public open spaces that are no longer vibrant.

7.5.4 Redevelopment Stakeholder Survey

The main use associated with the open spaces seems to determine the intensity of use and who uses the open spaces. There is also a need to do some study involving all the stakeholders to suggest what changes they may want to be undertaken on the various characteristics of the open spaces. Whatever proposals they will come with may radically transform the built environments.

7.6 PRACTICAL IMPLICATION

The findings of this study can be used to revitalise the public open spaces that are currently being underutilised. This will involve assimilating the respondents' perception on the components that contribute to the overall character of the open spaces. For the spaces to be attractive to the residents, they definitely have to meet the basic criteria.

As established in the findings the main use associated with a space has a bearing on whether it will be used for recreation or not. Parking in the Government Square and the Piggot Place deter residents from using these spaces for recreation even when no vehicles are parked. Considering the scarcity of public squares in OTM, the main use of these two spaces need to be changed. Thereafter, they can be transformed to small gardens furnished with sheltered benches.

The uses in the edges of the public open spaces contribute to the character of the open spaces. If they generate activity by attracting people then the open spaces will be vibrant. Walls with no or limited openings should be opened up to create some transparency in the edge that attracts activity and reduce the sense of enclosure. The introduction of glass windows ideal for window shopping and colonnades can enhance the visual appeal of the edges.

The floorscapes meant for Vehicular circulation and parking in the Piggot Place and Government Square should be redesigned with various patterned paving with changes in level to avoid monotony. The use of soft landscaping in the floorscape can check the hardness of the open spaces and add beauty that naturally has a soothing effect on people.

The introduction of trees for shade and appropriate furniture will serve as a cue to the public that the spaces are meant to cater for their social and recreational needs. The benches in the Treasury Square under the shade of the big trees are quite inviting.

7.7 RECOMMENDATIONS

The last specific objective of this study was to formulate policies and guidelines for the redevelopments of public urban open spaces in historic areas under conservation to meet the specific needs of residents. The aim of the policies and guidelines proposed is to guide decisions to solve the problems identified in the study and achieve rational sustainable redevelopment of the public open spaces. The following policy-oriented recommendations are crucial for the redevelopment of the open spaces:

7.7.1 Government Legislation

Urban design is an emergent profession that deals specifically with design, coordination and development of urban public open spaces. The Ministry of Nairobi Metropolitan whose mandate covers the development of identified urban and metropolitan areas should review all legislation and develop an act of parliament that will specifically address design, coordination and development of urban public open spaces. This recommendation will guarantee enforcement of the byelaws that will be developed for successful redevelopment of the urban open spaces in historic areas.

7.7.2 Urban Design Policy

The Ministry of Nairobi Metropolitan should develop an urban design policy for guiding the design, coordination and development of urban public open spaces to ensure sustainability.

7.7.3 Development Plans

An appraisal of all public open spaces in the historic areas should be done to facilitate the preparation of development plans for each space. All stakeholders should be involved in this

process that should be led by the Ministry of Nairobi Metropolitan to ensure conformity to the proposed urban design policy. The integrative development approach links stakeholders at diverse scales and in multiple contexts that produce more sustainable solutions with increased stakeholder satisfaction in the process and product of urban development.

7.7.4 Model and Tools

The model and tools based on the physical characteristics of public open spaces and residents' perception developed by this study can be refined to assist in the preparation of the development plans of the urban open spaces to be regenerated in the historic areas to meet their recreational needs.

7.7.5 Increasing Public Open Space

Deliberated effort must be made to increase the number of public open spaces in the densely built historic areas. Compulsory acquisition of plots in strategic areas with dilapidated or collapsed buildings to create reasonable sized neighbourhood public open spaces can be done.

7.7.6 Linkages

The public open spaces in historic areas are the outdoor living areas which should have a high concentration of public amenities and activities. There is a need to have elaborate linkages connecting the public open spaces together to foster security as the uses and activities in the different spaces complement one another.

REFERENCES AND BIBLIOGRAPHY

- Agrest D., (1991) *Architecture from Without.*, Cambridge: MIT Press.
- Alexander,C., (1977) *A Pattern Language.*, New York: Oxford University Press.
- Anderson, S., (1986) *On Streets.*, Cambridge: MIT Press.
- Attoe, W., Logan D., (1986) *American Urban Architecture, Catalysts in the Design of Cities.*
- Ashihara,Y., (1983) *Exterior Design in Architecture.*, London: MIT Press.
- Ashihara,Y., (1970) *The Aesthetic Townscape.*, New York: Van Nostand Reinhold Co.
- Bacon, E.N., (1984) *Design of Cities, London.*, Thames and Hudson.
- Baker, G., (1989) *Design Strategies in Architecture.*
- Barnett, J., (1982) *An Introduction to Urban Design.*, New York: Harper & Row.
- Benevolo, L., (1985) *The History of the City.*, London:Solar Press.
- Bentley (et al), (1985) *Responsive Environments.*, London: Architectural press.
- Blumenfield, H., (1967) *The Modern Metropolis, Its Origins, Growth, Characteristics, and Planning.*, London: MIT Press.
- Braunfels, W., (1988) *Urban Design in Western Europe: Regime and Architecture, 900-1900.*, Chicago: The University of Chicago press.
- Burden, E., (1995) *Elements of Architectural Design.*
- Buttimer, A; D. Seamon., (1980) *The Human Experience of Space and Place.*, London: Guildford CroomHelm.
- Broad bent, G., (1980) *Emerging Concepts in Urban Design.*, New York: Van Nostrand Reinhold.
- Calvino, I., (1974) *Invisible Cities.*, London: Picador.
- Camillo Sitte., (1945) *The Art of Building Cities.*, New York: Reinhold Publishing Corporation.
- Camillo Sitte., (1965) *City Planning According to Artistic Principles.*, New York: Random House.

Chava Frankfort Nachmias, David Nauchmias., (1996) *Research Methods in the Social Sciences.*, New York: St. Martins Press.

Charles Correa., (1999) *Housing and Urbanization.*, Bombay: The urban Design Research Institute.

Child F.C., "*Employment, Technology and Growth: The Role of the Informal Sectors*", Nairobi. University of Nairobi, (1976) Institute of Developing Studies, Occasional Paper No. 1.

Clare Cooper M.,(1998) *People Places.*, New York: John Wiley and sons Inc.

Collins G. R., Collins C. C., (1986) *City Planning According to Artistic Principles, by Camillo Sitte.*, New York: Random House.

Curran, R., (1983) *Architecture and the Urban Experience.*, New York: Van Nostrand Reinhold.

Cutler, L. S., (1976) *Recycling Cities for People — The Urban design Process*, Boston: Cahner.

Delbert C. Miller., (1991) *Handbook of Research Design and Social Measurement*, New Bury: Sage Publications.

Dewar et al., (1977) *Housing: A Comparative Evaluation of Urbanism in Cape Town*, Cape Town: Cape & Transvaal Printers Ltd.

Dwivendi R. S., (1997) *Research Methods in Behavioural Sciences*, New Delhi: Macmillan India Ltd.

Dyer, H. Thornley., (1963) *Mombasa Master Plan*, Mombasa: Mombasa Municipal Council.

Edward T. Hall., (1966) *The Hidden Dimension*, New York: Doubleday.

Entrikin, N., (1991) *The Betweenness of Place.*, Baltimore: The John Hopkins University Press.

Eyles, J., (1985) *Senses of Place.*, Warrington: Silverbrook Press.

Ferriss, H., (1986) *The Metropolis of Tomorrow*, New York: Ives Washburn.

Fishman, R., (1977) *Urban Utopias in the Twentieth Century: Ebenezer Howard, Frank Lloyd Wright, Le Corbusier*, Cambridge: MIT Press.

- Francis, M., (1987) *"The Making of Democratic Cities" Public Streets for Public use.*, New York: Van Nostrand Reinhold.
- Frankfort-Nachmias, C., Nachmias D., (1996) *Research Methods in the Social Sciences.*, New York: St. Martin's Press.
- Gareau, J., (1992) *Edge City: Life on the New Frontier*, New York: Anchor Books.
- Gehl, J., (1990) *Life Between Buildings: Using Public Space*, New York: Van Nostrand Reinhold.
- Geist, J.F., (1989) *Arcades: The History of a Building Type*, Cambridge: MIT Press.
- Getlein, M., (2002) *Gilbert's Living With Art*, New York: McGraw-Hill.
- Girouard, M., (1987) *Cities and People*, New Haven: Yale University Press.
- Givoni, B., (1998) *Climate Considerations in Building and Urban Design*, New York: Van Nostrand Reinhold.
- Goldfinger, E., (1941) *The Sensation of Space.*, *The Architectural Review.*
- Goodan, B., (1972) *The Economics of the Urban Areas*, Oxford: Pergamon Press.
- Gosling, D., Maitland, B., (1986) *Concepts of Urban Design*, London: Academy Editions.
- Gordon Cullen., (1961) *The Concise Townscape*, London: The Architectural Press.
- Greenbie, B., (1961) *Spaces: Dimensions of the Human Landscape*, London Yale University Press.
- Habitat., (1999) *Basic Facts on Urbanization*, Nairobi: UNCHS.
- Hall, P., (1974) *Urban and Regional Planning*, Middlesex: Penguin Books Ltd.
- Hall, Edward T., (1966) *The Hidden Dimension*, Doubleday: New York.
- Hardin G., *Population, Environment and the Quality of Life.*, *the Tragedy of the Commons*
- Hayden, D., (1984) *Redesigning the American Dream*, New York: WW Norton.
- Hayden, D., (1981) *The Grand Domestic Revolution*, Cambridge, Mass: MIT Press.
- Hedman, R., Jaszewski A., (1984) *Fundamentals of Urban Design*, Eashington: Planner Press.

Herbert G., (1996) *The GAIA Atlas of Cities*, London: Gaia books Limited.

Helmut E Landsberg., (1981) *The Urban Climate*, New York: Academic Press.

Hillier, B. and Shu, S., *Do Burglars Understand Defensible Space? New Evidence on the Relation Between Crime and Space*. <http://www.spacesyntax.org>.

Holt-Jensen, A., (1999) *Geography, History and concepts*, London: Sage Publications Limited.

Howard, Ebenezer., (1965) *Garden Cities of Tomorrow*, Cambridge: MIT Press.

International Labour Organizaion ILO., (1972) *Employment Incomes and Equity: A Strategy for Increasing Productive Employment in Kenya*, Geneva.

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

Jacobs, J., (1961) *The Death and life of Great American Cities.*, New York: Random House.

Jellicoe, G. S., (1975) *The Landscape of Man.*, London: Thames & Hudson.

Johnston, R., Gregory, D., Pratt, G., and Watts, M., (2000) *The Dictionary of Human Geography*, Oxford: Blackwell Publishing Limited.

Kenya, Republic of., (2002) *Ministry of Lands and Settlement – Physical Planning Handbook.*, Nairobi: Department of Physical Planning.

Kenya, Republic of., (2007) *Report on population Review.*, Mombasa: Central Bureau of Statistics.

Kenya, Republic of., (2003) *Report of the 1998/1999 Labour force Survey.*, Nairobi: Central Bureau of Statistics.

King J., Procesi D., (1990) *Conservation Plan for the Old Town of Mombasa.*,Nairobi: United Nations Educational, Scientific and Cultural Organisation.

Knox, P., Marston S., (2004) *Human Geography.*, Upper Saddle River NJ: Person Education inc.

Kostof, S., (1992) *The City Assembled: The Elements of Urban Form through History.*, London: Thames and Hudson.

- Kostof, S., (1992) *The City Shaped: Urban Patterns and Meanings through History.*, London: Thames and Hudson.
- Krevs, M., (2004) *Perceptual Spatial Differentiation of Ljubljana.*, research report Ljubljana: University of Ljubljana.
- Krier, R., (1979) *Urban Space.*, London: Academy Editions.
- Krier, L (et al)., (1978) *Rational Architecture .Brussels: Archives d'Architecture.*
- Lang, Jon., (1994) *Urban Design: The American Experience.*, New York: Van Nostrand Reinhold.
- Le Corbusier., (1987) *The City of Tomorrow and its Planning.*, New York: Dover publications.
- Licklider, H., (1965) *Architectural Scale.*, London : The Architectural Press.
- Liggett, R., (2001) *Bus Stop-Environment Connection: Do Characteristics of the Built Environment Correlate with Bus Stop Crime?*, *Journal of the Transportation Research Board.*, Washington, DC: National Academy Press.
- Le Corbusier., (1987) *The Radiant City.*, London: Faber.
- Lynch, Kevin., (1960) *The Image of the City.*, Cambridge: MIT Press.
- Lynch, Kevin., (1981) *A Theory of Good City Form .*, Cambridge: MIT Press.
- Madanipour, A., (1996) *Design of Urban Space.*, London: Wiley.
- Madanipour, A., (2003) *Public and Private Spaces of the City.*, London: Routledge.
- McKechnie, B. K., (2005) *Urban Regeneration.*, Dissertation, University of Pretoria.
- Michael K., *Downtown Design Guidelines.*, <http://www.cj.austin.tx.us/downtown>
- Middleton, M., (1987) *Man Made the Town.*, London: The Bodley Head.
- Middleton, R. (ed)., (1996) *The idea of the City.*, Cambridge: Massachusetts: MIT Press.
- Miller Delbert C., (1991) *Handbook of Research Design and Social Measurement.*, California: Sage Publications.
- Morris, A.E.G., (1974) *History of Urban Form.*, London: George Goodwin Ltd.

- Moughtin C., (1992) *Urban Design, Street and Square.*,Oxford: Butterworth-Heinemann.
- Moughtin C. et al., (1999) *Urban Design; Ornament and Decoration.*, Oxford: Butterworth Heinemann.
- Mugenda A.G., Mugenda O.M., (2003) *Research Methods, Quantitative and Qualitative Approaches.*, Nairobi: Acts Press.
- Mumford, L., (1970) *The Culture of Cities.*, New York: Harcourt Brace and Company.
- Mumford, L., (1982) *The City in History.*, London: Yale University Press.
- Peake, R., (2005) *Public Open Space Policy. Is it Meeting our Needs? The Planning Perspective.*, City of Wanneroo: Manager Planning Services.
- Purdum, C. B., (1913) *The Garden City.*, London: H.M. Dent & Sons Ltd.
- Nasar, J., (1998) *The Evaluative Image of the City.*, London: Sage Publications.
- Nelessen, A. C., (1997) *Visioning Open Spaces in New Development and Redevelopment.*, New Jersey: Inc. Princeton.
- Newman, O., (1972) *Defensible Space – Crime Prevention Through Urban Design.*, New York: Macmillan Company.
- Norberg-Schultz, C., (1979) *Genius Loci – Towards a Phenomenology of Architecture.*, New York: Rizzoli International.
- O'Brien, L., (2004) 'Feeling Good in the Woods', in *Green Places.*
- Ochieng, Chrispino., *Layering of a Spontaneous City Over a Planned One; A Case of Nairobi's Central Business District.*, <http://www.uia-berlin2002.com>
- Oke, T. R., (1987) *Boundary Layer Climates.*, New York: Routledge.
- Obudho, R.A., (1992) *The Nature of the Urbanization Process and Urbanism in the City of Nairobi, Kenya; African Urban Quarterly* Vd T.,Nairobi: University of Nairobi.

Poyner, B., (1983) *Design Against Crime – Beyond Defensible Space.*, Cambridge: University press.

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

Report of the 1998/1999 Labour force Survey., (2003) Central Bureau of Statistics., Nairobi.

Relph, E., (1987) *The Modern Urban Landscape, 1880 to the Present.*

Relph, E., (2002) *Place. In Companion En-cyclopedia of Geography. The Environment and Humankind*, London: Routledge.

Reps, J., (1965) *The Making of Urban America A history of City Planning in the United States.*, Princeton: Princeton University Press.

Reps, J., (1979) *Cities of the American West: A History of Frontier Urban Planning.*, Princeton: Princeton University Press.

Reps, J., (1980) *Town planning in Frontier America.*, Princeton: Princeton University Press.

Ridley, A., (1971) *Living in Cities.*, London :Heinemann.

Roger, T., (1986) *Finding Lost Space – Theories of Urban Design.*

Rosenau, H., (1974) *The Ideal City.*, London: Studio Vista.

Rossi, A., (1982) *The Architecture of the City*, Cambridge, Massachusetts: MIT Press.

Rowe, C., Koetter, F., (1979) *Collage City*, Cambridge, Massachusetts: MIT Press.

Rowe, P., (1991) *Making a Middle Landscape.*, Cambridge: MIT Press.

Rykwert, J., (1976) *The idea of a Town.*, London: Faber.

Saarinén, E., (1943) *The City, its Growth, its Decay, its Future.*, New York: Rheinhold.

Salingaros, N. A., (1999) *Urban Space and its Information Field*, Texas: Taylor and Francis Limited.

Sherwin, G., (1992) *City shape: Communicating and Evaluating Community Design*, APA Journal 179.

Spreiregen, P., (1965) *Urban Design: The Architecture of Towns and Cities.*, New York: McGraw Hill.

Stuber, F., (1979) *collective Spaces in Their Historic Urban Context.*

Tibbalds Francis., (1992) *Making of People Friendly Towns.*, England: Longmans Group UK.

Trancik,R., (1986) *Finding Lost Space: Theories of Urban Design.*, New York : Van Nostrand Reinhold Co.

Tuan, Y. F., (1979) *Landscapes of Fear.*, New York: Pantheon Books.

Tuan, Y. F., (1977) *Space and Place, The Perspective of Experience.*, Minneapolis: University of Minnesota Press.

Tuan, Y. F., (1974) *Topophilia, A Study of Environmental Perceptions, Attitudes, and Values.*, Columbia University Press.

Tunnard, C., Pushkarev, B., (1981) *Man Made America: Chaos or Control.*, New York: Harmony Books.

United Nations center for human settlements (Habitat), (1999) *Basic facts on Urbanization.* Nairobi: Habitat.

Urban Task Force, (1999) *Towards an Urban Renaissance: Final Report of the Task Force,* London: Urban Task Force.

Utterman, Richard K., (1984) *Accommodating the Pedestrian.*, New York: Van Nostrand Reinhold Company mc.

Voordt, D., Wegen, H., (1990) *Testing Building Plans for Public Safety: Usefulness of the Delft checklist, in: Netherlands Journal of Housing and Environmental Research.*

White (et al)., (1948) *Nairobi Master Plan for a Colonial City.*,London: His Majesty's Stationery Office.

Zeisel, John., (1981) *Inquiry By Design: Tools for Environment- Behavior Research.*, California: Cambridge University Press.

Zucker, P., (1959) *Town and Square: From the Agora to the Village Green.*, New York: Columbia University Press.

APPENDIX I: THE QUESTIONNAIRE

THE INFLUENCE OF PHYSICAL CHARACTERISTICS OF URBAN SPACES ON RESIDENTS PERCEPTION AND USAGE: A CASE OF 'OLD TOWN' MOMBASA – RESIDENTS SURVEY QUESTIONNAIRE

This questionnaire will assist the researcher in collecting primary data on the residents perception of the public open spaces in “old town” Mombasa through their feelings and sensibilities. The residents’ preferences will be used to regenerate the open spaces to meet the specific needs of the community.

Declaration:
 This study will be governed by the ethics of Social Science Research and no individual personal information will be divulged. Your participation in this study will be highly appreciated. **THANK YOU.**

The descriptive words with there opposites listed here below can be used to describe various characteristics of the..... Using the photographs shown in the album and the layout of the open space given to refresh your memory, please circle the number that best represents your feeling on the open spaces’ characteristics; where x refers to the left hand column and y the right hand column.

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

A. WHOLE SPACE IDENTITY: How the open space comprising of the built environment and activities is perceived.

1. Public	1 2 3 4 5 6 7	Private
2. Secure	1 2 3 4 5 6 7	Insecure
3. Soft	1 2 3 4 5 6 7	Hard
4. Quiet	1 2 3 4 5 6 7	Noisy
5. Small	1 2 3 4 5 6 7	Large
6. Overcrowded	1 2 3 4 5 6 7	Empty
7. Comfortable	1 2 3 4 5 6 7	Uncomfortable
8. Intimate	1 2 3 4 5 6 7	Distant
9. Pleasant	1 2 3 4 5 6 7	Unpleasant
10. Dirty	1 2 3 4 5 6 7	Clean

B. BUILT ENVIRONMENT: How the overall built environment (Buildings, Paving, Services & Landscaping) is perceived.

1. Comfortable	1	2	3	4	5	6	7	Intimidating
2. Old-fashioned	1	2	3	4	5	6	7	Modern
3. Homogeneous	1	2	3	4	5	6	7	Heterogeneous
4. Compact	1	2	3	4	5	6	7	Loose
5. Organic	1	2	3	4	5	6	7	Inorganic
6. Interesting	1	2	3	4	5	6	7	Boring
7. Appropriate	1	2	3	4	5	6	7	Inappropriate
8. Well maintained	1	2	3	4	5	6	7	Neglected

C. URBAN DESIGN 1: How the Built Form of buildings is perceived.

1. Simple	1	2	3	4	5	6	7	Complex
2. Appealing	1	2	3	4	5	6	7	Boring
3. Old-fashioned	1	2	3	4	5	6	7	Modern
4. Appropriate	1	2	3	4	5	6	7	Inappropriate
5. Monotonous	1	2	3	4	5	6	7	Varied
6. Joined	1	2	3	4	5	6	7	Disjointed

D. URBAN DESIGN 2: How the Edges of the open space are perceived.

1. Modern	1	2	3	4	5	6	7	Old fashioned
2. Interesting	1	2	3	4	5	6	7	Boring
3. Organic	1	2	3	4	5	6	7	Inorganic
4. Rich	1	2	3	4	5	6	7	Monotonous
5. Dominant	1	2	3	4	5	6	7	Weak
6. Maintained	1	2	3	4	5	6	7	Neglected
7. Welcoming	1	2	3	4	5	6	7	Unwelcoming
8. Accessible	1	2	3	4	5	6	7	Inaccessible
9. Glossy	1	2	3	4	5	6	7	Dull
10. Natural	1	2	3	4	5	6	7	Man-made

E. URBAN DESIGN 3: How the ground surface finish is perceived.

1. Soft	1	2	3	4	5	6	7	Hard
---------	---	---	---	---	---	---	---	------

2. Comfortable	1 2 3 4 5 6 7	Uncomfortable
3. Varied	1 2 3 4 5 6 7	Monotonous
4. Appealing	1 2 3 4 5 6 7	Repulsive
5. Appropriate	1 2 3 4 5 6 7	Inappropriate
6. Neglected	1 2 3 4 5 6 7	Maintained
7. Man-made	1 2 3 4 5 6 7	Natural
8. Decorative	1 2 3 4 5 6 7	Ugly

F. URBAN DESIGN 4: How the Landscaping is perceived.

1. Inadequate	1 2 3 4 5 6 7	Adequate
2. Diverse	1 2 3 4 5 6 7	Monotonous
3. Maintained	1 2 3 4 5 6 7	Neglected
4. Inappropriate	1 2 3 4 5 6 7	Appropriate
5. Ugly	1 2 3 4 5 6 7	Attractive
6. Natural	1 2 3 4 5 6 7	Imposed

G. URBAN DESIGN 5: How the urban furniture is perceived.

1. Appropriate	1 2 3 4 5 6 7	Inappropriate
2. Inadequate	1 2 3 4 5 6 7	Adequate
3. Up to date	1 2 3 4 5 6 7	Outdated
4. Comfortable	1 2 3 4 5 6 7	Uncomfortable
5. Inconspicuous	1 2 3 4 5 6 7	Conspicuous
6. Organized	1 2 3 4 5 6 7	Disorganized
7. Sheltered	1 2 3 4 5 6 7	Exposed

F. URBAN DESIGN 6: How the uses and activities are perceived.

1. Compatible	1 2 3 4 5 6 7	Incompatible
2. Inappropriate	1 2 3 4 5 6 7	Appropriate
3. Attractive	1 2 3 4 5 6 7	Repulsive
4. Monotonous	1 2 3 4 5 6 7	Varied

5. Adequate	1 2 3 4 5 6 7	Inadequate
6. Noisy	1 2 3 4 5 6 7	Quiet
7. Pollution	1 2 3 4 5 6 7	Pollution-free
8. Private	1 2 3 4 5 6 7	Public
9. Social	1 2 3 4 5 6 7	Anti-social
10. Beneficial	1 2 3 4 5 6 7	Worthless

G. URBAN DESIGN 7: How vehicular traffic and parking are perceived.

1. Incompatible	1 2 3 4 5 6 7	Compatible
2. Communal	1 2 3 4 5 6 7	Private
3. Pollution	1 2 3 4 5 6 7	Pollution-free
4. Noisy	1 2 3 4 5 6 7	Quiet
5. Adequate	1 2 3 4 5 6 7	Inadequate
6. Repulsive	1 2 3 4 5 6 7	Attractive

H. URBAN DESIGN 8: What you think about this open space

1. Is this open space of any value to you?.....
.....
2. What is the main use this open space should be identified with?.....
.....
3. What changes do you propose to be done on the: -
 - (a) Buildings?.....
.....
 - (b) Uses within the buildings?.....
.....
 - (c) Landscaping?.....
.....
 - (d) Furniture?.....
.....

(e) Activities in the open space?.....

4. What will people think of you if they found you enjoying passive recreation in this open space?.....

Here below are questions which require your individual personal information which will not be divulged, as declared above. Please tick the appropriate box that best represents your response.

I. RESPONDENT'S PERSONAL INFORMATION: Socio-Economic data

1. Please tick whether you are: Male Female
2. Please tick whether you are: Married Single Widowed
 Divorced Separated
3. Please tick your approximate age: Under 18 18<24 24<30
 30< 36 36<42 42<48 48<54 54& above
4. Please tick the highest level of education attained: Primary Secondary
 Diploma Graduate Post Graduate
5. Please tick your main occupation: Student Non Working
 Self Employed Employed Pensioner Other.....
6. Please tick the monthly rent for your house or how much you would rent out in Ksh.:
 Less than 3000 3001-6000 6001-9000 9001-12000
 12001-15000 15001-18000 18001-21000 21001 & above
7. Please tick the number of years you have resided in the study area:
 Less than 3 3<6 6<9 9<12 12 & above
8. Please tick your religion: Muslim Hindu Protestant
 Catholic Jew Atheist Other.....
9. Please tick the size of the household: 1 2 3 4 5
 6 7 8 9 10 Other.....

APPENDIX II: THE CHECKLIST

<p>THE OPEN SPACE</p> <p>a. Document all the patterns, shapes and sizes of the open space</p> <ul style="list-style-type: none"> • Plans • Elevation • Furniture <p>SPATIAL ANALYSIS</p> <p>a. Identify the elements that define the primary space and those that break it into secondary spaces</p> <ul style="list-style-type: none"> • Buildings • Trees • Roads • Ocean • Hedges • Changes in level • Changes in surface treatment • Changes in scale <p>b. Examine both primary and secondary spaces and note the major and minor activities</p> <p>c. Note where the major and minor activities are located with the specific characteristics that attract them</p> <ul style="list-style-type: none"> • Shade 	<ul style="list-style-type: none"> • Privacy • Setting <p>d. Note spaces attracting a lot of users</p> <p>e. Note the various finishes used for different parts of the open space</p> <p>f. Note special needs of users, whether adequate, inadequate, appropriate or inadequate</p> <p>g. Note relationship between uses in buildings and activities in open space if any</p> <p>h. Note any conflicts in activities and uses</p> <p>i. Check if the spaces conform to urban design parameters</p> <ul style="list-style-type: none"> • Scale and proportion • Unity • Harmony • Balance and symmetry • Rhythm and • Contrast <p>j. Are there secondary spaces that have been delineated as private space?</p> <p>BUILDING FACADES</p> <p>Take note of</p> <ul style="list-style-type: none"> • Scale and proportion 	<ul style="list-style-type: none"> • Fenestrations / all openings • Mass & size • Patters • Solids and voids • Materials • Colour and texture <p>ACCESS</p> <p>a. Note the various entry approaches</p> <ul style="list-style-type: none"> • Pedestrian • Vehicular <p>b. Identify all pedestrian and vehicular entries and exits</p> <p>c. Check what influence access into buildings have to pedestrian circulation and activities</p> <p>d. check if the linkage to neighbourhood is strong / weak</p> <p>COLOURSAND TEXTURE</p> <p>a. check colours and textures on</p> <ul style="list-style-type: none"> • Floorscape • Facades • Roofs and soffits • Furniture <p>b. Check if the colours and textures contrast and compliment each other</p>	<p>c. Check what mood and feelings the colours and texture create</p> <p>MATERIALS</p> <p>a. Document all materials and finishes visible in the open space</p> <ul style="list-style-type: none"> • Floorscape • Facades • Roofs and soffits • Furniture <p>b. Check if the materials contrast or compliment each other</p> <p>c. Check what mood or feelings the materials create</p> <p>FURNITURE</p> <p>a. Note the numbers, styles, and types of furniture</p> <ul style="list-style-type: none"> • Benches • Bollards • Lampposts • Railings • Kiosks • Swings <p>b. Note the location of the furniture in the space and their usage</p> <p>c. Note seating arrangement and comfort of benches</p>
--	---	--	---

<p>d. Note if the furniture is adequate, functional or appropriate</p> <p>e. Check for flexibility of furniture arrangement.</p> <p>f. Note if there is a variety of furniture types</p> <p>g. check for furniture preferences</p> <p>CIVIC MONUMENTS</p> <p>a. Take note of all urban decorative three dimensional objects and their locations</p> <ul style="list-style-type: none"> • Fountains • Sculpture • Landmarks <p>b. Check if their location and scale are appropriate</p> <p>MOVEMENT AND CIRCULATION</p> <p>a. Identify all major and minor circulation in the open space.</p> <ul style="list-style-type: none"> • Pedestrian • Vehicular <p>b. Note the users and intensity of use</p> <ul style="list-style-type: none"> • Individuals • Groups <p>c. Examine the materials, texture and size of circulation areas</p> <p>d. Note if the circulation space is congested or not</p>	<p>e. Note the movements and direction of traffic</p> <p>BEHAVIOURAL MAPPING</p> <p>a. Observe and map out all major and minor activities and behaviours</p> <ul style="list-style-type: none"> • Uses in adjacent buildings • Walking • Standing • Chatting • Playing • Parking • Commercial <p>b. Check if there are conflicts in the uses</p> <p>c. Establish if the activities are public or private</p> <p>d. Check for activities and uses that are not appropriate for the space</p> <p>e. Check for likely reasons for the environmental behaviours</p> <p>LIGHTING</p> <p>a. Take note of the quality of lighting during the day and at night</p> <ul style="list-style-type: none"> • Too bright • Insufficient • Sufficient 	<p>b. Establish influence of buildings and other elements on quality of light</p> <p>c. Note the influence the quality of lighting has on environmental behaviour and activities in the space</p> <p>OBSERVING PHYSICAL TRACES</p> <p>a. Systematically check for traces of previous activities and uses which can not be observed</p> <ul style="list-style-type: none"> • By-products of use • Adaptations for use • Displays of self • Public messages • Context <p>b. Check for inappropriate uses and activities done at night in early morning before traces are erased</p>	
--	--	---	--

APPENDIX III: RESIDENTS' PERCEPTION ON PHYSICAL CHARACTERISTICS

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Public	74.4	18.8	1.5	0.8	3.0	1.5	0.0	Private
Secure	18.0	36.1	21.8	3.0	7.5	7.5	6.0	Insecure
soft	3.8	7.5	21.8	0.0	18.8	17.3	30.8	Hard
Quiet	14.3	12.8	24.8	6.0	25.6	12.0	4.5	Noisy
Small	2.3	4.5	4.5	5.3	37.6	27.8	18.0	Large
Crowded	12.8	26.3	39.8	7.5	3.8	2.3	7.5	Empty
comfortable	12.8	29.3	29.3	6.0	13.5	2.3	6.8	Uncomfortable
Intimate	9.0	37.6	22.6	8.3	12.8	5.3	4.5	Distant
Pleasant	10.5	30.8	30.1	2.3	14.3	6.8	5.3	Unpleasant
Dirty	18.0	3.8	20.3	6.0	21.8	27.8	2.3	Clean

Table 1: Summary of perception on whole space identity of Government Square

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Comfortable	11.3	27.1	26.3	8.3	15.0	6.0	6.0	Intimidating
Old-fashioned	54.9	21.1	8.3	2.3	8.3	3.0	2.3	Modern
homogeneous	7.5	27.1	20.3	29.3	10.5	5.3	0.0	Heterogeneous
Compact	13.5	30.8	24.8	3.8	12.0	9.8	5.3	Loose
Organic	15.0	21.1	27.1	11.3	15.0	5.3	5.3	Inorganic
Interesting	19.5	21.8	26.3	6.0	12.0	8.3	6.0	Boring
Appropriate	11.3	30.1	21.8	12.0	16.5	3.0	5.3	Inappropriate
Maintained	12.0	27.8	31.6	4.5	10.5	5.3	8.3	Neglected

Table 2: Summary of perception on built environment of Government Square

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Simple	34.6	25.6	26.3	2.3	0.8	9.8	0.8	Complex
Appealing	10.5	30.8	33.8	5.3	8.3	5.3	6.0	Boring
Old fashioned	67.7	16.5	7.5	4.5	3.0	0.8	0.0	Modern
Appropriate	8.3	29.3	30.1	9.8	12.8	5.3	4.5	Inappropriate
Monotonous	8.3	20.3	18.8	14.3	21.1	15.0	2.3	Varied
Joined	30.8	36.1	15.8	6.8	3.0	3.8	3.8	Disjointed

Table 3: Summary of perception on built forms of buildings in the Government Square

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Modern	3.0	6.0	15.0	8.3	15.0	17.3	35.3	Old fashioned
Interesting	13.5	30.8	22.6	6.0	13.5	6.8	6.8	Boring
Organic	14.3	15.8	31.6	9.0	14.3	8.3	6.8	Inorganic
Rich	3.8	22.6	19.5	12.8	27.8	10.5	3.0	Monotonous
Dominant	15.8	18.8	34.6	6.8	17.3	2.3	4.5	Weak
Maintained	13.5	30.8	27.1	6.0	12.0	6.8	3.8	Neglected
Welcoming	22.6	17.3	25.6	11.3	14.3	5.3	3.8	Unwelcoming
Accessible	18.0	42.1	21.1	5.3	6.0	3.8	3.8	Inaccessible
Glossy	6.0	15.0	33.1	9.8	24.1	5.3	6.8	Dull
Natural	5.3	6.0	9.8	12.8	12.8	20.3	33.1	Man made

Table 4: Summary of perception on edges of the Government Square

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Soft	0.8	13.5	14.3	0.8	8.3	24.1	38.3	Hard
Comfortable	24.8	33.8	18.8	3.0	9.8	3.8	6.0	Uncomfortable
Varied	3.8	15.8	17.3	13.5	20.3	12.0	17.3	Monotonous
Appealing	12.8	36.8	24.8	11.3	6.8	3.0	4.5	Repulsive
Appropriate	19.5	33.1	15.8	13.5	8.3	6.0	3.8	Inappropriate
Neglected	4.5	2.3	11.3	6.0	21.8	36.1	18.0	Maintained
Man-made	44.4	33.1	3.8	10.5	3.8	2.3	2.3	Natural
Decorative	14.3	27.1	31.6	12.8	6.8	4.5	3.0	Ugly

Table 5: Summary of perception on floorscape of Government Square

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Inadequate	35.3	6.8	15.8	4.5	14.3	15.0	8.3	Adequate
Diverse	11.3	21.8	18.8	19.5	12.8	6.8	9.0	Monotonous
Maintained	9.8	18.0	17.3	21.1	9.0	10.5	14.3	Neglected
Inappropriate	18.0	10.5	6.8	20.3	18.0	22.6	3.8	Appropriate
Ugly	12.0	7.5	12.0	18.0	21.8	15.0	13.5	Attractive
Natural	5.3	11.3	12.0	18.0	11.3	16.5	25.6	Imposed

Table 6: Summary of perception on landscaping in Government Square

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Appropriate	4.5	12.0	14.3	12.8	12.8	19.5	24.1	Inappropriate
Inadequate	34.6	23.3	12.8	3.0	12.8	10.5	3.0	Adequate
Up to date	0.8	6.0	12.8	13.5	19.5	23.3	24.1	Outdated
Comfortable	3.0	12.8	25.6	10.5	16.5	12.8	18.8	Uncomfortable
Inconspicuous	18.0	12.8	18.0	14.3	21.1	11.3	4.5	Conspicuous
Organised	2.3	12.8	19.5	13.5	17.3	12.8	21.8	Disorganised
Sheltered	0.8	2.3	6.0	15.0	15.8	22.6	37.6	exposed

Table 7: Summary of perception on urban furniture in Government Square

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Compatible	18.8	23.3	24.1	9.8	12.0	5.3	6.8	Incompatible
Inappropriate	6.8	6.8	9.0	17.3	21.1	29.3	9.8	Appropriate
Attractive	9.8	24.1	26.3	15.8	12.8	5.3	6.0	Repulsive
Monotonous	3.8	13.5	15.8	12.8	25.6	21.8	6.8	Varied
Adequate	3.8	33.8	27.8	4.5	15.8	6.8	7.5	Inadequate
Noisy	9.0	9.8	27.1	4.5	15.8	24.8	9.0	Quiet
Pollution	5.3	5.3	23.3	3.0	25.6	19.5	18.0	Pollution-free
Private	0.8	5.3	4.5	6.0	11.3	23.3	48.9	Public
Social	38.3	31.6	12.0	6.0	4.5	4.5	3.0	Anti-social
Beneficial	29.3	30.8	15.8	9.0	6.0	0.8	8.3	Worthless

Table 8: Summary of perception on uses and activities in Government Square

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Incompatible	12.0	14.3	15.8	10.5	19.5	19.5	8.3	Compatible
Communal	33.8	24.8	6.0	23.3	3.8	5.3	3.0	Private
Polluting	6.8	6.0	20.3	4.5	21.8	21.8	18.8	Pollution-free
Noisy	7.5	7.5	24.8	3.8	21.8	19.5	15.0	Quiet
Adequate	12.0	15.0	29.3	6.0	12.0	17.3	8.3	Inadequate
Repulsive	5.3	2.3	21.1	23.3	21.1	16.5	10.5	Attractive

Table 9: Summary of perception on vehicular traffic and parking in Government Square

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Public	69.7	11.7	4.1	1.4	11.0	2.1	0.0	Private
Secure	62.1	16.6	11.7	2.1	2.1	0.7	4.8	Insecure
soft	11.0	15.9	10.3	15.2	16.6	11.0	20.0	Hard
Quiet	33.8	18.6	24.8	5.5	11.0	3.4	2.8	Noisy
Small	2.1	3.4	4.8	9.7	24.1	32.4	23.4	Large
Crowded	8.3	17.2	41.4	7.6	15.9	2.8	6.9	Empty
comfortable	24.8	36.6	24.8	5.5	4.1	2.1	2.1	Uncomfortable
Intimate	9.7	17.9	36.6	8.3	14.5	4.8	8.3	Distant
Pleasant	23.4	38.6	24.8	5.5	3.4	2.1	2.1	Unpleasant
Dirty	32.4	1.4	4.1	5.5	17.2	29.7	9.7	Clean

Table 10: Summary of perception on whole space identity of Treasury Square

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Comfortable	25.5	40.0	25.5	2.1	3.4	1.4	2.1	Intimidating
Old-fashioned	20.0	20.7	17.9	7.6	13.1	10.3	10.3	Modern
homogeneous	2.8	9.7	45.5	25.5	6.9	6.9	2.8	Heterogeneous
Compact	13.1	26.9	17.2	11.7	12.4	12.4	6.2	Loose
Organic	15.9	35.2	28.3	8.3	4.1	2.1	6.2	Inorganic
Interesting	22.8	26.9	29.0	6.2	6.2	5.5	3.4	Boring
Appropriate	35.2	30.3	13.1	9.0	5.5	2.8	4.1	Inappropriate
Maintained	43.4	26.9	20.0	4.8	1.4	2.1	1.4	Neglected

Table 11: Summary of perception on built environment of Treasury Square

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Simple	22.1	35.2	20.0	2.8	13.1	4.1	2.8	Complex
Appealing	24.8	29.7	27.6	2.1	6.9	5.5	3.4	Boring
Old fashioned	24.8	24.8	19.3	6.9	10.3	10.3	3.4	Modern
Appropriate	28.3	37.2	12.4	7.6	5.5	3.4	5.5	Inappropriate
Monotonous	6.2	11.7	27.6	20.0	20.0	8.3	6.2	Varied
Joined	16.6	13.1	15.2	9.0	14.5	21.4	10.3	Disjointed

Table 12: Summary of perception on built forms of buildings in Treasury Square

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Modern	69.7	11.7	4.1	1.4	11.0	2.1	0.0	Old fashioned
Interesting	62.1	16.6	11.7	2.1	2.1	0.7	4.8	Boring
Organic	11.0	15.9	10.3	15.2	16.6	11.0	20.0	Inorganic
Rich	33.8	18.6	24.8	5.5	11.0	3.4	2.8	Monotonous
Dominant	2.1	3.4	4.8	9.7	24.1	32.4	23.4	Weak
Maintained	8.3	17.2	41.4	7.6	15.9	2.8	6.9	Neglected
Welcoming	24.8	36.6	24.8	5.5	4.1	2.1	2.1	Unwelcoming
Accessible	9.7	17.9	36.6	8.3	14.5	4.8	8.3	Inaccessible
Glossy	23.4	38.6	24.8	5.5	3.4	2.1	2.1	Dull
Natural	32.4	1.4	4.1	5.5	17.2	29.7	9.7	Man made

Table 13: Summary of perception on edges of Treasury Square

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Soft	15.2	14.5	11.0	9.0	6.2	19.3	24.8	Hard
Comfortable	29.7	40.7	15.2	9.0	3.4	0.0	2.1	Uncomfortable
Varied	8.3	25.5	23.4	15.9	8.3	15.2	3.4	Monotonous
Appealing	29.7	35.2	22.8	5.5	5.5	1.4	0.0	Repulsive
Appropriate	37.2	24.1	14.5	11.0	5.5	4.8	2.8	Inappropriate
Neglected	0.7	4.8	7.6	4.1	17.9	26.9	37.9	Maintained
Man-made	39.3	20.0	10.3	13.1	3.4	9.7	4.1	Natural
Decorative	35.2	34.5	15.2	4.8	4.8	2.8	2.8	Ugly

Table 14: Summary of perception on floorscape of Treasury Square

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Inadequate	1.4	5.5	9.7	10.3	11.7	32.4	29.0	Adequate
Diverse	11.0	24.8	17.9	17.9	16.6	10.3	1.4	Monotonous
Maintained	33.1	33.8	17.2	5.5	5.5	2.8	2.1	Neglected
Inappropriate	2.1	2.8	2.1	7.6	20.7	33.1	31.7	Appropriate
Ugly	1.4	2.1	9.7	5.5	12.4	27.6	41.4	Attractive
Natural	9.7	14.5	13.1	13.1	18.6	15.2	15.9	Imposed

Table 15: Summary of perception on landscaping in Treasury Square

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Appropriate	25.5	40.0	25.5	2.1	3.4	1.4	2.1	Inappropriate
Inadequate	20.0	20.7	17.9	7.6	13.1	10.3	10.3	Adequate
Up to date	2.8	9.7	45.5	25.5	6.9	6.9	2.8	Outdated
Comfortable	13.1	26.9	17.2	11.7	12.4	12.4	6.2	Uncomfortable
Inconspicuous	15.9	35.2	28.3	8.3	4.1	2.1	6.2	Conspicuous
Organised	22.8	26.9	29.0	6.2	6.2	5.5	3.4	Disorganised
Sheltered	35.2	30.3	13.1	9.0	5.5	2.8	4.1	exposed

Table 16: Summary of perception on urban furniture in Treasury Square

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Compatible	23.4	23.4	20.0	9.0	11.0	5.5	7.6	Incompatible
Inappropriate	6.2	5.5	8.3	7.6	26.2	22.8	23.4	Appropriate
Attractive	25.5	32.4	23.4	2.8	5.5	6.9	3.4	Repulsive
Monotonous	5.5	11.7	18.6	22.1	18.6	13.8	9.7	Varied
Adequate	17.2	33.8	26.9	4.8	6.9	6.2	4.1	Inadequate
Noisy	1.4	4.8	9.0	9.7	26.2	23.4	25.5	Quiet
Pollution	2.8	2.8	11.0	5.5	24.8	30.3	22.8	Pollution-free
Private	8.3	6.2	11.76	3.4	8.3	23.4	38.6	Public
Social	48.3	29.7	11.0	3.4	4.8	2.1	0.7	Anti-social
Beneficial	50.3	17.9	14.5	5.5	4.8	4.1	2.8	Worthless

Table 17: Summary of perception on uses and activities in Treasury Square

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Incompatible	6.2	6.2	6.9	13.8	15.9	29.7	21.4	Compatible
Communal	30.3	24.8	6.9	17.2	7.6	4.8	8.3	Private
Polluting	3.4	3.4	7.6	9.0	21.4	26.2	29.0	Pollution-free
Noisy	2.8	6.2	13.8	5.5	20.7	22.1	29.0	Quiet
Adequate	24.8	25.5	31.0	7.6	6.2	2.8	2.1	Inadequate
Repulsive	0.7	5.5	6.2	13.1	22.8	24.8	26.9	Attractive

Table 18: Summary of perception on landscaping in Treasury Square

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Public	80.6	10.8	1.4	1.4	5.8	0.0	0.0	Private
Secure	27.3	37.4	13.7	0.7	9.4	5.0	6.5	Insecure
soft	8.6	22.3	10.8	10.1	6.5	13.7	28.1	Hard
Quiet	54.3	28.3	13.0	1.4	1.4	0.7	0.7	Noisy
Small	2.9	7.9	18.7	5.8	33.8	10.8	20.1	Large
Crowded	6.6	15.3	35.8	9.5	14.6	8.0	10.2	Empty
comfortable	38.8	41.0	13.7	0.7	2.9	2.9	0.0	Uncomfortable
Intimate	16.5	27.3	20.9	5.8	23.0	3.6	2.9	Distant
Pleasant	48.2	35.3	13.7	2.2	0.7	0.0	0.0	Unpleasant
Dirty	45.3	0.0	3.6	1.4	10.8	38.1	0.7	Clean

Table 19: Summary of perception on whole space identity of Waterfront

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Comfortable	29.5	46.0	12.2	5.8	4.3	2.2	0.0	Intimidating
Old-fashioned	28.1	9.4	12.2	9.4	7.9	21.6	11.5	Modern
homogeneous	2.2	10.3	36.0	30.1	11.8	8.1	1.5	Heterogeneous
Compact	12.9	30.9	23.0	6.5	8.6	14.4	3.6	Loose
Organic	15.9	39.1	26.8	12.3	2.9	2.2	0.7	Inorganic
Interesting	41.7	38.8	17.3	0.0	1.4	0.7	0.0	Boring
Appropriate	41.7	39.6	10.1	4.3	2.2	2.2	0.0	Inappropriate
Maintained	46.8	36.0	12.2	2.2	0.7	1.4	0.7	Neglected

Table 20: Summary of perception on built environment of Waterfront

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Simple	16.5	36.7	14.4	8.6	15.1	4.3	4.3	Complex
Appealing	38.8	38.8	17.3	2.9	1.4	0.7	0.0	Boring
Old fashioned	42.4	10.8	9.4	5.8	5.0	16.5	10.1	Modern
Appropriate	28.8	36.7	25.9	5.0	2.2	1.4	0.0	Inappropriate
Monotonous	3.7	5.1	23.5	11.0	26.5	22.8	7.4	Varied
Joined	14.4	18.0	17.3	18.7	5.8	17.3	8.6	Disjointed

Table 21: Summary of perception on built forms of buildings in the Waterfront

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Modern	17.3	12.2	30.2	1.4	2.2	18.7	18.0	Old fashioned
Interesting	36.2	48.6	10.1	0.7	1.4	2.9	0.0	Boring
Organic	26.6	29.5	26.6	10.8	2.2	4.3	0.0	Inorganic
Rich	19.4	38.1	19.4	12.2	5.8	3.6	1.4	Monotonous
Dominant	28.3	35.5	22.5	8.7	3.6	0.7	0.7	Weak
Maintained	50.4	27.3	12.2	3.6	2.9	2.9	0.7	Neglected
Welcoming	48.9	34.5	11.5	1.4	1.4	2.2	0.0	Unwelcoming
Accessible	40.3	36.0	17.3	2.2	2.9	1.4	0.0	Inaccessible
Glossy	20.9	38.1	22.3	12.2	4.3	2.2	0.0	Dull
Natural	12.2	10.1	2.9	13.7	5.0	22.3	33.8	Man made

Table 22: Summary of perception on edges of the Waterfront

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Soft	15.1	18.7	8.6	2.9	2.9	12.9	38.8	Hard
Comfortable	43.9	43.9	9.4	0.0	2.2	0.7	0.0	Uncomfortable
Varied	7.2	16.7	18.8	10.9	8.0	16.7	21.7	Monotonous
Appealing	41.0	43.9	8.6	3.6	2.9	0.0	0.0	Repulsive
Appropriate	40.3	38.1	12.2	6.5	1.4	1.4	0.0	Inappropriate
Neglected	1.4	4.3	3.6	4.3	8.6	25.9	51.8	Maintained
Man-made	47.5	25.2	5.0	2.2	2.9	10.1	7.2	Natural
Decorative	46.8	29.5	18.7	0.7	2.2	2.2	0.0	Ugly

Table 23: Summary of perception on floorscape of the Waterfront

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Inadequate	0.7	2.2	4.3	5.0	10.8	40.3	36.7	Adequate
Diverse	15.9	32.6	17.4	10.1	10.9	10.9	2.2	Monotonous
Maintained	55.4	31.7	5.8	1.4	2.2	1.4	2.2	Neglected
Inappropriate	2.2	2.9	3.6	2.9	11.5	36.7	40.3	Appropriate
Ugly	0.0	0.7	1.4	1.4	10.8	25.9	59.7	Attractive
Natural	15.8	19.4	2.2	2.2	7.2	21.6	31.7	Imposed

Table 24: Summary of perception on landscaping in the Waterfront

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Appropriate	28.3	38.4	20.3	5.1	4.3	2.9	0.7	Inappropriate
Inadequate	4.3	4.3	14.5	9.4	23.9	26.8	16.7	Adequate
Up to date	22.5	32.6	25.4	5.1	11.6	2.9	0.0	Outdated
Comfortable	31.2	43.5	18.8	2.2	2.9	1.4	0.0	Uncomfortable
Inconspicuous	3.6	21.2	6.6	6.6	27.7	21.9	12.4	Conspicuous
Organised	29.0	55.8	10.1	2.2	1.4	1.4	0.0	Disorganised
Sheltered	12.3	3.6	8.0	6.5	6.5	32.6	30.4	exposed

Table 25: Summary of perception on urban furniture in the Waterfront

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Compatible	19.4	33.1	18.7	10.8	5.0	7.2	5.8	Incompatible
Inappropriate	0.7	2.2	2.9	11.5	14.4	46.8	21.6	Appropriate
Attractive	34.5	43.9	13.7	2.9	3.6	1.4	0.0	Repulsive
Monotonous	1.5	7.3	18.2	10.9	31.4	24.1	6.6	Varied
Adequate	14.4	48.9	20.1	2.2	7.2	3.6	3.6	Inadequate
Noisy	0.0	2.2	5.8	4.3	15.8	44.6	27.3	Quiet
Pollution	0.0	6.5	12.2	0.0	20.9	25.2	35.3	Pollution-free
Private	9.4	4.3	2.9	0.0	4.3	22.5	56.5	Public
Social	60.4	28.8	4.3	0.0	2.9	2.2	1.4	Anti-social
Beneficial	50.4	30.9	14.4	2.2	1.4	0.0	0.7	Worthless

Table 26: Summary of perception on uses and activities in the Waterfront

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Incompatible	7.2	16.7	6.5	13.0	19.6	25.4	11.6	Compatible
Communal	25.9	26.6	5.0	18.0	7.2	12.2	5.0	Private
Polluting	0.0	3.6	7.2	1.4	25.9	33.8	28.1	Pollution-free
Noisy	0.0	2.9	6.5	2.2	24.5	25.2	38.8	Quiet
Adequate	12.9	24.5	20.9	7.9	12.2	14.4	7.2	Inadequate
Repulsive	2.9	1.4	4.3	13.7	18.0	33.8	25.9	Attractive

Table 27: Summary of perception on vehicular traffic & parking in the Waterfront

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Public	80.6	9.0	2.1	0.0	2.1	5.6	2.8	Private
Secure	8.3	12.5	21.5	2.1	11.1	24.3	20.1	Insecure
soft	0.7	6.9	12.5	9.0	24.3	18.1	28.5	Hard
Quiet	5.6	2.8	6.3	0.7	16.0	27.8	41.0	Noisy
Small	20.8	12.5	14.6	6.3	21.5	13.2	11.1	Large
Crowded	45.1	21.5	23.6	2.1	0.7	3.5	3.5	Empty
comfortable	2.8	9.0	11.8	6.9	31.3	13.2	25.0	Uncomfortable
Intimate	10.4	22.9	28.5	14.6	8.3	6.9	8.3	Distant
Pleasant	4.9	11.1	14.6	13.2	28.5	8.3	19.4	Unpleasant
Dirty	29.2	31.3	21.5	1.4	11.1	5.6	0.0	Clean

Table 28: Summary of perception on whole space identity of Piggot Place

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Comfortable	6.9	6.3	20.8	6.3	16.0	20.8	22.9	Intimidating
Old-fashioned	36.8	30.6	12.5	6.9	9.0	2.8	1.4	Modern
homogeneous	4.9	11.1	27.1	38.2	11.1	6.9	0.7	Heterogeneous
Compact	10.4	27.8	26.4	16.0	8.3	5.6	5.6	Loose
Organic	8.3	9.7	20.8	16.7	17.4	13.2	13.9	Inorganic
Interesting	6.9	18.1	22.2	3.5	22.2	11.1	16.0	Boring
Appropriate	4.2	8.3	20.8	14.6	20.8	13.2	18.1	Inappropriate
Maintained	4.9	8.3	11.8	9.7	22.9	18.8	23.6	Neglected

Table 29: Summary of perception on built environment of Piggot Place

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Simple	36.1	29.2	23.6	4.2	0.7	4.2	2.1	Complex
Appealing	4.2	13.2	23.6	6.9	25.7	10.4	16.0	Boring
Old fashioned	43.1	27.1	13.9	4.9	9.0	1.4	0.7	Modern
Appropriate	3.5	17.4	25.7	12.5	16.7	11.8	12.5	Inappropriate
Monotonous	4.2	10.4	18.8	16.0	36.1	9.0	5.6	Varied
Joined	30.6	22.9	9.7	6.3	13.9	9.0	7.6	Disjointed

Table 30: Summary of perception on built forms of buildings in the Piggot Place

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Modern	3.5	5.6	7.6	2.8	16.0	25.7	38.9	Old fashioned
Interesting	4.9	8.3	23.6	8.3	20.8	8.3	25.7	Boring
Organic	10.4	13.2	15.3	13.2	20.1	9.7	18.1	Inorganic
Rich	1.4	9.7	20.1	13.2	18.8	18.8	18.1	Monotonous
Dominant	3.5	19.4	24.3	13.2	13.9	7.6	18.1	Weak
Maintained	5.6	6.9	11.8	9.0	26.4	17.4	22.9	Neglected
Welcoming	7.6	9.0	16.0	12.5	20.8	9.0	25.0	Unwelcoming
Accessible	12.5	20.8	20.8	7.6	13.2	16.0	9.0	Inaccessible
Glossy	2.1	4.9	25.7	7.6	20.8	13.9	25.0	Dull
Natural	5.6	2.8	4.9	14.6	13.9	20.1	38.2	Man made

Table 31: Summary of perception on edges of the Piggot Place

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Soft	1.4	2.8	11.1	4.9	21.5	19.4	38.9	Hard
Comfortable	2.8	14.6	18.1	6.3	26.4	9.0	22.9	Uncomfortable
Varied	3.5	14.6	38.2	13.9	11.8	6.3	11.8	Monotonous
Appealing	1.4	11.8	24.3	10.4	23.6	10.4	18.1	Repulsive
Appropriate	3.5	12.5	15.3	20.1	17.4	12.5	18.8	Inappropriate
Neglected	20.8	25.0	23.6	4.9	18.1	2.8	4.9	Maintained
Man-made	36.8	25.7	13.2	13.2	3.5	4.9	2.8	Natural
Decorative	3.5	8.3	18.8	14.6	20.1	13.9	20.8	Ugly

Table 32: Summary of perception on floorscape of Piggot Place

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Inadequate	52.1	11.1	9.7	8.3	9.7	6.9	2.1	Adequate
Diverse	13.2	10.4	16.0	30.6	6.9	8.3	14.6	Monotonous
Maintained	2.1	9.0	16.0	16.0	7.6	7.6	41.7	Neglected
Inappropriate	36.1	11.1	6.3	18.1	13.9	9.7	4.9	Appropriate
Ugly	34.7	13.9	14.6	15.3	9.7	5.6	6.3	Attractive
Natural	13.2	4.9	7.6	21.5	7.6	17.4	27.8	Imposed

Table 33: Summary of perception on landscaping in the Piggot Place

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Appropriate	2.8	4.9	16.0	18.1	6.3	13.2	38.9	Inappropriate
Inadequate	45.8	16.0	13.2	8.3	9.0	5.6	2.1	Adequate
Up to date	1.4	6.9	3.5	13.2	13.2	18.1	43.8	Outdated
Comfortable	0.7	2.1	19.4	16.0	12.5	13.9	35.4	Uncomfortable
Inconspicuous	27.1	13.2	10.4	18.8	18.1	10.4	2.1	Conspicuous
Organised	0.0	8.3	10.4	17.4	12.5	20.8	30.6	Disorganised
Sheltered	2.8	2.8	4.9	11.8	7.6	22.2	47.9	exposed

Table 34: Summary of perception on urban furniture in Piggot Place

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Compatible	9.0	20.8	16.7	18.1	11.8	6.3	17.4	Incompatible
Inappropriate	20.8	9.0	14.6	13.2	27.8	12.5	2.1	Appropriate
Attractive	6.9	9.7	29.2	11.1	11.8	12.5	18.8	Repulsive
Monotonous	11.8	13.2	14.6	16.7	18.8	16.0	9.0	Varied
Adequate	4.9	15.3	36.1	5.6	9.7	8.3	20.1	Inadequate
Noisy	35.4	34.0	17.4	2.1	4.9	2.1	4.2	Quiet
Pollution	13.9	19.4	32.6	2.8	13.2	13.2	4.9	Pollution-free
Private	5.6	9.0	7.6	2.8	4.9	16.0	54.2	Public
Social	41.0	21.5	9.0	5.6	7.6	6.9	8.3	Anti-social
Beneficial	25.7	25.7	19.4	6.3	6.9	6.3	9.7	Worthless

Table 35: Summary of perception on uses and activities in Piggot Place

(1)-Extremely x (2)- Very x (3)- Quite x (4)- Neither x nor y (5)- Quite y (6)- Very y (7)- Extremely y								
x	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	y
Incompatible	24.3	14.6	4.9	17.4	14.6	16.0	8.3	Compatible
Communal	29.2	22.9	8.3	26.4	5.6	6.3	1.4	Private
Polluting	19.4	22.9	19.4	2.8	12.5	13.9	9.0	Pollution-free
Noisy	31.3	29.2	12.5	3.5	10.4	6.9	6.3	Quiet
Adequate	5.6	10.4	16.7	7.6	11.8	20.1	27.8	Inadequate
Repulsive	18.1	13.2	23.6	15.3	14.6	9.0	6.3	Attractive

Table 36: Summary of perception on vehicular traffic and parking in Piggot Place

APPENDIX IV: REDEVELOPMENT OF THE GOVERNMENT SQUARE - PROJECT REPORT

1.0 INTRODUCTION

The Government Square is one of the four case studies that was extensively analysed in the study that established the influence of the physical characteristics of urban open spaces on residents' perception and usage in 'Old Town' Mombasa. The physical characteristics of the open space and how the residents perceive the various attributes embedded in the physical characteristics were established. Through a discussion of the results the following findings were realised:

1. The residents of 'Old Town' Mombasa perceive the Treasury Square and the Waterfront to be more appealing for recreational purposes than the Government Square;
2. The residents preference for recreational purposes are:
 - (i) Larger open spaces with low sense of enclosure;
 - (ii) Open spaces with natural and soft landscaping as opposed to hard spaces;
 - (iii) Complex built forms encompassing the open spaces;
 - (iv) Perforated edges to open spaces with interesting building elevations;
 - (v) Floorscapes that are varied, natural and organic;
 - (vi) Diverse and well maintained soft landscaping in public open spaces;
 - (vii) Sheltered public benches and other urban furniture;
 - (viii) Minimal vehicular traffic and parking in public open spaces; and
 - (ix) Secure and serene atmosphere detached from the bustle and hassle of town.

Considering the above mentioned attributes, each of the public open spaces can be subjected to a 'SWOT' analysis to establish their strengths, weaknesses, opportunities and threats before redevelopment proposals to meet the specific needs of the residents and visitors are made. This is inevitable if the tremendous potential of the Government Square is to be realised that will

enable the Municipal Council of Mombasa turn it into a vibrant successful sustainable development to be enjoyed by both locals and tourists.

2.0 EVALUATION OF THE GOVERNMENT SQUARE

From the analysis and discussion of the results of the study the following observations on the prevailing condition of the Government Square are apparent:

1. The square has lost its status as the centre for business and commerce in Mombasa;
2. Even though the residents perceived it to be large, it has a strong sense of enclosure;
3. It is a hard space with insignificant natural and soft landscaping;
4. Simple built forms encompass the square;
5. The space is completely enclosed by buildings with simple elevations;
6. The entire floorscape is levelled and paved with concrete blocks making it monotonous;
7. There is a small garden that is insignificant on account of the vast scale of the space;
8. The only urban furniture found in the square is a vandalised telephone booth;
9. When the port is in operation there is a high presence of vehicular traffic and parking;
10. The atmosphere is not conducive for recreational purposes;
11. The garbage collection bins are a nuisance;
12. The buildings appear to be inward oriented due to the limited number of doors and windows opening into the square;
13. Glare from the white washed walls and parked vehicles are an issue in the afternoons.

Considering the above mentioned observations, it is not a wonder that the residents of 'Old Town' Mombasa can not use the Government Square for recreational purposes even when the port has been closed after the official government working hours and during weekends.

Despite the cited weaknesses of the Government Square, the old port with an edge of over 100 metres is a great asset that can be exploited to transform the dormant public space into a social node with favourable day and night activities.

3.0 THEME AND OBJECTIVES FOR REDEVELOPMENT

The theme and objectives for the redevelopment of the Government square are:

1. Create an urban design plan that would transform the Government Square to a social node with favourable day and night activities to meet the needs of old town residents and visitors;
2. Stimulate imaginative and viable urban design proposals that capture a sense of what the Government Square is now and what is appropriate development for the open space in this millennium;
3. Re-ordering of the urban space incorporating advanced urban design principles and techniques.

4.0 PROJECT DESIGN

To meet the objectives of the study the proposed redevelopment has addressed the numerous urban design problems that emanated from the analysis of the Government Square. The identity of the square was paramount as the current image of the open space lacks clarity. This necessitated the radical reorganisation of the port facility to create a built environment that is different from the existing western side of the square. The proposed square has been designed to promote social interaction while it offers all the services that the neighbourhood needs. The intervention have touched on the edges of the open space, the floorscape, landscaping, urban furniture, uses and activities, vehicular traffic and parking amongst others.

4.1 THE LAYOUT

The proposed development has created an enormous square by removing the edge that was created by the buildings on the waterfront and replacing it with a perfect semi circular arcade that has numerous restaurants, shops, health facilities and offices that radiate from the focus of the square. The large space is subdivided into three secondary spaces. One accommodates the amphitheatre and garden that softens the space, the second secondary space covers the buildings that are listed for conservation while the third covers the other buildings not listed. The secondary spaces offer a variety of visual experiences as one traverse the square. A colonnade has been used as a scaling element that ties up the three secondary spaces. Its transparency enriches the views within and out of the square. The elevated sculpture above the stage of the amphitheatre holds the entire space together. A pier has been created to accommodate the port facility with parking and the garbage collection point relocated out of the square.



Figure 4.1: Layout of proposed development,
Source: Author, 2008

4.2 THE EDGES OF THE SQUARE

The introduction of the two arcades has created an interface between the open space and the interior of the buildings. The traditional wall with few openings has been opened up to create positive interaction between inside and outside that creates a feeling of security. Views towards the Indian Ocean have purposely been created to draw people into the arcade that hosts numerous activities. The effort was to have perforated edges that make the square have a low sense of enclosure. The number of alleys connecting to the square was also checked to enhance the security of the square.

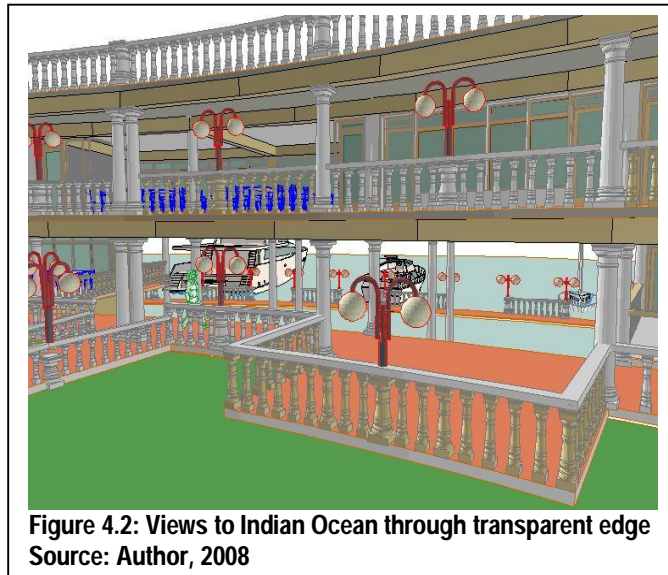


Figure 4.2: Views to Indian Ocean through transparent edge
Source: Author, 2008

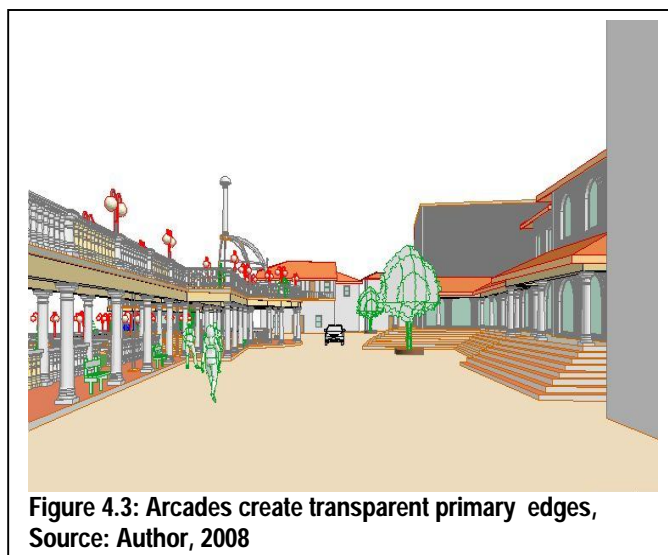


Figure 4.3: Arcades create transparent primary edges,
Source: Author, 2008

4.3 THE FLOORSCAPE

Changes in the floorscape have been designed to create appeal. The changes entail both materials and levels. Different finishes have been used for pedestrian circulation, vehicular circulation, the arcades and the soft landscaping in the gardens. The garden not only softens the space but it also has a cooling effect. The grand steps, stepping in the amphitheatre, and change in level between the procession area and arcades add drama to the floorscape. The change in levels provides ample informal seating in the various areas of the square.



Figure 4.4: Grand Steps and ramp to waterfront and swimming pool
Source: Author, 2008

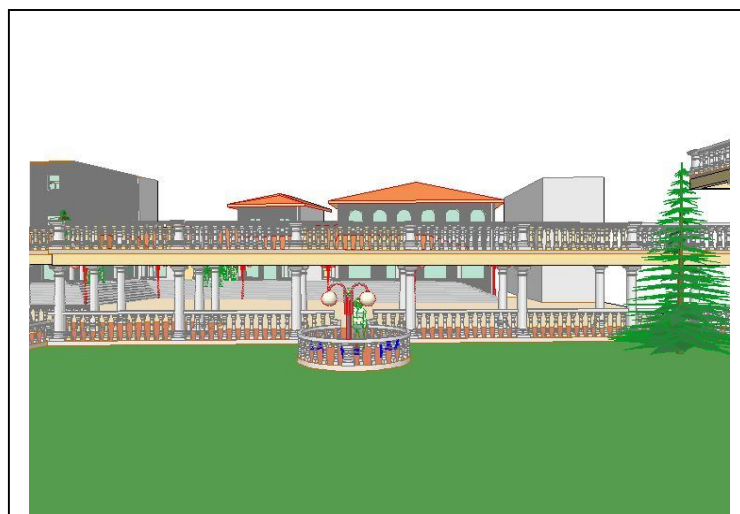
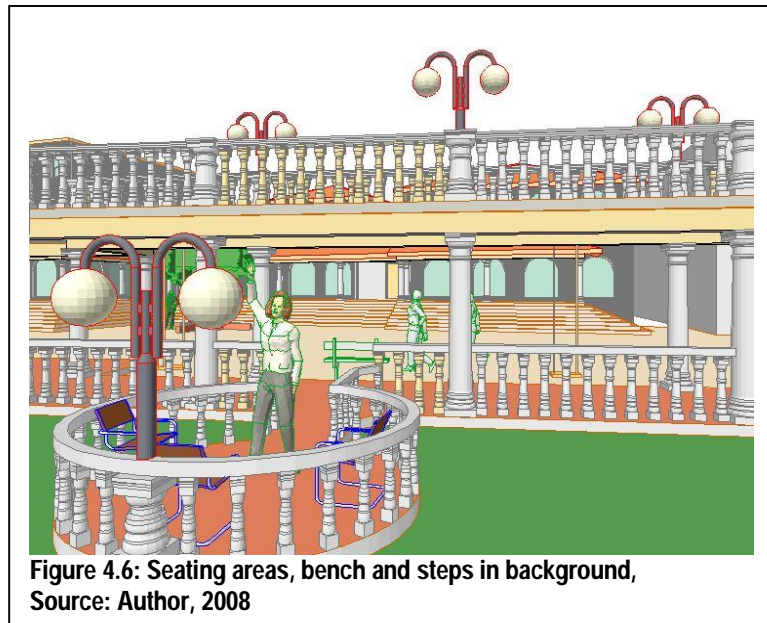


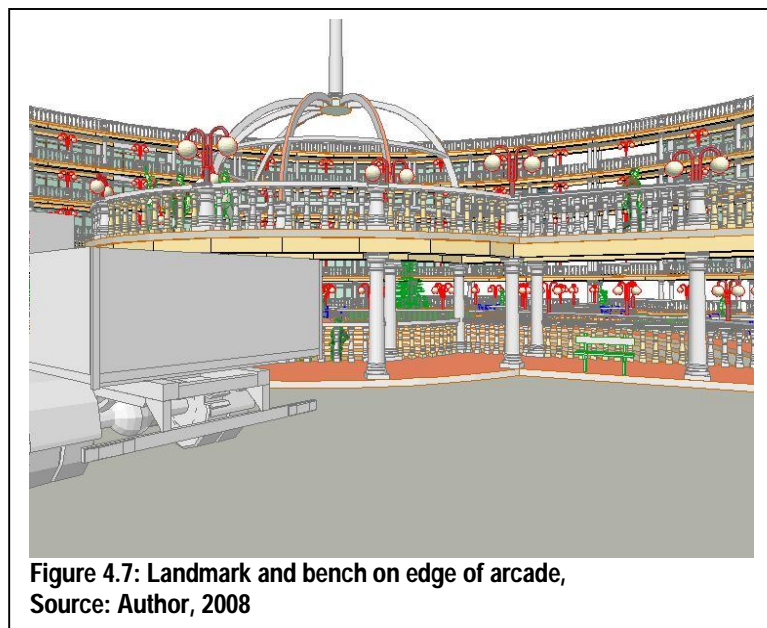
Figure 4.5: Garden and Grand steps in background,
Source: Author, 2008

4.4 URBAN FURNITURE

Benches, swings, lampposts have been provided in the proposed redevelopment of the Government square. Low walls that can be used for sitting under the shade of the trees in the procession and parking areas supplement the benches. The soaring landmark above the stage of the amphitheatre crowns the urban furniture in the square.



**Figure 4.6: Seating areas, bench and steps in background,
Source: Author, 2008**



**Figure 4.7: Landmark and bench on edge of arcade,
Source: Author, 2008**

4.5 USES AND ACTIVITIES

The loading and offloading activity in the square with the garbage collection points have been relocated outside the open space. A pier in the ocean has been designed to accommodate the port facility while at the same time offering opportunities for one to experience the ocean at close range. Various uses are lined on the edges of the square to generate activity. Pedestrian and vehicular circulations have also been separated.

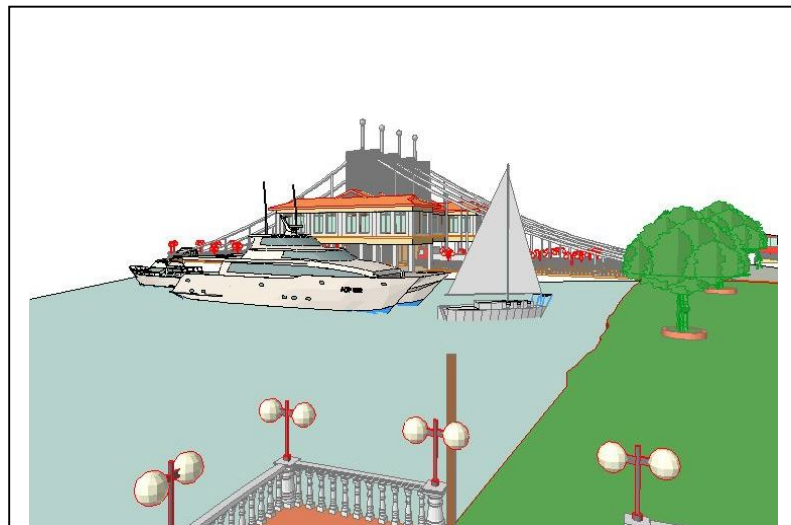


Figure 4.8: Port facility in the Indian Ocean
Source: Author, 2008



Figure 4.9: Open restaurant on edge of arcade
Source: Author, 2008

APPENDIX V: RESEARCH - SCHEDULE OF ACCOMODATION

Activity	February				March				April				May				June				July				August				September									
Week	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4						
A. Planning Phase																																						
1. Determine sample	█																																					
2. Design Field Tools			█																																			
3. Recruit interviewers					█		█																															
4. Train interviewers					█				█																													
5. Pretest Field Tools							█																															
6. Revise Field Tools									█																													
B. Implementation Phase																																						
1. Conduct Field Surveys							█		█																													
2. Conduct Field Surveys to Fill Gaps							█		█		█																											
3. Code Data											█																											
4. Check for Consistency											█																											
5. Key – punch Data											█																											
6. Tabulate Data											█																											
C. Analysis Phase																																						
1. Analyse Data													█																									
2. Write Research Report													█		█																							
D. Reporting Phase																																						
1. Print Report																					█																	
2. Disseminate Report																									█													
3. Present Findings at BPS.																													█									