ISLAND RESORT, IBESHE, LAGOS STATE
APPLICATION OF GREEN ARCHITECTURE PRINCIPLES TO WATERFRONT DESIGN.

BY
ADEKEYE, OLUTOLA FUNMILAYO
(B.sc. Architecture)
M.SC7ENV-DES/02085/2006-2007

A PROJECT THESIS SUBMITTED TO THE POSTGRADUATE SCHOOL, AHMADU BELLO UNIVERSITY IN PARTIAL FULFILLMENT FOR THE AWARD OF MASTER OF SCIENCE IN ARCHITECTURE (M.SC) IN THE DEPARTMENT OF ARCHITECTURE AHAMADU BELLO UNIVERSITY ZARIA.

FEBRUARY, 2009.

DECLARATION

I declare that the work in the project thesis entitled *ISLAND RESORT, IBESHE, LAGOS STATE, application of green architecture principles to waterfront design*, has been performed by me in the Department of Architecture under the supervision of Architect S.N Oluigbo. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this thesis was previously presented for another degree or diploma at any university.

Adekeye, Olutola .F.	Signature	17/04/2009
		Date

CERTIFICATION

This project thesis entitled ISLAND RESORT, IBESHE, LAGOS , application of green architecture principles to waterfront design, by Adekeye, Olutola Funmilayo meets the regulations governing the award of the degree of Master of Science in Architecture of Ahmadu Bello University, and is approved for its contribution to knowledge and literacy presentation

A.S. Sanusi ---------- Date 07/07/09

Chairman, Supervisory Committee

S.N Oluigbo ---------- Date 07-07-09

Member, Supervisory Committee

A.O. Salau ---------- Date 14-07-09

Member, Supervisory Committee

---------- Date 20-07-09

Dr. W.B Quri

Head of Department

---------- Date ----------

Dean, Postgraduate School

DEDICATION

This thesis is dedicated to God Almighty: the Omnipotent and Omnipresent God for bringing me this far and to my wonderful parents Prof. And Mrs. J.O Adekeye for being my only pillar of support and for your endless love shown to me.

AKNOWLEDGEMENT

I would first of all give my gratitude to God for allowing me the privilege to complete my M.Sc thesis work.

My gratitude also goes to my parents Prof. and Mrs Adekeye for abundant love and support they have rendered to me throughout my academic training and in my life in general, both physically and spiritually: May God grant them long life and prosperity.

I also acknowledge the guidance and support rendered to me by my supervisor architect S.N Oluigbo. Thank you sir for the time you took to put me through my research work.

My gratitude goes to architect Shrinkat Tulpule, architect Joy Maina and architect Badiru whom not only took their time but also put great efforts to put us through the thesis programme in a short amount of time.

My sincere appreciation goes to my siblings Mrs Tope Kadiri and family(Uncle Charles, Nugwa and Timi), Aunty Shike, Dr Toyosi , my cousins uncle Kunle, uncle Abbey, Segun, and also my pillar of support Mike Musa for his help during my stay in School and always.

I also want to appreciate Arc. Usman yakawu for being a good mentor and a friend from the day I entered the dept of architecture till date. Arc. Faworaja and Itunu for their great contributions towards the success of this thesis work.

I wish to extend my sincere thanks to all my friends and colleagues whom have helped me in one way or another during the thesis programme, especially late uncle Daniel (you are greatly missed), Onimisi, Jaga, Ayinga , Bile, Mariam ,Hamsa, Iember, Faridah,Z.D, Aisha, Lami, Dorcas, Femi, Kate, Arabo , Jones, John Ajonye, Umar , Sly; and many more whom I am not able to mention here. I acknowledge all the members of the class of U01.

ABSTRACT

The concept of Green Architecture has rapidly become an important component of tourism. In resort design Green Architecture has also become very prominent, although the principles of Green Architecture have not been fully integrated into most waterfront resorts in Nigeria. This proposed thesis focuses on the application of Green Architecture principles in the resort design in order to integrate the design with the environment.

This research attempts to identify the various techniques of applying the principles of Green Architecture to water front designs by examining and assessing case studies carried out to analyze the extent to which Green architecture principles have been applied to existing waterfront resort designs. This information will then be used to define and create design guidelines for the proposed Ibeshe Island resort.

From the case study research method that was adopted, findings reveal that Green Architecture principles have not been fully utilized and applied to existing waterfront resorts design.

Aspects of Green Architecture principles arc important to resort design in coastal areas which are characterized under hot humid zones, these principles enhance the relationship between the resort and its environment.

TABLE OF CONTENTS

Title Page	i
Declaration	ii
Certification	iii
Dedication	iv
Acknowledgement	v
Abstract	vi
Table of contents	vii
List of Tables	xi
List of Figures	xii
List of Plates	xiii
References	106
Appendices	108

CHAPTER ONE: INTRODUCTION

1.1 Background of study ----------1

1.2 Statement of problem----------3

1.3 Scope and limitation of study----------3

1.4 Aim and Objectives----------4

1.5 Research questions----------4

1.6 Significance of study----------4

1.7 Motivation and Justification----------5

1.8 Definition of key terms ----------5

CHAPTER TWO: GREEN ARCHITECTURE AND RESORT DESIGN

2.1 The concept of Green Architecture----------7

2.1.1 Green buildings----------9

2.1.2 Benefits of green designs----------11

2.2 Basic principles of Green Architecture----------12

2.3 Resort design----------13

2.3.1 Zoning criteria for Locating Resorts ----------14

2.3.2 Types and classifications of Resorts ----------15

2.3.3 Types and specific Resort facilities----------18

2.4 Trends in resort development----------19

CHAPTER THREE: RELEVANCE OF GREEN ARCHITECTURE PRINCIPLES TO WATERFRONT RESORTS

3.1 Waterfront resorts ----------22

3.2 Elements of green architecture applicable to waterfront resorts. ----------23

3.2.1 Conserving energy----------23

3.2.2 Working with climate----------23

3.2.3 Respect for site----------24

3.2.4 Minimizing new resources ----------24

CHAPTER FOUR: METHOD OF STUDY

4.1 Case studies----26

4.2 Data collection----27

4.2.1 Visual survey----27

4.2.2 Field forms----27

4.2.3 Interview schedule----27

4.3 Data analysis and presentation----27

4.3.1 Photographs----28

4.3.2 Tables----28

4.3.3 Figures----28

4.3.4 Descriptive Analysis----28

CHAPTER FIVE: CASE STUDIES

5.1 Case study Selection Criteria----29

5.2 Case study one: La Champagne Tropicana Beach Resort, Lagos ----32

5.3 Case study two: Whispering Palms, Iworo, Badagry, Lagos ----45

5.4 Case study three: Suntan Beach, Badagry, Lagos. ----58

5.5 Case study four: Eko Tourist Beach Resort & Amusement Park, Akodo, Lagos -70

5.6 Case study five: Casa de campo, Dominican Republic, Virgin Islands. ----77

5.7 Case study six: Sunterra resort, Carambola beach, Virgin Islands. ----81

5.8 Case Study Conclusion----88

CHAPTER SIX: DESIGN REPORT

6.1 The Site----90

6.1.1 Socio-cultural environment----90

6.1.2 Locality----91

6.1.3 Site selection criteria and features----92

6.2 Site Analysis----93

6.2.1 Climate----94

6.2.2 Topography----94

6.2.3 Vegetation----97
6.2.4 Scenic quality----97
6.3 Design brief----98
6.3.1 Site zoning----98
6.3.2 Design concept----99
6.3.3 Schedule of Accommodation----101
6.4. Building Form and Architectural Expression----103
6.4.1 Structural Integrity----104
CHAPTER SEVEN: CONCLUSION AND RECOMMENDATION. ----105
REFFERENCES----106
APPENDICES----108

DVR 485411

LIST OF TABLES

TABLES	PAGES
Table 1.1: Assessment of the application of green architecture principles	41
Table 1.2: Assessment of the application of green architecture principles	54
Table 1.3: Assessment of the application of green architecture principles	66
Table 1.4: Assessment of the application of green architecture principles	74
Table 1.5: Assessment of the application of green architecture principles	85
Table 1.6: Assessment of the application of green architecture principles	93
Table 2.0: Table illustrating case study summary sheet	97

LIST OF FIGURES

FIGURE	PAGE
Figure 1.0: A sketch site plan of La champagne tropicana beach resort, lagos.	41
Figure 2.0: A sketch site plan of. whispering palms, resort, badagry, lagos.	54
Figure 3.0: A sketch site plan of, suntan beach resort	66
Figure 4.0: A sketch site plan of, eko tourist beach resort and amusement park akodo	74
Figure 5.0: Map of Nigeria showing Lagos state.	102
Figure 6.0: A sketch of the proposed site location.	104
Figure 7.0: Graph showing sunshine hours.	105
Figure 8.0: Graph showing clouds cover	106
Figure 9.0: Graph showing temperature.	106
Figure 10.0: Graph showing rainfall	107
Figure 11.0: Graph showing Relative humidity	108
Figure 12.0: Site zoning of the proposed resort	111
Figure 13.0: Sketch plan of boats.	113

LIST OF PLATES

PLATE	PAGE
Plate 5.1: Reception	34
Plate 5.2a: Exterior view of Labalaba(butterfly) chalet	35
Plate 5.2b: Living room.	35
Plate 5.2c: Kitchenette/bar area	35
Plate 5.2d: Bathroom/toilet	35
Plate 5.2e: Sleeping area	36
Plate 5.3a: Exterior view of kodi chalet.	36
Plate 5.3b: Interior view of kodi chalet.	36
Plate 5.4: Olufunke tent	36
Plate 5.5a:Exterior view of restaurant	37
Plate 5.5b: Interior view of restaurant	37
Plate 5.6a: Open stage one	37
Plate 5.6b: Mega open stage.	37
Plate 5.7: Outdoor shower units.	38
Plate 5.8: Barbeque spot	38
Plate 5.9: Spa	38
Plate 5.10 Massage room	38
Plate 5.11a: View of adult swimming pool.	38
Plate 5.11b: View of children swimming pool.	38

Plate 5.12: View of fresh water lake. 38

Plate 5.13: View of boating facilities 38

Plate 5.14: Relaxation and sightseeing. 40

Plate 5.15: Beach sport facilities. 40

Plate 5.2.1a: Exterior view of chalet. 47

Plate 5.2.1b: Exterior view of Atlantic building. 47

Plate 5.2.1c: Interior view of Atlantic building. 47

Plate 5.2.1d: View of swimming pool building 47

Plate 5.2.1e: Views showing materials used. 47

Plate 5.2.1f: View showing flooring material 47

Plate 5.2.2a : Exterior view of restaurant 48

Plate 5.2.2b: Exterior view of staff canteen. 48

Plate 5.3.3a : Exterior view of chalet 60

Plate 5.3.3b: View of landscape 61

Plate 5.3.4: view of paved walkway. 61

Plate 5.3.5 interior view of conference room 61

Plate 5.3.6: view of staffroom 62

Plate 5.3.7: Exterior view of beach restaurant. 62

Plate 5.3.8: Exterior view of mini shops 63

Plate 5.3.9: Exterior view of public toilets. 63

Plate 5.3.10: View of beachfront 64

Plate 5.3.11: view of towering coconut trees 64

Plate 5.3.12: view of mini huts. 64

Plate 5.4.1 : Exterior view of chalet 71

Plate 5.4.2: view of chalet arrangement. 71

Plate 5.4.3. View of soft landscape 72

Plate 5.4.4a: View of paved walkway. 72

Plate 5.4.4b: View of lengthy walkway leading to the beach 72

Plate 5.5.1: View of site landscape. 78

Plate 5.5.2: View showing villas. 79

Plate 5.5.3a: View showing building materials 79

Plate 5.5.3b: View of living room 80

Plate 5.5.3c: View of kitchen 80

Plate 5.5.3d: View of bedroom 80

Plate 5.5.4: Exterior view of spa/massage room 80

Plate 5.5.5: Interior view of closed restaurant. 81

Plate 5.5.6: view of open-air restaurant 82

Plate 5.5.7: Exterior view of conference hall. 82

Plate 5.5.8: Interior view of play room. 82

Plate 5.5.9: View of beachfront. 84

Plate 5.5.10: Interior view of massage room. 84

Plate 5.5.11: View of horse riders. 84

Plate 5.5.12: view of natural landscape 84

Plate 5.5.13: View of water sports 84

Plate 5.6.1: Exterior views of villas. 82

Plate 5.6.1a: View of living room. 89

Plate 5.6.1b: View of bedroom. 90

Plate 5.6.1c: View of bedroom 90

Plate 5.6.2a: View of conference hall plan. 90

Plate 5.6.2b: Interior view of conference hall 91

Plate 5.6.3: View of beachfront 91

Plate 5.6.4: View of massage room. 91

Plate 5.6.5: View of swimming pool. 92

Plate 5.6.6: View of sit-outs. 92

Plate 5.6.7: View of boating facilities 93

Plate 6.1: View boat as the major means of transportation. 112

Plate 6.2: View of towering coconut trees on the proposed site. 113

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF STUDY

Tourism is one of the world's largest and fastest growing industries, coastal tourism and recreation are important parts of the largest and the most rapidly growing activity in the world. It is now possible to travel great distances within a much shorter time without difficulties. Some developed countries have boosted their economy by exploiting the revenue earning potential of the industry and have developed their tourist destinations. Due to the current fast growing high demand for new tourists destinations to satisfy the rapid growing population of individuals in pursuit of leisure and recreation has resulted to the development of resorts and other recreational facilities. A Resort can be defined as a place used for relaxation or recreation, attracting visitors for holidays or vacations. (Encarta, 2008)

1.1.1 The need to build green

Typical building construction, use, and demolition, as well as the manufacturing of building materials, contribute significantly to environmental problems. Green building also has tangible economic and public health benefits. These include lower operating costs via reduced energy and water utility bills, and reduced maintenance and replacement costs due to greater durability of materials. The use of non-toxic materials in construction is especially important in protecting children from respiratory and other diseases.

By building green, we can assist in preserving natural habitats, watersheds, and ecosystems, protect air and water quality, reduce greenhouse gas emissions and solid

waste, all while conserving natural resources and creating healthier indoor and outdoor environments (The Green Building Resource Center, 2008).

With the current growing concern of environmentally conscious designs and constructions in the world, green architecture has become a very important field of architecture that is pushing the profession to more demanding and creative heights, there is therefore a pressing need to explore possible ways in which green architecture can be applied to resorts, particularly in Nigeria.

1.1.2 Various viewpoints

Many definitions of Green architecture have been offered, some general and some more precise.

The term 'Green architecture' has been defined by various green architects such as : Jackie Craven, Andy Horn, James Wines to mention a few.

Jackie Craven described Green architecture as an approach to buildings that minimizes harmful effects on human health and the environment. The green architect attempts to safeguard air, water and earth by choosing Eco-friendly building materials and construction.

According to Andy Horn defined Green Architecture as not being a style, trend or a vernacular and neither is it new. It is a climatically, geographically and culturally appropriate way of architecture and building, combining the best of both old and new technology. At its core is the principle of respect and caring for the earth.

Green architecture can also be defined as an architecture that does not only focus on technological solutions, but also tries to reconcile man and nature in its formal idiom. (Wines, 2000).

Nigeria has a large expanse of beachfront and the beautiful beach locations are still largely without green design facilities to improve the quality of tourist's experience, which are targets for investors in most tourism destinations across the globe.(Wikipedia, 2008)

A lot of tourist's destinations such as beachfront resorts in Nigeria do not attempt to harness the maximum use of natural potentials of the site, that is; most of Nigeria resorts do not imbibe the application of green architecture principles and this causes damages which are very vital to tourism and resorts and increase the rate of environmental destruction.

This thesis will address the absence of clear criteria and guidelines showing the authentic values of green architecture and the possible ways in which green architecture principles can be applied for planners and architects while developing the schemes of resorts.

1.3 SCOPE AND LIMITATION OF STUDY

Studies on waterfront resorts will be reviewed in an attempt to check for the application of green architecture principles in waterfront resort designs and to discover existing planning problems of resorts and how they can be solved by applicable principles of green architecture. The identified principles will be applied in the proposal for a green resort in Ibeshe Island.

Lack of sufficient information of the site such as detailed maps and reliance on visual survey might be a constraint on the research.

1.4 AIM AND OBJECTIVES

The aim of the research is to explore the means and level of application of green architecture principles in waterfront resorts and to propose a resort design applying green principles.

The aim will be achieved through the following objectives:

1. To study the principles of green architecture: and its application.
2. To examine the relationship between green architecture and resort design.
3. To identify elements of green architecture principles which are applicable to waterfront resort designs.
4. To access the level to which green architecture principles have been applied to selected waterfront resorts in Nigeria.
5. Propose a resort for Ibeshe Island applying the principles of green architecture.

1.5 RESEARCH QUESTIONS

This research intends to answer two basic questions which are:

1. What aspects of green architecture principles can be applied to waterfront resorts?
2. To what extent has the principles of green architecture been applied to waterfront resorts in Nigeria?

1.6 SIGNIFICANCE OF STUDY:-

The outcome of this study will highlight the importance of green architecture principles to waterfront design and provide a guide for various professionals and organizations involved in tourist resort development in Nigeria. Such bodies include: the Federal ministry of culture and tourism. Nigeria tourism development cooperation, state tourism boards, Local Government committees, Private tourism entrepreneurs, architects, planners and Environmentalists.

1.7 MOTIVATION AND JUSTIFICATION

Most of Nigeria's beautiful islands/ seaside locations feature scenic views , and have environments which are very conducive for the development of recreational facilities and beautiful resorts .Many of these sites possess unique characteristics and immense potentials, adopting green architecture principles in their development will enhance their sustainable use and explore how the principles of green architecture can be applied in the design of waterfront resorts. It is in this light that this research was motivated. This is to provide a clear guideline for environmentally- conscious future resort development in Nigeria, to improve the quality of tourist's experience and to increase the economic livelihood of the Ibeshe people.

DEFINITION OF KEY TERMS

1. **Tourism**: is the act of travel for the purpose of recreation and business (Wikipedia, 2006).
2. **Resort:** is a place used for relaxation or recreation, attracting visitors for holidays or vacations.
3. **Seaside resort:** is a resort located on the coast. Where a beach is the primary focus for tourists.

4. **Green architecture**: is a general term that describes environmentally-conscious design techniques in the field of architecture. A green approach to built environment considers all the resources that go into the building.
5. **Beach sand**: is a strip of sand or pebbles at the point where land meets the sea or lake
6. **Waterfront**: Refers to that part of a town that lies alongside a body of water. (Encarta, 2008).

CHAPTER TWO

GREEN ARCHITECTURE AND RESORT DESIGN

2.1 The concept of Green Architecture

Green Architecture is a term used to describe economical, energy-saving, environmentally-friendly, sustainable development. Green architecture seeks to minimize the negative environmental impact of buildings by enhancing efficiency and moderation in the use of materials, energy, and development space (Muschamp,2001).

According to Clifford Espinosa: Green architecture has simple precepts, green architecture entails two things: the use of renewable and natural materials, and a design that exploits the science of air circulation—hot air rises, cold air sinks.

A green approach to built environment considers all the resources that go into the building, it could be materials, or the contribution of the users need to be considered if green architecture is to be produced. Producing green buildings involves resolving many conflicting issues and requirements.

Green architecture ranges from achieving energy efficiency and using interior finishes which are nontoxic, to utilization of solar energy and using recycled materials for construction (www.carltonarchitecture.com).

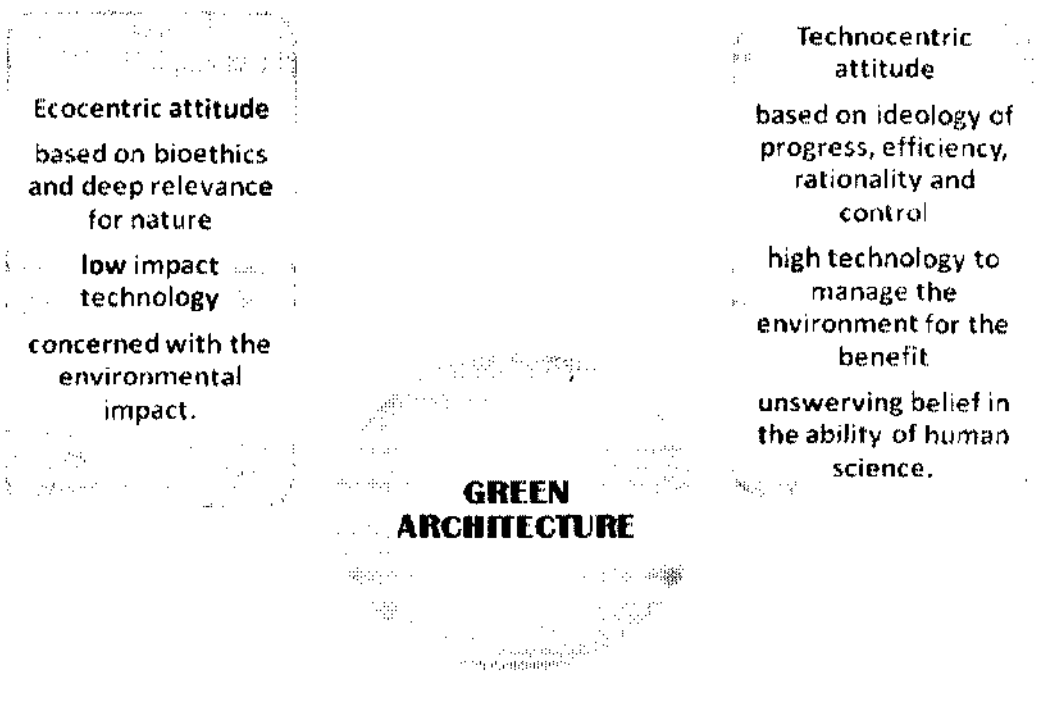
Buildings are one of the biggest emitters of Green house gas, accounting for about 45% of carbon emissions in the world. Built environment professionals thus have the unique opportunity to contribute towards a significant reduction in GHG emissions using green design and construction. Energy efficient and environmentally sustainable development that aims to slow down or reverse the impacts of climate change is generally termed as green architecture.

'Architecture' is the design and development of spaces and places that function to serve human needs, from the practical to the inspirational. 'Green' describes ways of producing and living that are intended to support the environment and its natural systems.

'Green' applied to 'Architecture' is design of spaces and places in full consideration of the natural environment; it seeks to maximize efficiency and minimize impact while meeting the needs of its occupants. Green architecture is not a particular style of architecture but a thoughtful and holistic approach to design in which priorities and strategies must be developed for specific situations and locations.

Green architecture can also be defined as is an approach to buildings that minimizes harmful effects on human health and the environment. The green architect attempts to safeguard air, water and earth by choosing Eco-friendly building materials and construction (Craven, 2008).

One very influential way of describing the different environmental movements of green architecture today is by Timothy O' Riodans's classification of "techno-centric" and "eco-centric." He used these terms to represent two fundamentally different outlooks. The Eco-centric attitude is based on bioethics and deep reverence for nature. It is in favor of low impact technology and is concerned with the environmental impact. While the Techno-centric mode is characterized by an unswerving belief in the ability of human science and high technology to manage the environment for the benefit of present and future generations and is based on an ideology of progress, efficiency, rationality and control. This thesis aims at adopting the eco-centric mode of green architecture and applying the principles of green architecture to waterfront resort designs.



Classification of Green architecture. source:Google, 2008.

2.1.1 'Green' buildings

Green buildings or sustainable designs are designed and constructed using energy-efficient, environmentally-friendly engineering methods and materials. The Leadership in Energy and Environmental Design (LEED) program offers five categories in which a building can achieve credits as being green. The number of credits earned and approved for a building corresponds to varying levels of LEED certification (Magee, 2005).

The five certification categories are as follows

The LEED has issued goals and intents associated with these categories:

1. Sustainable Sites: To reuse existing buildings and/or sites; protect natural and agricultural areas; reduce need for automobile use; protect and/or restore sites by reducing the impact on the environment through site selection.

2. Water Efficiency: To reduce the quantity of water needed for the building and reduce municipal water supply and treatment burdens.

3. Energy and Atmosphere: To establish energy efficiency and system performance; optimize energy efficiency; encourage renewable and alternative energy sources; and support ozone protection protocols.

4. Materials and Resources: To reduce the amount of materials needed; use materials with less environmental impact; and reduce and manage waste (both during construction and during building operation).

5. Indoor Environmental Quality: To establish minimum indoor air quality performance to prevent the development of indoor air quality problems in buildings, and to maintain the health and well being of the occupants. As the world's renewable resources are being depleted, the overall intent of the program is to spearhead monumental, environmentally-responsible development. Design firms therefore are looking to provide this service because it makes good sense, as well as addresses their clients' changing needs.

2.1.2 The Benefits of building Green Designs

There is a huge opportunity for the building and development industry to entice investors to invest in green developments and specifically, green resort developments. The key benefits are grouped into economic, social, environmental, and institutional.

Economically, the benefits to developers include product differentiation, exclusive market niche targets, streamlined design costs, reduced capital costs, reduced operating costs, increased market value, faster leasing, mortgage incentives, and new business opportunities. Socially, green developments contribute to indoor health and reduced operating costs over the life of the building. Environmentally, they improve the use of resources and reduce the building footprint. Institutionally, they streamline the approval process, reduce liability risks, and provide partnerships and funded research opportunities (Magee,2005).

Furthermore the benefits of building green can be simplified into three categories:

1. Environmental benefits which include the following: Enhance and protect ecosystems and biodiversity, Improve air and water quality, Reduce solid waste, conserve natural resources

2. Economic benefits which include the following: Reduce operating costs, Enhance asset value and profits, Improve employee productivity and satisfaction , Optimize life-cycle economic performance.

3. Health and community benefits which include the following: Improve air, thermal and acoustic environments, Enhance occupant comfort and health, Minimize strain on local infrastructure, Contribute to overall quality of life.

2.2 Basic principles of Green Architecture

Over the years many green architects have come-up with different principles of Green Architecture which are all inter-related based on this thesis the Principles of Green Architecture postulated by Brenda Vale and Robert Vale , have been selected because

the green architecture principles are the most suitable with reference to this particular research (Application of Green Architecture Principles to waterfront Design).

These Principles are:

1. Principle 1:- Conserving energy: - a building should be constructed so as to minimize the need for fuels to run it.

2. Principle 2:- Working with climate: - buildings should be designed to work with climate and natural energy sources.

3. Principle 3:- Minimizing new resources: - a building should be designed so as to minimize the use of resources and at the end of its useful life to form the resources for other architecture.

4. Principle 4:- Respect for users: - green architecture recognizes the importance of all the people involved with it.

5. Principle 5:- Respect for site: - a building will touch – this- earth- lightly (Vale & Vale, 1991).

2.3 Resort Design

A resort is a place used for relaxation or recreation, attracting visitors for holidays or vacations. Such a self-contained resort attempts to provide for most of a vacationer's wants while remaining on the premises, such as food, drink, lodging, sports, entertainment, and shopping. A resort can also be defined as a place essentially developed for the sojourn of tourists, providing facilities for their accommodation, leisure and other needs (Baud-Bovy and Lawson, 1977). It can be a place for recreation and leisure aimed at refreshment of the mind. It also can be defined as a place essentially designed or developed to cater for the sojourn of tourist, providing multiple facilities for their accommodation, leisure, and other needs (Buoy and Lawson, 1977). Resorts may be places in the snow for skiing or places in the sun.



View of a waterfront resort. Source: Google 2008

2.3.1 Zoning criteria for Green resorts

Understanding zoning for a green development site, in particular one selected for a resort, is critical. Zoning for tourism is important. Developers must know in what kind of tourism zone they want to develop. A restricted tourism zone only allows access to a limited number of tourists, usually on foot. A moderate tourism zone encourages visitors to carry out diverse low-impact activities compatible with the natural

48711

environment. An intensive tourism development zone occurs in popular mass tourism destinations, such as beach resorts, where a considerable degree of concentration of tourist facilities are located (Lascurain, 2001).

Even though this last zoning category would be incompatible with protected natural areas, planning should still try to minimize negative impacts, including pollution of air, water, and soil resources.

The zone in which a green resort is proposed will determine where and what type of physical infrastructure and services should be provided, by means of a clear categorization of modality, intensity of land use, and by the use of natural water and other resources. It should strive in every case to minimize negative impacts on the natural and cultural environment, as well as optimize the eco-tourists' experience. Zoning also indicates where facilities, activities or services should not be developed. In essence, a zoning scheme shows the development suitability of the different portions of a site. It is important that for each zone, a developer's team analyze density related to buildings as well as use on the site. A developer should also examine the relative merits of concentration versus dispersion, remembering that natural landscape values can normally be best conserved if the physical plan is carefully dispersed. However, by concentrating buildings and other structures, such as in the semi-intensive and tourism development zone, more undisturbed natural zones are made available (Croy & Hugh, 2002).The challenge is to strike the right balance.

2.3.2 Types and classifications of Resorts

Resorts range over many types, catering for different tourists requirements, they are as follows:-

Island resorts, Hotel resorts, Health resorts, Golf resorts, Luxury resorts, Ecotourism resorts, Mega resorts, Beach resorts, Spa resorts, Ski resorts, Diving resorts, Historical resorts, Lake resorts, Mountain resorts.

Resorts are categorized under vacation types:

1. Beach resorts and Island resorts

These are resorts by the sea or oceans. These are located in countries that have shorelines by the sea, or ocean. These places attract many tourists all year around.

Visitors to island resorts are primarily beach and nature lovers, who seek a resort that is well integrated into the surrounding landscape. Island resorts typically developed in environmentally sensitive areas, with casita-type building construction, and the success of the design is particularly dependent on the relationship of the resort building with the topographical, ecological, and climatic factors of the site.

The basic tourist facilities found in these resorts include extensive use of water resource in recreational or sports activities such as water skiing, swimming, sunbathing and others (McGraw-Hill, 1999).

2. Golf resorts

Golf resorts have grown faster in popularity than any other type of resort in recent years. When golf is the major amenity, a resort usually takes the form of a country club,

and groups of vacation and permanent residences form a second- home community (McGraw-Hill,1999).

3. Diving resorts

Diving resorts are located on or near the water and is primarily focused on providing lodging for guests interested in pursuing Sauba diving, snorkeling, or skin diving. A diving resort typically features a "dive shop" on or near the premises and offers diver support activities like guides, boats, and instructions (McGraw-Hill,1999).

4. Ski resorts

Ski resorts are incorporating other seasonal activities in order to balance costs and increase revenues. The transformation from winter to all season operation has called for the construction of extra facilities, such as village shops, a playhouse and a variety of restaurants combined with suitable off-season sports such as hiking, golf tennis, mountain bike trails, and hot-air ballooning (McGraw-Hill,1999).

5. Ecotourism resort

The concern with personal physical fitness and healthful outdoor activities is closely connected with an interest in wildlife and environment conservation issues. The "soft" activities of fishing, hiking, biking, and backpacking in nature parks have become enormously popular.

The new concepts of Ecotourism and eco-resort have arisen from this interest. There are two associated objectives:

- To provide a natural wildlife experience.
- To ensure minimum environmental damage (McGraw-Hill,1999).

6. **Health and spa resort**

Health resorts are commercial establishments providing facilities devoted to health and body fitness. These facilities cater for health needs that is, to enjoy recreation and relaxation. Health resorts are also places where people visit for recreation, healings, and cures, which present natural attractive features such as mountains, waterfalls, and lakes. Health resorts can also be defined as health oriented recreational facilities where counseling, psychoanalysis, therapy, and recreation are combined with nature, water, landscaping, and architectural planning to refresh and rehabilitate the mind and the emotions as this will also have an interpretation on the physical well being of the person. In such a place various methods are used for the treatment of many diseases some of which are hydrotherapy and aromatherapy. Hydrotherapy is the use of water for treatment of diseases and for relaxation. Hydrotherapy can be used to ease pains due to sprains and muscle-related injuries and speed up the repair process after a strenuous workout. Aromatherapy is the use of fragrance and hydrotherapy for relieve from certain ailments. It has been proven that the scent of particular plants in a garden can have therapeutic qualities. Other treatments include physiotherapy, reflexology, psychoanalysis, water exercise and massage (McGraw-Hill, 1999).

2.3.3 Types and specific resort facilities

Specific resort facilities are dependent on the type of resort, these facilities can be classified under three particular resort types which include:

1. **Mountain resorts**.

The term mountain resort is preferred, however, to ski or winter resort because it does not minimize the importance of the summer season. Mountain ski resorts cannot be

developed in isolation, the resorts includes provisions for the regional development of lifts with inter-connections between potential neighboring resorts. Specific facilities for mountain resorts are: the ski trail, the cable transporters and the Skating rink (Buoy and Lawson 1977).

2. Waterfront resorts:

Waterfront resorts are resorts in which the primary interest is centered on water, such as lakeside resort, seaside resort, and riverside. Specific facilities for waterfront resorts are: Lifeguard facilities, floating platforms and chains, security posts, first aid center, kiosks, restaurant, sports and play areas, hiring facilities for boats, pedalos, surfing equipments, supervised protected area for children and play grounds (Buoy and Lawson 1977).

3. Spas and Health resorts:

Spas are resorts in which contact with landscaped nature and restfulness are found to be combined with cultural, recreational and sports facilities and a highly developed social life. Specific facilities for Spas and Health resorts are: Fountains for drinking water, collective pools, shower rooms, resting rooms, cloakrooms, sanitary accommodations, medical diagnostic and administrative buildings, therapy buildings, therapy gardens (Buoy and Lawson 1977).

2.4 Trends in resort developments

Changes In the patterns of the industry are taking place for many reasons, foremost among them are technical and economic. Most notable is the growth of new sports, health, and fitness concepts and the addition of conference spaces and related facilities. These all depend in some way on the new technologies.

There is a world trend towards leisure and recreation being part of the quality of life. Some of the fundamental social motivations for these changes are:

1. The recent increase in income levels together with cheap and easy transport has made travel available to a very wide market.

2. People from more industrialized countries are travelling more frequently, although for shorter periods.

3. Increasing number of two income families has created a significant social change. The extra income has enabled many more couples to take vacations, but at the same time limits them to when both partners can take time away from work together. This factor tends to favor the long weekend and all exclusive vacation.

4. The number of vacations taken by single people each year is growing. The number of retired travelers is growing.

5. Conference attendees tend to spend extra days at the conference destinations, taking the opportunity for family time and relaxation.

6. In general, travelers allow themselves a much shorter cycle for booking and travelling. The incident has helped implement this pattern.

7. Safety has become a concern for the traveler. Resort destinations meet this criterion.

8. An increase in the level of education has made travelers more informed and aware of interesting and unusual destinations and host communities.

Such modern cultural factors limit the time available to the traveler to plan a vacation, a consideration that becomes important for the industry. Many travelers look for a well organized destination with a wide choice of facilities where they can participate in a variety of activities without prior planning. Guests are currently demanding a highly organized, trouble free, and diverse experience in easily accessible locations.

Subsets of travelers include families and mature upscale groups with special interests. For example, families are attracted to theme parks, beaches, lakes, and spas; groups visit archeological, art, or architectural monuments. All age groups like ecotourism, skiing, and golf (McGraw-Hill,2000).

Green- resort/Eco-resort is a new trend, a fashion, and is now becoming a huge money-earner as it attempts to sustain the natural environment. Most Green-resorts, a category within eco-tourism, have been developed in the last 10 to 15 years, as the demand for green holidays has expanded. Green-resorts typically offer the tourist a whole eco-experience, including sightseeing, accommodation, and transportation. The travel motivations of visitors to Green-resorts has been studied in literature, and they include the desire to learn about nature, to be physically active, to meet people with similar interests, to experience new lifestyles, to be daring or adventurous, to escape from everyday life, and to learn and experience native culture (Magee,2005).

CHAPTER THREE

RELEVANCE OF GREEN ARCHITECTURE PRINCIPLES TO WATERFRONT RESORTS

3.1 Waterfront resorts

Resorts have a rich history in the world- homesteaders initially offered accommodation to hunters and fishermen and then grand resorts were built, capitalizing on the steamships' ability to bring visitors into remote locations to promote socialization, relaxation and other recreational activities.

Waterfront resorts can be defined as the part of a recreational community or place that lies alongside a body of water; it could be an oceanfront resort, beachfront resort, seaside resort, island resort.

In waterfront resorts the main natural attractions are the beaches and coastlines. The beach is usually full of activities, such as constant movement and action throughout the beachfront whether people are standing and socializing or moving from one point to another. Biking, jogging, dog walking, family strolling with infants, surfing, swimming, water sports, snorkeling, diving and volleyball. Tanning, making sand castles, fishing and general relaxing are also part of the beach lifestyle.

3.2 Elements of green architecture applicable to waterfront resorts.

3.2.1 Principle 1: (Conserving energy): -

A building should be constructed so as to minimize the need for fuels to run (Vale & Vale, 1991).

1. Use of Solar energy.
2. Maximum use of day lighting (Green home building, 2006).

In waterfront resorts elements such as the use of materials that are of low thermal capacities on buildings is important in order to reduce the penetration of solar radiation into the resort building, the positioning of windows such as window openings should be positioned to face the north-south axis which is ideal for the designing for proper day lighting in the resort buildings, also the use of natural shading devices such as trees and shrubs help to reduce heat gain in the resort naturally are emphasized in the green architecture principle of conserving energy.

3.2.2 Principle 2: (Working with climate): -

Buildings should be designed to work with climate and natural energy sources (Vale & Vale, 1991).

1. Design for thermal comfort(for the tropical zones:- design for passive cooling)

   Waterfront resorts are usually in a hot-humid zone and continuous air movement is a necessity if comfortable conditions are to be achieved, diurnal land and sea breezes are available to provide this air movement when green architecture design elements are incorporated in the design of the waterfront resort design such as, the use of low thermal capacity building materials in order to enhance passive cooling, well spaced building layout to enhance free flow of air movement into buildings, appropriate size and position of windows to provide natural ventilation, the use of steep pitched roof to allow for easy run-off of rain water. These elements are emphasized in the principle of green architecture of working with climate.

3.2.3 Principle 3: (Respect for site):

Buildings will touch – this- earth- lightly (Vale & Vale, 1991).

1. Design should grow from the site.
2. Low Environmental Impact (Jagadish, 2007).

Waterfront resort designs should have minimal impact on the site that is: the design of the resort should not interfere with the site topography (the use of stilts to support the structure instead if levelling the topography), the resort design should incorporate preservation of site characteristics (high retention of existing trees and plants on the site), high use of natural landscape elements and the use of plants in and outside the buildings in resort designs. These design emphases are in green architecture principle of respect for site.

3.2.4 Principle 4: (Minimizing new resources):

A building should be designed so as to minimize the use of resources and at the end of its useful life to form the resources for other architecture. (Vale & Vale,1991).

1. Use of renewable materials.

Waterfront resort designs should include the use of natural building materials, such materials can be renewable materials; materials that can be replaced naturally when tampered with. For example, felling of trees to make wood can be replaced by replanting trees back naturally.

In a nut shell, Green architecture is also relevant in other to provide a green resort developer with benefits from implementing innovative site strategies to reduce infrastructure costs, incorporate energy-efficient heating and cooling systems, recycling water and waste, and conserving resources and materials.

CHAPTER FOUR

METHOD OF STUDY

The method of study for this thesis is based on qualitative research method.

4.1 Case studies:

The adopted case studies carried out on this research were based on purposive sampling of selected resorts located close to waterfronts and identification of resorts that have applied the principles of green architecture.

The method of study can be viewed in two aspects

1. As a case study unit of analysis:

The waterfront resorts were studied and analyzed individually by the use of field forms which had a table containing design elements broken down under the applicable principles of green architecture to waterfront resort design. This study is to analyze each resort studied and how each resort has applied the principles of green architecture.

2. As a case study research assessment method.

Based on the selected waterfront resorts, an assessment table on applicable principles of green architecture was used to conduct a comparative analysis of all the waterfront resorts studied in order to find out the extent to which green architecture principles have been applied to waterfront resort designs.

LIBRARY

4.2 Data collection

The collection of data was done through various ways which include: Visual survey, field forms, interview schedule.

4.2.1 Visual survey

A visual survey was done by looking and identifying what has been achieved by the already existing waterfront resorts with reference to the applicable principles of green architecture, this was done by the use of photographs.

4.2.2 Field forms

Field forms consisting of variables of green architecture principles were used to document on each waterfront resort selected for this research. Refer to appendices to view an example of the field form used.

4.2.3 Interview schedule

The selected resort operators / managers were interviewed to get more information on each of the existing waterfront resort design.

4.3 Data analysis and presentation

Data collected on each case study was analyzed and represented in different forms which include: Photographs, tables, figures, descriptive, analysis.

4.3.1 Photographs

Pictures of the existing waterfront resorts studied, were taken and documented showing the resort facilities and how green design elements were applied, (if applied). Refer to plates under case studies (chapter five).

4.3.2 Tables

Data collected on this research were documented and presented on the green architecture case study assessment tables. Refer to tables under case studies (chapter five).

4.3.3 Figures

Data collected on the case studies were also documented in form of drawings, such as the resort site plans. Refer to figures under case studies (chapter five)

4.3.4 Descriptive Analysis

The selected waterfront resorts showed the extent to which each resort applied the principles of green architecture after the case study analysis was done; this can be viewed under the case study summary and conclusion sheets. Refer to Case studies (chapter five).

CHAPTER FIVE

CASE STUDIES

5.1 CASE STUDY SELECTION CRITERIA

The selection criteria for the case studies on this research is based on purposely selected resorts located close to waterfronts and identification of resorts that have applied the principles of green architecture.

Each case study has been analyzed based on two aspects.

1. A general documentation of the waterfront resort.
2. An assessment on the application of green architecture principles.

5.1.1 ASSESSMENT OF THE APPLICATION OF GREEN ARCHITECTURE PRINCIPLES

The following design criteria principles are focused/ directed to the tropical zones, this is because the site for the resort design is located at the coastal region of Lagos state (Ibeshe Island) which is under the tropical zone of Nigeria.

Principle 1: (Conserving energy): -

1. Design for passive solar energy.

2. Use of day lighting (Green home building, 2006).

VARIABLES

a) **Building materials**: the roof, walls and floor materials of the building should be of low thermal capacity.

b) **Orientation** : longer walls should face north-south axis

c) **Use of day-lighting**: South facing glass admits solar energy into the interior of buildings.

d) **Shading devices:** trees, vertical shading device, horizontal shading device and eggcrate shading device.

Principle 2: **(Working with climate)**: -

1. Design for thermal comfort (for the tropical zones:- design for passive cooling)

VARIABLES

a) **Building materials**: the roof, walls and floor materials of the building should be of low thermal capacity to enhance heat loss immediately it is gained.

b) **Size of openings**: large openings should be provided in the north and south walls.

c) **Site planning and layout of buildings:** large spacing of buildings or staggered arrangements is required to allow adequate air flow around buildings. Outdoor spaces are essential.

d) **Floor plans:** Single banking of building should be used to facilitate cross ventilation.

e) **Shape of roof**: pitched roofs with adequate eaves projection to exclude rain and solar radiation. Roof gutters should be large enough and well drained.

Principle 3: (Respect for site). -

1. Design should grow from the site.

2. Low Environmental Impact (Jagadish,2007).

VARIABLES

a) **Building footprints**: interference with topography should be minimal.

b) **Preservation of site characteristics**: preservation of trees and other natural features on site.

c) **Landscaping** : use of water permeable landscape features, use of gardens, lakes

d) **Building forms and aesthetics**: relating buildings to cultural environment of the locality

Principle 4: (Minimizing new resources): -

1. Use of renewable materials.

VARIABLES

a) **Building materials**: Rapidly renewable materials such as straw, bamboo and some woods e.tc. Application of natural floor surfaces such as tiles, timber and linoleum (http//:www.buildinggreen.com).

5.2 CASE STUDY ONE: LA CHAMPAGNE TROPICANA BEACH RESORT, LAGOS.

La Champagne Tropicana beach resort is an enchantingly peaceful and quiet resort. The resort policy is to showcase the very best in rich and vied culture and cuisine of Nigeria. The idea of this resort was conceived by the owner Mr. Wonle Akinboboye. It was developed as a resort in 1995.

5.2.1 Location

The resort is located on the lekki peninsula of Lagos state on the coast of Nigeria, facing the Atlantic Ocean. It can be accessed by road from Lagos on a well maintained highway in a 50 minute road drive from Victoria Island to Ikegun, the site of the resort. It can also be reached from a 30 minute boat ride from the jetties located on Vitoria Island. Such a boat ride will be made either through the inland waterways that lead to a jetty close to the resort, from which an all condition bus will convey the visitors to the resort.

5.2.2 Natural attractions

The resort is endowed with an open superb white sandy beach stretching along the warm equatorial seas of the Atlantic Ocean bordered by the multitude of towering coconut trees and the green fields beyond. The beach gives the resort a paradise image having the waves moving to and fro, and depositing beautiful sea shells on it. Safe and clearly defined pathways have been carefully plotted through the green vegetation and waters of the tropical forest and lagoon.

5.2.3 Spatial organization

The resort has presently, a reception situated close to the parking area at the entrance gate. The chalets are well linked together in a linear arrangement and are centralized in the resort which gives room to a clear view of the beach and the ocean. The furnished bungalows spread out over 60 square meters of virgin green tropical lands on the banks of the lagoon.

The social facilities such as the restaurant, swimming pools, are located around the chalets, other spots such as the spa and massage room are located on the beach area.

5.2.4 Structures and building materials

The chalets are circular and are raised on silts. They are made up of a combination of red mud bricks used for walls, wood and glass used for the window sills, bamboo was used for as walls and columns in some structures such as the massage room, open stages e.t.c tiles are used for floors. While the roofs are conical in shape and are made of well treated thatch. The buildings are well linked with other functional spaces with soft water permeable landscape of a combination of white beach sand, carpet grass shaded by towering coconut trees in an attempt to blend in with the natural environment.

5.2.5 Facilities and recreational activities.

Reception: the reception is located by the entrance of the resort gate it is linked to the car park, the reception comprises of a receptionists desk and a waiting area.



Plate 5.1 Reception

Accommodation

Accommodation is provided in village clusters of five buildings, having bungalows with two floors each. One village 'Labalaba'-meaning butterfly- is furnished in Yoruba style, the 'Obieze' is furnished in igbo style while the 'Kodi' –meaning shell- shows the traditional Hausa décor of the north. Each bungalow is fully furnished with a comfort table sleeping area upstairs. (the Kodi village is better suited for families) a sitting area downstairs, a bathroom with shower and all other modern conveniences such as air conditioning or electric fans, color TV with DVD player and films, CD player with radio, refrigerator and coffee-tea making facilities. Olufunke camp-tents for day visits and relaxation.



Plate 5.2a exterior view of Labalaba(butterfly) chalet

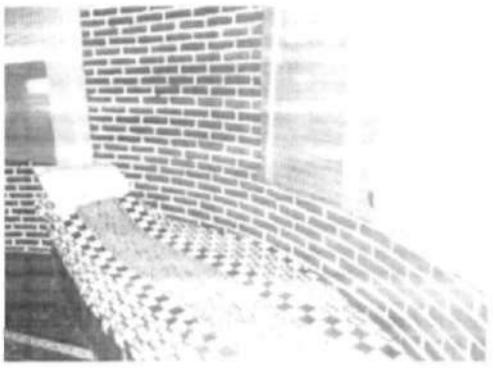


Plate 5.2b Living room



Plate 5.2c Kitchenette/bar area



Plate 5.2d Bathroom/toilet

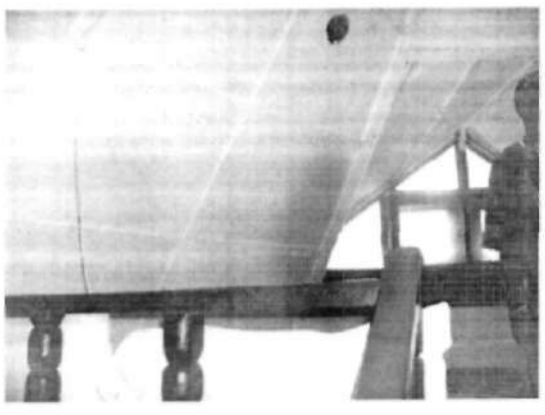


Plate 5.2e Sleeping area



Plate 5.3a exterior view of Kodi (shell)chalet

RECEIVED
15 AUG 2010
KASHIM IBRAHIM LIBRARY
485414





Picture 5.3b Interior view of kodi chalet

Picture 5.4 'Olufunke' tent

Restaurant:

The resort has one restaurant and it located close to the chalets and the beach front.





Plate 5.5a Exterior view of Restaurant

Plate 5.5b interior view of restaurant

Open stages: the resort has two open stages used for cultural dances and other live performances. Open stage one (see plate 5.6) is a small stage located close to the chalets. The mega open stage is located at the beach front looking over the ocean.



Plate 5.6a Open stage one



Plate 5.6b Mega open Stage



Plate 5.7 Out Door Shower Units



Plate 5.8 Barbeque Spot



Plate5.9 Spa

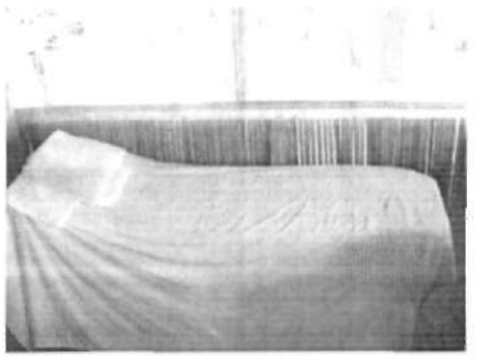


Plate 5.10 Massage Room

Some recreational activities that take place in the resort are:-

African aerobics, Base ball, Beach football/soccer, Bird watching, Board games, Camping, Children's activities, Cultural shows, Hydro biking, Fishing, Nature walks and jogging, Kayaking and boating, Swimming



Plate 5.11a view of adult swimmingpool



plate 5.11b view of children swimmingpool



plate 5.12 view of fresh water lake



plate 5.13 view of boating facilities



Plate 5.14 Relaxation/sight seeing



plate 5.15 Beach Sport Facilities

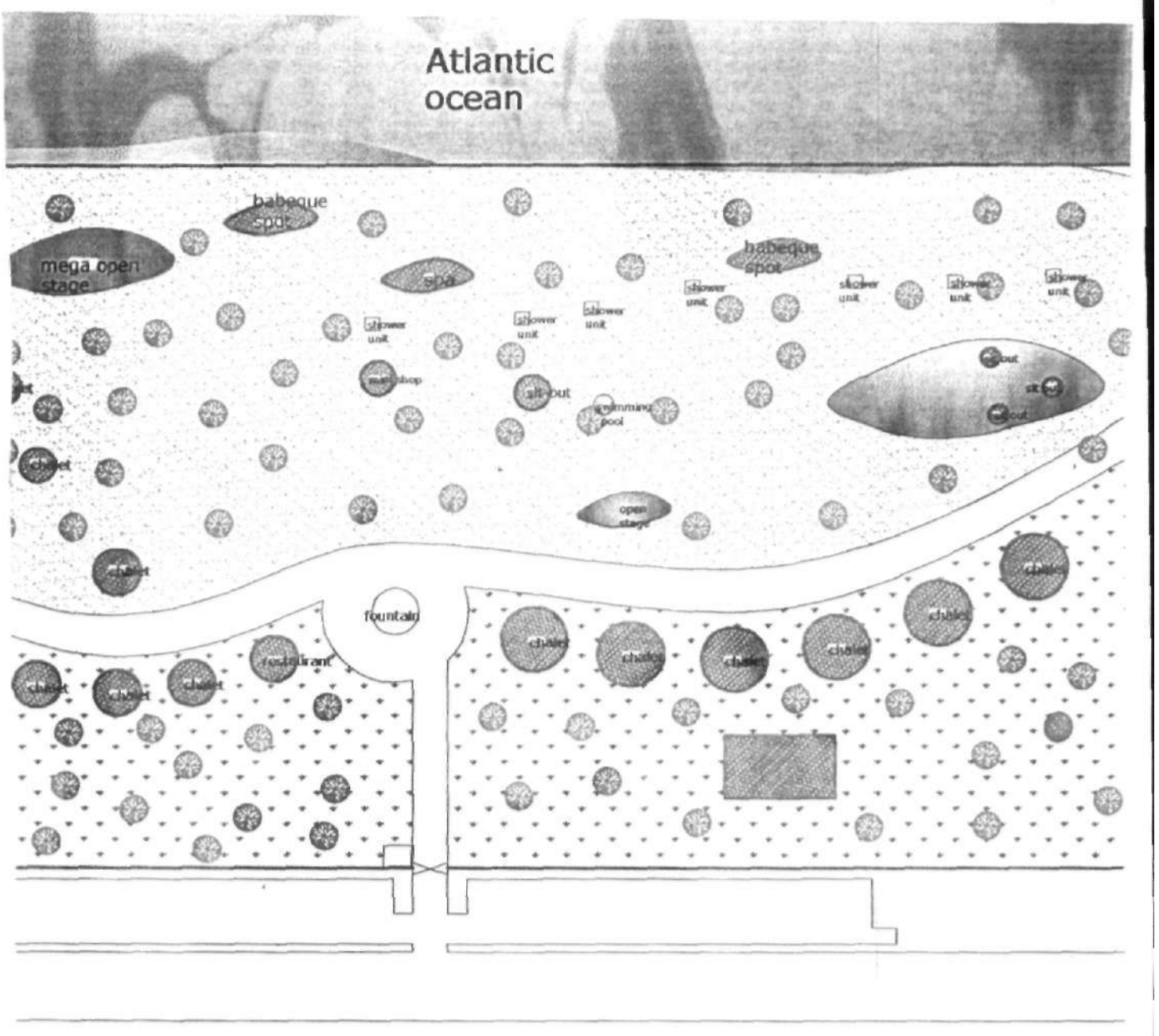


Figure 1.0 Resort site plan (source: **field work**)

5.1.6 ASSESSMENT OF THE APPLICATION OF GREEN ARCHITECTURE PRINCPLES

Green architecture principle 1: Conserving energy		
VARIABLES	DESCRIPTION	CONCLUSION
Building materials	- Use of timber on columns, walls, floors which reduces the penetration of solar radiation.	Positive
	- Use of mud bricks on walls which excludes penetration of solar radiation due to its high thermal capacity.	Positive
	- Use of concrete on some walls which is of low thermal capacity, increases the penetration of solar radiation.	Negative
	-Use of thatch on roofs reduces the penetration of solar radiation in buildings.	Positive
	-Use of aluminum roofing sheets which is of embodied energy increases the penetration of solar radiation.	Negative
Building orientation	-All the buildings are circular in shape and thus have windows on all sides of the building.	
	-Use of windows positioned to face the north and south axis which reduces incident solar radiation.	Positive
	-Use of windows positioned to face the east and west axis increases the penetration of incident solar radiation	Negative
Use of day lighting	-Window openings are positioned to face the north and south axis which is ideal when designing for day lighting	Positive
	-Window openings are positioned to face the east and west axis which is not ideal because these sides are of	Negative

	low sun angles and penetrates deeper into spaces.	
Shading devices	-The use of trees (coconut trees) to provide shade.	Positive
Green architecture principle 2: Working with climate		
VARIABLES	**DESCRIPTION**	**CONCLUSION**
Building materials	-Use of wood in the buildings enhances passive cooling.	Positive
	-Use of mud bricks on walls contributes to increase passive cooling because the material has high thermal capacity.	Positive
	-Use of floor tiles and marble also enhances passive cooling because these materials are of high thermal capacity.	Positive
	-Use of thatch on roof increases passive cooling.	Positive
	-Use of aluminum roofing sheets on some of the buildings reduces passive cooling.	Negative
Size of openings	-Use of large windows positioned to face the north and south axis enhances passive cooling.	Positive
	-Use of windows positioned to face the east and west axis reduces passive cooling.	Negative
Site planning and layout of buildings	The buildings are well spaced out and thus enhances passive cooling.	Positive
Floor plans	All the buildings are of single banking design thus enhances cross	Positive

	ventilation in the buildings.	
Shape of roof	-The use of conical, steep pitched roof which allows easy run-off of rain water	Positive

Green architecture principle 3: Respect for site

VARIABLES	DESCRIPTION	CONCLUSION
Building footprints	-The buildings are few and small in size, thus there is very minimal interference with site topography	Positive
Preservation of site characteristics	- Spatial organization of the resort is organic -Very high retention of existing trees on site.	Positive
Landscaping	-Use of natural elements of landscape was predominantly used.	Positive
Building form and aesthetics	- The buildings are circular in shape with high use of local facilities and utilities such as talking drums e.t.c	Positive

Green architecture principle 4: Minimizing new resources

VARIABLES	DESCRIPTION	CONCLUSION
Renewable materials	Roofing material:- -the use of thatch	Positive
	-the use of aluminum roofing sheet.	Negative
	Walling material:- -use of mud bricks on some walls.	Positive
	-use of timber and bamboo for walls	

	and columns.	Positive
	Flooring materials:- -use of bamboo, wood and marble as floor coverings.	Positive
	-use of concrete floors.	Negative

Table: 1.1

5.3 CASE STUDY TWO: WHISPERING PALMS, RESORT, BADAGRY, LAGOS.

Whispering palms resort is a peaceful well organized resort, the idea and design of this resort was conceived by Arc Dada and it was developed as a resort in 1991.

5.3.1 Location:

The resort is located at Iworo Badagary Lagos state, facing the Atlantic Ocean. It can be accessed by road from Badagry Lagos state. It can also be reached by boat through one of the jetties located on Badagry creek.

5.3.2 Natural attractions

The resort is endowed with an open superb white sandy beach stretching along the Atlantic Ocean bordered by the multitude of towering coconut trees lining calm. The beach gives the resort a breathtaking view having the waves moving to and fro, on it, protected waters for excellent sailing, and other water sports.

5.3.3 Spatial organization

The resort has presently a parking area in between a mini-zoo and the entrance gate of the resort. The reception is located at the centre of the resort, having the kitchen, restaurants and open bars located at the left side of the reception. The guest chalet Suites are nestled into colorful gardens at the east end of the reception. The Beach Bar & Grill is located at the south end of the reception, and the Beachfront comprises of several sit outs which are beautifully shaded. The standard accommodation units are contained in two buildings, having one building close to the swimming pool and the

other building close to the Atlantic Ocean. Tennis Courts, Water sports Pavilion, and the Fitness Center are nearby.

5.3.4 Structures and building materials

The chalets are rectangular in shape. They are made up of a combination of red mud bricks used for walls, wood and glass used for the window sills, concrete was used for walls and columns in some structures, tiles are used for floors. While the roofs are gable roof design and are made of well aluminum and wood, the buildings are well linked with other functional spaces with soft water permeable landscape of a combination of white beach sand, carpet grass shaded by towering coconut trees in an attempt to blend in with the natural environment.

5.3.5 Facilities and recreational activities

Reception: the reception is located at the centre of the resort.

Accommodation: Is provided in three separate units one unit has the chalets which are 10 in number facing the ocean, the second unit is the Atlantic building which comprises of 34 rooms on two floors, it is called the Atlantic building because it is situated close to the Atlantic ocean. The third unit is the swimming pool building which is located close to the swimming pool, it comprises of 38 rooms on 3 floors.



Plate 5.2.1a Exterior view of chalets



Plate 5.2.1b Exterior view of the Atlantic building.

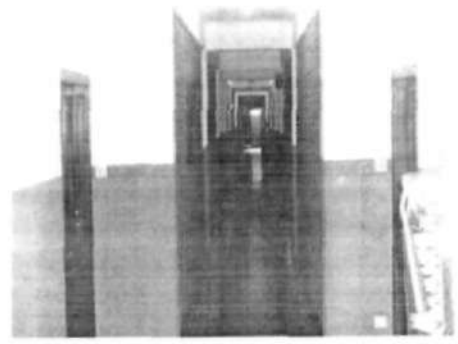


Plate 5.2.1c Interior view of the Atlantic building



Plate 5.2.1d View of the swimming pool building



Plate 5.2.1e View showing the material used.



Plate 5.2.1f View showing flooring building material.

Restaurants:

the resort has two restaurants located close to each other and also has open bars situated near the restaurants.



Plate 5.2.2a Exterior view of restaurant



Plate 5.2.2b View of open enclosed restaurant



Plate 5.2.2c Interior view of bar



Plate 5.2.2d Exterior view of Staff canteen

Clubs:

The resort has two clubs and the structures project over the water with the use of concrete silts (Dome and red roof club)



Plate 5.2.3a Exterior view of dome club



Plate 5.2.3b Interior of dome club



Plate 5.2.3c Exterior view of red roof club



Plate 5.2.3d Interior view of red roof club

Sit-outs



Plate 5.2.4a View of concrete seats



Plate 5.2.4b View of plastic seats



Plate 5.2.4c View of swinging seats



Plate 5.2.4d View of metal seats



Plate 5.2.5 View of mini zoo



Plate 5.2.6 Interior view of gymnasium



Plate 5.2.7 View of picnic area



Plate 5.2.8 View of children's play area

Some recreational activities that take place in the resort are: Swimming, Boating, Fishing, Board games, Tennis, Native walks and jogging, Beach soccer.



Plate 5.2.8 View of swimming pool



Plate 5.2.9 View of boating facilities

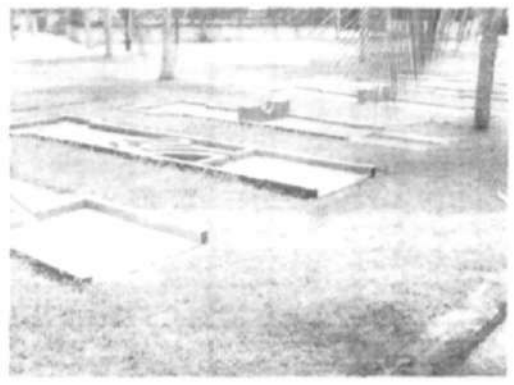


Plate 5.2.10 View of board game



Plate 5.2.11 View of tennis court



Plate 5.2.12 View of beach area



Plate 5.2.13 View of palm kernel Chaff for parking areas

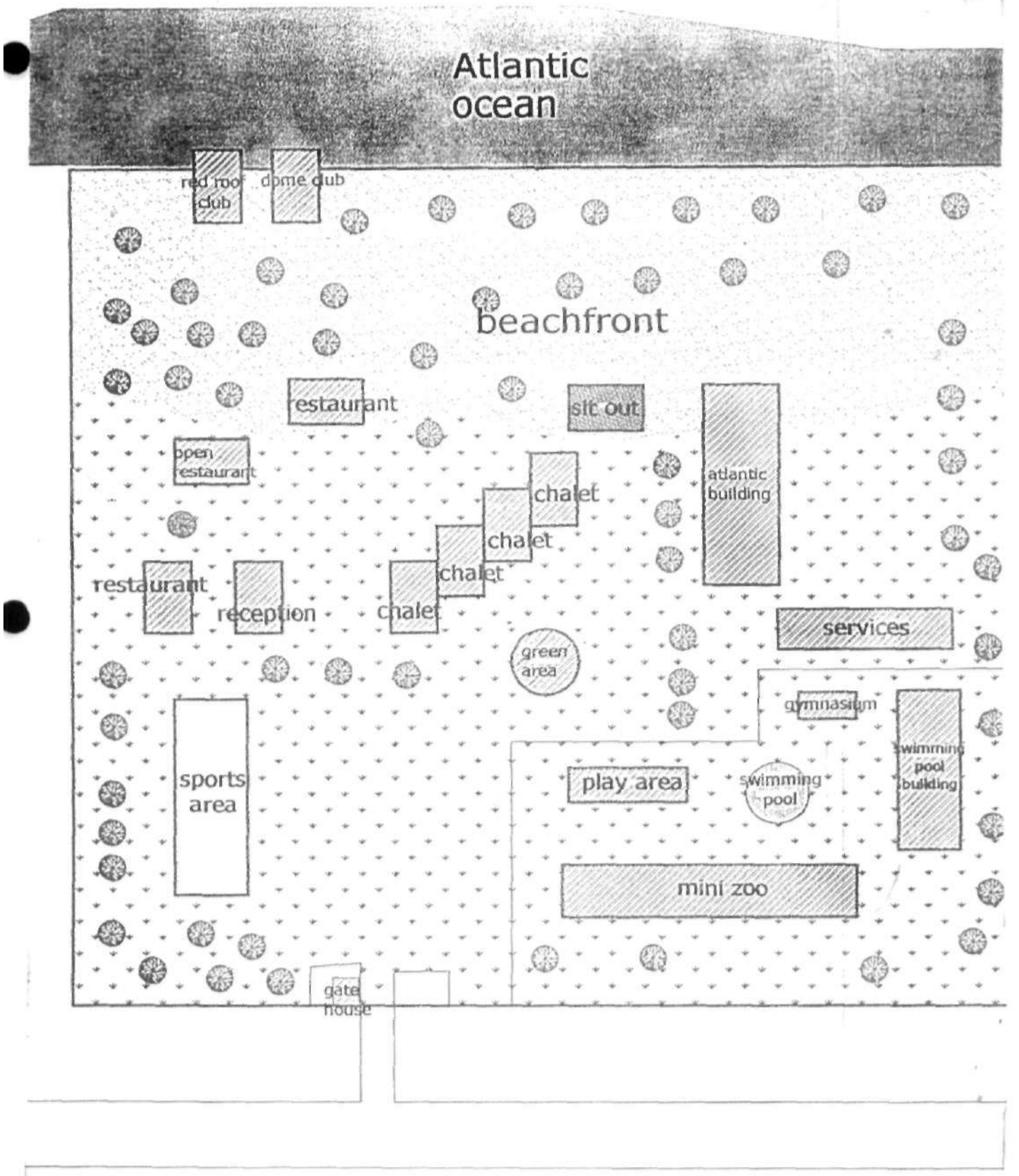


Figure 2.0 Resort site plan (source: field work)

5.1.6 ASSESSMENT OF THE APPLICATION OF GREEN ARCHITECTURE PRINCPLES

GREEN ARCHITECTURE PRINCIPLE 1: CONSERVING ENERGY		
Variables	**Description**	**Comment**
Building materials	- Use of timber on columns, floors which reduces the penetration of solar radiation.	Positive
	- Use of mud bricks on walls which excludes penetration of solar radiation due to its high thermal capacity.	Positive
	- Use of concrete on some walls which is of low thermal capacity, increases the penetration of solar radiation.	Negative
	-Use of thatch on roofs reduces the penetration of solar radiation in buildings.	Positive
	-Use of aluminum roofing sheets which is of embodied energy increases the penetration of solar radiation.	Negative
Building orientation	-All the buildings are rectangular in shape	
	-Use of windows positioned to face the north and south axis which reduces incident solar radiation.	Positive
	-Use of windows positioned to face the east and west axis increases the penetration of incident solar radiation	Negative
Use of day lighting	-Window openings are positioned to face the north and south axis which is ideal when designing for day lighting	Positive
	-Window openings are positioned to face the east and west axis which is not ideal because these sides are of low sun angles and penetrates deeper into spaces.	negative

Shading devices	-The use of vertical shading device and trees (coconut trees) to provide shade.	Positive
GREEN ARCHITECTURE PRINCIPLE 2: WORKING WITH CLIMATE		
Variables	**Description**	**Comment**
Building materials	-Use of mud bricks on walls contributes to increase passive cooling because the material has high thermal capacity	Positive
	. Use of floor tiles and marble also enhances passive cooling because these materials are of high thermal capacity	Positive
	-.-Use of aluminum roofing sheets on some of the buildings reduces passive cooling.	Negative
	-Use of thatch on roof increases passive cooling.	Positive
Size of opening	-Use of large windows positioned to face the north and south axis enhances passive cooling.	Positive
	-Use of windows positioned to face the east and west axis reduces passive cooling.	Negative
Site planning and layout of buildings	-The buildings are well spaced out and thus enhances passive cooling.	Positive
Floor plans	-Most the buildings are of double banking design thus enhances cross ventilation in the buildings.	Negative
Shape of roof	-The use of flat roof and gable roof with 10oC pitched angle which does not allow for easy run-off of rain water	

GREEN ARCHITECTURE PRINCIPLE 3: RESPECT FOR SITE		
Variables	**Description**	**Comment**
Building footprints	-The buildings are large in size. thus there is interference with site topography	Negative
Preservation of site characteristics	- Spatial organization of the resort is organic - Retention of existing trees on site.	Positive
Landscaping	-Use of natural elements of landscape was predominantly used such as - use of broken palm kernel shells e.t.c.	Positive
Building form and aesthetics	- The buildings are rectangular in shape with very low use of local facilities and utilities.	Negative
GREEN ARCHITECTURE PRINCIPLE 4: MINIMIZING NEW RESOURCES		
Variables	**Description**	**Comment**
Renewable materials	Roofing material:- - the use of aluminum roofing sheet	Negative
	- the use of thatch	Positive
	Walling materials:- -use of mud bricks on walls.	Positive
	Flooring materials:- -use of marble as floor coverings	Positive
	. Use of concrete floors.	Negative

Table: 1.2

CASE STUDY THREE: SUNTAN BEACH RESORT

Suntan beach resort is a peaceful resort; it was established 2002.

5.4.1 Location:

The resort is located along the Badagry express way Lagos state, facing the Atlantic Ocean. It can be accessed from the express way and also by boat.

5.4.2 Natural attractions

The resort is endowed with an open magnificent white sandy beach stretching along the Atlantic Ocean bordered by the multitude of towering coconut trees lining calm. The beach gives the resort a wonderful view having the waves moving to and fro.

5.4.3 Spatial organization

The resort has spaces allocated for different functions such as the west end is allocated to the built environment of the resort, the east end as the green area, a parking area near the entrance gate of the resort. The reception is located at the west end of the resort, having the chalets located behind the reception. The guest chalet Suites are nestled into colorful gardens. The Beach restaurant & Grill is located at the south end of the reception, and the Beachfront comprises of several sit out huts which are beautifully shaded and lined along the coastal line.

5.4.4 Structures and building materials

The chalets are circular in shape. They are made up of concrete walls, wood and glass used for the window sills, tiles are used for floors. While the roofs are conical shape and are made of aluminum and wood. the buildings are well linked with other functional spaces with soft water permeable landscape of a combination of white beach

sand, carpet grass shaded by towering umbrella trees in an attempt to blend in with the natural environment.

5.4.5 Facilities and recreational activities

Reception: the resort has a reception that is located by the entrance of the resort, the building is rectangular in shape and comprises of three offices which are: - office one for the manager, office two for the receptionist and office three for the staff.



Plate5.3.1a View of reception



plate5.3.1b Interior view of reception

- **Accommodation**:

- Accommodation is provided in 10 circular building units. Having two semicircular units in one building. Each half comprises of a living room, bedroom and toilet/bathroom.



Plate 5.3.2a Exterior view of chalet



plate5.3.2b view of living room

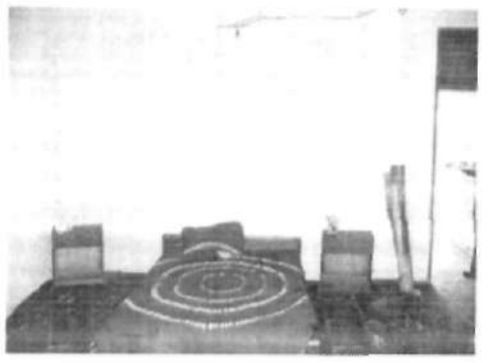


plate5.3.2b view of bedroom



plate5.3.2b view of bathroom



Plate5.3.3 View of landscape



plate5.3.4 view of paved walkway

RECEIVED
10 AUG 2010
IBRAHIM LIBRARY
UNIVERSITY
485414

- **Conference room:**
- The conference room is located at the centre of the built area that is; in between the reception and the chalets.

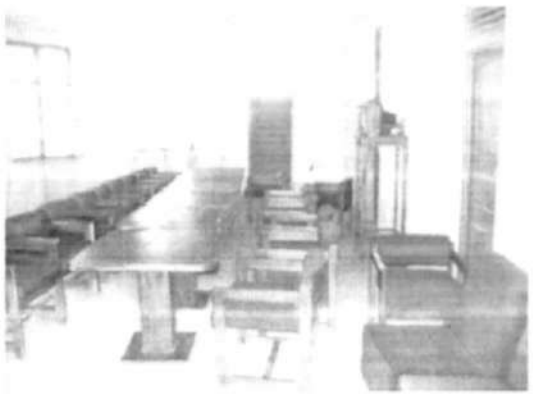


plate5.3.5 Interior view of conference room

Staff room:

The staff room is located in the reception building.



plate5.3.6 Interior view of staff room

Beach side restaurant :

the restaurant is located on the beach



plate5.3.7 Exterior view of beach restaurant

mini shops:

shops are also situated on the beach front



plate5.3.8 Exterior view of mini shops

public toilets:

toilets are also situated on the beach front



plate5.3.9 Exterior view of public toilets

- mini huts for sit out on the beach



plate5.3.10 view of beachfront

- **Some recreational activities that take place in the resort are:** swimming, fishing, nature walls and jogging, relaxation, site seeing.



plate5.3.11 View of towering coconut trees



plate5.3.12 View of mini huts

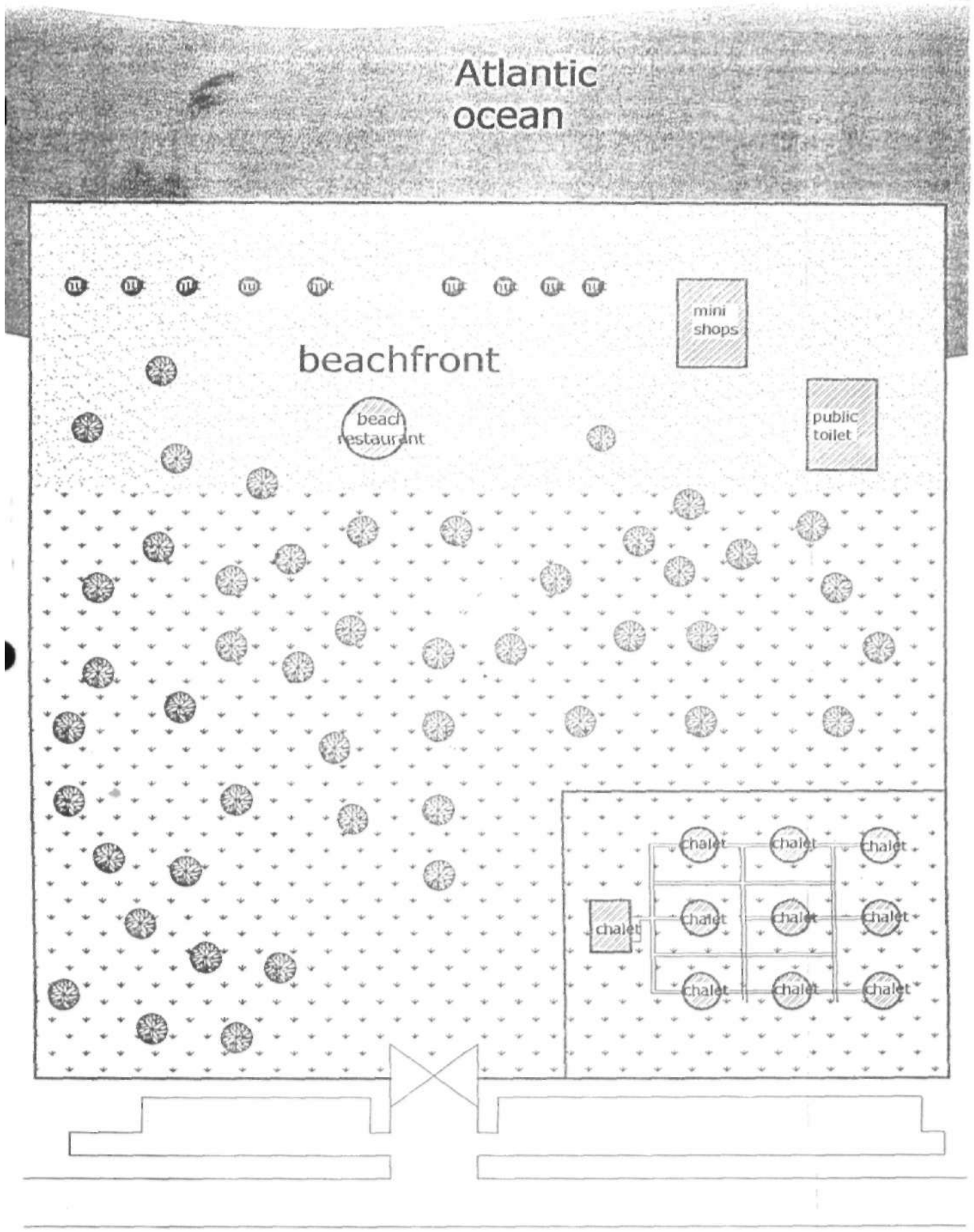


Figure 3.0 Resort site plan (source: field work)

5.5.6 ASSESSMENT OF THE APPLICATION OF GREEN ARCHITECTURE PRINCPLES

Green architecture principle 1: Conserving energy		
VARIABLES	DESCRIPTION	CONCLUSION
Building materials	- Use of concrete on walls which is of low thermal capacity, increases the penetration of solar radiation.	Negative
	-. Use of thatch on roofs reduces the penetration of solar radiation in buildings.	Positive
	- Use of aluminum roofing sheets which is of embodied energy increases the penetration of solar radiation.	Negative
Building orientation	-All the buildings are circular in shape and thus have windows on all sides of the building.	
	-Use of windows positioned to face the north and south axis which reduces incident solar radiation.	Positive
	-Use of windows positioned to face the east and west axis increases the penetration of incident solar radiation	Negative
Use of day lighting	-Window openings are positioned to face the north and south axis which is ideal when designing for day lighting	Positive
	-Window openings are positioned to face the east and west axis which is not ideal because these sides are of low sun angles and penetrates deeper into spaces.	Negative
Shading devices	-The use of horizontal shading device and trees (coconut trees) to provide shade.	Positive

Green architecture principle 2: Working with climate		
VARIABLES	*DESCRIPTION*	*CONCLUSION*
Building materials	Use of floor tiles and marble also enhances passive cooling because these materials are of high thermal capacity.	Positive
	-. Use of thatch on roof increases passive cooling.	Positive
	- Use of aluminum roofing sheets on some of the buildings reduces passive cooling.	Negative
Size of openings	-Use of large windows positioned to face the north and south axis enhances passive cooling.	Positive
	-Use of windows positioned to face the east and west axis reduces passive cooling.	Negative
Site planning and layout of buildings	The buildings are circular and are of a row arrangement and thus enhances passive cooling.	Positive
Floor plans	All the buildings are of double banking design thus reduces cross ventilation in the buildings.	Negative
Shape of roof	-The use of conical, steep pitched roof which allows easy run-off of rain water	Positive
Green architecture principle 3: Respect for site		
VARIABLES	DESCRIPTION	CONCLUSION
Building footprints	-The buildings are few and small in	

	size. thus there is very minimal interference with site topography	Positive
Preservation of site characteristics	- Spatial organization of the resort is organic -Very high retention of existing trees on site.	Positive
Landscaping	-Use of natural elements of landscape was used.	Positive
	Use of artificial elements of landscape was used.	Negative
Building form and aesthetics	- The buildings are circular in shape with very low use of local facilities and utilities.	Negative
Green architecture principle 4: Minimizing new resources		
VARIABLES	**DESCRIPTION**	**CONCLUSION**
Renewable materials	Roofing material:- -the use of thatch	Positive
	-the use of aluminum roofing sheet.	Negative
	Walling materials:- -use of concrete blocks on walls.	Negative
	Flooring materials:- -use of tiles as floor coverings.	Positive
	-use of concrete floors.	Negative

Table: 1.3

CASE STUDY FOUR: EKO TOURIST BEACH RESORT AND AMUSEMENT PARK AKODO, LAGOS STATE.

5.5.1 **Location**: The resort is located along the Lekki peninsula: it is situated at Ibeju Lekki area. It can be accessed from Ekpe express way and also by boat from the Atlantic Ocean

5.5.2 Natural attractions

The resort is endowed with an open superb white sandy beach stretching along the Atlantic Ocean bordered by the multitude of towering coconut trees lining calm. The beach gives the resort a magnificent view having the waves moving to and fro, on it, protected waters for excellent sailing, and other water sports.

5.5.3 Spatial organization

The resort has presently a parking area by the entrance gate of the resort. The reception is located at the west end of the resort, the guest chalet Suites are nestled into green area gardens at the west end of the resort. The Beach is located at the south end of the resort, and the Beachfront comprises of several sit outs which are beautifully shaded by towering coconut trees. The resort has a lengthy paved walk way that stretches from the reception up to the beachfront gate.

5.5.4 Structures and building materials

The chalets are rectangular in shape. They are made up of concrete walls, wood and glass used for the window sills, tiles are used for floors. While the roofs are gable roof design and are made of well aluminum and wood. the buildings are well linked with other functional spaces with soft water permeable landscape of a combination of white beach sand, carpet grass in an attempt to blend in with the natural environment.

5.5.5 Facilities and recreational activities

- **Reception**:
- the reception is located at the west end of the resort.
- **Accommodation**:
- Is provided in separate units which are 35 blocks of flats in a staggered form of arrangement. Each unit comprises of a room, living room, kitchenette and toilet.



plate5.4.1 Exterior view of chalet



plate5.4.2 View of chalet arrangement



plate5.4.3 View of soft landscape



plate5.4.4a View of paved walkway



plate5.4.4b View of lengthy walkway leading to the beachfront

- **Some recreational activities that take place in the resort are:** swimming, fishing, nature walls and jogging, relaxation, site seeing.

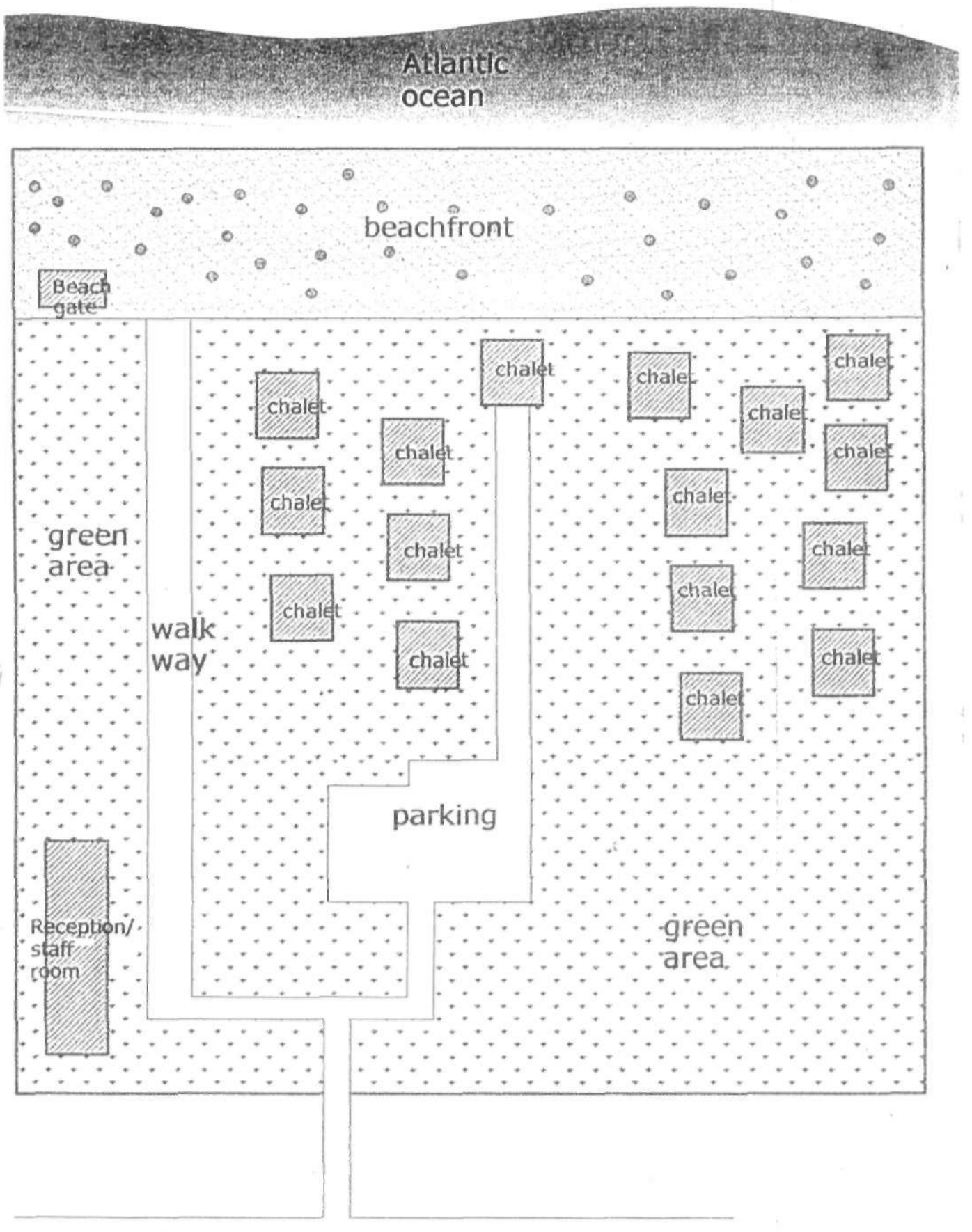


Figure 4.0 Resort site plan (source: field work)

5.5.6 ASSESSMENT OF THE APPLICATION OF GREEN ARCHITECTURE PRINCPLES

Green architecture principle 1: Conserving energy		
VARIABLES	DESCRIPTION	CONCLUSION
Building materials	- Use of concrete on walls which is of high thermal capacity, increases the penetration of solar radiation.	Negative
	- Use of aluminum roofing sheets which is of embodied energy increases the penetration of solar radiation.	Negative
Building orientation	-All the buildings are rectangular in shape and thus have windows mostly positioned to face the north and south axis.	
	-Use of windows positioned to face the north and south axis which reduces incident solar radiation.	Positive
	-Use of windows positioned to face the east and west axis increases the penetration of incident solar radiation	Negative
Use of day lighting	-Window openings are positioned to face the north and south axis which is ideal when designing for day lighting	Positive
	-Window openings are positioned to face the east and west axis which is not ideal because these sides are of low sun angles and penetrates deeper into spaces.	Negative
Shading devices	-the use of few trees.	Positive
	The use of projected eaves and recesses.	Negative

Green architecture principle 2: Working with climate		
VARIABLES	DESCRIPTION	CONCLUSION
Building materials	Use of floor tiles and marble also enhances passive cooling because these materials are of low thermal capacity.	Positive
	- Use of aluminum roofing sheets on some of the buildings reduces passive cooling.	Negative
Size of openings	-Use of large windows positioned to face the north and south axis enhances passive cooling.	Positive
	-Use of windows positioned to face the east and west axis reduces passive cooling.	Negative
Site planning and layout of buildings	The buildings are rectangular in shape and are of a staggered arrangement and thus enhances passive cooling.	Positive
Floor plans	All the buildings are of single banking design thus enhances cross ventilation in the buildings.	Positive
Shape of roof	-The use pitched roof which allows easy run-off of rain water	Positive
Green architecture principle 3: Respect for site		
VARIABLES	DESCRIPTION	CONCLUSION
Building footprints	-The buildings are few and small in size, thus there is very minimal interference with site topography	Positive

Preservation of site characteristics	- Spatial organization of the resort is organic	Positive
	Very low retention of existing trees on site.	Negative
Landscaping	-Use of natural elements of landscape was used.	Positive
	Use of artificial elements of landscape was used.	Negative
Building form and aesthetics	- The buildings are rectangular in shape with very low or no use of local facilities and utilities.	Negative
Green architecture principle 4: Minimizing new resources		
VARIABLES	**DESCRIPTION**	**CONCLUSION**
Renewable materials	Roofing material:- -the use of aluminum roofing sheet	Negative
	Walling materials:- -use of concrete blocks on walls.	Negative
	Flooring materials:- -use of tiles as floor coverings	Positive
	-use of concrete floors.	Negative

Table: 1.4

CASE STUDY FIVE: CASA DE CAMPO, DOMINICAN REPUBLIC, VIRGIN ISLANDS.

5.6.1 Location:

Casa de campo was the first resort in the Caribbean to be designed with under laying ecological principles. It is a 7000-arce (2835-hectare) development on the southern coast of the Dominican Republic. The site is formed by part of a sugarcane holding of 35,000 acres with a sugar refinery, which was purchased by a Cuban, Alvarez Carta in the 1960s.

5.6.2 Natural attractions:

The resort has a lush green hillside to the ivory sand beach at the edge of the sea. Beautifully landscaped with lush mature foliage the grounds offer expansive views and tropical breezes.

5.6.3 Spatial organization:

Casa de Campo Villa estate is superbly situated within the exclusive La Romana Country Club golf course. Beautifully landscaped with lush mature foliage the grounds offer expansive views and tropical breezes. A focal point for outdoor gatherings, the gracious terraces are highlighted by a lovely private pool and thatched roof gazebo. Distinctive night lighting enhances evening entertaining. Having colorful tropical gardens everywhere.



plate5.5.1 View of site landscape

5.6.4 Structures and building materials:

Casa de Campo resort is a part of the surrounding landscape and traditional man-made environment. This objective was achieved by maintaining a strong regard for environmental factors, natural and man-made, and through the use of structural forms, traditional materials, and indigenous plant.

Locally available materials have been used, some of them are palm thatch roof, telephone poles and pressure treated lumber.

5.6.5 Facilities and recreational activities:

Accommodation: Capturing the essence of Casa de Campo Resort's unique Caribbean tropical lifestyle, this outstanding private villa property is only a 10 minute walk from the beach and has convenient access to all of Casa de Campo Resort's other major amenities.

Constructed in 2004 and impeccably maintained, this distinctive Private Villa showcases mahogany French doors and Travertine marble floors and is gracefully furnished for aesthetics and comfort. The spacious open villa floor plan Living/Dining Room, full size billiards table salon and grand sitting areas lead to the expansive terrace

and pool area. The chef's Kitchen is equipped with mahogany cabinetry and new gas cooking appliances. The 2 Master bedrooms suites open to private terrace and elegant outdoor garden shower. They feature king size beds, walk in closets, whirlpool jacuzzi, bidet etc. Additional bedrooms are expansive and fully equipped with private bath, dressing room and walk-in closets. A loft, separate staff quarters and a 2-car garage complete the Casa de Campo villa residence

Exclusive Villas the epitome of privilege and exclusivity. These are Casa de Campo's finest villas, each with extra comforts, bonus features and architectural details, all the way up to estate-like oceanfront Villas.





plate5.5.2 View of villas **plate5.5.3aView showing building materials used for villas**

The Excel Villa experience is Casa de Campo's unique concept in vacation living a private home setting, perfect to share good times with family and friends, with all the services and amenities of a world-class resort. Each Excel Villa features common areas to mingle: a living room, dining room, full kitchen and private gardens with a pool or whirlpool. Guest bedrooms are air-conditioned, each with phone, cable television, large closet with safe deposit box and private bath with hair dryer.



plate5.5.3b View of living room



plate5.5.3c View of kitchen



plate5.5.3d View of Bedroom



plate5.5.4 Exterior view of spa/massage room

Restaurants:

La Piazzetta (enclosed restaurant)

The feel of Venice, Napoli or Milan is inescapable at La Piazzetta. Boasting an astounding antipasto bar, made-from-scratch pasta and outstanding food cooked to perfection, sink into the romance of Casa de Campo. Nightly live music with strolling Italian minstrels and an authentic Mediterranean atmosphere complete a night to be remembered.



plate5.5.5 Interior view of closed restaurant

Cafe del Sol (open air restaurant)

Overlooking the famous Dye Fore golf course, dine in the heart of the Altos de Chavón. Though everything is delicious, the brick-oven pizzas and ice creams are the specialties of the house. Nearby, Saint Stanislaus Church provides a backdrop of alluring Gregorian music that renders this a dining experience, not just a meal.



plate5.5.6 View of open-air restaurant

Conference hall:

- For group meetings



plate5.5.7 Exterior view of conference hall

Family love zone:

A play room/area where kids have fun and where customized family adventures and special events to share special moments together takes place.



plate5.5.8 Interior view of playroom

Some recreational activities that take place in the resort are:

nature walks and jogging, relaxation, site seeing, Golf, Tennis, Shooting, Non-Motorized Water sports, Swimming, Snorkeling, Deep-Sea Fishing, Fitness & Spa Treatments, Horseback Riding & Polo, Kids, Teen's and Family Programs, Tours, Shopping, Art Galleries, Museums, Concerts, Marina & Yacht Club, Dining & Entertainment.



plate5.5.9 View of beachfront



plate5.5.10 Interior view of massage room



plate5.5.11 View of horse riders



plate5.5.12 View of natural landscape

485414



plate5.5.13 View showing water sports

5.6.5 ASSESSMENT OF THE APPLICATION OF GREEN ARCHITECTURE PRINCPLES

Green architecture principle 1: Conserving energy		
VARIABLES	DESCRIPTION	CONCLUSION
Building materials	- Use of stones on walls which is of high thermal capacity, reduces the penetration of solar radiation.	Positive
	-. Use of thatch on roofs reduces the penetration of solar radiation in buildings.	Positive
	-Use of treated lumber on walls which excludes penetration of solar radiation due to its low thermal capacity.	Positive
Building orientation	-Use of windows positioned to face the north and south axis which reduces incident solar radiation.	Positive
	-Use of windows positioned to face the east and west axis increases the penetration of incident solar radiation	Negative
Use of day lighting	-Window openings are positioned to face the north and south axis which is ideal when designing for day lighting	Positive
	-Window openings are positioned to face the east and west axis which is not ideal because these sides are of low sun angles and penetrates deeper into spaces.	Negative
Shading devices	-The use of horizontal shading device and trees (coconut trees) to provide shade.	Positive
Green architecture principle 2: Working with climate		

VARIABLES	DESCRIPTION	CONCLUSION
Building materials	Use of floor tiles and marble also enhances passive cooling because these materials are of low thermal capacity.	Positive
	-. Use of thatch on roof increases passive cooling.	Positive
	- Use of roofing tiles on some of the buildings reduces passive cooling	Positive
Size of openings	-Use of large windows positioned to face the north and south axis enhances passive cooling.	Positive
	-Use of windows positioned to face the east and west axis reduces passive cooling.	Negative
Site planning and layout of buildings	The buildings are of a well spaced and thus enhances passive cooling.	Positive
Floor plans	*All the buildings are of single* banking design thus enhances cross ventilation in the buildings.	Positive
Shape of roof	-The use of steep pitched roof which allows easy run-off of rain water	Positive
Green architecture principle 3: Respect for site		
VARIABLES	DESCRIPTION	CONCLUSION
Building footprints	-The buildings are few and small in size, thus there is very minimal interference with site topography	Positive

Preservation of site characteristics	- Spatial organization of the resort is organic -Very high retention of existing trees on site.	Positive
Landscaping	-Use of natural elements of landscape was used.	Positive
	Use of artificial elements of landscape was used.	Negative
Building form and aesthetics	- The buildings are with very high use of local facilities and utilities.	Positive
Green architecture principle 4: Minimizing new resources		
VARIABLES	**DESCRIPTION**	**CONCLUSION**
Renewable materials	Roofing material:- -the use of thatch	Positive
	-the use of clay roofing tiles	Positive
	Walling materials:- -use of treated mahogany wood on walls.	Positive
	Flooring materials:- -use of tiles as floor coverings.	Positive
	-use of stone/marble floors.	Positive

Table: 1.5

CASE STUDY SIX: SUNTERRA RESORT, CARAMBOLA BEACH, VIRGIN ISLANDS

5.7.1 Location:

Sunterra Resorts Carambola Beach - Caribbean Resort St. Croix, U.S. Virgin Islands.

5.7.2 Natural attractions:

When you stand on the hills above Carambola and look down on the red roofs of the resort you get the impression that a recent rain has washed flower pedals down the lush green hillside to the ivory sand beach at the edge of the sea. Carambola sits alone on the western north shore of St. Croix and is, in a word, beautiful.

5.7.3 Spatial organization:

The resort complex contains 156 luxury suites of casita type and a golf course in tropical surroundings along the edge of the beautifully beach of Davis Bay. Carambola resort features one of the finest golf courses in the Caribbean designed by Robert Trent Jones. The accommodations are among St. Croix's finest and the amenities leave nothing out. A variety of dining choice range from a casual grille to island elegance. Mahogany structures and colorful tropical gardens are everywhere, giving you the feeling you want when you come to a Caribbean resort. Twenty-six of the complex's 185 acres have been landscaped: leaving ridge tops and the rest of the site open. Colorful tropical plants surround the casitas and courtyard.eastablished stands of black olive, tamarind, and false mahogany trees remain.

5.7.4 Structures and building materials:

The casitas are designed in a vernacular style and constructed of wood, with red tin roofs. The buildings take advantage of the cooling trade winds. Water reclamation systems supply the resorts requirements and rain is collected in underground cisterns.

5.7.5 Facilities and recreational activities:

-**Accommodations** are among St. Croix's finest Mahogany structures and colorful tropical gardens.



plate5.6.1Exterior view of villas



plate5.6.1a View of living room



plate5.6.1c View of bedroom



plate5.6.1d View of bathroom

- **Conference center:**

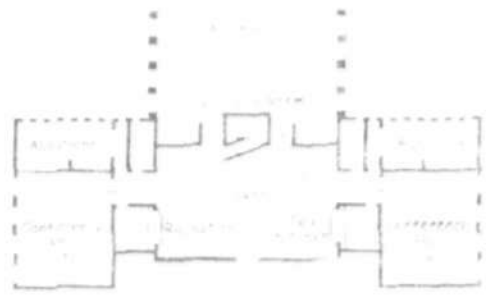


plate5.6.2 View of conference hall plan



plate5.6.2b Interior view of conference hall

- **Some recreational activities that take place in the resort are:**

nature walks and jogging, relaxation, site seeing, Golf, Tennis, Shooting, Water sports, Swimming, Snorkeling, Deep-Sea Fishing, Fitness & Spa Treatments, Horseback Riding, Dining & Entertainment.



plate5.6.3 View of beachfront



plate5.6.4 View of massage room



plate5.6.5 View of swimming pool



plate5.6.6 View of sit-outs



plate5.6.7 View of boating facilities

5.7.5 ASSESSMENT OF THE APPLICATION OF GREEN ARCHITECTURE PRINCPLES

Green architecture principle 1: Conserving energy		
VARIABLES	**DESCRIPTION**	**CONCLUSION**
Building materials	- Use of treated lumber on walls which excludes penetration of solar radiation due to its low thermal capacity	Positive
	-. Use of thatch on roofs reduces the penetration of solar radiation in buildings.	Positive
	- Use of stones on walls which is of high thermal capacity, reduces the penetration of solar radiation.	Positive
	-Use of tin roofs increases the penetration of solar radiation in buildings.	Negative
Building orientation	-Use of windows positioned to face the north and south axis which reduces incident solar radiation.	Positive
	-Use of windows positioned to face the east and west axis increases the penetration of incident solar radiation	Negative
Use of day lighting	-Window openings are positioned to face the north and south axis which is ideal when designing for day lighting	Positive
	-Window openings are positioned to face the east and west axis which is not ideal because these sides are of low sun angles and penetrates deeper into spaces.	Negative
Shading devices	-The use of local plants and trees	Positive

	(coconut trees) to provide shade.	
Green architecture principle 2: Working with climate		
VARIABLES	**DESCRIPTION**	**CONCLUSION**
Building materials	Use of floor tiles and marble also enhances passive cooling because these materials are of low thermal capacity.	Positive
	-. Use of thatch on roof increases passive cooling.	Positive
	- Use of tin roof s some of the buildings increases passive cooling	Negative
Size of openings	-Use of large windows positioned to face the north and south axis enhances passive cooling.	Positive
	-Use of windows positioned to face the east and west axis reduces passive cooling.	Negative
Site planning and layout of buildings	The buildings are well spaced and thus enhances passive cooling.	Positive
Floor plans	All the buildings are of single banking design thus enhances cross ventilation in the buildings.	Positive
Shape of roof	-The use of steep pitched roof which allows easy run-off of rain water	Positive
Green architecture principle 3: Respect for site		
VARIABLES	**DESCRIPTION**	**CONCLUSION**
Building footprints	-The buildings are few and small in size, thus there is very minimal	

	interference with site topography	Positive
Preservation of site characteristics	- Spatial organization of the resort is organic -Very high retention of existing trees on site.	Positive
Landscaping	-Use of natural elements of landscape was used.	Positive
	Use of artificial elements of landscape was used.	Negative
Building form and aesthetics	- The buildings are with very high use of local facilities and utilities.	Positive
Green architecture principle 4: Minimizing new resources		
VARIABLES	DESCRIPTION	CONCLUSION
Renewable materials	Roofing material:- -the use of thatch	Positive
	-the use of tin roofs	Positive
	Walling materials:- -use of treated mahogany wood on walls.	Positive
	Flooring materials:- -use of tiles as floor coverings.	Positive
	-use of stone/marble floors.	Positive

Table: 1.6

CASE STUDY SUMMARY SHEET

	CASE STUDY ONE: La champagne Tropicana beach resort, Lagos.	CASE STUDY TWO: Whisperin g palms, resort, badagry, Lagos	CASE STUDY THREE: Suntan beach resort, Lagos	CASE STUDY FOUR: Eko tourist beach resort and amusement park akodo, Lagos state.	CASE STUDY FIVE: Casa de campo, Dominica n republic, virgin islands.	CASE STUDY SIX: Sunterra resort, carambola beach, virgin islands.
Conserving energy variables						
1.Building materials	good	good	Fair	poor	excellent	Good
2.Building orientation	good	good	Good	good	good	Good
3.Use of day lighting	good	good	Good	good	good	Good
4.Shading devices	good	good	Fair	poor	excellent	Good
Working with climate variables						
1.Building materials	good	good	Fair	fair	excellent	Good
2.Size of openings	fair	fair	Poor	fair	good	Good
3.Site planning and layout of buildings	good	good	Good	good	good	Good
4.Floor plans	excellent	poor	Poor	excellent	excellent	excellent
5. Shape of roof	good	poor	Good	fair	Good	Good

Respect for site variables						
1.Building footprints	very good	poor	Good	fair	Good	Good
2.Preservation of site characteristics	excellent	good	Fair	poor	Good	excellent
3.Landscaping	very good	very good	Fair	fair	excellent	very good
4.Building form and aesthetics	very good	poor	Fair	poor	very good	very good
minimizing new resources variable						
1.Renewable materials	Very good	good	Fair	poor	excellent	excellent

Table: 2.0

Rating = Excellent Very good Good Fair Poor

Principle 1: Conserving energy = 80% of the resorts studied applied the principle of conserving energy in the water front resort design.

Principle 2: Working with climate = 60% the resorts studied applied the principle of working with climate in the water front resort design.

Principle 3: Respect for site = 50% the resorts studied applied the principle of respect for site in the water front resort design.

Principle 4: minimizing new resources = 70% the resorts studied applied the principle of minimizing new resources in the water front resort.

CHAPTER SIX

DESIGN REPORT

6.1 The Site

Lagos is the most populous conurbation in Nigeria with 7,937,932 inhabitants at the 2006 census. It is currently the second most populous city in Africa, and currently estimated to be the second fastest growing city in Africa (7th fastest in the world). Lagos is a huge metropolis which originated on islands separated by creeks, such as Lagos Island, that fringe the southwest mouth of Lagos Lagoon, protected from the Atlantic Ocean by long sand spits such as Bar Beach which stretch up to 100 km east and west of the mouth. From the beginning, Lagos has spread on the mainland west of the lagoon and the conurbation, including Ikeja and Agege, now reaches more than 40 km north-west of Lagos Island. The city is the economic and financial capital of Nigeria.

6.1.1 Socio-cultural environment

The two major urban islands of Lagos in Lagos Lagoon are the Lagos Island and Victoria Island. These islands are separated from the mainland by channel draining the Lagoon into the Atlantic, which forms Lagos Harbor. The islands are separated from each other by creeks of varying sizes and are connected to Lagos Island by bridges. However the smaller sections of some creeks have been sand filled and built over.

People from Ibeshe Island are known as Erede people and the language spoken by them is known as Ewe language. Erede men are mostly fishermen and the women are cassava farmers. The Erede people are divided into two religious groups: Idol worshippers (those that worship the water god) and the Christians.

The Erede people engage in a fishing festival yearly to appease the water god, they also have great affinity for nature and thus their dwellings are made up locally sourced materials such as the use of bamboo sticks for structural elements such as walls and floors, the use of thatch for roofs. The major forms of recreation enjoyed by the people are; swimming, boating and sightseeing.

6.1.2 Locality

Ibeshe island is located in between the Badagry creek and the Atlantic ocean. it is under the Amuwo odofin local Government, the island comprises of the Erede tribe. The island has small community settlements existing on it, with dwellings made from locally sourced materials such as bamboo, thatch. The only means of transportation is by boat and canoe. the Erede people are fish famers by occupation and thus they have an existing tradition of a fishing festival that takes place once every year.

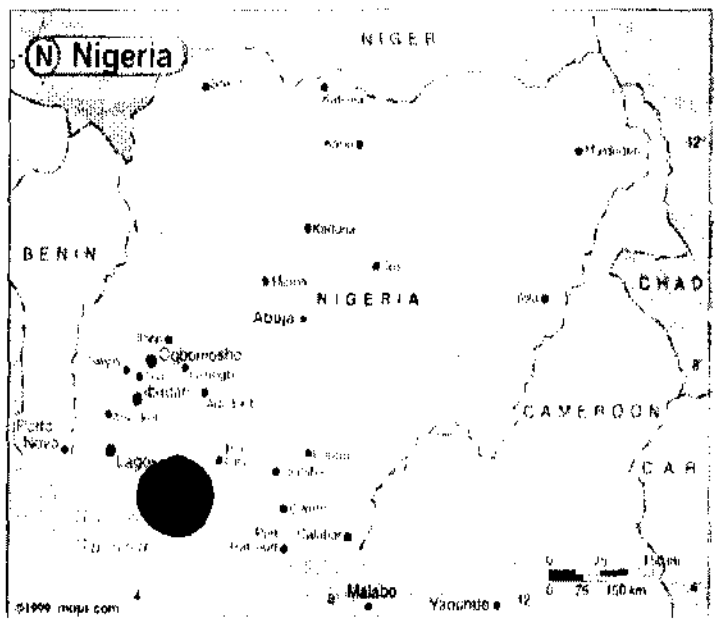


Figure 5.0 Map of Nigeria. Source: field work.

6.1.3 Site selection criteria and features

Site selection

Three (3) alternative sites were chosen for this research, based on purposive sampling

Site selection criteria

The following criteria were considered in the site selection

- accessibility to the site

  Transportation to Ibeshe Island from Lagos is through the creek with the use of ferries and boats.

  Stoppage to Ibeshe Island is an existing jetty.

- Scenic beauty

  Views on and from the site

- Services

  Nearness to existing power lines, water supply.

- Ecological characteristics of the site

  To what extent has the site been degraded by previous buildings, Industrial and Agricultural uses.

- Nearness to existing settlements

  Where human labour / services can easily be provide

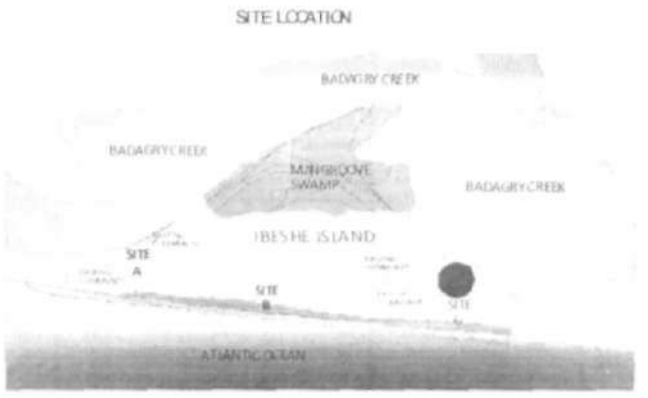


Figure 6.0 Site location .Source: field work.

This site is located between the waterfront of the Badagry creek and the Atlantic Ocean.

- The site is accessible from the creek and the Atlantic Ocean.
- There are existing access foot paths to the site.
- The sloping nature of the site provides scenic views and natural landscaping.
- The site is endowed with sporadic towering coconut trees.
- There are minimal existing services, but this can be tapped from nearby developments.
- The site has not been degraded due to the presence of existing structures and farming.
- The site is close to existing settlements.
- COMMENT – the site is suitable for this research.

6.2 Site Analysis

6.2.1 Climatic analysis

Ibeshe Island, Lagos state is located in the coastal region and has a hot humid climate which characterizes tropical areas. The basic climatic characteristics are below:

1. Sunshine



Figure 7.0 graph showing sunshine hours. Source: Min. of Land and survey Lagos state. 2002.

Difference in hours of daylight every month is minimal, artifitial lighting will not be needed to make for this.

2. Cloud cover



Figure 8.0 graph showing sunshine hours. Source: Min. of Land and survey Lagos state. 2002.

Due to the location of the site close to water bodies, there is the high presence of cloud cover all year round.

3.Temperature

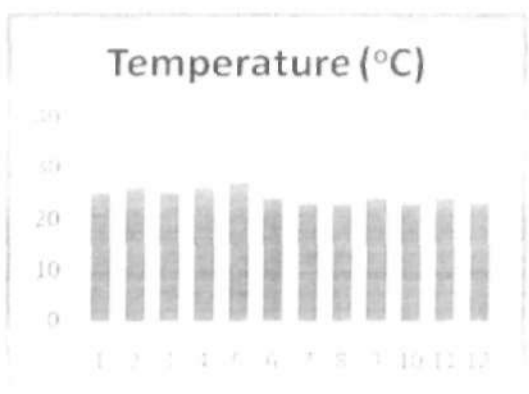


Figure 9.0 graph showing Temperature. Source: Min. of Land and survey Lagos state, 2002.

The temperature of the site is usually high all year round in lagos state, the site has a unique microclimate of its own which is due to the nearness of the site to water bodies. The design of some of the structures such as the chalets will be located close to the water (ocean) inorder to take advantage of the microclimate created by the sea breeze, this is to enhance passive cooling and thermal comfort in the buildings.

4.Rainfall

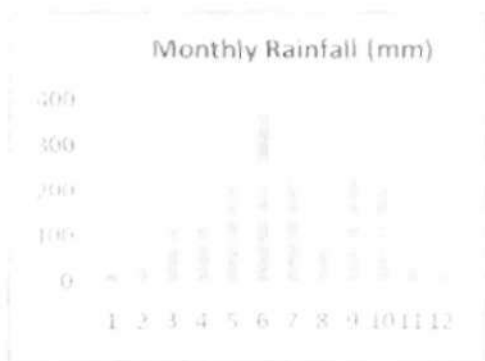


Figure 10.0 graph showing Monthly rainfall. Source: Min. of Land and survey Lagos state, 2002

Rainfall in ibeshe is of the conventional type. it falls all year round. with high mean rainfall between march and october with the highest mean monthly rainfall of 380mm occuring in June.The design of the structures will incoporate steep roofs and roof gutters inorder to allow for easy run-off of rain water.

5.Relative humidity

Figure 11.0 graph showing Relative Humidity. Source: Min. of Land and survey Lagos state, 2002.

Relative humidity in Ibeshe is high all year round with the highest occuring in the months of June and July recorded as 80% and above which is above the upper limits of thermal comfort zone.This high relative humidity attributes to Lagos state being hot in temperature.

The site is of high humidity thus trees on site will be retained and the use of natural landscape will be predominantly used in the design of the resort inoder to to enhance passive cooling and to reduce humidity in the air.

6.Prevailing winds

The North-East trade winds blowing over the creek into the site allows for passive cooling and enhances thermal comfort.this wind will be taken advantage of to provide natural ventilation.

The South-West trade wind s brings strong winds and flooding this will be prevented by landscape buffers and the design will have the chalets located at this area especially inorder to make use of the cool amd pleasant bearing humidity air blowing over the atlantic ocean into the site.

6.2.2 Topography

The site slopes gently towards the creek (North-East wards) and towards the Atlantic Ocean (south wards). Drainage will take this course. The nature of the site provides scenic views and natural landscape. Facilities such as the restaurant, administrative area e. t.c will be located on the highest point of the slope in order to provide magnificent view of the creek and the ocean.

6.2.3 Vegetation

The vegetation on the site comprises of various types, this includes:

-Sporadic plantation of towering coconut palm trees, the site is to retain most of the trees because most of the trees are of aesthetic value.

-Presence of some fruit trees on the site, most of the trees will be retained because of their economic value.

-Presence of thick shrubs and some hardwood trees on the site will be retained in order to preserve the natural environment.

-Presence of elephant grass on the site.

6.2.4 Scenic quality

The site is endowed with scenic views comprising of North- West side showing views of existing community surrounded by towering coconut trees on the Ibeshe island.

North-East side showing the beautiful view of the Badagry creek and the view of the existing community on the opposite side of the site. South-West side showing a magnificent view of the Atlantic ocean and the South-East side showing a view of a long stretch of sandy beachfront close to the ocean.

6.3 Design brief:

6.3.1 Site zoning

Understanding zoning for a green development site, in particular one selected for a resort, is critical. Zoning for tourism is important. An intensive tourism development zone occurs in popular mass tourism destinations, such as this proposed Island resort. This proposed island resort can be categorized into three main zones: Private, public and services.

1. Private spaces: Lodging units which include: Sleeping areas and living areas.

2. Public spaces which include the following : Parking area, Reception, Shops, First aid room, Gymnasium, Spa/ Massage area, Bar, Sport area, Sit outs, Restaurants.

3. Services: which include the following units: Kitchen, Laundry, Generator house, Offices, Jetty area.

The zoning of the proposed island resort can be further broken down into the following to suite the location and the design of the resort facilities as shown below: Parking area, Administrative area, Catering services, Services, Accommodation facilities, Outdoor recreation facilities.



Figure 12.0 Site zoning (Source: field work)

6.3.2 Design concept

As Green architecture describes an expression of individuality, it explores our needs to connect to nature. With nature for our design, a building or a design should grow as nature from the inside out. Thus nature grows from the idea of seed and reaches out to its surroundings.

1. Predominant site characteristics

- The presence of coconut trees.

- Sandy beachfront

- Presence of water bodies (The badagry creek and the Atlantic Ocean).

2. Plan concept

-Ibeshe fishing festival (use of boats and fishing net).

-Mode of transportation to and from the island (boat and canoe).

-Water bodies (sea and creek).



Plate 6.1- picture showing boat as the major means of transportation to the site. Source: field work

Figure 13.0 Plan of boats. Source: www.google.com.

3. Elevation concept

-Presence of towering coconut trees.



Plate 6.2- picture showing towering coconut trees on the site. Source: field work.

-Most dominant fruit on the site (coconut fruit).

6.3.3 Schedule of Accommodation

ADMINISTRATIVE SECTION

This section caters for the management and organization of all activities in the resort

Functional space	Area
Reception	25m2
Store	10m2
Accounts office	28m2
Cashier	25m2
Assistant manager's office	28m2
Personnel office	28m2
Manager	28m2
Shops	75m2
ACCOMMODATION	
Functional space	Area
Small chalets	35m2
Big chalets	58.5m2
Luxury chalets	72m2

RECEIVED
2010
185414

CATERING FACILITIES	
Functional space	Area
Open restaurant	360m2
Enclosed restaurant	133m2
Bar	180m2

7. SPORTS SECTION

This include all the sports facilities

- Beach sports
- Volley ball courts
- Tennis courts
- Boating facilities
- Swimming pools
- Fishing facilities
- other sports facilities
- Mini golf course
- Play areas

INDOOR AND OUTDOOR THERAPY FACILITIES

Massage rooms

Spa

Swimming pools

Gymnasium

ANCILLARY FACILITIES	
Functional space	Area
Laundry	225m2
Dirty linen store	15m2
Clean linen store	19m2
Generator house	30m2

6.4. Building Form and Architectural Expression

The resort buildings are oval in shape and are made-up of local / renewable materials such as timber, clay, thatch, in other to harness the resort with the environment. The structures of the administrative section of the resorts are of the shape of boats, this is to reflect the major means of transportation to and from Ibeshe island which are boats or canoes. Also the chalets reflect the shape of spilt coconuts on their elevational view this is to reflect the most prominent fruit on the island which is the coconut fruit.

6.4.1 Structural Integrity

The structural integrity of the proposed resort can be divided into two sections:-

The administrative section- Has a structural frame comprising of burnt bricks walls and clay tiles for the roofing system.

Accommodation section- The chalets have a structural frame comprising of timber roofs (glue and laminated), timber walls and timber floors supported by wooden stilts to the ground.

7.0 CONCLUSION

Based on findings Green architecture principles are not widely used in waterfront resort designs in Nigeria. This can be seen in the case study summary sheet in chapter 5, where it shows that only a few resorts have imbibed the application of some Green architecture principles. The design concept generation adopts various objects available in the site, surrounding the use of boats in two dimensional outlines for the floor plans, and the use of split coconuts expresses same in the elevations. The intention is to have a waterfront resort design that has analyzed and applied the principles of Green Architecture.

Finally this research has been able to apply the applicable Green architecture principles to waterfront resort designs.

7.1 RECOMMENDATION

This thesis has imbibed the applications of Green architecture principles through different ways in the proposed resort design such as energy efficiency, the use of passive cooling design, the use of stilts to reduce negative impact on topography of the site and the use of renewable building materials. The limitations of this thesis was due to time constraint which did not allow for further research on alternative ways of generating renewable power for the resort other than the use of windmills. It is recommended that more light should be shed on renewable power generation for the resort in any similar work that is to be carried out.

The application of Green architecture principles should be recommended in developing waterfront resort designs, to protect and enhance environmentally friendly and conscious resort designs.

REFFERENCES

Architecture week online Library. (2008). Green Architecture. Retrieved July 26, 2008 from http://www.architectureweek.com/topics/green.html.

Wikipedia. (2008). Green architecture. Retrieved July 26, 2008 from http :// en.wikipedia.org/wiki/Green building.

Green Home Building and Sustainable Architecture. (2006).Thirteen principles of sustainable architecture. Retrieved August 4, 2008 from http:// www.greenhomebuilding.com/weblog/2006/04/13-principles-of-sustainable.html.

Green Home Building, (2008). Sustainable Architecture: Principles .Retrieved July 26, 2008 from http ://www .green homebuilding .com/sustainable_architecture. html.

James ,W. (2000).Green Architecture. Retrieved July 15, 2008 from http://www.greenhomebuilding.com/sustainable_architecture.htm

Murcutt ,G. (2008). Green Building Resources. Retrieved August 4, 2008 from http://www.architecture.about.com/od/greenconcepts/Green_Building_Resources.html.

Romero ,P.S. (2008). *Newsbreak Online- Bahay kubo principles form core of green architecture*. Retrieved July 26, 2008 from http ://www.newsbreak. com. ph/index.php.

Prince ,R. (2008). Permaculture – Home. Retrieved August 4, 2008 from http :// www.royprince.com

Green architecture principles. (2008). Retrieved July 26, 2008 from http://www.wbcm.com/green.html

The four goals , (2008). The four goals of green architecture. Retrieved July 26, 2008 from http://www.harmoniousliving.co.za/Environment/Eco-Friendly/The -Four-Goals-Of-Green Architecture.

Magee, J. (2005 ,October). Sustainable Resort Development: Case studies from Australia that makes business sense. Retrieved December 19, 2008 from http://www.antearchitecture.com.

Lawson, F.R. and Baud-Bouy, M. (1977).*Tourism and Recreation Development:* A hand book of physical planning. London : Architectural press.

Odama, O.T. (2000). Ecologically sustainable development in tourism. Unpublished M.sc. Thesis. Ahmadu Bello University, Zaria, Nigeria.

Opara,C.O.(2000).Towards achieving harmony between architecture and environment. Unpublished M.sc. Thesis. Ahmadu Bello University, Zaria. Nigeria.

Vale, B., and Vale, R. (1991). *Green Architecture*: Design for a sustainable future. London: Thames and Hudson Ltd.

Croy, W.G and Hogh, L. (2002). Endangered Visitors: A phenomenological study of eco-resort development. *Current Issues in Tourism.*

PRINCIPLE 1 CONSERVING ENERGY

ENERGY EFFICIENCY

Generating renewable energy

- Windmills

(Use of sea breeze and creek breeze)

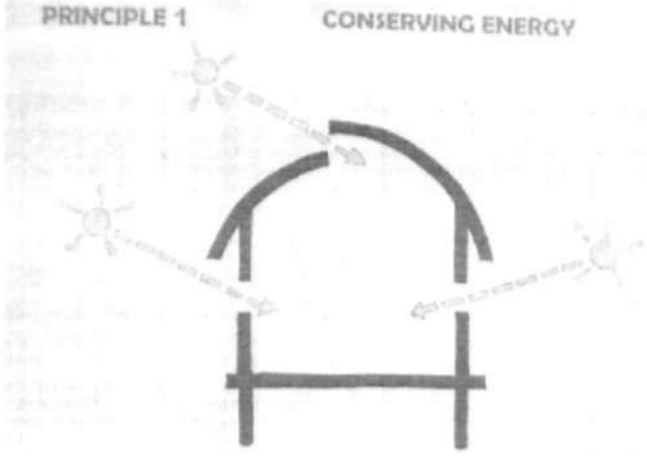
Use of passive solar design

- Maximum use of day lighting
- Roof overhang to reduce solar radiation
- Use of natural shading devices

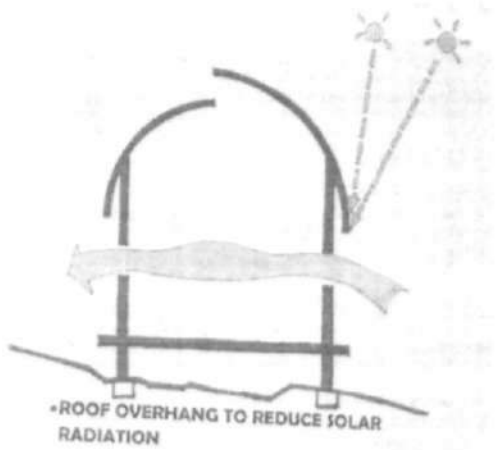


•WINDMILL)
(USE OF SEA BREEZE AND CREEK BREEZE)

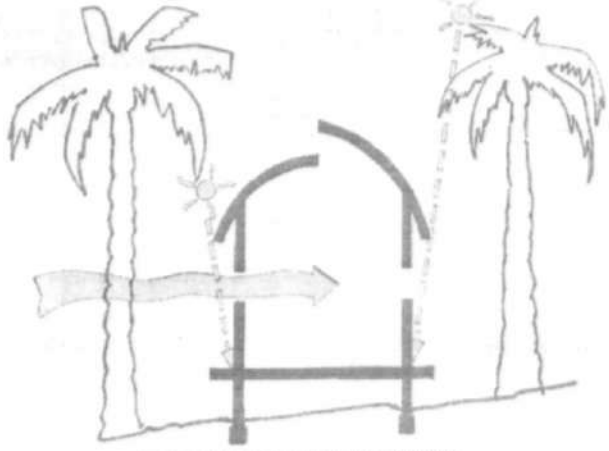
PRINCIPLE 1 CONSERVING ENERGY



•MAXIMUM USE OF DAY LIGHTING

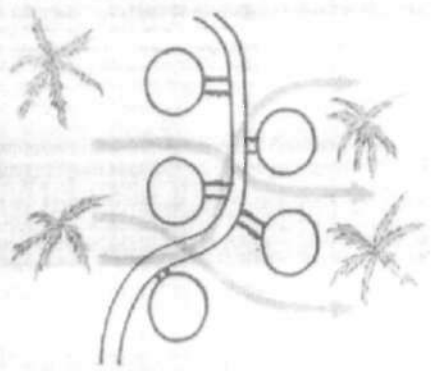


•ROOF OVERHANG TO REDUCE SOLAR RADIATION

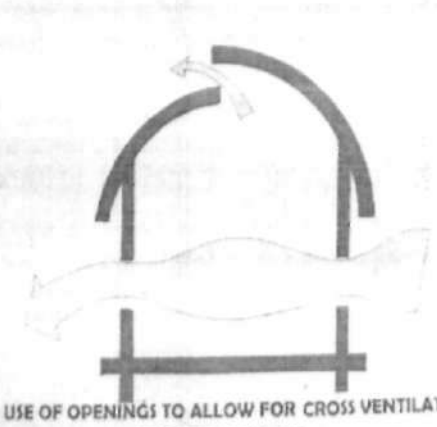


•USE OF NATURAL SHADING DEVICES

PRINCIPLE 2 WORKING WITH CLIMATE



- USE OF STAGGARD ARRANGEMENT OF BUILDINGS



- USE OF OPENINGS TO ALLOW FOR CROSS VENTILATION AND STACK EFFECT

'PASSIVE COOLING DESIGN FOR A HOT HUMID ZONE)

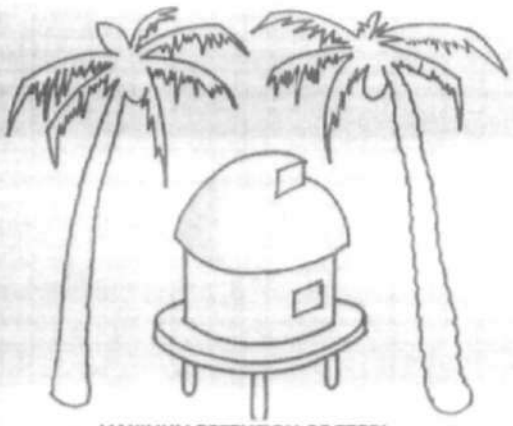


- USE OF ROOF OVERHANG

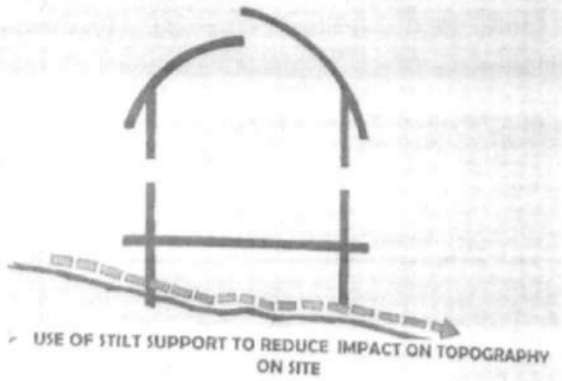


- USE OF COURTYARDS

PRINCIPLE 3 RESPECT FOR SITE



- MAXIMUM RETENTION OF TREES



- USE OF STILT SUPPORT TO REDUCE IMPACT ON TOPOGRAPHY ON SITE



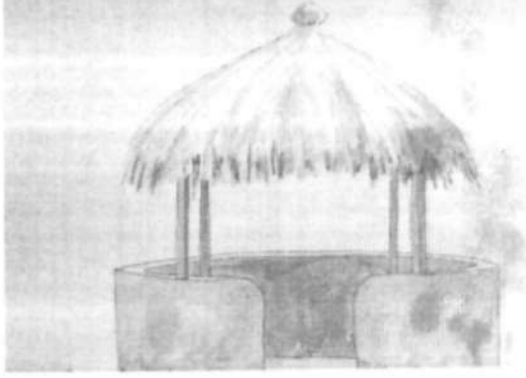
- USE OF NATURAL LANDSCAPE

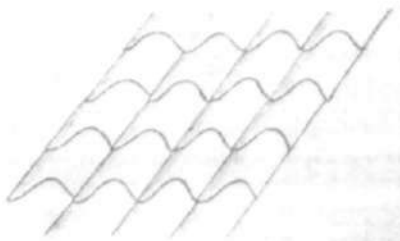
PRINCIPLE 4 MINIMIZING NEW RESOURCES

(USE OF RENEWABLE MATERIALS)

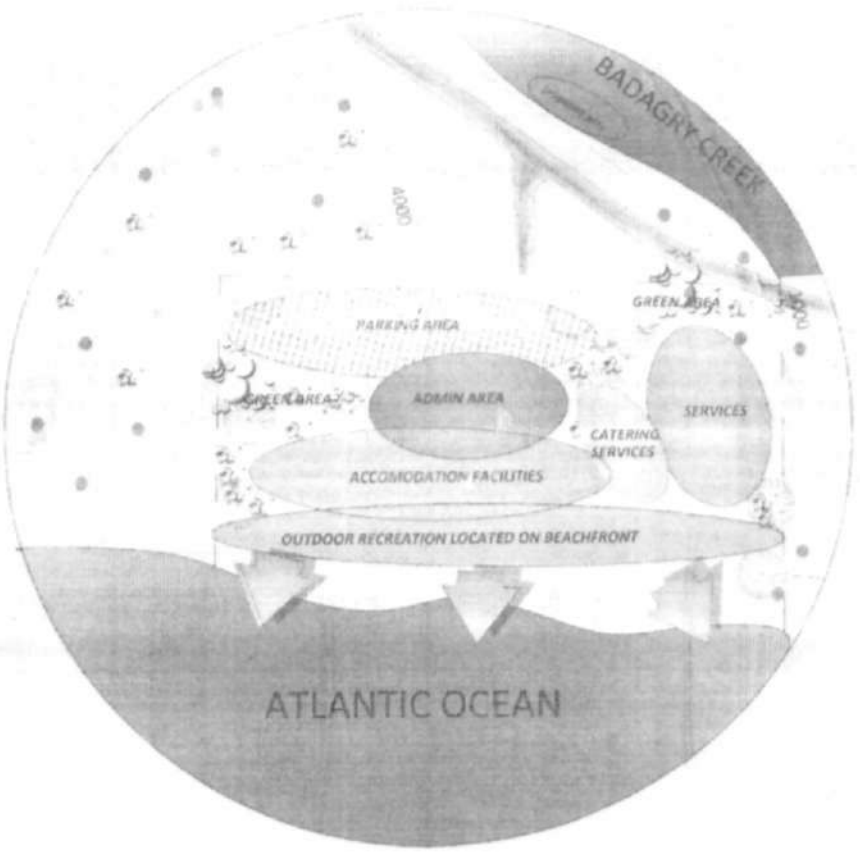
- CLAY :- ROOF TILES
  BURNT BRICK WALLS
- TIMBER :- WALLS
  GLULAM ROOFS
  FLOORS
  STILTS
- THATCH :- USE TO ROOF SIT-OUT HUTS
- PALM KERNEL CHAFF :- USED ON WALKWAYS

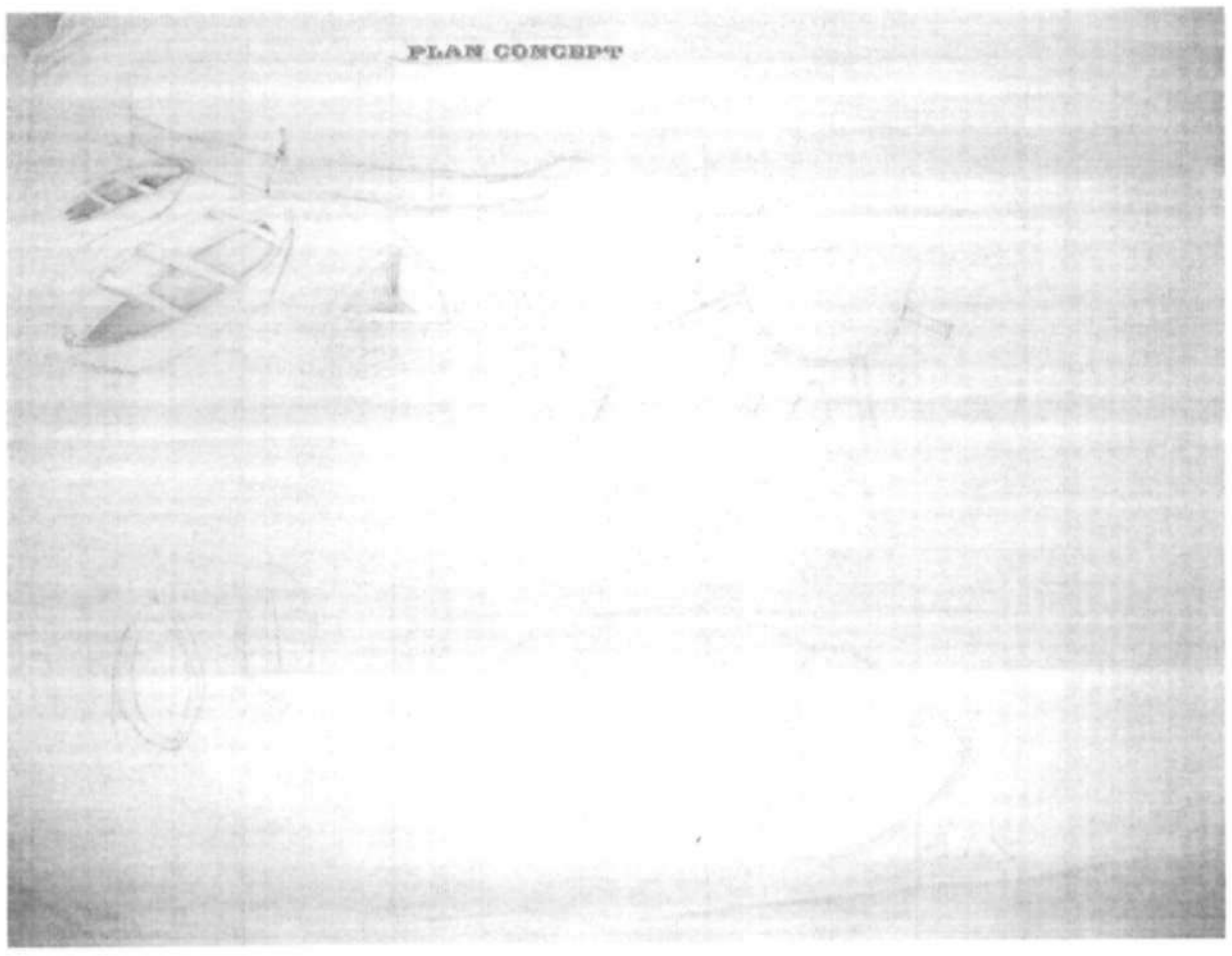


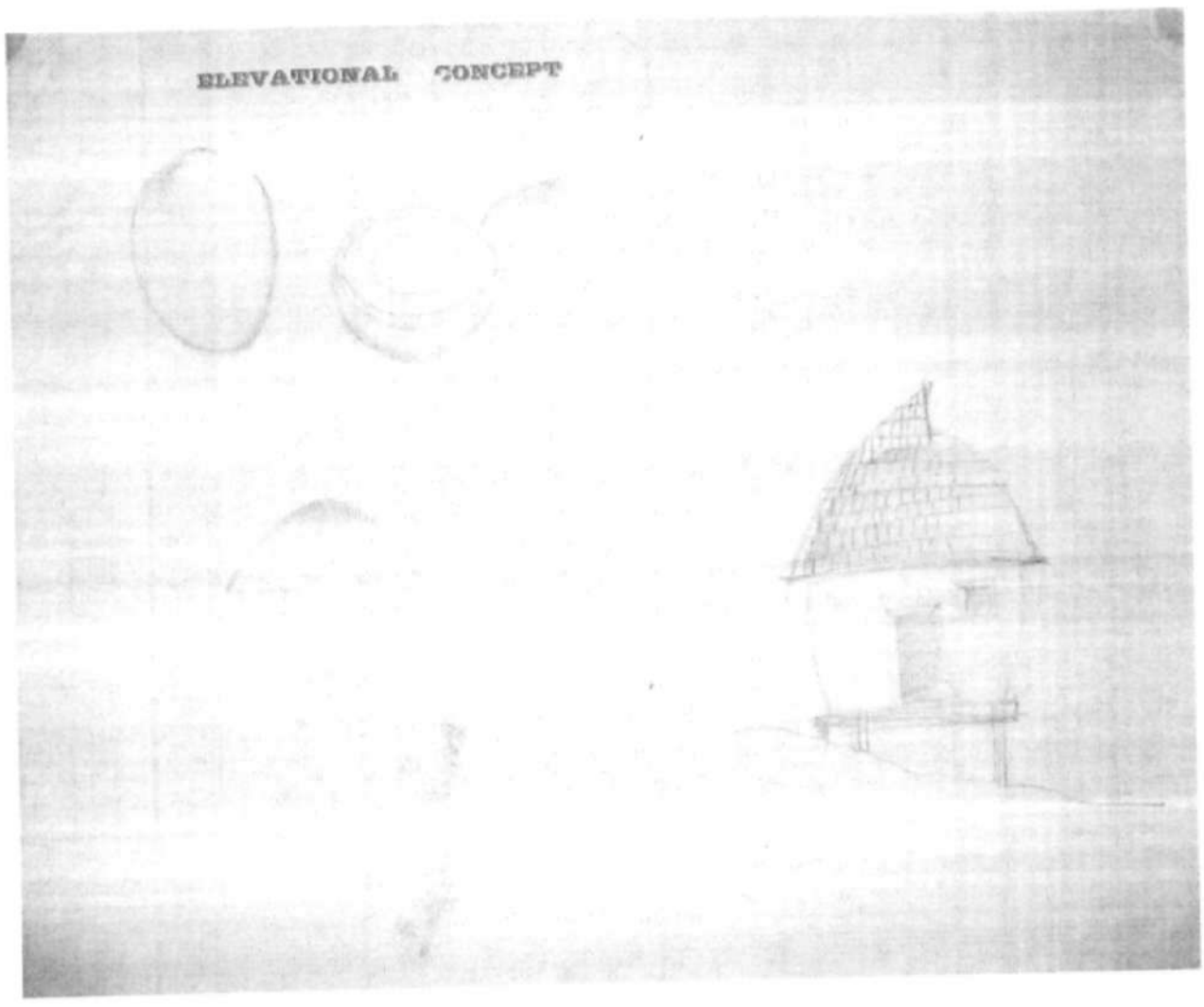




SITE ZONING


BADAGRY CREEK
PARKING AREA
ADMIN AREA
SERVICES
CATERING SERVICES
ACCOMODATION FACILITIES
OUTDOOR RECREATION LOCATED ON BEACHFRONT
ATLANTIC OCEAN

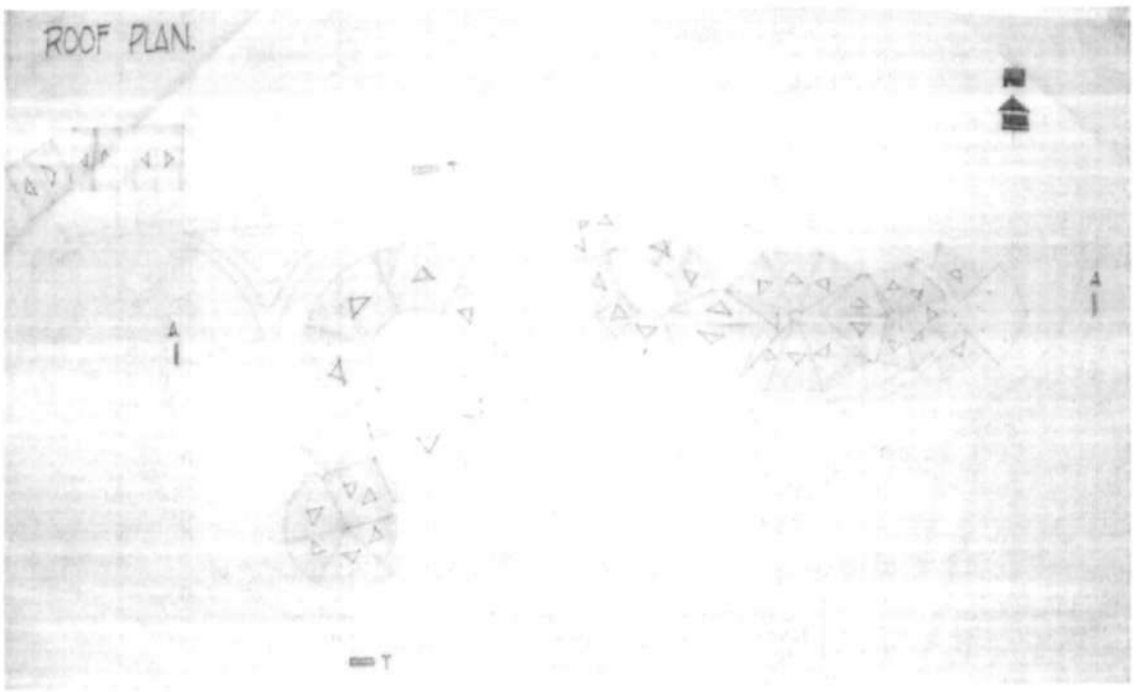

PLAN CONCEPT


ELEVATIONAL CONCEPT

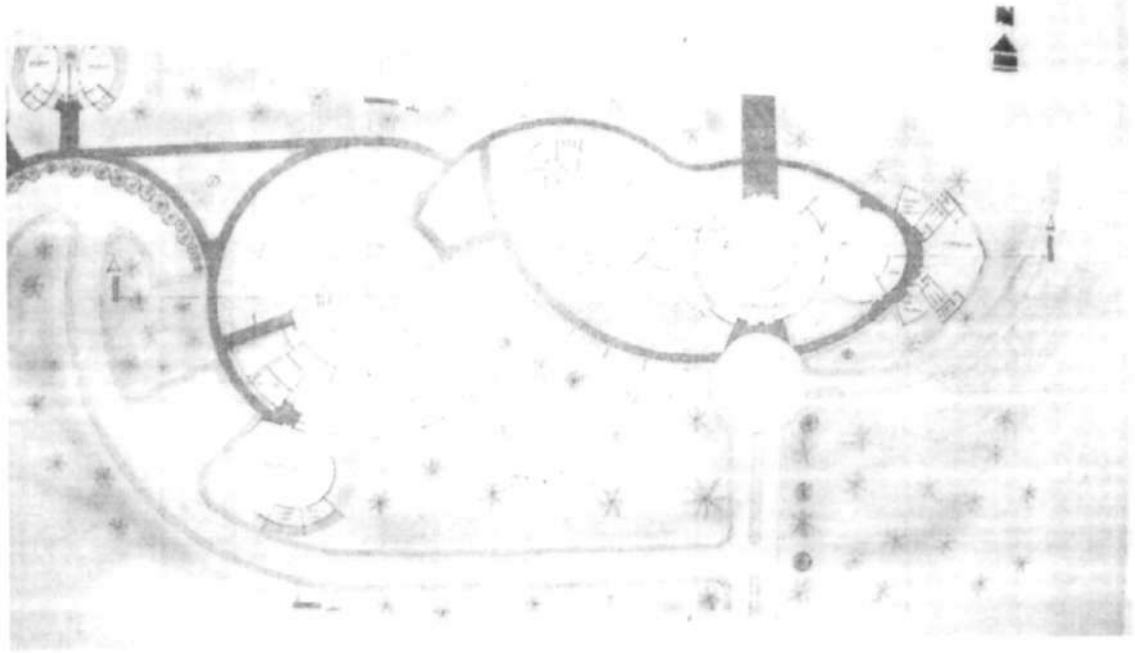
• SITE PLAN...

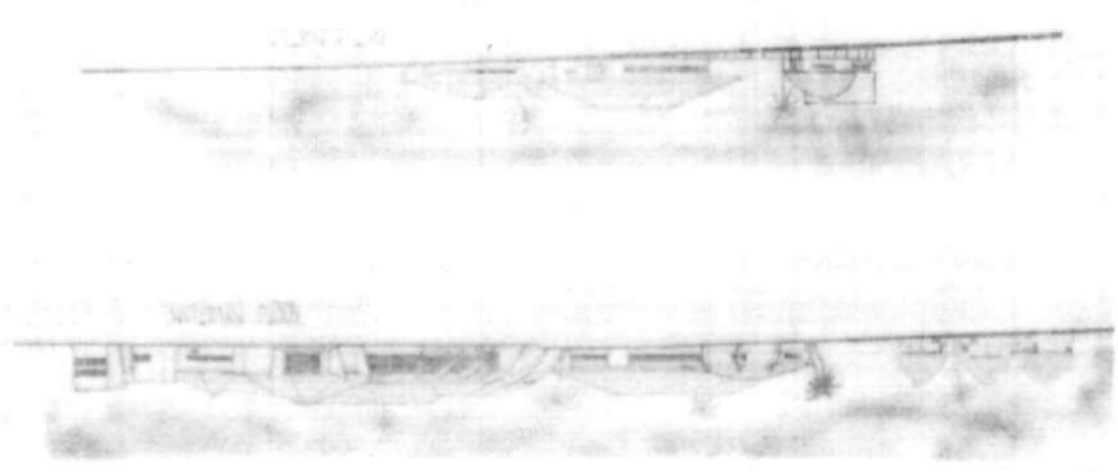


185414

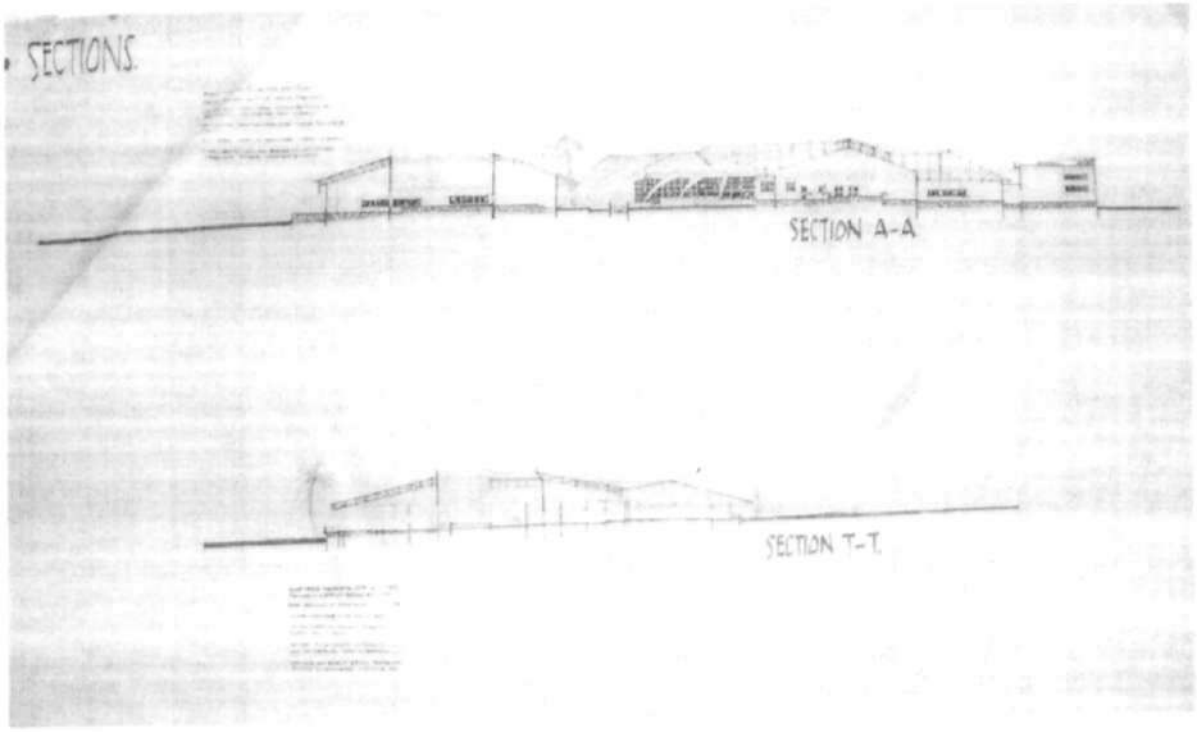

ROOF PLAN.

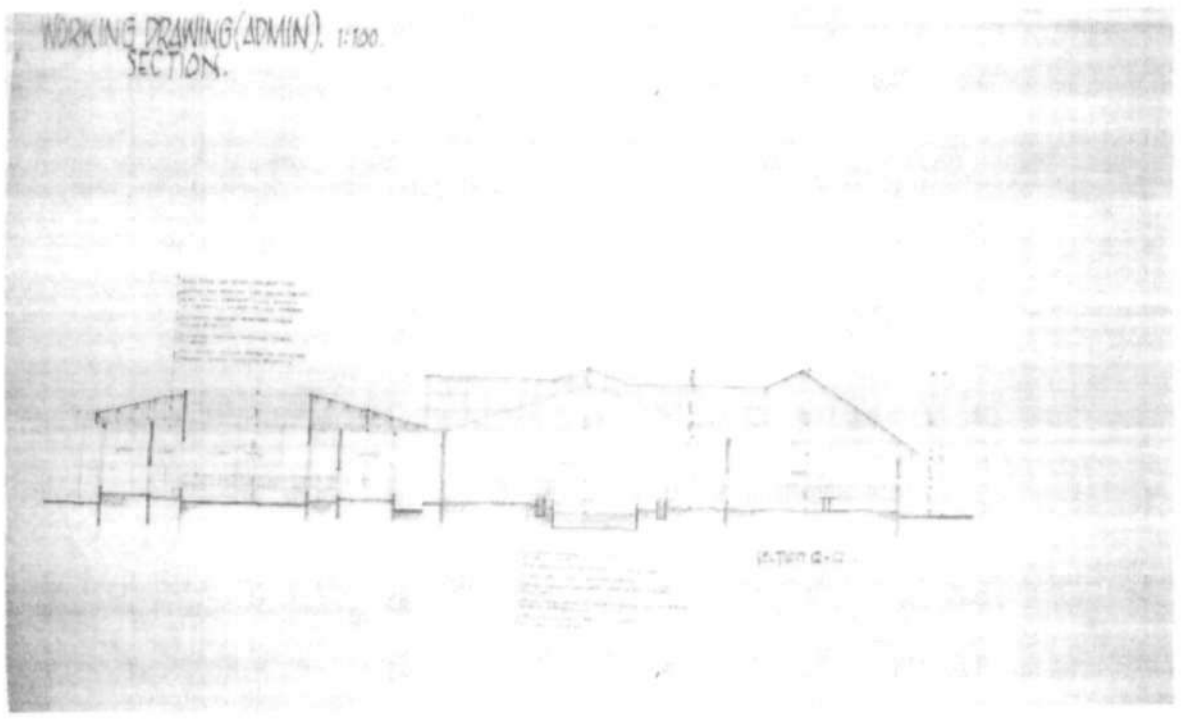
ROUND FLOOR...

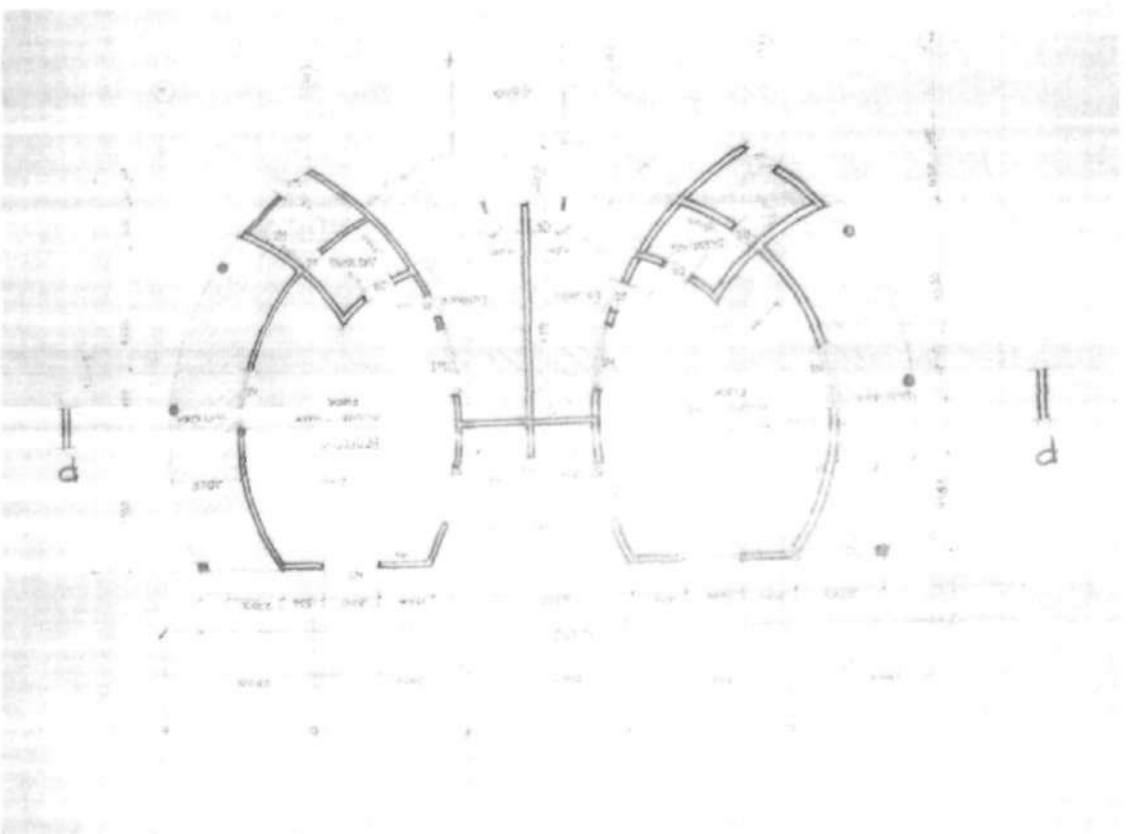




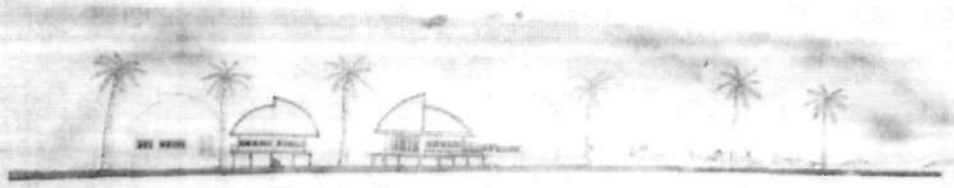
SECTIONS.



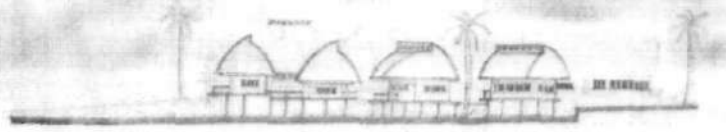

WORKING DRAWING (ADMIN). 1:100.
SECTION.



ELEVATIONS



NORTH ELEVATION.



EAST ELEVATION.