



UNIVERSITY OF NAIROBI

Collage of Architecture and Engineering

School of Arts and Design

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BDS 413: Project paper introduction

(Interior design specialization)

**INTERGRATING KIKUYU ARTIFACTS AND RECYCLED BOTTLES TO CREATE  
APPEALING, ACCESSIBLE, APARTMENTS, FOR THE PHYSICALLY DISABLED, IN  
DELIGHT APARTMENTS, IN NAIROBI**

By B05/38185/2016

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This project paper is submitted in partial fulfillment of the requirement for the Bachelor of Art in Design Degree submitted to the school of the Arts and Design, University of Nairobi.

Submitted 14 April, 2020

**Declaration**

I Nderitu Mary Watetu, hereby declare that this is my original piece of Work and it has not been presented for the award of Degree in any other university. Where the supporting scholars have been used, I have clearly indicated in the normal and the standard way.

To the best of my knowledge I have not committed any plagiarism or deliberate omission in the acknowledgement of original works by others

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### **Dedication**

I dedicate this paper to the Heavenly Father, who encouraged, strengthen and has enabled me to achieve this far faithfully.

I also dedicate this paper to my parents Mr. and Mrs. Nderitu, my sisters ,Kirigo, Wagaki and my brother, Mubia ,who never gave up on me even in the tough times in my education they stood by me at all times, may God reward you

## **Acknowledgement**

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My sincere gratitude, also go to all the lecturers of the School of the Arts and Design who have equipped me with design knowledge ,which I feel I have a different perspective towards a perfect, inspired good design

Special gratitude also, goes to the Management and the entire staff of Delight Apartments led by the Owners, Mr. and Mrs. Kariuki, for their time and unfailing willingness to assist me with Information wherever I needed it and allowing me to use their premises for my research. My gratitude also goes to the respondents for giving me their time so that I could do my research.

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## **Abstract**

The Integration of the Kikuyu cultural elements in sustainable interior spaces for physically disabled people ,forms the basis of this research paper. This paper seeks to establish the application of kikuyu artifacts in the creation of appealing and accessibility purposes in residential.

The research will also examine the ability of design, to promote African Cultural heritage in the residential using locally available sustainable materials and at the same retaining appealing and contemporary designs.

There has been a big change worldwide, which is, the negative environmental changes which is alarming ,due to peoples consumption practices which have led to environmental .degradation. The environmental crisis, they come from many sources but one of the biggest contributors to waste, pollution and depletion of natural resources is the building and construction industry. The field of interior design is a part of this industry which plays a part in contributing to the quality of the built and natural environments through the use of sustainable design principles.

This research paper will be divided into five chapters. Chapter one will describe the introduction and background leading to this study, problem statement, objectives and the research questions, significance of this study and the scope of the research, as well as the limitations of the study. Chapter two entails a critical analysis of theoretical literature on sustainability, sustainable design and Contemporary African Design and how it has contributed to appealing and sustainable interior design ,in Chapter three will outline the research design and Methodology used by the researcher to collect, analyses and present data of this study. Chapter four will contain a qualitative analysis research, the presentation and interpretation of findings then lastly, is chapter five will be a summary of the findings, and the researcher's Recommendations on the four major areas of interior design for the residential with regard to previous techniques used by previous designers that will be vividly discussed in chapter two

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## Definition of Terms

**Sustainability:** Meeting the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland, 1987)

**Sustainable design:** Design that minimizes environmental impact by using methods, products and processes that are respectful to the earth's life cycles, reflects a collaborative interaction between people and the earth and conserves natural resources for current and future generations (Ryn, 2007).

## **CHAPTER 1**

### **1.0 INTRODUCTION OF THE STUDY**

#### **1.1 Introduction**

In this research we shall be dealing with three main things accessibility of physically disabled people, plastic bottles which will be used for aesthetic together with the kikuyu culture. This three will be the dominating topics in this research, but the main one is accessibility of physically disable Approximately 650million are persons with disability in the world, which is ten percent the number of the global population, According to United Nation, Convection of the Rights of Persons with Disability. The idea behind accessibility is that all people are handled with equal opportunities in everything in job to building enablement. In addition to accessibility, it is important to encourage one, to perform simple task like using a dispenser for a glass of water, use of the washroom, through this a person is able to fill useful, Stolman, (2019).

The ADA which means the American Disability Act, prohibits discrimination against individuals with disability in all areas of public life including transportation, schools, jobs and public and private places that open to general people. The main purposes of the act are to make sure that people with disability have equal rights as everyone else. In accommodation, there minimum standards set for alterations and new construction of facilities. It also requires public accommodations to remove barriers in existing buildings where it is easy to do so without much difficulty or expenses. It also directs businesses to make changes on handling people with disabilities and also requires steps necessary to communicate effectively with customers with vision, hearing and speech disabilities. ADA is regulated and enforced by the US, United States department of Justice, Kent, (2017).

On sustainability there is the use of plastic bottles, specifically soda plastic bottles. Where plastic take 450-1000years to decompose, the same applies to plastic bags to the environment, SciVee (2011) we get to see that plastic bottles take too long to decompose, so it is best to recycle, reuse or repurpose the plastic bottle but on this research we will reuse the plastic bottles for aesthetic purposes.

The Kikuyu culture is a Bantu tribe that neighbors the Embu, Mbeere and Meru tribes around Mount Kenya, Kikuyu speak the kikuyu language, and most of them live around the fertile central highlands of Mount Kenya where they grow tea and coffee, but mainly kikuyu tend to grow all sorts of foods, Middleton, (2017). On the Kikuyu culture, specifically we shall deal with their artifacts like the guards that were used for porridge, winnowing tray that was used for winnowing food stuffs and even the kikuyu colors which are the brown

In this chapter, its aim is to provide structure and an overview of this project proposal. The chapter outlines the background of the study, problem statement, highlight objective, research questions, significance of the research, limitation of the study, scope of the study and finally conclusion

## **1.2 Background of the study**

Delight apartments, is a residential building located in Diani road, off Ole-Dume Road, it is close to Bangladesh High commission. Delight is an apartment which is light yellow in color; it is well constructed and quite firm in stone. The apartments cover a one acre piece of land, where it has four blocks, Block A, B, C and D, the apartment makes a rectangle in that there is an open space in between the blocks where there is a playground or rather there few trees planted and grass. In each block, it consists of five floors where the five floor is a pent house. In each floor, it consists of three houses, where each house consists of four bedrooms, where each bedroom has a shower and a toilet, a kitchen and a living and a dining room. The ground floor is an open car parking, in that each house has an allowance of three parking spaces, to get to the first till the five floors there is the use of stairs only, therefor.it has limitation of the residents living there

## **1.3 Problem statement**

Being viewed as an issue affecting globally, accessibility to apartments for physically disabled people is an issue that has not been fully addressed. This problem is also located greatly in developing countries and to specific we are going to ideal with Nairobi, Kenya which happens to be one of the countries where accessibility of people with physical disability in apartments is a problem.

## **1.4 Objectives of the study**

- I. To investigate whether delight apartment accessible for physical disabled persons
- II. To explore kikuyu artifact and plastic bottles how they have been applied in interior design
- III. To identify which opportunities are there for kikuyu artifacts and plastic bottles in Kenyan residential
- IV. To propose ways in which Kikuyu artifacts and plastic bottles can integrated for exterior and interior spaces in residential

## **1.5 Research Questions**

- I. How to investigate whether delight apartment accessible for physical disabled persons?
- II. How to kikuyu artifact and plastic bottles have been applied in interior design?
- III. How to identify which opportunities are there for kikuyu artifacts and plastic bottles in Kenyan residential?
- IV. How to propose ways in which Kikuyu artifacts and plastic bottles can integrated for exterior and interior spaces in residential?

## **1.6 Significance of the study**

It is anticipated that this study will enable the investors of Delight apartments to consider the idea of accessibility in the apartment and to consider persons with disability, also this study enables academic disciplines on the reason to why there are some accessibility problems in some apartments in Nairobi

## **1.7 Limitation of the study**

In this study there are factors that are limiting, the study to be done fully which is: time constraints and financial constraint

### **1.7.1 Time Constraints**

Time is a factor that is a challenge because the study is broader and needs a longer time for it to be fully covered. Due to this not all areas and aspects of the site will be covered and analyzed in the proposal designs which will be recommended once the research is done.

### **1.7.3 Financial Constraints**

The costs incurred during the research such as site visits, concept creations and presentations in forms of models and prototypes will entirely rely on the researcher's financial capability.

## **1.8 Scope of the study**

The scope of a study enables to explain the extent to which the research area will be explored in the work and specifies the parameters within the study will be operating. In this research we will use three types of scopes, which are: Conceptual scope, Contextual scope and Geographical scope

### **1.8.1 Conceptual scope**

The study will focus on apartments for physically disabled, where the kikuyu artifacts and bottles will be used in the exterior and interior of the apartments

### **1.8.2 Contextual scope**

The result of this study will be retrieved primarily from sources like interviews, case study method, observation and also photography and other information will be obtained from journals, magazines and even past research project papers from designers and even websites.

### **1.8.3 Geographical scope**

The research is based in an apartment called Delight apartments, which is located in Diani road off Ole-Dume close to Bangladesh high commission.

## **1.9 conclusions**

In this chapter we have been able to have rough idea of the problem of delight apartment regarding the accessibility for physically disabled people. The objective and also the research questions of the study have clearly been stated to show the need of the research being done, its significance and lastly the scope of the study which is in Diani road off Ole-Dume road. Through this information, it will assist in coming up with a solution for the design problem in

## CHAPTER 2

### 2.0 LITERATURE REVIEW

According to Galvan, (2016), a literature review is a text of a scholarly paper, which includes the current knowledge including substantive findings, as well as theoretical and methodological contributions to a particular topic. Literature reviews are secondary sources, and do not report new or original experimental work. The purpose of a literature review is to give an accurate and complete accounting of the current state of knowledge for whichever research question is being addressed. It is an essential feature of scholarship because without it the reader cannot judge whether the author is well-informed or whether the work that is being presented is novel and original.

#### 2.1 Introduction

According to null, (2013), universal design is that systematic creation of products that are accessible to people with a wide Range of abilities, disabilities and other characteristics, the products also accommodate individual preferences and abilities. On designing any product there is a lot that is usually considered that is the aesthetics, engineering options, environmental issues, safety concerns, industry standards ,and cost .The same way there is consideration in designing universal design there is principals that are usually considered in designing products ,Sheryl(2009).

The universal design were developed in 1997 by the working group of architects, product designers, engineers and environmental design architects, that were led by the late Ronald Mace in the North Carolina state university. The purpose of the principles is to guide the design environments, products and communication. According to the center of Universal Design, the principles may be applied to evaluate existing designs, guide the design process and evaluate existing designs, guide the design process and educate both the design process and educate both designers and consumers about the characteristics of more usable products and environments, Sheryl (2009).

According to Sheryl (2009), there are seven universal designs, which include;

**Equitable Use**-The design is useful and marketable to people with diverse abilities It provides the same means of use for all users: identical whenever possible; equivalent when not, It also avoids segregating or stigmatizing any users. Provisions for privacy, security, and safety are equally available to all users and the design is appealing to all users.

**Flexibility in Use**-The design accommodates a wide range of individual preferences and abilities, It provides choice in methods of use, It accommodates right or left handed access and use, It facilitates the user's accuracy and precision, and It provides adaptability to the user's pace.

**Simple and Intuitive Use**-Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level, It eliminates unnecessary complexity, It is consistent with user expectations and intuition, It accommodates a wide range of literacy and language skills, It arranges information consistent with its importance, And it provides effective prompting and feedback during and after task completion.

**Perceptible Information**-The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities, It uses different modes (pictorial, verbal, tactile) for redundant presentation of essential information, It provides adequate contrast between essential information and its surroundings, It maximizes "legibility" of essential information, It differentiates elements in ways that can be described (i.e., make it easy to give instructions or directions),and It provides compatibility with a variety of techniques or devices used by people with sensory limitations.

**Tolerance for Error**-The design minimizes hazards and the adverse consequences of accidental or unintended actions, It arranges elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded, It also provides warnings of hazards and errors, It provides fail safe and It discourages unconscious action in tasks that require vigilance.

**Low Physical Effort**-The design can be used efficiently and comfortably and with a minimum of fatigue. It allows user to maintain a neutral body position, It uses reasonable operating forces, It minimizes repetitive actions, and it minimizes sustained physical effort.

**Size and Space for Approach and Use**-Appropriate size and space is provided for approach, reach, manipulation, and use, regardless of user's body size, posture, or mobility, It provides a clear line of sight to important elements for any seated or standing user, It makes reaching to all components comfortable for any seated or standing user, It accommodates variations in hand and grip size, and It provides adequate space for the use of assistive devices or personal assistance. In this research, size and space for approach and use is what we will use, since it is the one that accommodates physically disabled persons.

## 2.2 Sustainability Philosophy

The daily life of humanity was dominated by technology after the industrial revolution. People began migrating from their villages to settle urban areas, industrial sites and cities. Structures were increased in the city so more trees were cleared to make space for buildings and industries and within time, there was more occupancy compared to more forest areas. On the aim of creating more advance



houses, natural areas were extremely destroyed. The more the advancement in housing, the more industries were established the more the amount of fuel consumption increased every year and more waste was released into the environment depleting it more. There was so much depletion that researchers and scientists realized what was happening, that there was an environmental crisis the world was facing, they started to focus their Studies on the cure so as to find ecological balance in nature. The term sustainability became important in political, social, and scientific studies at this point which were from 19<sup>th</sup> century (pugh, 2014).

Sustainability studies started being focused on the ecological system then , Sustainable development became a problem in international commissions especially the Brundtland Commission that happened in 1987 where they declared a report about the leading items in sustainable development. In Brundtland commission, Sustainable development definition is to ensure that everybody whether from poor or rich countries, are living currently as well as in future generations can have their basic needs without jeopardizing the natural systems on which life on the earth is dependent (pugh, 2014) (Brundtland, 1987).

In sustainable development, there are three categories: social, environmental and political, but environmental sustainability is the one that is in connection with other two Environmental sustainability or ecological, is the alternative that people have all turned towards now (Ryn,cowan, 2013)

By the development of Sustainability movement, it had such a positive response to environmental Crisis the world was and still is facing. Humans tend to create cultures and places that have enough integrity to persist for future generations and beyond. The same thing humans have a responsibility in creating sustainable environments and since interior designers create the most environments for the occupation for humans, interior environment should be the first item human needs and ensure sustainable environments (Ryn,cowan,2013).

### **2.3 Sustainable Design**

Sustainable design is the combination of sustainability and design to come up with solutions to environmental problems. Many definitions of what sustainable design is have been made by different designers, researchers and architects. For some it has many names such as ecological design, green design, eco-friendly design, and environmentally friendly design among others. According to Ryn and Cowan, 2013, it any form of design that minimizes environmentally destructive impacts by integrating itself with living process by minimizing resource depletion, minimizing energy and material use, reducing pollution and preserving habitats (Ryn,cowan, 2013). Since environmental crisis is design crisis, sustainable design is the best approach to solve unsustainability in the built environment So as to create a sustainable world where every single human being is being accountable of his or her actions to protect the natural environment and being considerate of the needs of all future generations

and all living organisms, humankind must recognize that the current forms of agriculture, engineering and technology are deeply flawed and main causes of environmental crisis (Ryn,cowan, 2013). To be able to create sustainable

Environments, transformation of these practices are a necessity and design of products, buildings and landscapes with sustainable design approach is one way to start effecting this transformation.

### **2.3.1 Principles of Sustainable Design**

According to McLennan (2004) He says that humans have an amazing capacity to damage the habitat of all living things while building their own but also have the ability to heal the environment through good design. He goes ahead to say that sustainable design is the philosophical basis of a growing movement of individuals and organizations that literally seek to redefine how buildings are designed, built and operated to be more responsible to the environment and responsive to people outlines the principles of sustainable design as follows;

**The Bio mimicry principle:** This principle is based on respect for the natural systems .It is designing from nature, imitating nature and learning from nature. The natural world has been surviving for years and sustaining itself perfectly before influence by humankind. Therefore, nature should be the best teacher as it runs on sunlight and recycles everything (McLennan, 2004).

**Human vitality principle:** It is based on respect for people. It states that every design should be humane, efficient and not harmful to people. This principle governs healthy designs (McLennan, 2004).

**The ecosystem principle:** This principle stands for respect of a place. Design should draw from and respond to the uniqueness of the place. This can be achieved through drawing inspiration from the local ecosystem, consider the climate of the area and using of locally available materials (McLennan, 2004).

**The seven generations principle:** This represents respect for the cycle of life. This states that any design should also consider the future generations. Actions of today should think of the impact of today's decisions on the next seven generations (McLennan, 2004).

**The conservation principle:** This principle is for respect for energy and natural resources which focuses on use of renewable resources, minimize consumption of non- renewable resources, minimize wastage of resources, and recycle, reuse and repurpose (McLennan, 2004).

**Holistic thinking principle:** Also known as respect for the process, deals with ways to ensure sustainability through changing the processes so as to get the desired result. The impact of the whole process from acquiring materials to production of the design is focused on so as to ensure sustainability by avoiding wastage during the whole design process (McLennan, 2004).

From the six principles of sustainable design by McLennan, 2004, the fifth principle, the conservation principle, will be the focus of the research. The conservation principle is about respect for energy and natural resources. It focuses on rapidly renewable materials and other renewable resources (McLennan, 2004). This principle will also be supported by the ecosystem principle through using locally available materials which belong in the category of sustainable materials.

### **2.3.2 Sustainable Design in Interior Design**

Interior Design industry is a fast-growing sector in Kenya, People have started to understand and respect Interior Design than before. Since humans spend 80% of their time daily on interior spaces, it would only seem fit for design of this space to be effective and efficient. Sometimes the design can harm the environment most through the materials used and the processes. Therefore, Interior designers need to focus on their designs and process to ensure that they do not harm the environment (Winchip, 2011). Building design significantly influences environmental impacts in the short-term and long-term. Sustainable design can be adopted in interior design practices through selecting furniture and building materials manufactured from renewable resources which can hence be reused and recycled and remain durable. The choice of materials for interior finishes plays a great role in reducing harmful effects to the surroundings.

Environmentally sustainable Interior Design (ESID) has become a key issue in Interior design practice but still the frequency with which Interior designers make sustainable choices in real practice is still limited particularly in material selection as some designer still prefer conventional materials. Traditionally interior designers focused on aesthetic and functionality of the interior and exterior spaces and the luxury of the space and looking at the impacts to the environment, energy saving and the impact on people.

However, in recent years when the world has been emphasizing Sustainability Development, designers have focus on healthy sustainable interiors and exterior spaces. Since materials are a key factor in design, use of sustainable materials would be one critical way to ensure environmental sustainability (Vezzoli ,Manzini (2008).

### **2.4 Sustainable Materials**

According to Sayigh, 2013, Sustainable materials are materials used throughout our consumer and industrial economy that can be produced in required volumes without depleting non-renewable resources and without disrupting the established steady-state equilibrium of the environment and key natural resource systems. Examples of sustainable materials are bamboo, wood, hemp, wool ,linen, straw, clay ,stone, beeswax and coconut

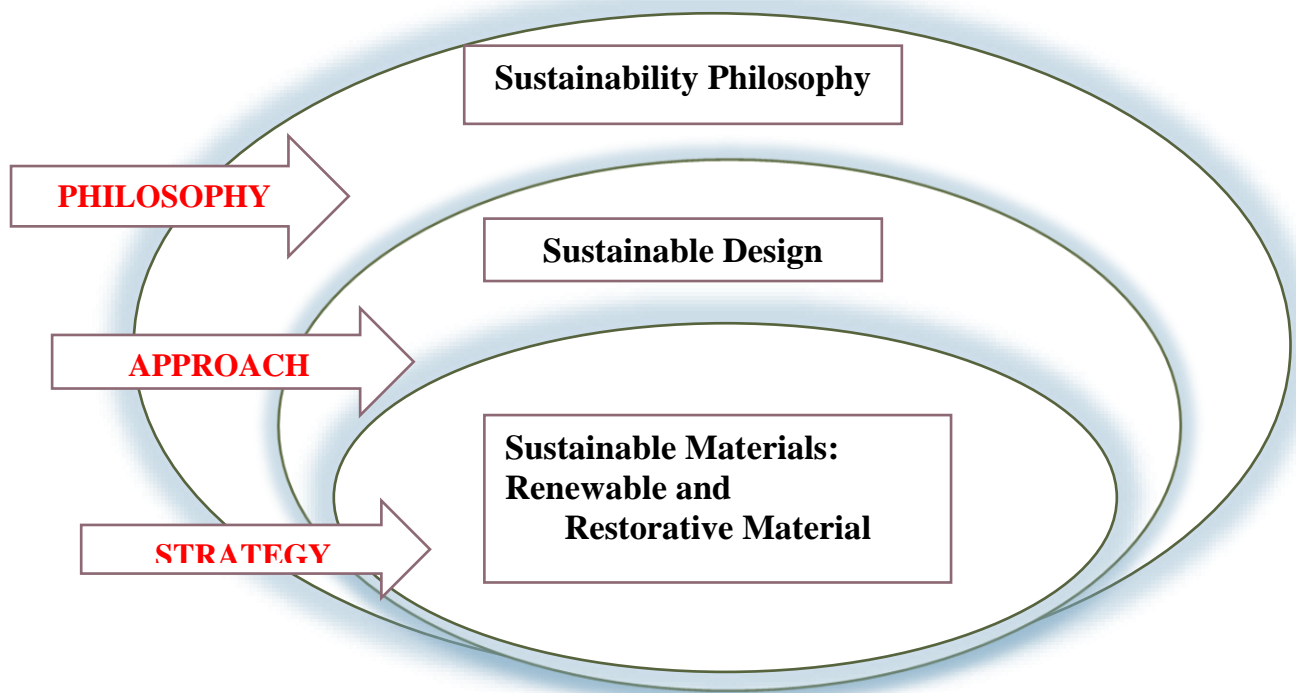


Figure 2.1: Environmentally Sustainable Design (Source: Author, 2020)

The philosophy of sustainability is broad, sustainable design is one approach to Ensure sustainability and the strategy to this will be sustainable materials as shown in figure 2.1 above. For many years design has been conventional where use of non- Renewable materials was at high rate and people focusing on high quality materials such as steel but with the need of Sustainability movement, designers have decided to consider the environment and so have opted for sustainable design in terms of materials and therefore use of sustainable materials; renewable materials and restorative materials. Restorative materials are recyclable materials or materials which are waste for one process and become food for the next process. For example, small pieces of wood that are waste can be glued together to make a piece of furniture (Sayigh, 2013) (Ryn, cowman 2013).

#### 2.4.1 Renewable Materials

According to Miller.(2015), renewable materials are those which can be manufactured or generated quickly enough to keep pace with how fast they are used up. Non-renewable materials, including materials for energy sources, are those which take a long time to renew and are generally used faster than they can be regenerated. renewable materials include: linseed, straw, cotton, wheat, sunflowers, natural rubber, bamboo, and cork.

Bamboo, eucalyptus, whistling pine and Sisal will be the main renewable materials that will be used in this project . The reason why these two materials are the main materials is because they are locally available in the region of the site. Some other material that will be used is organic cotton. But the main sustainable raw materials are bamboo as it is sustainable, highly sustainable, has tensile strength equivalent to that of steel, is flexible and also has hardness of hardwoods (Lefteri, 2013).

Bamboo is a futuristic sustainable material in furniture production and in interior finishes and should be highly applied because of its characteristics and also the aesthetic value it has. Due to its flexibility bamboo can make furniture pieces of any form and still have strength to hold load intended. The fiber obtained from the bamboo can be used in making fabrics that can also be used in upholstering of furniture. Since in Kenya bamboo is not easily available, bamboo can only be used in small products such as accessories and light fixtures. Organic cotton is another renewable material that will be considered. Cotton is an eco-friendly material for textiles that is highly renewable, better for health and better choice for any textiles (Choudhury, 2017) (Yu, 2015).

Wood is a sustainable resource and is actually the most sustainable material in built environment compared to other materials like concrete, stone and metals. With increase in population, more trees are cut down for furniture, as construction material to make other wood products for the growing population and this became a problem since most trees take so many years to reach their maturity. Looking at most items they tend to be wooden, so just as there is trees that takes long to mature, there is also trees that take very few years to mature and they include: bamboo, eucalyptus, jacaranda tree, whispering pine, Azadirachta indica/Mwarobaini, kei apple and meli volkesi (Miller, 2015).

#### **2.4.1.1 bamboo**

Bamboo is one of the most important nature's substitutes for the endangered rainforest hardwoods. It is a quick-growing, versatile, non-timber forest product whose rate of biomass generation is unsurpassed by any other plants. With a 10-30 % annual increase in biomass versus 2-5 % for trees, bamboo creates greater yields of raw material for use. It is utilized extensively for a wide range of purposes. The strength of the culms, their straightness, smoothness, lightness combined with hardness and greater hollowness; the facility and regularity with which they can be split; the different sizes, various lengths and thickness of their joints make them suitable for numerous end products/purposes. The versatility of bamboo outmatches most tree species. It is known to be a natural and excellent raw material for manufacturing strong and sturdy furniture, handicrafts, and novelty items bamboo has characteristics and they are: An effective erosion control plant and natural control barrier due to its widespread root system and large canopy; reduces runoff, prevents massive soil erosion keeps twice so much water in the watershed; sustains riverbanks; protects surrounding environment during typhoons due to its height; regenerates and resilient even after strong typhoons; helps mitigate water pollution due to its high nitrogen consumption; minimizes CO<sub>2</sub> and finally gases (sequesters up to 12 tons of CO<sub>2</sub> from the air per hectare); and finally It generates up to 35% more oxygen than equivalent stand of trees. Adam (2003)

Bamboo is an important component of development wherein all types of people have adequate access to. It requires little attention during its growing/production cycle and can occupy the same ecological

niche as that of trees. It is well suited for agroforestry and healthy ecosystems. It requires only a modest capital investment to generate a steady income. Around the globe, a lot of individuals and communities are dependent on bamboo for their subsistence, shelter and every-day utilities.

No other plant material can rival the utility of bamboo. Even in the early years, bamboo had been used in many ways, not to mention the traditional use of bamboo in the daily life of the early people especially in Asia. Thomas Edison successfully used a carbonized bamboo filament in his experiment with the first light bulb. He also used a bamboo as rebar for the reinforcement of his swimming pool. Similarly, Alexander Graham Bell made use of bamboo for his first phonograph needle. To this day, an innumerable application of bamboo can be thought of. Adams (2003)

Bamboo is useful for various applications at different ages :like in 30days old it is good for eating, in 6-7 months it good for making baskets;also,2-3 years its used for bamboo boards or laminations, also 3-6 years it for construction and lastly in 6 years bamboo gradually loses strength up to 12 years old. Adams (2003)

#### **2.4.1.2 Eucalyptus**

Eucalyptus grandis, commonly known as the flooded gum or rose gum, is a tall tree with smooth a bark, rough at the base fibrous or flaky, grey to grey-brown. At maturity, it reaches 50 meters (160 feet) tall, though the largest specimens can exceed 80 meters (260 feet) tall. Its takes 10years to fully be mature also it can also stay or survive up to 250years.

Eucalyptus tree has many uses including: improves respiratory health, it boost immunity, reduces anxiety and stress, skin care, controls diabetes, inflammatory all this uses are gotten from the leaves but lastly which is it's a source of wood is the whole tree, and this is the use that will be used in the research. Eucalyptus wood is primarily harvested for use in the construction industry. Wood from these trees is used for heavy construction, such as building commercial structures including shopping centers and apartment complexes, and for crafting furniture and household accessories, such as bowls and wooden spoons. Beentje (1994)

Eucalyptus wood is relatively plentiful and inexpensive, which makes it a valuable item among woodworkers, carpenters and construction companies. Wood from these trees is generally flexible and easy with which to work. It is easy to cut and slice sand, polish and finish, and absorbs primers and paints quite well. Eucalyptus trees produce wood that is distinct in color and smell, which makes it valuable for aesthetic uses as well as commercial and industrial uses. Wood from these trees is red to rusty brown in appearance and darkens as it ages. The addition of a finishing coat can enhance the natural color of Eucalyptus wood, too, and gives dark crimson woods and shavings richer, more robust shades. Eucalyptus woods have loosely interlocked grains, which may have rippled or fiddle back patterns depending on growing conditions. Eucalyptus wood has a medium to coarse appearance

and texture, and is resistant to termites and other insects. When cut, this wood remains strong and dense, and it may last up to 20 years without decaying. Beentje(1994)

#### **2.4.1.3 Whistling pine**

Whistling pine is a good tree for plantations and in agroforestry systems. Seedlings and wildings may be used to propagate it. It also produces root suckers if roots are exposed. Nursery soil where they are to be raised may need inoculation by addition of soil from beneath mature trees. Are fast growing and prune to get clear bole. It coppices well when young. It takes 4 - 6 yrs. to mature. Beentje (1994)

Whistling pine has uses which include: it the highly regarded wood igniting readily even when green, and ashes retain heat for long periods (burns very well),It also yields heavy hardwood for furniture, poles (for house construction), posts, boat building (dhow masts) and tool handles, It is also used in paper making rayon fibers, also its bark is a source of tannin or dyeing and Lastly its root extracts are used in the treatment of dysentery, diarrhea and stomach ache. Beentje (1994)

It is rarely attacked by diseases and pests unless if grown under unfavorable conditions. However, infected trees exhibit symptoms of foliar wilt and cracking of the bark where blisters develop, enclosing a black, powdery mass of spores .Beentje(1994)

#### **2.4.1.4 Sisal**

Sisal is a natural plant fiber that is obtained from leaves of Agave plant. It is considered as an economic fiber in several countries such as Brazil, China, Tanzania and Kenya. In Kenya, sisal is among the top most cash crops ranking in number six after tea, coffee, sugar, pyrethrum and cotton. Because of increasing awareness of the need to use environment friendly materials, sisal fibers have recently recorded a rapid increase in demand. Increase in demand will result in improved prices hence sisal production becomes more profitable (Takamura, 1994). For last two decades sisal production in Brazil and China has been increasing but in Kenya that is not the case. The reason for decline of sisal production could be associated to the low cash flow from sisal. Even though Kenya is one of the largest producers of sisal in the world, Kenyan sisal is exported as a raw material hence registering low income (Phologolo, 2012). Eighty percent of Kenyan sisal is exported to other countries United Arab Emirates. Since the cash received from the exportation of raw sisal is of low rate, the production and yielding has been declining. In Kenya, one of the key points of vision of 2030 is to encourage value addition of Kenyan agricultural products. Sisal should be processed and then exported as high valued products. Sisal has various grades with lower grade used for paper making, medium grade for rope making and high grade for carpets (Rao, 2016) (Phologolo, 2012). Sisal as a renewable material is because it is a fast-growing plant. Sisal leaves can be harvested after two years. Harvesting continues for about nine to twelve more years before its lifespan is over. One sisal plant can produce over two hundred leaves in that one lifespan. During the lifespan each sisal plant also produces sisal poles which are used in construction (Phologolo, 2012).



### **2.4.2 Recycled Materials**

Recycled materials are products which is manufactured from solid waste or paper mill sludge, it is also byproducts that have been recovered or diverted from solid waste, and have been utilized in place of raw or virgin material in manufacturing a product. Recycled materials include: Glass, paper, plastic, and metals such as aluminum and steel are all commonly recycled. Dead plants, fruit and vegetable scraps can be recycled through composting. Sayigh, 2013).

This aspect of sustainable design focuses on what happens to individual components once a product gets to the end of its useful life. For years solid waste was being sent to landfills but in recent years people have become conscious of the environment and recycle, reuse and repurpose has been put into focus. Recycling should mostly be emphasized on products which are made from raw materials from non-renewable resources. These include glass, steel, iron, other metals and some types of wood which are not renewable such as mahogany (Sayigh, 2013). For this research recycling will be of plastic bottles.

## **2.5 African Culture and Design**

Since man resided on earth, there has been a long struggle for survival between man and nature. Man has had to live and find where he belongs in this world. In the process of finding his identity, he left behind traces of the achievements acquired over the years at different stages of development. The general knowledge of these achievements constitutes what is called culture (Ayisi, 1979). According to the Oxford Dictionary, Culture is defined as the customs and beliefs, art, way of life and social organization of a particular country or group. African culture has been the source of inspiration for African design for decades.

### **2.5.1 African contemporary interior design**

Africa being a big continent sprawling from Egypt and Morocco in the North down to South Africa, Namibia and Mozambique in the South, it has countries with diverse cultures with each and every country having its own unique style and designs. Interior design ideas in Africa usually incorporate neutral, earth tones combined with vibrant splashes of color and inspired by nature, wild animals, colorful fabrics and wood carvings. People get inspired by African culture for a number of reasons. For some, it is the dream of a photographic or hunting safari, and others appreciate it from a cultural history perspective (Afro Style Magazine, 2010). The animals of Africa have and will always be a central theme in Africa's artworks, designs and fabrics. This is mostly done through animal prints such as of leopards, zebras and giraffes. The colors of these animals are also used as color schemes of the designs mostly grey, brown, black, white and beige. The everyday reminders of these magnificent, wild beasts conjure feelings of strength, power and virility (Afro Style Magazine, 2010). Carved wood sculptures and masks are a strong tradition in Africa and are mostly used for interior decor. Contemporary African interior design is not about cluttering a room with masks, tables, chairs,



pictures and carved wooden ornaments or statues, in Africa less is always considered more. However, there is more to African design than use of animal prints, wildlife, wood sculptures and mask, many interesting and untapped sources of African design exist and if people such deeper than what is already known many interesting and aesthetic designs would be established.

## 2.6 Kikuyu culture

The Kikuyu is the largest group of ethnic. The Kikuyu belong to the Bantu from the Northeastern branch. Their language is most closely related to that of them Mbeere and the embu. Geographically, they are concentrated in the vicinity of the peak of Mount Kenya. At a population of 6.6 million as of 2009, they account for close to 17% of the total population of Kenya. John& Molly. (2017)

The Kikuyu tribe was originally founded by a man named Gikuyu. Kikuyu history says that the Kikuyu God, Ngai, took Gikuyu to the top of Kirinyaga and told him to stay and build his home there. He was also given his wife, Mumbi. Together, Mumbi and Gikuyu had nine daughters. There was actually a tenth daughter but the Kikuyu considered it to be bad luck to say the number ten. When counting they used to say “full nine” instead of ten. It was from the nine daughters that the nine (occasionally a tenth) Kikuyu clans -Achera, Agachiku, Airimu, Ambui, Angare, Anjiru, Angui, Aithaga, and Aitherandu- were formed. John,Molly. (2017)

The girls grew into beautiful young women, who each full moon wandered the lands around Kirinyaga in search of men so that they could bear children. They begged their father to appeal to Ngai for help. Finally he bowed before the Mountain, and Ngai commanded him to make sacrifice among the figs and light a fire. John, Molly. (2017)

The kikuyu had different types of clothing for different age sets, the clothing vary from the young to the old. Children in the traditional kikuyu tribe wore skins around their waist, they normally wore no cloth on their upper body .men also wore skins on their waist and walk bare chested but during the cold seasons, the covered themselves up to the knees with shukas. Women in the kikuyu tribe normally had their whole bodies covered with a shukas that was tied on their left shoulder and extends all the way to their ankles. The also wear earrings, *hangi*, necklaces, bracelets and anklets that are made from multi-colored beads and cowrie shells. (Fay, 2005).

In most homes Kikuyu homes, typical traditional Kikuyu food includes *githeri* ,maize and beans, *mukimo*, mashed green peas and potatoes, *irio* ,mashed dry beans, corn and potatoes, roast goat, beef, chicken and cooked green vegetables such as collards, spinach and carrots. Traditionally, the kikuyu prepare and cook their food in earthen or clay pots; the food is served in wooden plates. The kikuyu use three stones put together and firewood to make fire to cook their food .kikuyus mainly plant their own food in their gardens their do batter trade with their neighbors E.g. the Maasai. (Fay, 2005).

The sacrifice of a goat beneath a fig tree is still considered a way to call rain in times of drought, but in this first case it was a different form of life sustaining rain that Gikuyu sought. After the sacrifice he plunged nine sticks into a fire, and prayed. The fire erupted into an inferno, from which nine strong young men emerged. Giving thanks, Gikuyu took them back to his daughters, and the nine marriages were blessed by Ngai. Each of the daughters made her own homestead, and nine separate clans of the Kikuyu were born. The unity of these clans was known as the *Nyumba ya Mumbi*, in honour of their Mother. The peak of Kirinyaga has since remained the sacred home of Ngai. John, Molly. (2017)

The Kikuyu relied heavily on agriculture. They grow bananas, sugarcane, arum lily, yams, beans, millet, maize, black beans and a variety of other vegetables. They also raise cattle, sheep, and goats. They used the hides from the cattle to make bedding, sandals, and carrying straps and they raised the goats and sheep to use for religious sacrifices and purification. In the Kikuyu culture boys and girls were raised very differently. The girls were raised to work in the farm and the boys usually work with the animals. The girls also had the responsibility of taking care of a baby brother or sister and also helping the mother out with household chores. John, Molly. (2017)

Kikuyu culture is a combination of their traditional culture and newly revived post-colonial cultures. Most of the Kikuyu people are still rooted in their traditional culture, speaking Kikuyu as their native language, in addition to English and Kiswahili as the lingua franca. The majority are Christians and worship Ngai, whom they believe lives atop Mount Kenya and is the provider of everything. According to the Kikuyu, the family is the basic social, economic, and political unit in society. It is through the family system that education and traditions are taught and transferred through the generations. Additionally, it is through the family system that members are inducted into political systems. Traditional Kikuyu cuisine includes githeri, mukimo, irio, roasted chicken, and mutton, John, Molly. (2017)

### 2.6.1 The kikuyu Art

The Kikuyu had traditional things that they used for their daily living which they used to prepare meals and others to cook meals, today they are called kikuyu artifacts, which include:

**Gourds /calabash:** the calabash *kinya* was used to store cooked porridge which was sealed with a dry ear of corn *muchakwe*. This mixture was allowed to ferment for seven days, and is then served cold, typically in a dish made of half of a calabash gourd *kihuri*. The porridge has a smooth consistency and sweet and sour taste. (Fay, 2005).

**Winnowing tray:** the winnowing tray *gitaroro* is a flat woven tray made of rushes or twigs, which was used for winnowing dried grains such as rice, beans or even maize. Winnowing uses airflow since the grain is much heavier than the chaff, a light breeze is usually enough to blow the chaff away, while leaving the grain in place. (Fay, 2005).

**Kikuyu dance shield:** the dance shield ndome, was used by boys in coming of age ceremonies. It is a leaf shaped wooden shield, it has an arm grip carved from the solid, and it is decorated from carved zigzag designs painted in black, red and white,(ethinnika,2010)

**Clay pots:** the kikuyu clay pots, the kikuyu prepared and cooked their food in earthen or clay pots, where their staple food was *githeri*, beans and maize mixed in one pot,(mukimo),mashed beans,maize,potatoes and pumpkin leaves and *irio* mashed beans and potatoes . (Fay, 2005).

**Sisal tote bag:** the sisal tote bag *kiondo* is a hand-woven handbag made from sisal with leather trimmings. It is indigenous to the Kikuyu and Kamba tribes. It is a traditional Kikuyu basket women use for carrying their wares when they go to the market. . (Fay, 2005).

**Kikuyu cultural face painting:** the kikuyu face painting *guro* was done during the wars for military purpose or to scare the enemy, but today it is only done for ceremonies only. The face painting is done by use of clay and dried leaves and plants to create different hues and color, where kikuyu used white and red for their faces, they also put stripes which resembles the zebra prints and zigzag shapes mostly around the eyes ,as shown below in fig 2.2,the face painting done to the woman, on her forehead there is zigzag like markings and on her cheeks to chin are stripes that resemble that of a zebra



Fig 2.2kikuyu cultural face painted woman (Source: [www.pinterest.com](http://www.pinterest.com), 2020)

## 2.7 Exemplars and Design Champions.

### 2.7.1 Décor Interiors, Kenya

Décor Interiors limited is a company that specializes in design and fabrication of Eco-conscious Furniture and lighting made exclusively from sisal. Décor Interiors has been operating for over twenty years dealing with handcrafted products for Interiors. They are known for innovative and contemporary design styling for furniture collections which promote aspects of Sustainability through use of sustainable material, Sisal. They have made furniture for many enterprises, commercial, residential, retail and hospitality. These include Safaricom Limited in Kenya, Serena Hotels Maisha Spas in Nairobi and Mombasa, White chili store in Nairobi and Bogani Park residential Estate.

### **2.7.2 Bottled houses in Nigeria**

In the Nigeria, there is this issue of overcrowding ,poor sanitation ,inadequate provision of water ,poor water drainage, collection of garbage ,according to A man called Yahaya solved a lot of problems in The village of Yelwa, where houses are being build out of plastic bottles. Since building a good house or a house is quite expensive then, Yahaya solved the issue by introducing this bottled made houses.(Dare,2011)



*Figure 2.3 plastic bottles :(Source: [www.google.com](http://www.google.com))*

## **2.8 The Interior Design Process**

The Interior Design Process is a series of steps that a designer takes when working on an interior design project. When these steps are followed the designer is able to achieve the goals of the project. The steps of the interior design process are outlined below, they are not definitive but they are the recommended stages in order to achieve a successful outcome (Cahill, 2016).

### **2.8.1 Analyze the Brief**

Every design project begins when a client delivers a brief to the designer. The brief outlines what the client wants but since the client will likely lack design experience, it is important for the designer to carefully analyze all details given by the client and if necessary, to make further enquiries about the needs of the client. The success of an interior design project depends on not only the skills and creativity of the designer, but also their ability to answer the brief set by the client. A good brief will be as detailed and project-specific as possible and will outline the client's requirements and aspirations (Cahill, 2016).

### **2.8.2 Research and Gather Information**

Research is important to identify possible design styles and ideas which may also suit the needs of your client. In this stage the designer should gather as much information as possible that will help in bringing the clients vision to life (Cahill, 2016).

### **2.8.3 Conceptualization**

The next stage is usually conceptualization where the designer has to use information gathered to come up with ideas that solve the client's problem. Conceptualization starts with bubble diagrams to sketches, presentation drawings and models for more visual representation of the concepts. It is very important for the designs to successfully display the ideas in a way that the client can understand and visualize. (Cahill, 2016).

### **2.8.4 Obtain Client Feedback**

As an interior design project cannot be easily edited, like digital designs can, it is vital for a designer to get feedback from the client before proceeding with the implementation stage. Clients are often uncertain about what they really want so it is important to present the design concept in a positive manner and highlight the positive features of the design to the client (Cahill, 2016).

### **2.8.5 Implement the Design**

This involves realizing the design concept and seeing it come to life. This stage may require sub sections of its own depending on the size of the project. However it is impossible to say exactly how as the number of variables is almost unlimited but what is important is to plan this stage extensively before you begin by preparing and clearing the space, ordering materials in advance and having them at hand on the day as well as hiring the staff required to get the project completed on time and within budget (Cahill, 2016).

### **2.8.6 Evaluate the Design**

Reflecting on a completed design is important in order to ensure that a designer learns from experience and identify the successful parts of the design to allow them to replicate them in future design projects as well as identifying the parts of the design that did not go well in order to avoid or solve them in future designs. It may also be useful to get the opinion of others (Cahill, 2016).

## **2.9 conclusions**

In this chapter we have been able to understand the kikuyu culture, the materials that are used in general and exemplars also are mentioned who have inspired in each decision made to use each item since if for them it worked so perfectly, why not come up with one's design. In short this chapter has overview of materials of the items that have been designed.

## **CHAPTER 3**

### **3.0 RESEARCH METHODOLOGY**

#### **3.1 Introduction**

Research is very important in that it helps one to understand various things like the culture of a certain community, their values and norms, it also assists in understanding the society, research also assist in creating awareness in things that one didn't have the idea about, it also assists in knowing the truth about a certain situation that may have brought concern, helps also in having the knowledge and also the difference between good or bad, the truth also, through the knowledge of good, good and the truth it's easy to make the right choices. Khan,(2011).Through the knowledge of the importance of research, it was used to assist in this research.

#### **3.2 Research Design**

According to Yin, 2009 research design is a method that is systematic and a procedure used in collecting and analyzing measures of the variables specified in the research problem. Investigating the objectives of any research, two main ways are used in Research design, the quantitative research method and qualitative research method. In this study, qualitative research method is what was appropriate based on the objectives and research questions. Qualitative method is the best because its methods are more open and flexible and also can be altered as the research gets expounded. The main idea behind qualitative research is to understand, explore, explain, discover and clarify situation, feelings, perceptions, attitudes, values, beliefs and experiences of a group of people (Kumar, 2010).In qualitative research method, there is a slight similarity between the research design and methods of data collection, therefore research design can also be used for data collection. Like we view case study research design can be used both as research design and also data collection. Qualitative method also works best for the study since its most distinguishing feature of agreeing to the concept of respondent; the researcher makes every effort to seek agreement of the respondents with the interpretation, presentation study, experiences, perceptions and conclusions. The power-gap between the researcher and the study population in qualitative research is very smaller than in quantitative research because of the informality in structure and situation in which data is collected. Study designs in qualitative research approach are more appropriate for exploring the variation and diversity in any aspect of social life (Kumar, 2011). Under Qualitative Approach, there are five research designs namely Narrative research design, Phenomenology research, Grounded theory research, Ethnography research design and Case Study research design (Creswell 2009).The main objective of the research will be integrating kikuyu culture and recycled bottles to create appealing, accessible apartments for

physical disabled in delight apartments ,Nairobi .The above objective defines the research design for the study to be case study research design. According to Creswell (2014), case study research is a qualitative approach in which the researcher explores a case or multiple cases through in-depth data collection methods like observations, interviews, audiovisual materials and documents and then reports a case description and case-based themes. In the case of the research, it was concerned with the intensive study of the background, current status and sustainable design of a given institute, and firm, business or social unit. Since the study will be based on one site, Single Case Study Research Design will have since the study will be based on one site, Single Case Study Research Design will have to be used. This will provide an in-depth understanding of the case and develop an in-depth description and analysis of the case (Creswell 2009). The philosophies under research will also have to be based on the site of the research.

### 3.3 Target Population and Sample

The population is sometimes too big and so a sample population has to be chosen to represent the whole target population (Maina, 2012). Sampling is the process of selecting a number of individuals for a study in such a way that the Individuals selected represent the large group from which they were selected (Mugenda and Mugenda 2003). For this research, non-probability sampling method was used to determine the sample population. As indicated on Table 1 below, the sample Population that was used for the study within the site was; the owner, the manager, some workers and customers, few of residents of the area, respondents and designers were required to complete the study sample population.

*Table 3. 1 Sample population for the study (Source: Author,2020)*

| Category           | Frequency | Percentage% |
|--------------------|-----------|-------------|
| Investors(owner)   | 1         | 3.3%        |
| Manager            | 1         | 3.3%        |
| Workers            | 5         | 16.7%       |
| Residents          | 10        | 33.3%       |
| Interior designers | 5         | 16.7%       |
| Passers by         | 8         | 26.7%       |
| Total              | 30        | 100%        |



### **3.4 Data Collection Methods**

There are so many different types of data collection in qualitative research approach. The more effective data collection methods for the research was non-participant, Observation, Interviews and Photography. Each method has its own Conditions on when most effective which can be determined by the scope of the study and what is being investigated.

#### **3.4.1 The Case Study Method**

Case studies are usually concerned with how and why things happen, allowing the researching of contextual realities and the differences between what was planned and what actually occurred. Robert Yin in his book Case Study Research (2009), he suggests that the term refers to an event, an entity, an individual or even a unit of analysis. It is an empirical inquiry that investigates a contemporary phenomenon within

Its real-life context using multiple sources of evidence. The reason why Case study data collection method will work for the research is because it focuses on only the sample population, a particular issue, feature, site or unit of analysis. This method enables one to understand the complex real-life activities in which multiple sources of evidence are used. The use of case study to investigate an area of interest in depth is particularly

Appropriate for the research. Proposing use of case study method in the research is because of its advantages. Case studies are becoming useful in a research that needs to understand some particular Problem or situation in great-depth, and where one can identify cases rich in information. One advantage of using case study method is that it enables the researcher to gain a holistic view of a certain phenomenon or series of events and can provide around picture since many sources of evidence can be used. Another advantage is that case study approach can be used in capturing the emergent and immanent properties of life in organizations and flow of organizational activity. The case study approach will be very important in this research as a tool for data collection. According to Ranjit Kumar (2011), it is a very useful research design when exploring an area where little is known or where one wants to have a holistic understanding of the situation, phenomenon, episode, site, group or community. This design is of immense relevance when the focus of a study is on extensively exploring and understanding rather than confirming and quantifying. It provides an overview and in-depth understanding of a case, process and interactional dynamics within a unit of study but cannot claim to make any generalizations to a population beyond cases similar to the one studied (Kumar,2011).



### **3.4.2 Interview**

Interview as form of data collection, information is obtained through inquiry and recorded by enumerators. The reason why interview was appropriate for the research is because of the freedom to decide the format and content of questions to be asked of the respondents, select the wording of the questions, decide the way to ask the questions and the order in which they are to be asked. This process of asking questions can be either very flexible, where the researcher has the freedom to think about and Formulate questions as they come to mind around the issue being investigated during the interview, or inflexible, where the researcher will have to strictly stick to the questions decided beforehand including their wording, sequence and the manner in which they are asked. Interviews are classified into different categories according to this degree of flexibility and so the researcher will use both structured and open Interviews depending on content being collected and the respondent (Leedy and Ormrod 2013).

Structured or closed interviews are performed using survey forms, while in interviews notes are taken while talking with respondents. The notes are subsequently structured, interpreted, for further analysis. Open-ended interviews, which need to be interpreted and analyzed even during the interview, are carried out with great skills. Structured interviews are to be conducted with a pre-established and well-designed form. Focus are more on open interviews because of the almost complete freedom they provide in terms of content and structure. Structured interview was used for the designers so as to collect uniform information, which assures the comparability of data. Structured interviewing requires fewer interviewing skills than does unstructured interviewing (Kumar 2011). In qualitative research the responses of interviews are used as descriptors, often in verbatim form, and can be integrated with arguments, flow of writing and sequence of logic. Open interviews was dominantly used in in the research. Both open ended and closed, interviews can be face to face, by telephone or by other electronic media. For the case face to face interviews was the best since it collect information from gestures.

### **3.4.3 Observation**

Observation refers to collection of data through eye witness in the field of study being researched. It is categorized into two main types of data collection that is direct observation also known as participant observation and non-participant observation. For this research, non-participant research was used where the researcher observed and learnt about actual processes without getting involved with the population being studied. This involved keeping an eye on what is happening and record it (Leedy and Ormrod 2013). During the observation, detailed notes were made of what was being observed in a format that best suits the data collected as well as the situation. The main advantage of observation

is that as the researcher spends adequate time in the site and so gains much deeper, richer and more accurate information. The main disadvantage of observation is that the data can be biased if one is not careful (Kumar 2011).

#### **3.4.4 Photography**

Photography is a method of data collection is when the researcher takes photographs of the site and the conditions of area of study. Use of photography as data collection for the study is because photography is most sincere and unbiased method as it shows the facts of the study and not assumptions. Photography was used to capture diverse spaces of the environment to present a real time visual illustration of the data. Photography also served as a recording tool of the current state of the site of study (Gaskell, 2000)

#### **3.5 Data Analysis**

After the study was done, the data collected was analyzed so to understand it better and explain it further before doing the presentation. This is basically dissecting the field notes whereby regularities or patterns that will emerge from numerous observations made during fieldwork stage (Nachmias, 2008). Qualitative Data Analysis is the range of processes and procedures whereby we moved from the qualitative data that has been collected, into some form of explanation, understanding or interpretation of the people and situations that were being investigated. The idea was to examine the meaningful and symbolic content of qualitative data. Qualitative data analysis was a means of data reduction, that is, reducing large amounts of data to manageable small bits or representations. There are various methods for reducing qualitative data. Even if a lot of data was collected during the research, it should be analyzed and reduced to understandable size. Data reduction should be transparent so that others can recognize the assumptions and follow the techniques.

Content analysis is the procedure for categorizing verbal and behavioral data for the purpose of classification, summarization and tabulation. Content analysis can be done on two levels which is in Descriptive analysis which means describing what the data is like in describing photographs and the information that the photos carry. Analyzing the visual that is photographs has its own of methods. “A picture is worth a thousand

Words” must contend with “Images do not speak for themselves.” The researcher must interpret the visual and determine whether the task merits analytic methods and strategies not applicable to language-based data. The visual has always been a vital part of fieldwork investigation. It is simply the forms and formats, the representation and presentation of visual data that have evolved over these decades (Miles & Saldaña,2014).

Interpretative analysis which means to interpret what the data meant like notes wrote during observation mean. Narrative Analysis which transcribes experiences that have been described or said during interviews. Every interview or observation has narrative aspect. The researcher, had to sort-out and reflect up on the interviews, enhance them and present them in a revised format to the research audience (Longhofer& Hoy, 2014) (Miles & Saldaña, 2014).Discourse Analysis, this is a method of analyzing a naturally occurring talk or spoken interaction and all types of written texts. It focuses on how people express themselves verbally in their everyday social life and how language is used in everyday situations.

Sometimes people express themselves in a simple and straightforward way and sometimes people express themselves vaguely and indirectly. The analyst or researcher must refer to the context when interpreting the message because the same phenomenon can be described in a number of different ways depending on context (Longhofer &Hoy, 2014).Site Analysis was used to analyze data collected using case study method. Site analysis gives a better understanding of the site in easy ways like drawings and tables. Site Analysis is the best analysis for case studies.

### **3.6 Data Presentation Methods**

After analysis, the next step was presenting the information in methods that was understood by audience of the presentation. There are several methods of presenting data collected during the study such as use of tables and graphs.

#### **3.6.1 Tabulation**

This deals with presenting data in a tabular form. A table is an array of data in rows and columns. Tabulation condenses a large mass of data and brings out the distinct patterning a data in an attractive form. It enables comparison to be made easily among classes of data and takes up less space than data presented in narrative form. A table has the following contents: a title at the top describing the content of the table; the caption column heading; the stubs- row headings; footnote- brief explanatory information about the table, which is not self-evident; units of measurement (Maina, 2012).

#### **3.6.2 Graphs and pie-charts**

This method of data presentation illustrates data in two forms i.e. bar graph and linegraph e.g. the data tabulated in the table above can be presented using a bar graph as shown below. Using graph one can compare data directly, easily evaluate data and even know the trend of the data he/she is processing and analyzing (Maina, 2012).

#### **3.6.3 Photographic Representation**

The primary data collected by the use of photographs was presented photographically and complimented by descriptions to give a clear, comprehensive and detailed pictorial nature and state of

the site and their relevance to the research. The researcher used the pictures to capture and highlight information on the site that may not have been exploited and described in writing.

### 3.6.4 Narrative Presentation

The secondary data reviewed from the existing literature: books, articles, journals, thesis and magazines on the area of study was analyzed and presented in narrative form. Field notes observation was also narratively presented, clustered and transcribed under various specific thematic subheadings based on the researcher's objectives and research questions.

### 3.7 Logical framework

According to Blokdyk, (2019) , logical framework or log frame is a document that gives an overview of the objectives, activities and resources of a project. It also provides information about external elements that may influence the project, called assumptions. Below in table3:1 is a logical framework that was used for the research

*Table 3.2: Logical Framework (Source: Authors ,2020)*

| <b>Objective 1:</b> To investigate whether delight apartment accessible for physical disabled persons             |                                      |  |   |  |
|---|--------------------------------------|--|---|--|
| <b>Data Needs</b>   | <b>Data Source</b>                   | <b>Data Collection tool</b>  | <b>Analysis method</b>  | <b>Expected output</b>   |
| Exploring the current designs at Delight apartments and analyze if they are suitable for physical disabled person | Observation<br><br>Case Study method | Interview<br><br>Observation<br><br>Photography<br><br>Case Study method | Narrative<br><br>Analysis<br><br>Interpretive<br><br>Analysis<br><br>Content<br><br>Analysis<br><br>Site analysis | Knowledge about the existing design of delight apartments and knowing the problems that need to be solved. |

|  |  |  |  |  |
|--|--|--|--|--|
|  |  |  |  |  |
|--|--|--|--|--|

**Objective 2:** To explore kikuyu artifacts and plastic bottles have been applied in interior design

| <b>Data Needs</b>   | <b>Data Source</b> | <b>Data Collection tool</b> | <b>Analysis method</b> | <b>Expected output</b>   |
|---|--------------------|-----------------------------|------------------------|--|
| Existing material on sustainable materials and the kikuyu artifacts | Books<br>Journals  | Literature review           | Content analysis       | Acquire an understanding of how sustainable materials and kikuyu artifacts can be applied. |

**Objective 3:** To identify which opportunities are there for kikuyu artifacts and plastic bottles in Kenyan residential

| <b>Data Needs</b>                                 | <b>Data Source</b>                              | <b>Data Collection tool</b> | <b>Analysis method</b>                   | <b>Expected output</b>  |
|---|---|-----------------------------|--|---|
| Gather data on opportunities available for kikuyu | Interior designers,<br>Owner,<br>Manager<br>and | Interviews                  | Discourse analysis<br>Narrative analysis | To acquire acceptance of<br><br>Kikuyu artifacts for residential<br><br>interior design |

|  |           |  |  |              |
|--|-----------|--|--|--------------|
| artifacts and plastic bottles on residential | Residents |  |  | inspiration. |
|--|-----------|--|--|--------------|

| <b>Objective 4:</b> To propose ways in which Kikuyu artifacts and plastic bottles can be integrated for exterior and interior spaces in residential |                               |                             |                        |   |
|---|-------------------------------|-----------------------------|------------------------|---|
| <b>Data Needs</b>   | <b>Data Source</b>            | <b>Data Collection tool</b> | <b>Analysis method</b> | <b>Expected output</b>  |
| Design process  | Literature Interior designers | Literature review           | Content analysis       | Knowledge on how to Conceptualize a residential for interior and exterior spaces using kikuyu artifacts and plastic bottles |

### 3.8 Conclusion

This research methods described in this section aided the researcher in efficient Collection of data and analyzing data .

## **CHAPTER 4**

### **SITE ANALYSIS**

#### **4.1 Introduction**

In this chapter, will entail analysis presentation and interpretation of the collected data in Delight apartments. First, will start with analysis of the site, where will look at geographical profile of the site, the structure of the site, climatically condition of the site, the typography and also the vegetation. Still there will descriptive and interpretive analysis of the data that is collected through the use of photos and observation, through this data, there will be a great discussion in the four areas of interior design, which are landscaping, interior architecture, furniture and Exhibition and display. Lastly ,the findings from the interviews will also be discussed in this very chapter through narrative analysis and then presentation of the findings

#### **4.2Site Analysis**

According to Benson,( 2016),Site analysis is a preliminary phase of architectural and urban design processes dedicated to the study of the climatic, geographical, historical, legal, and infrastructural context of a specific site, so in this chapter there will be a site analysis for delight apartments

##### **4.2.1Profile of the Site**

Delight apartments, are apartments that were completed to be built by 2015,where the apartments are owned by three investors where Mr. and Mrs. Kariuki have the biggest shareholding which is 55% . Ole-dume road being a serene place to live, the three decided to build the apartment for the purpose that it would be a great place for people who enjoy quiet place. The Apartment is located in such an amazing spot since, it is close to great schools like: Makini, Rusinga and even Brae bun where they are close by. Not forgetting that that it's close to Ngong road where accessing shopping malls is so easy. The structure was built with the aim that it's a residential apartment where some residents use as office spaces.Over time the owners have noticed that their apartments have got a limitation for people who are physically disabled since,they have no lifts neither ramps and have been desiring for a solution to be created.

##### **4.2.2Geographical Location**



Figure 4.1: Map showing the location of Delight apartments (Source: [www.googlemaps.com](http://www.googlemaps.com),2020)

According to fig4.2 Delight apartments are situated in diani road off Ole –dume road which is close to Bangladesh high commission. Delight apartments is just next to the road of Diani road. Delight is close to Delight living which is a restaurant.

#### 4.2.3 Apartments structure



Figure 4.2: delight apartments (Source: Author,2020)

Delight apartments are apartments that have four blocks, where each block contains four floors, where each floor has three houses. In each house, there is a sitting room, a dining room a kitchen, with three bedrooms where in each room there is bathroom and a toilet separately. The research was able to cover the sitting room and dining area, kitchen, the three bedrooms and finally the landscape of the apartments. This apartment is built with basic materials which are building stones, metal, glass, wood, iron sheets and concrete.

#### 4.2.4 Climate condition

According to Strom,(2007),Climate is the long-term average of the weather in a given place. While the weather can change in minutes or hours, a change in climate is something that develops over longer periods of decades to centuries.so that climate can be predicted it should have to take like 30years of watch so as to be standardized that it is its climate range.Below in fig 4.4, shows the temperature of Nairobi where delight apartment is situated.



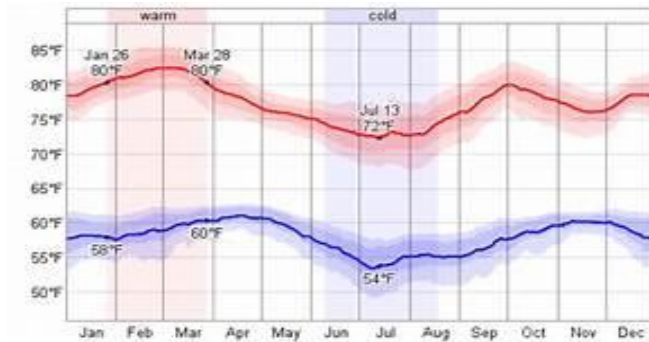


Figure 4.3: A graph showing climate in Nairobi (source: [www.google.com](http://www.google.com), 2020)

According to fig4.4, we see, the warm season lasts for 2.0 months, from January 25 to March 27, with an average daily high temperature above 77°F. The hottest day of the year is February 29, with an average high of 78°F and low of 58°F.

The cool season lasts for 2.6 months, from June 3 to August 24, with an average daily high temperature below 71°F. The coldest day of the year is July 13, with an average low of 53°F and high of 69°F (Weather Spark, 2019). while in the rainfall conditions, fig4.5 shows it well below:

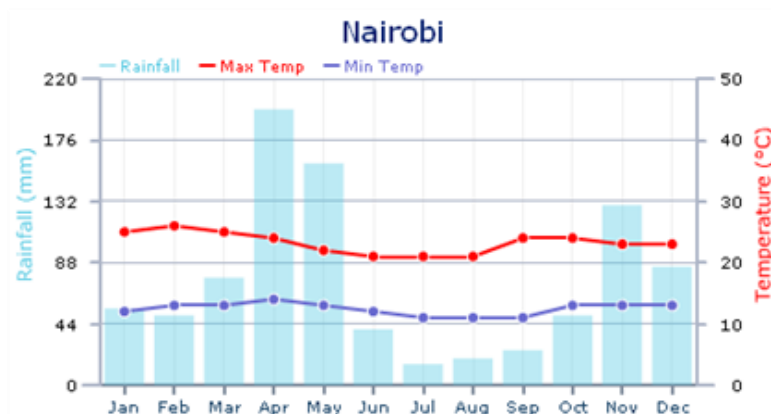


Figure 4.4: A graph showing rainfall in Nairobi (source: [www.google.com](http://www.google.com), 2020)

According to fig 4.5, The rainy period of the year lasts for 8.2 months, from October 1 to June 8, with a sliding 31-day rainfall of at least 0.5 inches. The most rain falls during the 31 days centered around April 21, with an average total accumulation of 3.5 inches.

The rainless period of the year lasts for 3.8 months, from June 8 to October 1. The least rain falls around July 10, with an average total accumulation of 0.1 inches. (Weather Spark, 2019).

#### 4.2.5 Typography

Delight apartment's lies at an elevation of 2.66oS and 38.14oE. The site is fairly flat with the site lying at 800m to 802m above the sea level

#### 4.2.6 Vegetation



*Figure 4.5: Vegetation cover (Source: [www.googlemaps.com](http://www.googlemaps.com))*

As seen in Figure 4.7above, the site has very few trees where the rest of the vegetation are a few shrubs and just plain grass that is beautiful in the rainy seasons after that it has patches of green and brown. The kind of trees are palm trees which mainly grow in the tropical areas but can also grow in dry areas which add moisture to the soil. the height of a palm tree can be from one meter to even eight meters high .

#### 4.3 Descriptive and Interpretive Analysis of the Existing Design

Descriptive analysis has been used to analyze photographs taken and interpretive analysis to analyze observations made during the research. According to the data collected from the target sample by the researcher, it was observed delight apartments was built with reference to sustainable design in the architecture of the hotel but not in design of the interior and exterior spaces. This can be seen from the general design of

the establishment and landscape. There is a disharmony of design on the interior spaces furniture and exhibition and landscape spaces. Though sustainable design has been applied in the architecture by use of sustainable materials such as sisal trunks, rammed earth and baked bricks, it has not been applied in interior architecture, furniture design, exhibition and display design and exhibition design. The most of the landscape which

used to be parking lot of distance trucks and buses is made of gravel and soil without ground cover.

#### 4.3.1 Landscape Analysis



*Figure 4.6: The exterior of Delight apartments (Source: author, 2020)*

According to fig 4.8, Delights apartments landscape is all leveled ,where there is a part where there is vegetation, that is in the middle of the apartments, where there few trees, which are palm trees and there is also shrubs and grass ,on the end of the apartment is the drive way where it is made of cabro all over even the packing which is the ground floor of the apartments



*Figure 4.7: existing floorplan of delight (Source: author, 2020)*

In fig 4.7 we get to view the floor plan of delight apartment as it is it has very few trees and the rest of the space is grass. In short the landscape is the focus point of all houses but it has no exciting view to look forward to viewing out of the window

#### 4.3.2 Interior Space Analysis

Interior space analysis is the detailed examination of the 3dimensional structure in a house ,or an office, an apartment or any building

#### 4.3.2.1 The walls



*Figure 4.8: The walls of Delight apartments (Source: author, 2020)*

According to fig4.9 The walls of delight apartment are smoothly and well painted in white and yellow, The only problem is that the accessories for the walls are too small compared to the length and the height of the walls. Space is a fundamental element of interior design, even the walls of a house is still space and it's very crucial in that it can change a big thing in space.

#### 4.3.2.2 Ceiling



*Figure 4.9: callings (Source: author, 2020)*

According to fig 4.10, shows that the ceiling of the living room is concrete because there is another floor up but on looking clearly it is white, and has a very simple Chandelier for both dining and the living room. Each accessory in living room space should have complement the look of the space, and in fig 4.11, it has a good outcome and very simple.

#### 4.3.2.3 Floor



*Figure 4.10: mosaic parquet floors (Source: author 2020)*

All the interior spaces floors are made of cement then the floor finishes, which are plain floor finished, tiled or even wooden. In this site in fig 4.11 the floors are mosaic parquet, which gives an apartment the sophisticated look since its applied varnish, but the disadvantage is that for physically disabled people due to the wheels of the wheel chair the floor will be left with markings.

#### 4.3.2.4 Lighting



*Figure 4.11: lighting (Source: author 2020)*

According to fig 4.12, the residential space of the delight apartment has windows on one wall and so adequate daylights available during the day, however on looking at the lighting at night the wall bulbs and the Chand aria give adequate lighting at night and gives a very beautiful outcome.



### 4.3.3 Furniture Inventory and Analysis



*Figure 4.12: furniture (Source: author,2020)*

According to fig 4.13, the apartment's furniture is a locally available which include the dining and sitting room chairs, they are commonly available where the chairs are made from renewable material where it is weaved. The seats being locally available, it's very easy to find such furniture in another's apartment in the same apartment, but there is the beauty in it all is that at least they have harmony, stability, and the throw cushions which have a different color tends to break the monotony of the grey seats in the whole room.

### 4.3.4 Exhibition and Display Analysis



*Figure 4.13: Exhibition and Display (Source: author,2020)*

According to fig 4.12, the display of delight apartment is quite impressive, since it has a modern touch in it. Looking at the same figure you will notice that the exhibition is a dining table which has very good culturally but the only problem is that it doesn't have a display unit.

## 4.4 Narrative Analysis of Response.

Interviews is a method that has been used to collect data, and that is what was used, so after collecting data through face to face semi-structured interviews from the population sample of 10 people based on the questions on the researcher's interview guides, the researcher compiled them into a narrative form. From the interview with the owner Mrs. Kariuki she was asked about the inspiration or considerations behind the existing hotel design and it is evidenced in his response that the hotel was

not designed on any specific inspiration or theme. Some aspects of sustainable designs were applied but not in design of interior and exterior spaces.

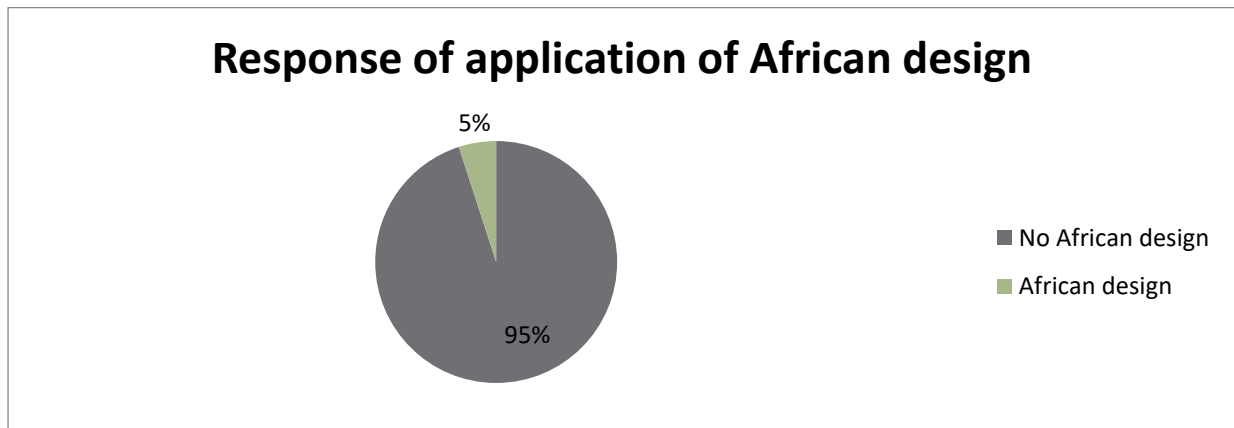


Figure 4.14: Pie-chart showing response to Application of African Design (Source: Author's construct, 2020)

In the chart in fig 4.2 it shows that the bigger portion 90% is where the application of African has not been used while in the smaller portion 10% shows the portion which the African design has been used. Through this chart it shows that there is such a minimal use of African design which is only the animal carpet

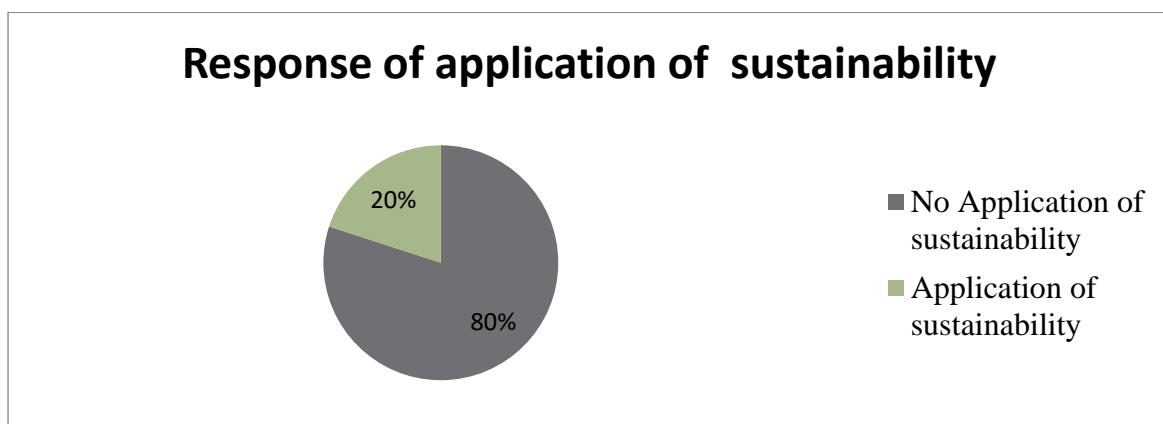


Figure 4.15: Pie-chart showing response to Application of sustainability (Source: Author's construct, 2020)

According to this chart in fig4.14,it shows that there is only 20% where they have tried to utilize sustainability in the apartment while 80% of the apartment has not been used up at all

#### **4.5 Conclusion**

From analysis, it is also evident that there are many opportunities of enhancing delight apartment's interior and exterior spaces using Kikuyu artifacts and it with sustainable materials to create contemporary and yet sustainable designs for interior and exterior spaces. From the findings it is also evident that residential industry could embrace sustainable designs with contemporary African aesthetics in their interior and exterior spaces. Additionally, interior designers could use this opportunity of assimilating African cultures hence creating awareness of African heritage and equally appreciating Africa, her people and culture.



## **CHAPTER 5**

### **5.0 SUMMARY FINDINGS CONCLUSIONS AND RECCOMENDATIONS.**

#### **5.1 Introduction**

Chapter Five of this research entails a summarized critical analysis of the site and data collected by the researcher as far as the research objectives are concerned. This summary with the knowledge gained from the Reviewed Literature will enable the researcher to come up with appropriate and suitable recommendations that can be sustainably implemented to better the Landscape, Interior Architecture, Exhibition design and the Furniture of Delight Apartments. All the recommendations are based on the facts established by the researcher from data methodology in chapter three of the research in line with sustainable design through use of sustainable materials and application of Kikuyu artifacts and plastic bottles for physical disabled people. The recommendations present a clear and implementable illustration of using sustainable materials inspired by African culture to create appealing and contemporary and sustainable interior and exterior spaces for Delight Apartments along Diani Road off Ole-dume road in Nairobi. Thereafter, this being the last chapter of the research it gives a conclusive summary of the research followed by the researcher's suggestions for the further study and research for the exhaustiveness of the concept of Sustainable Design in residential.

#### **5.2 Summary of Data Analysis/ Findings**

This research paper has discussed and analyzed the use of sustainable materials inspired by the African themes in the residential industry and the role of sustainability in the residential industry. The research has gone on to highlight the issues affecting the use of sustainable materials in interior design. The researcher then proposes the most effective ways in which sustainable materials inspired by kikuyu art can be applied in the residential interior architecture, landscaping, furniture designs and exhibition and display design as approach of sustainability. These materials should hold many Aesthetic, cultural, economic and functional aspects which are unique and cannot be achieved by the use of conventional materials and products.

## 5.3 Recommendations

### 5.3.1 Interior Architecture

Through interior architecture, buildings both commercial and residential are designed with all aspects of human needs based on psychological and physical parameters so as to improve quality of life. The elements of interior architecture considered are, walls, floor, ceilings, lighting, interior textiles and colour schemes. The interior spaces will be inspired by kikuyu artifacts which they are the African touch, while in sustainable materials plastic bottles will be used for the lighting. In figure 5.1 below shows the kikuyu winnowing basket decor



Figure 5.1: kikuyu winnowing basket decor (Source: [www.pinterest.com](http://www.pinterest.com))

**Lighting:** The kind of lighting that will best suit the apartment should be both direct and indirect lighting. It basically provides what designers refer to as ambience or the mood of a space. Use of solar panels as source of electricity is recommended and LED bulbs so as to minimize use of natural resources. The light fixtures can be made using plastic bottles as seen in figure 5.2



*Figure 5.2: plastic bottles lights (Source: [www.pinterest.com](http://www.pinterest.com))*

**Flooring:** mosaic parquet flooring is a good choice of flooring which has been used in the entire house, therefore there will be no change of them mosaic parquet, It provides warmth in the house and due to its mosaic design it creates beauty not forgetting it has an application of varnish which creates an overall beautiful look in the house .the mosaic parquet is made from the whistling pine which is a type of wood that takes only ten years for full maturity. Carpets and area rugs will be placed fully in the bedrooms and the sitting rooms .in figure 5.4 there is an illustration of how the floor is proposed to look



*Figure 5.3: mosaic parquet and ombre rug (Source: [www.pinterest.com](http://www.pinterest.com))*

### 5.3.2 Landscape Design

The landscape of Delight apartments is small in size but has full potential if properly designed. Almost half of the landscape is covered with plain grass. From the main entrance all-round the Apartment and under, that is the parking it is covered with cabro, but in this research I specifically concentrated on the middle part of the landscape which is the central point of all houses. This specific landscape is covered with plain grass and just a few palm trees. Since this particular place is a central point

### 5.4 Conceptualization

The concept behind the recommendations is coming up with designs that reflect African design through use of kikuyu artifacts as inspiration and use of sustainable materials to support the sustainability movement. The process begins with brainstorming ideas from different inspirations Below are the concepts

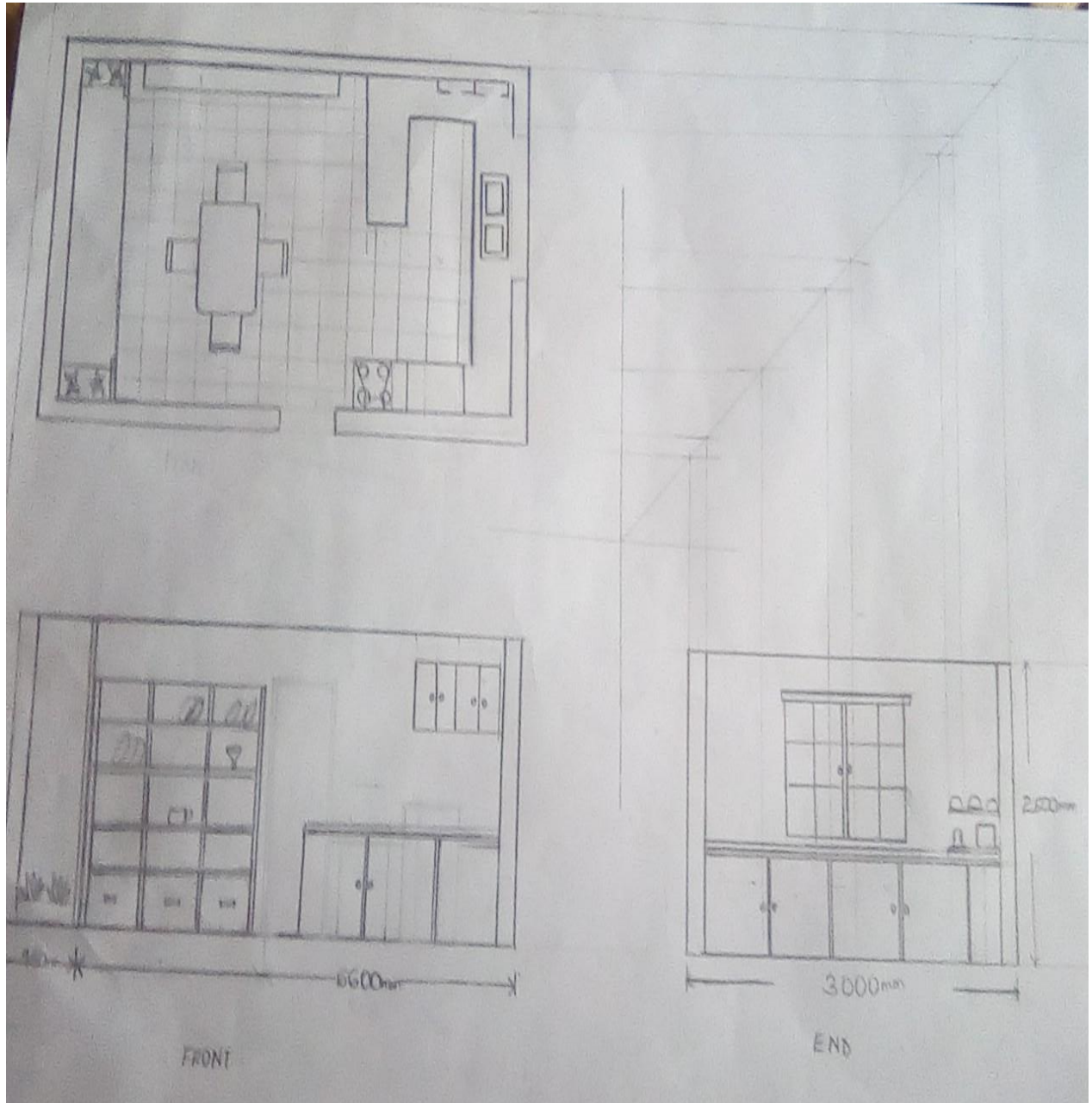


Figure 5.4: sectioning of exhibition and display (Source: author,2020)



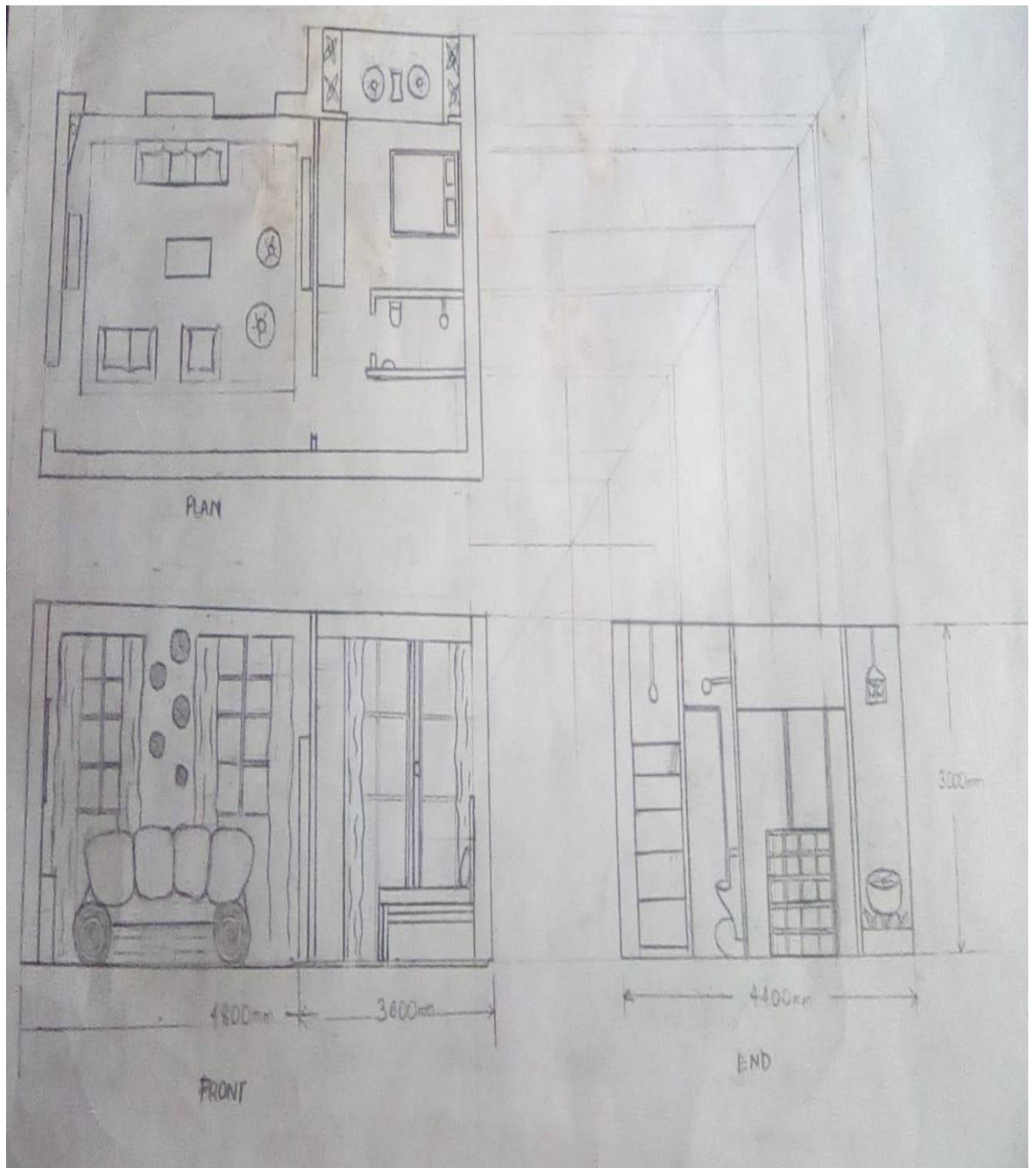
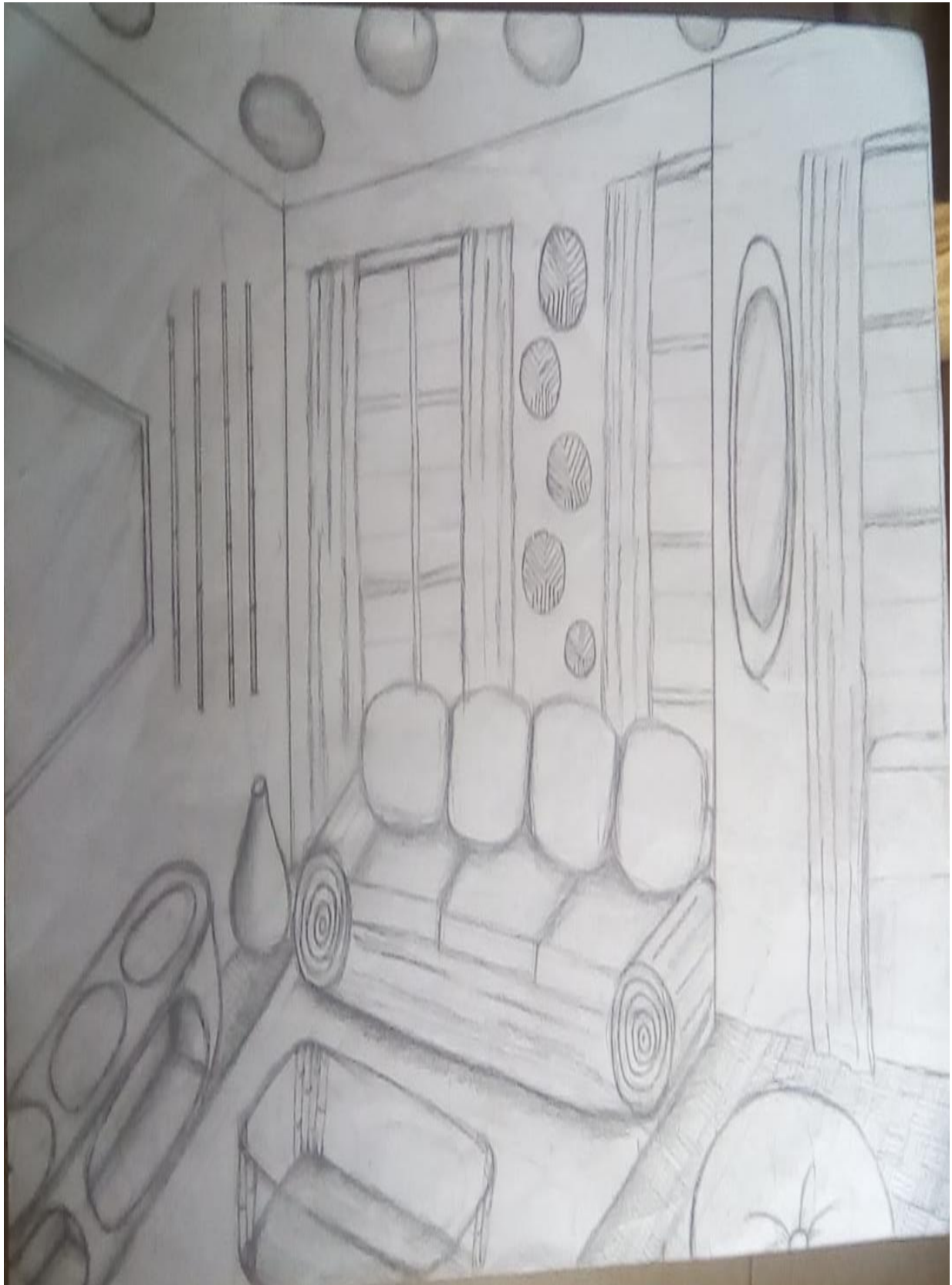


Figure 5.5: sectioning of interior design (Source: author,2020)



*Figure 5.6:3D of interior design (Source: author,202*

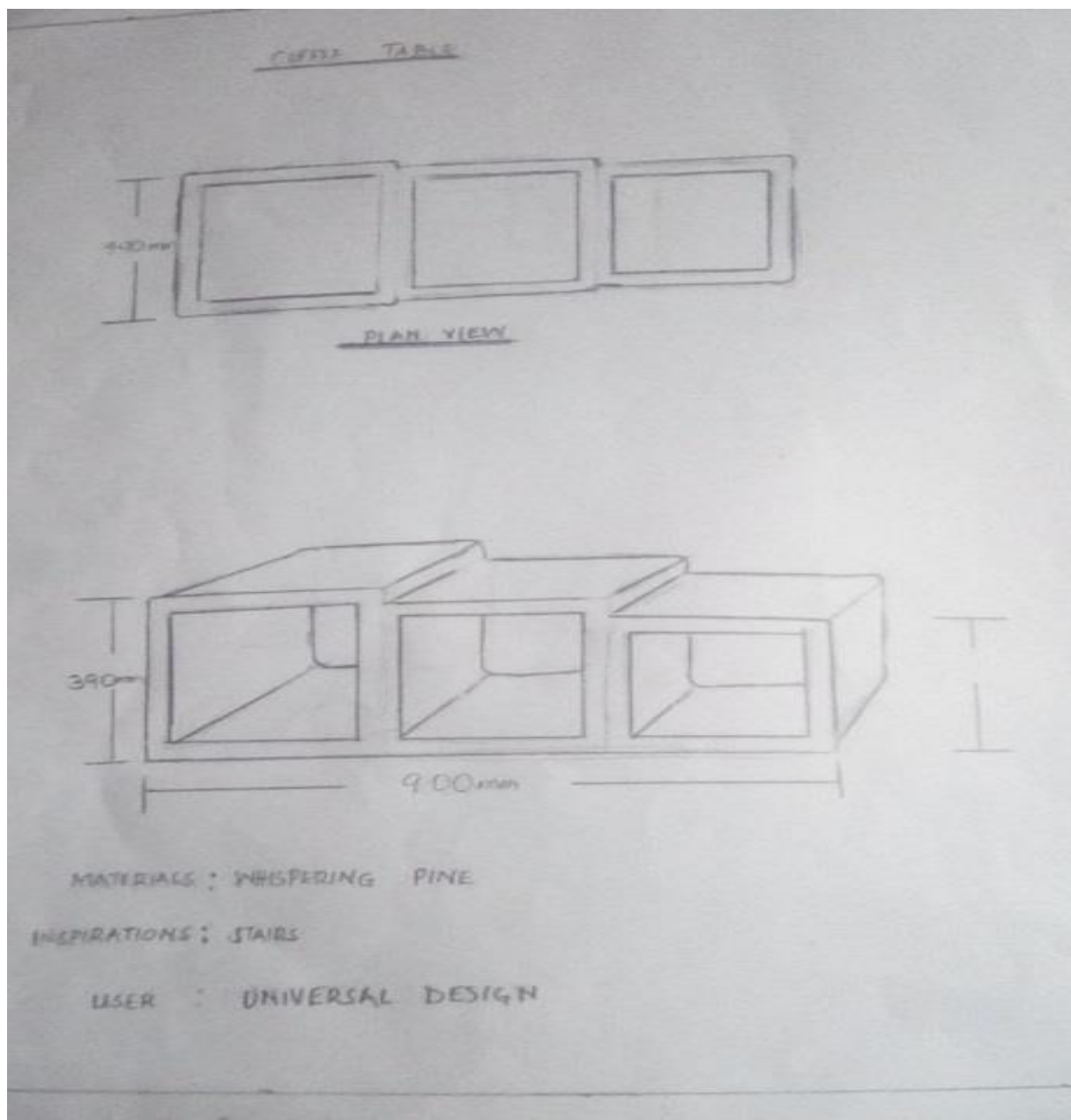


Figure 5.7: sketch of a coffee table (Source: author, 2020)

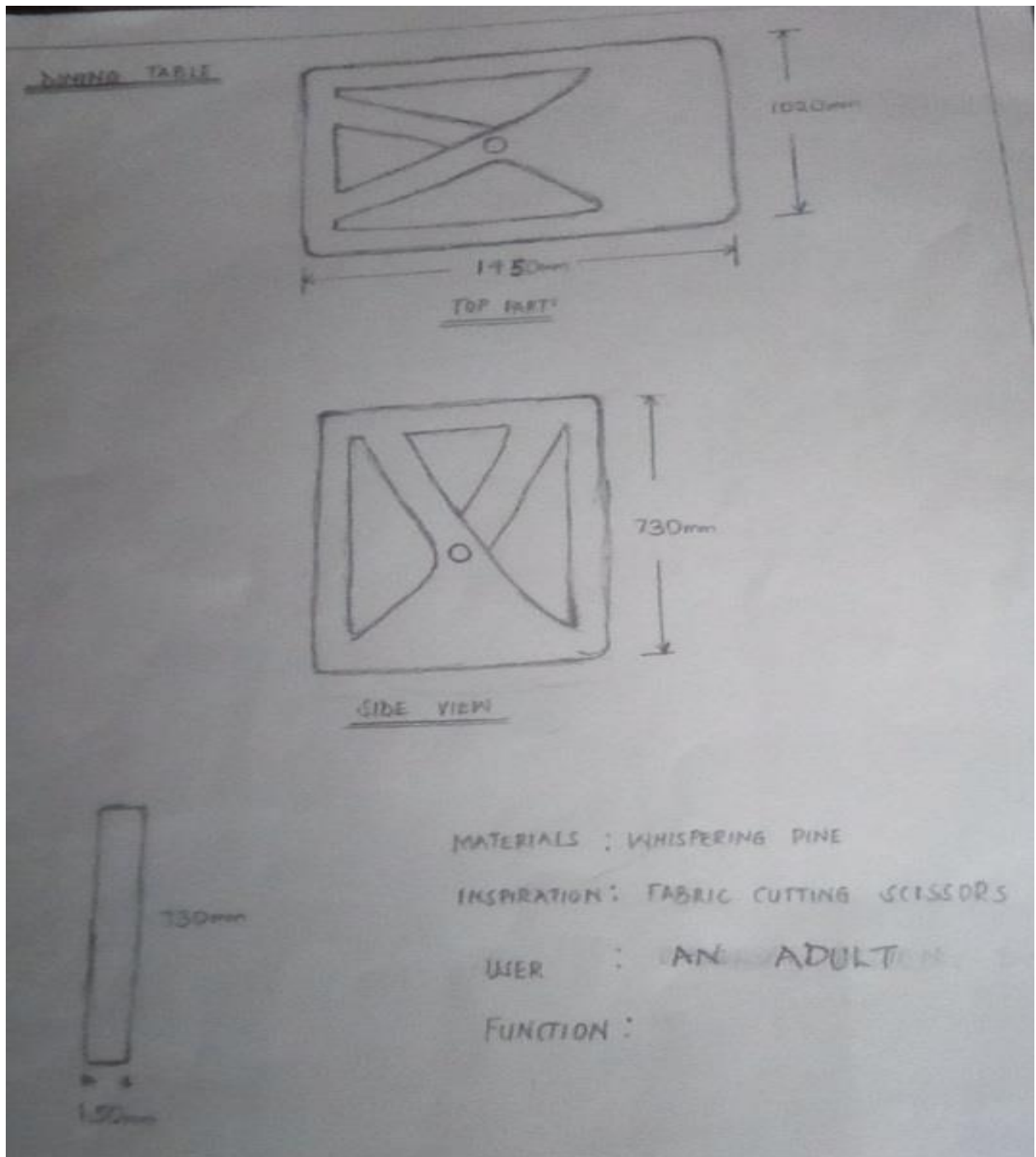


Figure 5.8: sketch of a dining table (Source: author, 2020)



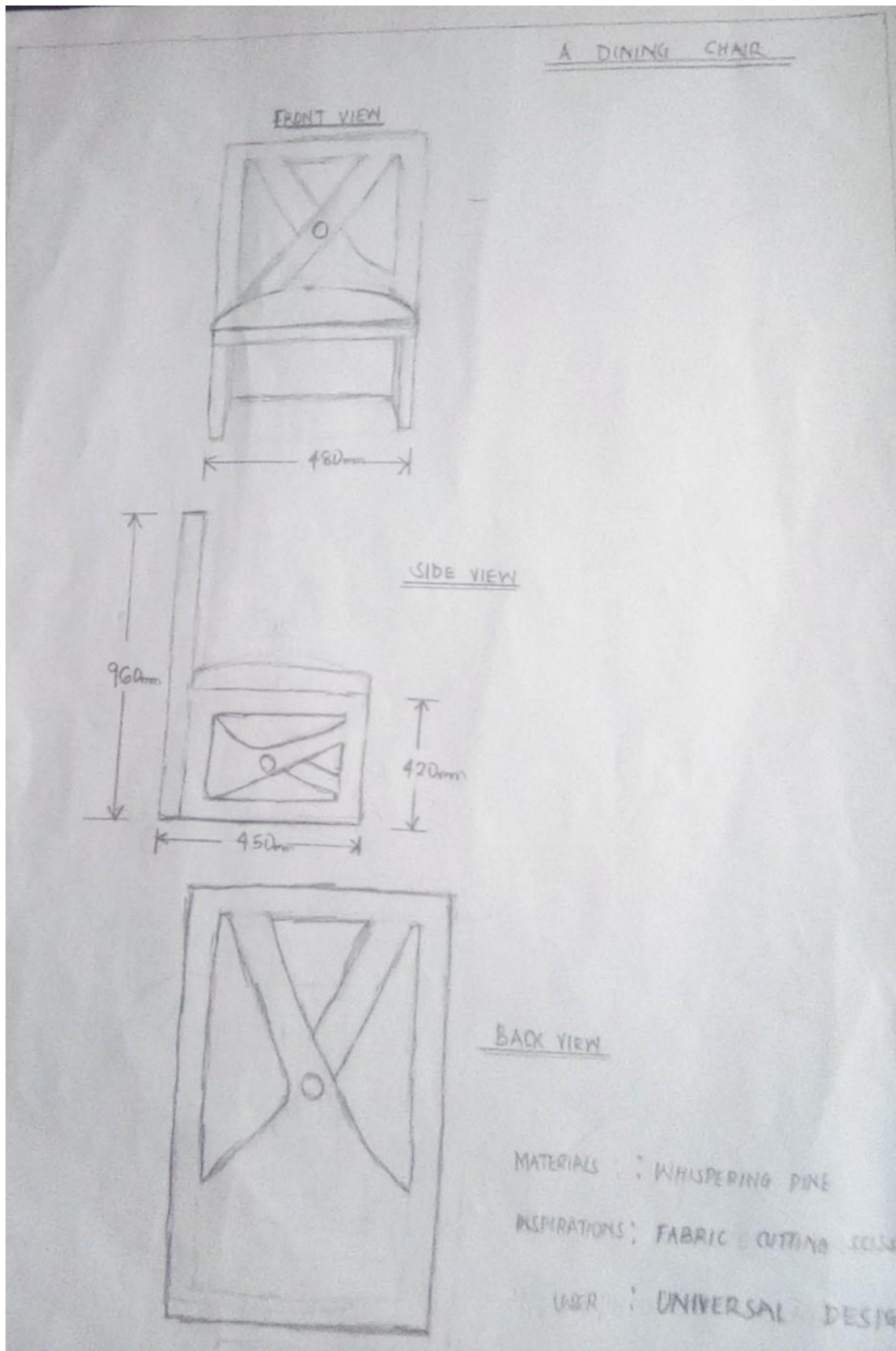


Figure 5.9: sketch of a dinning chair(Source: author,2020

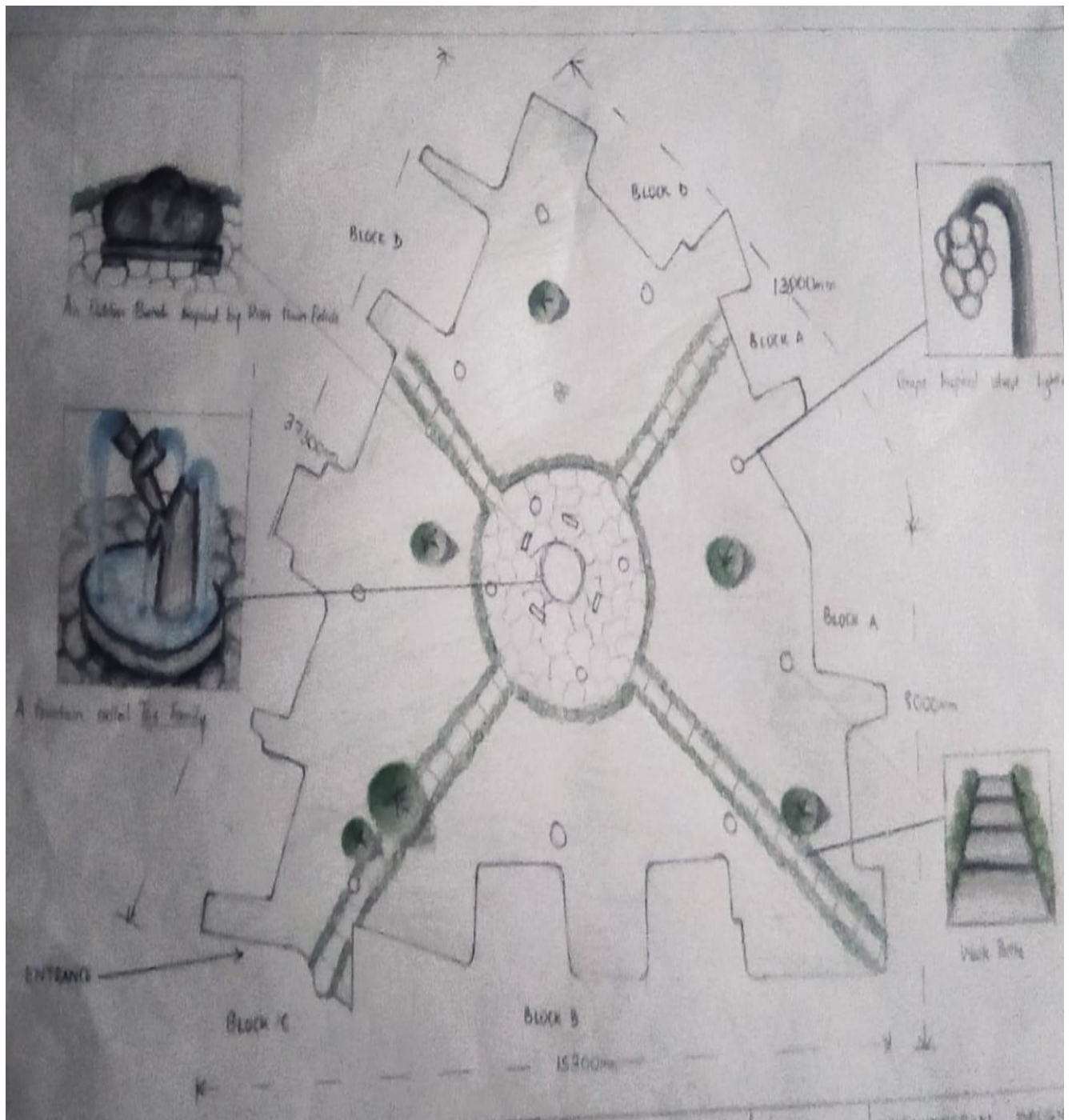


Figure 5.4: landscape (Source: author,2020)

## 5.5 Conclusion

There is need for the redesign of Delight Apartments necessitated by the responses in form of opinions and recommendations. When considering sustainable design and African design, the existing design and materials used don't take into consideration the approach of sustainable design using sustainable materials. In terms of African design, of delight interior and exterior spaces, it was noted that it is not applied. Furthermore, the concept of using sustainable materials was highly encouraged and supported by the respondents of the research. The researcher discovered that interior design can be used as an agent of advocating for Sustainability and contemporary African cultural appreciation in residential since it is the best tool of implementing sustainable and African design in the most intimate environments, the interior spaces.

## 5.6 Suggestion for Further Study

This research was carried out in a short period of time hence it was not exhausted as far as the concepts of sustainability and African design are concerned. Sustainability is a global concept with multidimensional approaches, all its elements, principles, aspects and contexts were not fully covered. Same applies to the cultural elements of African design as so many approaches of this exist. The research did not cover the whole Kenyan residential industry due to the geographical scope constraints hence some elements of the industry were not fully explored. Nevertheless, through this research, the researcher was able to establish various ways and contexts through which kikuyu artifacts can be used to create an appealing look of African and sustainable spaces for the Apartments in Kenya making them viable enough to withstand competition in the industry. Therefore, the researcher suggests a thorough, comprehensive and exhaustive research to be done in the following areas as a continuation of the current research:

- ❖ an exhaustive research on the Multidimensional Approach of Sustainable Interior Design in Apartments covering economic, social, and environmental aspects and elements of sustainability.
- ❖ A research on other principles of sustainable design and how they can be applied in residential Interior and exterior design.

Lastly, A thorough study on the level of sustainability of residential and its effects on the resident behavior, holistic interior design and satisfaction

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## **APPENDICES**

### **Appendix 1: Interview**



### **UNIVERSITY OF NAIROBI**

#### **College of Architecture and Engineering**

#### **School of the Arts and Design**

#### **Section A: Owner**

1. What was the considered inspiration for design for Delight apartments?
2. What is your opinion on Sustainable design and has it been used in design of Delight Apartments?
3. What influenced the materials selection of current design?
4. After brief introduction to sustainable materials, Kikuyu artifacts and accessibility for physically disabled people would you recommend use of these?
5. How often do you redesign your apartments and what are the sources of inspiration?
6. Would you reconsider redesigning of Delight Apartments by use of sustainable materials, kikuyu artifacts and accessibility for physically disabled? If Yes which areas would you recommend to be

Redesigned first?

### **Section C: Manager and Staff**

1. What is your take on the current state and design of the Apartment?
2. What design concerned feedback do you get from residing residents about the Current design of the Apartment?
3. After a brief description of sustainable design through use of sustainable Materials, kikuyu artifacts and accessibility for physically disabled , would you recommend the apartment to be redesigned based on that?
4. What areas of the apartment would you recommend to be redesigned first?
5. What are your opinions on ensuring sustainable design through use of sustainable materials?

### **Section D: Residents in the Apartment**

1. Do you reside in Delight apartments? If Yes, what was your opinion on the designs of the interior and exterior spaces?
2. After a brief description of sustainable design through use of sustainable materials , kikuyu artifacts and accessibility of the physically disabled , would you recommend the Apartment to be redesigned based on that?
3. Which areas would you recommend to be redesigned first?
4. If the Apartment was redesigned, what would it mean for you as a resident in the apartments?