Proposed Recreational Center for Landmark University, Omu-Aran, Kwara State (A Study on Biophilic Approach to a Recreational Center Design)

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Being a M.Sc. Thesis Submitted to the Department of Architecture, Faculty of Environmental Design and Management, Lead City University, Ibadan, Oyo State, Nigeria.

In Partial Fulfilment of the Requirements for the Award of Master Degree (M.Sc.) in Architecture.

2023

Certification

This is to certify that Rotimi Elijah Adeyemi with matriculation number LCU/PG/002874 carried out this research work titled "Proposed Recreational Center for Landmark University, Omu-Aran, Kwara State (A Study on Biophilic Approach to a Recreational Center Design)" in the Department of Architecture, Faculty of Environmental Design and Management, Lead City University, Ibadan, Oyo State, for the award of Master Degree (M.Sc.) in Architecture. The thesis is an outcome of an independent and original work. I have duly acknowledged all the sources from which the ideas and the extracts have been taken. The project is free from any plagiarism and has not been previously submitted to any other institution.

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Dedication

I dedicate this project to Almighty God, for His mercy and favour which has enabled me to attain this height academically, to Him alone be all the glory in Jesus Name.

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Acknowledgement

I want to express my appreciation to the Governing Council, Lead City University Ibadan, Oyo State for creating this platform for Department of Architecture, which gives me the opportunity to proceed with my academic pursuit. I sincerely acknowledge the Physical Planning and Development, Landmark University, Oum-Aran, Manager, University of Ilorin recreation garden, Director, Nelson Mandela Freedom Park, Osogbo, Osun State, the Management, Upbeat Recreational Centre, Lekki, Legos State for their assistance in providing relevant and necessary information used to carry out the research work.

My sincere appreciation goes to my supervisor, Arc. (Dr.) Oludare J. Obaleye for his guidance and contribution to the writing of this thesis, the Head of Department, Arc. (Dr.) Adedire, O., the Post Graduate Coordinator; Arc (Dr.) Ayanleke, O., for their unrelenting efforts towards the realization of this programme. I gratefully acknowledge all lecturers of the Department of Architecture for their wonderful contributions towards the success of this study.

I also appreciate my dear wife, Rotimi E. O, for her contribution, concern, and understanding and my children, I say thank you. I must also thank all my friends and everyone who have impacted me positively in Lead City University, I say thank you all.

Even though the above-mentioned institutions and persons have assisted in the process of this research work, I alone stand responsible for the errors, if any, found in the work

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Abstract

Nature and biophilic design have received robust attention and acceptance in architecture in the last fifteen years, especially in response to concerns about environmental challenges such as climate change and building aesthetics. This study attempts to look at the effect of biophilic design on campus recreational facility. Landmark University is one of the fastest growing universities in Nigeria, experiencing increase in the number of student intake per year, as the number of student increases, there is also increase demand for recreational facility. It was established in this study that construction of recreational facility for the university community will increase work-life balance, productivity, satisfaction and improved health for both the staff and students of the university. Qualitative research method was adopted for the study using case study approach as the instrument. Five related case studies which include three locals (University of Ilorin recreation garden; Nelson Mandela Freedom Park Osogbo, Osun State and Upbeat Recreational Centre, Lekki, Legos State) and three internationals (Campus Recreational Center, University of Utah, USA and Coles Sports and Recreation Center, New York University, New York City, USA) were analysed using physical observation and photographs to record findings, furthermore, journals, articles, books and other previous research works related to the study were also reviewed. The results revealed diverse biophilic design strategies and approaches applicable to achieving a sustainable environment, benefits of biophilic design were identified. The results indicate that biophilic design is more complex and richer than the mere application of vegetation in buildings. In conclusion, a recreational center, well design and constructed with adequate building material using biophilic approach will enhance productivity of staff and student academic performance, as well as enhancing environmental sustainability. This study therefore, recommends that the findings be included in all proposed campus recreational center designs.

Keywords: Biophilic design; Recreational and Students Performance; Biophilic architecture; Sustainability; Biophilic design benefit; Recreational Activities.

Word count: 293

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Chapter One

Introduction

1.1 Background of the Study

There is a general believe that there are three fundamental aspects to one's life, that when taken together encompass the staples of our existence (Lee, 2020). According to Western perspective, work, family, and leisure and recreation represent these three pillars of life, which demand a balanced portion of our time (Kelly and Freysinger, 2021). It is good to note that, these three dimensions of life do not act independently; rather, each and every one reciprocally affects the other in creating self, community and culture (Ives et al., 2018). The time allocated for work or school, family, and leisure and recreation correlate and complement each other, attempting to create synergy, which is a cooperative action of all three elements (Perez and Perini, 2018)

Recreation provides individuals the opportunity to refresh and relax after a long day at work or school (Somarakis et al., 2019).

If we look at stressful working environments, diseases that can stress people out gradually, rapidly changing technology, fast-paced urbanization and worker migration, we will see that the general health of our society is being threatened (Lan, 2018). This is the reason why more importance is been placed on social activities which can boost quality of life, such as functional competence, subjective well-being, happiness, physical and emotional vitality and is tied to a person's satisfaction with life, as well as social well-being (Kelly, 2022); unlike in the past when adequate attention was not given on social activities of people to boost their quality of life (Grawe, 2018). In Nigeria today, most of the workers in higher institutions are doing sedentary work that does not give the room to engage in healthy physical activity. They spend a lot of hours in front of computer or doing other works which require them sitting several hours in their offices, and they do it routinely (Fatih et al, 2020). Believe me honestly, when they get home after each day's work, the best they do is to watch television and surf the internet using their smart phones or tablets which is not far from being sedentary (Fatih et al, 2020). Furthermore, so many people have become so lazy

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and apathetic to walk-out or ride bicycle to work-places because of industrialization mechanization which have contributed to human progress in the name civilization (Mayers et al, 2017). They feel reluctant to stop at the designated bus stops and walk down to their destinations which may be some meters away from the designated bus stop. This scenario is common among girls and women who could have utilized the opportunity to engage in physical exercise (Fatih et al, 2020).

Amusement is significant to keeping up dynamic and sound way of life (McElveen & Ibele, 2019). Taken portion in normal physical movement is one of the arrangements to tending to inveterate ailment and progressing mental wellbeing. Community offices given by open or private segments, like recreational centers are key settings for progressing common wellbeing and quality of life and upgrading social back through interfacing communities (Wang, and Wu, 2013). Entertainment is prevalent for different reasons. Other than being a way to appreciate free time, numerous individuals utilize entertainment as a way to socialize. For occurrence, Martinez (2013) sets that American Entertainment Amalgamation found that, 88 percent of guardians accept that taking part in recreational exercises fortifies family connections. Guardians positioned camping as the finest open-air action, taken after by climbing, bicycling, and angling. They are a source of delight and give unwinding for one's intellect and body. Recreational exercises can be assembled into two bunches: indoor and open-air exercises. (Peterson, 2019).

Biophilic design seeks to create good habitat for people as a biological organism in the modern built environment that advances people's health, fitness and wellbeing. Translated as the "love of life", the biophilic design is a novel and popular trend within the scope of sustainable building design (Kellert et al 2008, Kellert 2018, Kellert and Finnegan 2011, Browning et al 2014). As a human-oriented approach, the Biophilic Design aims at enhancing connection with the nature, along with the natural processes within the buildings where we work and live (Abbas, & Jawaid. 2018). This enhanced connection can contribute to our welfare by means of minimizing the stress, improving the rejuvenation, thus assisting as to reduce the costs and enhancing the outcomes within

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the built environment (Kellert et al. 2019). Designing a recreational center from Biophilic approach will make the facility more unique and serve the purpose well.

1.2 Statement of the Problem

The continuous increase in the number of higher institutions in Nigeria is due to the ever-increasing number of students' intake to high institution as a result of population growth (Grawe, 2018), it is good to note that, the number of students admitted to many higher institutions is increasing every year, hence the need to provide a facility where institution community can refresh and relax (Jabir, 2021).

The rigours of academics could become too much for students and higher institutions workers with the attendant negative effect where there is no provision for recreation (Ahams, 2022), thus confirming the saying that “all works and no play make Jack a dull boy” (Coen et al, 2018). To balance these academic rigours, students and workers need facilities within the campus where they can recreate or participate in physical activities to enable them to return to their studies and works with renewed vigour and vitality (Sondrila, 2019).

To achieve this is not just about providing recreational facility, but providing facility with essential planning, well-articulated spaces so as to achieve the functional requirements, making human close to nature as much as possible while using the facility (Ramiro, & Astrolabe, 2016).

This research attempt to look at how a recreational centres can be design to function optimally in higher institutions using Biophilic Design Approach.

1.3 Justification for the Study

Nature and biophilic design have received robust attention and acceptability in architecture in the last fifteen years, especially in response to concern about environmental challenges such as climate change. However, much have not been said about the real benefits of biophilic design especially in relating to human health, sustainability, as well as how biophilic design can help in recreational facility for campus.

1.4 Aim and Objectives of the Study

This research work aims to evolve an architectural design proposal for a recreational centre for Landmark University that will meet the needs of all categories of users, making feel the effect of nature right inside a build environment.

i. To examine the history of recreational centres generally and within tertiary institutions;
ii. To examine the types of recreational centres and their functional requirements;
iii. To examine biophilic approaches to recreational facilities; and
iv. To develop a design proposal for a recreational centre for Landmark University, Omu-Aran, using biophilic approach.

1.5 Research Questions

The following research questions guided this study:

i. Where and how does recreational centre start, generally and in higher institutions?
ii. What are the different types of recreational centers?
iii. What are the functional requirements in recreational centers?
iv. How can biophilic design approach enhance recreational center functionality?

1.6 Hypotheses

- Construction of recreational facility increases students' performance.
- Recreational facility in campuses enhanced balance between students' education and social life.
- Biophilic design approach to recreational facility enhance quick rejuvenation of the users.
- Biophilic design approach to recreational facility helps in environmental sustainability.

1.7 Significant of the study

There are many studies conducted to determine the social-emotional development and learning outcomes associated with participation in sports clubs, but very few studies have been done on the recreational environment as a whole for higher institutions. It is important to know why recreation centres are important for students in higher institution and other community members' life as well

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as to understand what overall benefits people receive from the programs especially when the facility is designed with biophilic approach.

1.8 Scope of Study: Target Group

The scope of the proposed project would be based on the functional spaces required in a typical campus recreation centre, with the integration of landscaping elements and other outdoor recreational facilities focusing on analysing the service quality. This would include spaces like children playing ground, swimming pool, game courts, motion ground, sitting area, etc.

1.9 Limitation of the study

There are limitations to studies that are important to note. In the case of this study, one limitation is the fact that the findings are specific to university community at Landmark University, Omu-Aran, Kwara State. Because of this limitation, the results cannot be generalized to other university campuses. Although the study examines the effect of recreational center with respect to biophilic approach in campus, the study is limited to certain selected case studies. Therefore, the results cannot be generalized to other campus recreation facilities across various postsecondary institutions. Note that despite the limitations to this study, it offers very important and useful information to university administrators and researchers examining campus recreation and the effects of space planning, proper circulation, and the use of natural lighting in recreational centres. The findings of this study also provide valuable information to those involved in the decision-making of various student programs on campus.

1.10 Operational Definition of Terms

Recreation centre is defined as the facility and/or program opportunities available for students and workers to participate in physical activities. These various activities include sports, adventure programs, and general use of the gym facility.

Recreation Facility is defined as the venue in which students participate in physical activity. This term is used synonymously with Campus Recreation.

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Biophilic Design is defined as a concept used within the building industry to increase occupant connectivity to the natural environment through the use of direct nature, indirect nature, and space and place conditions.

Indoor activities are recreational activities undertaken on the comfort of one's home or more specifically indoor and they are to recreate the mind and soul.

Outdoor activities area recreational activities done or undertaken outside a building. It provides us with the means to exercise our body and hence happen to be one of the best forms of recreation.

Game: This means activity or a sport with rules in which people or teams compete against each other. Game can be major or minor. Minor games are not played for major tournaments or competitions but rather are played for the development of skills as a springboard for major games while major games are played for tournaments or competitions at school, inter-schools Local and International levels.

Leisure: Leisure refers to our free or spare time. The time left over after our survival needs are met. Leisure is not the same as idleness or fooling around it is during leisure that recreational activities take place.

Sport: Another word which most people confuse with recreation is sport. Sports are competitive activities with well spell out, strict rules and regulations. They are bound by space and time and are usually regarded as a very serious business, during sporting events players, and officials can cheat and a fight because of the reward that is at stake. It is well organized and structured while recreational activities on the other hand, are the joy of the act that is important, sports can be part of recreational activities, if one does it with playful attitude but that does not and cannot make recreational activities and sports the same.

Facilities: These are provided either as space, materials, objects or items for physicals education activities. They are outdoor or indoor paces in the form of play fields and hard surfaces area.

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Chapter Two

Literature Review

This chapter covers the review of related literature, theories and concepts on recreational center in higher institution and the effect of adopting biophilic approach.

2.1. Conceptual Review

The goal of this review is to categorize and describe concepts relevant to the study and outline a relationship between them, including relevant theory and empirical research.

2.1.1 Concept of Recreational center

Recreational center can be defined as a space where time is used in a creative way, which usually result to therapeutic refreshment of body, mind and gives satisfaction (Allen & Lyons 2019). It usually involves voluntary participation, determined by motivation and involves activities which can be active or passive (Anderson et al, 2020).

The concept of recreation is a form of leisure, with leisure being a period of self-indulgence (Thomas & Yukic, 1970). The concept of the need to engage in activities for the purpose of recreation is a fundamental component of human physiology and psychology (Anderson & Ramos, 2018). Generally, recreational activities are undertaken for the purpose of pleasure, amusement or amusement, and are thus referred to as "fun". (Babbie, 2020).

The primary objective of recreation is to relax and re-energize people so that they can return to their day-to-day lives, which are not leisure activities but economic activities (Bachert et al, 2021). Recreational activities include physical, mental, and emotional activities. Recreational activities can provide participants with intellectual, physical, and social development, improved health, better citizenship, and other forms of personal growth. (Barcelona & Quinn 2021).

Recreation activity is an important ingredient for long life. It is an experience or activity that is carried out within leisure, chosen voluntarily and providing pleasure for individuals of all age group (Barney et al, 2019) and according to Agbabiaka et al (2020) recreation is from the concept of

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creating again, reforming, or restoring the mind. It encompasses relaxation and recuperation; as it reforms and makes the individual to continue to perform on the job without undue stress

Recreation is a key component of long-term wellbeing. It is an activity or activity that is performed in the context of leisure, chosen on a voluntary basis, and provides enjoyment for people of all ages (Barney et al, 2019). According to Agbabiaka et al (2020), recreation is derived from the idea of re-creation, reformulation, or renewal of the mind. It includes relaxation and recovery; as it reformulates and enables the individual to continue working without excessive stress. (Barry et al, 2018).

Research has demonstrated that recreational activities can be taken on a community or individual basis, can be either active or inactive, can be conducted indoors or outdoors, and can be either beneficial or detrimental to health (Zuest et al, 2021). It has been highlighted that regular recreation is just as important as consuming a nutritious diet. Additionally, research has demonstrated that people's participation in recreation activities has a positive impact on social integration, socialization, and educational, health, and developmental outcomes. (Bloom et al, 2005; Kim et al, 2018).

2.1.2 Origin of recreational center

According to Buttler, (2015), the term ***recreation*** appears to have been used in English first in the late 14th century, first in the sense of "refreshment or curing of a sick person" (Online Etymology Dictionary).

The history of recreation and leisure is a rich tapestry of people, places, events, and social forces, showing the role of religion, education, and government and the customs and values of different cultures, their arts, sport, and pastimes (Zubiaur et al, 2021). By becoming familiar with the evolution of our recreation and leisure, we are better able to understand and deal effectively with the present (Beggs et al, 2022).

Ancient Greece and Rome were the birthplace of many sorts of recreational, leisure and sports that influenced modern understanding of social entertainment in various countries in the world (Alibis

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2016). Alibis (2016) said, the classical age (500–400 B.C.) was often described as the Golden Age of Greece. The Athenians took great interest in the arts, education and in athletics. This interest was reserved to wellborn, aristocratic noblemen, who are full citizens (Bilos & Galic 2020). Craftsmen, farmers and traders' people were also citizens but had limited and less prestige (Paggi, et al, 2018). The wealthy and powerful citizens represented the Athenian ideal of the balanced man, a combined soldier, athlete, artist, statesman and philosopher (Brock et al, 2019). This ideal was strengthened through education and the various religious festivals, which occupied about seventy days of the year (Veal, 2022). Other forms of arts such as music, poetry, theater, gymnastics and athletic competition were combined in these sacred competitions (Sansone, 2003).

Figure 2.1: Pieter Bruegel Children's Games (1560)

Source:(https://en.wikipedia.org/wiki/Recreation)

Children in Greece and Rome enjoyed toys, dolls, carts, skip ropes, kites and seesaws (Brunton et al, 2020). Gymnastic and music were taught at the age of seven which included running and leaping, wrestling, throwing the javelin and discus, boxing, swimming and ball games (Coen et al, 2018). The Athenian philosophers stressed the role of the unity of mind and body and the strong relationship of all forms of human qualities and skills (Yukic, 1970). Recreation, leisure and sports activities dominated the thoughts of city planners who were keen to reserve adequate provisions for parks and gardens, open-air theaters and gymnasiums, baths, exercise grounds and stadiums (Veal,

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2022). The Greek approach to leisure and play witnessed a gradual transition. According to Simon, (2019), in the beginning, not all citizens were expected to participate in sports and games, and the Olympic Games were restricted to free-born Greeks only. Later on, the religious and cultural event of the Olympic Games and other festivals were weakened by athletic specialization, corruption and commercialism (Udokanma, et al, 2016). Ancient Rome adopted many of the Greek traditions known for centuries passed before the Roman state evolved (Brunton et al, 2021). Roman arts, religions, education and sports were influenced by Greek experience. Roman citizens participated in sports and gymnastics, intended to keep the body strong and the spirit courageous (Buzzelli, 2016). Numerous games held in connection with the worship of carious Roman gods later developed into annual festivals supported by public funds such as military triumphs celebrations held in honor of the god Jupiter (Byun et al, 2019).

Figure:2.2: The Colosseum or Flavian Amphitheatre

Source: (www.worldhistory.org)

Figure:2.3:Dionysos, Roman Mosaic

Source: (www.worldhistory.org)

Roman children engaged in many sports and games and possessed toy carts, dolls and hobby horses (Carter-Francique, 2021). Young boys were taught various sports and exercises such as running and jumping, sword and spear play, wrestling and swimming and horseback riding (Chang et al, 2019). The Roman concept of the leisure was different from the Greeks. Although, the Latin words for "leisure" and "business" are otium and negotium, suggesting the same view of leisure as a positive value (Chrismas et al, 2019). The Roman supported play for utilitarian rather than esthetic or spiritual reasons (Rechner, 2020). Roman city planners and builders included in their town's

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provisions for baths, open-air theaters, amphitheaters, forums for public assembles and stadiums (Chu & Zhang 2018). They developed buildings for gymnastic sport, modeled after the Greek palaestra and including wrestling rooms and conversation areas for philosophers (Rajgopal, 2022). Roman society was divided into four social levels: the senators, who were the richest, the curiae, who owned more than twenty-five acres of land and were office holders or tax collectors, the plebs, free common people, and the coloni, who were lower class tenants of the land (Rechner, 2020). Gradually, since most of works were performed by coloni and slaves it became necessary for Roman Emperors and senate to amuse and entertain the plebs, they did so with the doles of grain and with public games—in other words, "bread and circuses" (Zajchowski et al, 2020). Number of public holidays during the year reached 159 in the first century A.D., ninety-three of which were devoted to games at public expense, including many new festivals in honor of national heroes and foreign victories (Paillard-Borg, et al, 2019). By 354 A.D. these public festivals reached two hundred public holidays each year, including one hundred and seventy-five days of games (Rechner, 2020). Entertainment became the central life activity of many citizens in the Roman Empire as leisure increased and the decline in military service need. Their daily routine was expressed in entertainment by exercise, bathing in large and comfortable establishments where they could eat, read, socialize and do business (Paggi, 2016). A substantial amount of business on Rome was done in thermaes, as they were a place for people to relax and chat in both tranquility and mild privacy (Zegre et al, 2022). Relaxing within the city of Rome was the campus next to the Tiber River (Nawijn, 2022). Young men from all over Rome used it due to being able to go and train, then wash off immediately after. Sports played there included fast racing, archery and wrestling (Marchildon, 2019).

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2.1.3 Classification of recreational activities

Recreational activities can be classified into two groups which are indoor and outdoor activities:

Indoor recreation activities are undertaken on the comfort of one's home or more specifically indoor and they are to recreate the mind and soul (Paggi, et al, 2016). For such indoor recreation

activities there are well-established clubs or recreation centers offer a varied program of activities throughout the year (Wilson et al, 2021). Activities on offer include basketball, swimming, volleyball, chess, table tennis, bowling, singing, reading, listening to music, watching movies and more of the same (Wilson et al, 2020). For example, basketball is the most popular indoor sport and second most popular team sport after soccer. Basketball has many health benefits as it demands lot of physical work. There is a quate saying "Basketball does not build character (Wilson et al, 2021). Outdoor recreational activities like the ones mentioned above, also provide us with the means to exercise and hence happen to be one of the best forms of recreation (Weese, 2019). Outdoor recreation sport examples include nature walks, river rafting, cycling, camping, fishing, hiking, adventure park, surfing and sports (Cooper et al, 2022). Outdoor recreational activities can range from nature walks to river rafting. Organized recreational activities are often planned by private clubs or government organizations (Gautam, et al, 2017). Sports, cultural activities and social gatherings are some of the organized ones. Clubs and recreation centers offer a variety of recreational programs for people of different ages and varied interests (Edginton, et al, 2022).

Figure:2.4: Outdoor recreational activities

Figure:2.5: indoor recreational activities

Source: (https://educarepk.com/recreational-institutions)

2.1.4 Concept of Campus recreational center

The exact origins of recreational sports on college campuses are sketchy (Corley & Gioia, 2018), but the first documented "intramural" activities occurred between the freshmen and sophomore classes at Princeton in 1857 when the baseball teams representing their levels competed in a game

(Webb & Forrester, 2016). A contest such as this one actually helped foster the growth of intercollegiate athletics as schools began to compete against each other, in similar fashion to the baseball contest, but in other sports (Weaver et al, 2019). In fact, it was not long after the 1857 "intramural" baseball contest that the first intercollegiate football game, between Princeton and Rutgers, was held in 1869 (Warner & Dixon, 2019). Physical education programs also began to receive more attention as colleges and universities recognized them as legitimate additions to the academic curricula (Tricco et al, 2021). Intercollegiate athletics and physical education underwent parallel growth through the early part of the 20th century, so much so, in fact, that the recreation/athletic "needs of the masses of students were almost entirely neglected" (Stankowski et al, 2022).

Programs of recreational sports play a more prominent role on college campuses than ever before; particularly as a means of enhancing the quality of life and as a complement to the academic experience a student receives at a particular institution (Standish & Umbach, 2019). Kovac and Beck (1997, p. 12) reported that "Recreational programs and facilities are accessed by the highest percentage of students than any other program identified in the Quality and Importance of Recreational Services survey.

In Nigeria, Campus recreational facilities planning and provision is an important criterion in the accreditation of both public and private universities in Nigeria (Aribigbola, 2018). The Nigerian Universities Commission (NUC) as part of its processes for granting the commencement of university education at a location rate among other things the availability and adequacy of recreational facilities on ground to determine the takeoff of the proposed university (Aribigbola, 2018). Aribigbola, (2018) Opined that this made the provision of campus recreational facilities a major part of campus master plan. Recreation does not only recharge man's battery for performance but also improve the health of participants (Czekanski & Lower, 2019). Campus recreation is designed to provide an on-campus leisure opportunity for college life and providing a wise use of their leisure time (Atare, 2017)

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Figure:2.6: Texas Tech University - Student Leisure Pool.

Source:(https://www.age-se.com/texas-tech-leisure-pool)

2.1.5 Activities at recreational center

- Physical activities: This is defined as any voluntary bodily movement produced by skeletal muscles that requires energy expenditure. Physical activity encompasses all activities, at any intensity, performed during any time of day or night. It includes sports, games, walking, dancing, swimming, water aerobics, jogging and running, aerobic exercise classes, bicycle riding (stationary or on a path), etc.
- Social activities: It means all activities associated with socializing with family, friends and in the community. Social activity is an event or pursuit that brings members of the community together such as parties, banquets, picnics, etc.
- Camping and outdoor activities such as day camps, resident camps, backpacking, float trips, etc.
- Arts and crafts activities such as painting, scrapbooking, ceramics, woodworking, etc.
- Dramatic activities such as plays, puppetry, skits, etc.
- Musical activities such as singing, bands, etc.
- Cultural activities such as art appreciation, music appreciation, panels, discussion groups, etc.

- Service activities such as fun in doing things for others, like volunteering, charitable donations etc.

2.1.6 Impact of recreational activities on the mental health of people

Leisure and recreational activities are pastime engagements freely chosen in order to add value to one's life (Palen, 2018). In general, involvement in leisure and recreation has a great positive impact on the overall quality of the life of a person. In a study by McLean, Hurd, and Rogers (2021), they established that being involved in the leisure and recreational activities gives a person a great feeling of control over his or her life. In order to live a balanced life, therefore, it is absolutely necessary for people to be actively involved in the leisure and recreational activities (Palen, 2018). Leisure and recreational activities are also very useful in helping people with mental disorders cope with the challenges they encounter in life. Although there are numerous rewards that are associated with leisure and recreational activities, it is alleged that most people are not actively involved (Freire, 2022).

Research findings indicate that mental illness problems are a common occurrence in all cultures across the world (Gartner & Lime, 2020). It is estimated that mental disorders will account for about 15% of the total number of diseases in the world by 2025 (Iwasaki, Coyle & Shank, 2020). Although efforts have been made to deal with illnesses related to mental disorders, not much has been achieved. Just like any other person, people with mental disorders wish for a fulfilling life (Gartner & Lime, 2020). To a very large extent, efforts to ensure the well-being of individuals have mainly focused on providing decent housing and elaborate social support. While this is important and makes people with mental illness problems feel a part of the community to which they belong, it is not sufficient (Lahey, 2013).

According to Morgan (2019), encouraging individuals with mental disorders to be actively involved in leisure and recreation activities is extremely essential in ensuring a quick recovery. Arguably, involvement in leisure and recreational activities provides a strong feeling of pleasure and satisfaction that can serve as a good outlet for discharging emotional drives that, if introverted,

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might lead to mental disorders (Iwasaki, Coyle & Shank, 2020). Even though active participation in leisure and recreational activities can also be fun and enjoyable, it is advisable for individuals to focus on the health advantages of the activities (Gartner & Lime, 2020). People with serious mental illnesses can take advantage of leisure and recreation activities to improve their health and enjoy a balanced life (Palen, 2018).

In general, most leisure and recreational activities compel individuals to exercise their bodies and this ensures that their muscles are active (Morgan & Goldston, 2019). This in turn leads to improved cardiovascular health and the general well-being of a person. As reported in some research studies, leisure and recreational activities are especially integral to the mental health of elderly people (Iwasaki, Coyle & Shank, 2020, Broadhurst, 2022, Gartner, & Lime, 2020). They play an important role in ensuring that elderly people enjoy a meaningful life (Lahey, 2013).

Popular leisure and recreational activities include swimming, taking a walk in a park, cycling, and dancing, to draw maximum benefit from taking part in these activities, they should be done regularly (Freire, 2022). It is not prudent to take extended breaks in between activities (Freire, 2022). Research also indicates that active involvement in leisure and recreation helps to reduce stress levels and to create a balanced lifestyle (Freire, 2022). The ability of leisure and recreation activities to promote quality life among individuals with mental illnesses cannot be undervalued. Research findings indicate that a very significant connection exists between recreational activities and the recovery of people with mental disorders (Iwasaki, Coyle & Shank, 2020).

Usually, individuals with mental illnesses who actively involve themselves in leisure and recreational activities make better progress during the recovery process unlike those not involved in such activities (Iwasaki, Coyle & Shank, 2020). Arguably, leisure and recreational activities are necessary elements for satisfying the highest levels of need in Maslow's hierarchy (Freire, 2022). In his writing, Maslow stressed the need for individuals to be more spontaneous and creative and to find fulfillment in a variety of expressive activities. Ostensibly, people with serious mental illnesses have a problem selecting appropriate leisure or recreational activities and may need assistance time

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and again to do so (Jenkins and Pigram 2019). This is particularly useful if the person being helped is used to having such choices made for him or her. Without a doubt, this ensures that interested individuals can find an appropriate activity without struggling (Jenkins and Pigram 2019).

Investing in healthy relationships also plays an important role in promoting good mental health. According to some researchers, social recreation is vital when dealing with mental disorders (Morgan, 2019). There is a very high possibility that long life is a result of having healthy relationships with other people. Certainly, recreational activities provide a great opportunity for people to meet and interact (Morgan, 2019). Recreational activities such as playing golf and watching movies typically involve more than one person and this presents a good environment for building and maintaining friendships Plotnikoff, et. al., 2015).

Through social leisure and recreational activities, it is possible for people with serious mental illness problems to meet with others who may be suffering from similar conditions (Broadhurst, 2022). By interacting with those going through similar challenges, people with mental illnesses get convinced that they are not alone. In the process of intermingling with one another, people with mental illness problems get to exchange ideas on how they can overcome their health problems (Lahey, 2013). Undoubtedly, this serves to improve their self-confidence. Palen (2018) discovered that outdoor leisure and recreation activities such as walking and cycling play a big role in promoting quality life among individuals with mental disorders. Social leisure and recreational activities also give families a reason to socialize outside their homes and to possibly meet and interact with members of other families Palen (2018).

A study by Iwasaki, Coyle, and Shank (2020) also revealed that individuals with mental illnesses who took part in charity activities organized by members of their respective communities enjoyed a healthy and well-balanced life. It is thus advisable to include such activities as part of what should be done by people with mental disorders as they work toward their recovery. According to Jenkins and Pigram (2019), social and mental processes required for both leisure and recreational activities are believed to help individuals with mental illnesses to maintain a healthy mind. It is, however,

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important to counsel individuals with mental illnesses on how to take advantage of leisure and recreation activities to improve the overall quality of their lives (Simon, 2019). Drawing on the ideas of Sivan and Ruskin (2020), leisure counseling has a great potential to have a positive impact on mental health. In the same way, service providers whose goal is to contribute to the well-being of individuals with mental illnesses should be advised on the best strategies to follow while assisting their clients (Lahey, 2013).

Considering that offering counseling on how to benefit from leisure and recreational activities has an impact on mental health, deliberate efforts should be made to provide counseling sessions as a means of promoting successful adjustment for individuals with mental disorders on their way to recovery (Broadhurst, 2022). As pointed out earlier, leisure and recreational activities also aid in dealing with stress and depression and this is helpful in promoting good mental health (Morgan, 2019). Consequently, participating in leisure and recreation creates a sense of fulfillment that is very vital for maintaining a balanced life (Broadhurst, 2022).

Clearly, leisure and recreational activities are a central part of our lives and should not be ignored. Considering the accompanying benefits, efforts must be made to encourage people with mental illnesses to be actively involved in order to improve their well-being (Broadhurst, 2022). For maximum benefits, however, it is imperative for individuals with serious mental disorders as well as their caregivers to be well educated on the subject.

Ostensibly, few people recognize the role of leisure and recreation in helping individuals deal with stress and the different challenges that life presents (Schwazeneger, et. al., 2005). It is thus very important to educate people with mental disorders and everyone else on the importance of leisure and recreational activities. Every person should be made to understand how to be involved in a way that leads to maximum rewards (Jenkins and Pigram 2019). If used properly, leisure and recreational activities can lead to faster recovery for individuals with mental illnesses.

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2.1.7 Advantages of Recreation

To encourage the support of recreational activities, consider the following benefits as pointed out by (Pinsker, 2019)

Stress management is a key factor in reducing negative stress levels, particularly in children and seniors. Moderate exercise, group activities, hobbies, and crafts can all help to build self-esteem, while lifestyle development, socialization, leadership, and organized sports can all contribute to positive lifelong experiences. Additionally, engaging in creative activities can lead to increased personal satisfaction, while being part of a team can give one the pride and satisfaction of being part of a community. Finally, regular exercise, its physiological benefits, and the associated stress reduction can all contribute to a quality of life that is better for one's health and overall wellbeing.

According to (Rechner, 2020) Recreation is Essential to Personal Health as stated below:

Adopting recreational activities can have a positive impact on the longevity of individuals, such as those in their elderly years, by allowing them to remain independent and participate in society. Additionally, it can help to reduce the risk of cardiovascular, stroke, diabetes, colorectal, breast, and lung cancer, back issues, mental health issues, and improve overall health and well-being. Recreational activity has been proven to be a successful form of therapy, as it can help to restore physical, psychological, and social functioning.

Recreation is Key to Balanced Human Development (Rechner, 2020).

Play has a significant impact on the development of our brains and minds, as well as many other essential life skills. Recreational activities provide adults with the opportunity to reach their full potential, and adult leisure education provides remarkable opportunities.

He further said that Recreation is Essential to Quality of Life:

Enhance self-esteem and self-confidence

Enhance well-being

Enhance quality of life for individuals, families and communities

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Enhance the quality of life and independence for individuals with disabilities through recreational activities, sports and arts/cultural activities

Furthermore, (Smith & Raab, 1986) pointed out that Recreation Reduces Self-Destructive and Anti-Social Behaviour as contained below:

- Recreation reduce crime
- Reduce the risk of self-destructive behaviours and negative behaviours in young people - an antidote to tobacco, alcohol and drug use, and suicide and depression
- Reduce crime
- Enhance understanding between different cultures
- Reduce racism
- Reduce isolation, loneliness and estrangement

They further posit that Recreation Builds Strong Families and Healthy Communities as stated below:

- Families who play together stay together.
- The latch-key child receives safe development opportunities.
- The combination of recreation, sport and arts/culture creates leaders who serve their community in many ways.
- Recreation and sports build social skills and encourage participation in community life.
- The recreation sector is often the driving force behind the formation of self-sustaining communities (e.g. sport clubs, arts guilds).
- The arts/culture helps people connect with their neighbours, their past and their surroundings.
- The recreation and arts/culture builds pride in a community.

(Surujlal, 2022) equally suggested that Recreation Reduces Health Care, Social Service and Police/Justice Costs as stated below:

Having a healthy lifestyle can help reduce the chances of getting sick and disabled, which can save money on healthcare. Plus, it can help out families by cutting down on the need for social services

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and foster care. And it can also help reduce crime and social problems, which can save on police, justice, and jail costs.

He further said that Recreation and Parks is Significant Economic Generators in the Community as seen below:

The combination of recreation and fitness can have a positive impact on work performance, productivity, absenteeism, staff turnover, and accidents. Additionally, it can draw businesses to the area, creating a magnet for economic growth and relocation. Furthermore, it can also draw in tourism, the world's third largest and fastest-growing industry. All of these factors combine to create a significant economic impact, providing numerous jobs. Furthermore, small investments into recreation, sports, and culture can often result in large economic returns, as the money generated from events, capital, and ongoing services is reinvested in the community multiple times.

He also opined that, Parks, Open Space and Natural Areas are Essential to Ecological Survival and his key points are as follow:

Green space preserves habitats, biodiversity, and ecological integrity. It also improves air quality by removing carbon dioxide, sulphur dioxide, and other pollutants. Outdoor recreation is a great way to promote environmental education, which is essential for long-term sustainability. It also protects land from development by keeping it as open space. It also reduces the risk of environmental disasters such as flooding, slip zones, and aquifer depletion. Trail and pathway systems also save energy and improve air quality by promoting non-motorised transportation. Art/culture is an excellent way to express the spiritual aspects of the land, thus promoting stewardship ethics. Outdoor recreation, fitness, sports, and arts/culture can be a major economic generator on their own, providing many jobs. Small investments in recreation/sports/arts/culture often result in large economic returns, as the money generated from events, capital development, and ongoing services is often reinvested in the community multiple times.

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2.1.8 How Recreational Activities is Carried Out

There are many forms of recreational activities and some of recreation activities are being listed below by (Torkildsen, 2020):

1. Cycling the streets and valley: Cycling is one of the ancient and healthy sports that gets you out of your busy workstation. You might experience pain in neck and back because of continuously working on your laptop without taking any healthy breaks. You can cut yourself free from the pains and relax your mind by cycling through the streets or adventuring to the nearest valley.

2. Early morning walks: Going for an early morning walk, meeting community people in the park in the evening or strolling alongside a river is included in passive recreational activities and are equally beneficial for mental and physical health. The serenity and peace of early mornings are incomparable to anything else in the world as you can enjoy the dew drops, the chirping of birds, cool breezes and obviously less polluted air.

3. Listening to music / watching movies: Find the huge entertainment industry around you and go for your favorite singers, film stars, comedians and lots of more. Overlook the charts and plan a movie in the cinema with your best buddies. Check out the availability, if you can invite friends and watch the movie at a home theatre while eating, drinking and gossiping.

4. Visiting amusement parks: An amusement park is a hub of entertainment and recreation. You can find a whole lot of fun filled activities at a central place. Go on the thrilling rides, watch the amusing shows and enjoy as much as you can.

5. Photography: Grab your camera or cell phone, select a theme and go out. Nature is so lovable that you will never stop yourself in capturing a scenic view! Try photographing rough pathways, barns, cute little puppies and birds, and other things that may interest you. Try your skills and share them with family and friends.

6. Browsing the internet for what you love: You might laugh at it, but frankly speaking, a hectic routine often stops you searching for your interests. The extensive research and an urge to deliver high-quality work stops you from surfing the internet for your favourite things. You can relax your

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mind by finding something you have never searched for, despite an inclination. Take a day off or a few hours to explore the cyber world without the intention of earning money from it and you will love it. (G. Torkildsen, 2020)

2.1.9 Concept of Biophilic architecture

The term biophilia was coined by social psychologist Erich Fromm (1964) to describe the 'love of life' that explained two fundamental tendencies of living organisms: sustaining life from death threats and the positive integration with each other (Samalavičius, 2020).

Biophilia theory did not receive wider recognition until 20 years after it was first proposed (Salingaros, 2019). The biologist and naturalist Edward Wilson (1984) defined 'biophilia' as 'the innate tendency to focus on life and life like processes'

Kellert & Wilson (1993) further raised the biophilia hypotheses to interpret that the emotional connection with 'life' was conserved after humankind migrated from the primitive natural environment into the artificial new environment. Satw`iko, (2018) emphasized that biophilia is 'the innately emotional affiliation of human beings to other living organisms', in which the 'innate tendency' represents the characteristics of hereditary'; meanwhile, as a 'learning rule', it provides an enlightening perspective with which to understand nature (Salingaros, 2019).

The former point is supported by psycho-evolutionary theory, which argues that some emotional reactions are rooted in human evolutionary history and developed to adaptive responses to modern society (Gutiérrez, et al 2019). The evolutionary dependence on 'nature' was also expounded by social ecologist J. Africa et al (2019) by identifying nine values of biophilia: 'utilitarian, naturalistic, scientific, aesthetic, symbolic, humanistic, moralistic, dominionistic, and negativistic'. The latter point might be a deliberate 'softening' of 'innate', which prevents biophilia from being restricted to the significance in evolutionary psychology (Andreucci, et al (2021). For instance, the loss of biodiversity is the most obvious example that illustrates the ways in which biophilic and environmental issues are closely related (Appolloni et al 2021).

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Furthermore, Barwise & Kumar (2020) pointed to biophilia as 'the inherent human inclination to affiliate with natural systems and processes, most particularly life and life-like (e.g., ecosystems) features of the nonhuman environment'. Since the 1990s, the concerns of the biophilia theory have shifted from its initial focus on life or living organisms to exploring the relationship between humans and the natural environment (Beatley & Newman 2013).

At the beginning of the 21st century, the notion of bio-philia was developed and adapted within the architectural domain, drawing attention to the emotional aspect of humans' needs for interactions with the natural environment in the building environment (Benis et al 2018). Biophilic design was proposed to provide some design guidance to satisfy this longing for 'nature' in architecture (Boiral et. al. 2019). Biophilic design explains why some buildings are considered to perform better than others regarding their nature-connectedness (Browning & Ryan 2020). This nature connectedness presents all sorts of benefits in the living, working, learning, entertainment, and medical environments (Abdelaal, 2019).

2.1.10 Concept of Biophilia within Schools' Functions and Spaces

The study supports measurable, positive impacts of biophilic design on health, strengthening the empirical evidence of the human-nature connection and raising its priority level within both design research and design practice; however, little guidance for implementation exists (Scott et. al., 2014, Boyatzis, 1998). Nowadays, it is finally possible to build a building to intensely "tied in," giving scientific explanations and expanding the geometric logic of the natural world for the built one. To summarize, two different currents are highlighted in the contemporary ecological design (Kellert et. al., 2008). Today, the biophilic phenomenon of school becomes one of the leading projects, which supports any educational process in the world as all components of the educational process. A practical application of biophilia as a new concept in an educational program help to minimize the negative impact of buildings and the operation of buildings on the surrounding environment (Modi and Parmar 2020). It must start before the design process and after implementation in the urban site. Biophilia in the school building has to take a different form in the reading process; it can be

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represented as a natural phenomenon integrated into the building design concept or a technique and technology required for a modern lifestyle. Green areas are the most important visual associations between land, buildings, and the sky, the most prominent of all plant life, and without their presence, our townscapes would be naked (Alexander, 2022). The application of biophilia as a concept in school building design is about joining students and school staff to nature; keeping attentive on this objective will help the group to stay focused on strategies that involve the educational institute form, materials, spatial responses, and psychological replies to space rather than simply introducing a limited green roof, walls, or enhancing natural daylight [Almusaed, 2019].

2.1.11 Essence of biophilic approach to recreational center

The challenge of biophilic design is to address these deficiencies of contemporary building and landscape practice by establishing a new framework for the satisfying experience of nature in the built environment (Kellert et al 2008, Kellert and 2005, Kellert and Finnegan 2011, Browning et al 2014). Biophilic design seeks to create good habitat for people as a biological organism in the modern built environment that advances people's health, fitness and wellbeing (Chun & Guldmann, 2018). The successful application of biophilic design necessitates consistently adhering to certain basic principles (Browning & Ryan 2020). These principles represent fundamental conditions for the effective practice of biophilic design. Biophilic design seeks to sustain the productivity, functioning and resilience of natural systems over time (Barwise & Kumar, 2020).

According to Boeri S. (2015), the successful application of biophilic design should also result in a wide spectrum of physical, mental and behavioral benefits.

Physical outcomes include enhanced physical fitness, lower blood pressure, increased comfort and satisfaction, fewer illness symptoms, and improved health (Cummings & Waring 2020).

Mental benefits range from increased satisfaction and motivation, less stress and anxiety, to improved problem solving and creativity (El-Baghdadi & Desha, 2017).

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Positive behavioral change includes better coping and mastery skills, enhanced attention and concentration, improved social interaction, and less hostility and aggression (Cummings & Waring 2020).

Kellert and Calabrese (2015) have identified fundamental conditions for the effective practice of biophilic design, comprising:

1. Biophilic design requires repeated and sustained engagement with nature;

2. Biophilic design focuses on human adaptations to the natural world that over evolutionary time have advanced people's health, fitness and wellbeing;

3. Biophilic design encourages an emotional attachment to particular settings and places;

4. Biophilic design promotes positive interactions between people and nature that encourage an expanded sense of relationship and responsibility for the human and natural communities; and,

5. Biophilic design encourages mutual reinforcing, interconnected, and integrated architectural solutions.

2.1.12 Theoretical basis of biophilic design in environmental psychology

The following concept form the theoretical basis of biophilic design, which was extracted from previous publications: Biophilia Hypothesis and Value Theory, **Prospect-Refuge Theory,** Stress Recovery Theory, and **Place Attachment Theory**

Biophilia hypothesis and value theory.

Wilson (1993) has a good knowledge of *biophilia*, and he explains it thus: the philia means love and bio means life or living things. To him biophilia means love for life or living things. He described it as an emotional response, which is hereditary and exists in the genes. This can be referred to as **The Biophilia hypothesis.**

Kellert (1993) opined that, when human beings moved from natural environment (during evolution) to the modern artificial environment, their dependence on nature for survival was retained and evolved into seeking connections with nature for personal identity. He further said the evolutionary

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dependence on nature for survival and personal fulfillment forms the basis of biophilia. This can also be referred to as **Biophilia Values Theory.**

Prospect-Refuge Theory

Hildebrand (2008) explained in his study that choosing habitats and building dwellings has connections with affection and emotional need for nature. It is argued in others studies that some natural landscapes or spaces were more conducive for our ancestors' survival before the commencement of building houses; therefore, some characteristics identified from these natural spaces are still preferred in modern architectural spaces. Fascinating nature-like environments can be created by putting deliberate effort into the arrangement of these natural characteristics. (Appleton, 1975; Hildebrand, 2008; Orians and Heerwangen, 1992). This can be referred to as **Prospect-Refuge Theory.**

Stress Recovery Theory

There are two theories under this perspective: Stress recovery theory and attention restoration theory.

Stress recovery theory suggest that, contact with natural features such as vegetations, water, natural structures, textures, images, and vistas can generate a quick and positive psychological reaction. This means, exposure to nature could reduce negative emotions and foster recovery from physiological stress and health problems (Ulrich 1983, Ulrich et al., 1991).

Attention restoration theory suggests that the cognitive tasks is excessively consuming human attention, and this leads to mental stress, then, since we do not need to spend much energy on attention when interacting with nature, and this can also create exciting experience, it can provide opportunities to restore exhausted attention (Kaplan, 1995; (Kaplan, 1995; Kaplan and Kaplan, 1989).

Place Attachment Theory

Place attachment theory explains the emotional connections between human being and places and opined that people have the tendency and willingness to stay in more familiar places (Hidalgo and

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Hernández, 2001). This theory further illustrates that connecting to the local natural environment by incorporating regional features such as geomorphology and landscape in buildings could generate the sense of place and sense of community, thereby realizing personal identity, belonging, and cohesion (Manzo, 2003).

It worth noting that different perspectives theories support the emergence of biophilic design and also suggest that human's craving for nature is natural. Emotional need for nature is preserves even though human dependency on nature has change to preferences for contact Hildebrand, 2008. Notwithstanding, there are some natures that cause fear and other negative effect to humans such as snake and other wild animals, wind, deep see and extreme height, this is termed biophobia (Ulrich 1993). It is therefore important for architects to examine and determine which kind of nature they will incorporate into the biophilic design.

2.1.13 Concept of Biophilic design and sustainability

In architecture, sustainability has been one of the major topics deliberated and explored to create a befitting and beneficial environment for all in recent years, especially in repose to climate change (Guy and Moore, 2005). Diverse sustainable approaches--such as the use of energy-efficient, high or low-tech, and vernacular strategies, the analogization of nature and natural systems for design inspiration, or the adoption of intelligent, responsive, renewable, recyclable, and biodegradable materials have all been investigated to address various environmental crises, such as resource scarcity and climate change (Guy and Moore, 2007).

The benefits of biophilic design are explored to investigate efficient design features, and various problems of sustainable architecture are identified to represent various design goals. The relationship between biophilic design components and the sustainable goals of architecture is revealed by contrasting different problems and advantages.

The term "sustainability" is still debated and confusing in today's society. In agreement with Schröder (2018), heterogeneity, complexity, conflicts of interest, and disagreements are common. To better understand how architects, engineers, and clients apply the concept of sustainability in

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their work, he suggests using the translational framework to examine "which challenges of sustainability they recognize and how in response to these accepted challenges they construct specific particular sustainability design goals and design targets are constructed to instruct and to align the design team when creating buildings." The controversial idea of sustainability in architecture can be unpacked and understood by bridging numerous difficulties and design purposes or goals.

Biophilic design offers a number of strategies for supporting sustainability in architecture (Almusaed, 2011; Almusead et al., 2006; Jiang et al., 2020; Jones, 2013; Ryan and Browning, 2018; Wijesooriya and Brambilla, 2021). Different researchers explore this theme through diverse pathways, such as by discussing biophilic design values on the resilience in the face of climate change Africa et al., 2019; Beatley and Newman, 2013; Frink, 2016) or comparing biophilic design patterns with SDGs (Sherifi and Sabernejad, 2016). Experimental and empirical findings provide evidence for the adoption of biophilic design in sustainable architecture.

2.1.14 Benefits of Biophilic design and environmental sustainability

These are some of the benefits of biophilic design practices as regards environmental sustainability as opined by various proponents:

- It strengthens the use of indigenous materials and native plant varieties (Kellert, 2018)
- It reduces air pollution and optimise air quality (Aydogan and Cerone, 2020).
- It improves how we manage water Vanuvtract et al., 2014).
- It optimizes thermal comfort (Africa et al., 2019).
- It provides psychological calmness (Berto and Barbiero, 2017).
- It increases healing rates (Abdelaal and Soebart, 2019).
- It enhances positive emotions (Mandasari and Gamel, 2017).
- It enhances physical activity participation (Korpela et al., 2017)
- It provides ground for reduction in energy and construction material costs (Lerner and Stopka, 2016).

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- It increases human performance in terms of attention capacity, creative performance, and memory functionality. (Abdelaal and Soebart, 2019).
- It raises environmental consciousness and awareness (Church, 2015)
- It reduces energy consumption by using natural heating and cooling system (Sudimac et al., 2019).
- It increases building value (Söderlund, 2019)
- It increases building rating (Söderlund, 2019)

2.1.15 Socio-Economic Characteristics and Recreational Participation

Associated with the factors influencing recreational participation is the need to understand the socio-economic characteristics and the circumstances under which participation in campus recreation occurs (St Quinton & Brunton, 2018). This requires the knowledge of participants' social characteristics, the reasons for participating, constraints and problems in relation to participation among students (Soler et al., 2019).

The followings are some of the factors influencing individual participation in recreational activities, noticeable among them include physical, socio-cultural, economic, level of education, mobility and institutional factor.

a. Physical Factors: Physical factors classified as land and water bodies have been particularly important determinants of patterns of recreation activities (Snyder et al., 2019). Land (space) is needed for almost all kinds of recreation activities. Land features provide opportunity for recreation activities like mountaineering, swimming and sailing (Snyder et al., 2019).
b. Socio-Cultural Factor: Socio-cultural factors such as age and sex influence the pattern of recreation of groups or community (Shutova et. al., 2021).
c. Age: age is significant with regard to outdoor recreation. DeBrun et. al., (2021) pointed out that age between 18-25 years have maximum participation in outdoor recreation activities. Thereafter, it declines progressively with age.

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d. Sex: Once again DeBrun et. al., (2021) points out that sex affect the type rather than the level of participation in the recreation activities. Males engaged in more recreation activities than female like football, boxing, fishing, hiking, while handball and photographing are more associated with female (Deng et. al., 2021).

e. Economic Factors: Income has some bearing on the level and type of participation in recreation. Those with higher income are more likely to participate more frequently in recreation activities (Denison 2021). This is more so with recreation pursuits such as polo, golf that requires substantial amount of money for equipment (Elkins et. al. 2021).

f. Educational Factor: Educational level shows some relationship with leisure patterns. It affects both type and level of participation (Dugan et. al., 2019). A study conducted by Outdoor Recreation Resources Review Commission in USA revealed that those with higher education engaged in greater number in outdoor recreation activities than those with less education (Flosdorf et. al. 2019). The contention here is that, higher education exposes one to a variety of ideas and experiences with the recreation habits one engages in.

g. Awareness of the benefits of recreation also influences participation in recreation as a planned behavior. It is a purpose driven adventure which is pursued for derived benefits such as physical, social, mental and health (Devine et. al., 2019).

h. Available free time is also an important determinant for recreation participation. This is the amount discretionary of time which can be used for recreation (Eubank et al., 2021). Among students, academic level comes with varying discretionary time which implies that people with more free time tend to expend more time on recreation (Fines & Block 2021).

i. Accessibility to facility and mobility: Transportation is a determinant of participation in recreational activities. Available and affordable transportation facilities enhance access to and patronage of recreational facilities (Flosdorf et. al. 2019).

2.2 Design Considerations

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After analyzing the literatures from past studies, it has become a necessity to refer to the primary attributes required for effective planning of recreational center especially in higher institution which goes beyond the provision of requisite facilities (Forrester 2019). These attributes as highlighted below, aid in enhancing users experience, efficiency and attractiveness to the recreational center. As observed by Forrester (2019), effective quality may not be achieved if all the key attributes discussed below are not exhibited and followed up with good maintenance culture.

Site Planning

The main goal in planning a site is to enhance the protection of life, property, and operations (Forrester 2019). Prior to planning, a thorough study and analysis should be conducted identifying threats and hazards to support decision making on the measures to the reduction of vulnerability and risk (Foster et. al., 2021).

Building Orientation

The orientation of the building on site affects its performance. According to Foster et. al., (2021), it impacts the energy efficiency of the building, the security of the occupants, privacy and so on. Orientation can be referred to as the spatial relationship to the site relative to its surroundings, or its orientation to the sun or as horizontal or vertical aspects relative to the ground (Foster et. al., 2021). Foster et. al., (2021) in is study says, orientation of buildings can be open, or it can turn its back, it can be inviting to those outside or it can be as defense wall restricting access to the inside.

Daylight Design

Daylight design is closely related to a number of environmental factors because the use of glass windows to let in light also allows the penetration of solar heat and noise and increases the rate of heat gain or loss of the building fabric (Shapiro et. al., 2020). Therefore, daylight design can never be considered alone. Fortunately, Shapiro et. al., (2020) opined that, by proper choice of window orientation and suitable sun shading device as well as proper construction materials, solar heat gain can be greatly reduced. The use of double-glazed window unit is able to cope with the noise problem and reduced significantly the heat gain or loss through the window (Foster et. al., 2021).

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The remaining problem would be proper design of windows or roof light to provide a visually comfortable and efficient environment for the type of tasks and activities to be performed in the space.

Fenestration

The lightning conditions in a room depend primarily on the fenestration (Ryan & Deci 2000). As shown in the site analysis and consequently the illumination near the window decreases as the height of the window above the floor is increased. However, the illumination increases away from the window, giving greater uniformity to the lighting (Forrester 2019). This means:

- A tall, tine windows will give a good open view
- A log, high-level window will provide more daylight illumination.

The following points should be considered in the design of fenestration:

- The window head should be as high as possible, at least 2m above floor level, to enable a standing person have a view of outside.
- The window sill should not be higher than 1 m from floor level to enable a sitting person have a view of outside.
- The window surface area should not be too small in relating to the wall area because this reduces the uniformity of lighting and produces undesirable shadows.
- Better lighting can be achieved with windows on opposite walls since the illumination produced by the individual windows are superimposed. The region with the minimum daylight factor is then displaced towards the center of the room. The usable depth of the room thus increases.

For roof lights, the day lighting is evenly spread over the working area and much higher DF can be obtained. Yet DF is often drastically reduced by overhead obstructions and poor window maintenance (Forrester 2019).

Shadow Intensity and Direction of Incident Light

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For the perception of the solidity and surface texture of objects reasonable shadow intensity is required. Adequate shadow intensity is generally provided by the lateral incidence of day light into rooms by side windows (Shaikh et. al., 2018). Working position should be arranged so that hand and body shadows do not fall on the working surface.

Permanent Supplementary Artificial Lighting of The Interior

By considering windows solely as admitters of daylight, it may be difficult to achievement certain minimum DF in some spaces especially when the design is big (Shaikh et. al., 2018). In such cases today, electric lighting used during daylight hours to achieve a minimum DF, say 2%. If window must be used, then it will be too large causing more serious glare and heating/cooling problems (Forrester 2019). It may be preferable to design to a lower DF and complement the daylight with the electric light. This is known as 'permanent supplementary artificial lighting of the interior,' according to Shaikh et. al., (2018) and it is based on three principles:

- Utilization of daylight as far as practicable
- Use of electric lighting to supplement the daylight in the interior parts of the room
- Installation of the electric lighting in such a way that the daylight character of the room is retained.

The required quantity of artificial light input is to achieve an illumance at the rear of the room comparable to, but slightly less than, the daylight illuminances near the window.

Suitable Material

The project should be designed in such a way that it should be able to use the material locally available, which will be cost-effective and efficient (Slade & Kies (2015).

Circulation

The design of the movement pattern of the people into, through and out of the site is shaped by the design of its access, circulation and parking layouts (Funk 2019). These patterns are generally designed in other to maximize efficiency while minimizing conflicts between pedestrians and vehicles.

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Funk (2019) voiced that, to achieve this objective, the transportation requirements are studied in relation to how the building will be used. This includes determination of the number and types of access points required, parking volume needed, pedestrian movement patterns and the modes of transport to be used.

Spacious Spaces

Bigger space doesn't automatically equate to better design for users, but one does need adequate size to create a breathable environment that utilizes every inch of the facility (Gathman et. al., 2018). When working with limited space, looking deeper into the design should help us see areas that we can open up. Of course, the right design should allow you to fit in all the necessary equipment without leading to overcrowding (Forrester 2019). Modern users, after all, demand to spend their recreational activity in a space that feels safe and comfortable. This means considering the height of the facility too, ensuring you can maximize every allowance you can get to cater to both your equipment and future patrons (Gillies & Dupuis 2013).

Floor Finish

The most common types of flooring found in puplic buildings today are either terrazzo or VCT (Vinyl Composition Tile). Although there are many new flooring systems being introduced, these two are the most common that require floor finish (Guan et. al., 2020). The type of floor to be used should be durable, hard-wearing, easy to clean and needs minimal maintenance, meaning no polishing or buffing to keep it looking its best, safe (slip-resistant surface).

Security

There must be adequate provision for security of life and property in the design. The design must be that you can come in or go out with proper check.

2.3 Empirical Review

Components of Recreational Center:

The main purpose of recreational center is basically the relaxation and revitalization of people so that they may efficiently return to their routine activities, which are not recreational but

economically gainful (Guo & Ross 2014). It involves physical, mental and emotional activities. (Fatih et al, 2020). In order to achieve the set objectives as explained by Agbabiaka et al (2020) the following components are required to be in place for efficient operation in recreational center:

Vehicular Layout – this encompasses accessibility and circulation of car within and outside the property, there should be proper parking space allotted for staff and that of other users.

Pedestrian and Circulation Spaces – this includes pedestrian circulation areas and spaces such as walkways, bicycle stands, waiting areas, lobbies and passages; shelters to shield users from the effect of weather and rain; hard & soft landscape; street furniture and lighting.

Trading Space – this composed of formal, dedicated sheltered and lock-up space with flexibility in layout such as retail outlets; informal trading, in relation to main pedestrian flow; refuse storage to keep the surrounding neat and information trading accommodated in relation to main pedestrian flow for making enquiries.

Signage – this comprises of information and communication facilities which indicates what a space is meant, such as main building, gym room, wall climbing; as well as what is expected of you at some spaces like for zebra crossing area (for the less privileged, old people and kids), keep children off, noise free zone, etc.

Management – this entails the management of the recreational center, such as how to reduce or minimize running cost; CCTV camera management, physical surveillance to monitor activities within and around the property; rank marshal / disaster control; maintenance of all equipment to enhance quality of activities and refuse collection and storage.

Circulation in Recreational Center:

Circulation – Circulation has been defined by different disciplines but from the Architecture point of view, it is defined as the safe and comfortable movement of goods and people of all ages and abilities within and around a building (Dima & Lawson, 2021) which include various infrastructure that supports the operation of different modes of transport system.

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Although a critical part of design, circulation is often not directly represented in a final Architectural Drawing Set - it is in the white space and gaps between structural elements (Helms & Moiseichik 2018). However, there are some instances where exit pathways do need to be shown, such as in the design of a public building where the routes people will take to exit the building in case of fire need to be clear for evaluation against the Building Code (Grant & Booth, 2009).

A better design in circulation helps people to perceive the architecture as they move through a building and its spaces. According to (Henchy 2021) circulation path can be referred to as a journey or the perceptual thread that links the spaces of a building, the interior and exterior spaces together that creating the movement in time over a sequence of spaces.

The circulation system refers to a "skeleton" that forms the supporting structure of the building (Jiang & Liu, 2010). To determine the effectiveness of the circulation system, it mainly depends on making the destination clearer and understandable to the user so that the users can be easily direct their movement towards their destination or targeted places. Thereby, circulation has demonstrated in a strong manner on how patterns of space and its composition can affect users through movements.

Henchy (2021) mentioned the four components of circulation which consist of the direction of movement, type of use, the frequency of use and time of use. The direction of movement often refers to horizontal or vertical, in public or private used, front or back of the house, while the number of uses can be divided into common or emergency and the time of use could be in the morning, day, evening or continuous. It requires different architectural consideration in each of these types of circulation. The movement and the pathways can be categorized as fast or slow, mechanical or manual, commence in the dark or bright, crowded or uncongested in movement while the pathways could be gentle and crooked, or narrow and direct. All the circulation pattern, direction, and usage are demanding to a building layout (Henchy 2021).

Biophilic Design Strategies for Achieving Best Recreational Center:

Increase Daylighting

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Daylighting strategies are foundational to biophilic design. Daylight plays a central role in boosting energy levels, improving mood, and regulating circadian rhythms. Paying attention to solar orientation, window style, and glazing can help architects seamlessly integrate natural light into a space (Khangura et. al., 2018).

Large buildings with deep footprints provide unequal access to natural light, leading many occupants to spend their time under harsh fluorescents (Lee et. al., 2020). Some interior design strategies can help mitigate these challenges. For example, during the design review stage, the design team removed walls and other physical barriers to allow daylight to travel deeper into the building. Adding skylights in windowless areas further increased natural light levels (Lee et. al., 2020). But while designing for daylighting can be complex, the results are well worth it. Human beings are happier, healthier, more focused, and more productive in naturally lit spaces (Lerner et. al., 2021).

These strategies can help cultivate a connection to nature even in less-than-ideal settings.

Use of natural shapes and forms

According to LeUnes (2008), most buildings use rectilinear forms with right angles, not because those forms are the most appealing and healthiest, but because those forms are the least expensive to build. But introducing organic forms into a design doesn't have to be expensive, and can get us back to our roots in non-rectilinear nature (Selvaratnam et. al., 2021). Our bodies and minds are intuitively drawn to curved shapes. LeUnes (2008) said grid like plans can be mentally grasped immediately, providing little of the richness and interest found in natural settings, while a simple curved path or wall can entice and stimulate us.

Use natural materials

Synthetic materials have evolved and are now almost indistinguishable from natural ones in appearance (Schneider et. al., 2019). Yet they don't smell like natural materials, they don't age like natural materials, they don't move like natural materials, and they don't feel like natural materials. Natural materials have richness and variety and show the passage of time – all qualities

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that our minds relate to and need to maintain a deep understanding of our environment (Ryan & Deci 2000). In terms of our senses, synthetic materials are two dimensional, while we thrive when surrounded by the complexity of three-dimensional nature.

Use of natural ventilation

Fresh air does more than just keep you healthy – it also connects you to your outdoor environment in ways that your body understand intuitively. You can feel the rain coming, sense the changing low-pressure system, smell the salt in the air coming off the ocean (Rundio & Buning 2021). Ventilation strategies need to go much further than just having operable windows. Buildings can be designed to take advantage of the stack effect, exhausting warm, stale air up high while pulling in fresh, cool air from down low. Multiple openings can be used to control the flow of air in the areas where it is most needed. Protected openings can be designed to maintain ventilation in times of rain or storms (Rundio & Buning 2021).

Use of Landscaping

Most buildings are surrounded by grass and parking lots, the most unnatural and ecologically useless form of vegetation (Phipps, 2021). Both of these strategies are isolating and alienating to us, separating us from a connection to, and understanding of, our environment (Phipps 2021). Instead, use native plants to connect your building to its site. Have a small lawn which you will actually spend time on because it is shady and protected and surrounded by the beauty of the plants on the rest of your lot. Group the parking lot of your building to leave space for trees and vegetation that give views from inside the building (Ramos et. al., 2018).

Use of colors

Human evolved the ability to perceive and understand a complex environment (Phipps 2021). When we spend our days inside off-white cubicles, the lack of sensory richness erodes our connection to our environment. Colors stimulate us, and bring back some of the environmental complexity that we evolved to handle (Rahman et. al., 2020).

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Design for views out

This is often misinterpreted as "put a glass wall facing anything pretty", but views need to be controlled (Patterson et. al., 2019). A window facing a cozy recess in the yard can be as powerful and restorative as a view to the mountains. Phipps (2021) opined that, human beings are highly attracted to situations where they have "prospect and refuge". That is, a view across an expanse ("prospect") from within a shelter ("refuge"). Too much view without enough shelter makes us feel exposed, too much shelter without a view makes us feel confined (Patchett & Foster 2015). Properly considered and designed for, views connect the interior and exterior spaces in a way that invites us to participate in our environment without giving up our sense of protection.

Design for views in

These may seem counterintuitive, but seeing the life inside a building is important to the health of a community. Patterson et. al., (2019) said people are much more comfortable when they can see into a space they are about to enter. A well-designed home or business gives life to its community. Biophilia is our attraction to nature, and a part of nature is other people.

Design for complex order

Nature is infinitely complex, but also filled with patterns, and we evolved to make sense out of that world (Newman et. al., 2013). Our brains have the desire to seek order in our environment, and the sophistication to find or create it in diverse settings. We feel most connected to our buildings when they represent that duality. When a building is too simple, too readily understood, our brains don't engage. When a building is too arbitrary, too difficult to find patterns in, we lose the comfort that comes from recognizing control. As Phipps (2021) said, "order alone is monotony, complexity alone is chaos."

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Chapter Three

Methodology

Introduction

The methodology approach adopted for this study is **case study** approach, this was used to acquire detailed information and description about the project in order to achieve the set objectives of the study. Therefore, five similar existing projects were studied and analyzed, which includes 3 local and 2 international recreational centers. The study and analysis covered areas like historical background of the project, material used, peculiar features and the main spaces provided for in the designs. Physical observation and photographs were used to capture and record findings using descriptive approach.

3.1 Case Study 1: University of Ilorin Recreation Garden

3.1.1 Brief History

University of Ilorin Recreation Garden also known as Unilorin zoo located in Ilorin, Kwara State started as a unit of the Biological Sciences Department in 1975 where experimental animals were raised and kept for research. A few other animals like patas monkeys, crocodiles and royal pythons were also kept for teaching and observation by students. The zoo was then located at the mini campus of the university but was subsequently relocated to the left side of the university gate on the main campus in 1981 and named Recreation Garden.

University of Ilorin Recreation Garden can be visited by anyone including tourists, couples, children, the elderly, historians. The zoo has 26 species of mammals, 19 species of birds and nine species of reptiles which include lions, spotted and stripped hyenas, chimpanzees, green and patas monkeys, Anubis baboons, giraffes, ostriches, geese, African rock pythons, royal pythons, Nile crocodiles, leopards, zebras, antelopes, etc, all of which are well managed. The Recreation Garden has also lived up to expectation in terms of providing education opportunities to students from

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primary to tertiary level who visit on excursions and those on industrial training, practical and research projects.

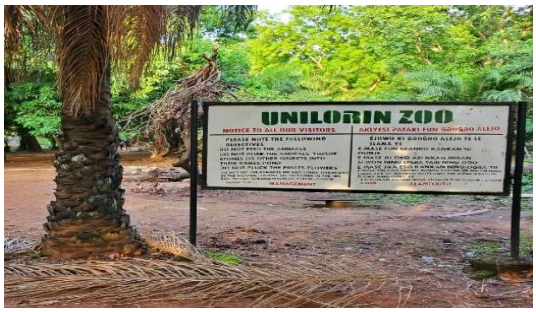

Figure:3.1: Directional signpost, University of Ilorin Recreation Garden. Source: Author

Figure:3.2: Sitting Area, University of Ilorin Recreation Garden. Source: Author

University of Ilorin Recreation Garden which is located at left side of the university gate on the main campus, comprises of two main sections namely zoo and physical activities sections. The layout plan of the site is strategically sectioned to compose of the animal cages, recreational activities area, relaxation area and admin building.

3.1.3 Circulation Pattern

The access into the site is through the main road of the university, there is provision to allow both vehicles and pedestrians to access the site. There is proper connection of the site elements through pedestrian path, that is, every cage is linked with another by pedestrian way.

3.1.4 Zoning / Facilities

The site is divided into four zones which are (i) Access / Egress zone where facilities and services were provided to accommodate different users arriving and departing the recreational center. It includes the canteen/store, parking lots, pedestrian walkways and perimeter fence; (ii) Zoo zone; this is where animal are kept for observation. There are many animals kept in different cages at this zone. (iii) Recreational activity zone: this is where you can engage in physical activity like climbing the bridge, taking boat at river side. Children also can play at children playing ground, there are many quite places to sit and meditate. (iv) Administrative zone; this is where administrative works are done, such as monitoring the people coming and going out of the site, maintaining the animals and the site in general.

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Figure:3.3: Sitting Area & walkway, University of Ilorin Recreation Garden. Source: Author

Figure:3.4: water-way, University of Ilorin Recreation Garden Source: Author

3.1.5 Material Used

The major building materials used for the construction of this recreational center are sandcrete blocks, reinforced concrete, wood, rubber, plastic, steel, metal, glass, aluminum and aluco-board.

3.1.6 Merits

- The site is easily accessible for both vehicles and pedestrians.
- There is proper space allocation for users.
- There is adequate provision for circulation, both within the structure and around the site.
- There is adequate natural lighting and ventilation within the building.
- There is provision for treated water tank and public toilet for users.
- There is provision for good drainage system.

3.1.7 Demerits

- The landscape is not architecturally appealing.
- There is no functional water supply to the building

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Figure:3.5 and Figure:3.6: Sitting Area & walkway, University of Ilorin Recreation Garden. Source: Author

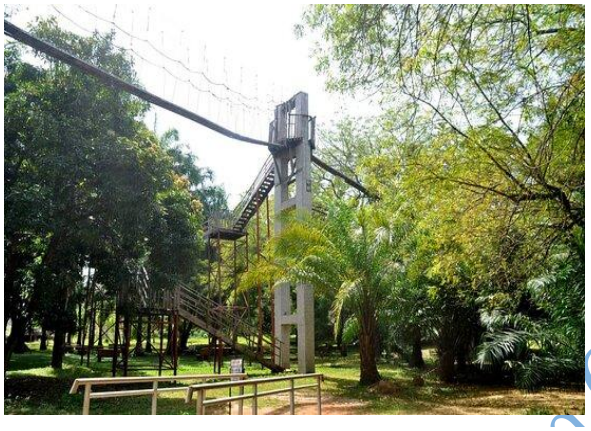

Figure:3.7: Rope bridge, University of Ilorin Recreation Garden. Source: Author.

Figure:3.8: Zoo Animal, University of Ilorin Recreation Garden. Source: Author.

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3.2 Case Study 2: Campus Recreational Center, University of Utah, USA

3.2.1 Brief History

The facility was established in 1980 by the University Authority as recreational center. It was design as a place where students' academic and social life can connect and create a more engaged campus community. The facility is located adjacent to Legacy Bridge, North-West of the campus. The facility houses Pools, Hot tub, Indoor running track and so on.

3.2.2 General Layout of the facility

The facility is the community center of the university, serving students, faculty, staff, alumni, and guests for recreation and socialization purposes. The layout plan of the site is strategically sectioned

to compose of the Parking area, The outdoor game area, the main building and landscaped areas. The main building is a structure of four floors with 320-yard running track at the last floor.

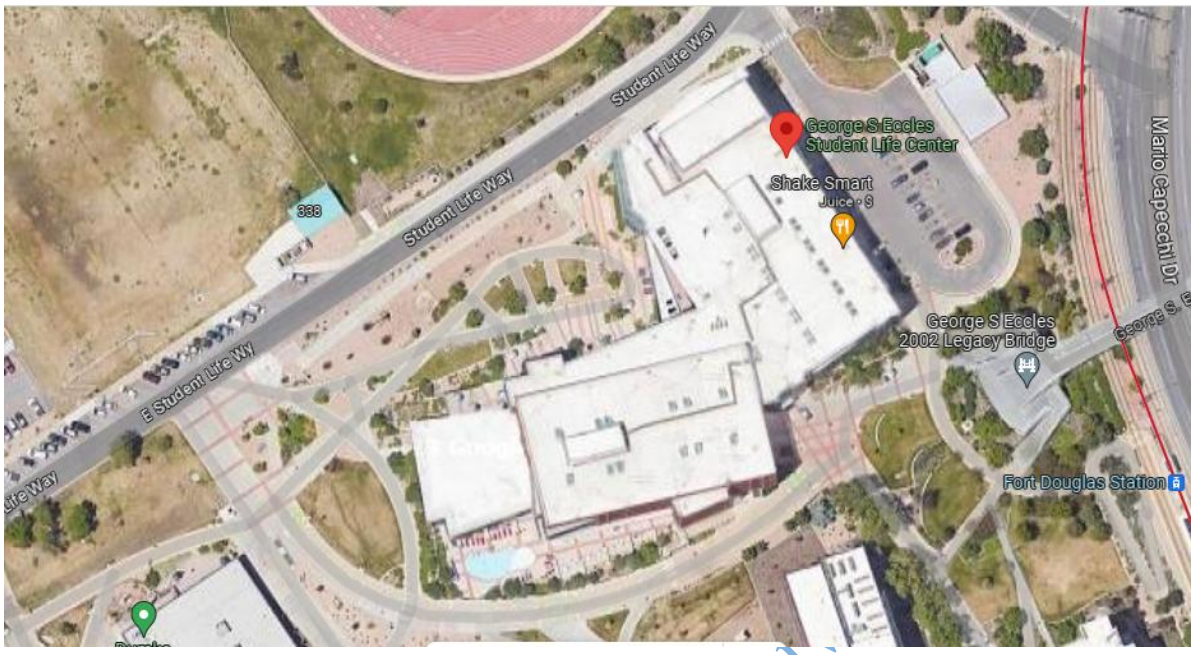

Figure:3.9: Layout of Campus Recreational Center, University of Utah, USA

Source: (https://campusrec.utah.edu/)

3.2.3 Circulation Pattern

You can access the access through any of the four sides, that means you can access it from anywhere you are coming from within the university, there is provision to allow both vehicles and pedestrians to access the site. There is proper connection of the site elements through pedestrian and bicycle path. There is no any form of traffic congestion around the facility.

3.2.4 Zoning / Facilities

The facility is zoned or sectioned into two (2) namely outdoor activities and indoor activities.

Outdoor activity section: this includes all areas outside the main building and all the activities carried out there, such as outdoor pools, running tracks, game courts, fire pit, sitting area, parking areas as well as green areas.

Indoor activity section: this includes all the four floors withing the mains building and the activities and spaces provided in it such as indoor pools, indoor hot tub, indoor running track, climbing wall,

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foot fitness, in door sport courts, combative room, fitness studios game studios, massage therapy, administrative area.

3.2.5 Material Used

The major building materials used for the construction of this recreational center are brick, reinforced concrete, wood, rubber, plastic, steel, metal, glass, aluminum, ceramics and aluco-board.

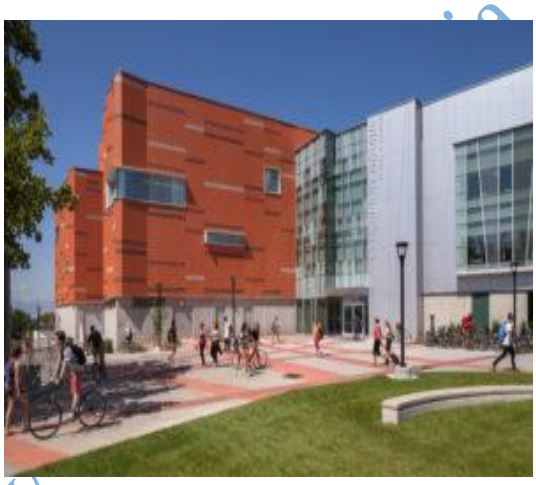

Figure:3.10: & 11: External view of Campus Recreational Center, University of Utah, USA

Source: (https://campusrec.utah.edu/)

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3.2.6 Merits

- The facility is easily accessible.
- The facility is well landscaped
- It is architecturally appealing
- Spaces within the site is properly managed.
- Stairs and lifts are properly located to facilitate easy access and circulation within and around the building.
- The use of transparent materials ensures adequate natural lighting and ventilation in some spaces.

3.2.7 Demerits

- There is little or no access control into the site which can bridge security.

- Some of the spaces has poor natural ventilation and lighten which is not a problem in temperate region like United States of America also considering the stability of their power supply but it is a big problem in tropical region like Nigeria with less power supply.

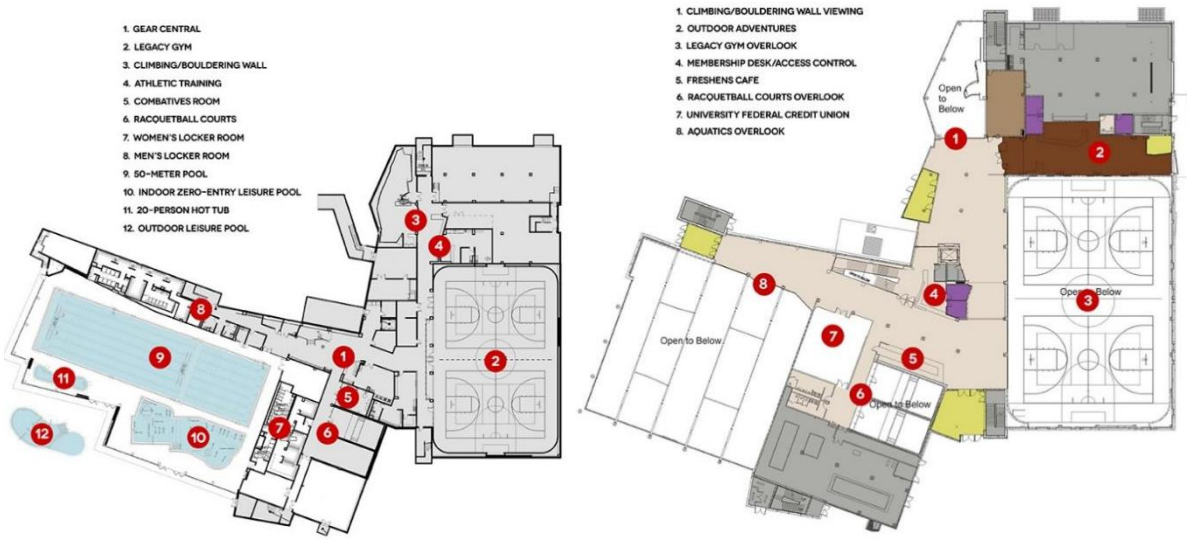

Figure 3.12: Floor plans of Campus Recreational Center, University of Utah, USA

Source: (https://campusrec.utah.edu/)

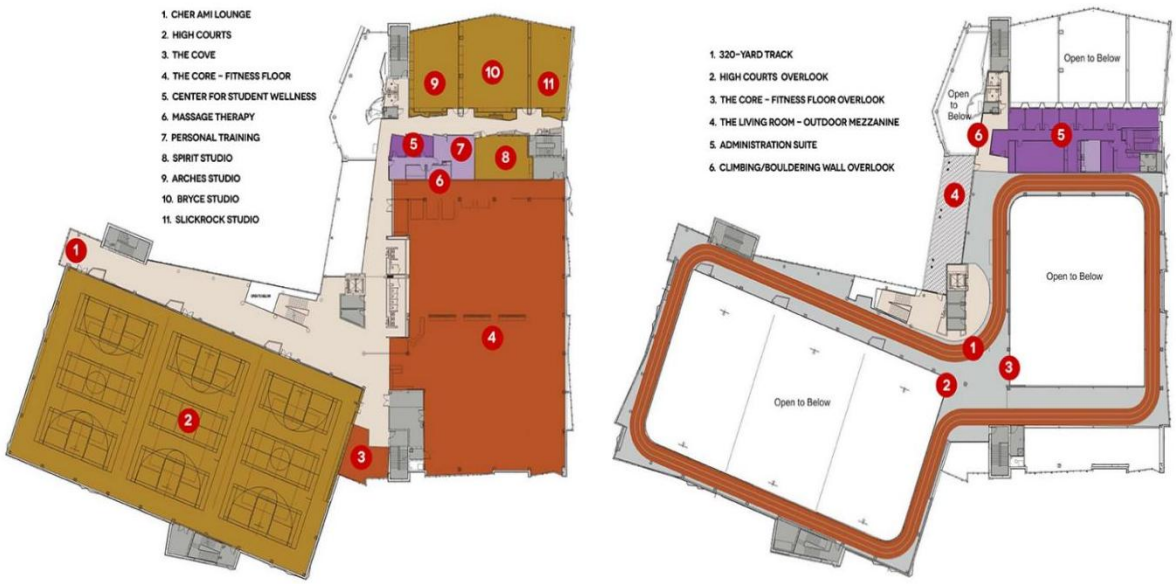

Figure 3.13: Floor plans of Campus Recreational Center, University of Utah, USA

Source: (https://campusrec.utah.edu/)

Figure 3.14 & 3.15: Internal view of Campus Recreational Center, University of Utah, USA.

Source: (https://campusrec.utah.edu/)

3.3 Case Study 3: Nelson Mandela Freedom Park Osogbo, Osun State

3.3.1 Brief History

The facility was established in 2009 by Osun State Government in Osogbo, the state capital. This is a Park and Train station from Osogbo to Lagos. The Nelson Mandela Freedom Park, is an exceptional tourist haven for residents of the capital territory, Osogbo and visitors from near and far. It was a previously abandoned piece of land at Osogbo Terminus of the Nigerian Railway State but today it has become a site for daily recreation and weekend picnics for residents and visitors.

3.3.2 General Layout of the site

The site is sectioned into two parts namely training area and leisure area. Once you enter into the site you have entered into a free space aside a small administration office for people that maintain the facility, there is no other building. What you see are beautiful walkway, sitting area, places where you can have a good view of the environment and the training ground. There is a place you can stay to see all the activities going on in the train station.

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Figure 3.16 & 3.17: View of Nelson Mandela Freedom Park Osogbo, Osun State

Source: Author

3.3.3 Circulation Pattern

The access into the site is through the main road that connect Osogbo and Gbagan together, there is provision to allow both vehicles and pedestrians to access the site. There is proper connection of the site elements through pedestrian path.

Figure 3.18 Aerial view of Nelson Mandela Freedom Park Osogbo, Osun State

Source: Author.

3.3.4 Facilities

There are several spaces provided within the site which includes Marquee Platform, Rail Crossing/Bridge, Food Court, River Walk, Training Ground, Public Toilet, General Beautification/Landscaping including pavilion Area, External Electrification, Icons and Statues, Fountains, Fence (Clear Vu) as well as Vehicular Parking area.

3.3.5 Material Used

University, Nigeria
Do No

The major building materials used for the construction of this recreational center are sandcrete blocks, reinforced concrete, wood, steel, metal, glass, aluminum and paving stones, ceramics and plants.

3.3.6 Merits

- The site is easily accessible from every part of Osogbo.
- There is proper space allocation for user within the site.
- The sloping nature of the site was well manipulated to properly suit required spaces and functions
- The facility is well landscaped
- It is architecturally appealing
- There is adequate link between the spaces

3.3.7 Demerits

- The site is somehow porous because you can gain access from different places without security adequate security control.
- There is not first aid treatment point in case of accident.
- The site is open to everybody without access control, this can encourage misuse and abuse

Figure 3.19 & 3.20: View of Nelson Mandela Freedom Park Osogbo, Osun State

Source: Author

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Figure 3.21 & 3.22: View of Nelson Mandela Freedom Park Osogbo, Osun State

Source: Author

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3.4 Case Study 4: Coles Sports and Recreation Center, New York University, New York City, USA

3.4.1 Brief History

The Coles Sports and Recreation Center was the main athletic facility at New York University, located at 181 Mercer Street in New York City, in the U.S. The building was named in honor of Jerome S. Coles, an alumnus and benefactor of NYU. The facilities accommodated a wide range of individual and group recreational sports and fitness activities, including over 130 different courses at various skill levels serving 10,000 participants, as well as club sports and an intramural program enjoyed by approximately 3,500 students. Coles was renovated with a new dehumidification system in 1999 to solve problems of corrosion.

3.4.2 General Layout of the facility

The facility is a unique center for the university community, serving students, faculty, staff, alumni, and guests for recreation and socialization purposes. The layout plan of the site is strategically sectioned to compose of the Parking area and the main building. The main building is a structure of two floors with a roof containing 1/6 mile, three-lane running track and six tennis courts

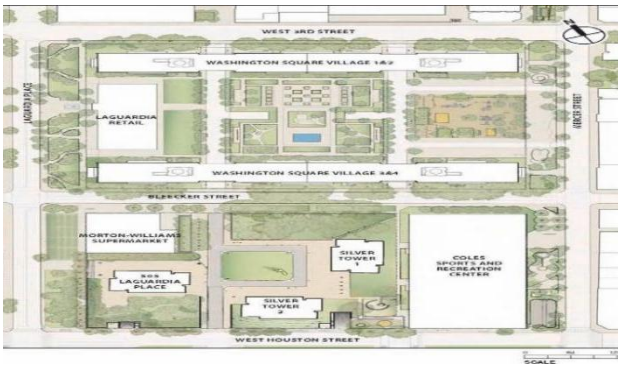

Figure 3.23: Layout plan of Coles Sports and Recreation Center, New York University, New York City, USA
Source: (https://www.nyu.edu/)

Figure 3.24: Front view of Coles Sports and Recreation Center, New York University, New York City, USA
Source: (https://www.nyu.edu/)

3.4.3 Circulation Pattern

You can access the site through East side, notwithstanding, you can access it from anywhere you are coming from within the university because the road is well connected, there is provision to allow both vehicles and pedestrians to access the site. There is proper connection of the site elements. There is no any form of traffic congestion around the facility.

3.4.4 Facilities

The building contains the following spaces: A multi-purpose arena with five courts, A roof with a 1/6 mile, three-lane running track plus six tennis courts, 25-meter swimming pool, Diving tank, Saunas, Five squash courts, Five handball/racquetball courts, Weight training facilities, An aerobic fitness room, Individual rooms for wrestling/judo, Fencing room, Physical fitness room, Calisthenics, Exercise prescription room, Dancing room, Free play activities area, Rock climbing wall.

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Figure 3.25 & 3.26: Interior view of Coles Sports and Recreation Center, New York University, New York City, USA
Source: (https://www.nyu.edu/)

3.4.5 Material Used

The major building materials used for the construction of this recreational center are brick, reinforced concrete, wood, rubber, plastic, steel, metal, glass, aluminum, ceramics and plants.

3.4.6 Merits

- It is easily accessible
- There is proper space allocation for user
- The facility is well landscaped
- It is architecturally appealing
- There is adequate link between the spaces

3.4.7 Demerits

- Some of the spaces has poor natural ventilation and lighten which is not a problem in temperate region like United States of America also considering the stability of their power supply but it is a big problem in tropical region like Nigeria with less power supply.
- Construction method and style might be difficult here.

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Figure 3.27 & 3.28: Interior view of Coles Sports and Recreation Center, New York University, New York City, USA

Source: (https://www.nyu.edu/)

3.5 Case Study 5: Upbeat Recreational Centre, Lekki, Legos State

3.5.1 Brief History

In recognizing the need to educate children of all backgrounds in the community, the Upbeat project has been setup to promote healthy, fun and educational lifestyles among the young citizenry in Nigeria. The Upbeat project is a vision of Upbeat's founder, Mrs. Moyo Ogunseinde. A passionate gymnast mother, board member of the Gymnastic Federation of Nigeria, Real Estate Business Developer and proud member of the URAGA team, Mrs. Ogunseinde is also an ardent believer in using business as a tool not only to provide products and services, but to also influence healthy and wholesome living in children, and by extension their families. Upbeat Recreation Centre was incorporated in December 2016.

3.5.2 General Layout of the Building

The facility is a special center for the people in that community, serving children and adult that are lovers of recreation and socialization. The layout plan of the site is strategically sectioned to compose of the Parking area which is the first section of the site, indoor section which is inside a building, and outdoor section which consist of game courts, football field, sitting area and so on. The main building is a structure of single floor but double volume built with steel and cover by waterproof nylon fabric.

Figure 3.29: Layout view of Upbeat Recreational Centre, Lekki, Legos State
Sources: Author

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3.5.3 Circulation Pattern

You can access the site through East side, that is from Admiralty Road, off Lekki-Epe Express Road, notwithstanding, you can access it from anywhere you are coming from within the community because the road is well connected, there is provision to allow both vehicles and pedestrians to access the site. There is proper connection of the site elements. There is no any form of traffic congestion around the facility.

3.5.4 Facilities

The facility contains the following spaces:

A multi-purpose open space building with the following different sections: High Performance Trampoline, General Jump, Foam Pit, Wall Climbing, Tumble Track, Wall Running, Dodge Ball, Soft-play, Go Cart, Fitness Classes.

Outdoor sport spaces: Football field, Basketball Court, Volleyball Court, Outdoor Aerobics.

Also, there are enough parking space for cars.

3.5.5 Material Used

The major building materials used for the construction of this recreational center are sandcrete blocks, reinforced concrete, wood, steel, metal, glass, aluminum and paving stones, ceramics, waterproof nylon fabric and plants.

3.5.6 Merits

- The facility is easily accessible, it is located just by the main road.
- The facility is well landscaped
- The land was well managed and utilized
- There are many interesting activities there

3.5.7 Demerits

- There is no proper space allocation for each activity
- In case of many users at the same time, there will be ventilation problem.

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Figure 3.30: Aerial view of Upbeat Recreational Centre, Lekki, Legos State

Source: Author

Figure 3.31, 3.32 & 3.32: Upbeat Recreational Centre, Lekki, Legos State

Source: Author

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3.6 Case Study Appraisal

The case studies carried out created an avenue for a detailed analysis of the project by helping the researcher have an in-depth and better understanding of various aspects peculiar to the project. It provided a broader knowledge from different perspectives in the reality sense. Information on the planning of recreational center generally and for campus specifically, the spaces and other facilities to be provided, the methodology and materials to be used and what factors to consider in the design of recreational center were all captured from the case studies.

Deduction from the case studies shows that recreational center is used by the general public irrespective of their status and age while the university or campus recreational center will also be used majorly by student, faculty and staff of the university and occasionally, guest from outside the university. Cutting wall is adopted as one of the major styles commonly used in the selected

university case studies for visuality purposes. The use of multiple access allows for seamless flow with the provision of lifts to ensure vertical movement of people. At the information desk point located in the reception, users have access to all necessary information about recreational center. Other ancillary facilities like toilets, security and service information were also provided to enhance the operation of the site.

However, each of the selected case studies have unique features that are peculiar to their planning. The University of Ilorin recreation garden includes zoo which provided more activities and created link between human and other beings (animal), they also incorporate water body where you can have water transportation experience which many describe a fun. Campus Recreational Center, University of Utah, USA have spaces that can be used for different activities at different time, such as providing a single space for different indoor sport court, is another way of effective use of space where there is space constraint, it minimizes resources usage and maximize space usage. At Nelson Mandela Freedom Park, Osogbo, Osun State, as the name sound, the planning was open and free from major construction. It is majorly for people that want to relax or have a good view and apricate nature. What is unique at Coles Sports and Recreation Center, New York University, New York City, USA is the usage of part of the roof as activity space, in the roof there is a 1/6 mile, three-lane running track plus six tennis courts which covers substantial part of the roof, also services as a way of minimizing resources and maximizing space for activity. At Upbeat Recreational Centre, Lekki, Legos State, what is unique in it planning was the use of large all for different activities at the same time making sure one is not affective the other.

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Chapter Four

Site Analysis and Design Synthesis

4.1 Study Area

Omu-aran is the Local Government Area Headquarters of Irepodun LGA of Kwara State, it is located at an elevation of 536.14 meters (1758.99 feet) above sea level, Omu Aran has a Tropical wet and dry or savanna climate (Classification: Aw), Omu-Aran has a latitude of 8°8'24.82"N and a longitude of 5°5'46.73"E or 8.140227 and 5.096314 respectively and it is the largest town in the Local Government Area (Jabir, K.O. 2019). Omu-aran has a population of about 150,000 people, and it is the most prominent transit point with trading routes between the southern regions of Kwara State and the neighbouring states and contains major transport arteries linking Kogi State with the Federal capital, Abuja, and Ekiti State and other important important cities (Jabir, K.O. 2019).

Landmark University is one of the major notable places in Omu-Aran, it has a land mass of 1,059 hectares of farming land; 320 hectares on the university property located at south-west part of the town. Landmark University is a private University established by the Living Faith Church World Wide, committed to raising leaders who shall be equipped with skills and character to lead the world in meeting the needs of humanity-FOOD. On March 7, 2011, the University was licensed by National Universities Commission (NUC) to run undergraduate programs in the Colleges of Agricultural Sciences; Sciences and Engineering, Business and Social Sciences. On March 21, 2011, the University was officially dedicated and commenced full operation. Presently, the university is awarding 15 different degree programs and have 6,450 students.

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Figure 4.1: Map of Kwara State showing all L.G.A
Source: www.researchgate.net.

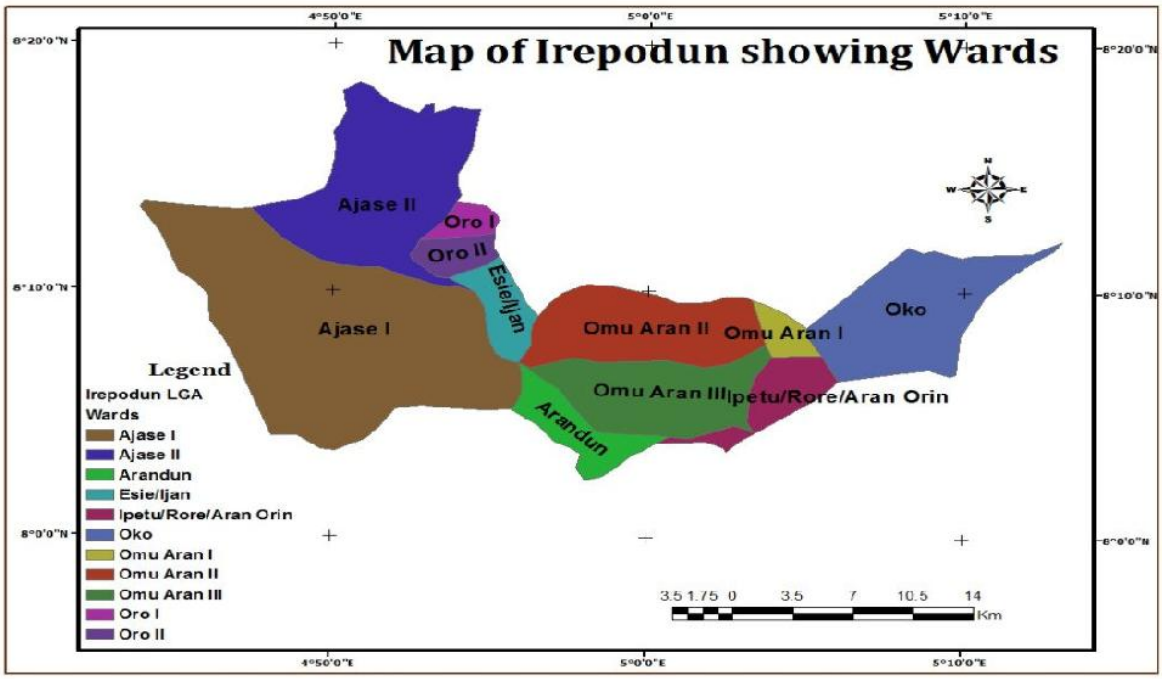

Figure 4.2: Map of Irepodun Local Government showing wards
Source: www.researchgate.net.

4.1.1 Site Location

The functionality of a design is not the only factor that determines the effectiveness of a project, careful selection of site based of the purpose of the project and site condition also plays a major role. The proposed site is located center of Landmark University on latitude 8º 12'33" north and

longitude 5º 08’51” east, at Km 4 Ipetu, Omu-Aran Road, PMB 1001, Ipetu Road, Omu-Aran, Kwara State.

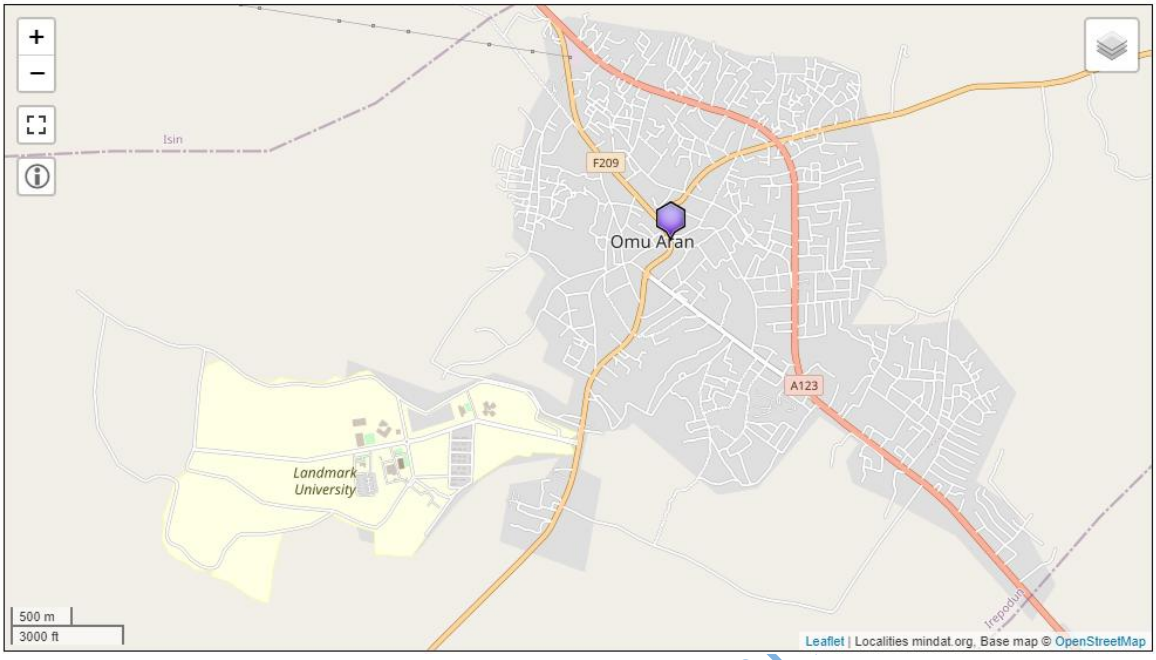

Figure 4.3: Map of Omu-Aran
Source: (www.openstreetmap.org/)

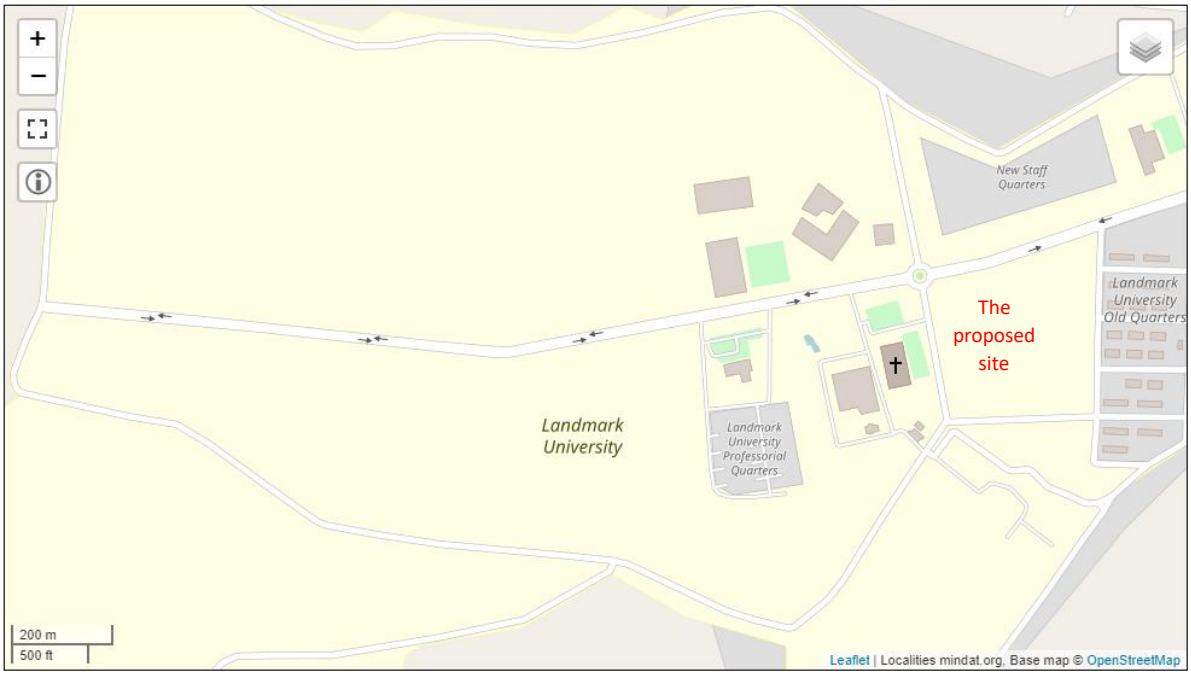

Figure 4.4: Map of Omu-Aran showing Landmark University
Source: (www.openstreetmap.org/)

Figure 4.5: Map of Landmark University showing the proposed site
Source: (www.openstreetmap.org/)

4.1.2 Site Selection Criteria

The following factors was taken into consideration before the site was selected, the choice of the site was based on the requirement for effectiveness of the recreational center:

- Availability: the land is vacant and spacious enough to accommodate the facility.
- Accessibility: The site is accessible from all part of the campus, you don't have to travel much to access it from student hostel, staff quarters and health center.
- Utility: Electricity, drainage and telecommunication network are accessible from the site.
- Topography: The site is relatively even.
- Vegetation: There are very few trees on the site. The grasses will be taking care of during construction.
- Natural Features: There are not obstructions to natural light and air.
- Environmental Impact Assessment: the site is not exposed to smoke or noise in any form and is not expected to impact the environment negatively.

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4.1.2.1 Site Analysis / Inventory

To have a robust design that will be functional and effective, a thorough site analysis is not negotiable. This is the stage where feasibility studies will be carried out and all information gathered will be analyzed to identify the site asset which is a plus to the site and liabilities which is a potential challenge. This is very important for an effective design because both site assets and liabilities will have effect on the final design, so when all these factors are identified, the assets will be harnessed while the liabilities or anything that can stand as obstacle to the success of the project will be addressed so as to improve on it for better outcome or to eliminate it completely if that will solve the problem and allow good flow and relationship between the site and the building.

The following are some of the existing site conditions that was taken into consideration and analyzed prior to the design stage as a way of gathering information about the site so as to make informed decisions during the design stage: master plan of the university, zoning arrangement, Solar (Sunlight) radiation, accessibility, soil, climate, topography, orientation, vegetation, water level.

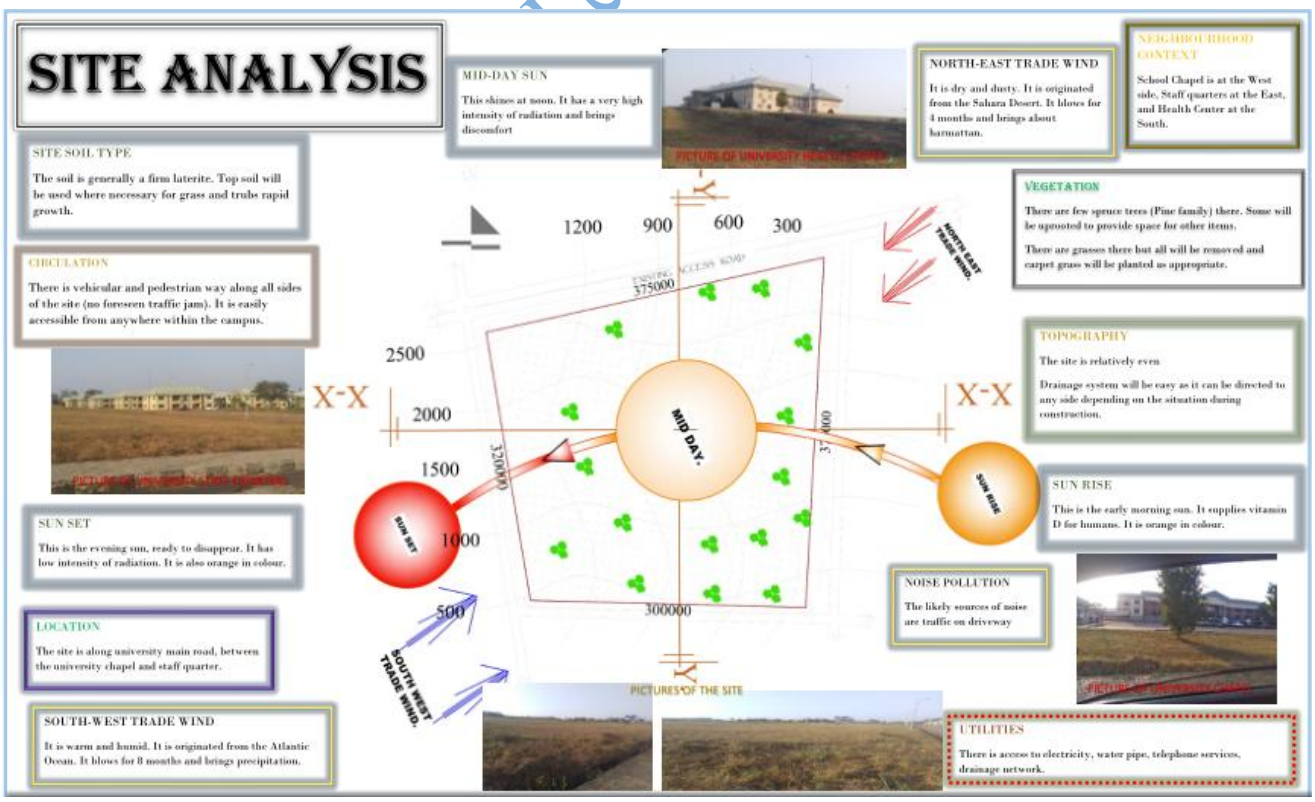

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Figure 4.6: Site Analysis.
Source: Researcher's field study, 2023.

Information about the Site

The site is 76,505.37 m2 with a perimeter of 1,114.87m. The site is along the major road coming directly from the main gate leading to collage buildings and the senate building. The site is surrounded with buildings; New Staff Quarts to the North, University Multipurpose Hall to the West, Student Hostel and University Health Center to the South, and Old Staff Quarters to the East.

Access Road

The site is accessible through the double line road the main gate, the road passed thought the university secondary school, university guest house, old and new staff quarters and leads to collage building and university senate building.

Vegetation

There, on the site are few trees with grasses and shrubs. The soil is a mixture of laterite, fine grained loamy and humus material which is light in nature which has been proved to having a strong bearing capacity to hold and support the proposed building to be constructed. Some vegetations and shrubs would be removed while some would be retained to serve as landscape elements.

Drainage

There is road along the four sides of the site with well-constructed drainage, there will be no need of constructing new drainage, the surface water will be linked to it.

Topography

The site is relatively even, this will be better utilized in the drainage of surface water which can be connected to any of the drainage along the four sides of the site.

4.1.2.2 Geographic / Climatic Data of the Study Area

Climate and Average Weather

Omu-Aran experiences two distinct climatic seasons: the wet season, which is characterized by warm, oppressive and overcast weather, and dry season, which is characterised by hot, humid and

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partly cloudy weather. Temperatures in the wet season range between 62°F and 92°F, while in the dry season, temperatures rarely drop below 56°F or exceed 97°F.

Average Temperature

Omu-Aran experiences a long hot and cold season, with the hot season lasting 2.6 months (January 23 to April 11) and the cold season lasting 3.8 months (June 21 to October 14). The average daily high temperature in the hot season is above 89°F, while the average daily low temperature is below 82°F in the cold season. The warmest month of the year is March, when the average high temperature is 91°F and the average low temperature is 71°F.

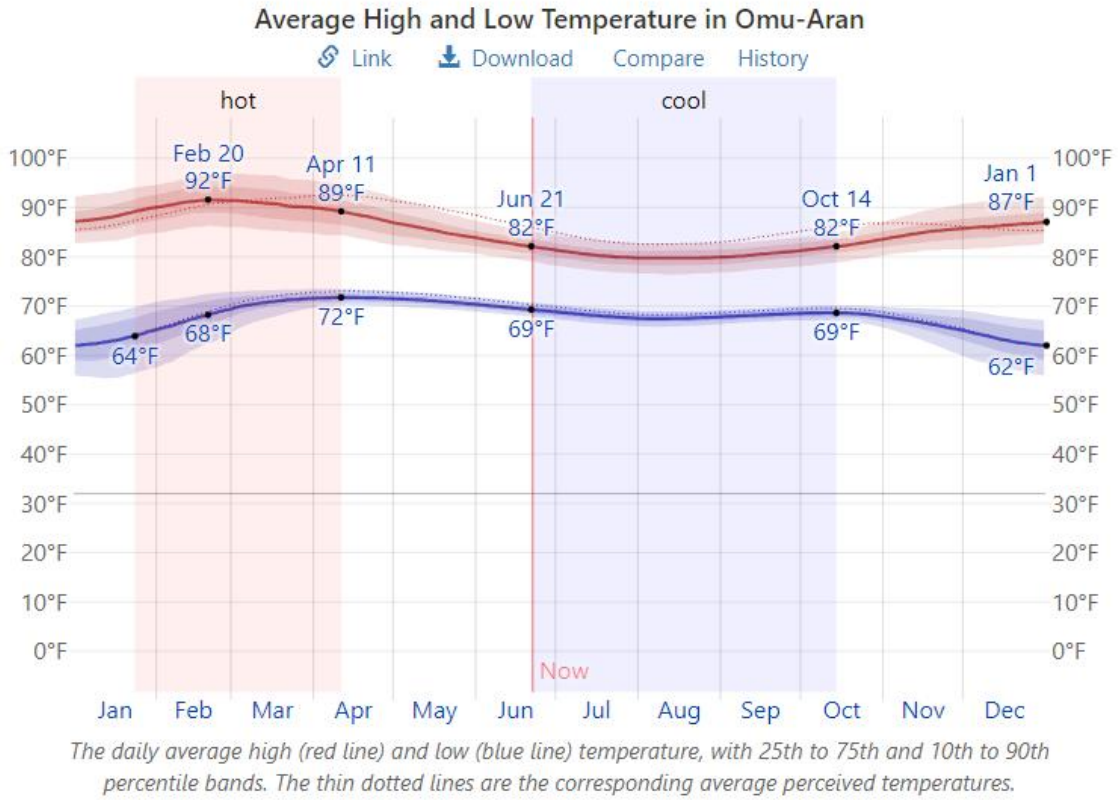

Figure 4.7: Average Temperature in Omu-Aran

Source: https://weatherspark.com.

Prevailing Wind

Omu-Aran's average hourly wind speed varies significantly from month to month throughout the year. The windiest part of the year is between February 17 and September 6, with an average wind speed of over 6.2 mph. The windiest time of year is April, when the average wind speed is 7.7 mph.

The calmer period is between September 6 and February 17, and the calmest time of year is November, when the wind speed is 4.6 mph.

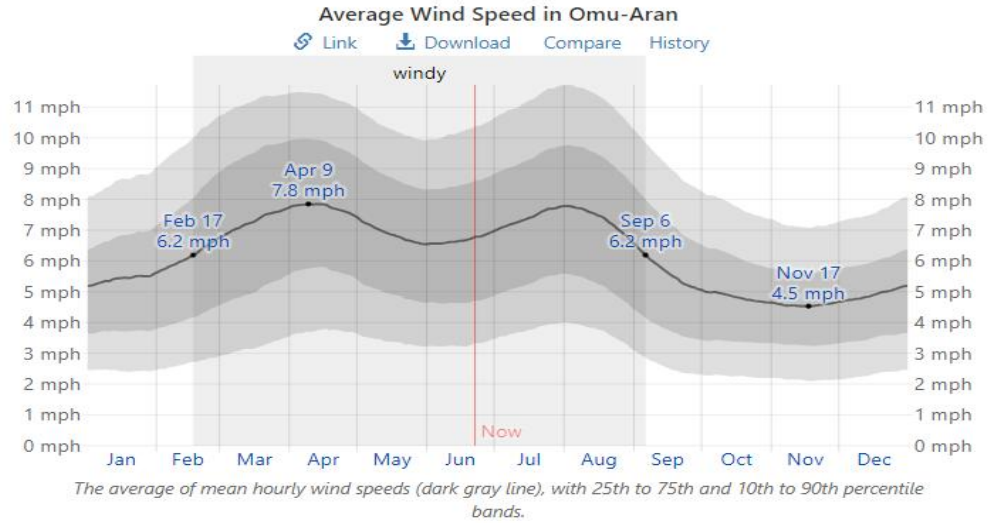

Figure 4.8: Wind Speed in Omu-Aran
Source: https://weatherspark.com.

Relative Humidity

Omo-Aran experiences remarkable seasonal variations in humidity levels. The period of muggier weather is typically between February 5 and December 6 of each year, with the majority of the time being humid, oppressive, or unpleasant. July is the month with the most humid days, with an average of 30.9, while January has the least humid days, averaging 6.6

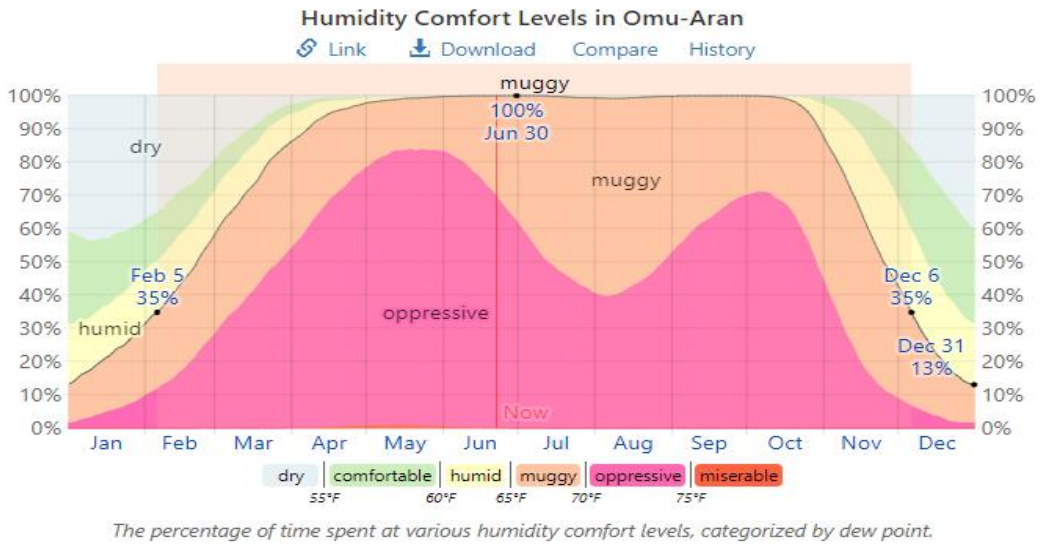

Figure 4.9: Relative Humidity in Omu-Aran
Source: https://weatherspark.com.

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Precipitation / Rainfall

A wet day is a day with 0.04 inches or more of liquid or liquid equivalent precipitation. The probability of wet days varies greatly across the year.

The wet season is 6.2 months long, running from April 17 through October 22, with more than 42% of days being wet.

September is the month with the highest number of wet days. On average, there are 24.1 wet days in September.

The dry season is between October 22 and April 17, with the drier season lasting from 5.8 to 7.3 months. December is the month with the lowest number of wet days, averaging 0.05 inches of precipitation on average.

The wet days are classified according to whether they are rain-only, snow-only, or a combination of both. September has the highest number of rain-only days, averaging 24.1. On the basis of this classification, rain alone is the most common precipitation type throughout the year, with the highest probability of precipitation occurring on September 11th.

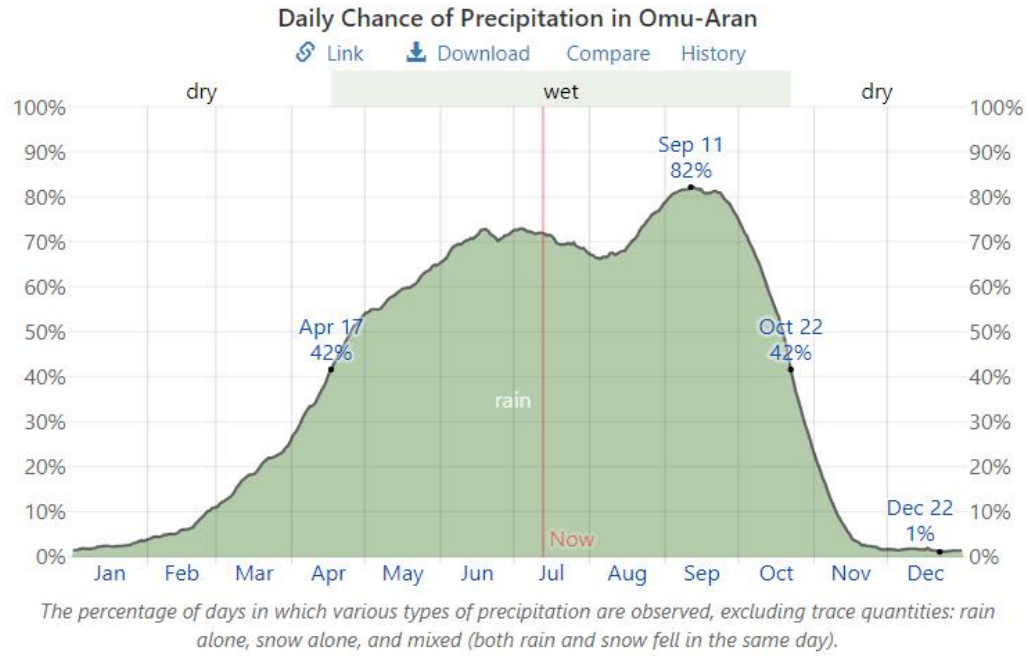

Figure 4.10: Average Precipitation / Rainfall in Omu-Aran

Source: https://weatherspark.com.

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4.2 **Project Analysis and Design Synthesis**

4.2.1 Brief Analysis

Recreational center as discoursed previously, is a space where time is used in a creative way, which usually result to therapeutic refreshment of body, mind and gives satisfaction (Allen & Lyons 2019). Construction of recreational center at Landmark university will bring exciting moments to the students, faculty and staff, as well dwellers of Omu-Aran community. Presently, there is no single facility dedicated solely to recreational activities in Landmark university or in Omu-Aran community. This project intends to bridge the gap between academic activities and leisure. It will foster interaction between the students and also easy the student-lecturer tension between the faculty and students. Most importantly it is armed at providing a facility where rejuvenation can take place and also boost internally generated revenue of the school, it is also aimed at addition architectural edifice to the school, thereby increasing streetscape beauty of the school.

4.2.1.1 Client Information

The client of the project is the Management of Landmark University. The management has tasked the Physical Planning and Development Unit of the university to come up with the minimum requirements to have a befitting recreation center, and also to identify spaces that will be need in the facility as well as other information to make the facility generate income for the school, improve health and education, promote peace, and environmental sustainability.

Client name: University Management of Landmark University.

Address: Km 4 Ipetu, Omu Aran Road, PMB 1001, Omu Aran, Kwara State.

4.2.2 Brief Development

In order to have a facility where people can relax and rejuvenate, the following functional spaces are needed to achieve that:

- Public car park
- Main gate / checking point
- Public /General outdoor sitting area

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- Outdoor swimming pool
- Building entrance
- Reception
- Membership/Access control room
- Legacy Gym
- Climbing wall
- Athletic training room
- Combative room
- Table tennis court
- Changing rooms
- Indoor pool
- Cash office
- Technical/I. T. room
- Foot gym room
- Cafeteria
- Customer service/complain desk
- Center for student wellness
- Massage therapy
- Private meditation room
- Dancing (Training) room
- Personal training
- Game studio
- Banquet hall/view center
- Administrative offices
- Judo Training Room

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- Yoga Room

4.2.3 Design Criteria

Having in mind the design of an effective and efficient recreational facility, it is important to put into consideration the environment in which the facility is to be located, the kind of users as well as the sustainability of the building.

These prompt one to consider the provision of the following:

- Large public open spaces
- Pedestrian access, accessible by both able and disable persons
- Large green areas with open and closed siting areas
- Directional guide
- Effective parking
- Flexible design

However, the general design consideration with respect to their overall impact on the building includes;

Access to facilities

- Facility should be accessible to the widest spectrum of users.
- Consider means of escape for users of different needs, abilities and disabilities.
- Identify the connection routes from road, pavement, footbridge and subway at various directions.
- Consider connection from major transportation drop-off and for pedestrian access.
- Consider vehicular access from the public street to the carpark facility
- All accessible routes should be connected to a major entrance of the facility
- Integrate or segregate the accessible routes for different user groups as appropriate

External signage

- Provide sufficient directional signage at prominent locations and allow ancillary lighting for good visibility of the signage at night time.

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- Signage should be pictorial in addition to words and letters, and should be easy to comprehend
- Signage should have contrasting colours and be eye-catching.
- Words and letters should be of suitable size and colour for good legibility.

Pathways

- Pathway width should be sufficient to allow at least two wheelchair users to pass each other.
- Straight pathway is preferred where possible and if winding pathway is provided, turning should be with the largest possible radius and with sufficient turning space, avoid acute turning.
- Pathway edges should be conspicuous and protected to avoid wheels from dropping off.
- Projections should be of suitable height and projecting width to avoid accidental bumping, and should not obstruct the pathway users.
- Channel grating slots should not be parallel to the major traffic direction, slot sizes should be small enough to avoid trapping of crutches or wheels

Changes in level

- Ramps, dropped kerbs or sloping grounds should be used to connect changes in level, in addition to steps and stairs, if any.
- Warning should be provided at a suitable distance before the change in level.
- For slight change in level, a full width continuous sloping ground accessible for all is preferable than a separate ramp.
- Effective lighting or footlight should be provided to make the change in level clearly visible.

Orientation

- Internal layout for public facilities should be able to communicate itself to orient visitors with a sense of direction within the space.
- Major functional points should have a heightened design language to tell its location.
- Spatial treatment of different facilities should be able to reflect their relative significance.

Site layout

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Site layout shows a detailed layout of the whole site and the relationship of the proposed works with the boundary of the property, nearby roads, and neighbouring buildings. It shows the organization and arrangement within the building and the site to enhance safety by controlling access while location of building and its form address the effect of climate.

Rhythm

In architecture, rhythm refers to the repetition and variation of elements such as lines, shapes, forms or colors resulting on organized movement within a space. A building with a strong sense of rhythm creates a feeling of harmony and balance that is pleasing to the eye and soothing to the soul. The use of reflectors can enhance the rhythm of a building by creating a sense of movement and flow. Reflectors can be used to highlight the repetition of elements such as columns, arches, and windows, or to create a sense of contrast and variation within a space. By manipulating the way light and sound interact with a building, architects can create a dynamic rhythm that is both functional and aesthetically pleasing.

Lighting

Whether it's daylighting or artificial lighting, light draws attention to textures, colors, and forms of a space, helping architecture achieve its true purpose. Vision is the single most important sense through which we enjoy architecture, and lighting enhances the way we perceive architecture.

Sustainability

Sustainable design seeks to reduce negative impacts on the environment, and the health and comfort of building occupants, thereby improving building performance. The basic objectives of sustainability are to reduce consumption of non-renewable resources, minimize waste, and create healthy, productive environments. It seeks to minimize the negative environmental impact of buildings through improved efficiency and moderation

Aesthetics

Aesthetics is a core design principle that defines a design's pleasing qualities. In visual terms, aesthetics includes factors such as balance, color, movement, pattern, scale, shape and visual

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weight. Designers use aesthetics to complement their designs' usability, and so enhance functionality with attractive layouts.

4.2.4 Conceptual Development

The concept of architectural design has always been to create a structure that is not only aesthetically pleasing, but also practical and safe. Concepts of such design usually depend on the materials and techniques that are used, as well as the geographical location of the building.

One of the most difficult steps in the design process of architectural projects is to find a concept. In addition to the concept search, it is also significant to develop the found concept and present it appropriately. A good architectural concept can help an architecture company stand out from their competitors. When it comes to the idea of an architectural concept, there are a lot of different aspects to consider.

4.2.4.1 Design Concept

The design concept was inspired by biophilic design and it effect on human rejuvenation, the closet graphical representation of this effect which in itself also create this kind of effect is an **orchid flower** which symbolizes delicate beauty, loving thoughts, healing, relaxation, consolation and radiance. The concept was chosen to soothe the health of the users of the facility.

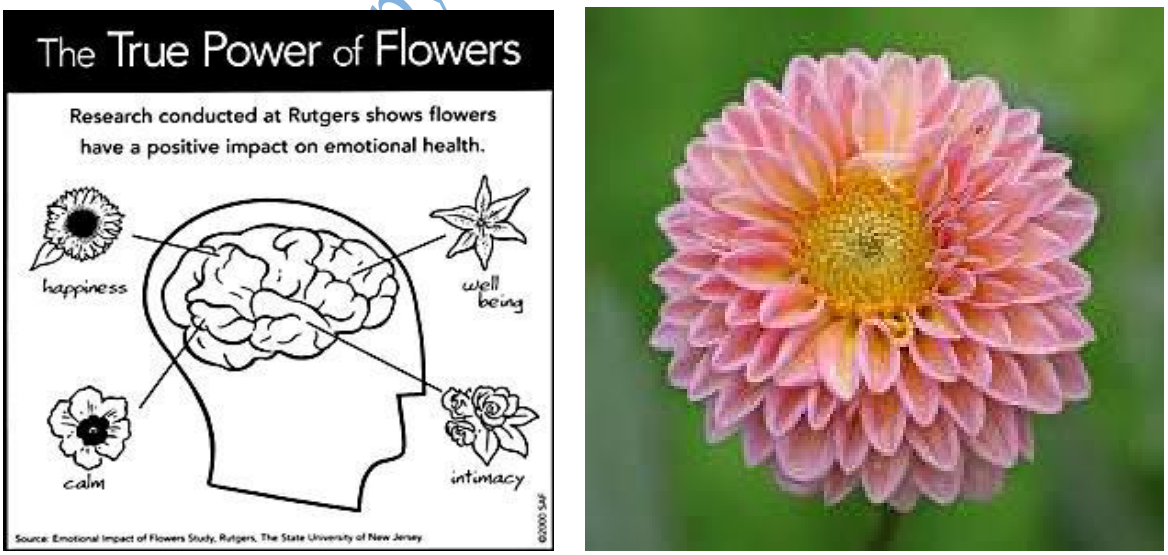

Figure 4.11: Conceptual Development
Source: (www.google.com)

4.2.5 Functional Relationship

Functional relationship is the way of showing how each space were related to one another as well as the circulation flow among various spaces in the building and the facility as a whole. This shows complementary and interactive relationship among spaces. Functional relationship can be demonstrated by grouping the spaces in the facility in to groups which can also be referred to as zone, for this study, the spaces are grouped or zoned into three (3) namely, public zone, semi-private zone and private zone. The three zones which are achieved through vertical and horizontal circulation comprise of:

Public zone: These are areas in and around the proposed building that can be freely accessible to every user which includes:

Main Entrance/Checking Point

Car Parking Spaces

General Outdoor Sitting Areas

General Outdoor Swimming Pool

Outdoor Game Courts

Cafeteria,

General Launch

Entrance Porch

Reception/Waiting Room

Membership/Access control area

Customer service/complain desk

Changing rooms

Conveniences

Semi-private zone: These areas are areas you have access to if you are a staff in the facility or you have membership access card or you have a reason or mission to carry out at that point such as repair or maintenance.

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Legacy Gym

Climbing wall

Athletic training room

Combative room

Foot gym room

Center for student wellness

Massage therapy

Private meditation room

Dancing (Training) room

Personal training

Game studio

Banquet hall/view center

Judo Training Room

Yoga Room

Private zone: These spaces are out of bound for non – staff member facility, these includes:

Administrative offices

Cash office

Technical/I. T. room

4.2.6 Space Allocation / Schedule of Accommodation

4.2.6.1 Space Allocation

Space allocation is the computational arrangement of rooms or spaces in a floor plan. In other words, it is the process of determining the position and size of different rooms in a two-dimensional space, according to the user's requirements and topological and geometric constraints.

Therefore, for this design, spaces within the building are allocated based on users' requirements, easy flow of movement and other constraints. This was done to create user's satisfaction as well and control movement within the building.

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In other to achieve this, the building was classified or divided to three zones, namely, administrative zone, general activity zone and special activity zone.

Administrative Zone

Entrance Porch

Reception/Waiting Room

Membership/Access control area

Customer service/complain desk

Changing rooms

Conveniences

Cafeteria

General Launch

Stair hall

Administrative offices

Cash office

Technical/I. T. room

General Activity Zone

Legacy Gym

Climbing wall

Athletic training room

Combative room

Foot gym room

Game studio

Banquet hall/view center

Judo Training Room

Conveniences

Special Activity Zone

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Center for student wellness

Massage therapy

Private meditation room

Dancing (Training) room

Personal training

Yoga Room

Conveniences

4.2.6.2 Schedule of Accommodation

Table 4.1: Schedule of Accommodation for administrative zone

S/n	Space	Number required	Number of People		Area (m^2)
1	Reception	1	20	1.5x1.2	36
2	Membership room	1	5	1.5x1.2	9
3	Customer service	1	5	1.5x1.2	9
4	Changing room	8	-		12.96
5	Conveniences	48	-	1.5x2.1	3.15
6	Cafeteria	1	30	0.9x1.2	32.4
7	General Launch	2	6	1.5x1.2	10.8
8	Administrative offices	2	-		12.96

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9	Cash office	1	-	12.96
10	Technical/I. T. room	1	-	36

Table 4.2: Schedule of Accommodation for General Activity Zone

	Space	Number required	Number of People		Area (m^2)
1	Legacy Gym	1	30	2.1x1.5	94.5
2	Climbing wall	1	10	2.1x1.5	31.5
3	Athletic training room	1	10	2.1x1.5	31.5
4	Combative room	2	10	2.1x1.5	31.5
5	Foot gym room	1	20	1.8x1.5	54.0
6	Game studio	1	40	0.9x1.2	43.2
7	Banquet hall/view center	1	100	0.7x1.2	90
8	Judo Training Room	1	10	2.8x2.8	78.4

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Table 4.3: Schedule of Accommodation for Special Activity Zone

S/n	Space	Number required	Number of People		Area (m^2)
1	Center for students' wellness	1	5	0.9x1.2	5.4
2	Massage therapy	2	4	2.4x3.0	7.2
3	Private meditation room	2	4	2.4x3.0	7.2
4	Dancing (Training) room	2	6	3.0x3.0	54.0
5	Personal training	2	6	2.1x2.1	26.46
6	Yoga Room	1	10	2.8x2.8	78.4

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4.2.7 Construction Methods and Materials

Building construction describes the physical activity on a construction site that contributes to building or structure construction. This process involves unloading plant, machinery, materials, cladding, fixture, fitting of installations, formwork, and external finish. The building construction process is a series of routine tasks completed by skilled persons. It involves a lot of time and tedious work and must be managed carefully.

The first thing that should be done before the start construction works is to take the contactor to the proposed site so as to understand the site conditions and the extent of work need to be done, the facilities needed to start the work, the likely sources of materials and unskilled labour, as well as what will likely be the reaction of the environment to the construction process.

The soil is a mixture of laterite, fine grained loamy and humus material which is light in nature which has been proved to having a strong bearing capacity to hold and support the proposed building to be constructed, therefore, combination of pad and strip type of foundation would be employed. Pad foundation refers to the foundation which is intended for sustaining concentrated loads from a single point load such as structural columns. Strip foundation is used to support a line of loads such as load-bearing walls.

These are step by step construction activities:

Site preparation: these are activities that are carried out in readiness for the actual construction works which includes:

- Site clearing: Site clearing involves removing rubbish, machinery, equipment, and unwanted materials from the site. All plants and shrubs existing on the site will be excavated and some trees retained to serve as landscape elements.
- Site hoarding: This is installation of temporary perimeter fencing round the site boundary to demarcate the working area and secure the site from unwanted access. Material to be used for hoarding the site is galvanized corrugated iron roofing sheets nailed to 50x75mm timber frames. This is used to secure and monitor the site.
- Removal of top soil: It is important to remove the top soil in the areas earmarked for the proposed building construction while other parts would be retained for landscape purposes and future development. The depth of the soil to be removed would be determined by soil engineer on site.

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- Erection of site office and store: Another important item is the construction of site office where site engineers, architects, and other stakeholders will stay while on site. The store is to store the materials needed for the construction.
- Setting out: Setting out is bringing the dimensions from a plan to the real situation. The activity consists of establishing the exact location and measurements of the house to be built. Centre walls and columns of the building are established on site using the site layout. The building dimensions would be transferred on site according to the architectural drawings in relation to the survey of the proposed site as earmarked by the Ministry of Lands.

Substructure construction: The substructure refers to the portion of the building that sits below the ground, from DPC level to foundation footing. The substructure distributes the weight of the building to the ground beneath the building.

- Excavation to trenches: An excavation is defined as any man-made cut, cavity, trench, or depression in the Earth's surface formed by earth removal. A trench is defined as a narrow excavation (in relation to its length) made below the surface of the ground. The trench will be done by excavators to depth approved and certified by the structural engineer.
- Leveling of trench bottom: This is the act of making the bottom of the trench even. It is done by leveling instrument and compacting machine.
- Blinding, foundation footing, short column and column bases: Concrete mix required is a combination of cement, coarse and soft aggregates with adequate water. The mix ratio would be 1:2:4 with reinforcement to structural engineer's specification for different locations.
- Foundation block wall: Block foundation walls refer to walls that are made from hollow concrete. During construction, builders lay the blocks on top of the foundation footing and join them with mortar. Each row of blocks forms a course until the wall rises to the desired floor height. Blocks to be laid on foundation footing will be cement sandcrete hollowed blocks of 230mm filled with concrete for additional strength.

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- Laterite filling: The internal part of the building will be filled with laterite (earth) to the level desired by the engineer/architect, which varies depending on the site. For this site, it will be 300mm less that the level of the foundation wall, it will be leveled and compacted with ramming machine.
- Hardcore filling: After filling the internal part of the blocks with laterite to the level required, hardcore is placed. Hardcore materials for the building would be larger parts of granite, boulders which would be levelled with ramming machine and well compacted with a vibrator to get rid of voids which may exist within the soil. This will help strengthen the stability of the foundation and create a strong base for the german concrete.
- Damp proof membrane: A damp proof membrane (DPM) is a type of membrane material used to prevent dampness from occurring through capillary action. It is often used underneath a concrete floor to stop it from gaining moisture, it to prevent damage to surface finishes and decay of building fabrics. Polyethylene material with uniform thickness of 40mm would be laid as damp proof membrane to prevent the transmission of moisture into the building.
- Casting of oversite concrete: Wire mesh and iron rods would be placed over the damp proof membrane to act as reinforcement. Concrete mixture would be poured to make a ground floor slab with the specified thickness of the engineer. The mix ratio would be 1:2:4 with reinforcement to structural engineer's specification for different locations.

Superstructure construction: A superstructure is the portion of a building or structure that is above the foundation and supports the loads imposed by the structure and its intended use. The superstructure is the visible part of a building that sits above the ground. The superstructure includes beams, columns, finishes, windows, doors, the roof, floors, and anything else visible above the ground.

- Superstructure Walls: Superstructure walls are the walls that are above the oversite concrete slab. These are major building elements that define the shape and look of the building. They are used to define and enclose spaces within the building. Walls for terminal buildings are to be

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good sound insulators, fire resistant and rigid enough to withstand both live and imposed loads. The walls will be of 225mm thick sandcrete hollowed blocks while all conveniences will be of 150mm thick walls. The curtain walling will be of 6mm thick glass insulating glass shielded with aluminum plate wall facing used as shading device.

- Lintels, beams and columns:

  A lintel is a beam placed across the openings like doors, windows etc. in buildings to support the load from the structure above. The width of lintel beam is equal to the width of wall, and the ends of it is built into the wall.

  Beams are usually horizontal structural elements that carry loads perpendicular to their longitudinal direction. Beams are used to support the weight of floors, ceilings and roofs of a building and to transfer the load to a vertical element called column. Sometimes bigger and heavier beams called transfer beams are used to support the cumulative weight of stacked walls or other beams and transfer the load to the supports.

  Columns are vertical structural elements where the load is transferred parallel to the longitudinal axis as compression, and sometimes as tension. Columns are used to support floor/roof beams and the columns of the floor above. The columns at the bottom floor of a tall building must carry the accumulative weight of all the floors above. This is why the location of columns ideally should be consistent throughout all floors.

  Lintel supports only the weight of the wall above the openings and it transfers the load to walls only. Column and beam are the main parts of the structural frame. Beams transfer the total loads from the slab to the column and columns carry it to the foundation and provide stability to the structure.

- Floors: Floor forms the bottom of a room. It may consist of joist-supported wood planks or panels, decking or panels supported by wood or steel beams, a slab of stone or concrete on the ground, or a reinforced-concrete slab carried by concrete beams and columns. Floors should be constructed to provide comfort, safety, less noisy and easy to maintain. This building floors will

be reinforced concrete slab finished with polished terrazzo, vitrified tiles, cement interlocking paving stones for walkways and parking areas.

- Doors and Windows: A window is defined as an opening in a wall of a building to serve one or more of the functions like natural light, natural ventilation and vision. A door is a movable barrier secured in an opening, known as the doorway, through a building wall or partition for the purpose of providing access to the inside of a building or rooms of a building. A door is held in position by doorframes, the members of which are located at the sides and top of the opening or doorway. Sills may or may not be provided at the bottom of doorways. Doors and windows are used to provide ventilation and physical access into a place. All external doors will be double leaf swing glass door of 5mm thickness, 2100mm high with fixed glass of 600mm height. Some internal doors will be double swing glass doors of 2100mm high while some will be 50mm thick high density fibre door of same height. All windows shall be aluminum 5mm thick sliding windows fixed into bronze aluminum tainted frames.
- Ceiling: Ceiling is the overhead surface or surfaces covering a room, and the underside of a floor or a roof. Ceilings are often used to hide floor and roof construction. Suspended ceiling materials of 600x600mm cellulose ceiling boards installed to architect's specification will be used for acoustic and aesthetic purposes as well as to conceal the light fittings.
- Roof: Roof forms the covering over the top of a building, serving to protect against rain, snow, sunlight, wind, and extremes of temperature. Roofs have been constructed in a wide variety of forms; flat, pitched, vaulted, domed, or in combinations—as dictated by technical, economic, or aesthetic considerations. Roofing system in building is usually determined by the span and nature of its construction. Gauge of 0.75mm thick long span aluminum roof cover will be laid over the wooden trusses.
- Plastering: Plastering is the process of covering rough walls and uneven surfaces in the construction of houses and other structures with a plastic material, called plaster, which is a mixture of cement and sand along with the required quantity of water.

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- Painting: Painting is a combination of pigments with suitable thinners or oils to provide decorative and protective coatings. Painting is the expression of ideas and emotions, with the creation of certain aesthetic qualities, in a two-dimensional visual language. The elements of this language—its shapes, lines, colours, tones, and textures—are used in various ways to produce sensations of volume, space, movement, and light on a flat surface. Painting is done to protect the surface from the effects of weathering, to prevent wood from decay and metal from corrosion, to provide a decorative finish and to obtain a clean, hygienic and healthy living atmosphere. The internal and external walls of the building will be painted with product of Chemstar Paints Industry Nigeria and colour to architect's specification.

4.2.8 Building Services

Building services are the system installed in building to make them comfortable, functional, efficient and safe. Building services play a central role in contributing to the design of a building, not only in terms of overall strategies and standards to be achieved, but also in façade engineering, the weights, sizes and location of major component of the building, the position of vertical service risers, routes for the distribution of horizontal services, drainage, energy sources, sustainability, and so on.

This means that building services design must be integrated into the overall building design from a very early stage in the design process, particularly on complex projects.

The detection of clashes between building services and other building components is a significant cause of delays and variations on site, not just in terms of the physical services themselves, but also access to allow the builders work in connection with those services. 3D computer aided design system (CAD) and building information modeling (BIM) will be used to help reduce the occurrence of such problems.

Installation of service systems in a building makes it to be comfortable, functional and efficient to use. It includes the mechanical, electrical and plumbing systems in a building otherwise known as MEP services.

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Mechanical services

Firefighting systems: A firefighting system is an activity of prevention during a fire spread in building, home or warehouse with the use of proper fire safety equipment like extinguisher, hose reels, fire monitors, nozzles and hose pipes. The aim of a firefighting system is to protect a building's occupants and minimize the damage associated with fire. Overall, the goal is to provide the widest possible window for a safe evacuation, whilst also reducing potential repair costs. Fire protection systems can be categorized as either active or passive. While active systems are designed to help fight fires (such as fire alarms and sprinklers), passive fire protection describes the structural measures which prevent the passage of flames and smoke.

Different between fire protection, prevention, and suppression systems

Fire protection system is aimed at protecting building's occupants and minimize the damage associated with fire.

Fire prevention systems are put in place so a building's fire load is as low as it can possibly be. Essentially, fire prevention reduces the likelihood of a serious fire. By safely storing combustible materials, and taking care of points of ignition (such as heating systems and plug sockets), we are reducing the risks associated with fire.

The sole objective of a fire suppression system is to extinguish a fire as quickly as possible. Once occupants are alerted to the presence of a fire, the system will begin to emit a concentrated substance to suppress the flames. The exact nature of this substance can vary, based on the environment the system is designed to protect. Common examples include carbon dioxide and inert gas, as well as a range of both liquid and dry chemical agents.

Sprinklers: A sprinkler system is designed to control or extinguish fires in the early stages. This makes it easier and safer for building occupants to exit the building, and for firefighters to extinguish any fire that remains. Sprinklers reduce the loss due to fire. Sprinklers, and other Automatic Fire Suppression Systems (AFSS), can save lives, homes, and businesses. They provide protection from fire damage and, most importantly, they give people a greater chance of

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getting out if there is a fire. By reducing the damage and severity of a fire, they can also save money, too.

Elevators & escalators: Elevator, also called lift, car that moves in a vertical shaft to carry passengers or freight between the levels of a multistory building. Most modern elevators are propelled by electric motors, with the aid of a counterweight, through a system of cables and sheaves (pulleys). Escalators are mechanical devices used for transporting people vertically between different levels of buildings. Typically, they take the form of a moving staircase, consisting of a 'chain' of single-piece aluminum or stainless-steel steps guided by a system of tracks in a continuous loop.

HVAC systems: Heating, ventilation, and air conditioning (HVAC) system is designed to achieve the environmental requirements of the comfort of occupants and a process. HVAC systems are more used in different types of buildings such as industrial, commercial, residential and institutional buildings. There are four main types of HVAC systems. There are split systems, hybrid systems, duct-free systems, and packaged heating and air systems.

Gas supply system: gas supply system means the Gas Cylinder and any process or apparatus for the supply of pressurized gas for use in or with a Device, including any gas filling means and any actuation mechanism therefor.

Security systems: Building security system is the protection of property, assets, and occupants from intruders, perpetrators of violence, and unsafe or hazardous situations that can cause them harm or damage. Its goal is to deter, prevent, detect, and respond to physical security violations effectively. Security systems are composed of two constituent elements. The first is a monitoring system that oversees what is going on in and around the building by means of cameras and sensors of various types. The second is a crime prevention system that performs ingress and egress management and control based on the information from the monitoring systems.

Monitoring Systems: Monitoring systems may include motion sensors for ingress monitoring and fire detectors, carbon monoxide detectors, and the like to monitor for emergencies within the

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building. The monitored information is sent via the network to a supervisor in the form of emergency signals and images. This information can also be stored and managed on a secure data server if needed.

Crime Prevention Systems: Crime prevention systems may incorporate sensors such as door open-close detectors and glass break detectors to detect emergencies as well as ingress and egress management functions to enforce entrance and exit regulations and keep logs of those entering and leaving. They control the entrance and exit of persons to and from the building in conjunction with the information from the monitoring systems.

Communication Networks of Security Systems: Via the network, the large volumes of data making up the security logs, operation logs, and entrance and exit logs from the monitoring and crime prevention systems are tracked on security monitoring PCs and stored and managed on secure data servers. This information may also be linked via a network to other building automation systems (air conditioning systems, lighting systems, etc.) to enable more efficient building security management.

Electrical services

Power supply: This refers to the combination of conductors, materials, and equipment that transfer power from the utility system to the wiring system that supplies the subject property with electrical power.

Back-up power: Back-up power generally refers to various electrical systems that keep the lights on when your primary power fails. They also power appliances and devices you might need during an outage. The energy sources you could use include battery backups, solar power, wind power, or portable or fixed generators.

Public address systems: Public Address System (PAS) is an electronic sound amplification and distribution system with a microphone, amplifier and loudspeakers, used to allow a person to address a large public. The public address system consists of three main parts namely, the microphone (input transducer), amplifier and the loudspeaker (output transducer). The microphone

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picks up the sound and convert it to electronic signal in milivolts and this is fed to the amplifier for amplification. There are three main types of public address systems - ceiling, wall, and outdoor systems.

Data networks: A data network is a system that allows two or more computers to communicate with each other. The most common type of data network is a Local Area Network (LAN). A LAN connects computers and other devices in a small area, such as a home, office, or school. A data network can also be a Wide Area Network (WAN). Perhaps the largest benefit of using a data network is its ability to enable fast and seamless communication. Linked computers over a data network can communicate with each other and transfer files without the need for physical transfer media.

Plumbing systems

Water supply: A water supply system is a network of pipes, pumps, storage facilities, and other infrastructure designed to deliver clean and safe water to homes, businesses, and other users. Cold and hot water may be conveyed to plumbing fixtures under the pressure of a water source, such as a public water main, by pumps, or by gravity flow from elevated storage tanks. Water is distributed for consumption in a building through internal water distribution system. Water supply in a building depends on the size and height of the building. Water piping system may be basically horizontal or vertical systems above the main or pressure tank.

Drainage of wastes: Drainage of waste system is used to get rid of human wastes through well-arranged network of drainage pipes. The pipes generally used are GI, copper, HDPE, CPVC, mostly now a days CPVC plastic pipes are used as they don't get rusted, light weight, easy installation and maintenance and economic. One is connected to toilets and urinals in the building (soil pipe) and the other to basins, showers, washing machine etc (waste pipe). There is a pipe vent leading waste gases up to air. The soil pipe is connected directly to the sewerage system and the waste pipe is connected via a trapped gully either to the stormwater system or recycled for use in the garden.

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Water recycling systems: This is the process of reclaiming water from a variety of sources then treats and reuses it for beneficial purposes such as agriculture and irrigation, potable water supplies, groundwater replenishment, industrial processes, and environmental restoration.

Rain harvesting: Rainwater harvesting (RWH) is a process of collecting and storing rainwater that falls on a catchment surface (typically a roof, although almost any external surface could be suitable) for use, independent from, or supplemental to the mains water supply.

Storm water drainage: This is a network of structures, channels and underground pipes that carry stormwater (rain water) to ponds, lakes, streams and rivers. The network consists of both public and private systems. A storm drainage system is designed to drain rainwater or surface water from your non-porous ground. This ground could be your cabro-paved parking or concrete walkway. Storm drains are essential because they help prevent stagnant water in your home, which could lead to musty odors and health risks.

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Chapter Five

Conclusion

5.1 Project Appraisal

Project appraisal is an important activity to evaluate the key factor of the project to check the viability of a project proposal. The following various parameters were used to check the viability of the proposed project:

5.1.1 Nature into the Building: Nature was brought into the design in many ways, first, through the concept of the design which was the shape of an **orchid flower.** This symbolizes delicate beauty, loving thoughts, healing, relaxation, consolation and radiance, the concept was chosen to soothe the health of the users of the facility. Second, green roof was used, people can easily go up there and relax among the nature. Thirdly, there is an open courtyard within the building which also brings access to plants, daylight and natural ventilation without going out of the building. Fourthly, each room (space) has real green within it. Lastly, the wall and floor finishing as well as the decorations.

5.1.2 Site Plan: The site plan reflects biophilic design by incorporating different kind of nature ranging from grass, shrubs, trees, water body and many more.

5.1.3 Accessibility: The site is accessible through two entrances, one is the main entrance for both pedestrian and vehicle at the northern side of the site and the second is a pedestrian way which is located at the southern part of the site, this is to give people coming from the student hostel, health center and part of staff quarters quick and easy access into the site. At the main entrance, the pedestrian movement shall be clearly separated from the vehicular movement by the construction of paved walkways, ramp will be incorporated into the walkways for easy access or movement for disable persons as a way of inclusive design. Speed limit signage will be mounted at the main entrance to avoid risk of accident. The introduction of staircases at different area will ease movement within the building. The provision for handicapped toilet is an advantage in creating a sense of satisfaction in every user of the facility.

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5.1.4 Safety and Fire Services: There is any exit door at both sides of the building which is located close to staircase, these serves as an escape route in case of emergency. Smoke alarms will be installed, Smoke alarms sense abnormal amounts of smoke or invisible combustion gases in the air. They can detect both smoldering and flaming fires. Also, fire extinguishers are to be mounted at various strategic areas where it will be easily assessable. Underground high-pressure pipes are to be linked to external water points along the external lobby for easy access by fire fighters in case of fire incident.

5.1.5 Ventilation: Since the project is about biophilic introduction into building, natural ventilation was adopted in the design and with the use of casement windows, utmost air inlet was achieved. It is very imperative to achieve coolness in the building naturally with the introduction of laser cut exterior façade which is used as shading device to shield the building from reflection from the sun, also, high level windows were also adopted to allow the displaced hot air escape outwards of the building. It is important to note that, using natural system of ventilation is not only cost effective and energy saving, it brings nature close to human, interior green plants was introduced which also aid the quality of air withing the building. Notwithstanding, artificial ventilation was also incorporated to serve as alternative.

5.1.6 Security: Security personnel will be present at all entry points to the site, conducting checks on personnel and vehicles entering and exiting the facility. Additionally, security personnel will be on regular patrol throughout the facility. CCTV cameras will be installed in designated areas to observe the movement and activity of people.

5.1.7 Drainage: The drainage of the surface storm water within the premises shall be through covered drainage of 600mm width by 750mm depth, depending on the final slope of the site, the drainage will be directed towards and connected to the exiting road side drainage. Some of the store water will be directed towards the green area of the site, so as to serve as additional source of water, the grasses also will prevent erosion.

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5.1.8 Lighting: In recreational facility, lighting system is very important because it determines whether the project will be useable and enjoyable or not especial in this project where we are trying to incorporate nature into the design for human satisfaction and rejuvenation after work. Natural light (daylight) was allowed into the building as much as possible, this was achieved through the provision large passage ways, transparent wall materials (glass), high-level window openings as well as court yard. In addition to daylight, artificial lighting system was included in each space, both within the building and outside the building. All walkways, sitting areas, sport courts were provided with adequate lighting. The specification of the lightings is according to electrical engineer's advice.

5.1.9 Parking: The parking area and the driveway shall be constructed with interlocking paving stone.

5.1.10 Electrical Services: The primary source of electricity for the facility is sourced from the university's electrical system, and provision has been made for solar power through the installation of panels on the rooftop of the building. The electrical cables and pipes, as well as the panels and boards, have been concealed within the walls as much as possible, as only the fixtures are visible from the surface of the walls. To further reduce energy consumption, energy-saving bulbs will be used throughout the building. Additionally, motion detection/sensors will be employed in certain rooms to automatically turn off the lights when no one is present. The external light fixture has been designed to automatically switch off when the day is sufficiently bright for visibility.

5.1.11 Sewage Disposal: It is necessary to ensure that waste baskets are installed on each floor with appropriate signage to direct users accordingly. Cleaners are appointed to sweep, mop floors and dispose of waste collected to the designated areas. Additionally, a regular incinerator should be installed on the site premises.

5.1.12 Plumbing and Water Services: The building's plumbing system is composed of conduit with accessible wall ducts in various concealed locations for convenient upkeep. Additionally, the

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heating system is equipped with both hot and cold water, which can be managed by the Facility Department.

5.1.13 Future Expansion: Presently, the proposed facility is aimed at serving the students, faculty and few people from outside the campus with membership card. As time goes on, the number of students will increase and there is tendency that the facility will be open for more people from outside the campus, therefore, the design was done to allow easily expansion vertically and horizontally, the positioning of the proposed design on the site also reflect this.

5.2 Conclusion

In conclusion, this study carried out though investigation about the current situation of students, faculty and staff of Landmark University as regard recreational, there is a clear indication that there is little to no recreational activity in the campus, this makes the people to result into almost the same activities both at work and when they are relaxing (in form of recreation) for example people that stayed behind laptop or desktop since morning till evening, and when they get home, they result to watching television or surf the net which is more or less the same as what they have been doing since morning.

One of the major takes away from the case studies are the different spaces that are needed in recreational center and how they are related to one another as well as the minimum size required, such spaces are Main Entrance/Checking Point, Car Parking Spaces, General Outdoor Sitting Areas, General Outdoor Swimming Pool, Outdoor Game Courts, Reception/Waiting Room, Membership/Access control area, Customer service/complain desk, Cafeteria, General Launch, Entrance Porch, Changing rooms, Conveniences. Furthermore, from research and study of how recreational center works, the design should be flexible, should be in such a way that a space can be used for different occasion, such as using the same space for different game court. The facility should be in such a way as not to restrict users to much as to what they can do with a space, for example, walkway can be used to connect two spaces together, it should also be available to be used for walking exercise, like endurance trek.

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In the design, the pedestrian routes were clearly defined and separated from the vehicular way using kerbs and raised interlocking paving stone which has a different colour to the ones used for vehicular driveway. Other facilities provided includes security and safety measures, alternative lighting system, water treatment plant and open spaces for people to relax, transparent materials were used in some area in the building for visual aid with the provision of adequate ventilation and daylighting. The design of the project adopts biophilic design approach which brings nature close to people and serves as a source of joy and inspiration, it also helps in bringing back loss energy and cause rejuvenation.

In conclusion, the design and construction of recreational center for Landmark University will bring new life to both students and staff, it will provide them with opportunity to relax and or engage in activities that will cause therapeutic refreshment of body, mind and gives satisfaction, this can be active or passive, depending on individual. It will also foster the relationship between the students and give then the sense of togetherness. It will also serve as source of IGR for the school.

5.3 Recommendation

Fron the outcome of the study, I recommend that the government should enact policy that will mandate the inclusion of all the above-mentioned parameter into the design of recreational centers especially in campus for efficiency.

5.4 Contribution to Knowledge

The actualization of this project will without doubt, significantly boost the productivity of the faculty and staff of the university as well as increase the wellness and academic performance of the students because they will work and study with all their strength knowing fully well there is a place, they can go at the end of the working hours to relax and regain their strength and energy. Therefore, having known the origin, nature and activities in recreational center and its important in improving work performance, Biophilic Design Approach to recreational facility in campus will enhance the

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goal of recreational facility which is to create balance between work life and social life and to give satisfaction.

5.5 Suggested Areas for further Research

Further research can be conducted on the following areas:

- Relationship between student's academic performance and engagement in recreational activities.
- The benefit of recreational activities in Nigerian higher institutions
- Biophilic design approach and environmental sustainability in higher institutions.

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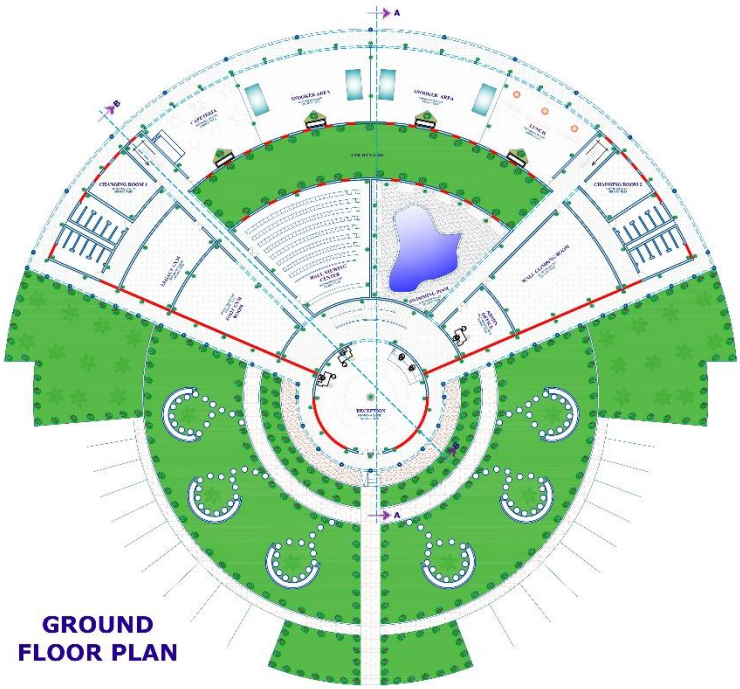
Appendix

Presentation Drawings

SITE PLAN

NAME: ROTIMI ELIJAH ADEYEMI MATRIC NO: LCU/PG/002874 COURSE CODE: ARC 731 COURSE TITLE: ADVANCED DESIGN STUDIO IV	PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.	SUPERVISOR: DR. (ARC) OBALEYE JOSEPH O. SCALE: 1:750 DATE: JULY 2023	SITE PLAN	1



GROUND FLOOR PLAN

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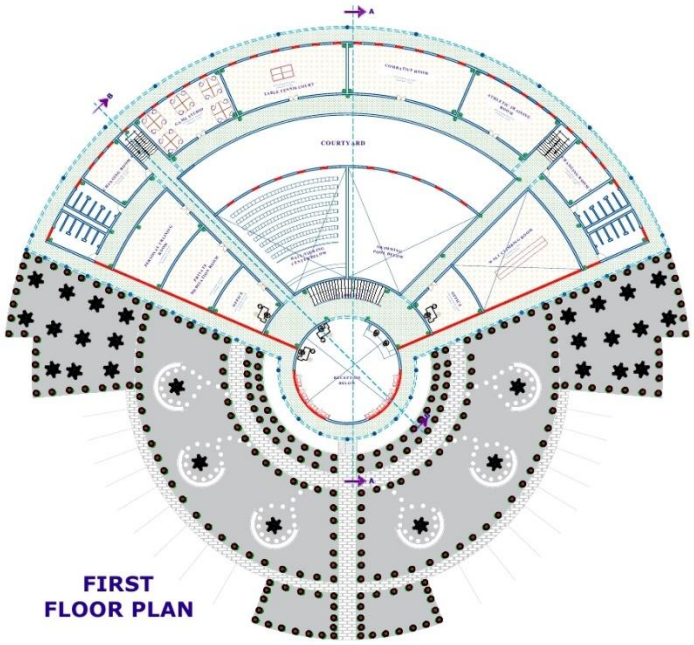

FIRST
FLOOR PLAN

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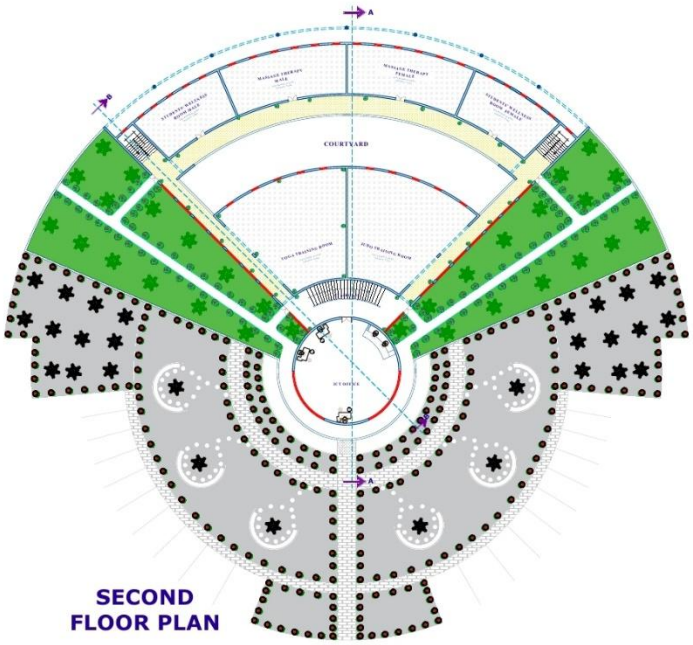

SECOND
FLOOR PLAN

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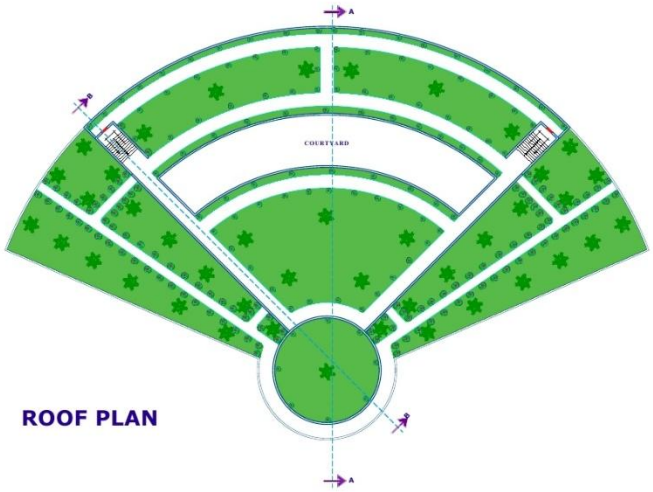

ROOF PLAN

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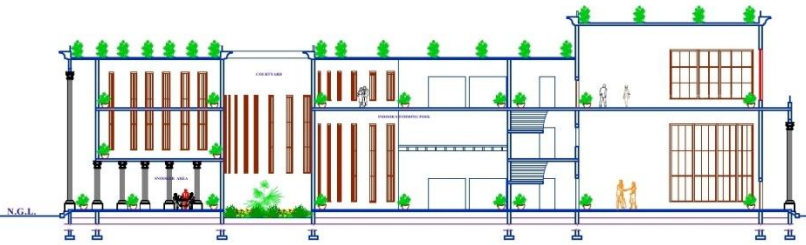
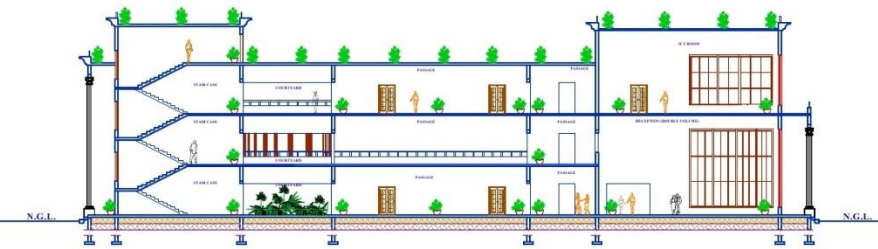
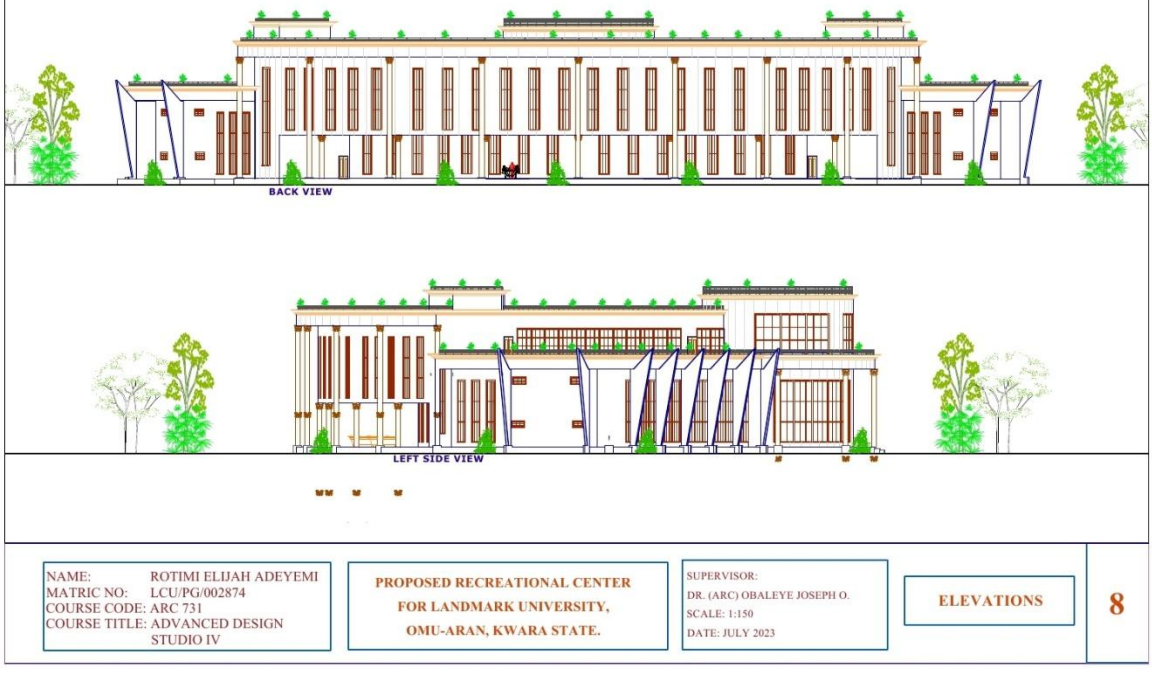




NAME: ROTIMI ELIJAH ADEYEMI MATRIC NO: LCU/PG/002874 COURSE CODE: ARC 731 COURSE TITLE: ADVANCED DESIGN STUDIO IV	PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.	SUPERVISOR: DR. (ARC) OBALEYE JOSEPH O. SCALE: 1:150 DATE: JULY 2023	SECTIONS	6

NAME: ROTIMI ELIJAH ADEYEMI MATRIC NO: LCU/PG/002874 COURSE CODE: ARC 731 COURSE TITLE: ADVANCED DESIGN STUDIO IV	PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.	SUPERVISOR: DR. (ARC) OBALEYE JOSEPH O. SCALE: 1:150 DATE: JULY 2023	ELEVATIONS	7



NAME: ROTIMI ELIJAH ADEYEMI MATRIC NO: LCU/PG/002874 COURSE CODE: ARC 731 COURSE TITLE: ADVANCED DESIGN STUDIO IV	PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.	SUPERVISOR: DR. (ARC) OBALEYE JOSEPH O. SCALE: 1:150 DATE: JULY 2023	ELEVATIONS	8

NAME: ROTIMI ELIJAH ADEYEMI
MATRIC NO: LCU/PG/002874
COURSE CODE: ARC 731
COURSE TITLE: ADVANCE ARCHITECTURAL DESIGN STUDIO IV

PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.

SUPERVISOR:
DR. ARC. OBALEYE, JOSEPH
SCALE: ALL DIM. ARE IN MM
DATE: JULY, 2023

3D View | 09

NAME: ROTIMI ELIJAH ADEYEMI
MATRIC NO: LCU/PG/002874
COURSE CODE: ARC 731
COURSE TITLE: ADVANCE ARCHITECTURAL DESIGN STUDIO IV

PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.

SUPERVISOR:
DR. ARC. OBALEYE, JOSEPH
SCALE: ALL DIM. ARE IN MM
DATE: JULY, 2023

3D View | 10

NAME: ROTIMI ELIJAH ADEYEMI
MATRIC NO: LCU/PG/002874
COURSE CODE: ARC 731
COURSE TITLE: ADVANCE ARCHITECTURAL DESIGN STUDIO IV

PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.

SUPERVISOR:
DR. ARC. OBALEYE, JOSEPH
SCALE: ALL DIM. ARE IN MM
DATE: JULY, 2023

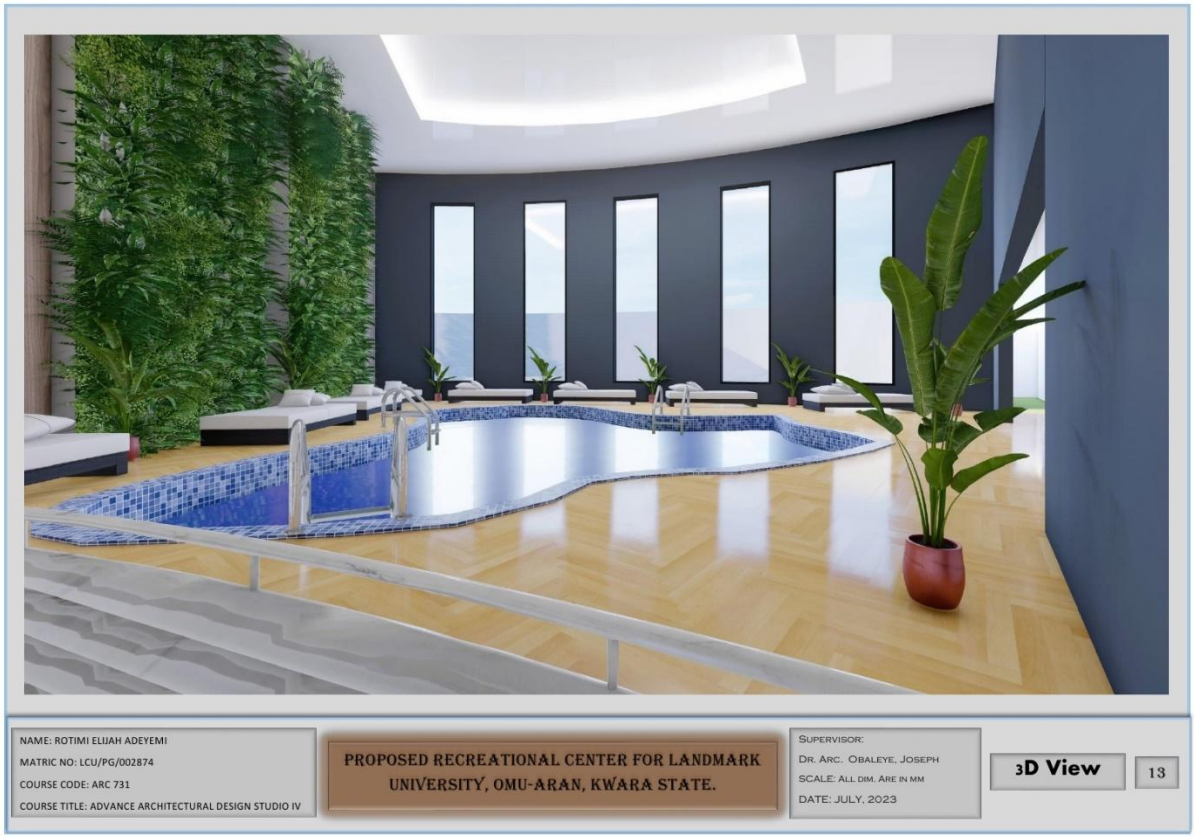
3D View | 11

NAME: ROTIMI ELIJAH ADEYEMI
MATRIC NO: LCU/PG/002874
COURSE CODE: ARC 731
COURSE TITLE: ADVANCE ARCHITECTURAL DESIGN STUDIO IV

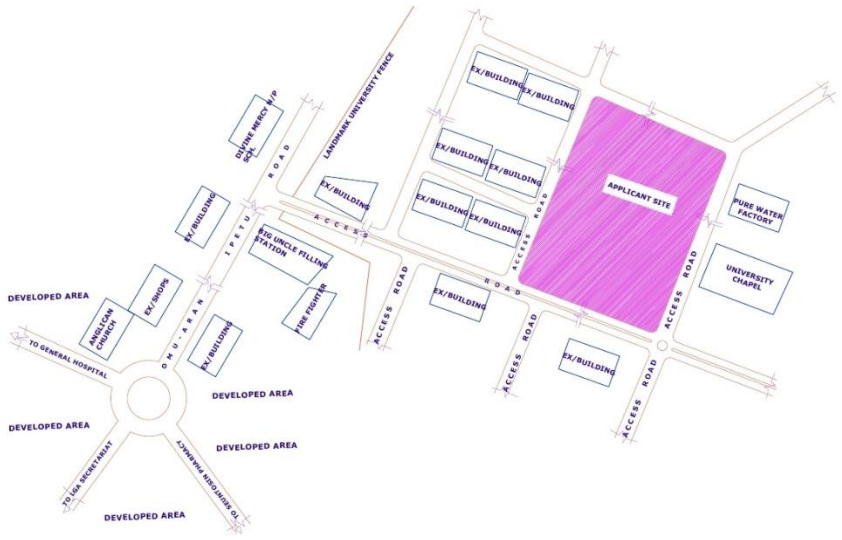
PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.

SUPERVISOR:
DR. ARC. OBALEYE, JOSEPH
SCALE: ALL DIM. ARE IN MM
DATE: JULY, 2023

3D View | 12



Working Drawings



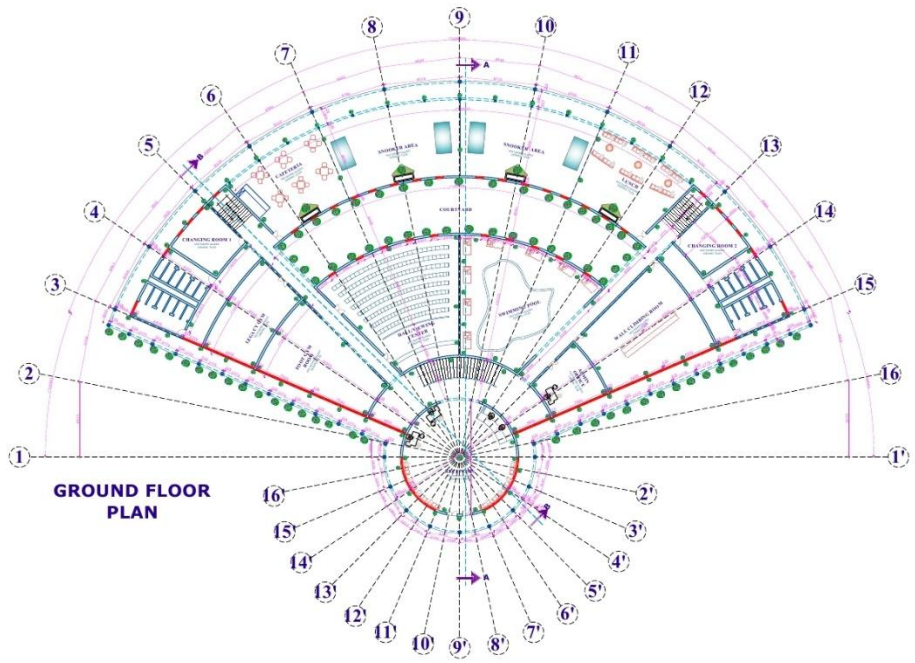
SITE LOCATION PLAN

NAME: ROTIMI ELIJAH ADEYEMI MATRIC NO: LCU/PG/002874 COURSE CODE: ARC 731 COURSE TITLE: ADVANCED DESIGN STUDIO IV	PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.	SUPERVISOR: DR. (ARC) OBALEYE JOSEPH O. SCALE: NOT TO SCALE DATE: JULY 2023	SITE LOCATION PLAN	01

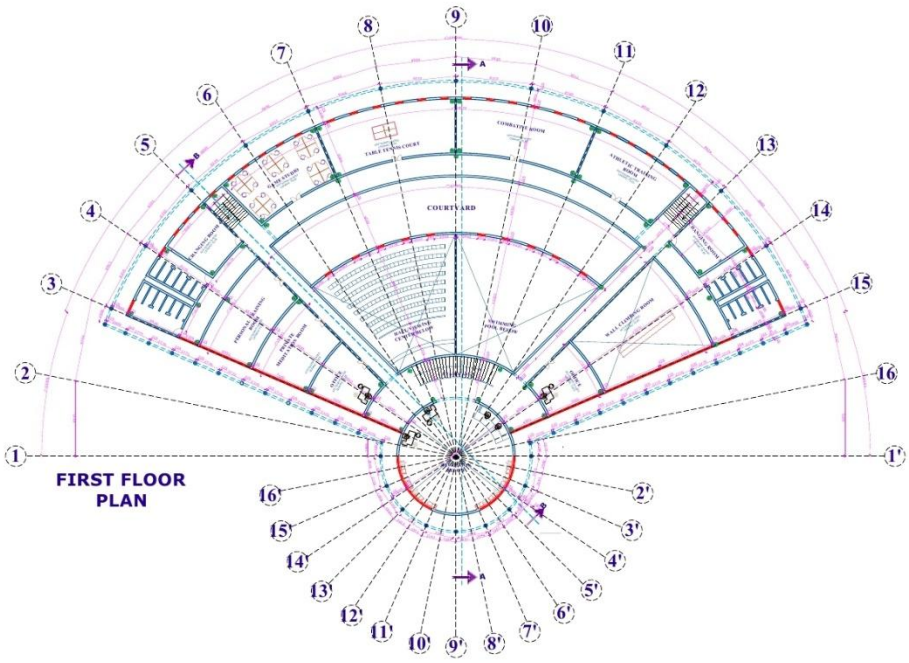
LEGEND	
A	PARKING AREA
B	SITTING AREA UNDER TREE
C	SITTING AREA WITHOUT COVER
D	MOTION GROUND
E	CHILDREN PLAYING GROUND
F	FISH POUND
G	BASKETBALL COURT
H	VOLLEYBALL COURT
I	HANDBALL COURT
J	LAWN TENNIS COURT
K	OUTDOOR SWIMMING POOL
L	CHILDREN POOL
M	GAZEBO
N	LONG POOL

SITE PLAN

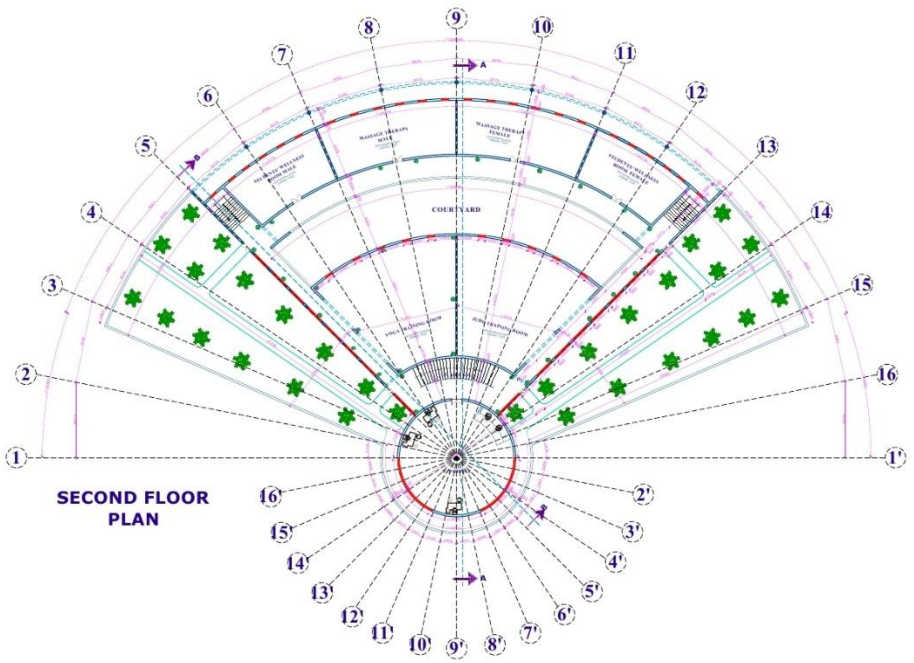
NAME: ROTIMI ELIJAH ADEYEMI MATRIC NO: LCU/PG/002874 COURSE CODE: ARC 731 COURSE TITLE: ADVANCED DESIGN STUDIO IV	PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.	SUPERVISOR: DR. (ARC) OBALEYE JOSEPH O. SCALE: 1:750 DATE: JULY 2023	SITE PLAN	02



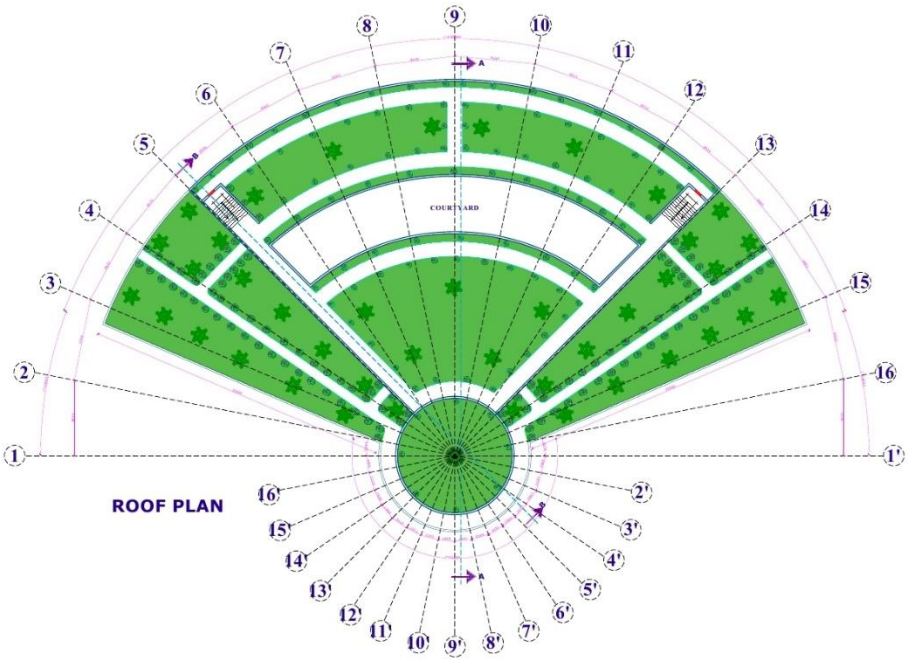
NAME: ROTIMI ELIJAH ADEYEMI MATRIC NO: LCU/PG/002874 COURSE CODE: ARC 731 COURSE TITLE: ADVANCED DESIGN STUDIO IV	PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.	SUPERVISOR: DR. (ARC) OBALEYE JOSEPH O. SCALE: 1:150 DATE: JULY 2023	GROUND FLOOR PLAN	03



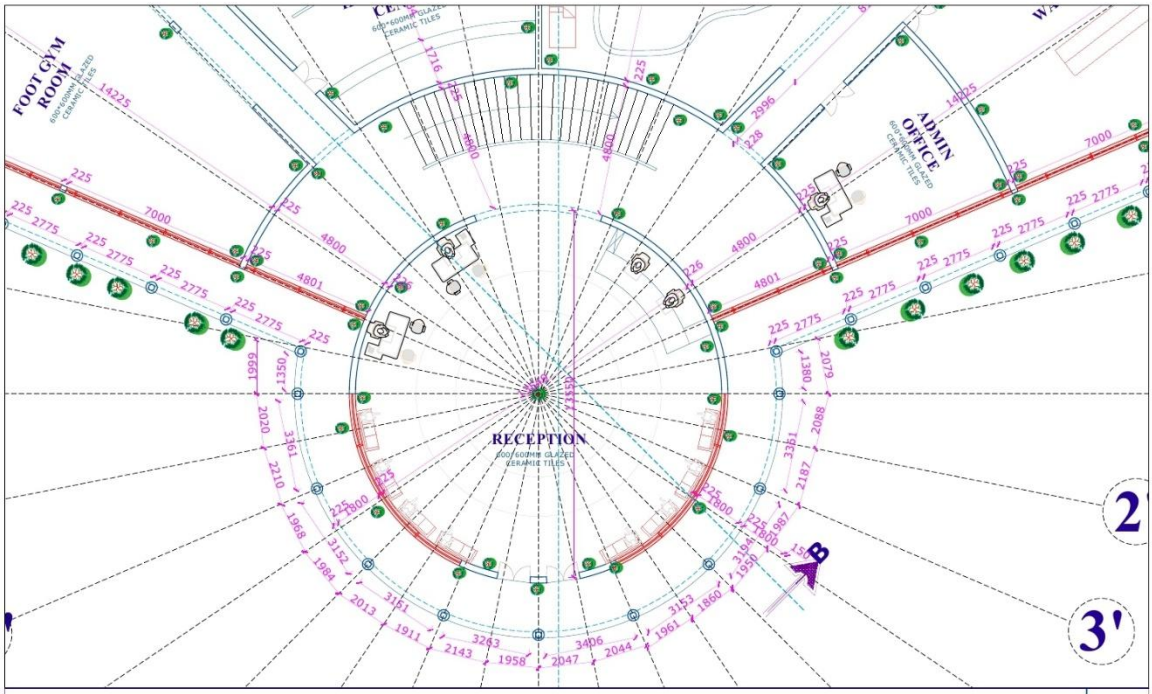
NAME: ROTIMI ELIJAH ADEYEMI MATRIC NO: LCU/PG/002874 COURSE CODE: ARC 731 COURSE TITLE: ADVANCED DESIGN STUDIO IV	PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.	SUPERVISOR: DR. (ARC) OBALEYE JOSEPH O. SCALE: 1:150 DATE: JULY 2023	FIRST FLOOR PLAN	04



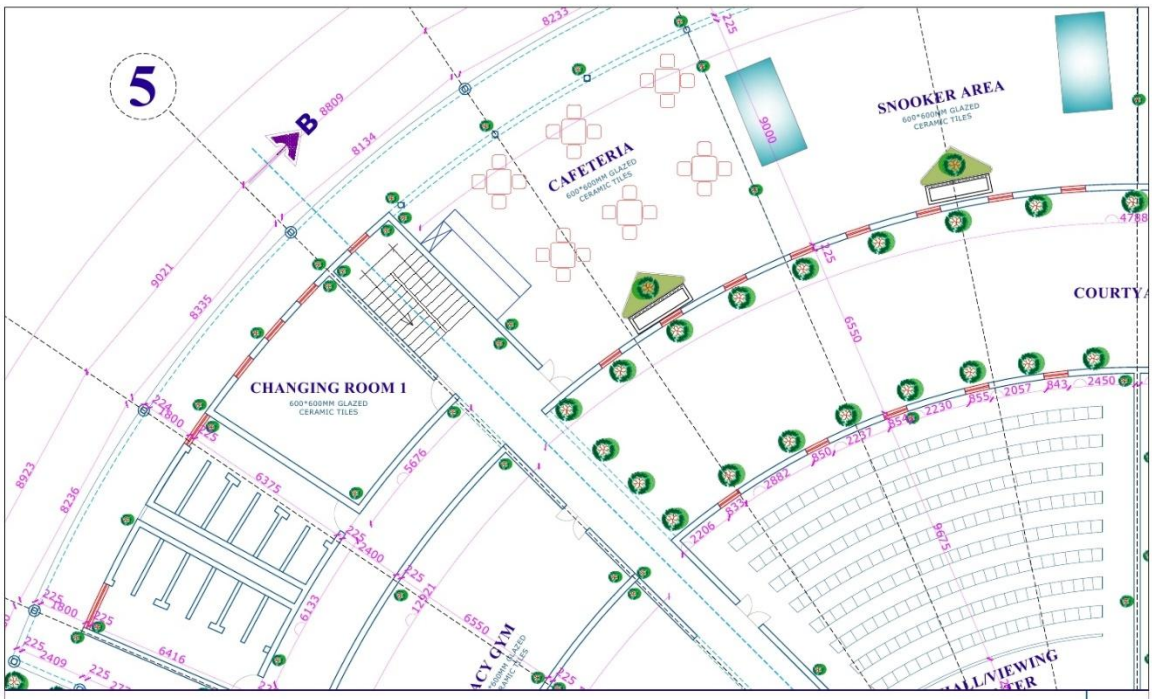
NAME: ROTIMI ELIJAH ADEYEMI MATRIC NO: LCU/PG/002874 COURSE CODE: ARC 731 COURSE TITLE: ADVANCED DESIGN STUDIO IV	PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.	SUPERVISOR: DR. (ARC) OBALEYE JOSEPH O. SCALE: 1:150 DATE: JULY 2023	SECOND FLOOR PLAN	05



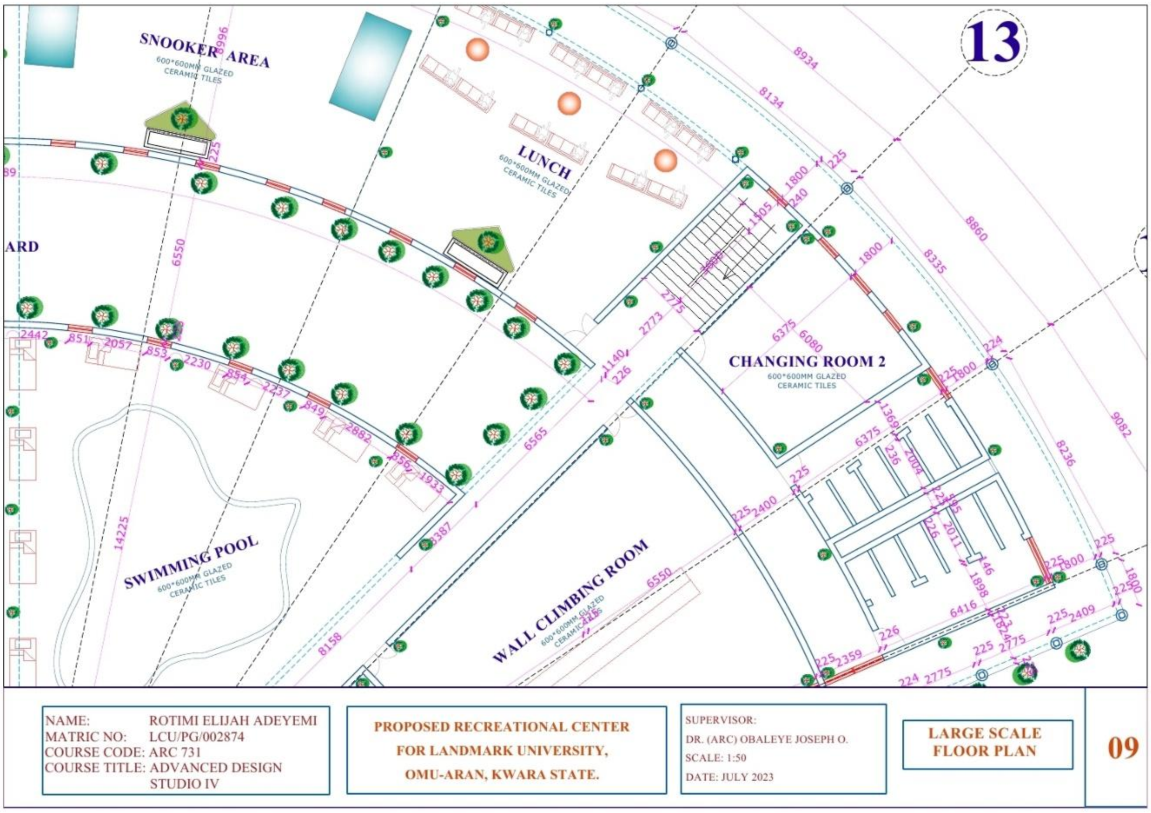
NAME: ROTIMI ELIJAH ADEYEMI MATRIC NO: LCU/PG/002874 COURSE CODE: ARC 731 COURSE TITLE: ADVANCED DESIGN STUDIO IV	PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.	SUPERVISOR: DR. (ARC) OBALEYE JOSEPH O. SCALE: 1:150 DATE: JULY 2023	ROOF PLAN	06

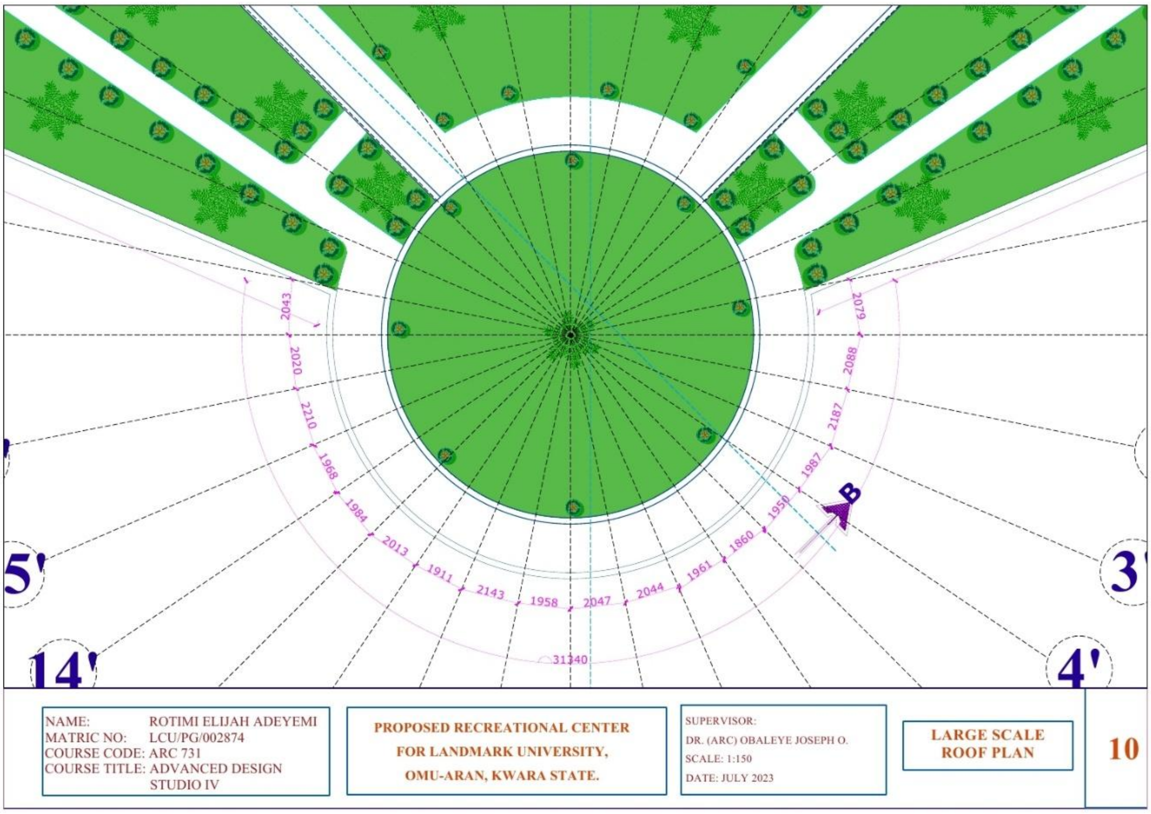


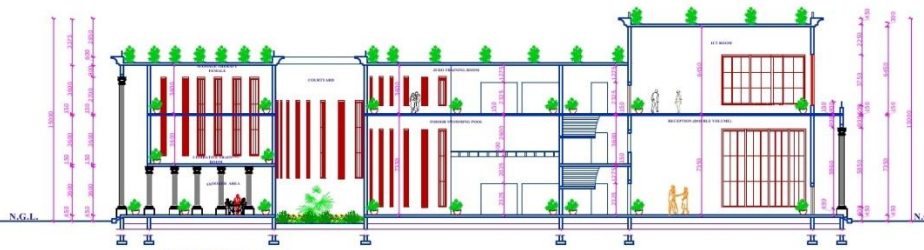
NAME: ROTIMI ELIJAH ADEYEMI MATRIC NO: LCU/PG/002874 COURSE CODE: ARC 731 COURSE TITLE: ADVANCED DESIGN STUDIO IV	PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.	SUPERVISOR: DR. (ARC) OBALEYE JOSEPH O. SCALE: 1:50 DATE: JULY 2023	RECEPTION AREA	07



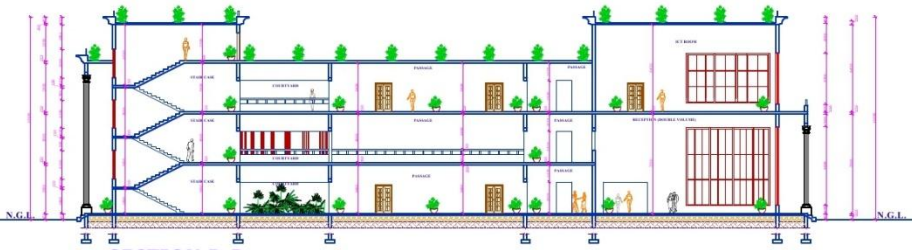
NAME: ROTIMI ELIJAH ADEYEMI MATRIC NO: LCU/PG/002874 COURSE CODE: ARC 731 COURSE TITLE: ADVANCED DESIGN STUDIO IV	PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.	SUPERVISOR: DR. (ARC) OBALEYE JOSEPH O. SCALE: 1:50 DATE: JULY 2023	LARGE SCALE FLOOR PLAN	08


SNOOKER AREA
600*600MM GLAZED CERAMIC TILES
LUNCH
600*600MM GLAZED CERAMIC TILES
CHANGING ROOM 2
600*600MM GLAZED CERAMIC TILES
SWIMMING POOL
600*600MM GLAZED CERAMIC TILES
WALL CLIMBING ROOM
600*600MM GLAZED CERAMIC TILES
13
NAME: ROTIMI ELIJAH ADEYEMI
MATRIC NO: LCU/PG/002874
COURSE CODE: ARC 731
COURSE TITLE: ADVANCED DESIGN STUDIO IV
PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.
SUPERVISOR:
DR. (ARC) OBALEYE JOSEPH O.
SCALE: 1:50
DATE: JULY 2023
LARGE SCALE FLOOR PLAN
09


5'
3'
14'
4'
B
NAME: ROTIMI ELIJAH ADEYEMI
MATRIC NO: LCU/PG/002874
COURSE CODE: ARC 731
COURSE TITLE: ADVANCED DESIGN STUDIO IV
PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.
SUPERVISOR:
DR. (ARC) OBALEYE JOSEPH O.
SCALE: 1:150
DATE: JULY 2023
LARGE SCALE ROOF PLAN
10



SECTION A-A



SECTION B-B

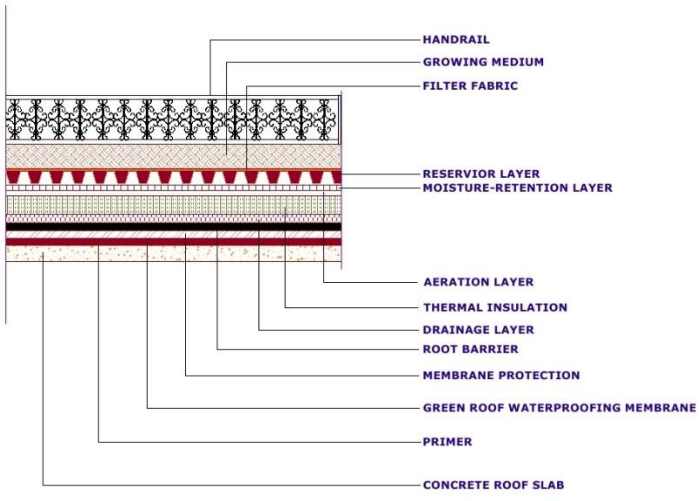
NAME: ROTIMI ELIJAH ADEYEMI MATRIC NO: LCU/PG/002874 COURSE CODE: ARC 731 COURSE TITLE: ADVANCED DESIGN STUDIO IV	PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.	SUPERVISOR: DR. (ARC) OBALEYE JOSEPH O. SCALE: 1:100 DATE: JULY 2023	SECTIONS	11

FRONT VIEW

RIGHT SIDE VIEW

NAME: ROTIMI ELIJAH ADEYEMI MATRIC NO: LCU/PG/002874 COURSE CODE: ARC 731 COURSE TITLE: ADVANCED DESIGN STUDIO IV	PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.	SUPERVISOR: DR. (ARC) OBALEYE JOSEPH O. SCALE: 1:100 DATE: JULY 2023	ELEVATIONS	12

NAME: ROTIMI ELIJAH ADEYEMI MATRIC NO: LCU/PG/002874 COURSE CODE: ARC 731 COURSE TITLE: ADVANCED DESIGN STUDIO IV	PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.	SUPERVISOR: DR. (ARC) OBALEYE JOSEPH O. SCALE: 1:100 DATE: JULY 2023	ELEVATIONS	13



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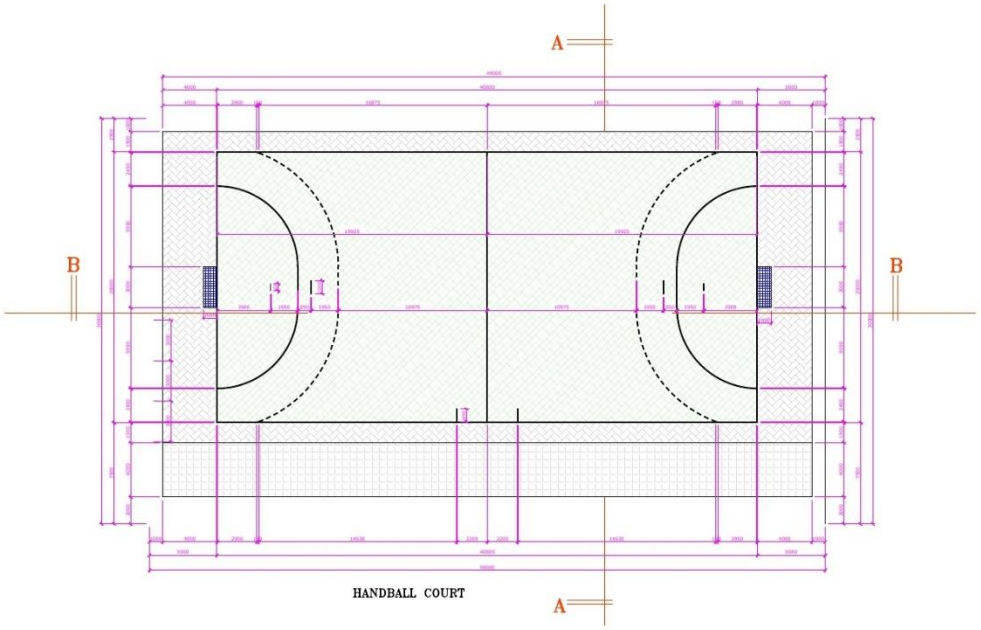


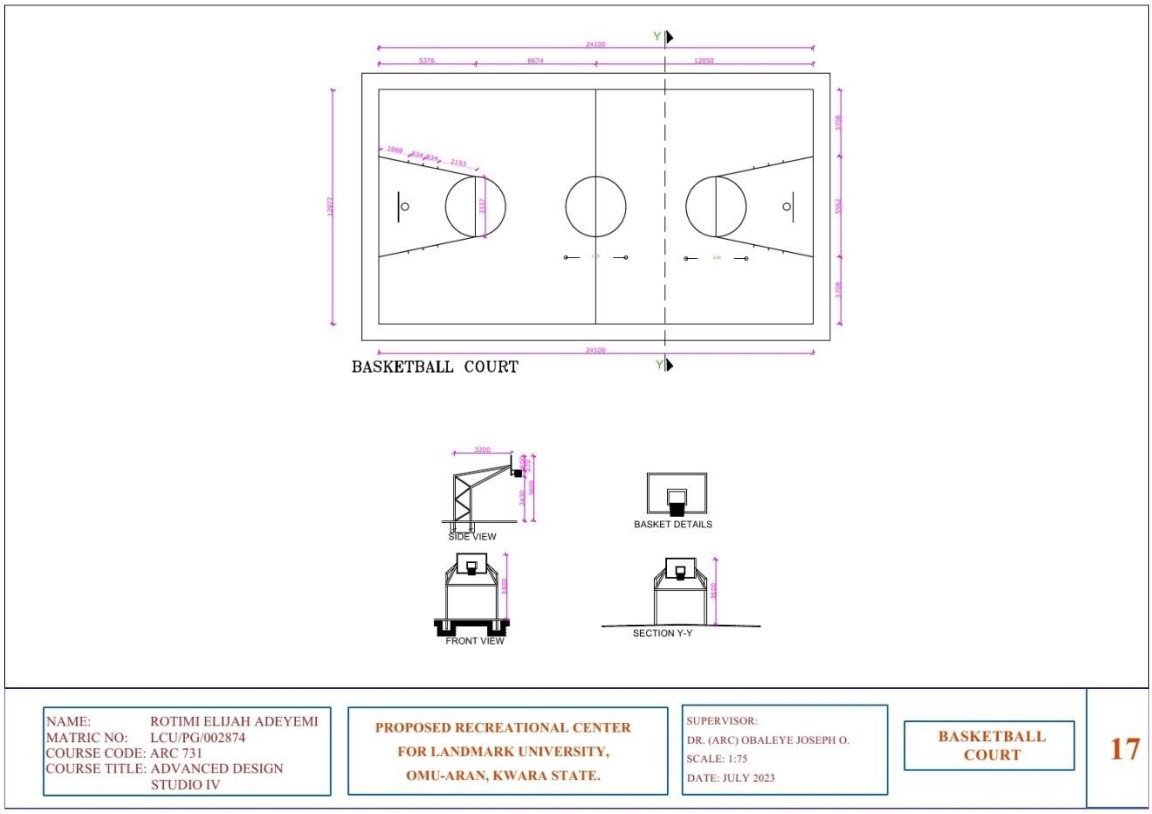
HANDBALL COURT

NAME: ROTIMI ELIJAH ADEYEMI MATRIC NO: LCU/PG/002874 COURSE CODE: ARC 731 COURSE TITLE: ADVANCED DESIGN STUDIO IV	PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.	SUPERVISOR: DR. (ARC) OBALEYE JOSEPH O. SCALE: 1:100 DATE: JULY 2023	HANDBALL COURT	15

Section A–A

Section B–B

NAME: ROTIMI ELIJAH ADEYEMI MATRIC NO: LCU/PG/002874 COURSE CODE: ARC 731 COURSE TITLE: ADVANCED DESIGN STUDIO IV	PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.	SUPERVISOR: DR. (ARC) OBALEYE JOSEPH O. SCALE: 1:50 DATE: JULY 2023	SECTIONS	16



NAME: ROTIMI ELIJAH ADEYEMI MATRIC NO: LCU/PG/002874 COURSE CODE: ARC 731 COURSE TITLE: ADVANCED DESIGN STUDIO IV	PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.	SUPERVISOR: DR. (ARC) OBALEYE JOSEPH O. SCALE: 1:75 DATE: JULY 2023	BASKETBALL COURT	17

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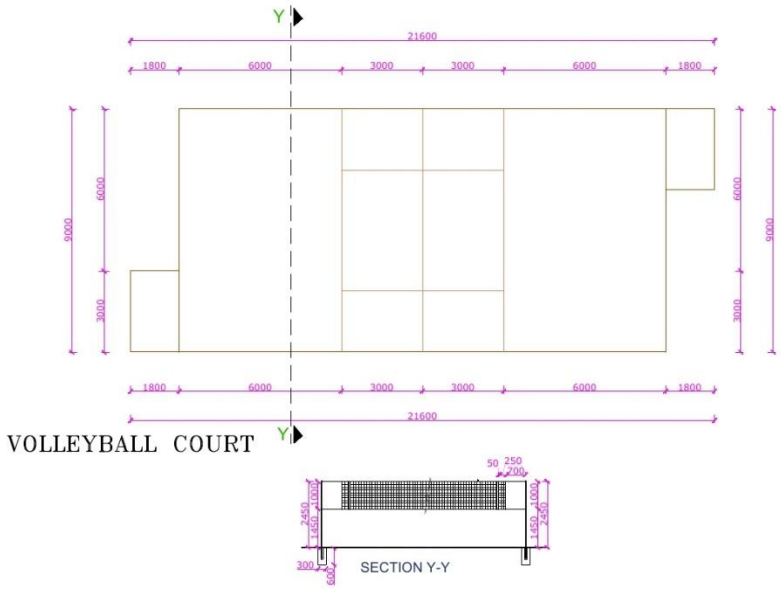
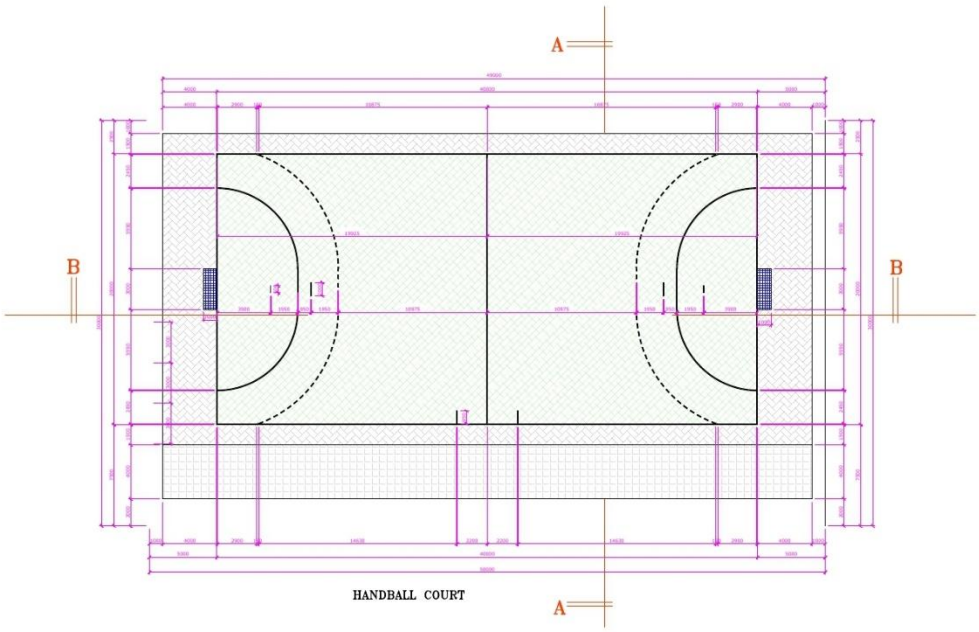


VOLLEYBALL COURT

NAME: ROTIMI ELIJAH ADEYEMI MATRIC NO: LCU/PG/002874 COURSE CODE: ARC 731 COURSE TITLE: ADVANCED DESIGN STUDIO IV	PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.	SUPERVISOR: DR. (ARC) OBALEYE JOSEPH O. SCALE: 1:50 DATE: JULY 2023	VOLLEYBALL COURT	18



HANDBALL COURT

NAME: ROTIMI ELIJAH ADEYEMI MATRIC NO: LCU/PG/002874 COURSE CODE: ARC 731 COURSE TITLE: ADVANCED DESIGN STUDIO IV	PROPOSED RECREATIONAL CENTER FOR LANDMARK UNIVERSITY, OMU-ARAN, KWARA STATE.	SUPERVISOR: DR. (ARC) OBALEYE JOSEPH O. SCALE: 1:100 DATE: JULY 2023	HANDBALL COURT	15

Bio Data

A. Personal Data

Full Name	:	Rotimi Elijah Adeyemi
Address	:	Pa Abraham Oyedepo House, Beside First Bank PLC, Omu-Aran, Kwara State
Email Address	:	rotimioneone@gmail.com
Phone Number	:	08065244311
Date of Birth	:	January 04, 1985
Place of Birth	:	Owaatun Opin.
Nationality	:	Nigeria
Marital Status	:	Married
Name and address of next of kin	:	Rotimi Elizabeth Omotayo Pa Abraham Oyedepo House, Beside First Bank PLC, Omu-Aran, Kwara State

B. Educational Background

Educational Institutions Attended with Dates and Qualification:

Community L.G.E.A School, Idera Opin	1990 – 1996	Leaving Certificate
Anglican Comprehensive High School Oke Opin.	1996 – 2002	SSC

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The Federal Polytechnic, Offa, Kwara State	2008 – 2010	ND Arch.
The Federal Polytechnic, Offa, Kwara State	2011 – 2014	HND Arch.
Lead City University, Ibadan, Oyo State	2019 – 2021	BSc in Arch.
Lead City University, Ibadan, Oyo State	2021 – 2023	MSc in Arch.

C. Other Academic/Professional Qualifications: Nil

D. Work Experience and position with date:

- ***Homics Construction Company Limited, Omu-Aran, Kwara State***
  - Position: Chairman — 2021 to Date

- ***Landmark University, Omu-Aran, Kwara State***
  - Physical Planning and Development
    Position: Design Architect — 2015 – 2021

- ***Glorious Homics Designs, Ilorin, Kwara State***
  - Part-time Staff
  - Position: Design & Monitoring Team Member — *2009 – 2015*

- ***Imperial Consultants, Ibadan, Oyo State***
  - National Youth Service Corps Year
  - Position: Design & Monitoring Team Memebr — *2014 – 2015*

- ***Arcoplan Consultants, Ilorin, Kwara State***
  - Industrial Training (I T)
  - Position: Design & Monitoring Team Member — *2010 – 2011*

- ***Moth designs and Construction Limited, Offa, Kwara State***
  - Students Industrial Work Experience Scheme (SIWES)
  - Position: Design & Monitoring Team Member — *2009*

E. **Member of Academic Professional Bodies:** Nil

F. **Publications, if any:** Assessment of Architecture Students' Knowledge of Passive Design Strategies in Academic Buildings in a Typical Nigerian Private University. International Conference: Energy Transition and the Built Environment (CETRABE-2023), October 29-30, Constantine 3 University. Algeria.
Authors: O. Olasupo., O.J Obaleye., E. Opaluwa., & E. A. Rotimi.

G. **Creative Works:** Nil

H. **Major Conferences/Workshops Attended:** Nil

I. Extra - Curricular Activities:
Sketching, Traveling and Researching

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…… ……

Signature Date

University Compliance Certification

This is to certify that this Theses by **Rotimi Elijah Adeyemi** with Matriculation Number **LCU/PG/002874** in the Department of **Architecture**, Faculty of **Environmental Design and Management,** Lead City University, Ibadan, is in full compliance with the University format and style of Theses.

…….. ……

Signature Date

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