EVALUATING CONFORMITY TO UNIVERSAL DESIGN PRINCIPLES TO ENHANCE INCLUSIVENESS IN THE DESIGN OF PROPOSED MODERN SPORT COMPLEX, KANO

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ZARIA, NIGERIA

DECEMBER, 2021

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A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, AHMADU BELLO UNIVERSITY, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTERS OF SCIENCE DEGREE IN ARCHITECTURE

DEPARTMENT OF ARCHITECTURE,

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ZARIA, NIGERIA

DECEMBER, 2021

DECLARATION

I declare that the work in this dissertation entitled "EVALUATING CONFORMITY TO UNIVERSAL DESIGN PRINCIPLES TO ENHANCE INCLUSIVENESS IN THE DESIGN OF PROPOSED MODERN SPORT COMPLEX, KANO" has been carried out by me in the Department of Architecture, Ahmadu Bello University Zaria. Information derived from literature has duly been acknowledged in the text and a list of references provided. No part of this dissertation was previously presented for another degree or diploma at this institution or any other.

Ahmad Rulwanu	_____	_____
Name of Student	Student's Signature	Date

CERTIFICATION

This dissertation entitled “EVALUATING CONFORMITY TO UNIVERSAL DESIGN PRINCIPLES TO ENHANCE INCLUSIVENESS IN THE DESIGN OF PROPOSED MODERN SPORT COMPLEX, KANO” by Ahmad RULWANU meets the regulations governing the award of the degree of Master of Science in Architecture of the Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This dissertation is dedicated to my father and mother Alhaji Rulwanu and Hajiya Maimuna and to my wife Mallama Surraya whose support and encouragement made this research a success.

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All utmost thanks and gratefulness belongs to almighty God for sparing my life and for giving me the opportunity to carry out this research work. Without whom this success would have been impossible. I remain eternally grateful to Him for this unfailing faithfulness unto me.

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This piece is incomplete without express gratitude to my entire family especially my parents, siblings and also to my wife who has stood by me through all travails. I will not fail to recognize the support of my friends, colleagues and course mates who we shared ideas and concepts that made this work a success. Thanks to you all.

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ABSTRACT

Sport has been realized as a key towards healthy developments, sport complex is a sport facility comprising of facilities such as stadium; baseball stadium, football stadium, track and field events, swimming pools and indoor sport. Sport activities involve all groups of people; children, adults and elderly, able and disable people, some groups of people come across barriers when participating in sport activities which hinder there effective inclusiveness in their communities. Therefore standard design should be maintained to carter for all these groups of people. The study is aimed at evaluating the conformity to inclusive design principles to enhance inclusiveness in sport activities, through evaluating universal design for spaces and activities in sport complexes and accessing conformity of sport complexes to universal design. The methodology employed a mixed-method approach which (quantitative and qualitative methods), which include visual survey (case study) checklist, and interview. The checklist was used to access degree of conformity to universal design while finding from visual survey showed pictures of conformity to inclusive design standards, while the checklist showed in (percentage) degree conformity to universal design. And finally the interviews conducted are structured and ask two questions. The research established that all the facilities studied has complied up to 64%, the highest had 76% and the lowest had 56%.therefore the universal design principle;Equitable Use, Flexibility in Use, Simple and Intuitive Use, Perceptible Information, Tolerance for Error, Low Physical Effort, Size and space for Approach and Use need to be considered in such cases. And this will serve as a framework for new designs and strategies for improving the standards of existing sport complexes so as to enhance inclusiveness in sport activities.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Sporting activities have been given more encouragement in recent years by advice from health personnel, financial incentives, popularity, personal inspiration, provision of facilities and equipment and also as hobby to some able and disable people in developed and developing countries. Sports are very popular all over the world, this is because many nations and societies have realized that it is the key towards healthy developments of the citizens Odejide, (2012). Mbaye, (1999) stated that ‘‘Sport is the use of complex physical skills or an institutionalized competitive activity that involves the use of vigorous physical exertion. Usually undertaken by individuals who are motivated or by either the intrinsic satisfaction or the external reward earned’’. However, Odejide, (2012) stated that countries all over the world have used sports as means of nation building. In addition, over the past twenty years' investment in sporting infrastructure at states and cities level was not only aimed at getting the local community involved in sport, but also aimed at attracting tourists, changing the image of the city and encouraging inward investment (Singleton and Darcy 2013). Therefore, sport has been employed as a unifying element/activity.

Unarguably, sport is an area of life in which people with disabilities have less-favourable experience than their able peers and competitors (Stevenson, 2009). People with disability globally come across different form of barriers when participating in sport activities. These barriers hinder their effective inclusiveness in their communities. These barriers contributed due to a lack of adequate research into inclusiveness in designing new facilities for participation. Although specially designed facilities are of more benefits, the participation of

people with physical disability concurrently with other people in community activities can reduce societal barriers.

Although (Downward, 2007, p. 3-38) stated that ‘‘It is a common misconception that people who are physically impairments should avoid rigorous sporting activities that are typically associated with injury because they are susceptible to trauma’’. Participation of Nigerians with physical disabilities in sport have increased in recent years, nevertheless they still face many challenges because of their impairments. Apart from lack of access to appropriate facilities, funds, technological aids including sporting wheel chairs, prostheses, special materials for persons who are blind and sign language interpretation, to the provision of separate sport facilities which instead of solving their problems often compound it. The good integration of emblematic sport facilities with surrounding can contribute to increase attractiveness of the city Ahlfeld & Meaning, (2010).

It is important to note that when discussing the development of sports for the physically impairments and the consideration of conformity of design standards in Nigeria, it should be compared with the evolution of special Education in Nigeria Okuneye, (2002). The educational programs for physically impairments children had undergone series of changes in the last two decades globally. These changes were inevitable since the education of physically impairments children in Nigeria has to keep pace with the education of the physically impairments children in other parts of the world particularly in the United States of America and United Kingdom (Ogedengbe 2005). The education of physically impairments children started with segregation, where the physically impairments children were educated in special classroom or schools. (Olukotan 2004) However, segregation system has its disadvantages because; it failed to recognise the fact that the physically impairments children are part of the community and the society at large (Okuneye, 2002). The shortcomings of

segregating the education of the disable children later changed to integration/inclusion. The Revised National Policy on Education (2004) adopted as an integration/inclusion placement for segregation. The policy stated that "government has decided that integration is the most realistic form of special education since the disable children are eventually expected to live a life normal in the same society". In this recent time, inclusive education has become an educational placement for the physically challenged children, which enable them to be fully integrated into the larger society. Sports in any society is an institution of considerable importance, which reflects societal belief, values, and needs as well as prescribed acceptable behavioural patterns for attaining and fulfilling those values and need (Mshelia, 2000).

The UN recognises the vital role sport can playing enhancing personal and societal development (UN, 2015). The term inclusion means ―being in ordinary facility with other athletes, having the same sport at the same time with full acceptance by all and in a way which makes the impairments athletes feel no different from abled athletes. It has been further explained that ―inclusion is a process of addressing the diversity of athlete's legitimate needs within regular sport provision using all available resources efficiently to create a diversity of opportunities to learn in preparing impairments athletes for active economic and social life in a culturally diverse and rapidly changing world. This updated social view recognizes that attitudes, assumptions, myths and stereotyping, along with inadequately designed environments all impose limitations on physically impairments people. To give balanced recommendations, the Champion must also have an appreciation of other users' needs including children and older people. An understanding of design and construction is also important in order to understand the other demands on the design or redevelopment of a sports facility (Ugochukwu, 2011).

1.2 Statement of Research Problem

At sports venues the field of play is defined by sport. Everything else – the seating bowl, circulation areas, food and drink outlets and toilets, turnstiles and exit gates – is defined by the needs and demands of the group of athletes and spectators that visit the complex or arena.

"Architects had to cope with new requirements of international competitions. New solutions have been developed in respect of functional as well as of constructive aspects" (Schmidt, 2002). The challenge of non-inclusion of diverse users' needs in sporting facilities and complexes has to be re-evaluated from time-to-time in developing countries such as Nigeria. (Kiuri & Teller, 2012) argued that seven out of ten international sport facilities that provided the spectators with a view of natural or symbolic urban elements from 1960 to 2012 have been significantly modified after the games.

In addition, the provision of athletics' dressing rooms, toilets, and rest rooms, exhibition halls in planning a new facility is geared towards getting the athletics' and spectators' needs of paramount importance, often without due consideration for impairments athletes and spectators in Nigeria. And be can be of severe consequences when wrongly gotten. Earlier researches in sports facilities, Architecture and Disability in Nigeria had been carried out; consequently, a gap exists for studying the specific aspect of sports facilities that influence user inclusiveness especially in Nigeria. Ugochukwu, (2011) researched on: A proposal for Kaduna township stadium, incorporating paralytic needs in the design of a stadium; the research focus mainly on athletes, Mahmoud (2016) researched on: Inclusive design as a tool in the design of sport complex for the impairments, Kano; the research focus on isolating people with disability. Sadiq (2016) Perception of mobility impaired students on accessibility design features in selected skill acquisition centres; the research focus only on impairment and accessibility in skill acquisition centre. And Mai (2018) researched on:

Assessment of design requirements in special education schools in Kano; the research focus also on isolating people with disability in schools. Those researches had either suggested provision of separate facilities for abled people or for impairments people separately. Research into standards of facilities and spaces, can recommend required inclusive facilities that can enhance inclusiveness in sports and reduce berries specifically in participation and discrimination in general. (Shukshin 2005) Facilities which are developed by and for physically abled people are now seen as the main sources of discrimination and likewise facilities which are also developed by and for physically impairments people are other sources of discrimination.

Therefore, modern sport complex that will provide standard inclusive facilities needed are required; Entrances, Spaces (Social, Transitive or Performance), Toilets, Dressing Rooms Etcetera, that will enhance the participation of various groups of people in sport activities. Well-designed complexes that will minimize the amount of management activities required and provide an environment that makes the life of the stadium manager as easy as possible (Durden, 2016).

1.3 Justification

A united nation secretary declared that "Sport is a universal language", (Annan, 2015). Arguably the most unifying element of nation building, it can bring people together, no matter what their origin, background, religious beliefs or economic status. Facilities have to be upgraded to accommodate everyone. This research work if successful will provide a fully functional inclusive sport complex. Furthermore, findings of this study could help policy makers such as those involved with the review of the sport facilities in the country to make effective decisions on the new demands and changes to be made on issues to do with application of spatial equality. This would significantly make sport facilities more effective

and serve the purpose of which they are made, and to boast the ability of the people living with disability.

According to sustainable development goals number eleven; more than half of the world's population now live in urban areas, by 2050 the figure will rise to 6.5billion people. Sustainable development cannot be achieved without significantly transforming the way we build and manage our spaces; in the way that is both participatory and inclusive so as to support better spatial planning in order to increase access to basic resources and services.

Physical disability is very unpredictable because a once vibrant able-bodied person can become physically impairments overnight due to an accident or as a result of the side effect of treatment of an illness (Sadiq, 2014)., according to sensor 2006 estimated population projection, Nigeria has a population of 27 million people living with disability out of which Kano state account for 2.3million people living with disability (JONAPWD, 2019), without a single fully inclusive sport facility where abled and impairments athletes will perform their social right effectively and acceptably. Hence, there is a need for a well-designed inclusive sport complex in the state.

Bringing abled and impairments athletes together in the design of modern sport complex is an attempt of making sport activities more successful and to change the landscape of sport. Impairments athletes are also great at sport; they should be included in the mainstream.

1.4 Aim and Objectives

1.4.1 Aim

The aim of this research is to evaluate conformity to universal design principles in sport complexes towards enhancing inclusive in sport activities Nigerian.

1.4.2 Objectives

The research was achieved through the following objectives:

1. To evaluate universal design principles for spaces and activities in sport complexes.

2. To access conformity of sport complexes to universal design principles.

3. To demonstrate findings in the design of proposed Kano modern sport complex.

1.4.3 Research question

1. What are the universal design principles for spaces and activities in sport complexes?

2. What is the degree of conformity to universal design principles for able and impairments users in sporting complexes in Nigeria?

3. How findings can be demonstrated in the design of proposed Kano modern sport complex?

1. 5 Scope of Study

The scope of this study is to evaluate conformity to universal design in sport complexes in through accessing the degree of conformity to universal design principles to accommodate users in respective of their age, gender, ability, excreta to enhance spot activities.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter gave an overview of Definition of Design Standards, universal design principles, how sport complex conform to inclusive design standards, standards of sports spaces and that can enhance inclusiveness in sport activities and relevant details will accessed. Concentration will be given on enhancing inclusiveness in sport activities, Spatial Organization, and the modern design standards that will enhance inclusive participation in sport. The literature review will contain the above synopsis as its content.

2.2 Definition of Design Standards

Design Standards are guidelines regarding the aesthetics and architectural appearance of a building or improvement to property; the standards govern the alteration, construction, demolition, or relocation of a building or improvement (Davidson & Dolnickeds, 2010.). This includes building and site design elements such as exterior modifications and additions, accessory buildings, fences, walls, landscaping, architectural styles, building materials, colours, right-of-way, easements, setbacks, scale, density and maintenance of character. Appearance codes were the earliest type of architectural design review ordinances that contained a set of standards the design review board must apply (Mandelker, 2003).

Design standards often incorporate graphic or photographic materials to illustrate designs The range of topics addressed in design standards is broad specifications of materials, physical measurements, and processes, performance of products and characteristics of services rendered.

The design of spaces in sport facilities has great impact on the sports as a career as well as recreational activities. The positive or negative performances and records of athletes do not

entirely depend only on the athletes themselves and on the equipment, but for many sports also the sport facility is very relevant, Sports require a facility that is designed for top performances, in case of both competitions and trainings. Lawson, (2014) Physical form of space: This can be easily demonstrated and illustrated by its solid nature. These include; length, width, scale, geometry, and also texture, colour, light etcetera.

2.3 Concept of Inclusive design

Inclusive design is an approach to the development of "products and environments that can be used effectively by all people, to the greatest extent possible, without the need for adaptation or specialized design" (North Carolina State University, 1997 in City of New York Department of Design and Construction (CNDDC), 2003) In view of the difficulty faced by designers, (Newell, 2000), who recommends the use of the term “inclusive” rather than “inclusive”. Inclusive design is not limited to buildings but also comprise both the internal and external environment where people take part in everyday activities, including sporting complexes and facilities, shops, offices, hospitals, leisure facilities, parks and the street. By considering people's diversity, inclusive design seeks to provide an environment which addresses the varying needs of users thereby breaking down barriers and removing exclusion. It is accepted, however, that inclusiveness will not always be able to meet every need (Planning Advice Notes (PANs), 2006). Inclusive design is about making places such that it can be used by everyone. The way places are designed affects one’s ability to move, see, hear and communicate effectively. Inclusive design aims to remove the barriers that create undue effort and separation. It enables everyone to participate equally, confidently and independently in everyday activities (Fletcher, 2006).

2.3.1 Principle of inclusive design

Basically, there are seven principles of inclusive design, which are discussed below (Welsh Assembly Government, 2007); (Commission for Architecture and the Built Environment CABE, 2008); (Town and Country Planning Association 2009);

a) Principle 1 Equitable Use
b) Principle 2 Flexibility in Use
c) Principle 3 Simple and Intuitive Use
d) Principle 4 Perceptible Information
e) Principle 5 Tolerance for Error
f) Principle 6 Low Physical Effort
g) Principle 7 Size and space for Approach and Use

a) Principle 1 Equitable Use: The design is useful and marketable to people with diverse abilities.

b) Principle 2 Flexibility in Use: The design accommodates a wide range of individual preferences and abilities so that different people can use the built environment in different ways.

c) Principle 3 Simple and Intuitive Use: Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

d) Principle 4 Perceptible Information: The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

e) Principle 5 Tolerance for Error: The design minimizes hazards and the adverse consequences of accidental or unintended actions.

f) Principle 6 Low Physical Effort: The design can be used efficiently and comfortably and with a minimum of fatigue.

g) Principle 7 Size and space for Approach and Use: Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

Inclusive design seeks to provide improved usability and safety for all groups of users in the community. It seeks to extend the ideals of accessible design to previously underserved groups like people of short stature, older people, pregnant women, parents with children in strollers, people who do not speak the local language and others. Such designs recognizes that improving the usability of spaces enhances the value of buildings for all of users and, piece by piece, thereby creating a facility that is a true home for everyone and one that welcomes all visitors with elegance and dignity.

2.3.1.1 Equitable Use

This idea speaks to democratic principle of equality, meaning that everybody should have equal access to the built and urban environments (Nasar, and Cowley, 2007). This principle advocates for a building designs that ensure equality in its usability by everyone. Ideally, the means by which people use the building should be the same (e.g., providing one means of entry to the building that works well for everyone). If it cannot be identical, the several means provided must be equivalent in terms of privacy, security, safety and convenience. The building must never employ means that isolate or stigmatize any group of users or privilege one group over another thereby creating an imbalance among users towards the use of spaces and facilities (Onyekwere, 2018).

2.3.1.2 Flexibility in Use

The building’s design should allow people to use its design features in more than one prescribed way (such as providing a countertop orientation map that is viewable from either a

seated or standing position). It should accommodate both right-and left-handed use and be adaptable to the individual pace. Such a building design should have the built-in flexibility to be usable even when it is employed or approached in an unconventional or unanticipated manner. This concept provides for adaptive re-use of existing facilities, such as converting from a particular function to the other. At the community scale, it also aims at the creation of a variety of mixed, complementary uses, such as retail and recreation and entertainment in connection with housing (i.e., so-called lifestyle centres) or even more advanced and increasingly popular mixed-use suburban town centres.

2.3.1.3 Simple and Intuitive

Buildings ought to make it easy for everyone to understand the purpose of each design feature and how to use such (e.g. providing washroom lavatory faucets that make the method of operation readily apparent and relatively easy). Moreover, its means of usage should be friendly, intuitively obvious in such a way that the mode of operation can be anticipated and can be used spontaneously. The designs of urban environments are to be legible and attractive through spatial qualities for easy usage and accessibility.

2.3.1.4 Perceptible Information

There is need for every building to provide all essential information and details in a variety of modes (e.g., written, symbolic, tactile, verbal) in order to ensure effective communication with all users regardless of sensory abilities. “Clarity in signage systems and communication of information is essential to the traveller’s direction as finding is of utmost importance” (Nasar, & Cowley, 2007). Information provided must be presented with sufficient contrast to surrounding conditions so that it is distinguishable from its context and understandable in all the various modes that are being presented.

2.3.1.5 Tolerance for error

Ideally, the building's design should eliminate, isolate or shield any design features that could prove hazardous to or inconvenience any user. Where such potentially dangerous conditions are unavoidable, users should receive prior warnings before approaching the design feature (e.g., providing proximity warnings in a variety of sensory modes near the top of stairs). The building's design should also anticipate accidental or unintended actions by any user to minimize the inconvenience and protect the users from harm. The main concern is that the building design should be "secure and safe for all".

2.3.1.6 Low Physical Effort

Design features that require little or no physical force to use should be utilised in buildings (e.g., replacing a traditional door knob with a lever handle that does not require the ability to grasp and turn the wrist). If a low level of force is required, any user should be able to engage the feature without assuming an awkward or hazardous body position (an example is seen in the provision of a smooth travel surface with minimal slope along the path of travel leading to the entrance).

2.3.1.7 Size and Space for Approach and Use

A building's design features should provide an adequate amount of space or clearance that is appropriately arranged to enable anyone to use features (e.g., providing knee space under a washroom lavatory to enable use by someone in a seated position). In addition, the space needs should be provided in such a way to allow for a clear path of travel to and from important design features for all users.

2.4 The Inclusive Design Process

Inclusive design should be seen as a continuous process from the initial concept, the design brief or master plan, through to the detailed design; the planning and building control approval processes; onto construction and the operation, management and maintenance of the completed facility. Each of these stages should be an inclusive process in themselves, involving potential users, including impairments people.

2.4.1 Forms of Space

Different studies in recent years have shown that sports participation has undergone changes, since the scale of participation in sport is dependent, among other things, on the extent, the variety and the Inclusiveness in sports, the overall planning of facilities shall be accepted as a matter for government, shall take account of local, regional and national standards, and shall incorporate measures designed to ensure full use of both new and existing facilities. (Council of European 1975). Abstract and Complex form of space: The Abstract and Complex form of space, are characteristic of space which difficult to talk about. It includes code, rules, and abstract parts shaping meaningful things in space. Barrier free environment provide a means of enabling people with disabilities to move about safely and freely and to use the facilities within the built environment Kyei-Dompim, (2020).

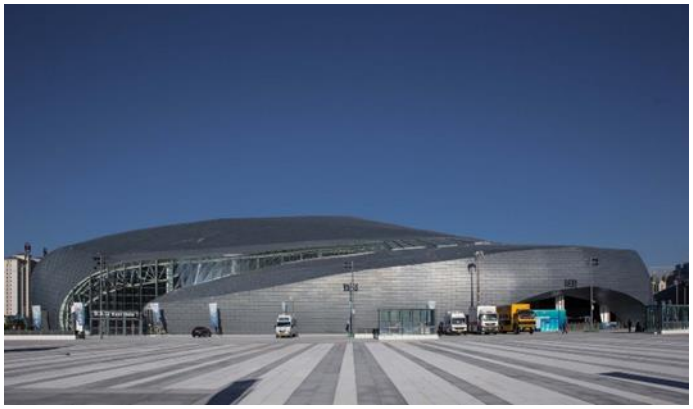


Plate I View from entrance of a sport facility
Source: Arch daily (2020)

2.4.2 Spatial Organization

'Spatial organization' describes how the project is organized spatially and functionally such that way finding can be simplified. Weisman (1981) identified four general classes of environmental variables that shape spatiality: visual access, degree of architectural differentiation, use of signs/room numbers and floor plan configuration. These environmental variables were evaluated within hospitals where access is easily granted and pedestrian routes largely predefined. This is also true of airports, train stations and conference centres where many of the studies reviewed earlier were conducted Maina and Umar,(2015).This is closely related to the following 'per formative spaces' and 'transitional spaces' which are found in sport facilities. 'Per formative spaces' is used as a denominator for the primary spaces, where the actual programmed physical activities are taking place. 'Transitional spaces' then are the adjoining spaces supporting the performance spaces. As the naming suggests the transitional spaces are in general characterized by a short-termed use on the way to or from the performance spaces. These spaces include functions as hallways, locker rooms, showers, sauna, massage as well as space for arrival and social interaction. These spaces in general have a character of transition, since the primary spaces typically are the reason for visiting.

In design, it is very important to conceive and mull over architectural space around us by deciphering its nature and discovering the significance in its built forms Dursun, (2009).

Considering the invaluable role way finding has on human psychology and occupants' safety, its inattention by designers has reduced the inclusiveness of buildings for all categories of users Hunter, (2010). Culture also plays a vital role in such planning processes.

2.4.2.1 Social and viewing spaces

Where possible sports halls should be capable of being viewed from social accommodation and every hall with public use, including those on school sites, should have some social and refreshment accommodation.



Plate XXX: sport viewed from a gallery
Source: Source: Arch daily (2020)

The simplest answer is to extend the foyer to include a seating area overlooking the hall through safety glazing fitted with blinds or a curtain to avoid distracting badminton players or other user groups. Two or three vending machines with adjacent storage are often sufficient for small halls but an alternative is to extend the reception counter for staff to serve drinks and snacks. If a cafe area is included it should be:

- Located in or close to the entrance foyer to enhance the welcoming ambience and to enable the centre to benefit from customer secondary spend

- Designed to ensure that standards of décor match successful high street equivalents.

In large centres social and viewing areas can be grouped together and may include:

- A bar and lounge
- Viewing into the hall and other areas.

Where it is not possible to accommodate these facilities at ground floor level, the social areas should be visible from the foyer and linked to it with a prominent staircase set in a generous well. It is important that this relationship is emphasized and that the social content is not tucked away in a remote corner of the building. Support accommodation will include:

- Storage and server areas serviced from a nearby vehicle delivery point
- Proper refuse storage and containment with direct access
- If there is a licensed area separate cellarage will be needed and a physical form of segregation may be required.

Viewing of sports halls and other activity areas provides added interest to the social content and assists in breaking down the cellular characteristics common to many older sports buildings. These benefits have to be reconciled with the privacy needs of some occupants so open galleries should be capable of being shut off and glazed screens must be fitted with curtains or blinds.

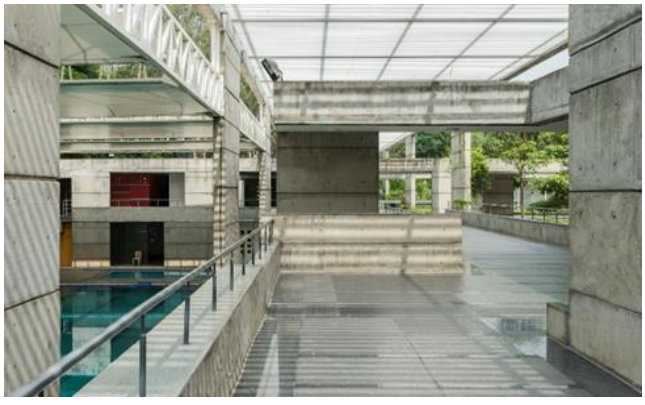
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Plate XXXI: social and refreshments area
Source: Source: Arch daily (2020)

2.4.2.2 Performance spaces

The multipurpose hall can be intended for sports, concerts and different types of performances. The space can be separated from the central space with the stairway by closing a large folding door with a traditional, box shaped space as result. It is important that smaller groups are taken into consideration regarding the scale of space.



Plate IV : multiple sports taking place in a multipurpose hall
Source: Source: Arch daily (2020)

2.4.2.3 Transitional spaces

The stairway has an appearance as an open foyer for different overlapping functions such as playroom, Internet café, exhibitions, newspaper reading room, etc. Beneath the stairway a play area for children emerges in close contact with the adjoining café. The transitional spaces are the very fulcrum of this scheme with the central one being the stairway connecting the multipurpose hall, the library, and the activity and service wing.



Plate XXXII : Entrance/reception hall
Source: Source: Arch daily (2020)

The primary function of transitional spaces is to connect individual spaces and they include; walkways, corridors etcetera NPC (2015).

2.4.2.4 Spectator seating / viewing

In larger halls, bleacher seating can be integrated into the wall and linked up to a first floor access route. In smaller halls smaller temporary seating units may be kept in the sports hall store. In all cases, the space requirements need to be considered in relationship to the court markings.



Plate VI Bleacher seating integrated into the side wall and access gallery above

Source: Source: Arch daily (2020)

2.4.2.5 Changing areas

Changing areas often attract criticism in facilities that would otherwise be well received.

- Always use high quality, robust and easily cleaned materials to give an immediate and lasting impression of hygiene and cleanliness

- Ceramic tiles need to be used on all wall surfaces in showers and changing rooms, with slip-resistant ceramic tiles on the floors
- Whenever possible changing areas should be equipped with high ceilings and roof lighting.

Note that clerestory windows and suspended ceilings are vulnerable to vandalism.

2.5 The Concept of Sport complex

The concept of Sport complex cannot easily be defined because complex can be defined in different perspectives depending of a variety of activities undertaken in the locations. However, various definitions have certain features in common. “An enclosure or platform surrounded by seats on all sides in which sport event, contest etcetera takes place” American heritage dictionary, (2016). Therefore, sport complex can be a ring, ground stage, theatre, bowl, pitch, stadium, enclosure park, coliseum or amphitheatre that can accommodate individual’s choice as an athlete for competition, career development or exercise or as spectator during free time as a mean of socialization.

A Sport complex is a building complex which provides multi –functional spaces for different kinds of sport. The Sport complex serves as a place for leisure, physical fitness and of course relaxation. Therefore, it is a complex building typology which needs to be inclusive to enhance patronage from multiple user ranging from adults, children, male and female to able and impairments peoples.

2.5.1 Modern sport complex

In the early decades of sport , Facilities were mainly geared to ‘traditional’ sports which could influence the standard of these facilities, such as in swimming pools, sports halls; soccer fields or athletics tracks Rafoss & Troelsen (2010), Waardenburg and Van Bottenburg

(2013). Hence, even though they were originally designed as a part of Sport for athletes. Such facilities were mainly used by competitive, abled bodied athletes organized participants. Rafoss & Troelsen principles (2010). Additionally, different types of sport facilities are found to be accessed by different types of sports participants Rafoss & Troelsen (2010), Hallmann (2012), Bolton and Martin (2013) and again do not seem to be inclusive. Unarguably, it is well-established that increase levels of sport and participation in physical activity strategies are most viable by the availability of facilities in neighbourhoods. Mota (2005), Kaczynski and Henderson (2007) with this, a standardization of space for sport had become reality.

2.5.2 Sport Center Honggerberg

The campus of the Eidgenössische Technische Hochschule (ETH) (Swiss Federal Institute of Technology in Hönggerberg/ Zurich is currently undergoing energetic expansion. New additions will be a sport facility on the east side of the property, adjacent to the recreational area of Käferberg. The structure interprets the landscape and has been inserted into a sloping site with a hayfield; only its west façade becomes visible. The outdoor space appears to flow through the generous foyer along a green ramp back into the open. Appealing interiors create an inviting atmosphere for sport training, leisure activities, recreation and even large festive events. The complex was dominated early on by the six-storey physics auditorium designed by municipal architect Albert Heinrich Steiner. Today, it forms the boundaries of the sloping, centrally located longitudinal plaza on the east side of the complex. Past the south side, runners and walkers can enter the recreational area surrounding the forested mountaintop of Käferberg, while faculty members, who seek balancing physical exercise, gain access to sport facilities.



Plate XXXIII Facade of the building

Source: Arch Daily 2020

The flat structure forms the edge of a slightly depressed area and has been inserted deeply into the smoothly sloping landscape, forming a natural progression between the surroundings and the green roof. Facing the campus, the structure boasts an expansive façade, featuring prominent, slanted edges on top and the sides. Thus, the edifice seems lower and adapts diffidently to its environs. It respects the quality of the site and expresses the specific functions of the building.

The flat construction with its greenish crystalline façade has been outfitted with a triple sports hall, featuring an auditorium and changing rooms, other facilities include dance halls and gymnasiums, a gym and a wellness area. The architectural concept has placed the rather bulky cube structure of the triple sports hall deeply into the ground, thus smoothly aligning the upper edge of the ceiling and the adjacent grassland. The hall is flanked by multi-storied recreational facilities, adjoining rooms and other uses. The building edges are polyhedral, respecting site conditions and preventing the oversized construction from dominating the locale.

A partially opaque, and partially transparent façade crafted from green insulating glass evokes the impression of an irregularly cut crystal. The balanced interplay of its impactful setting and the building's dialogical edges becomes manifest at the entrance and the adjacent foyer: Precisely following movement the entrée opens at the front of the flat angled west façade, while receding at the same time to form a vestibule. The vestibule leads to an ample glazed foyer adjacent to the main hall that pierces through the complex and terminates in a green, sloping area forming the transition to the open grassland. The structure merges urban-planning and architectural elements. Exterior movement is absorbed, separated and directed toward various functions, while on the other hand it is channelled into green space. Another northern green ramp connects the building again to the surrounding landscape.

The ceiling above the hall extends through the auditorium and the foyer. It merges topography of varying heights and uses under its roof: a development of large dimensions that aside from sport premises facilitates festive occasions. In addition to such expansive space configurations the gym, cardio and wellness area in the south side of the building are vertically oriented to the space and on top enclosed by a slanted roof. Its exterior, interior and zoning form a contrast of corresponding and superimposing elements, which according to individual interpretation offer stimulation, surprise and architectural indulgence.

2.5.3 Datong Sports Centre

The city sports centre, which started construction on September 6, 2010, is built in a beautiful environment. It is located in the central area of Yudong, near Wenyu Lake. The actual land area is 646 square meters, and the total construction area is 101,700 square meters. It consists of four main buildings: stadium, gymnasium, swimming pool and comprehensive training hall. It is mainly used for regional and national single competitions.



Plate XXXIV: Arial view

Source: Arch Daily 2020

It is understood that the design of the entire sports centre is inspired by the stunning natural features of the Loess Plateau. Each of the main elements is full of strength and majesty, showing the Taihang Mountains in the east, Luliang Mountain in the west, Hengshan and Wutai Mountain in the north. The style reflects the history of Datong as a military location in several dynasties, and the important economic role played by modern Datong in the mining and finance industries

The rich layering of the stadium is like the pattern and rhythm of the Yungang Grottoes, reflecting the harmonious characteristics of multiculturalism and multi-ethnic integration in the history of northern China. The total number of seats in the stadium is about 30,000. It is divided into four floors. The basement is the stadium, the athletes' facilities, the indoor training ground and the shooting range, as well as other operational, storage, equipment and other backcourt functional spaces.

The first floor is the platform floor. The main entrance level of the audience and the lower level of the viewing platform; the second level is the official/body school level, including the

box and the technical room, which can be used as a physical school classroom. The third floor is the upper deck, which includes a semi-open spectator hall and spectator facilities. The building's architectural shape incorporates the athlete's physical strength and graceful movement. The ground floor is 2 stories above ground and can accommodate approximately 8,000 seats.

The design concept of the swimming pool mainly emphasizes the powerful movements of the swimmers in the water, the natural swimming posture, and the strength and clear outline of the athlete's muscles. The swimming pool has 3 floors and a basement floor, which can accommodate 1,500 fixed seats and 1000 temporary seats.

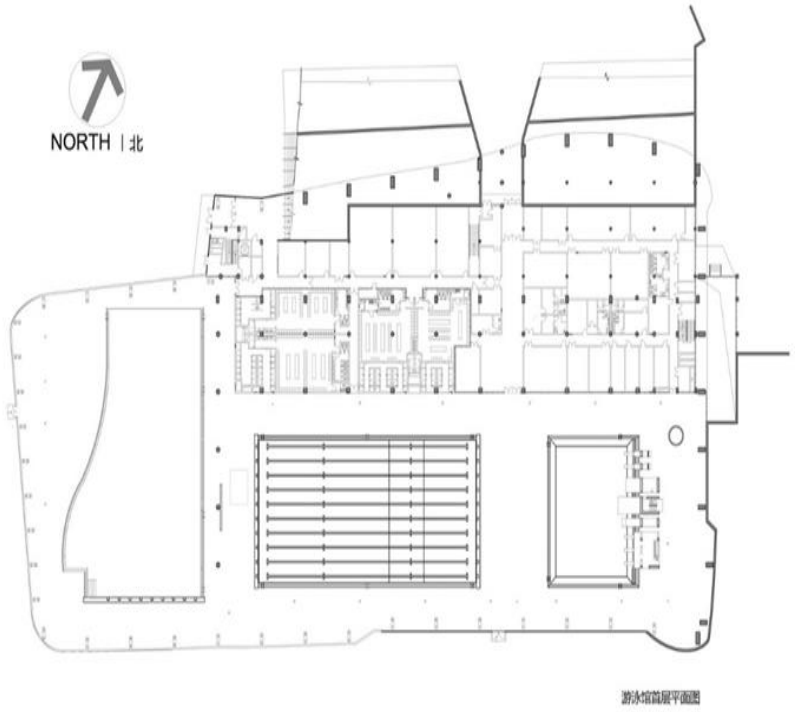


Plate IX: Floor plan

Source: Arch daily (2020)

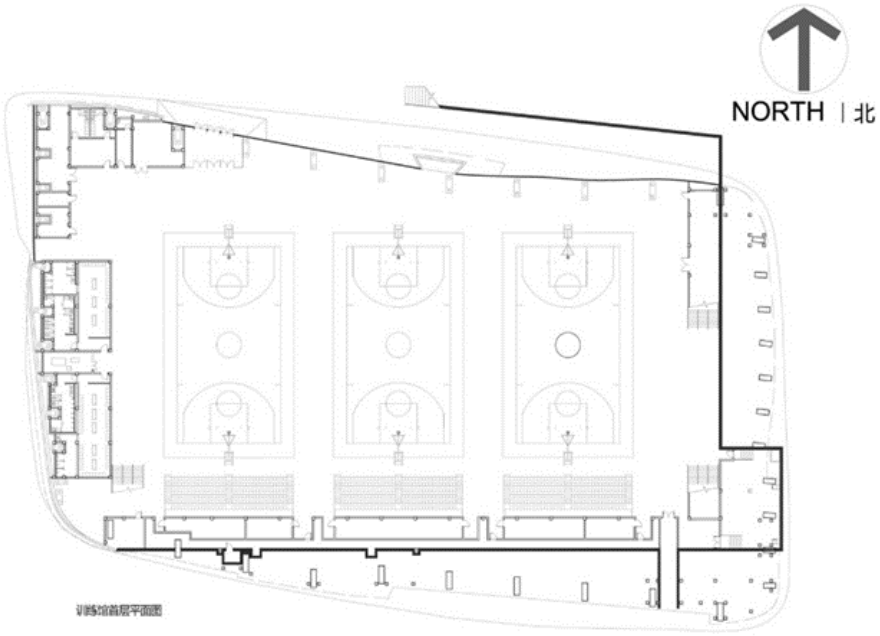


Plate XXXV: Floor plan 2

Source: Arch daily (2020)

2.5.3 Zhonghe Sports Center

The given site is located inside a large recreational park with a small footprint for buildings to be erected within. The plot is bounded by a main road to the north, an existing parking lot to the east, a swimming facility to the west and an outdoor basketball court to the south. Existing utilities such as gas pipes and water sewage on site were to be kept according to the design guidelines.

The design concept of the sports centre was then generated from the idea of stacking all the required programs in the most compact form, which incorporates playful building sections that engage indoor space with outdoor surroundings, and at the same time, involves spatial arrangements with visual connectivity. One big decision was to house the field hockey rink away from the main building and bury it deep into the basement, revealing only its triangulated roof with grass covered on top. By doing so, they were able to reduce the

building height and create less urban congestion in terms of building mass and scale. Moreover, with grass and soil covering the roof of the hockey rink, one was able to prevent summer heat penetrating directly into the interior space. As the result, cooling load was further reduced, and a more sustainable environment was possible for the district of Zhonghe.

With low building budget, construction methods, material selections as well as building geometry were all as important to help realize the design intention. The atrium on the first floor was designed to be a double height space with mezzanine levels on both sides all the way through the entire length of the building so that the plinth feels open and spacious with no obstruction in sight. This atrium space is designed to function as an urban living room, which welcomes visitors with well-lit space and features urban furniture for people to linger and stay.



Plate XXXVII: Aerial View

Source: Arch Daily 2020

The Mezzanine level hosts a fitness room, a spinning-bike room and three yoga rooms. The third-floor hosts six badminton courts and two squash courts. The fourth-floor houses 2 basketball courts and a rock-climbing room. These four floors were bundled together to form

the “main building” with a faceted exterior that speaks to the hilly surrounding. The field-hockey rink on the other hand was pulled away from the main building and reveals only its green roof to the general public with triangulated windows for people to peek below. This triangulated roof spans almost sixty meters in length and 30 meters in width without one single column. In addition, more than two hundred seats at B1 level were provided when games were hosted.

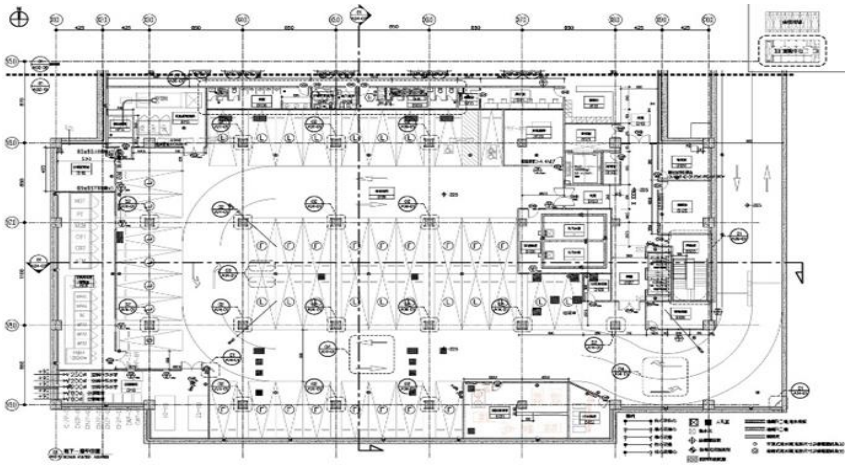


Plate XXXVII: Floor plan

Source: Arch daily (2020)

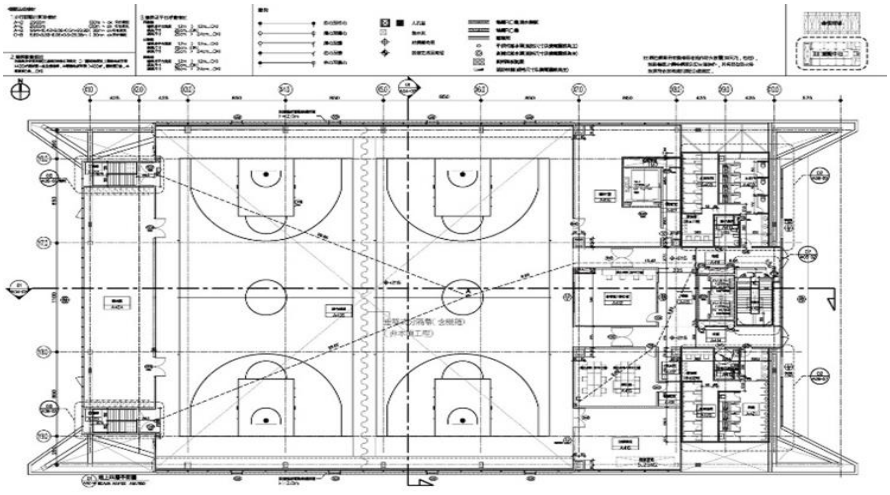


Plate XXXVIII: Floor plan 2

Source: Arch daily (2020)



Plate XXXIX: Gallery View

Source: Arch daily (2020)



Plate XL: Sports Hall

Source: Arch daily (2020)

2.5.4 Sports Centre / Studio Shift

Studio Shift's 3,000seat Sports Centre in Miyi County provides a multi-purpose venue to accommodate sporting events such as badminton, table tennis and basketball. The main centre is connected to smaller venues that feature a 200-seat tennis court, a diving/swimming pool, and several badminton and table tennis courts. To unite the disparate collection of venues, an undulating metal roof encapsulates the program and defines the external boundaries of the building as it wraps down towards the ground plane.

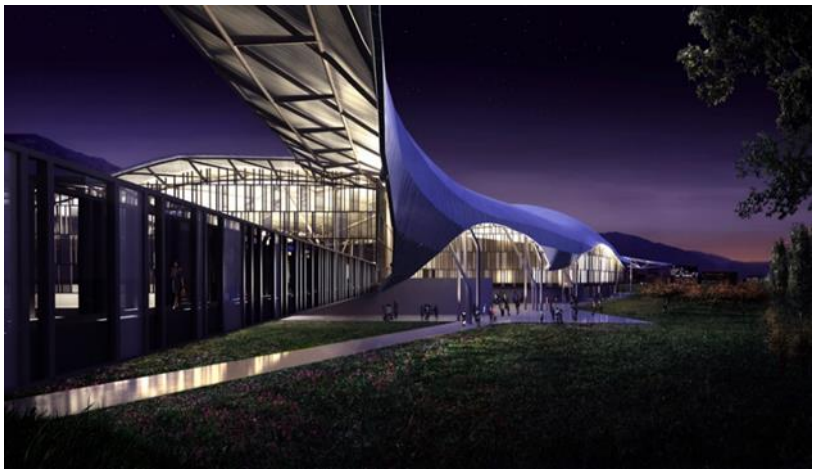


Plate XLII: Façade

Source: Arch daily (2020)

The roof geometry responds directly to the span requirements of the major venues. Various thin-film photovoltaic technologies are being investigated as critical components of the broad roof surface along with strategies to collect and re-use rainwater and maximize controlled, natural daylight. A panelised, glazing system allows for selective control of glare and heat gain through the treatment of individual panes. Varying opacities and tones are assigned to the glazing panels in response to solar position and orientation in an effort to maintain maximum building performance as well as the individual performance of its athletes and users.

The Miyi County Sports Centre is bounded by linear parks on the east and the south which carries an irrigation canal and follows a natural creek, respectively. To the north, the Centre directly interfaces with the main commercial and cultural Promenade of Miyi through a sports-specific retail program and the intersection of its primary circulation systems. At the main concourse, a grand stair provides an entrance to the venues and casual, public seating in a z'one of high pedestrian activity. The second major entry, on the eastern linear park, ensures the activation of the green space. The sports retail program and the concessions and services are connected and accessible through the main elevated concourse level thus bringing together the existing with the new.

2.5.5 IIM Sports Centre

The sports centre is planned in proximity to the existing hostel blocks. The planning had to take care of existing trees at the site. Main access and secondary access spines are created using trees as focal points

The sports facilities are planned in two levels, in response to the contours on site. The structure is designed as a non- building that emerges from the green ground. There is a gradual transition: starting from the pergola-covered double height, which acts as the main circulation spine, up to a semi open veranda and eventually to the enclosed sports hall.

Wide steps and platforms located in the sporting facility hold cultural activities and also connect the building to the landscape. The intended concept aims to establish a tranquil relationship between buildings, human, site and nature. Formal and informal interaction is encouraged through the use of common areas for staff and students. The main materials are stone and concrete that help unify the new to the existing material in terms of language. Moreover, the sports facilities adhere to International standards.

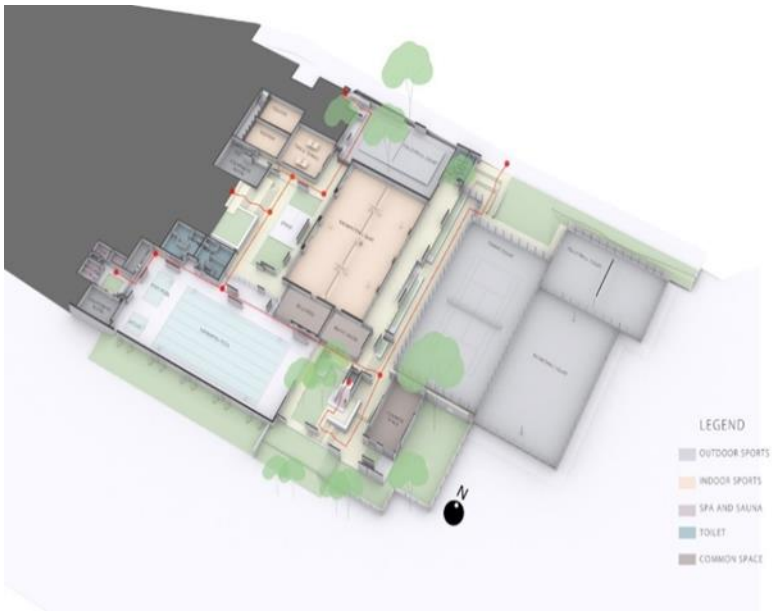


Plate XLII: isograph of ground floor

Source: Arch daily (2020)

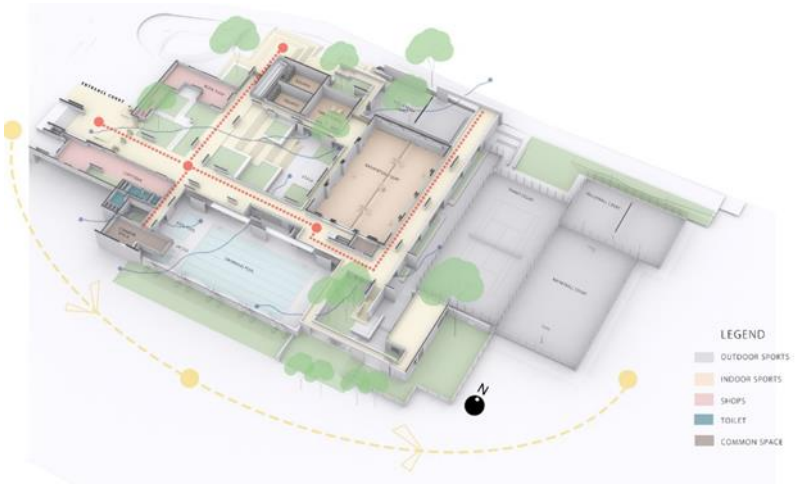


Plate XLIII: Isograph of first floor

Source: Arch daily (2020)

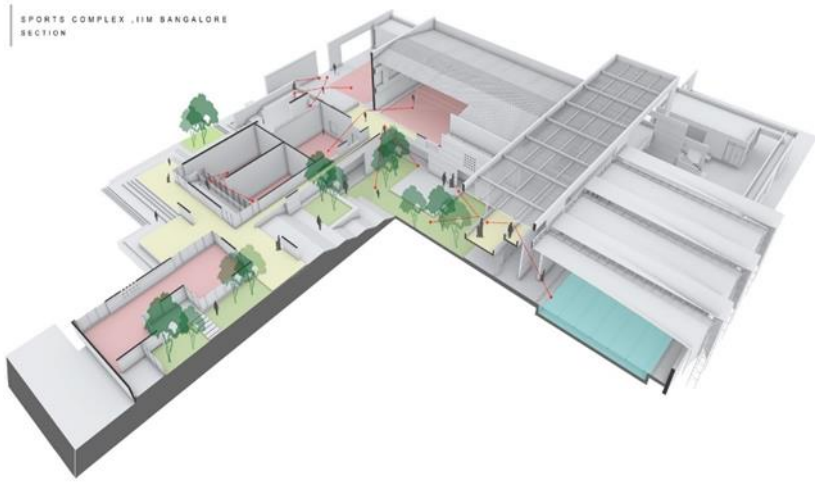


Plate XLIV: Isograph

Source: Arch daily (2020)

Table 2.1: Summary of findings from Literature Review

Concept/ keyword	Key findings	Source/Author
Design Standards	Design Standards are guidelines regarding the aesthetics and architectural appearance of a building or improvement to property; the standards govern the alteration, construction, demolition, or relocation of a building or improvement.	(Davidson & Dolnickeds, 2010).
	Appearance codes were the earliest type of architectural design review ordinances that contained a set of standards the design review board must apply.	(Mandelker, 2003).
	Physical form of space: This can be easily demonstrated and illustrated by its solid nature. These include; length, width, scale, geometry, and also texture, colour, light etcetera.	Lawson (2005)
Inclusive design	Inclusive design is not limited to buildings; it includes sporting complexes and facilities, shops, offices, hospitals, leisure facilities, parks and the street. By considering people's diversity, inclusive design seeks to provide an environment which addresses the varying needs of users thereby breaking down barriers and removing exclusion.	**(**Planning Advice Notes (PANs), 2006). (Fletcher, 2006). (Commission for Architecture and the Built Environment CABE, 2008); (Town and Country Planning Association 2009)
	Inclusive design aims to remove the barriers that create undue effort and separation. It enables everyone to participate equally, confidently and independently in everyday activities.	
	Basically there are seven principles of inclusive design.	
	It enables everyone to participate equally, confidently and independently in everyday activities.	(Fletcher, 2006).

Inclusive design process	Barrier free environment provide a means of enabling people with disabilities to move about safely and freely and to use the facilities within the built environment.	Kyei-Dompim, (2010).
	It is very important to conceive and mull over architectural space around us by deciphering its nature and discovering the significance in its built forms.	Dursun, (2009).
	Considering the invaluable role way finding has on human psychology and occupants' safety, its inattention by designers has reduced the inclusiveness of buildings for all categories of users.	Hunter, (2010)
	The primary function of transitional spaces is to connect individual spaces and they include; walkways, corridors etcetera.	Mai (2016).
Concept Of Sport Complex	An enclosure or platform usually surrounded by seats on all sides in which sport event, contest etcetera takes place.	American heritage dictionary, (2016).
	These environmental variables were evaluated within hospitals where access is easily granted and pedestrian routes largely predefined. This is also true of airports, train stations and conference centres where many of the studies reviewed earlier were conducted.	Maina and Umar, (2015).
Modern Sport Complex	In the early decades of sport, Facilities were mainly geared to 'traditional' sports which could influence the standard of these facilities, such as in swimming pools, sports halls; soccer fields or athletics tracks.	Rafoss & Troelsen (2010), Waardenburg and Van Bottenburg (2013).
Modern Sport Complex	Even though they were originally designed as a part of Sport for athletes. Such facilities were mainly used by competitive, abled bodied athletes organized participants.	(Rafoss & Troelsen 2010).
	Different types of sport facilities are found to be accessed by different types of sports participants.	Rafoss and Troelsen (2010), Hallmann (2012), Bolton and Martin (2013)
	Increase levels of sport and participation in physical activity strategies are most viable by the availability of facilities in neighbourhoods. With this, a standardization of space for sport had become reality.	Mota (2005), Kaczynski and Henderson (2007)
	The design of the sport facility should have elements that make it inclusively accessible `to all persons. However, the need to factor the various form of disabilities into the design of the built environment.	Danso (2017).

Source: Authors literature review

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

In this chapter guideline information on how the research was conducted to achieve the research aim and objectives of the study is given. The overall research methodology adopted for this research is given in figure 3.1 below; it shows the research strategy, research design, Case study selection criteria, sampling method adopted, instrument of data collection and also data analysis and presentations adopted for the research. For the purpose of achieving the aim and objectives of this research, quantitative and qualitative research approach were adopted to assess conformity to inclusive design standards in sport complexes to identify the relationships between variables.

Mixed research method was used in this research which includes (quantitative and qualitative research approach). And this method was used by similar researches and studies conducted by Mahmoud, (2016) and Sadiq, (2016). Onyekwere, (2018) opined that the choice of a research design is governed by factors dictating its suitability to the approach most appropriate to address the research questions. The study was categorized into five stages as shown in figure 3.1. The first stage deals with the study of existing literature, looking into similar studies obtained by various researchers. The second stage deals with case study of sport facilities under the sport councils in selected states of north-west and north-central geographical region of Nigeria carry out a checklist for spaces in the sport facility. The third stage deals with the guided interview to the management of the facility to access conformity of these standards in sport complexes. Consequently, the results will be analysed in various tables, charts and graphs through which discussion on findings to ascertain the level of conformity to universal design principle and conclusions were drawn. Also a pilot study was

carried out at Ahmadu Bello University Main Campus Sport Complex (gym) sammaru, to test the validity of the research instruments.



Figure 3.1: The research workflow

Source; Author

3.3 Population of survey

Population of the study includes all sport facilities in the Northern Nigeria. Case studies and checklist and interviews were conducted to understand the existing situation which will help to expose problems as well as solutions inherent in existing facilities to serve as guide in design formation. And it will take into consideration such aspects as function, structures, site and economy, with a view to identifying the complexities essential in them in order to find ways of incorporating some ideas in future designs.

3.4 Case study selection criteria

Researcher uses judgment in selecting cases with specific purpose in mind which is known as non-probability sampling. Therefore, situations are identified due to their inherent qualities which are especially informative about the phenomenon under investigation for study (Oluigbo, 2017). Case study selection is comparable to sampling in a quantitative research and that cases were usually purposely selected Neuman (2013).

The criteria used in the selection of the study will be:

1. Sports complex in Northern Nigeria
2. Sports facilities under ministry of sport.
3. Sports Facilities used for international competitions.
4. One from each geopolitical region of northern Nigeria

In this regard, the below sport facilities were selected and studied

I. Sani Abacha International Stadium and Indoor Sport Kano, Kano State.
II. M.K.O. Abiola National Stadium (wing B) FCT Abuja and.
III. M.K.O. Abiola National Stadium (wing A) FCT Abuja where studied.
IV. Multi-Purpose Indoor Hall Bauchi, Bauchi State.

Are selected from each geopolitical zones of northern Nigeria

3.5 Instruments of Data Collection

The instruments of data collection were:

- Interview
- Visual Survey
- Checklist
- Documental Analysis.

3.5.1 Interview

Regarding interviews, the information was collected using a pre-defined procedure, but allowing the respondents to discuss and expose their ideas freely. A phenomenon was required to be studied within its context in Interview research Oluigbo (2017). The interviews was not recorded and transcriptions (but notes) for later analysis. Interviews in architectural case study research involve the respondent which may include; the Architect and other members of the construction team, the client or owner, the users and passive consumers Oluigbo (2017). The questions are related to conformity to universal design principles.

3.5.2 The Visual Survey (case study)

This is a method of data collection in which the researcher used his visual perception to analyse data, make record and take notes. It involves a descriptive report on cases or surveillance of physical features Oluigbo (2017). Camera and sketchpads were employed for visual survey. In this research visual survey was also employed because it helps the researcher to reach the second objective by observing sports facilities Conformity to standard, Available inclusive facilities, Inclusive design principles, Organizational layout (Plan form) and this reflect in various formats such as photographs, sketches and notes relevant to universal design

2.5.3 Checklist

To aid the research when collecting data during the study, a checklist was prepared. The data gathered using the checklist was used to evaluate conformity to universal design in the sport facility for inclusive sport activities. And then evaluated to know the degree of conformity to the universal design

3.5.2 Data analysis

Data was presented in tables, descriptions and pictures.

Table 3.2: Summary of types of data, description and sources

Data type	Objective	Data element	Description	Source
Primary data	Establish standards for universal spaces and activities in sport complexes.	Architect's data, sport hall design layouts and archi-daily	Standards and guide	Literature review
Secondary data	To access conformity to universal design s in sport complexes in north-west and north-central Nigeria	Observation of Facility, Character and description	Physical properties and universal design features of the cases studies	Pictures, descriptions, figures and tables
	To demonstrate findings in the design of proposed Kano modern sport complex	model architectural features	Provision of required universal designs spaces for activities	Proposed design

Source: Author (2019)

3.6 Primary data sources

Primary data sources used include available literature and statistics data from architectural data, sport facility building guide and other available sources.

3.7 Secondary data sources

Secondary data sources used include results from checklist, visual survey and interviews.

Finally, findings on a number of restitution measures recommended by some designers, spot facilities and countries are discussed. The data collected is coded, tabulated and summarized using descriptive approach. The analysis and findings are arranged in line with the research question.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This Chapter answers the second research question; what is the degree of conformity to these universal designs for inclusive users in sporting complexes in Nigeria? It contains in details the analysis of data collected from the pilot study, as it. Presents the case study, structured check list and the interview (research instruments) conducted in Ahmadu Bello University Main Campus Sport Complex (gym), this is to ensure the accuracy of the information and confirm the psychometric properties of the data collection instruments. Secondly also, the main research areas which were four and they include; Sani Abacha International Stadium and Indoor Sport Kano, Kano State, M.K.O. Abiola national stadium (wing B) FCT Abuja, M.K.O. Abiola national stadium (wing A) FCT Abuja and Multi-purpose indoor hall Bauchi, Bauchi State. Also contain the detail analysis of data collected from the study areas, which include the Presentation of case studies, structured check lists and the interviews.

The case study report (visual survey was discussed under these headings; Conformity to standard, Available inclusive facilities, universal design principles, Organizational layout (Plan form). while the checklist has thirty-three variables showing their degree of conformity to inclusive design standards and remarks. The other section contains questions and answers from the structured interview conducted.

4.2 Findings from pilot study: Ahmadu Bello University Main Sport Complex, Samaru, Zaria, Kaduna State

A.B.U. sport complex is located in Ahmadu Bello University, Samaru main campus, Zaria, Kaduna state, longitude 11.0855 and latitude 7.7199.



Plate XX Building on Site

Source: Google Earth (2019)



Plate XLVI Facade of sports complex

Source: Google Earth (2019)

4.2.1 Introduction

The A.B.U., Main Sport Complex, Samaru was established in 1968 in a location very close to the now a days North gate but was later relocated to its present location and never completed to be fully operational until 1982. It is located inside the main campus and serves the university community. It is own and managed by the school management board. The complex helps to carry out several sport activities and they include:

1. Table Tennis
2. Football
3. Track Event
4. Badminton
5. Basketball and
6. Volleyball
7. Squash
8. Lawn tennis
9. Gymnasium

4.2.2 Conformity to standards

The building is a double volume building, a predominantly of reinforced concrete structure frame work of grid system of about 6 by 8 meters with columns of rounded and squared shape. It has a multipurpose hall (performance space) were most of the sport takes places, Colors are used to differentiate various sports, the transition space; lobbies, passages, reception conform, but the spectators and athletes facilities do not conform to current standards.

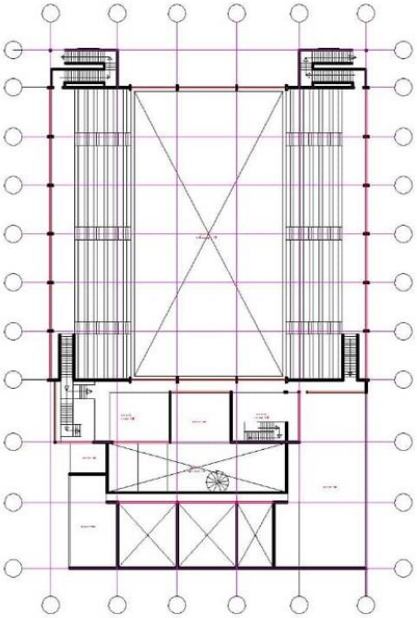


Figure 4.1: First floor plan

Source: Author’s field work (2019)

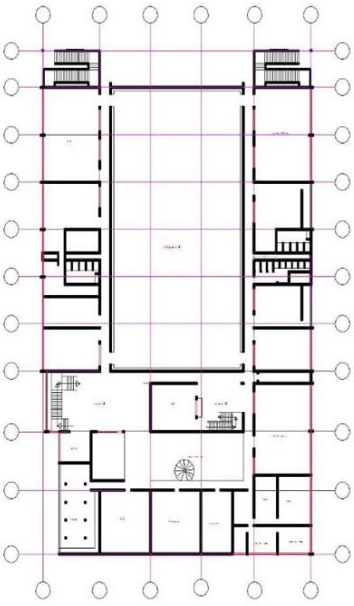


Figure 4.2: Second floor plan

Source: Author’s field work (2019)



Plate XXII: sport court
Source: Author's field work (2019)

4.2.3 Inclusive design

The design is not useful and marketable to people with diverse abilities, because it does not encourage their participation from entrances, toilets, seats and exits The design does not accommodates a wide range of individual preferences and abilities so that different people can use the built environment in different ways, The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities, such as signs and signage. The design cannot be used efficiently and comfortably and with a minimum of fatigue, because it does not have low physical effort .Appropriate size and space is not provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.to have equitable usage.



Plate XXIII: Entrance
Source: Author's field work (2019)



Plate XXIV: Exits
Source: Author's field work (2019)

4.2.4 Availability of Inclusive Facilities

The sport complex does not have inclusive facilities especially in the entrance, exit, toilets, viewing and dressing rooms, these makes it impossible for people with dis-ability to make use of the facility conveniently. Like ramps, wearing blocks (tactile), thresholds, excreta.

4.2.5 Inclusive design principle

The design is not useful and marketable to people with diverse abilities, because it does not encourage their participation from entrances, toilets, seats and exits The design does not accommodates a wide range of individual preferences and abilities so that different people can use the built environment in different ways, The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities, such as signs and signage. The design cannot be used efficiently and comfortably and with a minimum of fatigue, because it does not have low physical effort .Appropriate size and space is not provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.to have equitable usage.



Plate XXV: Convenience
Source: Author’s field work (2019)



Plate XXVI: Steps as means of Movement
Source: Author’s field work (2019)

4.2.6 Organizational layout

The entire sport complex building covers about 50% of the entire land area. Very few dedicated parking space for the staff and general public, the landscape is poor. Also, there is an open courtyard within and an open space in the terrace.



Plate XXVII: Entrance
Source: Author's field work (2019)



Plate XXVIII: Parking
Source: Author's field work (2019)

4.2.7 Visual Survey Checklist report

Check list for assessment of conformity to universal design of a selected sport complex.

Name of sport complex: ABU main sport complex Samaru ABU Zaria, Zaria Kaduna State

Three respondents (the researcher with two others) where used to assess the performance and situation of the Sport complex to reduce the high level of subjectivity that usually occurs when a single individual does the assessment alone. The demographic of the three respondents is presented on the table below:

Table 4.1: Checklist Respondent's Demographics

RESPONDENTS	1	2	3
GENDER	Male	Male	Male
AGE	35-45	20-30	20-30
INSTITUTION	A.B.U., Zaria	A.B.U., Zaria	A.B.U., Zaria
FACULTY	Env. Design	Env. Design	Env. Design
DEPARTMENT	Architecture	Architecture	Architecture
LEVEL	800/ M.Sc.	800/ M.Sc.	800/ M.Sc.
GEO POLITICAL ZONE	North West	North East	North Central
NATIONALITY	Nigerian	Nigerian	Nigerian

Table 4.2: Checklist survey for A.B.U., main sport complex Samaru, Zaria

Degree of conformity: (1) 0-19% (2) 20-39% (3) 40-59% (4) 60-79% (5) 80-100%

	Availability	Conformity [1]	[2]	[3]	[4]	[5]	Remark (Present State)
Entrance	✓		⊕				The entrance does not encourage inclusive entrance
Exits	✓		⊕				The exit does not encourage inclusive exit
Supervisor's Room	✓			⊕			Provided but not adequate
Instructor's Room	✓			⊕			Provided but not improvised
Janitor's Equipment	✓	⊕					Provided but not adequate
First Aid Room	✓		⊕				Provided but not adequate
Fitness Room	✓		⊕				Provided but not adequate
Rest Room	✓						Provided but not adequate
Dressing Room	✓		⊕				
Shower	✓		⊕				Does not encourage inclusive usage
Gymnastic Room	✓						Provided but not adequate
Wight Training and Conditioning Room	X						Not Provided
Hall	✓				⊕		Provided to standard
Equipment/ Apparatus Room	✓						Provided but not adequate
Store Room	✓			⊕			Provided but not adequate
Open Air Sport	✓		⊕				Provided to standard
Learning and Leisure Rooms	X						Not Provided
Cafeteria	X						Not Provided

Source: Author's field work (2019)

Table 4.3: Checklist survey for A.B.U., main sport complex Samaru, Zaria

Degree of conformity: (1) 0-19% (2) 20-39% (3) 40-59% (4) 60-79% (5) 80-100%

	Availability	Conformity [1]	[2]	[3]	[4]	[5]	Remark (Present State)
Entrance	✓		⊕				The entrance does not encourage inclusive entrance
Exits	✓		⊕				The exit does not encourage inclusive exit
Supervisor's Room	✓			⊕			Provided but not adequate
Instructor's Room	✓			⊕			Provided but not improvised
Janitor's Equipment	✓	⊕					Provided but not adequate
First Aid Room	✓		⊕				Provided but not adequate
Fitness Room	✓		⊕				Provided but not adequate
Rest Room	✓						Provided but not adequate
Dressing Room	✓		⊕				
Shower	✓		⊕				Does not encourage inclusive usage
Gymnastic Room	✓						Provided but not adequate
Wight Training and Conditioning Room	X						Not Provided
Hall	✓				⊕		Provided to standard
Equipment/ Apparatus Room	✓						Provided but not adequate
Store Room	✓			⊕			Provided but not adequate
Open Air Sport	✓		⊕				Provided to standard
Learning and Leisure Rooms	X						Not Provided
Cafeteria	X						Not Provided

Source: Author's field work (2019)

Table 4.4: calculation of checklist result

Scale	Frequency	
	F	**FS**
5	3	15
4	2	8
3	6	18
2	10	20
1	2	2
	23	63

Source: author

$$\text{Mean} = \frac{63}{23} = 2.7$$

$$\text{Percentage (\%)} = \frac{2.7}{5} \times 100 = 54$$

Degree of conformity is 54% to universal design of the facility.

Calculation method: The variables were divided by the frequency of the scale and then the percentage was taken.

4.2.8 Interview

The interview conducted includes two structured questions; to accesses the conformity of standards in the pilot studies. One respondent was administered the questions, the demographic of the respondent was presented on the table below:

Table 4.5: Interview Responded Demography

RESPONDENT	
GENDER	**Male**
AGE	**35-above**
ADDRESS	**ABU Zaria**
FACULTY	**P.H.E.**
DEPARTMENT	**Human kinetics**
HIGHEST QUALIFICATION	**Ph. d**
GEO POLITICAL ZONE	**North East**
NATIONALITY	**Nigerian**

4.3.8.1. Interview question:

1. To what degree the sport facility /spaces conform to universal design?

2. Are there any contextual issues that inhabit the conformity to universal design in Nigeria?

Responses:

1. Yes, at the time of construction the facility /spaces conform to universal design.

2. Yes, inadequate funding, such that new equipment and upgrading of facility /spaces can conducted from time-to-time.

4.3 Findings from Main Study Areas (1):

Sani Abacha International Stadium and Indoor Sport Kano, Kano State. Longitude 11°59′59″N and latitude 8°31′45″E

Below are the findings from the visual survey, case study, checklist and interview.



Plate XXIX: Aerial View
Source: Author 2019



Plate XXX: Front entrance

Source: Author 2019

4.3.1 Introduction

Sani Abacha Stadium was commissioned in 1999 shortly after the demise of General Sani Abacha in 1998 by the then Deputy Head of States. The stadium was established in order to allow Nigeria host Nigeria's 1999 Junior World Cup which held at the International Stadium. SAS has a capacity of 16000 seats but at peak period can accommodate up to 20000 spectators.

The Stadium has three major sections namely;

I. Outdoor games
II. Indoor games
III. Auxiliary facilities

There quite a number of sporting activities such as athletics, gymnasium and indoor games among others that are provided for at the Sani Abacha Stadium. These sporting activities are made up of the following;

- Basket Ball
- Gymnastic
- Squash
- Boxing
- Football
- Para soccer
- table tennis
- javelin
- short put
- discourse
- Fives
- Rugby
- Cricket

Gymnasium: the gymnasium comprised of the following;

- Power lifting, which is meant for the disable
- Weight lifting, which is meant for the able
- Wrestling
- Judo
- Karate
- There is also a volley ball court, Hand ball court basketball court (indoor and outdoor).
- Tecquando
- Tennis (lawn tennis)

4.3.2 Conformity to standards

The building is a double volume building, a predominantly of reinforced concrete structure frame work of grid system. It has a multipurpose hall (performance space) were most of the sport takes places, Colors are used to differentiate various sports.

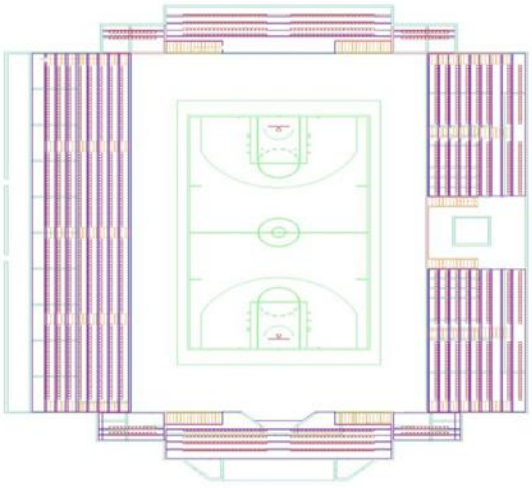


Figure 4.3: Floor plan

Source: Author 2019

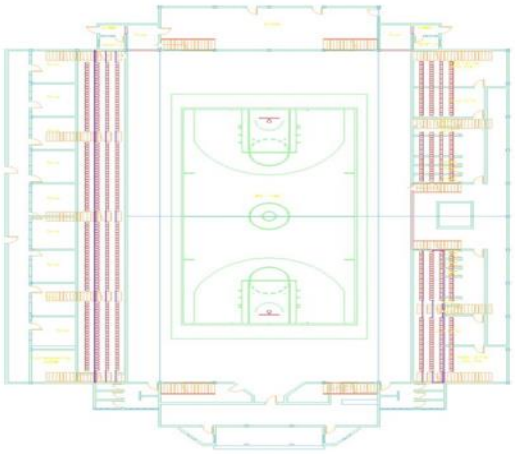


Figure 4.4: Floor Plan 2
Source: Author 2019



Plate XXXI: Indoor Court

Source: Author 2019

4.3.3 Availability of Inclusive Facilities

The sport complex does not have inclusive facilities especially in the entrance, exit, toilets, viewing and dressing rooms, these makes it impossible for people with dis-ability to make use of the facility conveniently.

4.3.4 Inclusive design principle

The design is not useful and marketable to people with diverse abilities, The design does not accommodates a wide range of individual preferences and abilities so that different people can use the built environment in different ways, The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities, The design cannot be used efficiently and comfortably and with a minimum of fatigue, Appropriate size and space is not provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

But the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level present within the complex especially at the entrance and parking spaces and the rare area.



Plate XXXII: means of movement
Source: Author's field work (2019)



Plate XXXIII: Convenience
Source: Author's field work (2019)

4.3.5 Organizational layout

The entire sport complex building covers about 30% of the entire land area. Very few dedicated parking space for the staff and general public, the landscape is poor. Also, there is an open courtyard within and an open space in the terrace.



Plate XXXIV: Undedicated Parking
Source: Author's field work (2019)



Plate XXXV: Non Inclusive Entrance
Source: Author's field work (2019)

4.3.6 Visual Survey Checklist report

Check list for assessment of conformity to inclusive design standards of selected sport complex. Name of sport complex: Sani Abacha International Stadium Indoor Sport Kano, Kano State

Table 4.6: Checklist survey for Sani Abacha International Stadium Indoor Sport Kano,

	Availability	Conformity [1]	[2]	[3]	[4]	[5]	Remark (Present State)
Entrance	✓		⊕				The entrance does not encourage inclusive entrance
Exits	✓			⊕			The exit does not encourage inclusive exit
Supervisor's Room	✓			⊕			Provided but not adequate
Instructor's Room	✓			⊕			Provided but not improvised
Janitor's Equipment	✓		⊕				Provided but not adequate
First Aid Room	✓		⊕				Provided but not adequate
Fitness Room	X						Provided but not adequate
Rest Room	✓						Provided but not adequate
Dressing Room	✓		⊕				
Shower	✓		⊕				Does not encourage inclusive usage
Gymnastic Room	✓		⊕				Provided but not adequate
Wight Training and Conditioning Room	X						Not Provided
Hall	✓				⊕		Provided to standard
Equipment/ Apparatus Room	✓		⊕				Provided but not adequate
Store Room	✓			⊕			Provided but not adequate
Open Air Sport	✓			⊕			Provided to standard
Learning and Leisure Rooms	X						Not Provided
Cafeteria	X						Not Provided

Source: Author's field work (2019)

Table 4.7: Checklist survey for Sani Abacha International Stadium (SAS) Indoor Sport Kano, Kano State

	Availability	Conformity [1]	[2]	[3]	[4]	[5]	Remark (Present State)
Seating Area	✓				⊕		Need to be upgraded
Standing Area	X						Not Provided
Circulation Area	✓		⊕				Provided but not adequate
Toilets	✓			⊕			Does not encourage inclusive usage
Maintenance room	✓		⊕				Need to be upgraded
Safety and Security	✓					⊕	
Privacy	✓				⊕		Not adequate
Water Supply	✓					⊕	
Electricity	✓					⊕	
Waste Management	✓			⊕			
Internet	X						Should be Provided
Printing/Photocopy	X						
Selling	X						
Watching TV	X						Should be Provided
Functionality of the Complex	✓				⊕		
Inclusive facilities	X						Should be Provided
Zoning activities	✓				⊕		

Source: Author's field work (2019)

Table 4.8: Calculation of checklist result

Scale	Frequency	
	F	**FS**
5	3	15
4	5	20
3	7	21
2	9	18
1	0	0
	24	74

Source: Author

$$\text{Mean} = \frac{74}{24} = 3$$

$$\text{Percentage} = \frac{3}{5} \times 100 = 60$$

Degree of conformity is 60% to inclusive design standards of the facility.

Calculation method: The variables were divided by the frequency of the scale and then the percentage was taken.

4.3.7 Interview

The interview conducted includes two structured questions; to accesses the conformity of standards in the pilot studies. One respondent was administered the questions, the demographic of the respondent was presented on the table below:

Table 4.9: Interview Respondent's Demography

RESPONDENT	
GENDER	**Male**
AGE	**35-above**
ADDRESS	**Ministry of works, Kano**
FACULTY	**Ministry of works, Kano**
DEPARTMENT	**Building and estate Department**
HIGHEST QUALIFICATION	**M. SC**
GEO POLITICAL ZONE	**North West**
NATIONALITY	**Nigerian**

4.2.7.1 Interview question:

1. To what degree the sport facility /spaces conform to universal design?

2. Are there any contextual issues that inhabit the conformity to universal design in Nigeria?

Responses:

1. Yes, at the time of construction the facility /spaces conform to universal design.

2. Yes, inadequate funding, such that new equipment and upgrading of facility /spaces can conducted from time-to-time.

Findings from Main Study Areas (2): M.K.O. Abiola national stadium (wing B) FCT Abuja. Longitude 9°01′46.36″N and latitude 7°55′21″E

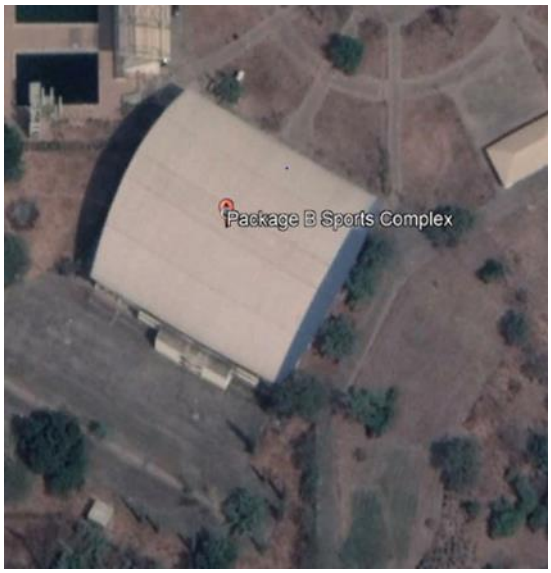


Plate XXXVI: Site plan
Source: Author's field work (2019)



Plate XXXVII: Entrance
Source: Author's field work (2019)

4.3.1 Introduction

M.K.O Abiola national stadium, (formerly known as national stadium Abuja) Abuja, is a multipurpose national sport stadium located in Abuja, was established in July 2000 to host 8th all African games which took place in October 2003.all facilities in the sport complex are design to meet international standards, particularly federation international of football association (FIFA) and the international association of athletics federations (IAAF). Package B of the complex housed sports including:

1. Table Tennis
2. Hockey stadium
3. Swimming pool
4. Badminton
5. Basketball and
6. Volleyball

7. Squash
8. Lawn tennis
9. Gymnasium

4.3.2 Conformity to standards

The building is a double volume building, a predominantly of reinforced concrete structure frame work of grid system of about 6 by 8 meters with columns of rounded and squared shape. It has a multipurpose hall (performance space) were most of the sport takes places, Colors are used to differentiate various sports, the transition space; lobbies, passages, reception conform, but the spectators and athletes facilities do not conform to current standards.

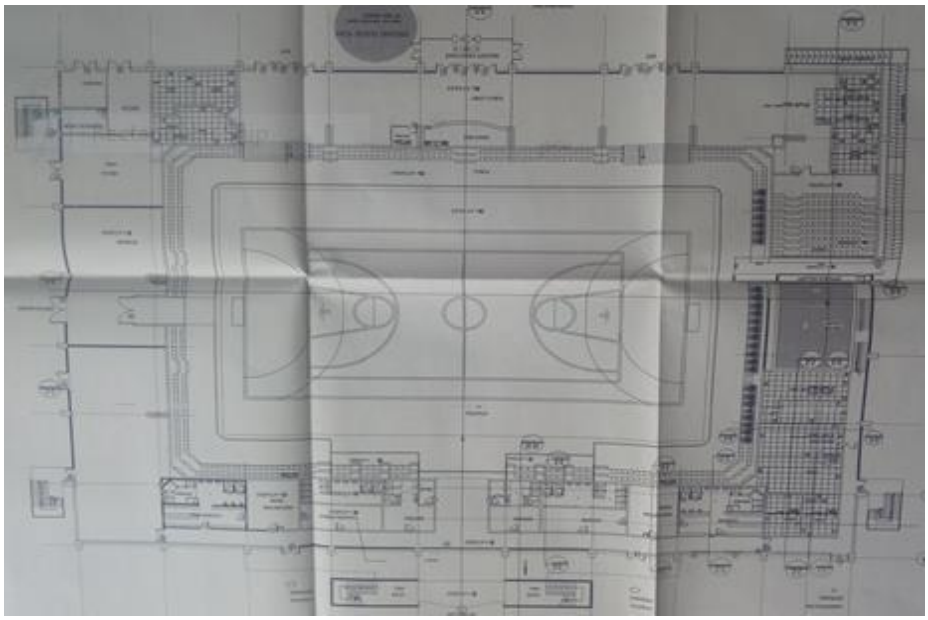


Figure 4.5: Floor Plan
Source: management (2019)



Plate XXXVIII: sport court
Source: Author's field work (2019)

4.3.3 Availability of Inclusive Facilities

The sport complex does not have inclusive facilities especially in the entrance, exit, toilets, viewing and dressing rooms, these makes it impossible for people with dis-ability to make use of the facility conveniently.



Plate XXXIX: Disable Entrance
Source: Author's field work (2019)



Plate XL: Disable Exit
Source: Author's field work (2019)

4.3.4 Inclusive design principle

The design is not useful and marketable to people with diverse abilities, The design does not accommodates a wide range of individual preferences and abilities so that different people can use the built environment in different ways, The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities, The design cannot be used efficiently and comfortably and with a minimum of fatigue, Appropriate size and space is not provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

But the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level present within the complex especially at the entrance and parking spaces and the rare area.



Plate XLI: Steps for movement
Source: Author's field work (2019)



Plate XLII: Standing area
Source: Author's field work (2019)

4.3.5 Organizational layout

The entire sport complex building covers about 50% of the entire land area. Very few dedicated parking space for the staff and general public, the landscape is poor. Also, there is walkway to define movement and there no much change of levels in the entrance.



Plate XLIII: Landscaping/Parking
Source: Author's field work (2019)



Plate XLIV: Dedicated Parking space
Source: Author's field work (2019)

4.3.6 Visual Survey Checklist report

Check list for assessment of conformity (or otherwise) to inclusive design standards of selected sport complex.

Name of sport complex: M.K.O. Abiola national stadium (wing B) FCT Abuja

Degree of conformity to standards: (1) 0-19% (2) 20-39% (3) 40-59% (4) 60-79% (5) 80-100%

Table 4.10 Checklist survey for M.K.O. Abiola national stadium (wing B) FCT Abuja

	Availability	Conformity [1]	[2]	[3]	[4] [5]	Remark (Present State)
Entrance	✓			⊕		The entrance does not encourage inclusive entrance
Exits	✓			⊕		The exit does not encourage inclusive exit
Supervisor's Room	✓			⊕		Provided but not adequate
Instructor's Room	✓			⊕		Provided but not improvised
Janitor's Equipment	✓			⊕		Provided but not adequate
First Aid Room	✓			⊕		Provided but not adequate
Fitness Room	✓			⊕		Provided but not adequate
Rest Room	✓					Provided but not adequate
Dressing Room	✓			⊕		
Shower	✓			⊕		Does not encourage inclusive usage
Gymnastic Room	✓			⊕		Provided but not adequate
Wight Training and Conditioning Room	X					Not Provided
Hall	✓	⊕				Provided to standard
Equipment/ Apparatus Room	✓		⊕			Provided but not adequate
Store Room		✓			⊕	Provided but not adequate
Open Air Sport		✓			⊕	Provided to standard
Learning and Leisure Rooms		X				Not Provided
Cafeteria		X				Not Provided

Source: Author's field work (2019)

Degree of conformity to standards: (1) 0-19% (2) 20-39% (3) 40-59% (4) 60-79% (5) 80-100%

Table 4.11 Checklist survey for M.K.O. Abiola national stadium (wing B) FCT Abuja

	Availability	Conformity [1]	[2]	[3]	[4]	[5]	Remark (Present State)
Seating Area	✓			⊕			Need to be upgraded
Standing Area	X						Not Provided
Circulation Area	✓			⊕			Provided but not adequate
Toilets	✓			⊕			Does not encourage inclusive usage
Maintenance room	✓		⊕				Need to be upgraded
Safety and Security	✓					⊕	
Privacy	✓		⊕				Not adequate
Water Supply	✓					⊕	
Electricity	✓					⊕	
Waste Management	✓				⊕		
Internet	X						Should be Provided
Printing/Photocopy	X						
Selling	X						
Watching TV	X						Should be Provided
Functionality of the Complex	✓				⊕		
Inclusive facilities	X						Should be Provided
Zoning activities	✓				⊕		

Source: Author's field work (2019)

Table 4.12: Calculation of checklist result

Scale	Frequency	
	F	**FS**
5	4	20
4	4	12
3	13	39
2	3	6
1	1	1
	25	78

Source: author

$$\text{Mean} = \frac{78}{25} = 3.12$$

$$\text{Percentage} = \frac{3.12}{5} \times 100 = 62.4$$

Degree of conformity is 62.4% to inclusive design standards of the facility.

Calculation method: The variables were divided by the frequency of the scale and then the percentage was taken.

4.3.7 Interview

The interview conducted includes two structured questions; to accesses the conformity of standards in the pilot studies. One respondent was administered the questions, the demographic of the respondent was presented on the table below:

Table 4.13: Interview Respondent's Demography

RESPONDENT	
GENDER	Male
AGE	35-above
ADDRESS	M.K.O. Abiola national stadium
FACULTY	M.K.O. Abiola national stadium
DEPARTMENT	Facility management
HIGHEST QUALIFICATION	M. SC
GEO POLITICAL ZONE	North central
NATIONALITY	Nigerian

4.3.7.1 Interview questions:

1. To what degree the sport facility /spaces conform to inclusive design standards?

2. Are there any contextual issues that inhabit the conformity with to inclusive design standards in Nigeria?

Responses:

1. Yes, at the time of construction the facility /spaces conform to inclusive design standards.

2. Yes, inadequate funding, such that new equipment and upgrading of facility /spaces can conducted from time-to-time.

4.4 Findings from Main Study Areas (3):

Multi-purpose indoor hall, Bauchi. Bauchi State. Longitude 10°18′58.60″N and latitude 9°49′06″E

Below are the findings from the visual survey, case study, checklist and interview.



Plate XLV: Site plan
Source: Author's field work (2019)



Plate XLVI: Entrance
Source: Author's field work (2019)

4.4.1 Introduction

Multi-purpose indoor hall, Bauchi was initiated by the administration of Col. Sani Sami and completed and commissioned by the administration of Col Criss Abutu Garba by the then Military President General Ibrahim Badamasi Babbangida on the 16th june 1988. It has a total capacity of 4500 seats and a100kba generator as an alternative source of power. The facility was renovated twice in 1999 and 2020. It is own and managed by the Bauchi state sport council. The complex host commercial activities apart from the sport activities carry out sport, the international sport activities the facility host includes:

- World women hand ball competition
- African hand ball competition
- African badminton competition

The sports the conducted in the facility includes:

- Table Tennis
- Badminton
- Basketball and
- Volleyball
- Squash
- Lawn tennis

4.4.2 Conformity to standards

The building is a double volume building, a predominantly of reinforced concrete structure frame work of grid system of about 6 by 8 meters with columns of rounded and squared shape. It has a multipurpose hall (performance space) were most of the sport takes places, Colors are used to differentiate various sports, the transition space; lobbies, passages, reception conform, but the spectators and athletes facilities do not conform to current standards.



Plate XLVII: sport court
Source: Author's field work (2019)

4.4.3 Availability of Inclusive Facilities

The sport complex does not have inclusive facilities especially in the entrance, exit, toilets, viewing and dressing rooms, these makes it impossible for people with dis-ability to make use of the facility conveniently.



Plate XLVIII: V.I.P Entrance
Source: Author's field work (2019)



Plate XLIX: Hall Entrance
Source: Author's field work (2019)

4.4.4 Inclusive design principle

The design is not useful and marketable to people with diverse abilities, The design does not accommodates a wide range of individual preferences and abilities so that different people can use the built environment in different ways, The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities, The design cannot be used efficiently and comfortably and with a minimum of fatigue, Appropriate size and space is not provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

But the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level present within the complex especially at the entrance and parking spaces and the rare area.



Plate L: Means of Movement
Source: Author's field work (2019)



Plate LI: urinary
Source: Author's field work (2019)

4.4.5 Organizational layout

The entire sport complex building covers about 40% of the entire land area. Very few dedicated parking space for the staff and general public, the landscape is poor. Also, there is an open courtyard within and an open space in the terrace.



Plate LII: Landscaping
Source: Author's field work (2019)



Plate LIII: Parking space
Source: Author's field work (2019)

4.4.6 Visual Survey Checklist report

Name of sport complex: Multi-purpose indoor hall, Bauchi. Bauchi State.

Degree of conformity to standards: (1) 0-19% (2) 20-39% (3) 40-59% (4) 60-79% (5) 80-100%

Table 4.14: Checklist survey for Multi-purpose indoor hall, Bauchi. Bauchi State

		Conformity					
	Availability	**[1]**	**[2]**	**[3]**	**[4]**	**[5]**	**Remark (Present State)**
Entrance	✓		⊕				The entrance does not encourage inclusive entrance
Exits	✓		⊕				The exit does not encourage inclusive exit
Supervisor's Room	✓		⊕				Provided but not adequate
Instructor's Room	✓		⊕				Provided but not improvised
Janitor's Equipment	✓		⊕				Provided but not adequate
First Aid Room	✓			⊕			Provided but not adequate
Fitness Room	✓	⊕					Provided but not adequate
Rest Room	✓						Provided but not adequate
Dressing Room	✓			⊕			
Shower	✓		⊕				Does not encourage inclusive usage
Gymnastic Room	✓		⊕				Provided but not adequate
Wight Training and Conditioning Room	X						Not Provided
Hall	✓					⊕	Provided to standard
Equipment/ Apparatus Room	✓		⊕				Provided but not adequate
Store Room	✓			⊕			Provided but not adequate
Open Air Sport	X						Provided to standard
Learning and Leisure Rooms	X						Not Provided
Cafeteria	✓			⊕			Not in use

Source: Author's field work (2019)

Name of sport complex: Multi-purpose indoor hall, Bauchi. Bauchi State.

Degree of conformity: (1) 0-19% (2) 20-39% (3) 40-59% (4) 60-79% (5) 80-100%

Table 4.15: Checklist survey for Multi-purpose indoor hall, Bauchi. Bauchi State

	Availability	Conformity					Remark (Present State)
		[1]	[2]	[3]	[4]	[5]	
Seating Area	✓			⊕			Need to be upgraded
Standing Area	X						Not Provided
Circulation Area	✓		⊕				Provided but not adequate
Toilets	✓		⊕				Does not encourage inclusive usage
Maintenance room	✓			⊕			Need to be upgraded
Safety and Security	✓			⊕			
Privacy	✓			⊕			Not adequate
Water Supply	✓					⊕	
Electricity	✓					⊕	
Waste Management	✓					⊕	
Internet	X						Should be Provided
Printing/Photocopy	X						
Selling	X						
Watching TV	X						Should be Provided
Functionality of the Complex	✓			⊕			
Inclusive facilities	✓		⊕				Should be Provided
Zoning activities	✓		⊕				

Source: Author's field work (2019)

Table 4.16: Calculation of checklist result

Scale	Frequency	
	F	**FS**
5	4	20
4	0	0
3	9	27
2	12	24
1	1	1
	26	72

Source: Author

$$\text{Mean} = \frac{72}{26} = 2.8$$

$$\text{Percentage} = \frac{2.8}{5} \times 100 = 56$$

Degree of conformity is 56% to inclusive design standards of the facility.

Calculation method: The variables were divided by the frequency of the scale and then the percentage was taken.

4.4.7 Interview

The interview conducted includes two structured questions; to accesses the conformity of standards in the pilot studies. One respondent was administered the questions, the demographic of the respondent was presented on the table below:

4.17: Interview Respondent's Demography

RESPONDENT	
GENDER	Male
AGE	36-above
ADDRESS	MPH, Bauchi
FACULTY	MPH, Bauchi
DEPARTMENT	PHE
HIGHEST QUALIFICATION	B. SC
GEO POLITICAL ZONE	North central
NATIONALITY	Nigerian

4.4.7.1 Interview questions:

1. To what degree the sport facility /spaces conform to inclusive design standards?

2. Are there any contextual issues that inhabit the conformity with to inclusive design standards in Nigeria?

Responses:

3. Yes, at the time of construction the facility /spaces conform to inclusive design standards.

4. Yes, inadequate funding, such that new equipment and upgrading of facility /spaces can conducted from time-to-time.

4.5 Findings from Main Study Areas (3): M.K.O. Abiola national stadium (wing A) FCT Abuja. Longitude 11.0855 and latitude 7.7199.

Below are the findings from the visual survey, case study, checklist and interview.



Plate LIV: Building on site
Source: Google Earth (2019)



Plate LV: Façade building
Source: Author's field work (2019)

4.5.1 Introduction

The sport facility as it stand today remain the biggest in Nigeria and rated among the 50 most expensive stadium in the world, the stadium consist of a 60491-capacity covered bowl, a presidential suite and viewing area, 56 corporate suites , modern turnstile, a box office, post offices, banks and media facilities, and a voldrome

THE VALDROME

The large shelter of sun and rain in shape of a tortoise shell covers the veldrome and the circumference stands.it was built to host cycling events.

4.5.2 Conformity to standards

The building is a double volume building, a predominantly of reinforced concrete structure frame work of grid system of about 6 by 8 meters with columns of rounded and squared shape. It has a multipurpose hall (performance space) were most of the sport takes places, Colors are used to differentiate various sports, the transition space; lobbies, passages, reception conform, but the spectators and athletes facilities do not conform to current standards.

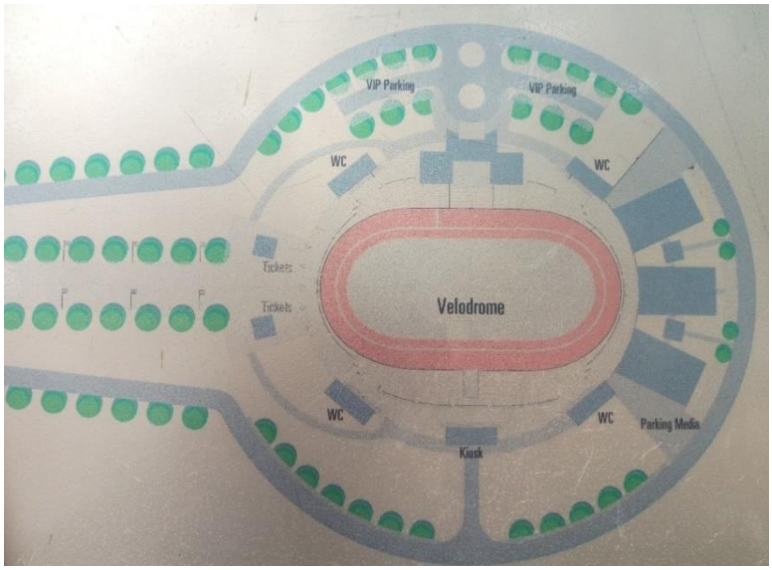


Figure 4.6: Floor Plan
Source: management (2019)



Plate LVI: Sport track
Source: Author's field work (2019)

4.5.3 Availability of Inclusive Facilities

The sport complex does not have inclusive facilities especially in the entrance, exit, toilets, viewing and dressing rooms, these makes it impossible for people with dis-ability to make use of the facility conveniently.



Plate LVII: inclusive ticketing
Source: Author's field work (2019)



Plate LVIII: inclusive water closet
Source: Author's field work (2019)

4.5.4 Inclusive design principle

The design is not useful and marketable to people with diverse abilities, The design does not accommodates a wide range of individual preferences and abilities so that different people can use the built environment in different ways, The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities, The design cannot be used efficiently and comfortably and with a minimum of fatigue, Appropriate size and space is not provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

But the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level present within the complex especially at the entrance and parking spaces and the rare area.



Plate LIX: space for wheelchair
Source: Author's field work (2019)



Plate LX: Signage
Source: Author's field work (2019)

4.5.5 Organizational layout

The entire sport complex building covers about 35% of the entire land area. Very few dedicated parking space for the staff and general public, the landscape is poor. Also, there is an open courtyard within and an open space in the terrace.



Plate LXI: parking
Source: Author's field work (2019)

4.5.6 Visual Survey Checklist report

Check list for assessment of conformity (or otherwise) to inclusive design standards of selected sport complex.

Name of sport complex: M.K.O. Abiola national stadium (wing A) FCT Abuja

Table 4.18: Checklist survey for M.K.O. Abiola national stadium (wing A) FCT Abuja

Degree of conformity to standards: (1) 0-19% (2) 20-39% (3) 40-59% (4) 60-79% (5) 80-100%

	Availability	Conformity					Remark
		[1]	[2]	[3]	[4]	[5]	(Present State)
Entrance	✓					⊕	The entrance does not encourage inclusive entrance
Exits	✓					⊕	The exit does not encourage inclusive exit
Supervisor's Room	✓			⊕			Provided but not adequate
Instructor's Room	✓			⊕			Provided but not improvised
Janitor's Equipment	✓			⊕			Provided but not adequate
First Aid Room	✓			⊕			Provided but not adequate
Fitness Room	✓			⊕			Provided but not adequate
Rest Room	✓						Provided but not adequate
Dressing Room	✓			⊕			
Shower	✓			⊕			Does not encourage inclusive usage
Gymnastic Room	✓		⊕				Provided but not adequate
Wight Training and Conditioning Room	✓			⊕			Not Provided
Hall	✓					⊕	Provided to standard
Equipment/ Apparatus Room	✓						Provided but not adequate
Store Room	✓			⊕			Provided but not adequate
Open Air Sport	X						Provided to standard
Learning and Leisure Rooms	X						Not Provided
Cafeteria	X						Not Provided

Source: Author's field work (2019)

Table 4.19: Checklist survey for M.K.O. Abiola national stadium (wing A) FCT Abuja
Degree of conformity: (1) 0-19% (2) 20-39% (3) 40-59% (4) 60-79% (5) 80-100%

	Availability	Conformity					Remark
		[1]	[2]	[3]	[4]	[5]	(Present State)
Seating Area	✓					⊕	Adequate
Standing Area	✓					⊕	Adequate
Circulation Area	✓				⊕		Provided
Toilets	✓				⊕		Encourage inclusive usage
Maintenance room	✓			⊕			Need to be upgraded
Safety and Security	✓					⊕	Adequate
Privacy	✓			⊕			Provided
Water Supply	✓					⊕	Adequate
Electricity	✓					⊕	Adequate
Waste Management	✓					⊕	Adequate
Internet	X						Should be Provided
Printing/Photocopy	X						Should be Provided
Selling	X						Should be Provided
Watching TV	X						Should be Provided
Functionality of the Complex	✓			⊕			Need to be upgraded
Inclusive facilities	✓					⊕	Provided
Zoning activities	✓				⊕		Adequate

Source: Author's field work (2019)

Table 4.20: Calculation of checklist result

Scale	**Frequency**	
	F	**FS**
5	10	80
4	3	12
3	12	36
2	1	2
1	0	0
	26	100

Source: Author

$$\text{Mean} = \frac{100}{26} = 3.8$$

$$\text{Percentage} = \frac{3.8}{5} \times 100 = 76$$

Degree of conformity is 76% to inclusive design standards of the facility.

Calculation method: The variables were divided by the frequency of the scale and then the percentage was taken.

4.5.7 Interview

The interview conducted includes two structured questions; to accesses the conformity (or otherwise) to inclusive design standards in the sampled population of the research. The demographic of the respondent is presented on the table below:

Table 4.21: Interview Respondent's Demography

RESPONDENT	
GENDER	Male
AGE	35-above
ADDRESS	M.K.O. Abiola national stadium
FACULTY	M.K.O. Abiola national stadium
DEPARTMENT	Facility management
HIGHEST QUALIFICATION	M. SC
GEO POLITICAL ZONE	North central
NATIONALITY	Nigerian

Source: Author's field work (2019)

4.5.7.1 Interview question:

1. To what degree the sport facility /spaces conform to to inclusive design standards?
2. Are there any contextual issues that inhabit the conformity with to inclusive design standards in Nigeria?

Responses:

1. Yes, at the time of construction the facility /spaces conform to to inclusive design standards.
2. Yes, inadequate funding, such that new equipment and upgrading of facility /spaces can conducted from time-to-time.

Table 4.22: Calculation of total checklist result

Scale	**Frequency**	
	F	**FS**
5	21	105
4	12	48
3	32	96
2	25	50
1	2	2
	92	298

Source: Author

$$\text{Mean} = \frac{298}{92} = 3.2$$

$$\text{Percentage} = \frac{3.2}{5} \times 100 = 64$$

Degree of conformity of the field work = 64% of the field work to universal design of the facilities.

4.7 Discussion on Findings

The data presented and analysed shows the level of inclusiveness sport facilities should have in a developing countries. It shows that the ability has fewer roles to play in the participation of individual in sport activities, which indicated that large portion of the population are both physically-able and physically-disable individuals, and the next significant variable of participants is gender (male and female), this indicates that the community is gender based and inclusive.

Spaces and facilities for various sports provided in the initial design or upgrade at latter periods that can cater for the needs of the different categories of users can influence participation and enhance inclusive participation in sport activities.

The data also shows that a lot of spaces for various important activities and purpose are not provided and in some cases provided but not to the current international standards of facilities that should be provided cater for all groups and ages. Although these facilities studied shows significant level of conformation to those current international standards. Yet, the facilities record a less significant level of inclusive participation. That will be given due consideration in terms of the inclusive user facilities that will be made available in the proposed modern sport complex design, to enhance inclusive participation. It also shows that the facilities encourage discrimination as separate spaces and facilities were made available based on class of ability and age. This shows that the sport complex is dominated by the able athletes and spectators as such that should be at the centre of policy and design consideration.

Also, considering the computer age, internet services should be provided at strategic spaces; halls and cafeterias and other large open air gathering spaces for the users that require

communications, discussions, presentations and other activities that call for interaction via the internet services.

In order to fully enhance inclusiveness in sport activities through assessing to inclusive design standards of transitional and performance spaces should be given a high priority. Determining the usage of those spaces within the sport facility will enhance participation in sport activities. Barriers in participation should be reduced to a barest minimum. The provision of separate spaces and facilities for different groups of users consume a large space and resources. Therefore, in the absence of these trends, the facility will have extra carrying capacity and increased space. Another important space in sport complex is the open air sport which is more suitable for training sessions and for amateurs, which can also enhance grassroots participation.

A fully landscaped facility will not only attract sport participation, but also other activities that can help in funding, through partnerships .therefore, sport facilities should also serve as community centers, which can host Gatherings, public events and academic lectures. Therefore adequate guided parking spaces should be provided.

On the part of additional spaces which should be incorporated proposed sport facilities, the checklist show some spaces that are not found in most of the studied facilities; standing area, cafeteria, Learning and Leisure Rooms, Wight Training and Conditioning Room, printing and photocopy and also shops for selling.

4.8 Summary of Findings

The summary for this research work on the following findings;

1. The studied sport facilities did not adequately provide for the inclusive participation in sport activities. Especially in entrance, exits, circulations, toilets etcetera.

2. The indoor areas and the outdoors lack synergy between them;
3. Lack of Facilities and spaces that can support social interaction and economic growth such as cafeteria, Learning and Leisure Rooms and also retail shops.
4. There is also continues lack of means of alternative and sustainable means of generating power.
5. The studied sport facilities did not adequately follow the principles of inclusive design.
6. As a inclusive language, larger hall and open air gathering to accommodate more participants across the country and ahead should be encouraged.
7. Major use of sport complex is for training and competitions. Therefore provision of non-inclusive spaces and equipment will reduce participation. This will make the number of participants reduced.
8. As a facility that also, encourage social functions, as such provision of open air sheds and shaded trees would suit such individuals. Courtyards and terraces could also be utilised for this function.
9. Since competitions and major training sessions takes place in the morning and evening, lighting need to be controlled to meet requirement.
10. Documentation and video projection spaces will cause the amount of lighting needed within the sport complex to be drastically reduced as screens and projections will be more frequent around the spaces.
11. Better spatial planning will cause a reduction in some administrative spaces and increase access to basic resources and services.
12. Reduced need for permanent sits will cause an increase in the space for flexible services. This will be more pronounced with modern sport environment.

CHAPTER FIVE

DESIGN REPORT

5.1 Introduction

This chapter focuses on the preliminary design proposal and given considerations that gave the design a proper solution to the problems identified. This formed the basic guidelines for the design.

5.2 The Design Site

Kano is the second largest city in Nigeria, with a population of over three million, six hundred thousand. The site is located in kano, it has an area of 241,901 m2 and a perimeter of 2,067.44 meter, a longitude and latitude of 8° 30’07.61E and 11°58’56.63N respectively. It is the most developing, urbanizing cities and commercial centre of the Northern Nigeria, Kano metropolis population is projected to reach 5,724,000 people by 2025 (Abdullahi,siniah and siong, (2019). The climate of kano metropolis is the tropical dry, it receives an average of 690mm of rainfall which last for three to five months, with mean daily temperature of the metropolis ranges from 26°C - 33°C and rises up to 40°C in-between March to mid-May which is a transition period between the harmattan and the wet season (Umar, 2015). Vegetation is a savanna type. Jakara, Kano and Challawa rivers are the major water bodies that drained the metropolitan area (Ibrahim & Mohammed, 2016). The open and green areas however declined from 93% in 1986 to 55.8% in 2016 (Mohammed, Hassan, & Muhammad, 2019).



Figure 5.1The study Area, Kano

Source: Google, 2021.

5.2.1 Site location

The site is located in Kano, along BUK road close to the historic kafa naisa gate bounded by sharada phase 1, and by major and minor roads It has an area of 241,901 m2 and a perimeter of 2,067.44 meter, a longitude and latitude of 8° 30’07.61E and 11°58’56.63N respectively.

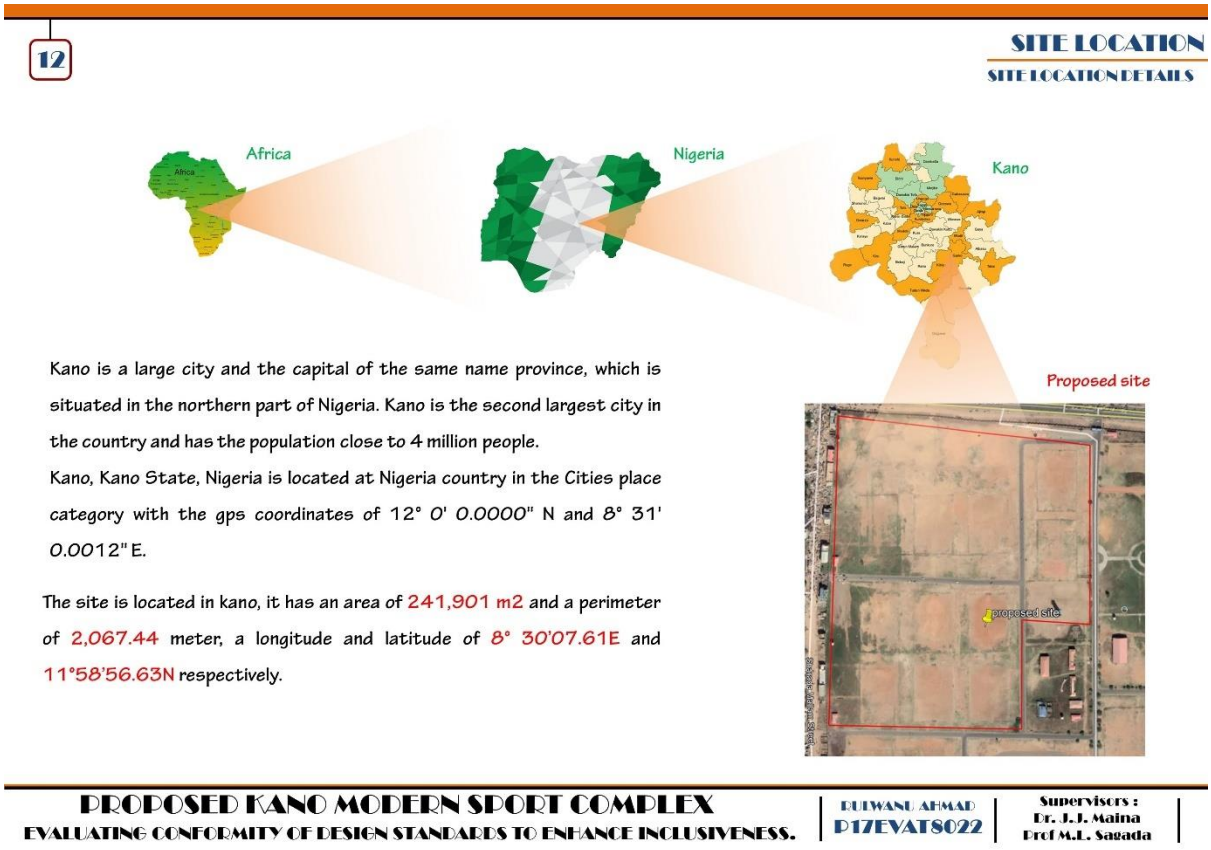


Plate LXII: Site location

Source; Author's field work (2020)

5.2.2 Site analysis

This section discusses the site features considering natural and man-made features present on the site. Climatic conditions of the site are also analysed to check their effects on the proposed building.



Plate LXIII: Site Analysis

Source; Author's field work (2020)

5.2.3 Climatic analysis

5.2.3.1 Weather and Climate

Kano has a tropical savanna climate with a distinctive rainy season and dry season. A brief harmattan season is experienced between the months of December to early February. Kano is very hot most of the year peaking in April.

5.2.3.2 Temperature

Kano has an annual temperature of 25.7°C, with April being the warmest month of the year having a temperature of 28.5°C and august the coldest month with an average temperature of 23.9°C. Throughout the year temperature varies averagely by 6.4° C.

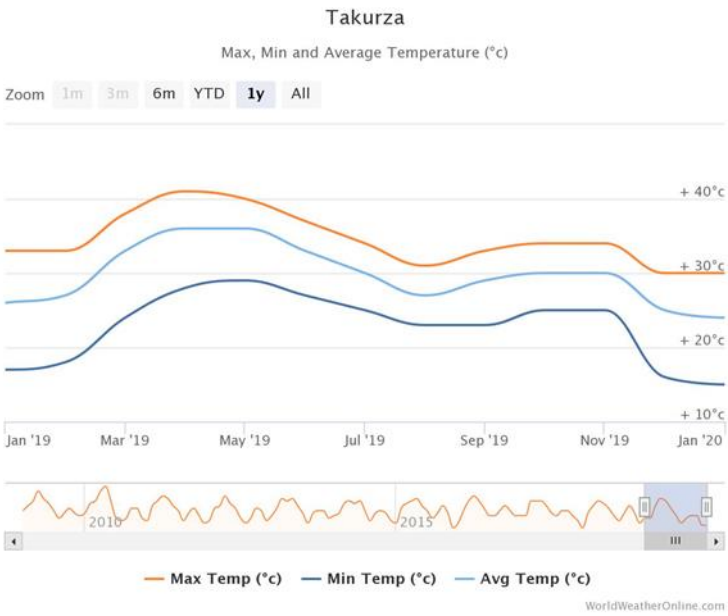


Figure 5.2 Temperature chart, Kano

Source**:** en.climate-data.org, 2018.

5.2.3.3 Rainfall

Kano rainy season lasts for a period of seven months from April to October with precipitation at the lowest in January at an average of 0 mm. The highest amount of precipitation in September, at an average 284 mm as Onsite drainage systems would be appropriately considered to avoid undesirable ponding and stagnation on site.

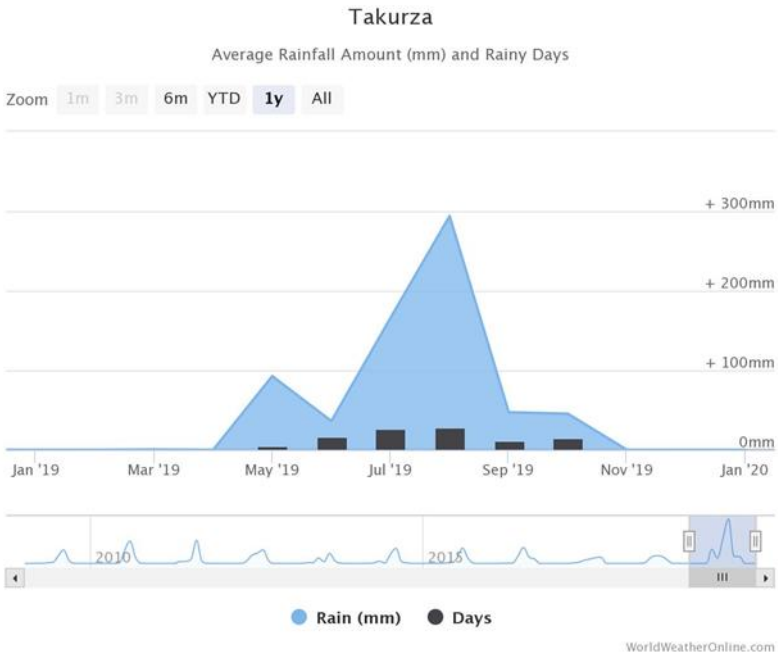


Figure 5.3 Rainfall chart kano

Source**:** en.climate-data.org, 2018.

5.2.3.4 Wind speed

The average wind speed is about 8 km/hr. Trees and high-rise buildings within the Vicinity act as wind breakers decreasing wind by approximately 19% relative to other places which have no wind breakers.

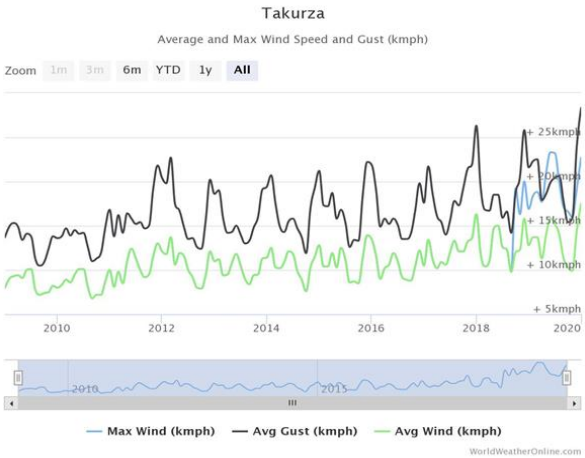


Figure 5.4 Wind speed Kano

Source**:** en.climate-data.org, 2018.

5.2.3.5 Solar radiation

The months of February and December have an average yearly sunshine of 275hours which are the months with the most sunshine. While August having an average yearly sunshine of 150 hours has the least sunshine. High levels of precipitation observed in this period contributes immensely to the low level of sunshine

5.2.4 Site topography

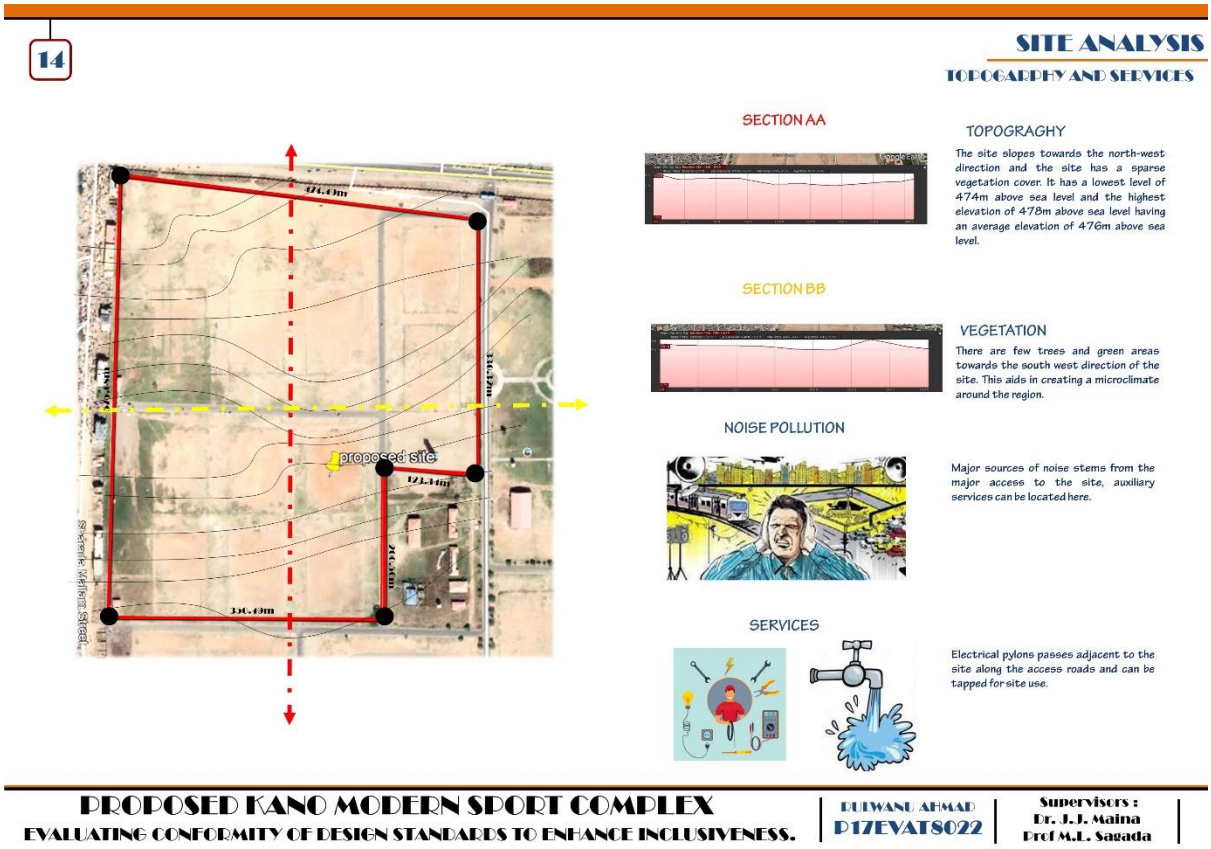


Plate LXIV: Site topography

Source; Author's field work (2020)

The site slopes towards the north-west direction and the site has a sparse vegetation cover. It has a lowest level of 474m above sea level and the highest elevation of 478m above sea level having an average elevation of 476m above sea level.

There are few trees and green areas towards the south west direction of the site. This aids in creating a microclimate around the region. Major sources of noise stems from the major access to the site, auxiliary services can be located here. Electrical pylons pass adjacent to the site along the access roads and can be tapped for site use. The major access stems from the northern axis of the site, a multilane tarred road runs across this axis, another minor untarred road runs across the eastern axis of the site.

5.3 Concept development

The form was derived from the idea of inclusivity, including people who might otherwise be excluded or marginalised. The buildings together bring to light an image of different things (people) coming together, they have different facade and scale, but similar form and are in harmony with each other.

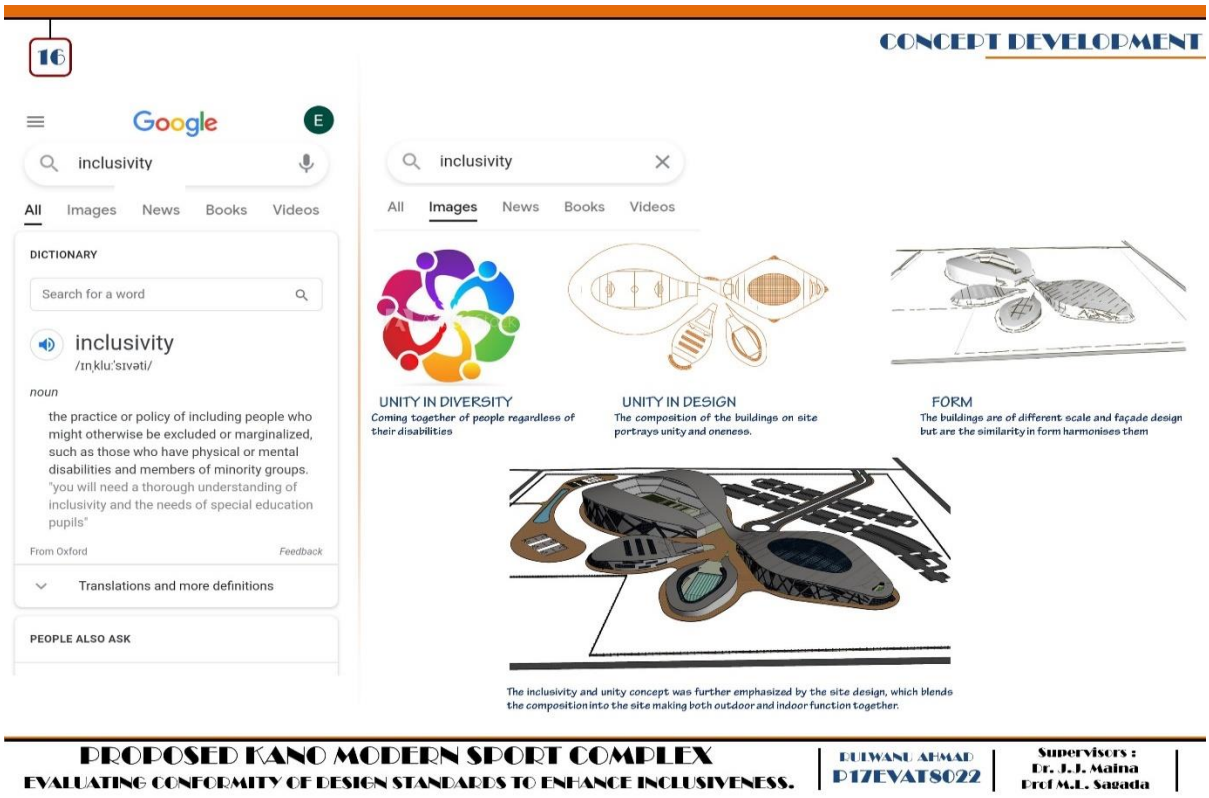


Figure 5.5 Concept layout
Source; Author's work (2021).

5.4 Site design

The site was designed to further emphasize the unity of the buildings, and also to blend the composition into the site. Outdoor sporting facilities were Incorporated to enhance community development. A reflective pool, outdoor restaurant, natural and soft landscape elements were used to create tranquillity in the environment.

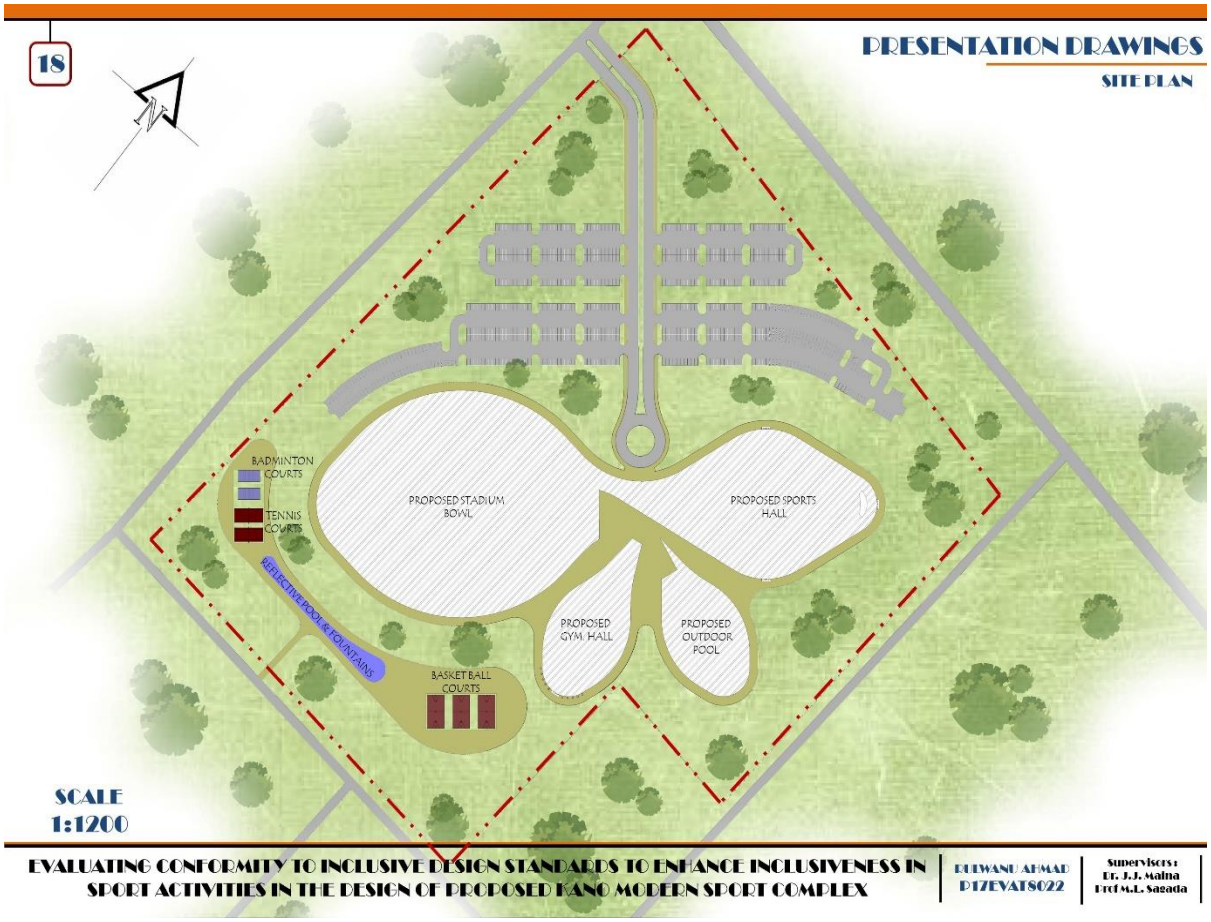


Plate LXV: Site Plan 1

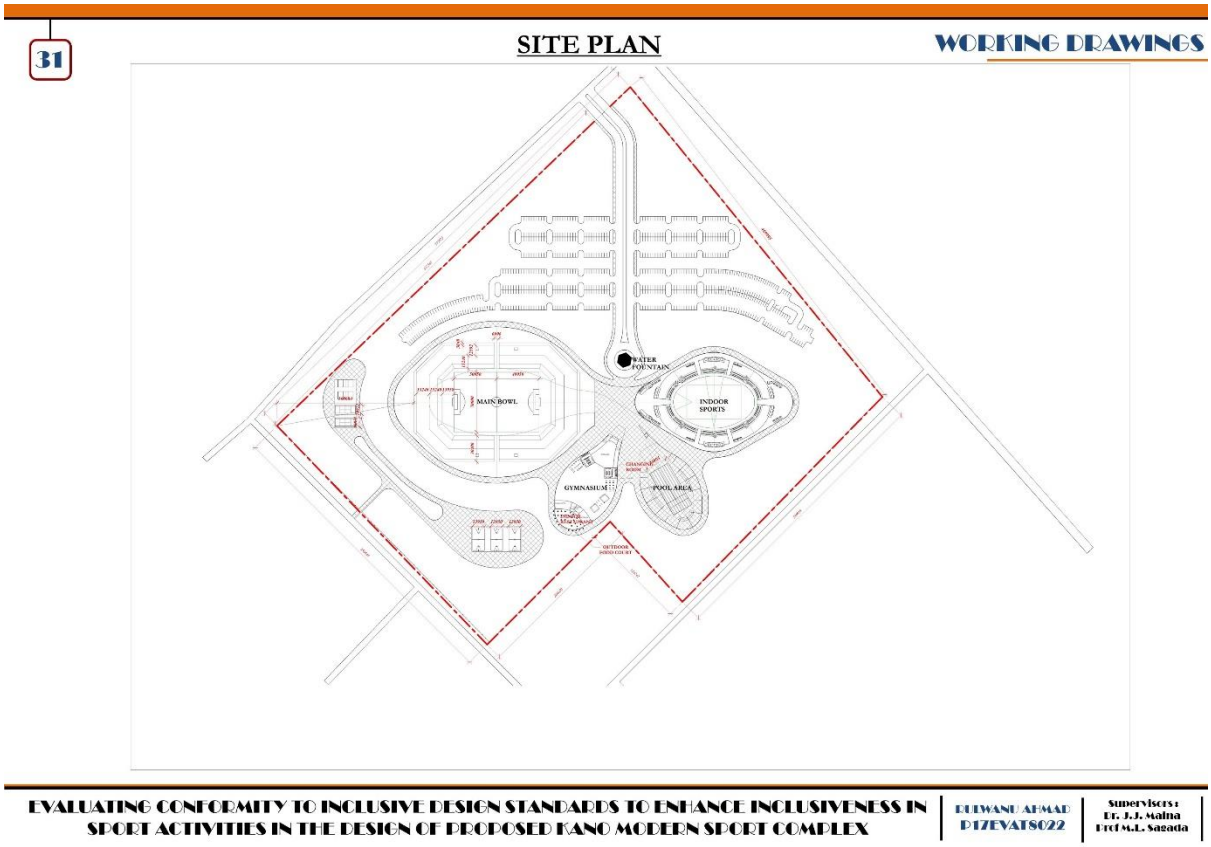


Plate XLVI Site plan 2

The use of both soft and hard landscaping elements was necessary in the design of the external landscape that surrounds the building. The use of tropical trees common to the environment such as varieties of palm trees were an added advantage to the scenery of the site. The use of hard landscaping for walkways and driveways were necessary as they conform with planning regulations. The interplay of lawns, pavements, lighting fittings, signposts, bridges, trees and shrubs were obviously necessary to make the landscape stand out as appealing.

5.5 Building planning and organization

Spaces on floor plan were arranged typically around the courts, making them the focal point and also enhancing accessibility without disrupting the main event. This also allows natural

lighting and ventilation. The void underneath the sitting was utilised for conveniences and ticket booths. Circulation in the sports Hall was designed such that people can circle the building internally without and every space can be easily accessible without going out and disrupting the main event. The facility was designed to serve the community and as such, the sports Hall can be used as an auditorium, the Gymnasium is open to the public and can be used even when other activities are going on in the main hall. The Olympic pool can also be used to train and for sporting events also.

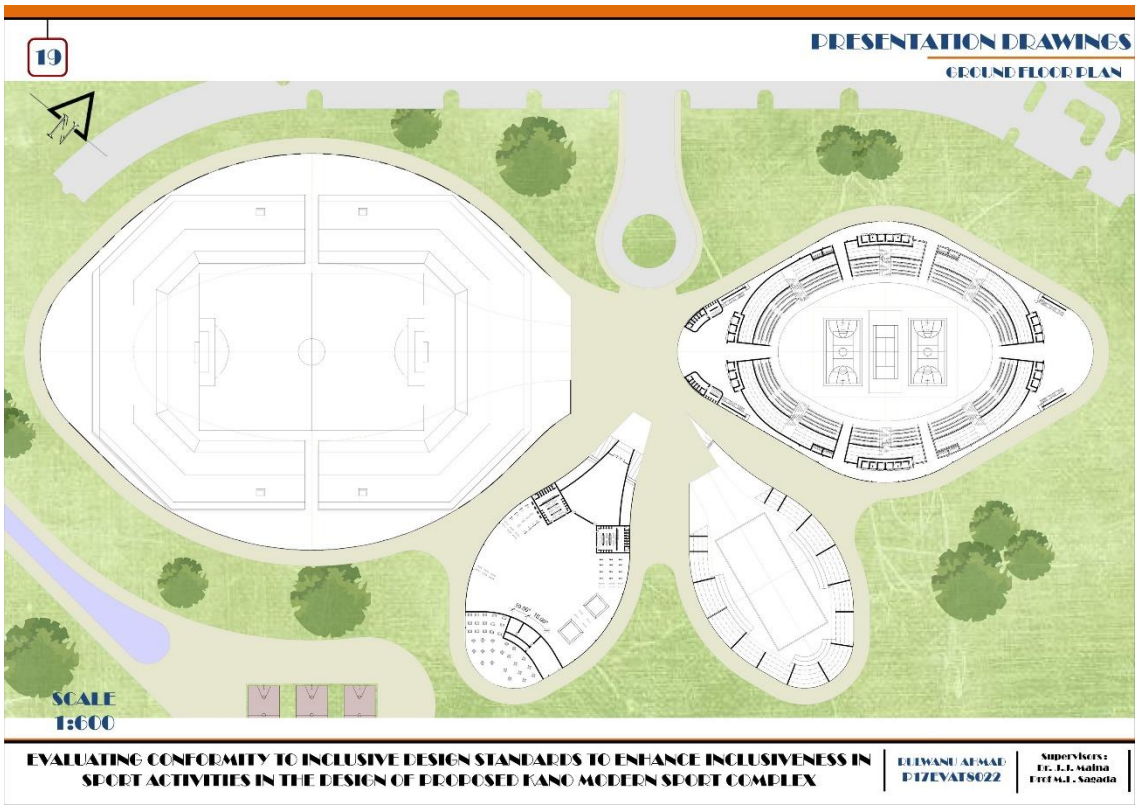


Plate LXVII floor plan

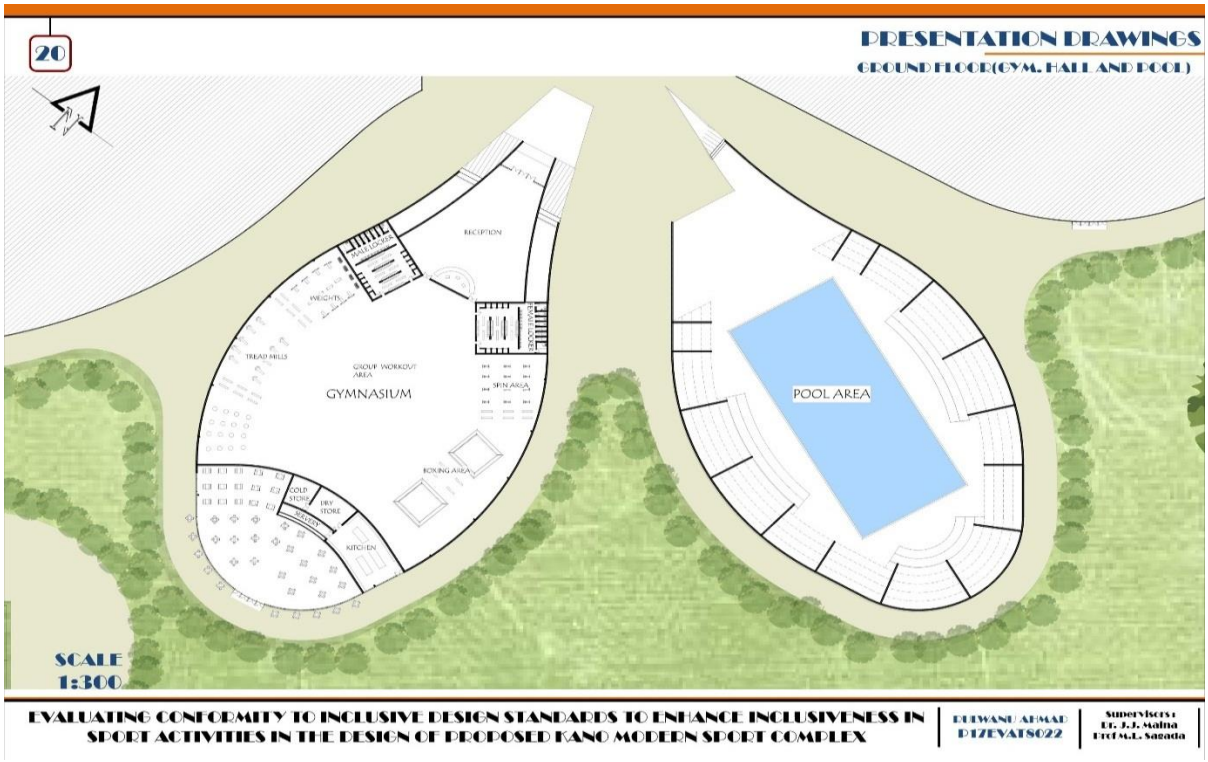


Plate XLVIIIII Ground floor plan (Gymnasium)

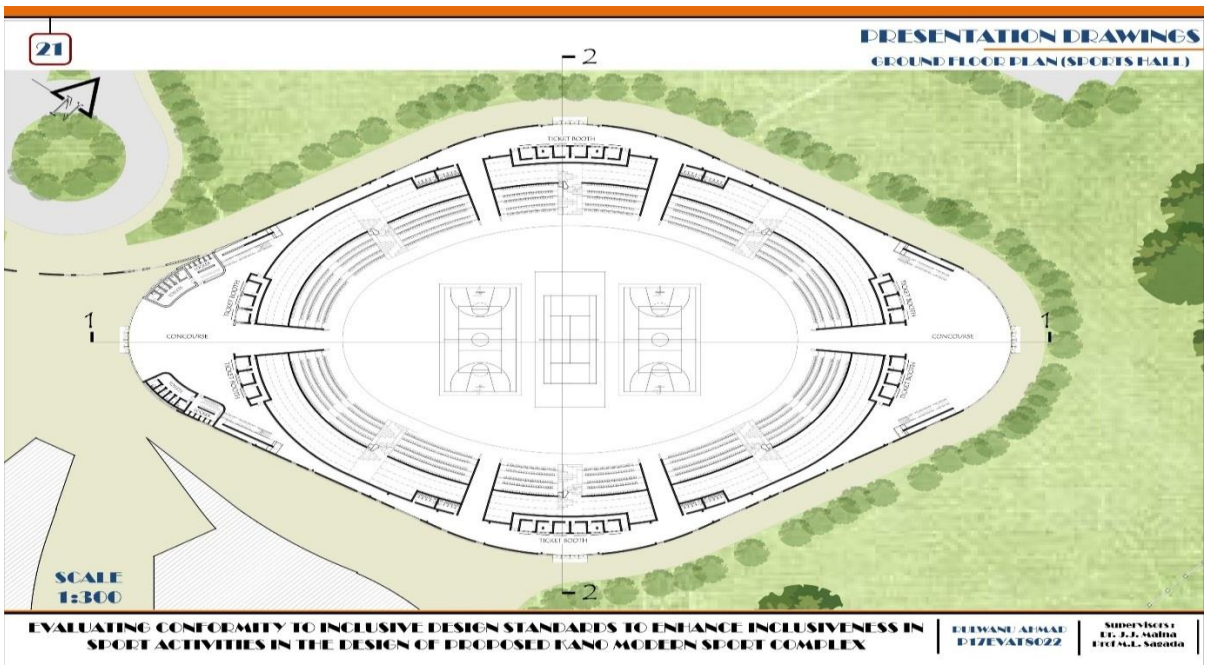


Plate LXIX Ground floor plan (Indoor Hall)

The building can be accessed by the disabled at all entrances; this also extends to the facilities provided for both athletes and spectators. Upper levels are accessed by ramp and staircase. A Stair-Ramp hybrid structure was designed to access upper levels of sitting which further unites the abled and disabled to share the same sporting experience

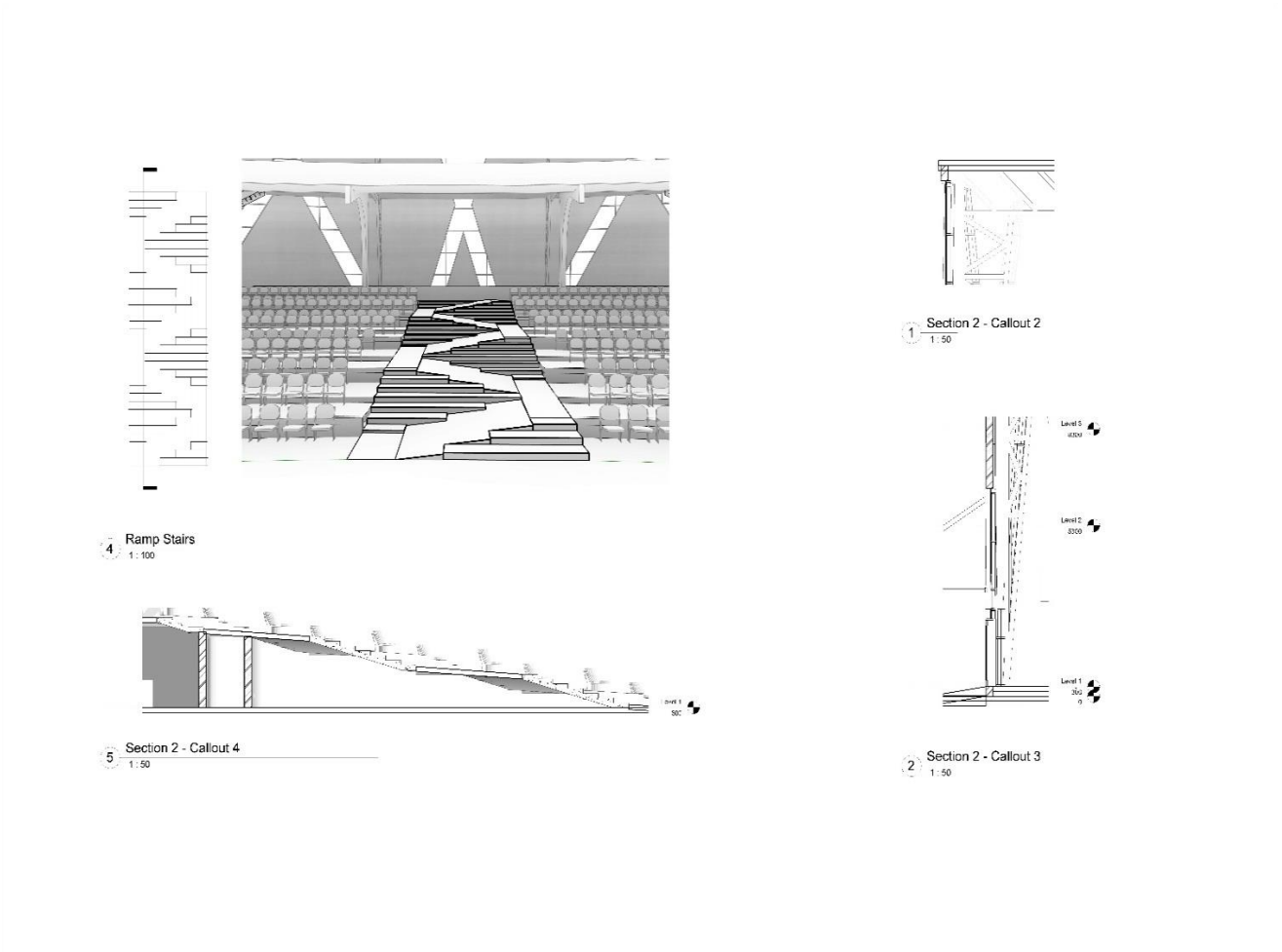


Plate LXX Details I

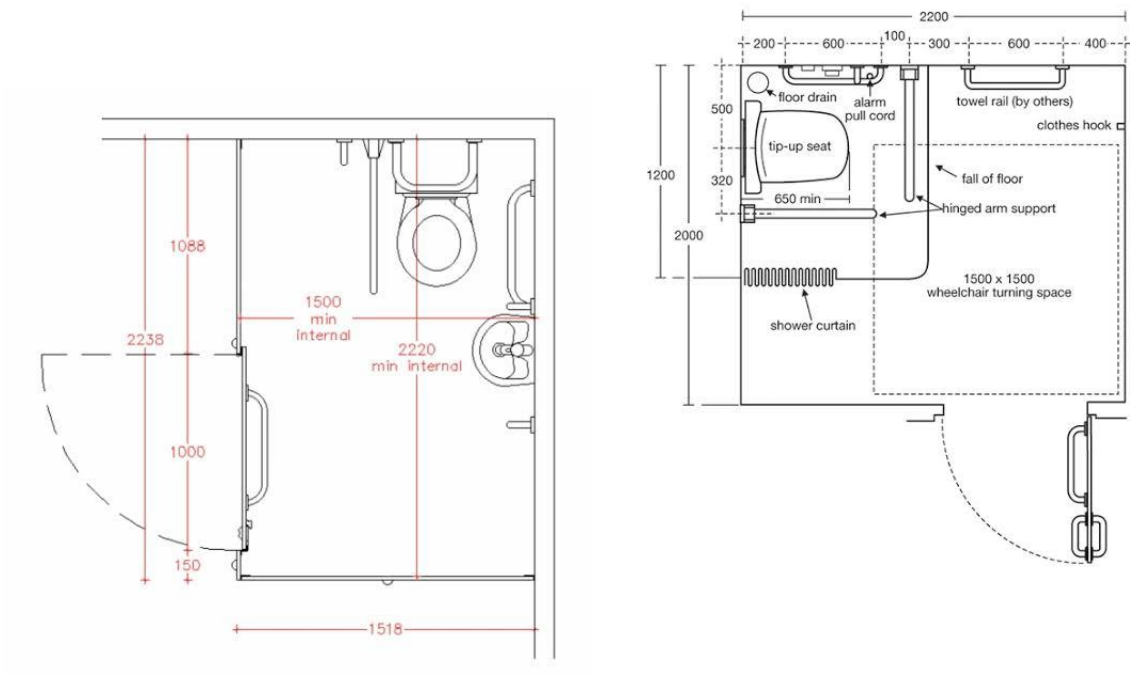


Plate XLVIII Details II

The administrative section, whose function is well defined in running the operations of the library has spaces demarcated and well defined. Due to the shape of the facility, the roof has been designed to allow light and reduce the heat intensity.

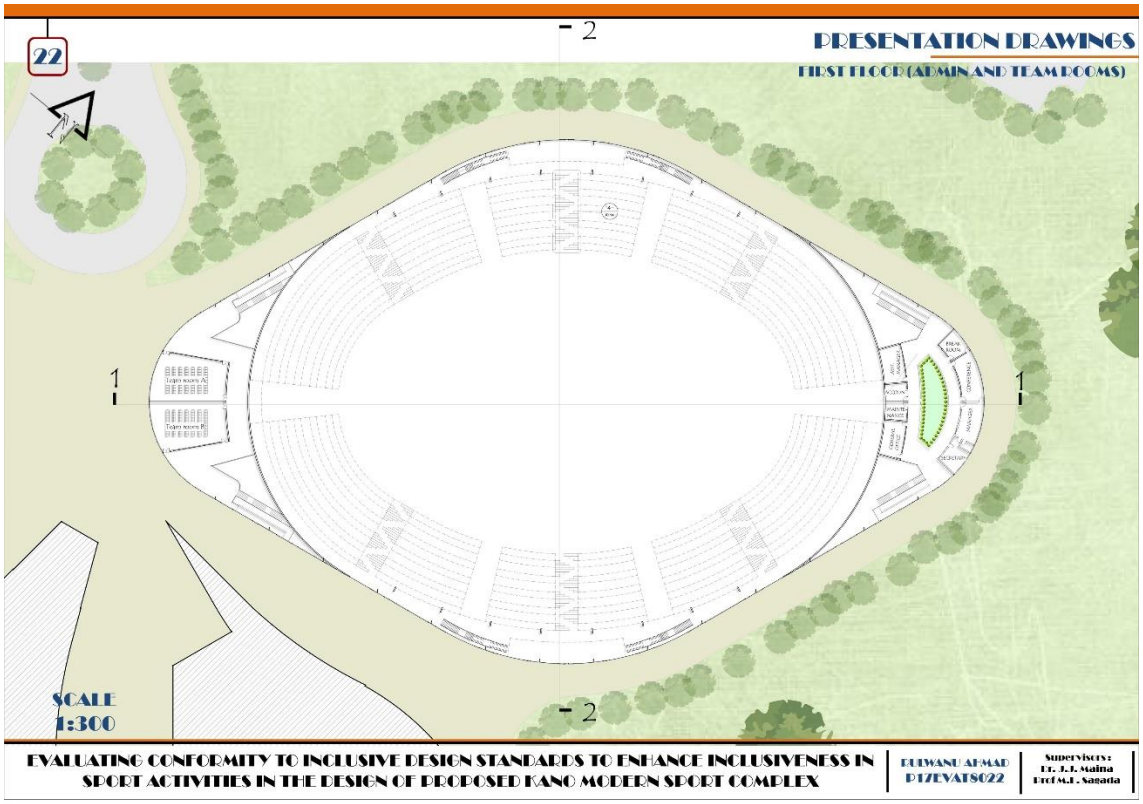


Plate LXXII Ground floor plan (Indoor Hall)

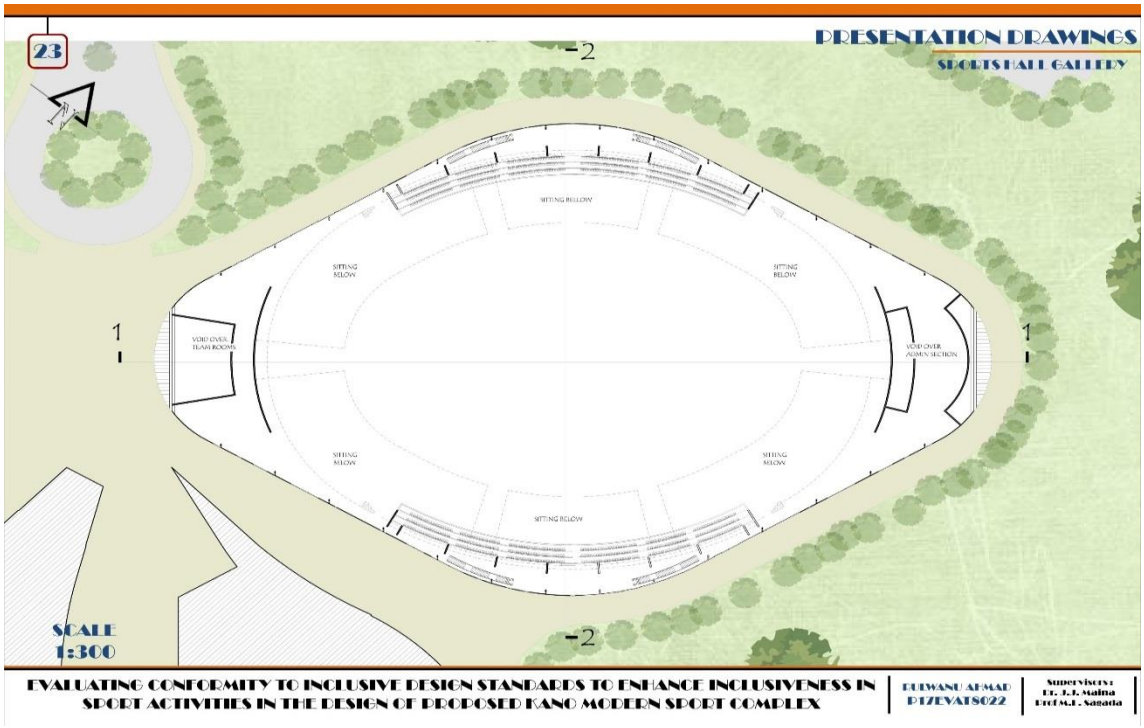


Plate LXXII Upper floor plan (Indoor Hall)

Plate LXXIV Application of Inclusive Design Principles

5.6 Building materials and technology

Different materials and technology have been employed at different stage of the building. Most are purely due to their functionality while other are because of their aesthetic appeal. These materials include but are not limited to concrete, glass, aluminum, steel, stone, timber etc.

5.6.1 Steel

Steel was used as to create a frame structure which independently supports the external shell (wall and roof) of the building, making the interior adaptable. The interior of the buildings can be redesigned and repurposed. Steel is also used as reinforcement for concrete structures.

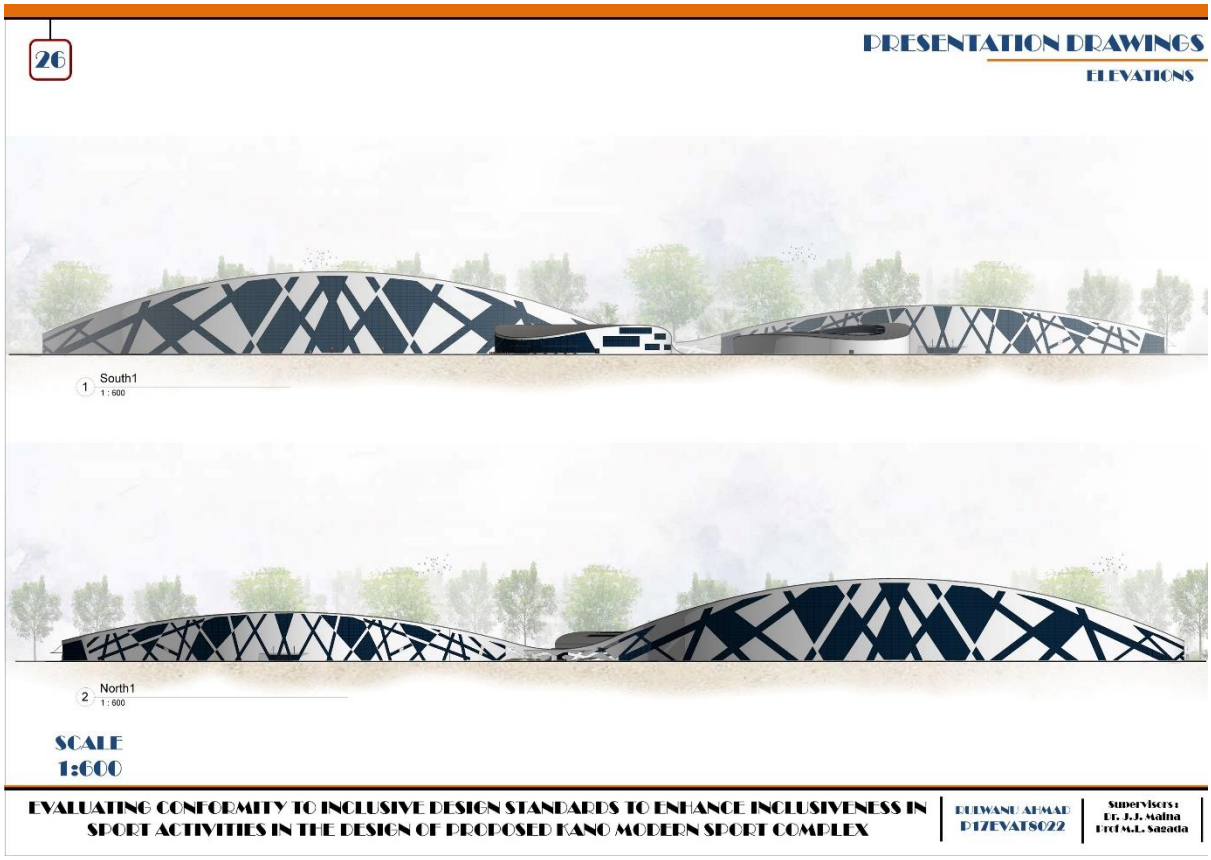


Plate LXXV Elevations

5.6.2 Concrete

Reinforced Concrete is used for structures such as floors, decks, staircases, ramps and interior columns and beams. The plasticity of concrete makes it easy to get custom forms for such structures. Concrete is also used for outdoor landscape and courts.

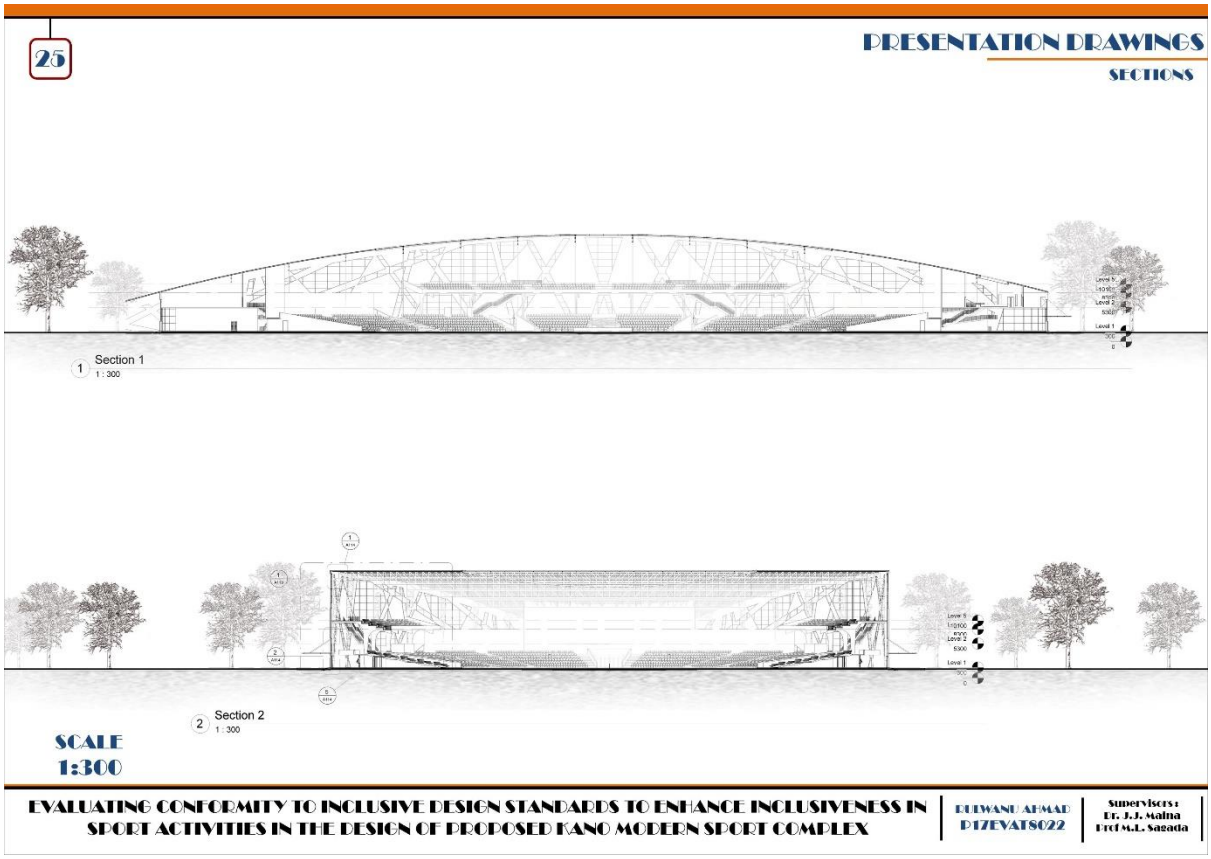


Plate LXXVI Sections

5.6.3 Glass

Tinted double paned glass is used to allow light and keep out heat from the building. It is used on exterior as curtain walls and interior/exterior windows

5.6.4 Plastic

Plastic Polycarbonate was used in roofing the atrium above the administrative section of the library section providing light to the central section of the first floor. It also forms part of the synthetic grass used in covering the deck of the atrium.

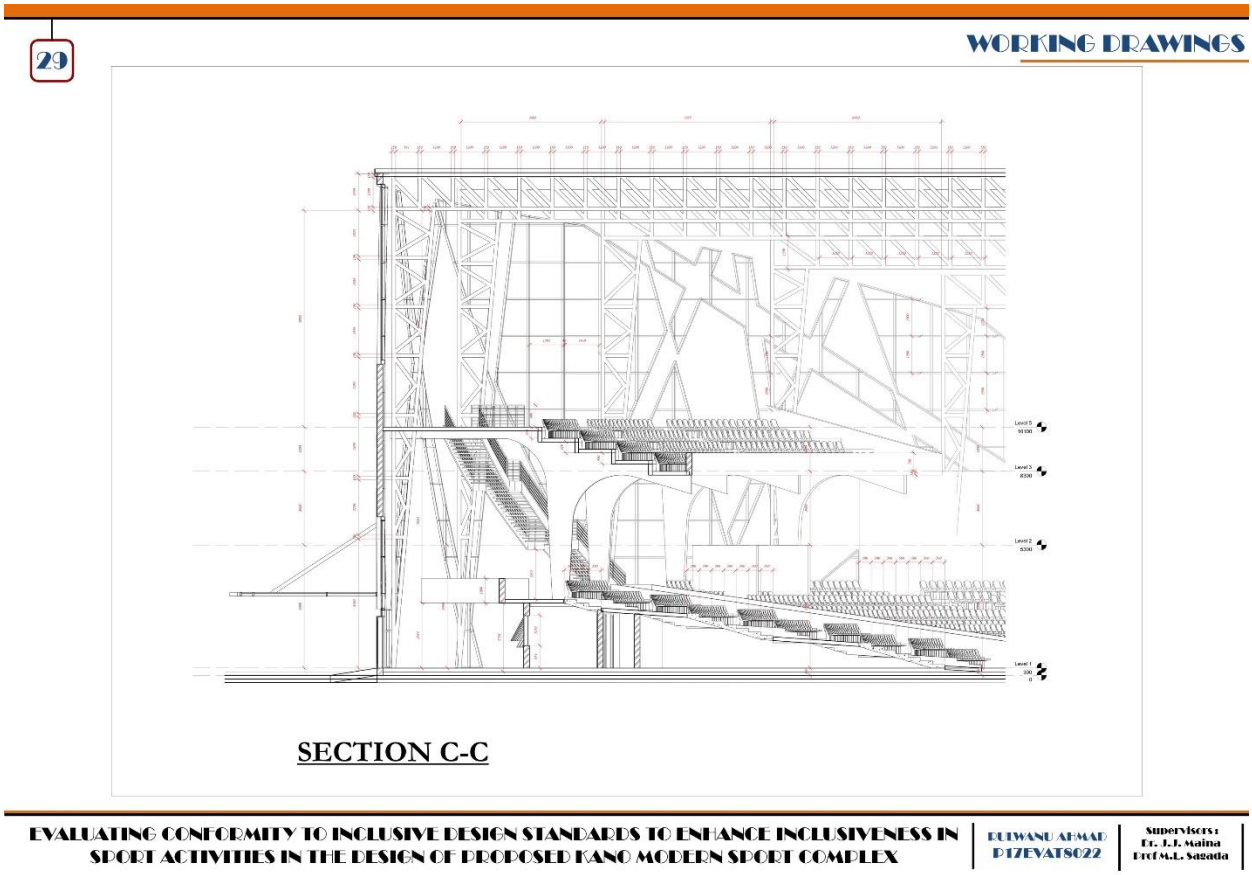


Plate LXXVII Details III

5.7 Schedule of accommodation

Table 5.1 Schedule of accommodation

Indoor hall				
Sn	Function	Quantity	Area	Total area
1	Games court	1	4500	4500
2	Spectator stand/ gallery	1	4580	4580
3	Ticket stand	28	9.8	235
4	Toilets	12	5	60
5	Changing room	2	40	80
6	Briefing room	2	160	360
7	Manager office	1	42	42
8	Asst. Manager office	1	38	38
9	Secretary	1	30	30
10	General office	1	40	40
11	Maintenance office	1	30	30
12	Account office	1	35	35
13	Conference room	1	120	120
14	Break room	1	40	40
Gymnasium and pool				
Sn	Function	Quantity	Area	Total area
1	Reception	1	76	76
2	Locker room	2	103	103
3	Toilets	16	5	80
4	Gym hall	1	3297	3297
5	Restaurant	1	564	564
6	Kitchen	1	182	182
7	Spectator stand	1	2116	2116
8	Swimming pool	1	217	217

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATION

6.1 Summary

Sport complex is a sport facility comprising of facilities such as stadium; baseball stadium, football stadium, track and field events, swimming pools and indoor complex. Over the years sport has been realized as a key towards healthy developments, it involves all groups of people; children, adults and elderly, able and disable people. It is important to evaluate the standards of such facilities to know their adequacy in spaces and facilities to enhance inclusiveness in sport activities in order to accommodate the different users' requirement which will facilitate participation and enhance social interaction in their society. This will help in reducing the rate of discrimination of people living with physical disabilities.

Participation of peoples with physical disabilities in sport have increased in recent years, nevertheless they still face many challenges because of their physical disabilities. Apart from lack of access to appropriate facilities, funds, technological aids including sporting wheelchairs, prostheses, special materials for persons who are blind and sign language interpretation, to the provision of separate sport facilities which instead of solving their problems often compound it.

At sports venues the field of play is defined by sport. Everything else – the seating bowl, circulation areas, food and drink outlets and toilets, turnstiles entrance and exit gates – is defined by the needs and demands of the group of athletes and spectators that visit the complex. In addition, the provision of athletics' dressing rooms, toilets, rest rooms and exhibition halls in planning a sport complex is geared towards getting the athletics' and

spectators' needs of paramount importance so as to support better spatial planning and increase access to basic resources and services.

6.2 Conclusion

The research evaluates conformity to universal design through the use of the research instruments (check list, observations and interviews). It was carried out to bridge the gap in research and also to enhance inclusiveness in sport activities Nigeria. The study shows vividly that most of the sport complexes available in northern Nigeria have either failed to provide inclusive facilities and spaces like ramps, wearing blocks (tactile), thresholds, excreta that enhance inclusiveness in sport participation. which is a source of discrimination or provide separate facilities and spaces which is also another source of discrimination which are some of the current challenges facing the sport industry and its participants in general, it shows the degree of conformity, therefore facilities needed to be upgraded from time-to-time to meet current demands, Even though efforts to improve participation has been on, still improvement is needed especially in the field of inclusive sport activities in Nigeria, as most impairments participant are missing out in the current trend of sport activities. Conformity to universal design in sport complexes will surely enhance inclusiveness in sport activities.

The physical, social and technological development has an effect of human behavior and activities which also effect sport activities. Therefore, architects, engineers and designers have challenges to face in designing modern sport complex which will enhance inclusive participation presently and, in the future, that might help to achieve significant transformation in the way we build and manage our spaces.

6.3 Recommendation

The research makes the following recommendations;

i. Designers should keep in mind that Inclusive design is not limited to buildings but also comprise both the internal and external environment where people take part in everyday activities; therefore, entrances and exits should be easily accessible to all in order to encourage inclusive participation in social, physical and economic activities.

ii. To maximize effective inclusive participation in sport activities, spaces and equipment provided in the facility that needs special attention should be carefully studied

iii. Partnerships can help in funding, to facilitate this; sport facilities should also serve as community centers, which can host Gatherings, public events and academic lectures. This will make it serve up to its full potential for longer period.

iv. Provision of attractive outdoors facilities for the use of amateurs, and junior athletes should be considered when designing inclusive sport facilities to harmonize the facility.

v. Green features and sufficient parking spaces suitable for inclusive usage should be provided to enhance the function of the facility.

6.4 Contribution to knowledge

The following are the specific contribution made by this research;

1. The research has been able to identify inclusive design principles; Equitable Use, Flexibility in Use, Simple and Intuitive Use, Perceptible Information, Tolerance for Error, Low Physical Effort, Size and space for Approach and Use. And standards related to inclusive facility.

2. The research established that within the facilities studied has complied up to 64%, which show the deficit in the degree of compliance to inclusive design standards. Also funding needed to upgrade these standards.

3. The research was also able to demonstrate an architectural design of a modern sport complex that can enhance inclusive participation in sport activities.

6.5 Area for further research

This research has its own delimitation, Therefore further research could be conducted using the same pedagogy in different regions of the country; universal design in facilities such as Libraries, Railway Stations, Airports and Malls could also be accessed to enhance inclusive activities. User satisfaction in different groups of peoples while using inclusive facilities can also be evaluated and researched in local contextual of Nigeria.

REFERENCES

Abdullahi,sinniah & siong (2019) *rapid urban growth and land use change in Kano metropolis Nigeria.* International journal of science and technology research vol. 8issue December 2019

Ahlfeld, G and Meaning, W. (2010). *stadium architecture and urban development from the perspective of urban economics.* international journal of urban and regional research 34, pp. 624-646.

Bolton, N. and Martin, S. (2013). *The policy and politics of free swimming.* International journal of sport policy and politics, 5 (3), 445–463.

Cabe annual report 2007 to 2008: *financial statements and accounts*: ISBN 9780102956245, HC 902 2007-08

Council of Europe, (1975). *European sport for all charter*. Strasbourg: Council of Europe.

Daniel R. Mandelker, *Land Use Law* § 7.27, At 7-24 (5th Ed. 2003)

Daniel r. Mandelker, *land use law* § 7.27, at 7-24 (5th ed. 2003)

Davidson, M.. and F. Dolnick, (Eds.).(2010): *A planners dictionary*. American Planning Association, Planning Advisory Service.

Downward, G.H (2007). *Including students with moderate and severe physical challenges in extracurricular and Community recreation activities*; teaching exceptional children. *39* (6) 3-38

Duncan, R. (2007). *Inclusive Design-Clarification and Development*. North Carolina: North Carolina State University.

Durden, W. (2016). *Stadium circulation: transport planning and crowd control. In W. Durden, Momentum Transport Planning, London*, U.K. London: Institute of Civil Engineers (ICE) Publishing. (pp. 67-72).

Dursun Peksen (2009). Better or Worse? The Effect of Economic Sanctions on Human Rights. International Studies Quarterly 50(2): 233-262.

Eime, R.M., et al., (2015). *Integrating public health and sport management: sport participation trends* 2001–2010. Sport management review, 18 (2), 207–217.

Falagas, M.E., Pitsouni, E.I., Malietzis, G.A., and Pappas, G. (2008). Comparison of PubMed, Scopus, Web of Science, and Google Scholar: strengths and Weaknesses. *FASEB Journal, 22* (2008), 338- 342.

Fletcher, H. (2006). *The Principles of Inclusive Design: They Include You*. London: CABE.

Gratton, C. (2005) Sport and Economic Regeneration in Cities. Harlow: Longman.

Hallmann, K. and Petry, K.,(2013). *Comparative sport development. Systems, participation and public policy.* New York, NY:Springer.

Hamer, S (2016). *Architectural Concepts: Circulation*. Retrieved December 02, 2016, from Potico. Space: http://portico.space/journal//architectural-concepts-circulation

Henderson, K. A. & Ainsworth, B. E. (2007). Enjoyment: A link to physical activity, leisure, and health. Journal of Park and Recreation Administration, 20(4), 130–146

Jack Nasar & Jennifer Evans-Cowley(2007). Universal Design and Visitability From Accessibility To Zoniing. The John Glenn School of Public Affairs.

Jerry Weisman (1981). Evaluating Architectural Legibility: Way-Finding in the Built Environment. First Published March 1, 1981 Research Article https://doi.org/10.1177/0013916581132004.

Joana Kyei-Dompim (2020). Final Year Nursing Students' Knowledge and Attitudes regarding Children's Pain. February 2020. Pain Research and Management 2020 Jerry Weisman (1981). Evaluating Architectural Legibility: Way-Finding in the Built Environment. First Published March 1, 1981 Research Article https://doi.org/10.1177/0013916581132004.

JONAPWD. 2019. Joint National Association of Persons with Disabilities (JONAPWD) Annual Report 2017. JONAPWD, Abuja http://www.jonapwd.org/2017REPORT.pdf

Kabir M. 2018. Ganduje signs Kano Disability Bill into law. New Telegraphy. Posted 05.12.18. Accessed online: 07.12.18 https://www.newtelegraphng.com/2018/12/ganduje-signs-kano-disability-bill-into-law/

Kaczynski, A.T. and Henderson, K.A., 2007. *Environmental correlates of physical activity: a review of evidence about parks and recreation. Leisure sciences*: an interdisciplinary journal, 29 (4), 315–354.

Klostermann, C. and Nagel, S., 2014. *Changes in German sport participation: historical*

Kuiri, M. and Teller, J. (2012). *Olympic stadium in their urban environment: A question of design and cultural significance.* Journal of cultural heritage Management and sustainable development, 2 (2) 115- 129.

Lang, R. A. (2008). *Scoping Study: Disability Issues in Nigeria*. Retrieved from http://www.ucl.ac.uk/lccr/downloads/dfid_nigeriareport

Lawrence Neuman (2013). Social Research Methods: Qualitative and Quantitative Approaches: pearson-education-limited-2013.

Lawson, Tony (2014) 'A Speeding up of the Rate of Social Change? Power, Technology, Resistance, Globalisation and the Good Society, in Margaret S. Archer (ed.), (2014), Late Modernity: Where are we Going?. New York: Springer.

Mahmood, (2016). *Universal design as a tool in the proposed design of proposed kano modern sport complex for the disable* (Unpublished M.Sc. thesis)

Mahmoud, A. M., M. D. Brown, S. A. Phillips, and J. M. Haus. 2015. Skeletal muscle vascular function: a counterbalance of insulin action. Microcirculation 22:327– 347

Mai, (2018). *Assessment of Design Requirements in Special Education Schools in Kano* (Unpublished M.Sc. thesis)

Maina, J. J. and Umar, B. O. (2015). *Wayfinding in multi-level buildings*: A case study of the Senate Building,Ahmadu Bello University. In: Samuel Laryea and Roine Leiringer (Eds.). Procs 6th West Africa Built Environment Research (WABER) Conference, 10-12th August 2015, Accra, Ghana, Vol. 2, 1227-1241. ISBN 978-0-620-66247-5

Mbaye, K. (1999). *Sport and human rights*, Olympic review xxvi (24)

Michailakis, D. (2003). *Government action on disability policy:* A global Survey. Retrieved from http://www.independentlivingorg/ standardrules/UN answers/UN.pdf

Mshielia, B.S. (2010) *The Dimension and politics in sport,* 21st century and sport development in Nigeria Abuja P.p. 40-50

National policy on education 2004*, Inclusive education in Nigeria*

Newell, A. F. & Gregor, P. (2000). "User Sensitive Inclusive Design – in Search of a new paradigm":pp 39-44. Proc. A. C. M. Conference on Inclusive Usability, Washington, DC.

NPC. 2015. National Integrated Infrastructure Master Plan. National Planning Commission, Abuja http://www.nationalplanning.gov.ng/images/docs/National%20Intergrated%20Infractr ucture%20M aster%20Plan.

Obedenge, D. O. (2005) *Determinant for effective management of school sports in inclusive basic education Program in Nigeria*, Journal of sport management and education research.

Odejide, D. O. (2002). Sport as an essential ingredient to national development. Journal of academy of sport Administration (1), 34-40.

Okuneye, R.O. (2002) Regular exercise and individual health. Nigerian Journal of Physical Health Education and Recreation. 2:5–10.

Oluigbo, B.C. Asiegbu, G.N. Ezeh, O.C. Nwokonkwo "Group Membership Prediction of an Outsourced Software Project: A Discriminant Function Analysis Approach", International Journal of Scientific Research in Multidisciplinary Studies, Vol. 3, Issue 4, pp. 12-18, 2017

Olukotan, L. M. (2004) *Decision making and social support of increasing exercise adhesive.*

Onyekwere J, Olatuji K and Afolabi A. 2018. PWDs urge assent to disability bill. The Guardian 29.11.18. Accessed online: 03.12.18 https://guardian.ng/news/pwds-urge-assent-to-disability-bill/

Peloquin, A. (1994). *Barrier-free Residential Design*. USA: McGraw-Hill Inc.

Rafoss, K. and Troelsen, J., (2010). *Sports facilities for all? The financing, distribution and use of sports facilities in Scandinavian countries.* Sport in society: cultures, commerce, media, politics, 13 (4), 643–656.

RIBA. (2009). *Inclusive Design:* Creating a user's World. London

Sadiq, I. B. (2014). *Architecture and the Impairments; A Case Study of Female Hostels in Ahmadu Bello University, Zaria*. (Unpublished B.Sc. project)

Sadiq. I.B., Maina.J.J. and Sagada. M.L. (2016). *Perception of mobility impaired students on accessibility design features in selected skill Acquisition canters*. construction focus 9 (1) 1-5

Scheerder, J. and Van Bottenburg, M., (2010). *Sport light. De opkomst van lichte organisaties in de sport [The emergence of light organisations in sport]*. *In*: B. Pattyn and B. Raymaekers, eds. In gesprek met morgen. Lessen voor de eenentwintigste eeuw (series 16). Leuven: Universitary Press, 89–120.

Scheerder, J. and Vos, S., (2011). *Social stratification in adults' sport participation from a*

Schmidt A, et al. (2002) The RHO1-GAPs SAC7, BEM2 and BAG7 control distinct RHO1 functions in Saccharomyces cerevisiae. *Mol Microbiol* 45(5):1433-41.

Schmidt A. (2002) The RHO1-GAPs SAC7, BEM2 and BAG7 control distinct RHO1 functions in Saccharomyces cerevisiae. *Mol Microbiol* 45(5):1433-41.

Shukshin, G. U. (2005). *Towards effective teaching of the physically challenged in sport.* quarterly, 33 (1): 37-42

Stevenson, P. (2009). *The pedagogy of inclusive youth sport : working towards real solution*, disability and youth sport, edited by H. fitzerald, 119-131. London: Routledge. [Google scholar *time-trend perspective.* Results from a 40-year household study. European journal for the sociology of sport, 8 (1/2), 31–44.

Ugochukwu, (2011) *A proposal for Kaduna township stadium, Kaduna.* An unpublished dissertation submitted to the Department of Architecture, Ahmadu Bello University, Zaria.

UN 2015, *declaration of the 2030 agenda for sustainable development*, resolution adopted by the general assemlyon 25th December 2015.retrieved from http" // www.un.org/en/ga/search/view-doc.asp.

Van Der Linden, V., Dong, H., & Heylighen, A. (2016). *From accessibility to experience: Opportunities for inclusive design in architectural practice*. Nordic Journal of Architectural Research. w.w.w. archi daily (2020)

Waardenburg, M. and Van Bottenburg, M., (2013). *Sport policy in the Netherlands.* International journal of sport policy and politics, 5 (3), 465–475.

Wolfensohn, J. (2013). *Poor impairments and shut out*. Washington post.

Wong, H. L. (2014). *Architecture without barriers: Designing inclusive environments accessible to all*. Ryerson University:(Unpublished Master's thesis).

APPENDIX

A; Letter of introduction



DEPARTMENT OF ARCHITECTURE
(Postgraduate Section)
AHMADU BELLO UNIVERSITY, ZARIA
VICE CHANCELLOR: Professor Ibrahim Garba, BSc (Hons) MSc (ABU) PhD (London), DIC, FNSE, MCOMBE

R/A/2.27

27th September, 2019

The Director of Sport,
Ahmadu Bello University,
Zaria.

Dear Sir/Madam,

LETTER OF INTRODUCTION: AHMAD RULWANU M.SC.POSTGRADUATE ARCHITECTURE STUDENT P17EVAT 8022.

I wish to request your kind permission to allow the above named M.Sc. Postgraduate Architecture Student of this Department who is currently undertaking his thesis research to use your **Establishment** as a case study for data collection relevant to the research towards purely academic purpose.

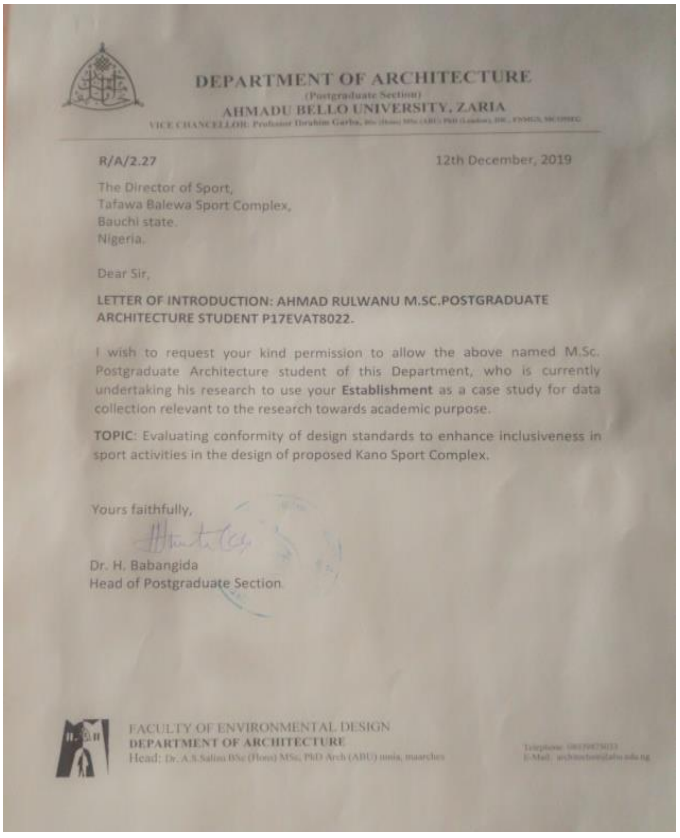
TOPIC: Assessing Spatial Equality to enhance Inclusiveness in sport activities in the design of Kano Modern Sport Complex .

Yours faithfully,

Dr. H. Babangida
Head of Postgraduate Section.

FACULTY OF ENVIRONMENTAL DESIGN
DEPARTMENT OF ARCHITECTURE
Head: Dr. A.S.Saliu BSc (Hons) MSc, PhD Arch (ABU) mnia, maarches

Telephone: 08039875033
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DEPARTMENT OF ARCHITECTURE
(Postgraduate Section)
AHMADU BELLO UNIVERSITY, ZARIA
VICE CHANCELLOR: Professor Ibrahim Garba, BSc (Hons) MSc (ABU) PhD (London), DIC, FNSE, MCOMBE

R/A/2.27

12th December, 2019

The Director of Sport,
Tafawa Balewa Sport Complex,
Bauchi state.
Nigeria.

Dear Sir,

LETTER OF INTRODUCTION: AHMAD RULWANU M.SC.POSTGRADUATE ARCHITECTURE STUDENT P17EVAT8022.

I wish to request your kind permission to allow the above named M.Sc. Postgraduate Architecture student of this Department, who is currently undertaking his research to use your **Establishment** as a case study for data collection relevant to the research towards academic purpose.

TOPIC: Evaluating conformity of design standards to enhance inclusiveness in sport activities in the design of proposed Kano Sport Complex.

Yours faithfully,

Dr. H. Babangida
Head of Postgraduate Section.

FACULTY OF ENVIRONMENTAL DESIGN
DEPARTMENT OF ARCHITECTURE
Head: Dr. A.S.Saliu BSc (Hons) MSc, PhD Arch (ABU) mnia, maarches



DEPARTMENT OF ARCHITECTURE
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AHMADU BELLO UNIVERSITY, ZARIA
VICE CHANCELLOR: Professor Ibrahim Garba, BSc (Hons) MSc (ABU) PhD (London), DIC, FNMGS, MCOMEG

R/A/2.27

12th February, 2020

The Director of Sport,
National Stadium, Abuja,
Abuja, Nigeria.

Dear Sir/Madam,

LETTER OF INTRODUCTION: AHMAD RULUWANU, M.SC.POSTGRADUATE ARCHITECTURE STUDENT8022.

I wish to request your kind permission to allow the above named M.SC. Postgraduate Architecture Student of this Department who is currently undertaking his research to use your **Establishment** as a case study for data collection relevant to the research towards academic purpose.

TOPIC: Evaluating conformity of design standards to enhance inclusiveness in sport activities in the design of proposed, Kano Sport Complex.

Yours faithfully,

Dr. H. Babangida.
Head of Postgraduate Section.

FACULTY OF ENVIRONMENTAL DESIGN
DEPARTMENT OF ARCHITECTURE
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R/A/2.27

12th December, 2019

The Director of Sport,
Sani Abacha Stadium,
Kano state.
Nigeria.

Dear Sir,

LETTER OF INTRODUCTION: AHMAD RULWANU M.SC.POSTGRADUATE ARCHITECTURE STUDENT P17EVAT8022.

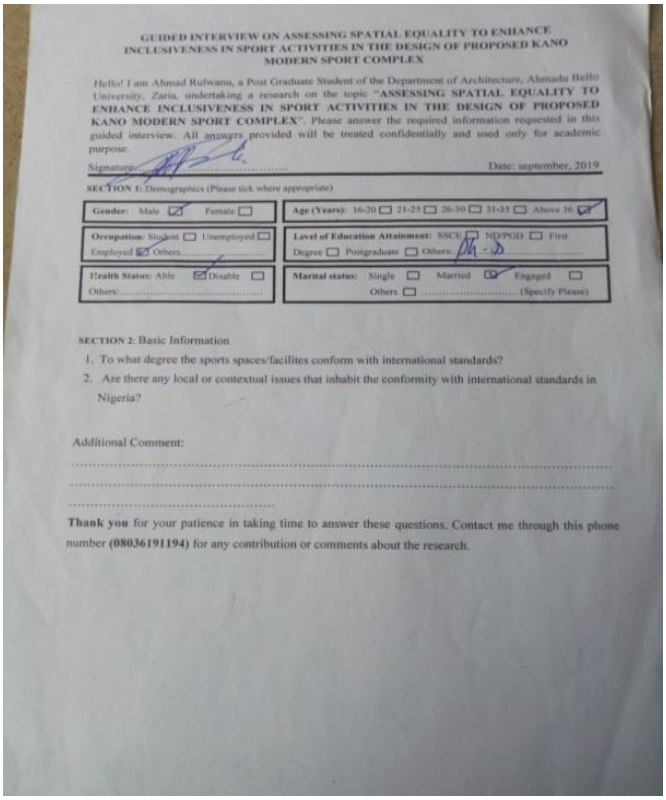
I wish to request your kind permission to allow the above named M.Sc. Postgraduate Architecture student of this Department, who is currently undertaking his research to use your **Establishment** as a case study for data collection relevant to the research towards academic purpose.

TOPIC: Evaluating conformity of design standards to enhance inclusiveness in sport activities in the design of proposed Kano Sport Complex.

Yours faithfully,

Dr. H. Babangida
Head of Postgraduate Section

FACULTY OF ENVIRONMENTAL DESIGN
DEPARTMENT OF ARCHITECTURE
Head: Dr. A.S.Salisu BSc (Hons) MSc, PhD Arch (ABU) mnia, maarches



GUIDED INTERVIEW ON ASSESSING SPATIAL EQUALITY TO ENHANCE INCLUSIVENESS IN SPORT ACTIVITIES IN THE DESIGN OF PROPOSED KANO MODERN SPORT COMPLEX

Hello! I am Ahmad Rufwanu, a Post Graduate Student of the Department of Architecture, Ahmadu Bello University, Zaria, undertaking a research on the topic "**ASSESSING SPATIAL EQUALITY TO ENHANCE INCLUSIVENESS IN SPORT ACTIVITIES IN THE DESIGN OF PROPOSED KANO MODERN SPORT COMPLEX**". Please answer the required information requested in this guided interview. All answers provided will be treated confidentially and used only for academic purpose.

Signature: ..... Date: september, 2019

SECTION 1: Demographics (Please tick where appropriate)

Gender: Male ☑ Female ☐

Age (Years): 16-20 ☐ 21-25 ☐ 26-30 ☐ 31-35 ☐ Above 36 ☑

Occupation: Student ☐ Unemployed ☐ Employed ☑ Others.....

Level of Education Attainment: SSCE ☐ ND/PGD ☐ First Degree ☐ Postgraduate ☐ Others: M.Sc

Health Status: Able ☑ Disable ☐ Others:.....

Marital status: Single ☐ Married ☑ Engaged ☐ Others ☐ .....(Specify Please)

SECTION 2: Basic Information

1. To what degree the sports spaces/facilites conform with international standards?
2. Are there any local or contextual issues that inhabit the conformity with international standards in Nigeria?

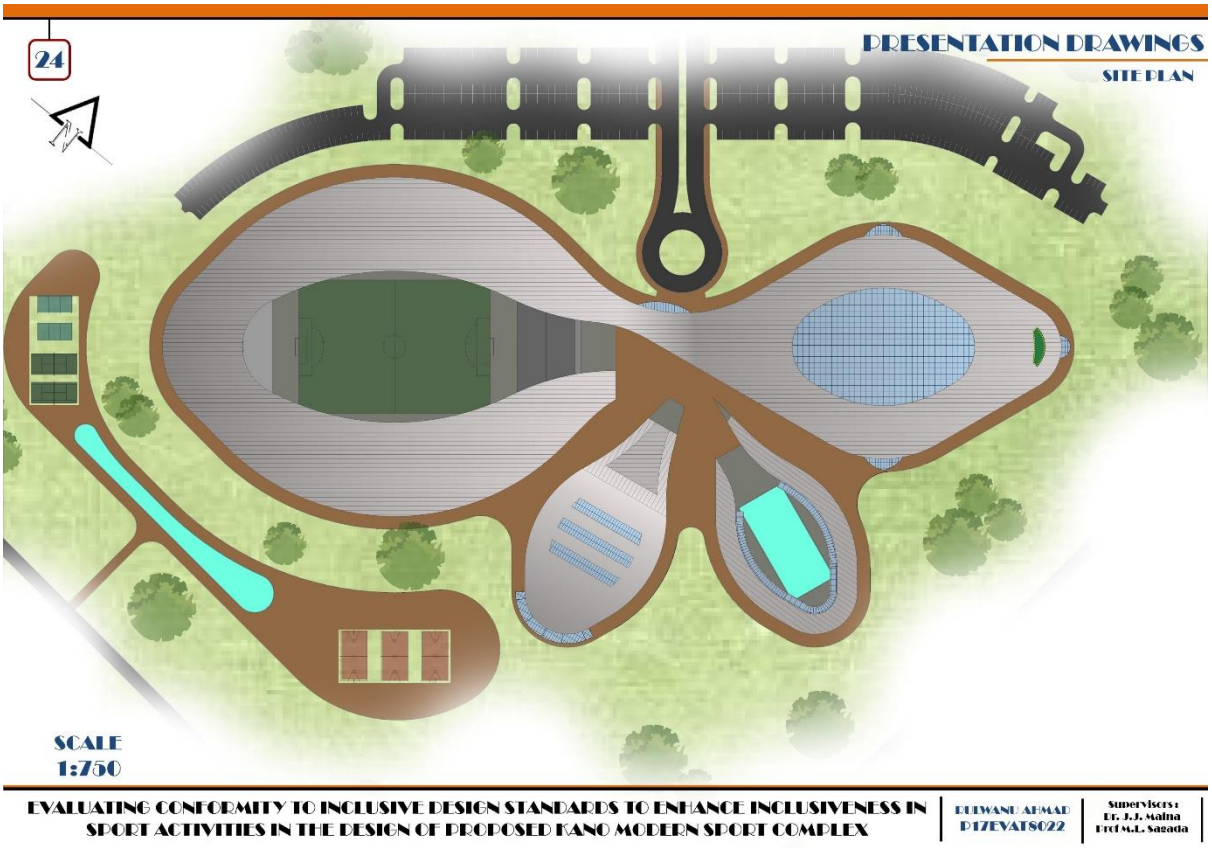
Additional Comment:

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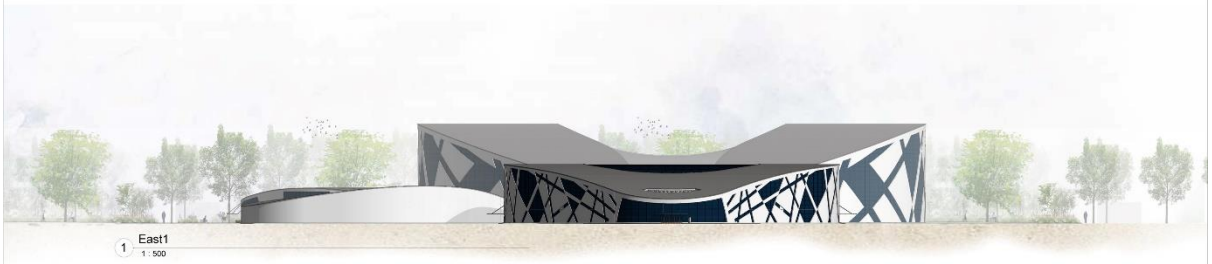
Thank you for your patience in taking time to answer these questions. Contact me through this phone number **(08036191194)** for any contribution or comments about the research.



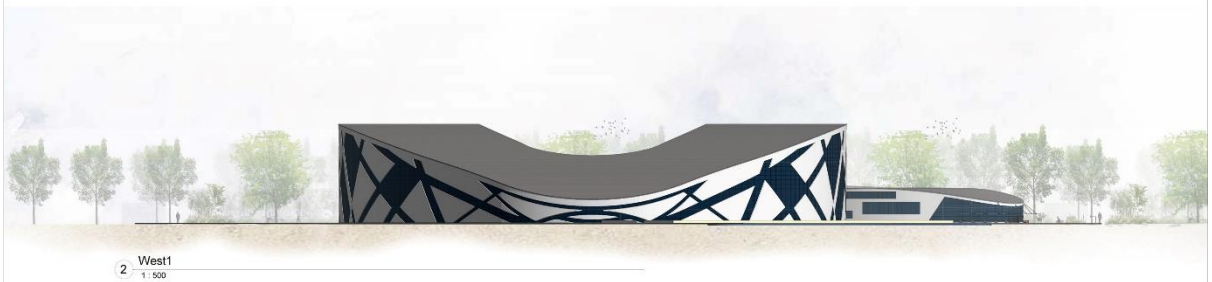
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PRESENTATION DRAWINGS

ELEVATIONS



1 East1
1 : 500



2 West1
1 : 500

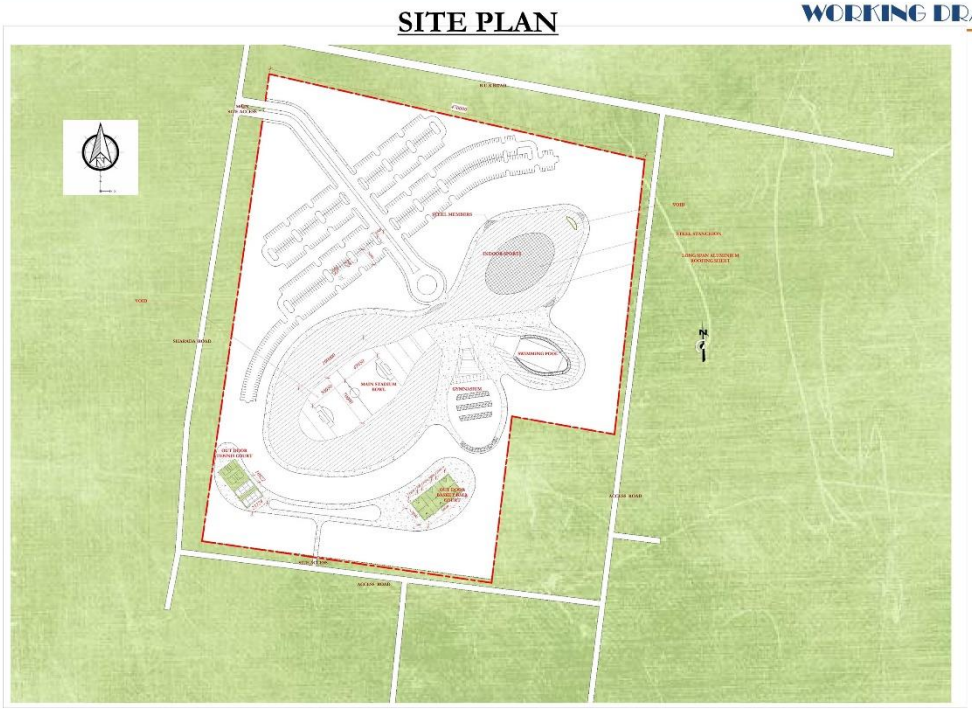
SCALE
1:500

EVALUATING CONFORMITY TO INCLUSIVE DESIGN STANDARDS TO ENHANCE INCLUSIVENESS IN SPORT ACTIVITIES IN THE DESIGN OF PROPOSED KANO MODERN SPORT COMPLEX | RUKWANU AHMAD P17EVAT8022 | Supervisors: Dr. J.J. Malna Prof M.L. Sazada

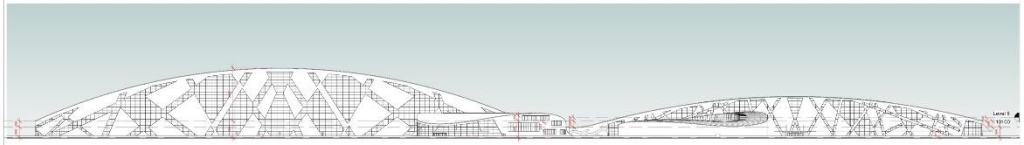
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WORKING DRAWINGS

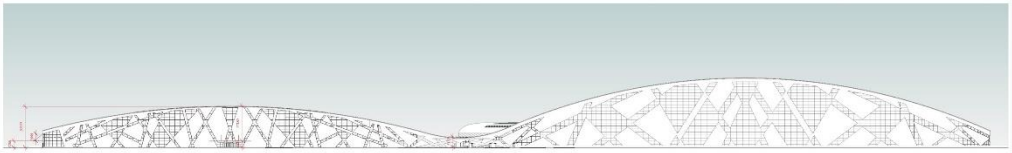
SITE PLAN



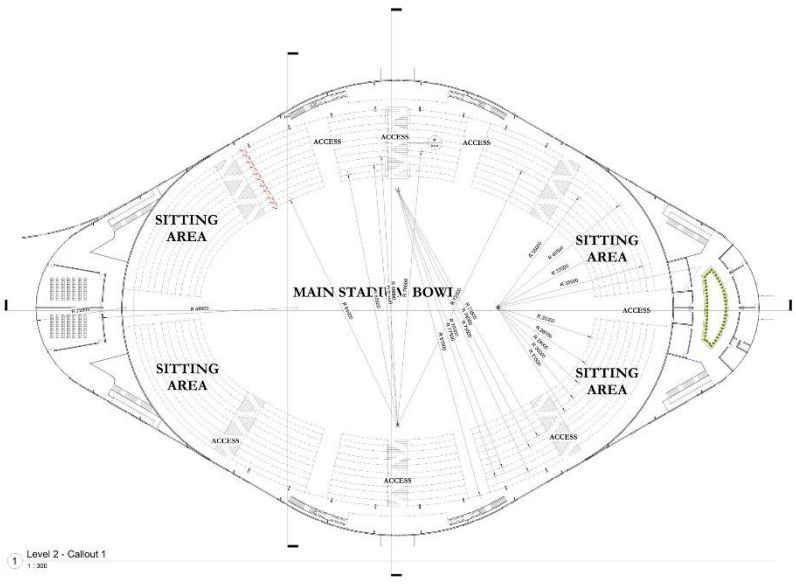
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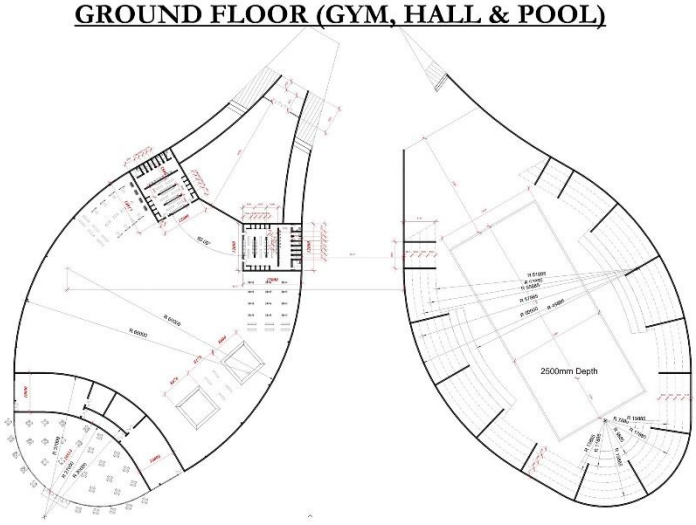
SOUTH ELEVATION

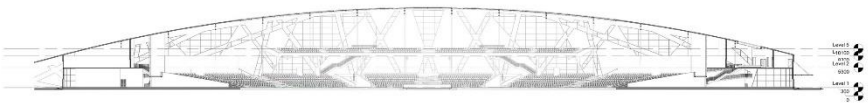


NORTH ELEVATION

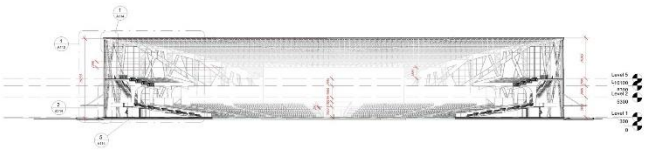


GROUND FLOOR (GYM, HALL & POOL)





SECTION 1



SECTION 2