INCLUSIVE DESIGN AS A TOOL IN THE DESIGN OF SPORT COMPLEX FORTHEDISABLED, KANO

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Declaration

I declare that the work in this dissertation entitled 'INCLUSIVE DESIGN AS A TOOL IN THE DESIGN OF SPORT COMPLEX FOR THE DISABLED, KANO' has been carried out by me in the Department of Architecture. The 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 or any other university.

Hamza MAHMOUD		
Name of student	Signature	Date

Certification

This thesis entitled 'INCLUSIVE DESIGN AS A TOOL IN THE DESIGN OF SPORT COMPLEX FOR THE DISABLED, KANO' by HamzaMAHMOUD, meets the regulations governing the award of the degree of Master of Science of Ahmadu Bello University, Zaria, and is approved for its contribution to knowledge, literary presentation and policy formation.

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Dedication

With a heart filled with great inexpressible gratitude, I dedicate this research and achievement to the glory of God the most beneficent and merciful for his sustenance throughout the period of this study.

Abstract

Inclusive design takes into consideration the varying needs of diverse users in order not to socially exclude any potentials user irrespective of one's ability from the use of any functional space. The seven principles of inclusive designs enhance the wide use of spaces thereby minimizing architectural disability and increasing diverse users of the built environment. The study aimed at integrating an inclusive sporting complex which can accommodate varieties of users irrespective of age, sizes, physical challenges and ability. A mixed research methodology was used for the study in order to allow for research triangulation and wide range of data collection. The instruments of data collection used for the study include interviews, visual surveys and observation at the respective case studies selected for the study. Two management staff at each of the stadium, coaches of the physically challenged persons were altogether interviewed at SAS and Rwang Pam stadium while a total of ten physically challenged persons were also interviewed. The research found out that there is minimal application of inclusive design in all the selected case studies which result in the negligence and exclusive of the physically challenged persons from fully participating in social and entertainment activities such as sports. There is no any special or dedicated facility which adequately meets the design requirements of the physically challenge in any of the selected case studies. This tends to question the usage of spaces and the sporting facilities thereby intensifying architectural disability and social exclusion among the physically challenged persons. As such, there is need to always take into consideration the physically challenge persons by integrating inclusiveness in the design approach of public spaces as reflected in the proposal sporting complex which explores the principles of inclusive design.

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1.0 INTRODUCTION

1.1 Background of Study

Buildings and spaces should achieve the required performances regarding functions as well as standards. A functional space is not considered as being well designed without adequately taking the users into consideration.Inclusive design is an evolving and complex concept, whose definition can be extended to address not only age, gender and disability, but also race, income, education and culture. It is worth noting that everyone needs to be part of social lifethrough the use of public buildings and spaces(Afacan, 2010) inclusive of sporting facilities as this tends to help in the social integration of people with various forms of disability. By considering people's diversity, inclusive design seeks to provide an environment which addresses a wide spectrum of needs. In this way it can break down barriers and remove exclusion. "The quality of buildings and spaces has a strong influence on the quality of people's lives. Decisions about the design and management of places can enhance or restrict a sense of belonging. Such spaces can increase or reduce feelings of security, stretch or limit boundaries, promote or reduce mobility and improve or damage health". Spaces should therefore be designed in order to integrate a wide range of user needs into both new and existing sports facilities. Adopting the principles of inclusive design should therefore be seen as an important part of meeting Disability Discrimination Act (DDA) duties(Australian Bureau of Statistics (ABS), (2006).

1.2 Statement of the Research Problem

Public spaces tend to be an integral part of society ought to take into consideration diverse kinds of users of such spaces such that all potential users of such spaces will not be

disadvantaged or be disabled in using such spaces (Fletcher, 2006). Although there are building codes, standards and regulations, yet these are not maximally incorporated into the design of both public and private spaces.Thus, limiting usage of designed spaces most especially sport complexes in Nigeria (Ugochukwu, 2011). The challenge of non-inclusion of diverse users in sporting facilities and complexes is not only prevalent in some developed nations but also in developing countries such as Nigeria as the disabled are being marginalized and socially excluded.

As such, the need to address this challenge in sport complexwhich will give topmost priority to the disabled remains paramount through the exploration of inclusive design in sport complex for the disabled.

1.3 Aim and Objectives

This research is aimed at exploring inclusive designdesign in order to offer the users equal participation, and independence through the usage of sporting facilities. This aim can be achieved through the following objectives;

i. To identify design parameters that affects the inclusion of the disabled in Nigerian sporting facilities/stadium.
ii. To identify the challenges associated with sporting complexes, stadia as regards inclusive design.
iii. To determine the level of inclusion of sporting facilities and stadium in Nigeria.
iv. To formulate or develop a suitable design framework using inclusive design in the design proposal of Kano sports complex.

1.4 Research Questions

An attempt has been made in order to answer the following research questions mentioned below;

i. What design parameters affect the inclusion of disabled people in the use of sporting facilities?
ii. What are some of the challenges associated with sporting complexes as regards inclusive design?
iii. What is the level of inclusion of sporting facilities and stadium in Nigeria?
iv. How can a suitable a suitable design framework/model be formulated or developed using inclusive design in the design proposal of Kano sports complex?

1.5 Scope of the Study

The research is streamlined to the study of inclusive design in sporting facilities/stadia in (two geo-political zones of Nigeria (North-central and North-West) in order to reduce the complexity of the scope thereby enhancing the research reliability.

1.6 Justification of Study

Kano State is a sport loving State and is known for their track record of excellence and outstanding performances in Para soccer and other sporting activities of the physically challenged persons over the past twenty five years both at national and international level (Musa, 2015). The Kano para soccer team have won twenty three golden medals and several silver and bronze medals in the past silver jubilee. Also, in the just recently concluded tournament, the same Kano team of physically challenged players emerged as winners by winning the gold medal. Despite these track records of excellence, there has not

been any befitting training facilities that has been provided specifically for the use of the physically challenged persons. Thus, it can be said that despite the fame and glory these teams have brought to the KanoState Government and the Nation (Nigeria) at large, yet these persons are marginalized and not being properly equipped with any indoor sport complex which will further enhance their performance. Hence, it is as a result of this backdrop that thisresearch seeks to bridge the gap thereby giving the physically challenged a sense of belonging disabled thereby re-integrating the physically challenged persons into the broader society as indoor sports complex is an integral part of any civil.

2.0 LITERATURE REVIEW

2.1 Inclusive Design

Universal 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). 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).

An inclusive approach to design offers new insights into the way people interact with the built environment. It seek creates new opportunities to deploy creative and problem solving skills. Meeting access needs should be an integral part of design considerations in the built environment most especially in sport complexes.

2.2 Principle of Inclusive/Universal 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.

Universal 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 recognises 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 (Denise, 2003).

2.2.1 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 (Levine, 2003, CNDDC, 2003).

2.2.2 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 centers) or even more advanced and increasingly popular mixed-use suburban town centers (Fletcher, 2006, Denise, 2003).

2.2.3 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.

2.2.4 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 essential to the traveler's direction finding is of utmost importance"* (Nasar, and 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.

2.2.5 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)(Fletcher, 2006, Denise, 2003). 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".

2.2.6 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).

2.2.7 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 (Fletcher, 2006, Danise, 2003).

2.3 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 disabled people.

2.3.1 Involvement and inclusive design champion

The involvement of disabled people is a key element of Inclusive Design in sporting facilities for the disabled (Ugochukwu, 2011). Regardless of the scale of a redevelopment or new build project, someone involved with the design of a project must champion the principles of inclusive design. This should be undertaken from the early briefing stages for a scheme and provide on-going good practice advice and reviewing of the proposal at key stages to ensure that aims are being met. The inclusive designermust have a detailed

technical knowledge and understanding of the diverse and sometimes conflicting needs of disabled people within sports environments. This includes the needs of everyone, from people with sensory and cognitive impairments to people with mobility impairments, including wheelchair users.

2.3.2 How will people use the facility

When designing a sports facility it is necessary to visualize how people will use the facility as a whole, from transport links, to the initial approach, through to specific areas, for example the changing rooms, the social area and activity spaces. It is also essential to identify the potential obstacles and restrictions that a disabled person may face.

This includes the needs of everyone, from people with sensory and cognitive impairments to people with mobility impairments, including wheelchair users. 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).

2.3.3 Accommodating sports chairs

In recent times, the design of sports chairs has developed and in some cases sports chairs nowrequire a design width of 1.2m making it impractical to achieve this throughout the facility. It is therefore essential to establish those areas where sports chair access is required to ensure proper access. From reception, there is need to push sports chair to secure storage point which must be conveniently located close to the changing areas. Having secured sports chair, the next is to then move to the changing and toilet facilities

prior to returning to the secure area where such individuals be will transferred into sports chair and then secure day chair. Once in sports chair, the user will then travel to the sports activity space (Ugochukwu, 2011). After sports activity the user will then return to the secure storage to transfer into the day chair and will then either secure their sports chair and move into the other parts of the sports facility or return to the reception and exit the facility.Thus it can be said that, when considering how disabled people will use any part of the facility it is important to ask the following questions:

• How will the find the facility?

• How will the users reach the facility?

• How will the users use the facility?

• How will the users leave the facility?

To achieve this, there is need for a 'sports chair zone', which must be established. This is a zone where the circulation and the elements within it, such as doors and lobbies, are designed to allow large sports chairs to be used, manoeuvred and stored easily and safely. The minimum extent of the wheelchair zone in any sports chair facility consists of the following:

• The route from the site entrance, car park, setting down point to the entrance and reception area.

• The route from the entrance/reception to a safe, convenient and secure storage point for the sports chair.

• The route from the storage point to the activity area e.g. sports hall or outdoor/indoor tennis court

• The means of escape route from the activityarea to a place of safety.

This will allow a user to arrive at the facility and enable the push of sports chair, in most cases from the 'day chair', to and through the entrance and into the reception area.

> *"In facilities such as sports centres where sports chairs are a key piece of sports equipment for some people and some sports, it is essential that the design of the building and the external works ensures that the sports chairs have unhindered access to all sports activities / facilities." (Australian Bureau of Statistics, 2006).*

2.4 Impairments, disability and handicap

Many people with disabilities do not have equal access to health care, education, employment opportunities, sporting facilities, do not receive the disability-related services that is require, and experience exclusion from everyday life activities. Disability is also an important development issue with an increasing body of evidence showing that persons with disabilities experience worse socioeconomic outcomes and poverty than persons without disabilities**(**World Health Organization**,** 2011)

All human beings tend to operate within a range of abilities and are able to do different things at different ages. Ability is therefore a relative concept, considered to lie within the normal range of behaviours for a human being at a particular chronological age. In this context, disability becomes synonymous with deviation from the normal. The World Health OrganisationWHO, (1980) in Hanson, (2004), defined impairment, as a loss or abnormality of psychological, physiological or bodily structure or function. Disability can be refers to as any limitation or lack of ability resulting from an impairment, when performing an activity in the manner or within the range considered normal for a human being. Handicap refers to the disadvantage that an individual experiences as a result of impairment or a disability that limits or prevents the fulfillment of a role that would have

been considered normal for a person of the same age, gender and circumstances to perform (Hanson, 2004). Thus there is a link such that impairments cause disabilities, which in turn lead to handicaps.

2.5 Models of Disability

There are two models of disability diametrically opposed to each other namely; medical and social model of disability. Medical model being the traditional view of disability consider an individual with impairment as 'the problem'. It holds the view that people with impairments need to be cured or rehabilitated to fit into 'normal' life, and that inability to do so should be met with special provisions that are often separate or outside of community life (Town and Country Planning Association, 2009).

The social model, on the other hand, asserts that whilst individuals may have impairments that may or may not require medical treatment, this need not prevent disabled people from being able to live a normal and fulfilling life. Rather, it is society's unwillingness to devote enough resources to ensure that they do, which is the root cause of social exclusion. The social model points to environmental barriers, poor employment protection, and inadequate civil rights legislation and so on, that prevents the disabled people benefitting from the same advantages as nondisabled people. This view stresses the importance of broader attitudinal and environmental factors in shaping disabled people's lives arguing, in effect, that disability is socially produced.

By contrast, the 'social model' of disability asserts that it is society itself – through our attitudes and behaviour, our institutions and laws, our buildings and public spaces – that creates barriers which can result in segregation and separation. The social model aims to

integrate the needs of all into mainstream provisions, thereby avoiding the need for unwanted special facilities (Town and Country Planning Association, 2009)

These two opposed models have both been criticized for selectively emphasizing different aspects of disability; the medical model for ignoring social values and attitudes and the social model for denying the debilitating effects people experience as a result of impairment. The social model looks at ways of removing barriers that restrict life choices for disabled people. When barriers are removed, disabled people can be independent and equal in society, with choice and control over live. Disabled people developed the social model of disability because the traditional medical model did not explain the personal experience of disability or help to develop more inclusive ways of living (English Federation of Disability Sport EFDS, 2013).

A third position, the 'bio-social' model attempts to reconcile medical and social positions by proposing that the makeup of the human body affects an individual's ability to interact with the built environment but at the same time who or what is defined as disabled depends on social attitudes and values. Indeed, impairment is neither fixed nor static, or confined to any particular part of the population. It can be temporary or permanent, debilitating or not; in short, it is a contingent condition dependent on circumstances". Bio-social perspectives therefore begin by acknowledging both the complexity of impairment -for example, there is no agreed definition of impaired vision and every vision impaired person's experience of sight loss is unique - and the diversity of social responses to impairment, which can range from empathy and inclusion to intolerance and ostracism. The richer framework afforded by the bio-social model allows the issue of multiple disability to be addressed, thus

providing a more holistic alternative to the stereotyped accounts based on single issue disability, as illustrated in the Figure 2.1 below.

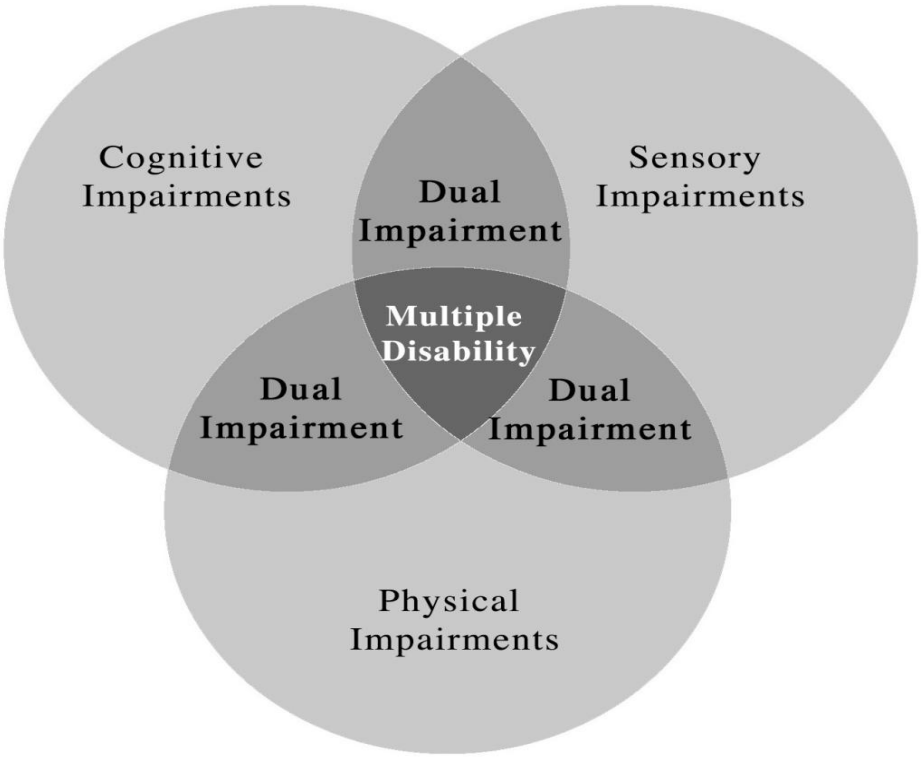


Figure 2.1 Dimensions of disability
Source: Hanson, (2004**)**

Multiple disabilities is a far more challenging issue for urban design than that of making towns and cities more accessible for people with reduced mobility, as it requires a more complete understanding of the circumstances under which environments are experienced as disabling.

2.6 Architectural Disability and Environmental Pressure

The design of physical environment is crucial determinants that limit or enable disabled users to use spaces maximally. Hanson, (2004) used the term 'architectural disability' to describe "how the physical design, layout and construction of buildings and places can

confront people with hazards and barriers which make the built environment inconvenient, uncomfortable or unsafe and may even prevent some people from using it at all". In this context, 'disability' implies a loss of functionality, thus the term refers to badly designed, shoddily built or poorly maintained buildings, which are dysfunctional, which can adversely affect people's access to and use of the environment. Disabled people are disabled by poorly designed environments and providing add-on or special Facilities tend to creates segregation rather than inclusion. For example, a wheelchair user cannot use the fitness equipment room in a sports centre not because of the use of a wheelchair. The design and management of the facility creates the barriers and limitations that disable. Consequently, the correct view would be that a wheelchair user cannot use the fitness equipment room because the equipment is inappropriate and/or the room is located on an inaccessible floor (Australian Bureau of Statistics, 2006).

A poorly designed building can disable or handicap older people, children, adults with babies in push chairs, larger, taller or smaller people and those carrying heavy luggage, as well as people with a physical, sensory or cognitive impairment. Some building features may not even be convenient for young, healthy and able-bodied people. Users tend to experience problems in using the built environment at some time in lives experiences. Seen in this light, people are all potential or actual victims of architectural discrimination as a result of conventional building design. According to Hanson, (2004) as many as 90% of individuals may be architecturally disabled in some way or other at some time in life. The term 'environmental pressure' was first used by Lawton in 1974 *ibid*to describe the impact that poorly designed homes, public buildings and places can have on people's lives most especially thereby defining it as 'environmental pressure as a state

induced by the necessity of dealing with environments built for younger, fitter people which may render the older person more vulnerable, or more docile and accepting of environmental constraints.

Imrie and Hall (2000) identified four assumptions that are current within the construction industry that prevent the built environment from being designed in such a way as to reduce environmental pressure or architectural disability. These are that:

1) There is insufficient demand among disabled people to justify providing a more accessible built environment;

2) It is unreasonably costly to provide environments that are fully accessible;

3) Meeting the needs of wheelchair users is sufficient to meet the needs of all disabled people;

4) Accessible environments can be provided by specifying technical design solutions without there being any corresponding change in social attitudes, values or practices.

2.7 Independent Living

The Disability Rights Commission has defined independent living as referring "to all disabled people having the same choice, control and freedom as any other citizen – at home, at work, and as members of the community. This does not necessarily mean disabled people' doing everything for themselves', but it does mean that any practical assistance people need should be based on choices and aspirations of people having special needs(Department for works and pensions (DWP), 2005). Disabled people stress that, just because someone might need assistance to go about daily life, this does not mean that one have to be 'dependent'. Independence comes from having choice and being empowered

regarding the assistance needed. Without this choice and empowerment, disabled people are unable to fulfill roles and responsibilities as citizens.

Independent living is not just about having choice and empowerment in personal care. For Deaf people and those with communication impairments, independent living is about interpreter and/or communication support. For people with mental health support needs, advocacy is a vital component of independent living. Mental health service users need advocacy support, just as people with serious physical impairments need personal assistance.

Indeed, there are many aspects ofpeople's lives where the existence or absence of disabling barriers will determine whether one can be an active citizen. Independent living is therefore an important part of enabling disabled people to fulfill the roles and responsibilities of citizenship. Its importance spans the full range of life experiences faced by disabled people, from early years and transition to adult hood through to adult life and employment, extending into old age (DWP), 2005).

2.8 Moving from General and Special Needs to Inclusive Design

Today, the approach has changed from one of tailoring buildings and products for fragmented constituencies of people with special needs and instead, greater stress is being placed upon the importance of 'inclusive design', 'universal design' or 'design for all'. Inclusive design means creating environments and products that are usable by all, without the need for specialist adaptation or design, see the Table 2.1. This goal arises out of the understanding that disability is socially defined.

Table 2.1: From 'special needs' to' inclusive design'

Special needs	Inclusive design’
Designer client. Persona of a young, fit, active, male, white adult the yardstick for good design.	People are individuals, who have different needs and requirements during their life course.
Others - older people and people with disabilities - are not ‘normal’ clients.	Us - we all have goals / aspirations as well as problems / impairments.
They have ‘special needs’. Micro-environmental approach	We share ‘generic needs’. Macro-environmental approach
Ethos of specialisation and pragmatism. Tailors the environment so that it is ‘just right’ for each client group.	Ethos of normalisation and enablement Extends parameters of design until no one is excluded
Telling people what they need.	. Asking people what they want.
Does your disability prevent you from using the city centre?	What is it about the design of the city centre that prevents you from using it?
Intuitive	the product is easy to use
Effective	it works in most situations and for most people

Source: Hanson, (2004)

An inclusive environment is one in which all users, whatever their abilities, are able to carry out day to day activities comfortably, effectively and safely without being restricted by the poor design, maintenance or management of the built environment. The principles of inclusive design aim to accommodate the broadest range of bodily shapes, dimensions and movements, in the belief that designers and manufacturers should ensure that buildings, products and services address the needs of the widest possible audience, see Table 2.2and Figure 2.2 displayed a key outcome for inclusive design which should therefore be to both alleviate environmental pressure and architectural disability, and also

to achieve a greater measure of social equity and justice. However, critics of inclusive design argue that in many cases it is impossible to provide a 'one size fits all' solution. Some people will always be excluded.

Table: 2.2: Principles of Inclusive Design

Principle	Description
equitable	the product is useful and marketable to people with a range of abilities
Flexible	it can accommodate a wide range of individual needs and preferences
Intuitive	the product is easy to use
Effective	it works in most situations and for most people
tolerant	the product can cope with user-errors
efficient	it does not stress or tire the user
appropriate	it is ergonomically designed to be acceptable to the majority of users

Source: Hanson, (2004)

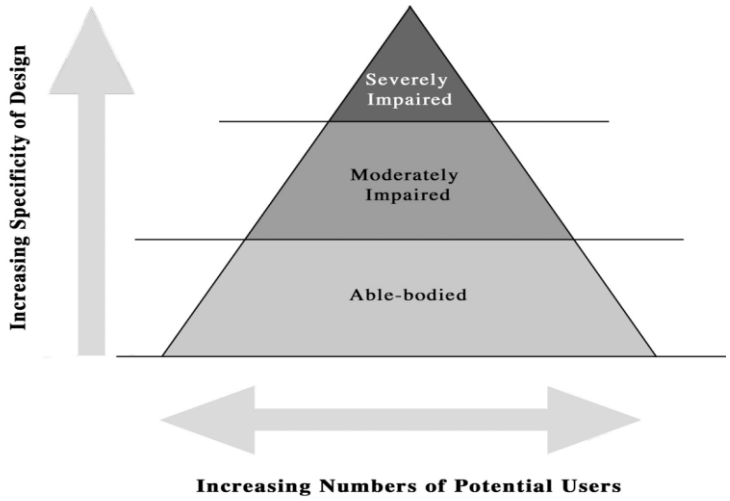


Figure 2.2: Benktzon's design pyramid
Source: Hanson, (2004)

This allows for customized and tailored products to meet a need in situations where it is particularly difficult to extend the design parameters of mainstream provision to include everyone. Clearly, this approach can be extended to the design of the built environment.

2.9 Users' Diversity

There is need to correctly understand people as failure to this can result in products that cause unnecessary frustration and exclusion, which reduces commercial success because of increased returns and customer support. In order to better understand population diversity, it is important to challenge the polarised separation of "able-bodied" and the "disabled". Diversity within the population is better modelled using a pyramid to model the full range of ability variation within a population. This pyramid can then be segmented to identify various categories of users. The bottom segment of the pyramid represents those with no difficulties, and the severity of difficulties increases up the pyramid. This is shown in the Figure 2.3, specific interpretation of this pyramid model is shown

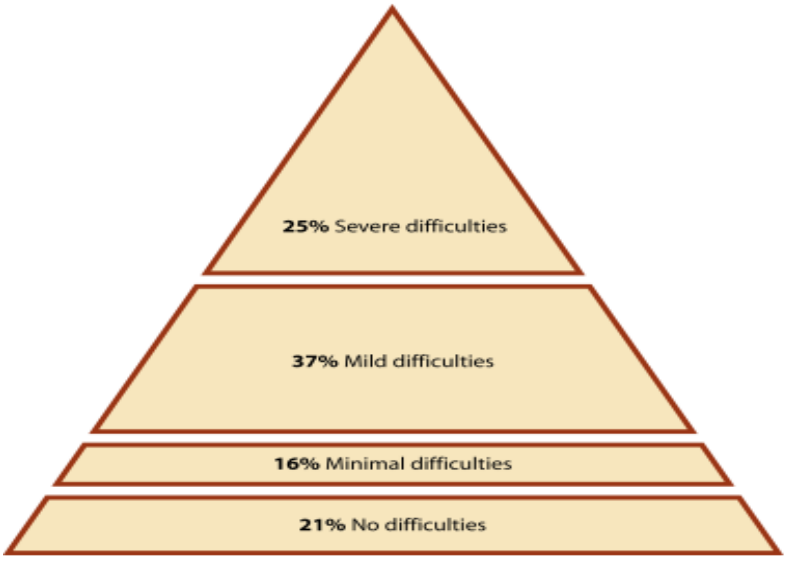


Figure 2.3: The pyramid model of population diversity
Source: Microsoft (2003)

Population diversity is introduced first from the perspective of ability variation, but can be further broadened to consider diversity associated with different real-world contexts, lifestyle, aspirations, gender, and past experiences. Inclusive design does not suggest that it is always possible (or appropriate) to design one product to address the needs of the entire population. Instead, inclusive design guides an appropriate design response to diversity in the population through:

i. Developing a family of products and derivatives to provide the best possible coverage of the population.
ii. Ensuring that each individual product has clear and distinct target users.
iii. Reducing the level of ability required to use each product, in order to improve the user experience for a broad range of customers, in a variety of situations.

The pyramid model of diversity shows how inclusive design aims to extend the target market to include those who are less able, while accepting that specialist solutions may be required to satisfy the needs of those at the top of the pyramid. Alvarenga, and Dedini, (2005)

2.10 The Inclusive Design Cube (IDC)

There are very few structured approaches that describe the implementation of inclusion design. There is a need to develop an inclusive methodology and also provide appropriate tools and data for supporting designers to inclusive design(Alvarenga, and Dedini, 2005).The inclusive merit of a product depends on two criteria: the merit of the requirements that, define the product, and the merit of the product when judged against those requirements (Keates, 2002). A simple graphical representation offered a visual

summary of the level of inclusion achieved by the design. One of such representation tool is the “Inclusive Design Cube” (IDC) (Keates, 2002).

The IDC highlights the different design approaches that can be used to develop products appropriate for a given range of capabilities. It was known that the principles of inclusive design generate products widely accessible to the population and hence good population coverage. This approach denoted “User-aware design”, dominates the cube as shown in Figure 2.4.

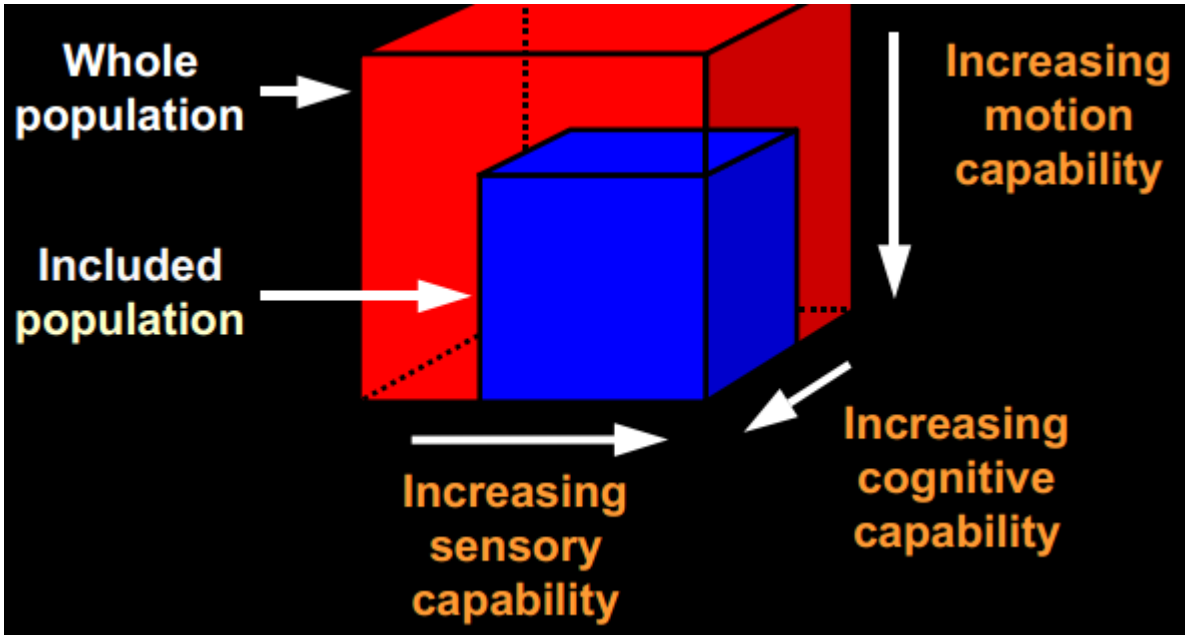


Figure 2.4: The “Inclusive Design Cube”
Simeon Keates (2002)

For severely impaired users, it may be necessary to adopt rehabilitation design approaches of custom products for specific users, “Special purpose design” in Figure 2.4 above. In between the two approaches is an intermediary design approach with flexible boundaries. “Customizable/modular design” takes a base unit designed using the “User-aware design” principles, but with a changeable interface that is either adaptable or can be swapped for

one of a series of modular designs. The “Inclusive Design Cube” is a very potent visualization tool and communicates the needs of different sections of the population. However, for practical implementation of inclusive design practices, it is necessary to supplement it with a systematic design approach.

Giuliani (2016)

2.11 General Building and Facility Issues

There are five general building issues that users of most facilities commonly encounter: using circulation systems,entering and exiting, wayfinding, obtaining products and services, and using public amenities. Buildings that facilitate these activities for the widest possible population are more usable by everyone(Giuliani, 2016).

2.11.1 Using circulation systems

Moving around outdoors and inside buildings is the quintessential activity of urban life. Accessibility of resources, in its broadest sense, and the mobility required for that access is what cities are all about.

Exterior Path Planning and Design: The layout of path systems should establish a pattern that is safe and accommodates the needs of people on the site and in buildings.Planning should give consideration to the needs and preferences of people who move at different paces and may have varying abilities.Travel surfaces and dimensions should support comfortable and easy movement without hazards or barriers, except in locations where challenge is part of a recreational experience. People should not encounter unexpected obstacles on a path (Giuliani, 2016).

2.11.2 Entering and exiting

The rest of a building's features do not matter to the person who cannot get in or out. Therefore, it is imperative that the design of entry and exit conditions ensures their ready use by everyone.

Finding the Building: Before people can enter a building, they first must be able to find it.

The use of external landmarks that distinguish the building from other nearby facilities can help people locate it.

Identifying the Entrance or Exit: When faced with multiple doors or panels that imitate the appearance of doors at the entrance or exit of a building, a person should be able to tell the difference between the ones that are doorways and those that are not.

2.11.3 Wayfinding

Wayfinding is the organization and communication of our dynamic relationship to space and the environment. Successful design to promote wayfinding allows people to:

i. Determine their location within a setting,
ii. Determine their destination, and
iii. Develop a plan that will take them from their location to their destination.

The design of wayfinding systems should include: identifying and marking spaces,grouping spaces, and linking and organizingspaces through both architectural and graphic means.Architectural Wayfinding: There are five primary architectural wayfinding elements:

Paths/ Circulation,Markers, Nodes, Edges, and Zones/Districts.These, along with visual accessibility, are the design criteria for highly legible and comprehensible urban environments.

Architectural wayfinding systems use the design and organization of landscaping, urban amenities, and buildings as spatial indicators.

2.11.4 Obtaining products and services

One of the main reasons for using buildings is to obtain access to products and services. Any building with that function should be designed to facilitate such access for the entire population. Such buildings include commercial facilities, service centres, bill payment locations, libraries and offices handling applications and forms (Giuliani, 2016).

Entries and Circulation Spaces: These spaces will be the first contact people have with the interior of the facility. Providing a sense of openness improves knowledge of the facility's spatial layout and social organization.

2.11.5 Using public amenities

Public amenities are resources, conveniences, facilities or benefits continuously offered to the general public for their use and/or enjoyment, with or without charge (e.g., restrooms, information displays, public telephones, rain shelters, drinking fountains, etc.).As such, public amenities are expected to function around the clock, in adverse conditions such as inclement weather, high noise environments and in varying degrees of light and heat.

Consequently, there are several key attributes that should be integrated into all public amenities to ensure universal usability.

2.12 Summary of Chapter Two

This chapter discusses the seven principles of inclusive design, models of disability and sporting requirement for the disabled persons. The physically challenged person are an integral portion of the larger society which should be adequately catered for in the design considerations of both public and private spaces in order to minimise architectural disability as everyone in the society can become disabled at any point in life.

3.0 RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the research design, sampling technique used in the course of the research. In addition, research techniques used in data collection from the various case studies selected alongside with case study selection criteria and the assessment criteria are further explained. The research variables, and how data were analyzed, presented inclusive of the limitations encountered in the course of field survey are also incorporated in this chapter. Research methodology is the plan, mode or conceptual structure of the research and type of approach adopted in the study (Olaofe, 2010). It is the scheme considered in order to obtain response to research questions posed. Decisions taken at this stage are very vital to the success of any research work because these decisions determine the worth of the research findings (Bordens and Abbot, 2002).

3.2 Research Design

A qualitative survey and case study research approach is adopted in the cause of this research.The research strategy used is due to other similar past researches conducted in the use of inclusive design on the built environment (Ugochukwu, 2011). Case studies were conducted with interviews and visual surveys of selected cases which aided in data collection during the field work. The use of the multi research techniques is to allow for research triangulation. Collected data were then subjection to through qualitative analysis using the theoretical frame work of inclusion principles design principles and standards required in stadium/sport complexes.

3.3 Populationof the Study

Montella (2008) states that specification of the population, to which the inquiry was addressed, affect decisions that researchers make both about sampling and resources. Sports centres in North-West geopolitical zones made up the primary population for this study. There are six (6) indoor sports complex within the location of the research. In view of this, three (3) indoor sports complex fit with the definition. Below is a list of the respective sport complex, namely;

i. Ado Bayero Square Kano
ii. Rwang Pam Township Stadium Jos
iii. Sani Abacha International Stadium (SAS) Kano

Three (3) respondents formed the population of the owners and management of the selected sporting complex which fit the above mentioned criteria of the case studies. The population of the people with mobility impairment (disabled) is made up of 560 registered with the disability association of Kano State. Below is Table 3.1 showing the distribution with respect to the mobility aid used.

Table 3.1 Distribution of Mobility Impaired with respect to devices used

Mobility Aid used	Number of Registered Disabled
Wheel Chair	385
Crutches	96
Frames	26
Walking ticks	42
Roller Wheel	7
None	4

Source: Author's Disability Association of Kano State, (2016).

3.4 Area of Study

The area of study is Kano State with the proposed site as the focal point. The choice of Kano State was due to its' large population and the need to upgrade the underutilized site, which is of about 2250000 square metres. Hence the need to integrate the disabled in the society remains significant.

3.5 Sampling Technique

Purposively sampling was used in order to select the case studies as suggested by Fletcher (2006). Purposive sampling technique was use in the course of sampling case studies. This method of sampling was used in order to select cases that will allow for sufficient and suitable data collection with respect to the theoretical framework. Cases were identified for study due to inherent qualities which are in consonance with the phenomenon under investigation (Ugochukwu, 2011).

3.6 Sampling Size

Managersof each of the sporting complex, facility officers were interviewed as well as 6 disabled personswere also interviewed.

3.7 Case Study

Case studies were used as an important aspect of data collection. Such selected cases were based on purpose, richness of information to be obtained and criticalness of the cases.

3.7.1 Case study selection criteria

The criteria use for selection of cases wasbased on the following parameters:

i. Inclusive design principles ;

ii. Provided sporting facilities

iii. The research questions.

3.7.2 Case study assessment criteria

Selected case studies were assessed using the theoretical frame work of inclusive design and the research questions.

3.8 Research Technique

Three research instruments/tools were utilized in the research are as follows: namely; visual survey, and semi-structured interview. These research instruments were considered most suitable for data collection in the course of the research. The choice of the instruments mentioned above is to allow for the triangulation of collected data so that each of the selected tools can corroborate and complement the other as used in other previous researches (Ugochukwu, 2011)

3.8.1 Visual survey

A visual survey of tangible architectural elements, components and spatial organization of spaces was made. This tool was use in order to ascertain available facilities, spaces and design considerations use to cater for the variety of users needs. The tools used under the visual survey are checklist, photographs, note taking and sketches.

i. Checklist: The checklist used for data collection was based on the principles of inclusion and sports complex design considerations. Templates from online sources and literature review were used as a guide in drafting the checklist.

ii. Photograph: This was used in order to snap defined spaces, sections of the case studies, physical objects and ongoing activities within the cases that were studied. Such snap shots were with the consent of the management and were taken for the purpose of references in order to augment data collected from other research tools

iii. Sketches and note taking:Sketches were drawn of layouts, spaces and items to description of items were photographs were not possible. Note taking or documentation was made while touring round the building facilities and during interviews.

3.8.2 Observation

Activities such as the use of spaces, movements, circulation and users accessed spaces where critically observed in order examine degree of suitability of available spaces. Observations were made as users makes us of spaces and available circulation means within the spaces during trainings and exercises.

3.8.3 Semi structured interview

Key personnel, coaches, players and athletes were interviewed on issues relating to the sporting facilities. The choice of this type of interview was a deliberate attempt in order to allow the respondents to freely respond to questions, digressed where necessary and be at ease during the interview session.

3.9 Procedure for Data Collection

The data collection procedure entails an onsite visitation to the three selected cases studied and where the research tools were administered and visual survey was conducted. A guided walk through of the facility courtesy of a staff representative from the three cases aided during the course of the field survey.

3.10 Variables of Study

The variables of the study include the following:

Functional spaces, circulation modes, building materials, signages, users, use of technology local or traditional sporting activities and the reflections of the principles of inclusive design.

3.11 Validity and Reliability

The choice of the instruments of data collection was to a large extent guided by literature review and the theoretical framework of inclusiveness and sports complex design. Templates checklistsobtained from literatures guided the design of the used checklist for the fieldwork. In addition, experts' advice such as lecturers and supervisors were sought alongside colleagues input further completed the research design procedure. Hence, reliability and validity was maintained through the outlined measures mentioned above.

3.12 Ethical Considerations

A prior notification were given to the management of the cases visited. Respondents of the interview were properly informed about the purpose of the data collection which is meant for academic purpose. Anonymity and confidentiality of the respondents was equally emphasized.

3.13 Data analysis and Presentation

Data were analyzed using descriptive statistics white qualitative data were reduced in themes, and models of high tech design. Tables, charts, and figures were used in order to present analyzed data.

3.14 Summary of Chapter Three

This chapter takes into consideration the various approaches adapted towards data collection from the respective case studies selected in the study. Three case studies were selected namely; AdoBayero square, Kano Sani Abacha (International) stadium (SAS), Kano, and the Rwang Pam township stadium, Jos. The selected case studies were used for the various sporting activities of the physically challenge/disabled. Interviews were conducted with various physically challenged players and participants, managers and staff of the sporting facilities, observations were conducted as well as visual surveys such as checklist and photographs also formed an important aspect of the data collection.

4.0 DATA PRESENTATION AND ANALYSIS

4.1 Introduction

This chapter covers the description and analysis of the cases studied. It presents data obtained from the selected cases visited, studied and analyzed based on the established study areas.

4.2 Case Study I: Ado Bayero Square Kano

4.2.1 Introduction

The sporting activities for the disabled (Figure 4.1) in 1989 in Kano State had been in existence forthe past twenty five years, the state have twenty three golden medals, several trophies, awards and other international recognition inclusive of COJA which had the highest number of spectators so far.



Plate I: Athletes during Para soccer training at Ado Bayero Square Kano.
Source: Author's field work, (2015)

The Plate I: shows a training session of para soccer at the Adebayo Square, Kano. The training is done weekly so as to keep the players in form during any competition.Although the Para sporting activities has come to stay in the State and is among the pioneers in the

state, yet there is no dedicated sport complex provided for the training and the activities for the disabled except the Ado Bayero Square which is just made up of three pitches and Para-lifting unit.Training for power lifting are done on weekly basis in the morning on Saturdays likewise Para soccer which is held weekly every Saturday between 5:00pm-6:30pm. Other training activities (see Plate II) such as wheel chair race (disabled athletes) and wheel chair table tennis are scheduled from time to time.



Plate II: Athletes during fitness exercise/training at Ado
Source: Author's field work, (2015)

4.2.2 Available spaces and sporting facilities at Ado Bayerosquare

i. Para soccer pitch:The soccer pitch is played on a hand ball pitch with a dimension of (9x18m) which could be floored with either cement or coal tar as shown in the Figure 4.3 below. The game is made up of six (6) players and a goal keeper while during competition; the team is made up of twelve (12) players' altogether (see Plate III).



Plate III: Athletes during athletic exercise/training at Ado Bayero Square Kano
Source: Author's field work, (2015)

ii. Table tennis court: The tennis court is fenced with barb wire floored surface area. The court is used whenever training activities is to be conducted as shown in the Plate IV



Plate IV: Tennis and Volley ball court at Ado Bayero Square Kano
Source: Author's field work, (2015)

iii. Power Lifting centre: The power lifting centre is made up of two sections namely; the abled bodied weight lifting and the power lifting section for the disabled. The centre is just a rectangular building with some demarcations for the weight lifting and the power lifters as can be seen in the Plates V and VI



Plate V: Power lifting room 1 at Ado Bayero Square Kano
Source: Author's field work, (2015)

The Plate V and VI shows the power lifting unit for the physically challenged/disabled persons at the Ado Bayero square in Kano. This section is poorly lighted and is not adequately equipped with the basic equipment for the disabled/physically challenged persons.



Plate VI: Power lifting room 2 at Ado Bayero Square Kano
Source: Author's field work, (2015)

4.3 Case study II: Rwang Pam township stadium, Jos

The Rwang Pam Township Stadium Jos started in 1976 as a local government Area where local competitions and matches where played and hosted. Later in 1988, the then military government upgraded and expanded the stadium; the redevelopment of the township stadium, which was designed by TRANSPROJECT NIGERIA L.T.D. after the construction, the stadium was commissioned on 3rd September 1991 by General Ibrahim Badamasi Babangida.

The Plate VII below shows the approach view of the RwangParm Township Stadium in Jos, Plateau State. A gently sloping ramp is provided at the stadium approach which enable vehicles and users to easily access the stadium from the access road.



Plate VII: An approach view of Rwang Pam Township Stadium, Jos
Source: Author's field work, (2015)

The Plate VIII shows the VIP section of the Rwang Pam Township Stadium. The sitting arrangements are racked without the provision of any access for the physically challenged/disabled most especially users with wheel chairs.



Plate VIII: Sitting arrangements at Rwang Pam Stadium Jos
Source: Author's field work, (2015)

4.3.1 Sporting activities

Sporting activities such as athletics and gymnasium among others. The athletics is made up of sporting activities such as;

i. Basket Ball Court
ii. Gymnastic
iii. Squash
iv. Boxing
v. Football
vi. Para soccer
vii. table tennis
viii. javelin
ix. short put

x. discourse

Gymnasium: the gymnasium comprised of the following;

xi. Power lifting, which is meant for the disable

xii. Weight lifting, which is meant for the able

xiii. Wrestling

xiv. Judo

There is also a volley ball court, Hand ball court basketball court (outdoor).

Karate, Abula

xv. Tecquando

xvi. Traditional wrestling

xvii. Traditional dambe

xviii. Langa (i.e holding legs and pushing an operant falls to the ground) which is played at both national and international level.



Plate IX: Weight lifting hall at Rwang Pam Stadium Jos
Source: Author's field work, (2015)

The PlatesIX and X and below respectively are showing a cross-section of the power lifting and weightlifting sectors at the RwangParm Township Stadium. The volleyball court area is not totally floored and designed to allow for the easy usage and accessibility for the physically challenge/disabled. This is because there are pavements, change in levels and thresholds leading to this area which further impairs the use of the court for diverse users.



Plate X: Boxing hall at Rwang Pam Stadium Jos
Source: Author's field work, (2015)

4.3.2 Main Hall

There are three games that are played in the main Hall namely; dart, scrabble and table tennis.

4.3.3 Deficiencies of the Rwang Pam Township stadium

Despite the 21 sporting activities being played in the stadium there is no provision for some sporting activities where as some of those available are insufficient. There is also the need for upgrading and provision of other facilities at the township stadium. Some of the sporting activities that are not available include;

xix. Tennis (lawn tennis) often played at plateau club

xx. Golf, which is played at refilled, lamingo and rukuba Barracks

xxi. Rugby, which is played at polo field

xxii. Cycling also known as velodrome

xxiii. Hockey

xxiv. The athletics field is made up of a 6 tracks and is covered with synthetics as such field is below the standard requirement of (8-10) tracks and should be covered with synthetic material



Plate XI: Volley ball court at Rwang Pam Stadium Jos
Source: Author's field work, (2015)

Plate XII shows the indoor sports hall at the RwangParm township stadium. Although the floor is well treated, yet there is a threshold or change in floor level at the entrance door

which does not adequately take into consideration the physically challenge/disabled users. There are no sitting arrangement for spectators except for the available dwarf wall which does not users with wheel chairs.



Plate XII: Indoor games hall at Rwang Pam Stadium Jos
Source: author's field work, (2015)

PlateXIII below shows the outdoor basketball court which is not demarcated but left exposed to external influences most especially passersby and the adjacent road beside it. The floor has cracks and is elevated above the natural ground level without an easy access point for the physically challenged/disabled persons.



Plate XIII: Outdoor Basketball court at Rwang Pam Stadium Jos
Source: author's field work, (2015)

4.4 Case Study III: Sani Abacha (International) Stadium (SAS) Kano

Sani Abacha Stadium (SAS) 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.

Plate XIV shows an ambulance bus parked adjacent to the vip section of the SAS, Kano. There are several change in levels at the stadium which marked movement, usage and accessibility at the stadium difficulty for the disabled persons. The football pitch is covered with synthetic grass, which impairs usage for para soccer games. Thus, design of the

stadium virtually neglect the physically challenged persons thereby socially excluding such persons from using the stadium.



Plate XIV: VIP section of Sani Abacha International Stadium, Kano
Source: Author's fieldwork, (2015)

The Stadium has three major sections namely;

I. Outdoor games

II. Indoor games

III. Auxiliary facilities

The plate XV shows the popular section and the carpeted football pitch of which is impossible for it to be used for para soccer a well as the seating arrangement has no provision for the users on wheel chair and other physically challenged persons/disabled.



Plate XV: Popular section of Sani Abacha International Stadium, Kano
Source: Author's fieldwork, (2015)

4.4.1 Sporting activities

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;

i. Basket Ball
ii. Gymnastic
iii. Squash
iv. Boxing
v. Football
vi. Para soccer
vii. table tennis

viii. javelin

ix. short put

x. discourse

xi. Fives

xii. Rugby

xiii. Cricket

Gymnasium: the gymnasium comprised of the following;

xiv. Power lifting, which is meant for the disable

xv. Weight lifting, which is meant for the able

xvi. Wrestling

xvii. Judo

xviii. Karrate

xix. There is also a volley ball court, Hand ball court basketball court (indoor and outdoor).

xx. Tecquando

xxi. Tennis (lawn tennis)

4.4.2 Available facilities

Some of the facilities provided at SAS are as follows; media unit,indoor games hall, mosque, police outpost station, conference hall and Fives.

i. Medical unit: The media unit is where all the media coverage is coordinated at the Stadium. This also has the display unit directly located behind the VIP section. This is shown in Plates XVI and XVIII

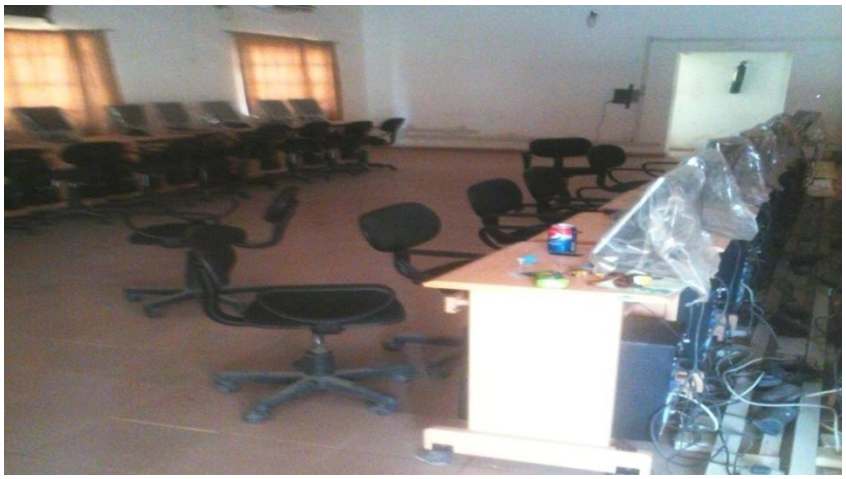


Plate XVI: Media unit of Sani Abacha International Stadium, Kano
Source: author's fieldwork, (2015)

ii. Indoor games hall: The hall is use for indoor sports such as Volley Ball, Hand Ball, Tennis, Para Soccer and often times as reception hall.



Plate XVII: Media unit of Sani Abacha International Stadium, Kano
Source: author's field work, (2015)

iii. Mosque: The mosque is meant for prayers has thresholds at the entrances which limits its accessibility. It is located adjacent to the entrance point into the stadium.



Plate XVIII: Media unit of Sani Abacha International Stadium, Kano
Source: Author's fieldwork, (2015)

iv. Conference hall:This is mostly used by VIP's whenever there any crucial or important meeting, deliberation or conference. The Plate XIX shows the conference room of the presidential wing at the SAS. The area is not adequately lighted and ventilated as it has only one accessed to the external surrounding. The plate XX shows a cross section of the living area of the presidential section of the SAS. The presidential wing is connected to the VIP area of the stadium for easy access.



Plate XIX: Conference room in presidential unit of Sani Abacha International Stadium, Kano
Source: Author's field work, (2015)



Plate XX: Presidential section of Sani Abacha International Stadium, Kano
Source: Author's field work, (2015)

v. Outdoor volley ball and basketball court



Plate XXI: Outdoor Volley Ball court of Sani Abacha International Stadium, Kano
Source: author's field work, (2015)

Plates XXI and XXII shows the pitches for Volley Ball and Fives games which is adjacent to the media unit of the stadium. The floor treatment may is not be favourable for the certain categories of users as the floor area is relatively coarse around the Fives pitches.



Plate XXII: Fives pitches of Sani Abacha International Stadium, Kano
Source: author's fieldwork, (2015)

4.4.3 Deficiencies of Sani Abacha International Stadium, Kano

Some of the architectural challenges at SAS are that some of the spaces are not properly lighted, ventilated, difficulty in accessibility and the inadequate consideration for the disabled players and spectators as shown in the plates below.

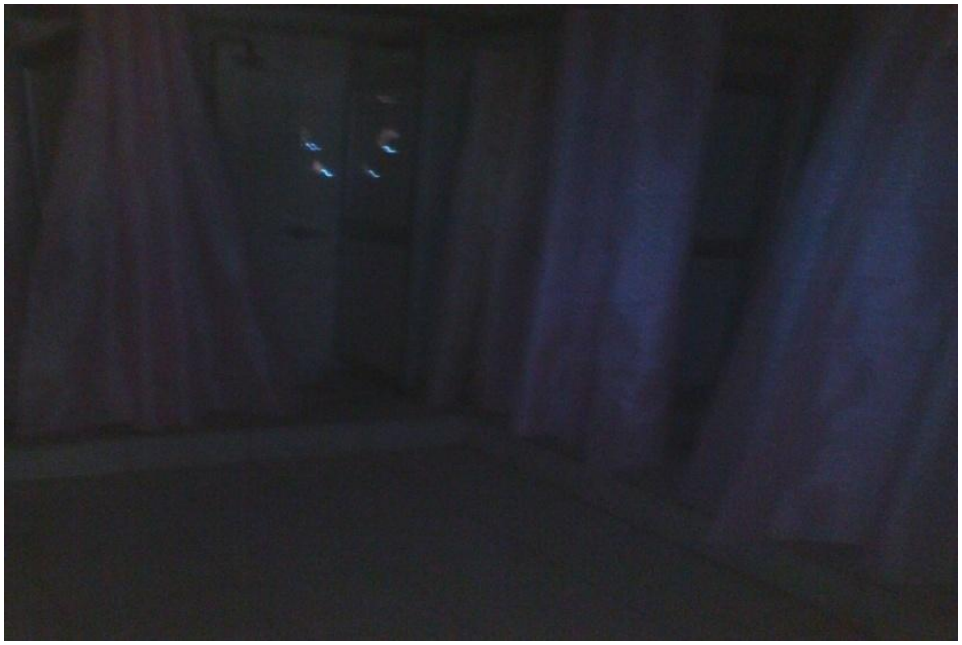


Plate XXIII: Poorly lit bathroom in Sani Abacha International Stadium, Kano
Source: Author's field work, (2015)

Plate XXIIIshows a poorly lit passages which links auxiliary spaces such as the medical area, changing room for players and sport officials, fitness and relaxation area for players, staff and sporting official. The passage makes it difficult for easy circulation and access to other functional spaces within the administration area.

While Plate XXIVshows the urinals in the toilet meant for players. The positive of the urinal is not convenient physically challenged persons most especially users on wheel chairs. The height level of the toilet fittings and fixtures do not allow for the easy usage of the physically challenged persons.



Plate XXIV: Bathroom for players at the Sani Abacha International Stadium, Kano
Source: Author's fieldwork, (2015)

4.5 Discussions of Findings

An overview of the findings under the specific objectives are discussed below

4.5.1 Design parameters that affect the inclusion of the physically challenged persons sporting facilities

Some of the design considerations that determine the inclusiveness of the sporting facilities/stadium include the following.

i. Height: This has to do with vertical distances, change in floor levels or positions where fittings are fixed, facilities are kept and changes in various spaces. This is because unnecessary change in floor levels and varying heightof fittings without adequate consideration for the physically challenged persons always impairs the usability of such facilities and spaces within the stadium.

ii. Textureof surface areas for tactile perception: This is another important design parameter worth considering in the design of any space/facilities but often neglected. This is due to the nature of surfaces required for various sporting activities of the physically challenged persons which differs from those of the abled persons. A good example of is seen in the soccer pitches. The Para soccer which is made up of six players and one goal keeper making a team of seven players, the Para soccer pitch is expected to be hard, smooth and well-polished in order to aid the movement of the players while playing on wheel chairs. The reverse is the case for the football pitch of able-bodiedpersons where there is need for such pitches to be carpeted with natural or synthetic grass so as to avoid injury of person while using the fields.

iii. Wheel chair zone: This circulation space is specifically needed at major circulation points, lobbies, parking areas and on various pitches. This is to allow free flow of traffic, avoidance of random parking of wheel chairs and other items or facilities that are peculiar to the physically challenged persons. There were noprovision wheel chair zones in the three case studies visited.

4.5.2 **Challenges faced by physically challenged persons with sport complexes**

One of the common challenge experienced is that the available sporting facilities are not always readily available to the physically challenged persons except the AdoBayerosquare which is mostly used as training ground for Para soccer and powerlifting. In addition, there is an imposed architectural disability/pressure that is being exerted on the physically challenged persons. This is because most of the spaces in the stadiums do not adequately carter for the needs of these individuals. As such, these personsare more of an afterthought.

4.5.3 Objective III: the degree of the reflection/application of the principles of inclusive design in the selected sporting facilities/stadium.

Among the three case studies, AdoBayero square is rated least in terms of the degree of the reflection and application of the seven principles of inclusive design. This can be attributed to the fact that square is below the basic requirement for a sporting facilities and there was no design considerations made for the square. The RwangPam Township Stadium shows some level architectural design considerations for the physically challenged persons. The Sani Abacha international stadium (SAS) further reflects and apply a little more of inclusive design principles than the Rwang Pam Township stadium. A summary of the assessment on the degree of reflection/application of the principles of inclusive design is as shown in Table 4.1 and in Figure 4.1 below.

Table 4.1: Summary of case study assessment using inclusive design principles

Variable	AdoBayero Square	SAS	RWANG Pam Stadium
1. Simple and Intuitive Use	1	3	1
2. Equitable Use.	1	3	3
3. Perceptible Information	1	2	2
4. Tolerance for Error.	1	3	3
5. Flexibility in Use.	1	2	2
6. Low Physical Effort.	1	1	1
7. Size and Space for Approach and Use.	1	2	2

Source: Author's field work, (2015)

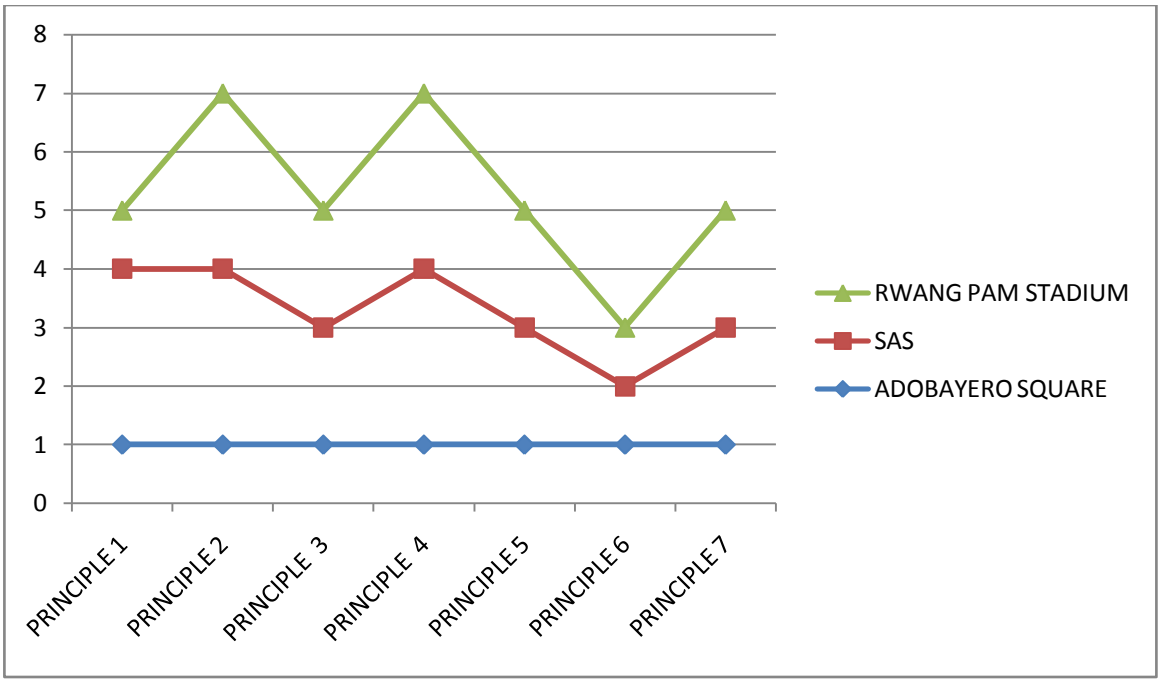


Figure 4.1: Assessment of the selected case studies based on inclusive design principles
Source: Author's field work, (2015)

4.5.4 Design framework using inclusive design for the proposal of Kano sports complex.

The design framework uses a form which is flexible and symmetrical longitudinally from the aerial view. The seven principles of inclusive design are adequately explored as well as basic design requirements for indoor sport complex and the physically challenged persons are equallytaking into cognizance. A detail discussion on the proposed design is made in Chapter five.

4.5.5 Deductions from case studies

1. Poor floor conditioning of the Para soccer pitches as there are cracks on the surfaces at AdoBayero square.
2. The volley ball court is not floored rather it is left bare at AdoBayero square.
3. Poor lighting condition in the power lifting hall at AdoBayero square.

4. Availability of ramp at main entrance to aid in the accessibility of physically challenged persons both at SAS and Rwang Pam Stadium, Jos.
5. Multi use of indoor halls which limits access for physically challenged persons both at SAS and Rwang Pam Stadium, Jos.
6. Several use of door thresholds and changes in floor level most especially at SAS.
7. Excessive demarcations and barriers which impedes physically challenged person from using most of the spaces both at SAS and Rwang Pam Stadium, Jos.

4.6 Summary of Findings

The findings made from the respective case studies are summarized and presented in the Tables 4.2, 4.3 and 4.4 below.

Table 4.2: Summary of findings on Ado Bayero Square Kano

s/n	Variable/Parameter	Findings
1	Ramp	There is no any single use of ramp within this facility
2	Means of horizontal of circulation	There are no walkways or any defined path ways. There corridor is narrow and poorly lighted
3	Vertical means of circulation	Due to the nature of the facility, there is no provision for vertical access.
4	Way finding	The spaces are not properly integrated to allow users to easily find their way around the facility
5	Variation in heights	The heights of facilities are equally undefined. Due to the poor design consideration of the space.
6	Floor levels, demarcation and surfaces	The soccer pitch has obstacles, absence of flooring of the tennis court and volleyball court. The floor level of the indoor hall is relatively satisfactory without unnecessary demarcations and change in floor levels.

Source: Author's field work, (2015)

Table 4.3: Summary of findings on Sani Abacha International Stadium, Kano

s/n	Variable/Parameter	Findings
1	Ramp	There is no any single use of ramp within this stadium except at the main entrance (gate). As such, there is difficulty in accessing space
2	Means of horizontal circulation	Although passages/corrodors are relative wide of about 2.4m, yet majority of such passages and lobbies are not adequately lighted.
3	Vertical means of circulation	Only staircases are made available at the stadium and steps at entrances. This limits accessibility and use of spaces most especially to the physically challenged people.
4	Way finding	The spatial layout is relatively simple such that users can easily navigate within the stadium. The use of signages mostly in Hausa and English languages.
5	Variation in heights	Heights of fittings, and fixtures are relatively not favourable for some of the physically challenged as there is difficulty in using such items/facilities.
6	Floor levels, demarcation and surfaces	There is excessive use of door thresholds and change in floor level which tends to impede movement properly treated to suite movements

Source: Author's field work, (2015)

Table 4.4: Summary of findings on Rwang Pam, Jos

s/n	Variable/Parameter	Findings
1	Ramp	Ramp is only made available at the approach of the administration block which has a gentleslope
2	Means of horizontal circulation	There are defined passages although with change enlisted due to steps difference. Steps are used in such place instead of ramp which could serve diverse users.
3	Vertical means of circulation	There is no adequate consideration for the physically challenged as there are only staircases in the whole facility.
4	Way finding	The juxtaposition of some of the spaces tend to impairone's ability to easily navigate are find his or her way around. There is also minimal use of signages
5	Variation in heights	There is likewise several changes in heights/levels of fitting, equipments which are relatively difficult to access and for usage.
6	Floor levels, demarcation and surfaces	Although the surfaces are made of terrazzo and relatively satisfactory, yet the use of thresholds, steps instead or ramps equally impose difficulty to the physically challenged persons.

Source: Author's field work, (2015)

4.7 Design Framework

The design framework used for the proposed sporting complex is dependent on three parameters namely; principles of inclusive design, sporting activities for the physically

challenged individuals or persons, and the social cultural values of the Kano people. The Figure 4.2 shows the relationship of the parameters that constitute the design framework.

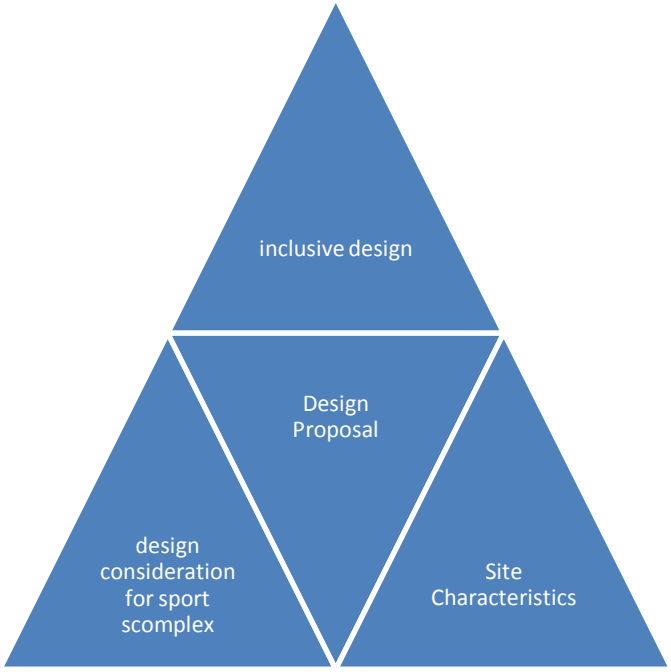


Figure 4.2: Design Framework,
Author's Sketch, 2016

4.8 Summary of Chapter Four

The three selected case studies used in the study indicate that the areas are merely used in the gaining activities of the physically challenged persons/disabled. This is because there is no adequate provision for the design requirements of the physically challenged persons. As such, players and spectators within this category find it difficult to use the available facilities and equipment at the selected case study. This suggests the poor consideration of the disabled persons in the design approach of the selected case studies. This results in the social exclusion of the disabled persons/physically challenged and an increased level of architectural disability within the sporting facilities are vary users are constrain from using such spacing facilities and equipment.

5.0 DESIGN REPORT

5.1 Introduction

This chapter gives an overview of the design brief which served as the basis for the design of the proposed sport complex for the disabled, Kano. The preliminary design considerations such as the site characteristics, inclusive design principles and indoor sport design parameters are equally presented in this chapter. In addition, the proposed design is presented and discussed detail with its various components and other necessary details all form an integral aspect of this chapter.

5.2 Design Brief

Kano State being one of the most populated State in Northern Nigeria, has over the years assisted the physically challenged persons in so many ways in order to alleviate their pains and hardship so as to give them a sense of belonging. Among these are several homes for the disabled, medical services and allowances in which such physically challenged persons are beneficiaries, yet there is more to be done in order to co – opt the physically challenged persons in their millions into the broader society. It is against this backdrop that the Kano State Government have made available vast portion of land for various sporting activities and for investors to invest in several sustainable project which will contribute positively to the development of Kano State and to the wellbeing of the citizens. This therefore calls for the design of a befitting indoor sport complex for the disable which should be international reputation and large enough to carry a sizable number of the physically challenged individuals and numerous spectators to participate in the diverse sporting activities in order to engage the physically challenge persons positively. The design brief therefore calls for

the adequate consideration of the physically challenged as they are the key players and users of the indoor sport complex. In order achieve this demand; it is paramount to use inclusive design as a tool in the design proposal of the indoor sports complex.

5.3 Preliminary Design Considerations

The design process started with a preliminary study which covers the site characteristics, analysis and concept formulation.

5.3.1 Site selection

Three sites were initially selected for the proposed design. The selected sites include;

(a) The Ado – Bayero Square Kano: This site is presently being use temporarily for local boxing, para-soccer, power lifting and volley ball. It is one of the selected case studies as discussed in above in chapter four.

(b) Extension of Sani Abacha's Stadium (SAS) Kano:The Sani Abacha (International) Stadium is quite large and has a vacant/free space which can be used for any future development adjacent to the main soccer field.

(c) Kano Square, BUK Road Kano: This is a vast area which have designated for various events as mention above. The square has been demarcated, well laid out, partition into different sizes with adequate drainages, good road network with utilizes such as water, telephone and power supply as can be seen in the PlatesXXV and XXVI



Plate XXV: Proposed site showing utilities and services
Source: author's field work, (2015)



Plate XXVI: Proposed site showing road network
Source: Author's field work, (2015)

5.3.2 Site selection criteria

The criteria which used for the selection of the site include the following;

(a) Inclusive design principles: The seven (7) design principles of inclusive design were taken into consideration so as to achieve a design that will be universally friendly, flexible and suitable for users of diverse category. Among the three selected sites A, B, and C, site C (i.e. the KanoSquare along BUK road tend to be more favourable and suitable for and inclusive design.

(b) Design consideration for Indoor Sport: These are set rules and standards which must be given priority such as the topography, size accessibility, safety and zoning with

respect to other adjacent activities. Thus, The Kano square equally favors this course in terms of size, accessibility, relatively flat terrain and other available utilities.

This is followed by site B and then site A.

5.3.3 Site location

The site is located along BUK Road which can be assessed from different areas of Kano metropolis. The plate below shows the immediate surroundings around the Kano Square

5.3.4 Site characteristics

The Characteristics of the proposed site such as the topography, vegetation, natural features such as rock out crops etc., Soil type, services, utilities, and site scenic qualities both from interior and exterior point of view were critically analyzed in order to arrive at the design process. This is as shown in figure 5.1

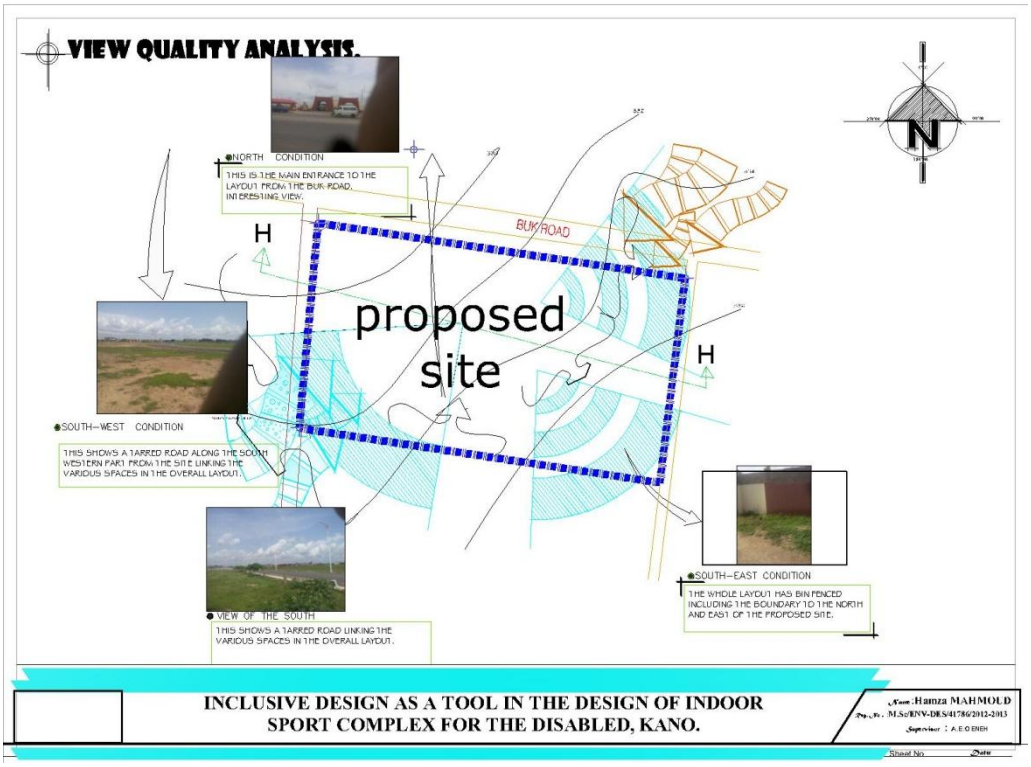


Figure 5.1: Site location
Source: Author's sketch, (2015)

a. Topography: the site has a relatively Flat terrain and a gentle slope which allows foreasy site drainage. This can be seen as existing drainages have been dug to aid in the passage of water during rainfalls and from other activities. The Figure 5.3 below shows the site drainages system, relative gentle slope and the soil type.



Plate XXVII: Proposed site showing gentle slope and drainage system
Source: author's field work, (2015)

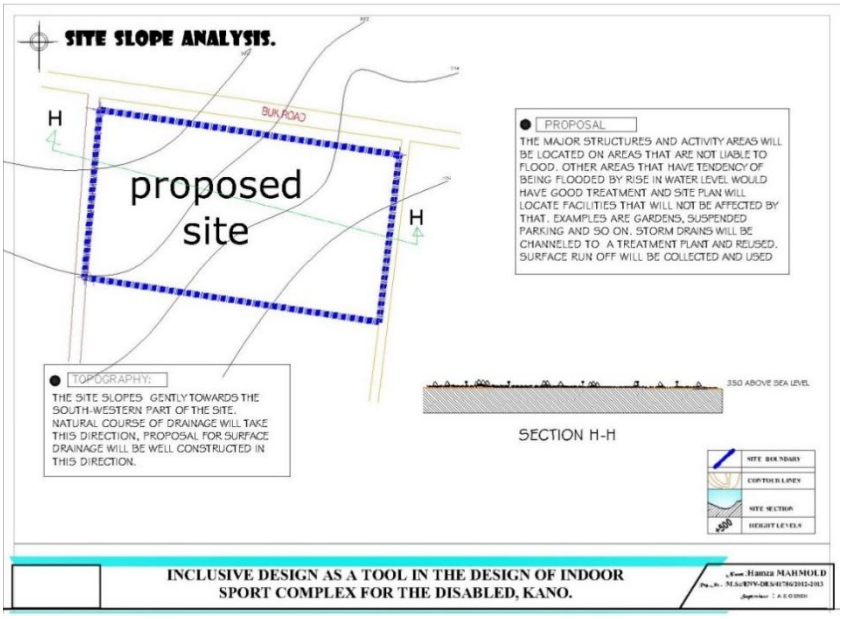


Figure 5.2: Site topography analysis
Source: Author's sketch, (2015)

b. Vegetation: the site is covered with grasses with a portion of the square having some planted flowers, hedges, shrubs and trees. Hence, since the site has been cleared and free from unnecessary obstruction, this will allow for the maximum utilization of the selected portion of land selected for the indoor sport complex within the square which have already been demarcated into varying sizes. The Figure 5.3 and 5.4 show the vegetative characteristics of the site.

c. Soil type: the site is basically made up of loamy soil and sandy-loam in some areas. This therefore suggest to the suitability of the soil for construction activities. However, at soil test will equally be conducted to ascertain the actual bearing capacity of the soil before any construction work is to be embarked upon on the site.

d. Natural Feature: The site is free from rock out crops and other natural features which could have impede or jeopardize its suitability and chances to being used for the design proposal. Figure 5.3 below shows the analysis sheet where such parameters are critically analyzed.

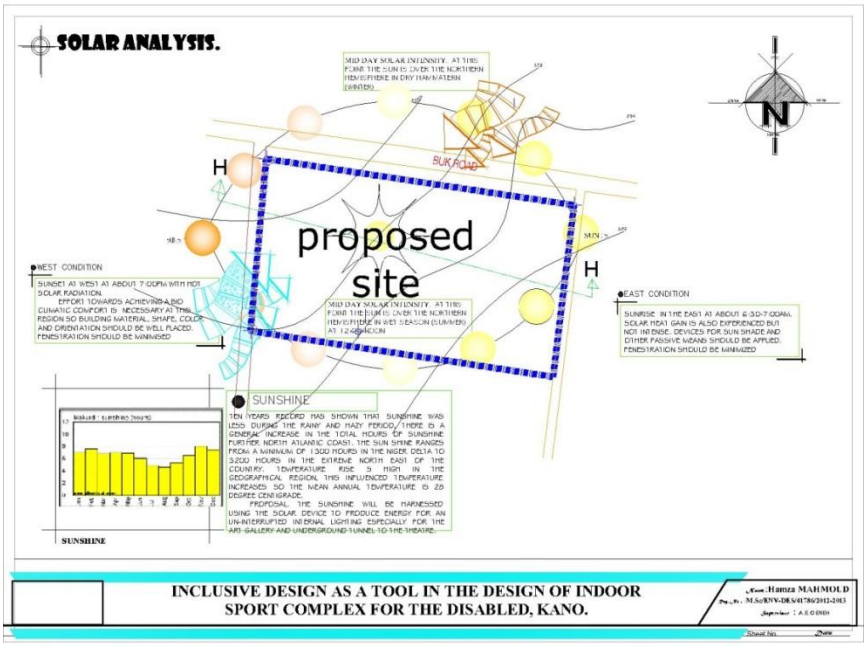


Figure 5.3: Site solar analysis
Source: author's sketch, (2015)

e. Site Utilities and Service: Services such as power supply, telephone services, water supply and hydrants are available within the square. These services can easily be tapped or sourced within the site as can be seen in Figure 5.1, 5.2 and 5.3.

5.3.4 Climatic conditions

Climatic conditions such as temperature, rainfall relative humidity, solar radiation, wind flow have be integrated design with detail attention to the diurnal range in the conditions mentioned above.

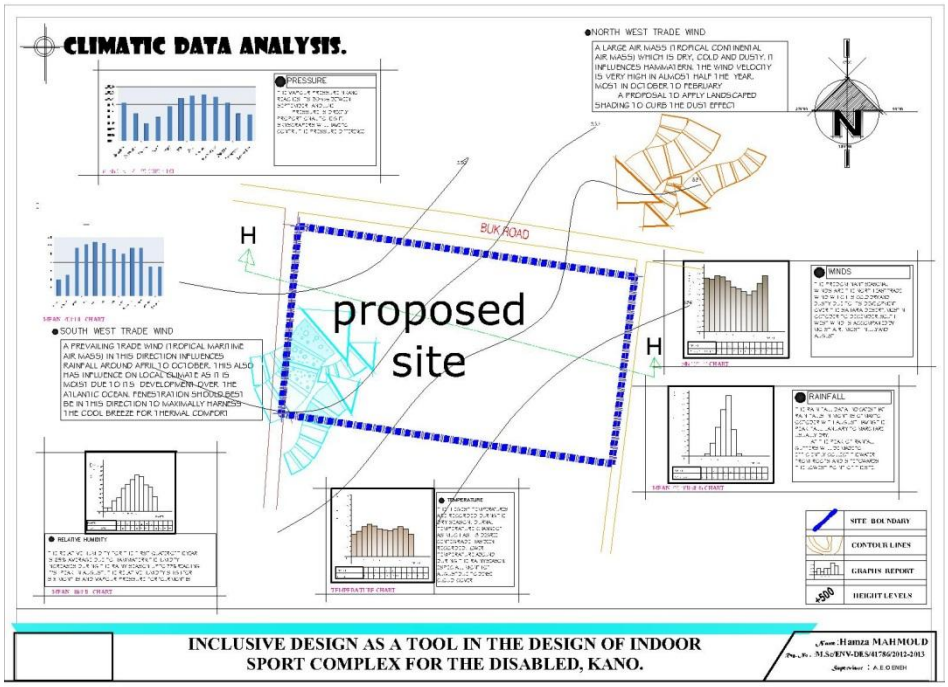


Figure 5.4: Site climatic data analysis I
Source: author's sketch, 2015)

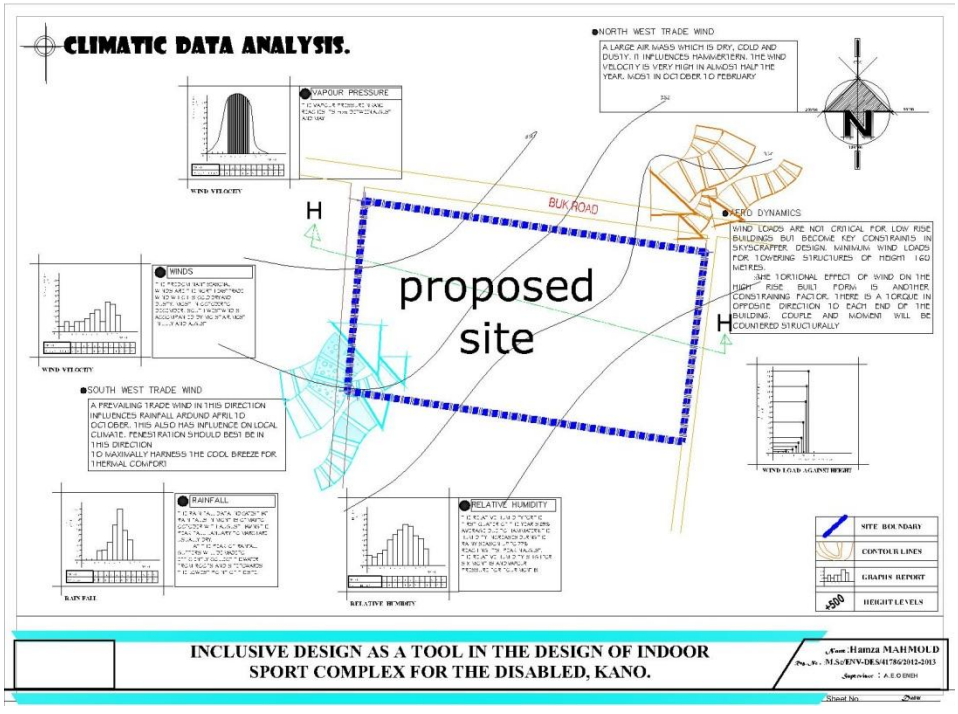


Figure 5.5: Site climatic data analysis II
Source: author's sketch, (2015)

5.3.5 Bubble diagram

The bubble diagram below shows the bulk layout and interrelation of spaces within the sports complex. After the entrance into sports complex, the first point of contact is the open concourse which serves as a confluence point and circulation to other spaces within the building. To the left of the concourse is the aquatic and spa where all aquatic games are accommodated and performed. Where as to the right wing of the concourse is where the administrative functions and offices are located alongside other games, and auxiliary facilities. Ahead of the concourse is the main games hall where the pitches for several games can be laid and arranged with a siting capacity of 2500 spectators. It should be noted that changing rooms and conveniences are connected to the two arms of the complex which tend link both the aquatics and administration section to the main games hall. As shown in the figure 5.6

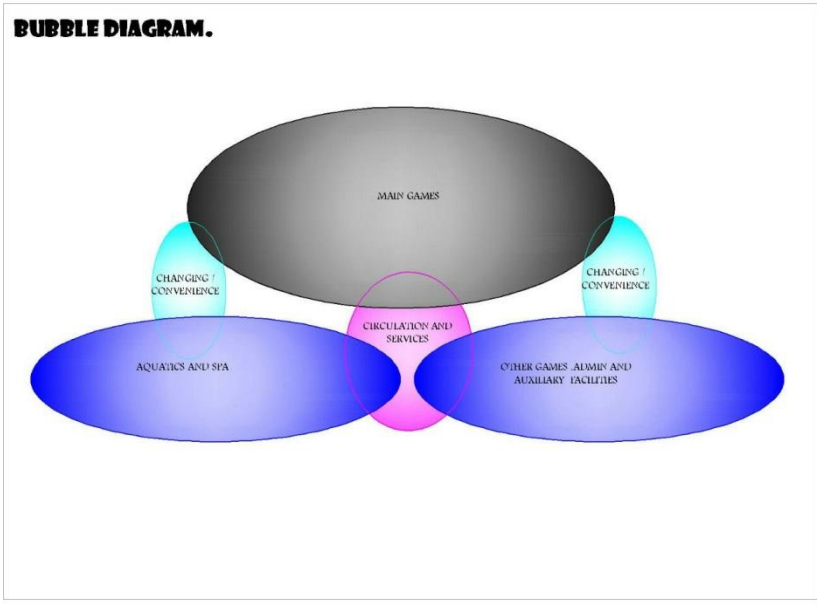


Figure 5.6: Bubble diagram
Source: Author's sketch, (2015)

5.4 Concept Formulation

Basically, four determinants influence the concept formulation of the design proposal, namely.

a) Inclusive design principles: The design was geared towards showcasing inclusive design from the preliminary stages to the design stages. This is considered in the design layout, design elements and features.

b. Design consideration for indoor sport complex: Literatures and relevant authorities were consulted in order to evolve a befitting and a contemporary sport complex. This tend influence most of the decisions made regarding sizes of spaces, orientations, openings against glare, choice of materials for convenience and comfort.

c. Site characteristics: The site qualities and features further contributed to the overall design output. This is done in order to strike a balance between the site and the design so as to achieve a design that will be totally inclusive and being in harmony with the site.

d. Socio – cultural Values and architectural expressions: The traditional architectural expressions of the Kano indigenes have been incorporated so as to give the design a flare of Hausa architecture and the use of Arewa logo is equally significant (see Figure 5.7). Thus, the four parameters discussed above collectively informed the design of the proposed indoor sport.

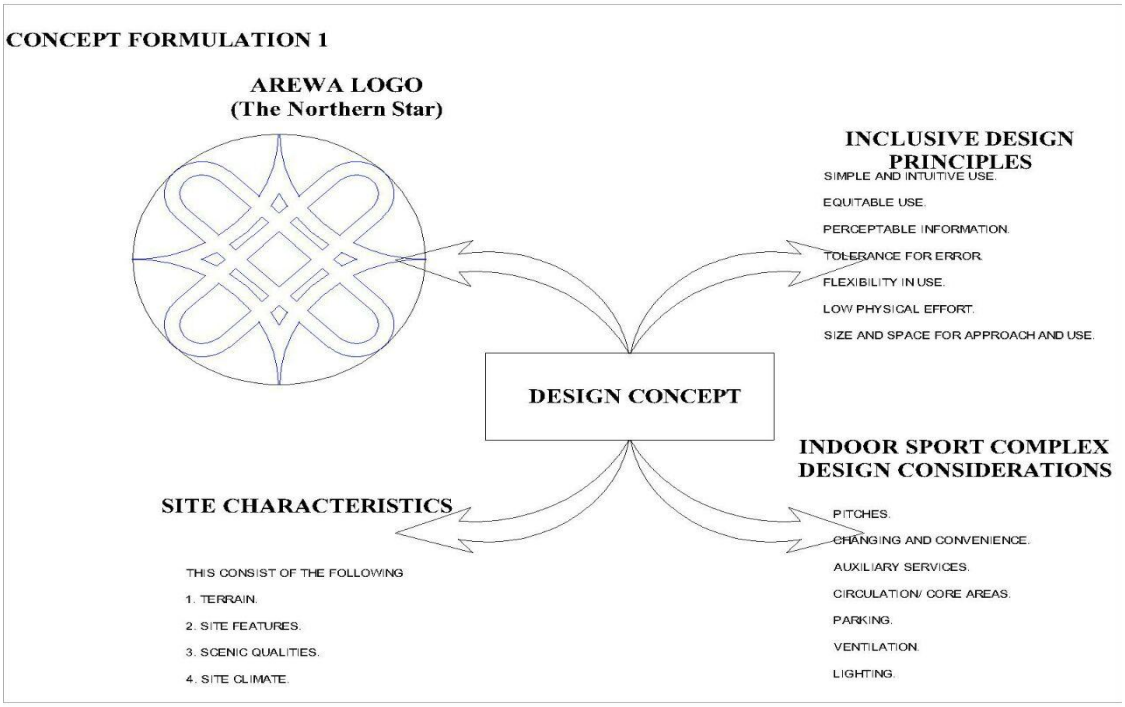


Figure 5.7: Concept formulation I
Source: Author's sketch, (2015)

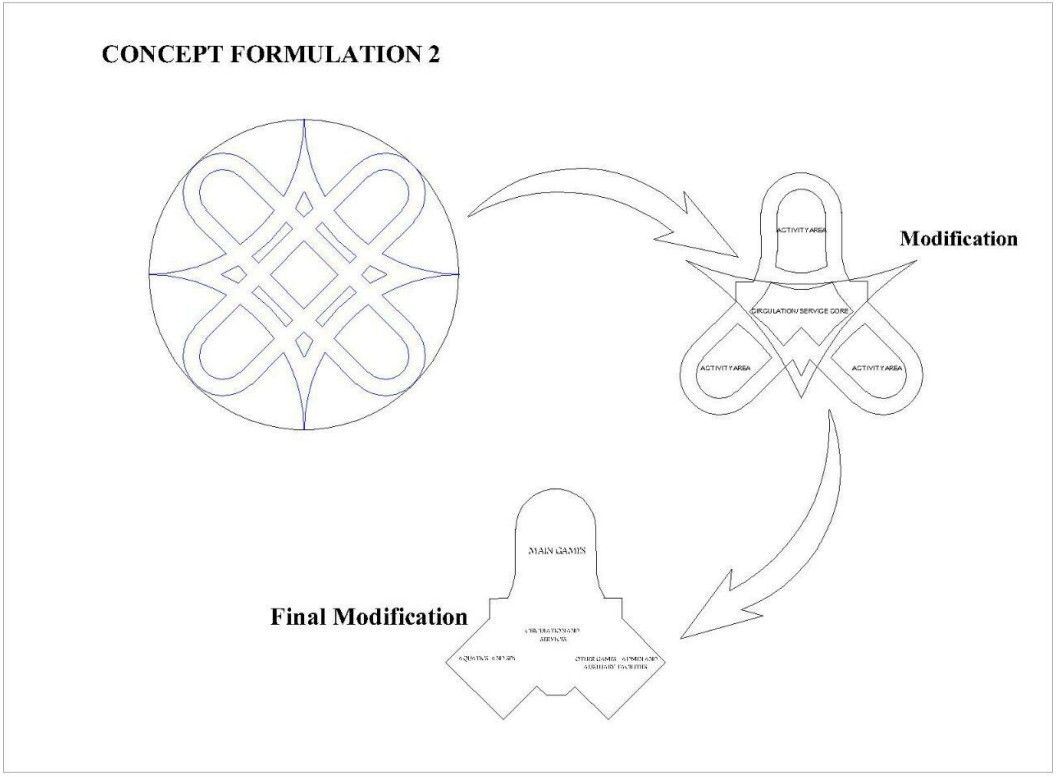


Figure 5.8: Concept formulation II
Source: Author's sketch, (2015)

5.5 General Design Description, Specification and Consideration

This section describes the design layout spaces, floor plans provided in to proposed indoor sport complex.

5.5.1 Ground floor plan

The ground floor plan has three basic compartment/sections namely;

* Administration Block: - This is made up of offices for official management staff, sport representatives and officiating staff with board rooms and these auxiliary facilities.

* The aquarium: This entails the gaming activities done in water such as swimming. The swimming pool has seven lanes with seating capacity of four hundred (400) seats well arranged to allow for proper viewing and speciation without obstruction.

* The main indoor court: This is where the Para soccer is being played and other indoor sports can equally arranged set their pitch. The main hall/stadium can accommodate two thousand five hundred spectators/viewers. Ramps and low risers have been provided to aid in vertical circulation.

* The tracks are made round the perimeter of soccer pitch. The conveniences, control rooms and situated up the balcony which leads to an exit for easy decongestion of traffic within the sporting complex.

* The Aquarium is a double volume as well as the main indoor hall except for the administration area which have voids to allow day lighting into the interior.

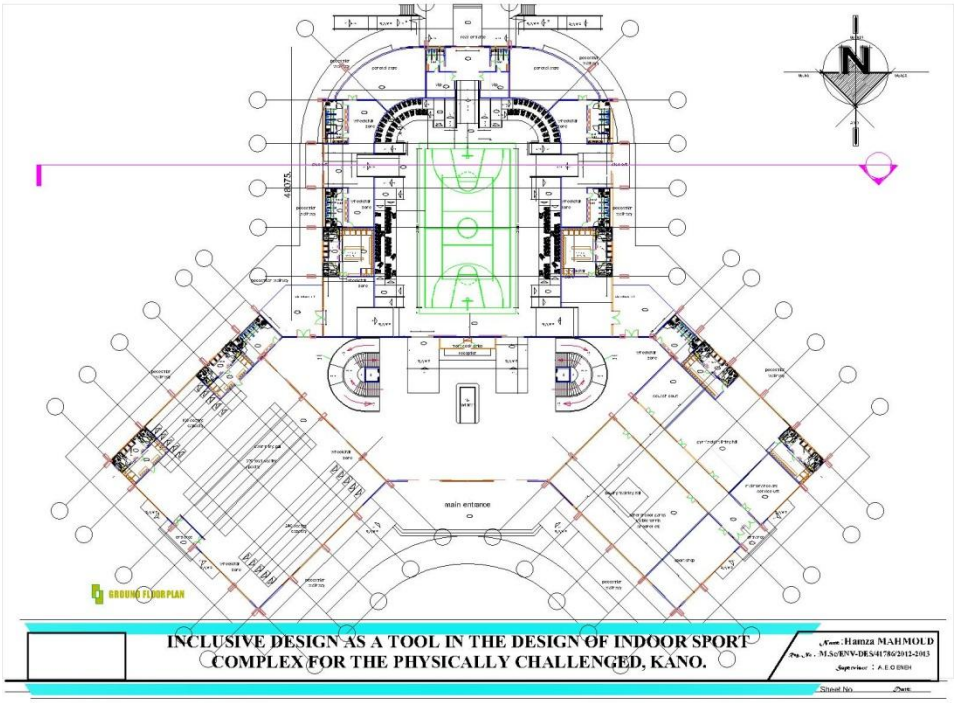


Figure 5.9: Ground floor plan
Source: Author's Design, (2015)

5.5.2 First Floor plan

This section of the complex has a mezzanine floor at the right wing of the building where other minor games are anchored. The aquatics section and spa has double volume as such it is open all through. Changing rooms and auxiliary facilities are located on this too as can be seen in the figure 5.10

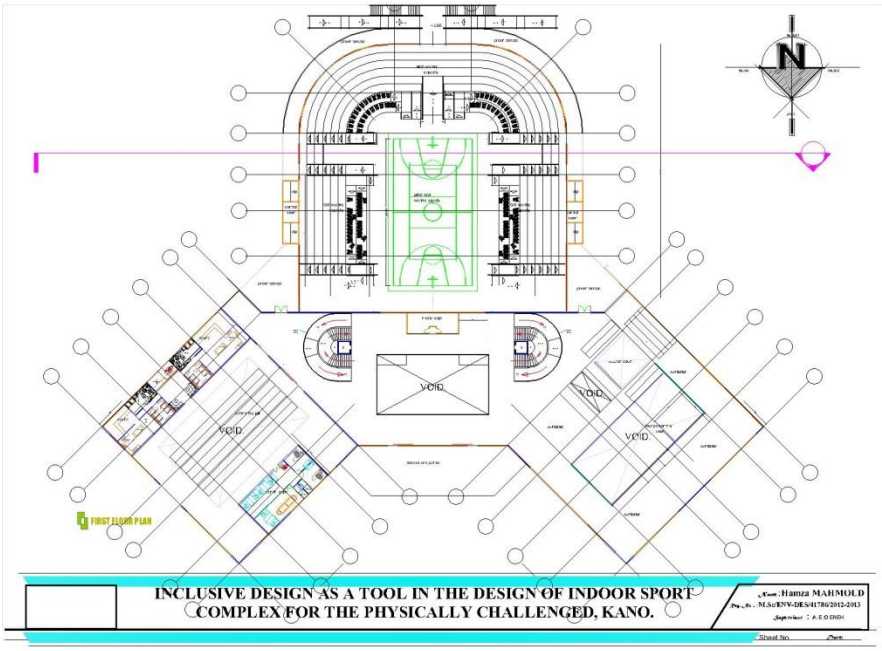


Figure 5.10: First floor plan
Source: Author's Design, (2015)

5.5.3 Roof plan

The roof plan introduces natural light (i.e. daylight) into the building cores at strategic positions in order to augment the daylight requirement penetrating through the openings on the perimeter walls. Such openings and use of translucent materials allow light to enter spaces at varying degree/angel as this is shown in the figure 5.11

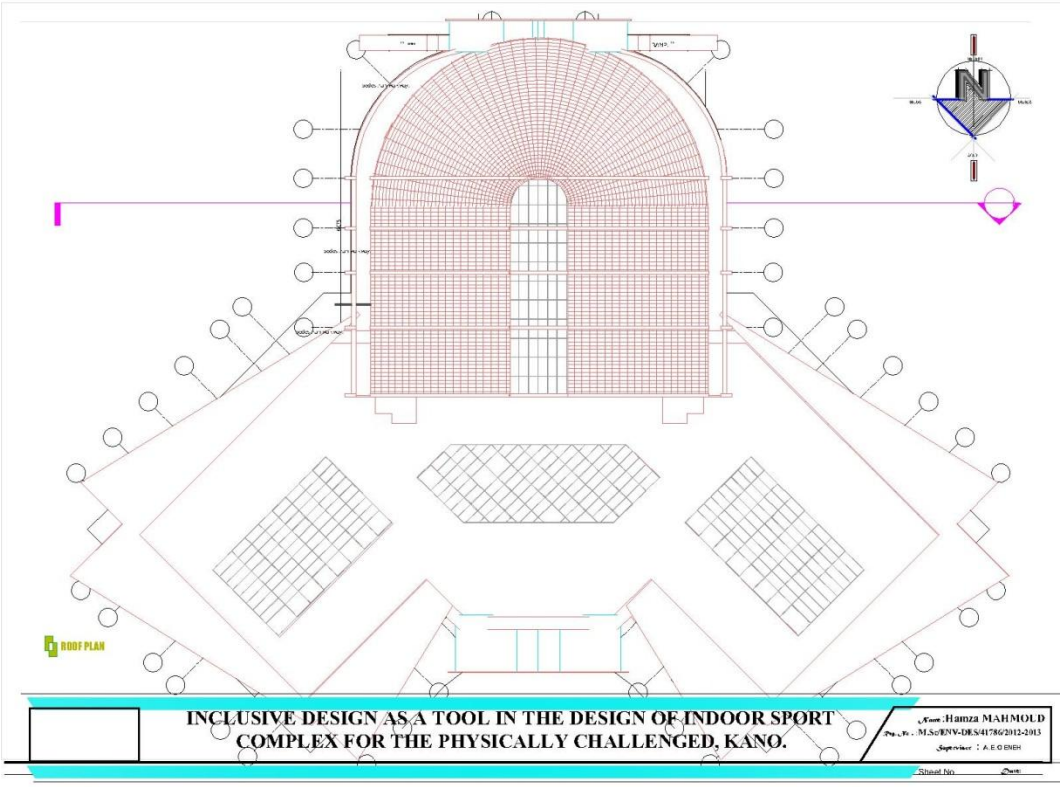


Figure 5.11: Roof plan showing solar panels and roof light
Source: Author's Design, (2015)

5.5.4 Ventilation

Although the sport complex uses a mixed mode cooling system, the figure below the direction of air movement for ventilation through various openings and reinforcement on the floor plans. Such design considerations minimizes the excessive demand for artificial means and energy achieving comfort and ventilation. This tends to make the complex to be eco-friendly and reduces running of the whole indoor sports complex. This can be seen in Figure 5.12.

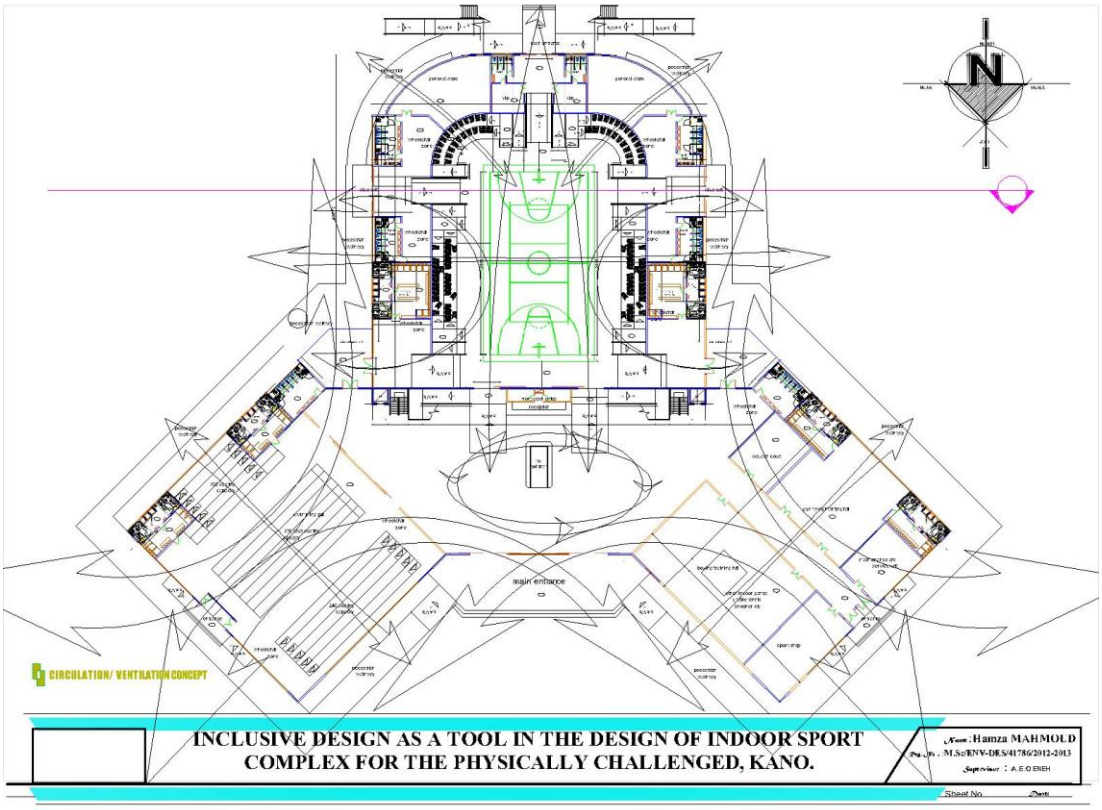


Figure 5.12: Floor plan showing means of ventilation
Source: author's Design, (2015)

5.5.5 Building materials

The building materials are mostly Titanium (It is known for its corrosion immunity, strength, durability and low maintenance cost.), glass PTFE (Polytetrafluoroethylene), PTFE is a coated fiberglass, with high strength and long service life) steel and concrete. Other materials used for finishes are wood, plastic and ceramics. The material finishes provide a good blend with the required taste of interior design. Entranceand the reception (security points), rooms and balconies are made of quarry floor finishes. Special stainless steel rounded railings of glass embedded are vertically and horizontally connected by fasteners and so, could be dismantled. The doors are swing at the entrance; aluminum glazed, flush, wooden panel and plastic doors. For the conveniences, the whole set of the

interior of conveniences are customized from the factory. It is well finished and serviced. All it needs is the coupling which takes mechanical and electrical engineers to do that. The flexible photo-voltaic panels are laid over the roof shells and tower in selected areas where the solar radiation intensity is mostly felt. The roofing material for adopted is long span aluminum sheet. In addition, floor finishes such as glazed granite floor files will be used along major circulation pathways while vitrified floor finishes and glazed ceramic floor tiles are recommended for other offices and toilets respectively as indicated on the Figure 5.13

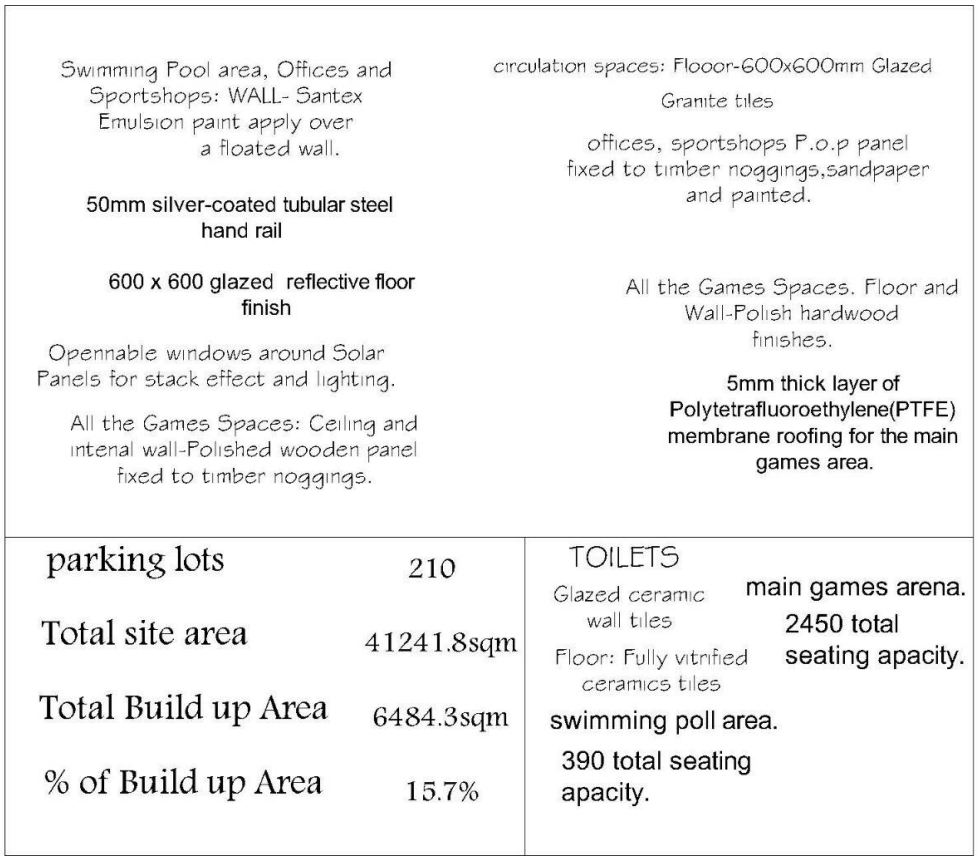


Figure 5.13: Material schedule
Source: Author's sketch, (2015)

5.5.6 Services

Water supply to the site will be sourced from the water main available within the square. The electrical power supply will be connected from the existing transformers which have been installed and the site. Solid and liquid waste disposals are made through the PVC ducting and pipes of various grades in diameters and strength (150mm-300mm). Areas of high pressure will be swept at the bends. Inspection chambers are placed at intervals, bends and places of different altitude and connected appropriately to existing drainage system.

5.6 Design Features

The use of signage's to aid way finding was dully emphasized with minimal obstruction and partitioning within the complex. Day lighting was introduced through opening and at roof tops as well as the use of solar panels and photo voltaic cells which harnesses solar radiation was greatly utilized in the design as can be seen in the Figure 5.14, 5.15, and 5.16 The use of shading devices was equally used on the building facade to minimize excessive penetration of solar radiation into the sporting complex. This is as shown in the Figure 5.14, 5.15, and 5.16.



Figure 5.14: 3D, approach view
Source: Author's Design, (2015)



Figure 5.15: 3D, Side and rear view
Source: Author's sketch, (2015)



Figure 5.16: 3D, Aerial view
Source: Author's Design, (2015)

5.7 Summary of Chapter Five

This chapter critically took into consideration the design brief thereby making adequate design provision which enables the inclusiveness of diverse users of the facilities in order to avoid the exclusion certain categories of users and to minimize architectural disability. This was achieved through the exploration of the principles of inclusive design so as to favourably consider the physically challenged/disabled persons.

6.0 CONCLUSION AND RECOMMENDATION

6.1 Introduction

This chapter concludes the whole thesis research starting with the summary which summarizes the whole write up from chapter one to chapter six. Also, the conclusion made is based on the literature review, findings, and the application in the proposed design. Recommendation and contribution to knowledge are made in this chapter.

6.2 Conclusion

The design adequately considered the physically challenged by using inclusive design as a tool to cater for diverse users with varying abilities.Inclusive design make provision for diverse user make use of facilities meaningfully since everyone is prone to being disable any moment and the question of architectural disability to be greatly reduced with the built environment.

6.3 Recommendation

The following recommendation can be made from the findings and the design proposal. Measures should always be put in place at different levels in order to incorporate the physically challenged persons in the society since they form and integral part of the Nigeria's population (about 10%). Since peoples conditions vary as they age or circumstances can affect some one's ability it is needful to always design inclusively so as to accommodate a larger variety of users and to reduce the imposed disability on users due to insufficient design consideration of a wider spectrum of users.

6.4 Contribution to Knowledge

The research has been able to identify basic loop holes in the design of sport complex which often neglect or marginalizes the physically changed. As such ample circulation and wheel chair zones should be provided so as to enable easy usages of such facilities. The provision of opportunities for the disabled to engage their minds positively is paramount as this goes way to enhance their wellbeing.

i. Means of mobility: the study was able to establish that 90% Nigerians physically challenged with mobility use tricycle.

ii. The minimum spacing for circulation is 1.5 square metres.

iii. Wheel chair zones are an important space for the design consideration of the physically challenge and should be provided in most spaces.

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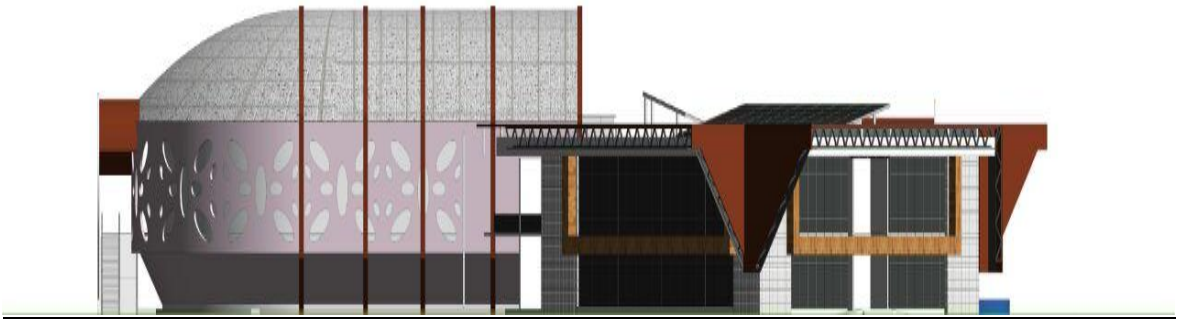
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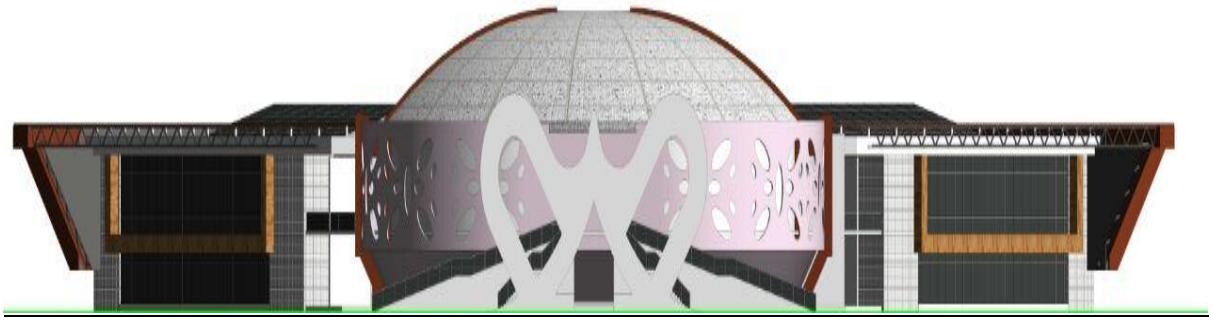
Appendix I: West View



West Elevation

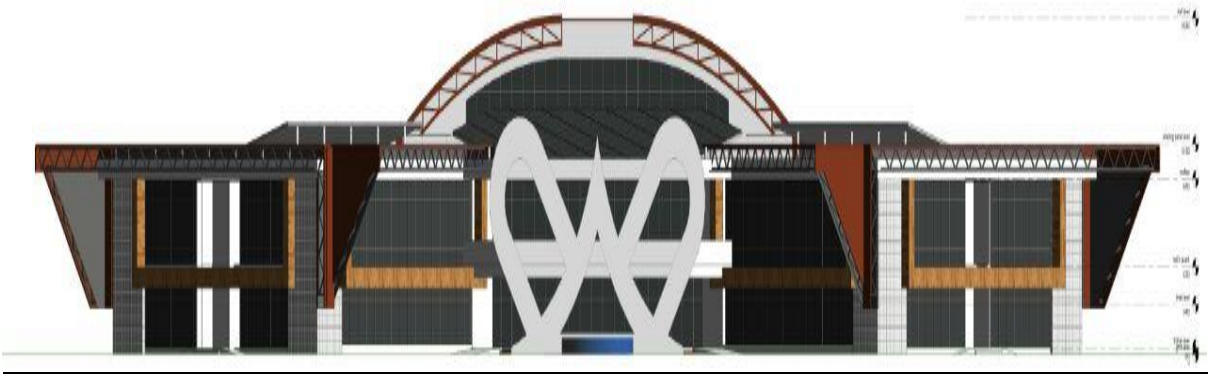
Source: Author's Design, (2015)

Appendix II: Rear view



Source: Author's Design, (2015)

Appendix III: Approach view



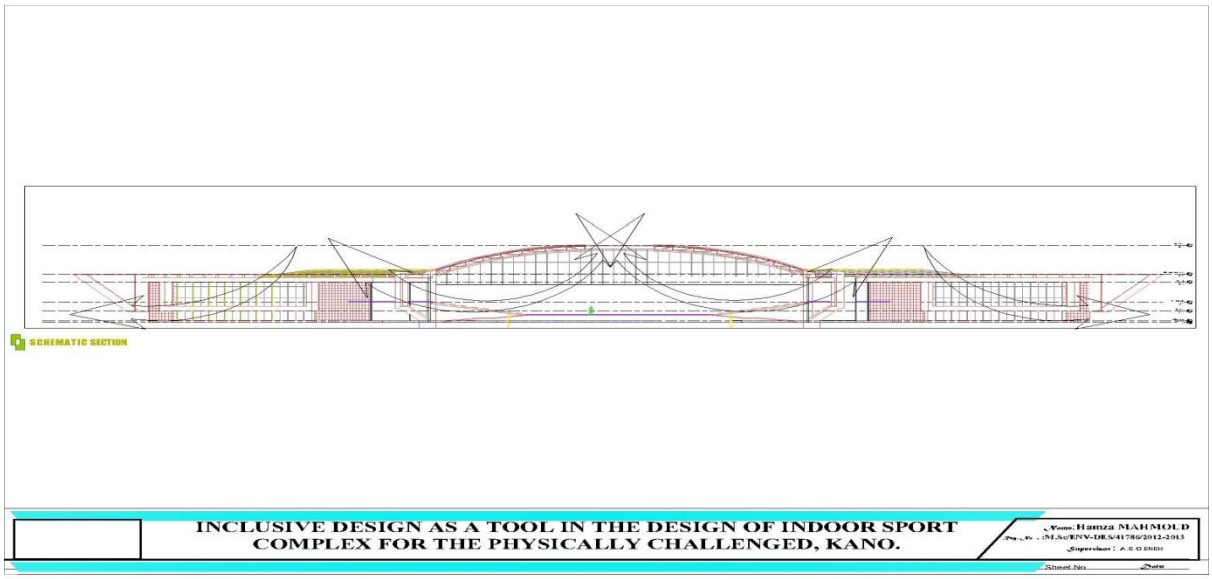
Source: Author's Design, (2015)

Appendix IV: East view



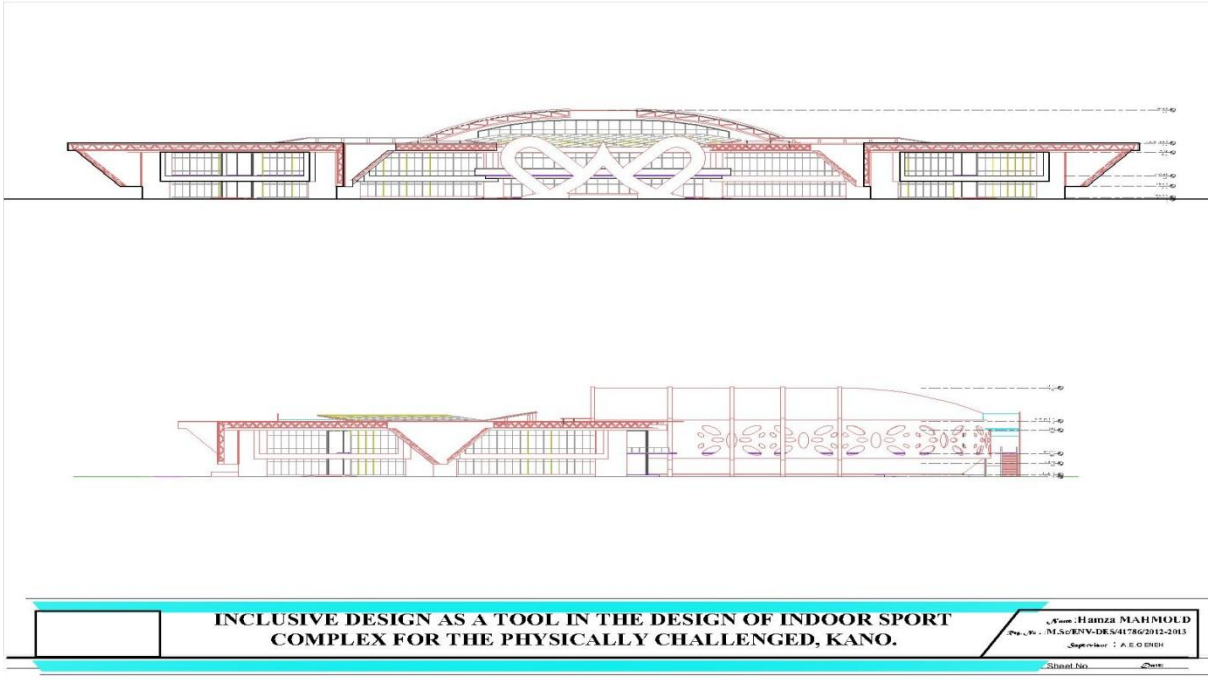
Source: Author's Design, (2015)

Appendix V: Section



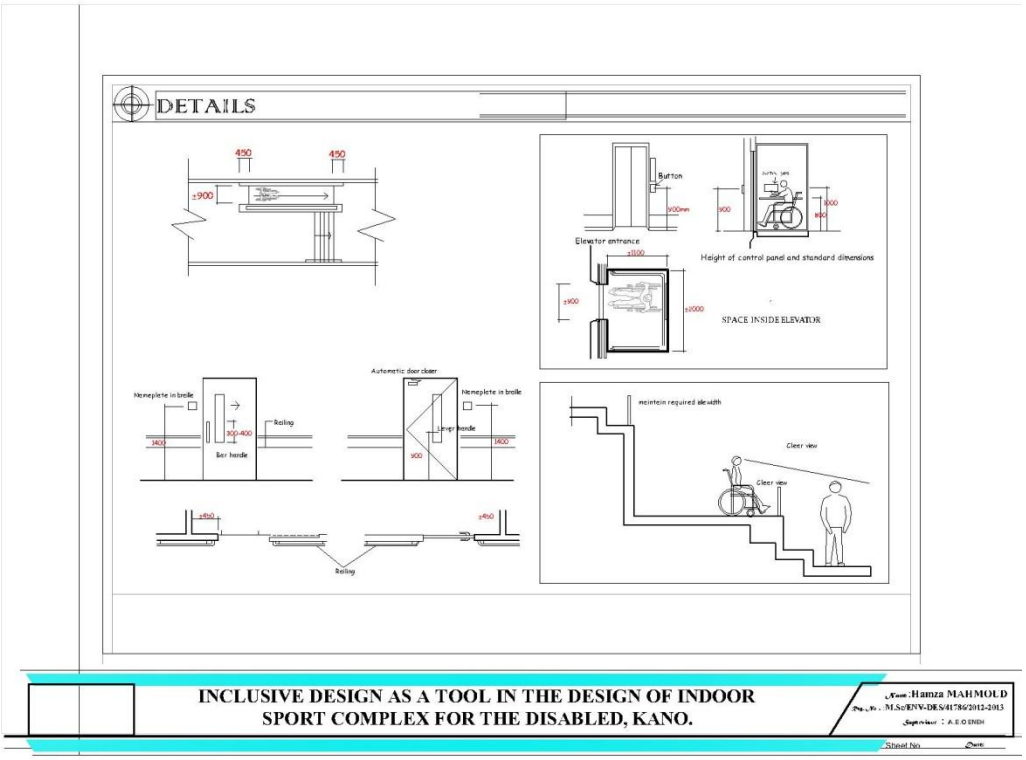
Source: Author's Design, (2015)

Appendix VI: Approach and side view



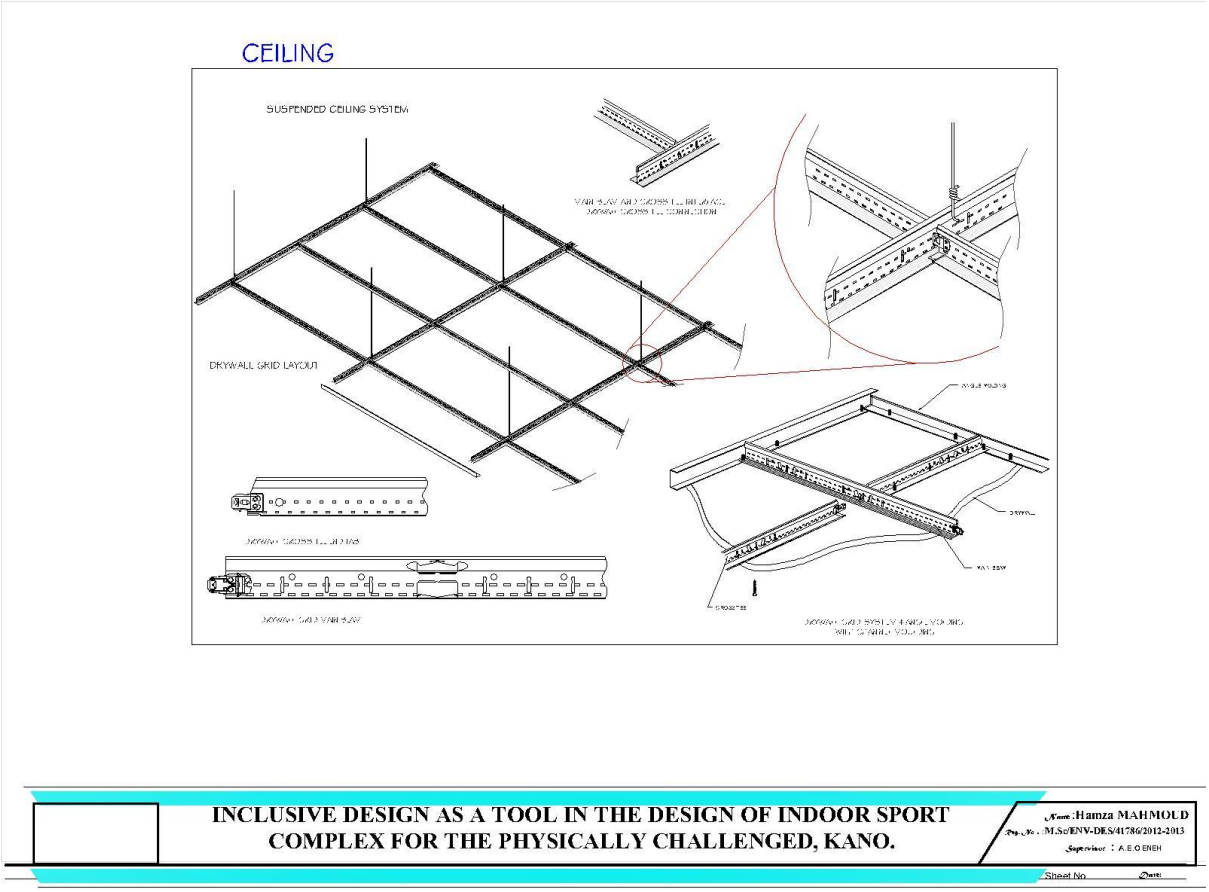
Source: Author's Design, (2015)

Appendix VII: Detail I



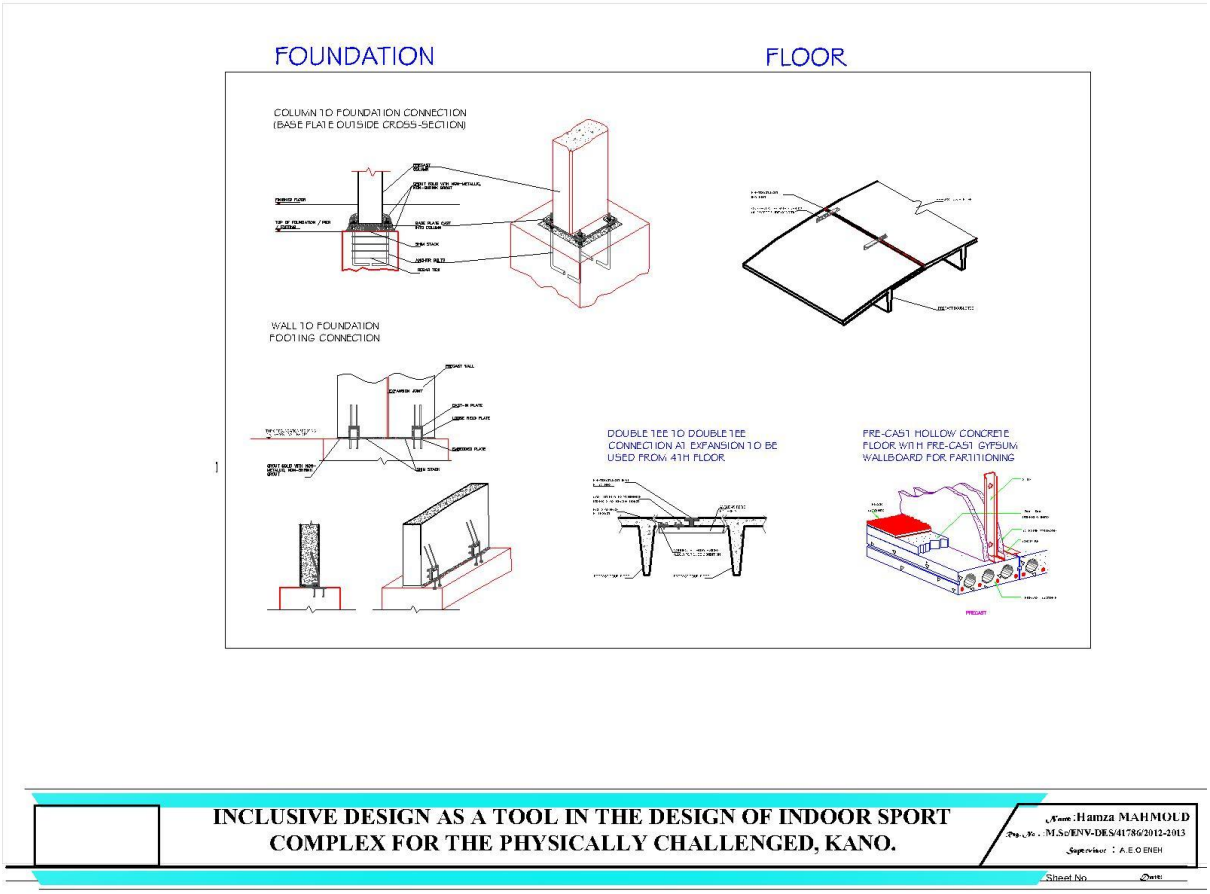
Source: Author's Design, (2015)

Appendix VIII: Detail II



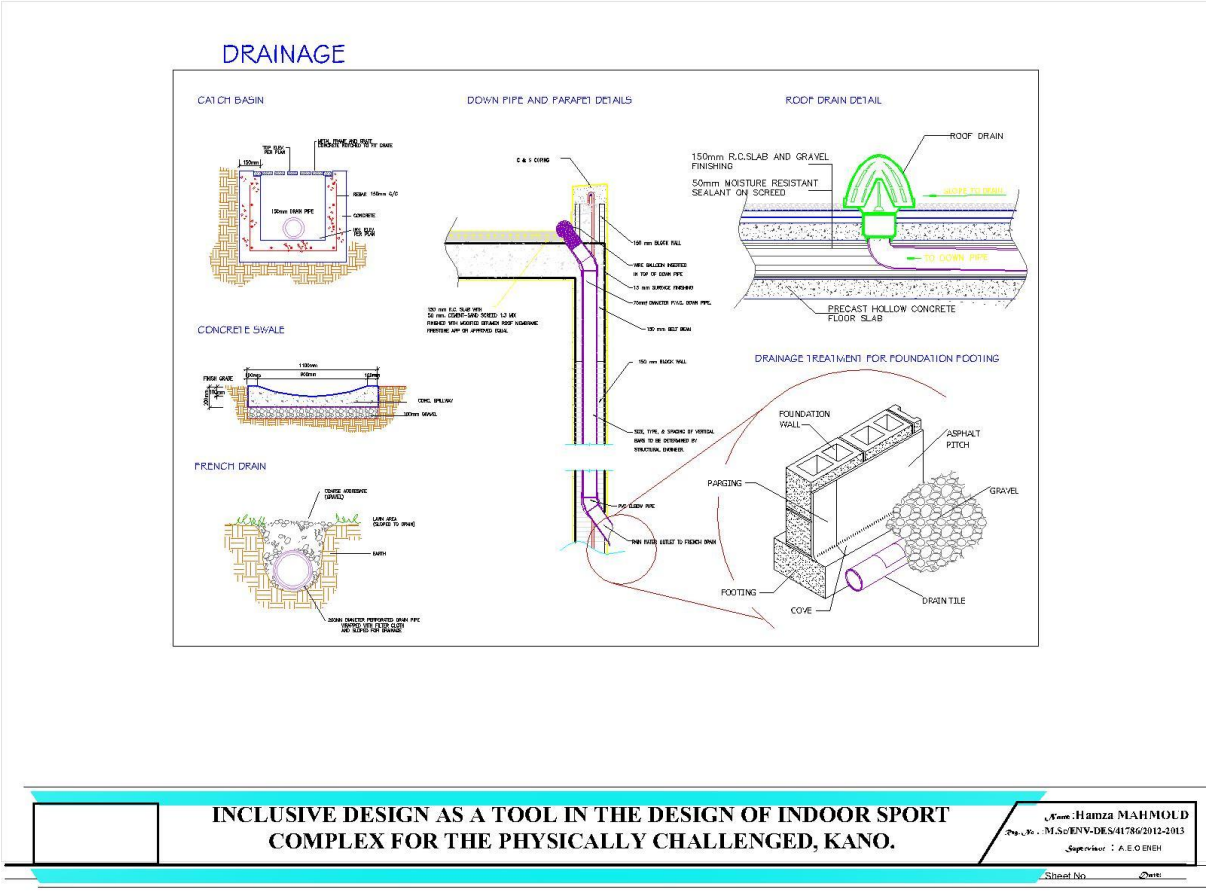
Source: Author's Design, (2015)

Appendix IX: Detail III



Source: Author's Design, (2015)

Appendix X: Detail IV



Source: Author's Design, (2015)

Appendix XI: Schedule of accommodation

SCHEDULE OF ACCOMMODATION.

S/No.	FACILITIES	DIMENSIONS		No.	TOTAL
		STANDARD	ADOPTED		
	Main Games Arena (Basketball)	514.71sqm	514.71sqm	1	514.71sqm
	Swimming Games Arena	239.4sqm	239.4sqm	1	239.4sqm
	other indoor games (table tennis, snooker,etc.	Varies	384sqm	1	384sqm
	gym/weight lifting hall.	Varies	256sqm	1	256sqm
	squash court.	70sqm	80sqm	1	80sqm
	boxing/training hall.	Varies	128sqm	1	128sqm
	Fitness hall	Varies	256sqm	1	256sqm
	exhibition	Varies	480sqm	1	125sqm
	Control room /media dept.	Varies	52sqm	1	52sqm
	wheelchair zone.	Varies	32sqm	10	320sqm
	admin. dept.	Varies	160sqm	1	160sqm
	changing/ locker room.	Varies	48sqm	5	240sqm
	vip.	Varies	45sqm	4	180sqm
	sport shop.	Varies	128sqm	1	128sqm
	maintenance and service unit.	Varies	80sqm	1	80sqm
	Toilet	2sqm per person	31.5sqm	14	441sqm
	general store.	Varies	83.7sqm	2	167.4sqm
	Total site area				41241.8sqm
	Total Build up Area				6484.3sqm
	% of Build up Area				15.7%

Source: Author's Design, (2015)

Appendix XII: Inclusive Assessment of Adobayero Square Bayero Square, Kano

VARIABLES	LEVEL OF REFLECTION			
1. Simple and Intuitive Use	Absent	low	moderate	High
Eliminate unnecessary complexity.			√	
Be consistent with user's expectations and intuition.		√		
Accommodate a wide range of literacy and language skills.	√			
Arrange information consistently with its importance		√		
Provide effective prompting and feedback during and after task completion.	√			
2. Equitable Use.				
Provisions for privacy, security, and safety should be equally available to all users.		√		
Make the design appealing to all users.		√		
3. Perceptible Information				
Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.	√			
Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).		√		
Maximize "legibility" of essential information.		√		
Provide compatibility with a variety of techniques or devices used by people with sensory limitations.		√		
4. Tolerance for Error.				
Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded.		√		
Provide fail-safe features.	√			
5. Flexibility in Use.				
Provide choice in methods of use.	√			
Accommodate right- or left handed access and use.	√			
6. Low Physical Effort.				
Provide warnings of hazards and errors	√			
Minimize sustained physical effort.		√		

Use reasonable operating forces.		√	
Allow user to maintain a neutral body position.	√		
7. Size and Space for Approach and Use.			
Provide a clear line of sight to important elements for any seated or standing user.			√
Make reach to all components comfortable for any seated or standing user.			√
Accommodate variations in hand and grip size.	√		
Provide adequate space for the use of assistive devices or personal assistance.		√	

Source: author's field work, (2015)

Appendix XIII: Inclusive Assessment of Rwang Stadium, Jos

VARIABLES	LEVEL OF REFLECTION			
1. Simple and Intuitive Use	Absent	low	moderate	High
Eliminate unnecessary complexity.			√	
Be consistent with user's expectations and intuition.		√		
Accommodate a wide range of literacy and language skills.		√		
Arrange information consistently with its importance		√		
Provide effective prompting and feedback during and after task completion.		√		
2. Equitable Use.				
Provisions for privacy, security, and safety should be equally available to all users.			√	
Make the design appealing to all users.			√	
3. Perceptible Information				
Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.		√		
Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).			√	
Maximize "legibility" of essential information.		√		
Provide compatibility with a variety of techniques or devices used by people with sensory limitations.		√		
4. Tolerance for Error.				
Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded.			√	
Provide fail-safe features.			√	
5. Flexibility in Use.				
Provide choice in methods of use.		√		
Accommodate right- or left handed access and use.		√		
6. Low Physical Effort.				
Provide warnings of hazards and errors			√	

Minimize sustained physical effort.		√	
Use reasonable operating forces.		√	
Allow user to maintain a neutral body position.		√	
7. Size and Space for Approach and Use.			
Provide a clear line of sight to important elements for any seated or standing user.			√
Make reach to all components comfortable for any seated or standing user.		√	
Accommodate variations in hand and grip size.		√	
Provide adequate space for the use of assistive devices or personal assistance.	√		

Source: author's field work, (2015)

Appendix XIV: Inclusive Assessment of Sani Abacha Stadium Kano

VARIABLES	LEVEL OF REFLECTION			
1. Simple and Intuitive Use	Absent	Low	moderate	High
Eliminate unnecessary complexity.			√	
Be consistent with user's expectations and intuition.			√	
Accommodate a wide range of literacy and language skills.		√		
Arrange information consistently with its importance			√	
Provide effective prompting and feedback during and after task completion.			√	
2. Equitable Use.				
Provisions for privacy, security, and safety should be equally available to all users.			√	
Make the design appealing to all users.			√	
3. Perceptible Information				
Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.			√	
Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).			√	
Maximize "legibility" of essential information.			√	
Provide compatibility with a variety of techniques or devices used by people with sensory limitations.		√		
4. Tolerance for Error.				
Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded.			√	
Provide fail-safe features.			√	
5. Flexibility in Use.				
Provide choice in methods of use.		√		
Accommodate right- or left handed access and use.			√	
6. Low Physical Effort.				
Provide warnings of hazards and errors			√	

Minimize sustained physical effort.	√			
Use reasonable operating forces.		√		
Allow user to maintain a neutral body position.	√			
7. Size and Space for Approach and Use.				
Provide a clear line of sight to important elements for any seated or standing user.				√
Make reach to all components comfortable for any seated or standing user.		√		
Accommodate variations in hand and grip size.		√		
Provide adequate space for the use of assistive devices or personal assistance.			√	

(Source: author's field work, 2015)