APPLICATION OF DEFENSIBLE SPACE STRATEGIES IN THE DESIGN

OF A SECONDARY SCHOOL FOR OTA

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A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTERS OF SCIENCE (M.Sc) DEGREE IN ARCHITECTURE, COVENANT UNIVERSITY, OTA, OGUN STATE, NIGERIA.

SEPTEMBER, 2021.

ACCEPTANCE

This is to attest that this dissertation is accepted in partial fulfillment of the requirements for the award of the degree of Master of Science in Architecture in the Department of Architecture, College of Science and Technology, Covenant University, Ota, Ogun State, Nigeria

Mr. John A. Philip   …..…………………………..

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Prof. Akan B. Williams   ……………………..........

(Dean, School of Postgraduate Studies)   Signature and Date

DECLARATION

I, **AYARA EFE JOANNA (19PCA02010)**, of the Department of Architecture, College of Science and Technology, Covenant University, Ota, Ogun State, hereby declare that the information contained in this dissertation work is the result of an honest academic research undertaken by me under the supervision of Dr. Foluke O. Jegede. I attest that the dissertation has not been presented either wholly or partially for the award of any degree elsewhere. All sources of data and scholarly information used in this dissertation are duly acknowledged.

AYARA EFE JOANNA   ………………………………….
                                                                Signature and Date

CERTIFICATION

We certify that this dissertation titled "**APPLICATION OF DEFENSIBLE SPACE STRATEGIES IN THE DESIGN OF A SECONDARY SCHOOL FOR OTA**'' is an original research work carried out by **AYARA EFE JOANNA (19PCA02010)** in the Department of Architecture, College of Science and Technology, Covenant University, Ota, Ogun State, Nigeria, under the supervision of Dr. Foluke O. Jegede. We have examined and found this work acceptable as part of the Master of Science in Architecture award requirements.

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(External Examiner)   Signature and Date

Prof. Akan B. Williams   **…………………………………**
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DEDICATION

This project is dedicated to the Lord Almighty for guiding me through the entire project and granting me grace to see its completion.

I also dedicate this dissertation to my father Dr. Charles Ayara and my mother Mrs. Ann Ayara and to my siblings Tega Ayara, Brume Ayara and Ejiro Ayara.

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ABSTRACT

The worrisome degree of insecurity in Nigeria has fuelled the rise in crime and the increase in terrorist attacks across the country. Educational institutions such as schools appear to be the primary target of insecurity, making the fundamental business of schools, efficient teaching and learning, difficult to achieve. Defensible space theory is a concept coined by Newman who argued that architectural and environmental design plays a crucial part in increasing or reducing criminality. The study examines the manifestation of the principles of defensible space used in the design of selected secondary schools in Ota, Ogun State, Nigeria. The study made use of both qualitative and quantitative inquiry method. Purposive sampling technique was used in selecting the secondary schools studied in this research. Four schools were pick, two of which were public owned and the other two were privately owned. To pick the sample size of student a combination of purposive and multistage sampling technique was used. Observation guide and photographs were used to collect qualitative data and were analysed using content analysis while questionnaires were used to collect quantitative data and analysed using Statistical package for social science (SPSS). The study revealed that elements of defensible space such as Natural surveillance and Territoriality were implemented and perceived by the respondent to adequate. The study also revealed that the school building had physical deterioration and the road leading to the schools were not well constructed, which indicates that elements such as Image and Milieu were perceived to be inadequate. And finally, the study revealed that the staff and student felt safe within the school. It also revealed that although the staff were satisfied with general level of security in the school, the students were not satisfied.

Key word: Defensible space, CPTED, Security, secondary school

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND TO THE STUDY

School is the basis on which a child's knowledge is built. It allows students to obtain information in a variety of educational fields. It is widely acknowledged that the learning process is essential for shaping one's personality and dealing with life's challenges. Students' personalities are shaped by their surroundings, and because they spend the majority of their time at school, the school environment is heavily responsible for instilling excellent values in them (A.S, 2012). School education focus on mental, social, physical and overall development of a child mind. With this importance attributed toward a school environment, it is only necessary that it be a safe environment. Schools by nature of their occupancy and use requires higher standard of safety than other types of buildings (Callender, 1983). Provision for safety have the highest priority and influence the entire design.

Due to recent developments in our society, such as terrorist attacks, cultism, vandalism, arson, child abuse, and other problems widespread in our community that put the safety of students, teachers, employees, and parents at danger, school security has become a rising concern (warrior doors, n.d.). The strategies for addressing this challenge form the focus of this study. For a stable, safe learning environment, overall security in a school is crucial, as fearfulness decreases the success of students. several studies have concluded that individual student performance is impacted by the safety characteristics of the school facility.

Security and welfare of people stand as one of the main purposes of the government existence' as indicated in the 1999 Federal Republic of Nigeria constitution, however, this constitutional responsibility have long failed in placing a safe and secured

environment for properties, live, individual daily operation and economic events except for those in government's high-ranking position. Security is the pillar upon which every meaningful development could be sustained (Omede, 2015). A lot of studies have been conducted in relation to defensible space in a residential environment, however there is limited study in defensible space specifically to the academic environment in Nigeria. This study seeks to investigate the nature of defensible space in secondary schools in Nigeria as well as it's physical environmental conditions.

Definition of terms: defensible space, secondary school, security.

1.2 STATEMENT OF RESEARCH PROBLEM

A study conducted by safe school academy international with the support of Exam Ethics Marshall International (EEMI) revealed that 80 percent of primary and secondary schools in the country had little or lack protective, protocols and measures against security risk, threats and vulnerability (PM NEWS, 2019). The study also revealed the high level of non-compliance to safety and security despite the increase in attacks directed toward a school environment. With the rising level of insecurity in Nigeria it has become an absolute necessity to enhance the safety and security of the immediate environment. Hence the study is performed to address the issues with reference to defensible space theory in the design of academic buildings.

1.3 RESEARCH QUESTIONS

1. How does Defensible space manifest in the design of secondary school buildings in Ota, Ogun state, Nigeria?

2. To what extent are the staffs and students satisfied with the level of security within the school?

3. How can defensible space theory be implemented in the design of a secondary school buildings?

1.4 RESEARCH AIM

The research aims to examine the manifestation of the principles of defensible space used in the design of secondary schools and to design a secondary school building in Ota, Ogun state, Nigeria by applying the principles of defensible space to enhance protection within the school environment without sacrificing the building aesthetic.

1.5 RESEARCH OBJECTIVES

1. Identify the elements of defensible space principle and Crime Prevention Through Environmental Design strategies applied in the design of secondary school in Ota, Ogun state.

2. Investigate the level of satisfaction with the security experienced by the staffs and students.

3. Design a secondary school building using the principle of defensible space.

1.6 JUSTIFICATION OF STUDY

The study will help to provide information on defensible space theory in reference to the design of a school building in order to enhance safety of students and staff and promote a proper learning environment. It is important to consider the overall safety and security of educational facilities, especially with the current increase of insecurity in the country. We don't have to wait for an incident to occur and then plan on how to resolve it.

1.7 CLIENT

Enko Education is a rapidly developing network of African international schools dedicated to provide young Africans with affordable admission to the world's finest

institutions. Enko has a total of 15 schools and aims to open 45 more in at least 20 African countries over the next five years and one of those countries includes Nigeria.

1.8 SCOPE OF STUDY

The study will focus on evaluating defensible spaces in selected secondary school buildings in Ota, Ogun state, Nigeria. Special attention will be paid to the facility design and the implementation of a complete violence prevention strategy in the area. Facilities such as administrative office, classrooms for senior secondary students, science facilities and multipurpose hall will be mainly focus on in this study.

1.9 STUDY AREA

Ota is a town in Ogun state, Nigeria, located at 641' 00" N 341' 00" E. It is estimated to have a population of around 163,783 inhabitants (according to 2006 census). Ota is the capital of the Ado-odo/Ota local government region, which covers an area of approximately 878 kilometers square. The indigenes are mostly Yoruba of the Awori dialect group. The development of state schools began around the late 1970s and now there are various private schools in the area. The study area has about forty-seven existing public secondary school (Oluwatoyin, et al., 2017). The research will be conducted in selected secondary school buildings within Ota, Ogun state, Nigeria.
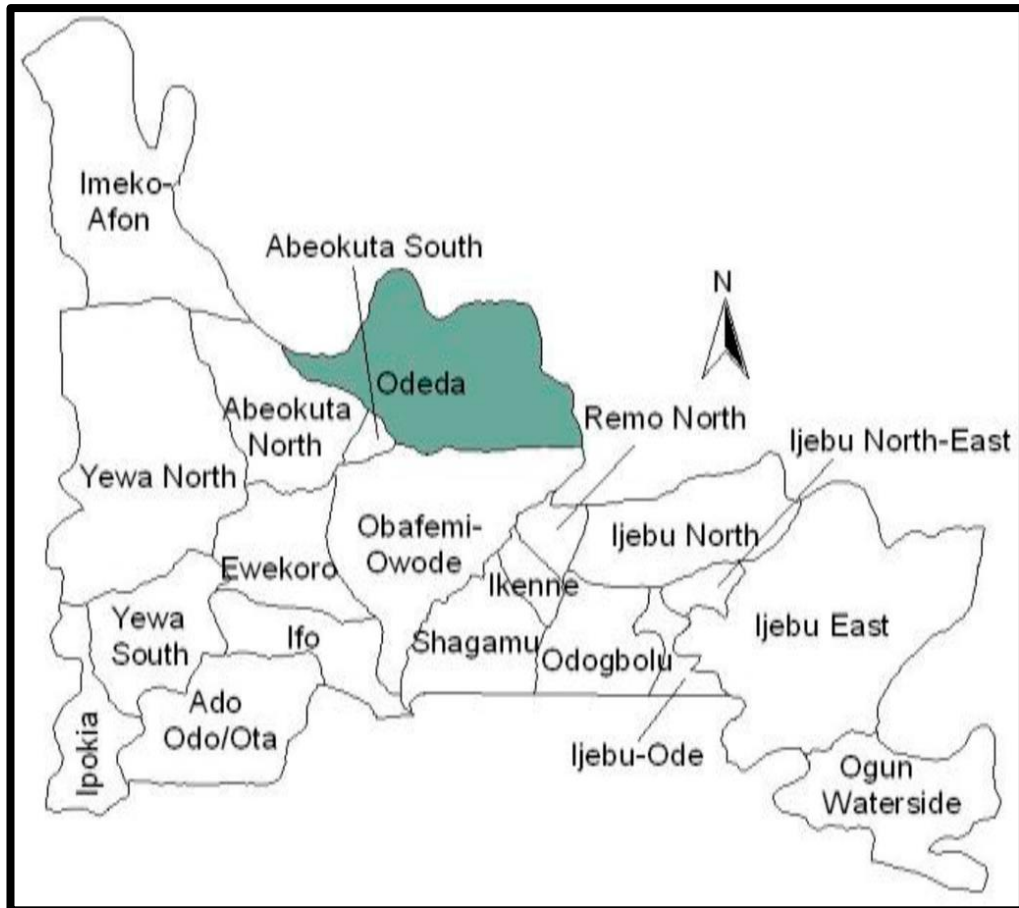
Figure 1.1 Map of Ogun State

Source: (Adeleke, et al., 2015)

1.10 RESEARCH APPROACH

The research hopes to employ both qualitative and quantitative research through case study which will identify physical deficiencies that contribute to insecurity, questionnaires will also be administered to the teaching staffs and security personal within the chosen case study. Information from previously researched studies will also be used as well as observation studies of the selected case studies.

1.11 DEFINITION OF TERMS

I.   **Defensible space:** As outlined in the 'Design guidelines for creating Defensible space' by Newman's defensible space is a residential area whose

physical features, building layout and site plan, function to allow residents themselves to become key agents in warranting their security. (Sirdevi Rao, 2016).

II. **Secondary School:** A school that provides secondary education, it is an intermediate between primary school and university and that typically provides general, technical, vocational or college-preparatory curricula.

III. **Security:** security is the freedom from perceived harm or other unwanted coercive change caused by others or resilience towards it.

CHAPTER TWO

LITERATURE REVIEW

2.1 DEFENSIBLE SPACE

The concept of Defensible space was first coined by Oscar Newman in 1972, he conducted a study on several housing units in New York city. In his study, he noted the higher crime rate that existed in high-rise housing project than in low rise complex. This was due to the fact that low rise complex had fewer resident or families sharing common spaces such as lobbies, corridors, elevators and stairs that were clearly defined as their own (Newman, 1996). This sense of ownership evoked a feeling of responsibility and control for their shared environment. Whereas in high rise housing, which was naturally occupied by many families and designed with large corridors and public areas with limited opportunities for surveillance, evoked no feeling of identity or control for their shared environment. This anonymous public space made it difficult to tell resident from intruder. This phenomenon is illustrated with Newman hierarchy of defensible space which was influenced by Jacob (1973) concept of delineating between private and public space in (figure 2.1) (Love, 2015). It is within this interior and exterior common public areas that most crime in public housing take place. This led to the development of the concept defensible space theory which Newman defined as a residential area whose physical features, building layout and site plan, function to allow residents themselves to become key agents in warranting their security. (Sirdevi Rao, 2016). The concept was grounded in the assumption that particular design decisions could reduce the probability of successful criminal victimization. This concept offers a set of architectural guidelines which are used in the design of a new urban residential complex to facilitate the territorial claim of the inhabitant to their surroundings as well as their right to perform natural surveillance (Fennelly, 2016).

The concept also suggest that the design of physical space has an influence on the behaviour of the resident and outsider's interaction with the space. Although the concept of defensible space was developed around the context of a residential setting, it can also be adapted for use in other building types (Stanley, 1976). (Julie Samia Mair, 2003)Defines defensible space as a crime prevention model for residential environment which reduces crime by expressing a social fabric that protects itself physically. (scince, 2018)Also described it as a collection of mechanisms, real and symbolic obstacles, clearly defined area of influence and enhance surveillance opportunities that function together to put the environment under the control of its inhabitant.
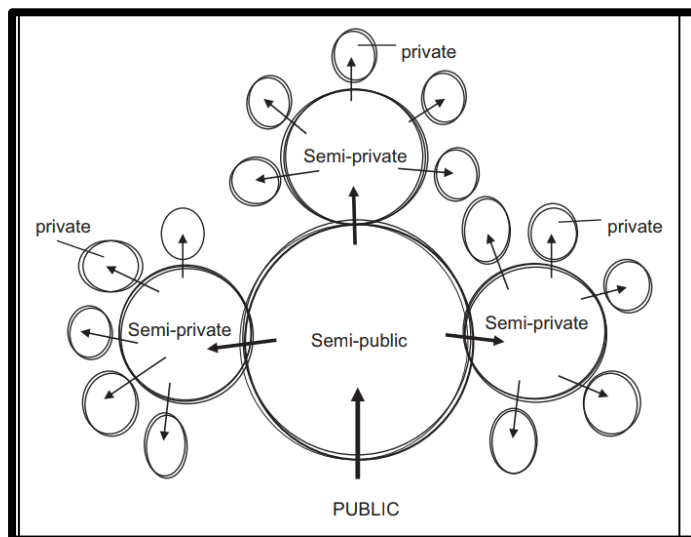
Figure 2.1 Hierarchy of Defensible space (Arrows indicate entrance and exist point at different level of the hierarchy).

Source: Love (2015)

2.1.1 Element of Defensible Space

There are four elements of defensible space as defined by Newsman which work individually and together to help create a safer environment. They are: territoriality, natural surveillance, image and milieu.

2.1.1.1 Territoriality

Newsman defined territoriality as the capacity of the built environment to create perceived zones of territorial influences, it measures the degree to which people have a sense that a space is "owned" or is private, that it has clearly demarcated divisions and boundaries and that it sponsors proprietorship (Morton, 2020). He also observed that limiting access to neighbourhood residential streets, common areas of apartment buildings and back of houses can reduces crime as seen in the case study of Five Oak Development where 26% reduction in crime rate was reported. This was achieved using barriers to separate areas into smaller units, splitting of large residential area into smaller ones, blocking of certain streets and alleys and the use of speed bumps. Territoriality may also be conveyed by creating buffers and boundaries around a structure, such as hedges, walls, and fences. within these walled boundaries, a very strong sense of ownership and involvement exist. The structure is maintained by the occupants, and any visitor would be asked to justify his presence. Although this method resulted in the reduction of crime it was also heavily criticized by scholars, who viewed the idea as a means of restricting the access of poorer people to higher income areas.

2.1.1.2 Natural Surveillance

Jocobs's concept of "eye of the street" describes natural surveillance as the capacity of the physical design to provide surveillance opportunities for residents and their agent. Because they were not owned and managed by the residents, features like unsupervised pathways, common areas, and shared outdoor spaces were linked to crime, according to the newsman (Morton, 2020). Newsman believed that designs facilitating surveillance allowed residents to observe the public areas of their environment and to feel that they were under observation, which created a greater

sense of security. Using straight unobstructed sight line reduces potential hiding spaces and creates spaces that can be easily surveyed (Hall, 2016).

2.1.1.3 Image

This refers to the physical design's ability to instil a sense of security. When an area's image is negative, it becomes less distinguishable from its surroundings, making it more prone to criminal activity. It also instils fear in residents, discouraging them from spending time in their homes and managing them as their own. (Yermus, 2013). This also result in the deterioration of the effectiveness of natural surveillance

2.2.4 Milieu

This describes the features of the building which must provide a sense of security, such as its location near a police station, the installation of a security system or proximity to a busy commercial area. Milieu requires that the areas around building should be defined based on its function; paths should be defined for movement and out-door areas should also be juxtaposed with home (Jegede, 2018). This is done by positioning spaces within the rougher environment, including proximity to town centre, business district or industrial zones.

2.2 DEFENSIBLE SPACE AND ITS ASSOCIATION WITH CPTED

The term CPTED was created by criminologist C. Ray Jeffery. It refers to an endeavour that assists in the creation of healthy and safe communities via well-planned design. Oscar Newman created a more restricted method called Defensible space at the same time. Both men drew from the previous works of Elizabeth wood, Jane Jacob and Schlomo Angel. The Jeffery CPTED approach is more inclusive than the Newman CPTED model, which is more focused on the built environment. Jeffery model is a multidisciplinary one, covering different fields such as wellbeing, law and business. Various CPTED models were later created based on Newman's concept, with an

emphasis on the built environment. As of 2004, the most prevalent CPTED model was that given in Newman and Crowes, which is a multi-disciplinary approach to crime prevention that incorporates biology and psychology. Jeffrey's contributions to CPTED in the 1970s heralded the beginning of a new age of publication. Despite the fact that it got little attention, it was published at the same time as Newman's idea of defensible space. His work which was largely theoretical compared with more accepted works of Newman that are empirical studies of crime environment were seen in the study of New York City public housing in the 1970s. Defensible space contributes to a more in-depth knowledge of the idea of CPTED, which is comprised of two components and concepts. These include: (I) allowing people to see and be seen continually; and (ii) allowing individuals to take control of the locations where they live by taking an ownership role and a readiness to intervene and report criminal occurrences when necessary.

The challenge of creating a defensive environment has lately been tackled from both a physical and psychological standpoint, which is a novel approach (Gardner 1995). The goal of the CPTED is twofold. The goal of CPTED is twofold. First is the reduction of opportunities for crime to occur by employing physical design features that discourage crime. The second encouraging legitimate use of the environment. These two aspects are captured in the modification of defensible space. According to a study of the literature, although Jeffery (1971) originated the phrase "Crime prevention through environmental design (CPTED)," most of the theoretical and practical progress in the subject has been based on Defensible Space and on subsequent research in the field. (Paul Cozens, 2001).

Authors like Moffat (1983) and (Paul Cozens, 2001) presented a model that illustrates the parallels between CPTED and Defensible space. Environmental design has the

capability of encouraging social contact, as demonstrated by Moffet (1983), who stated that CPTED principles applied in redesigning communities allow for increased socializing, which in turn helps to minimize criminal opportunity. He also highlighted the theoretical foundation provided by Defensible space and classified CPTED into seven linked areas with Defensible space serving as the conceptual base. Moffat depicts all seven components in the same form, with defensible space at the center and the others revolving around it. A close analysis of this model indicates that defensible space is a concept that encompasses access control, images and the surrounding environment, territoriality, target hardening, activity program support, and monitoring.
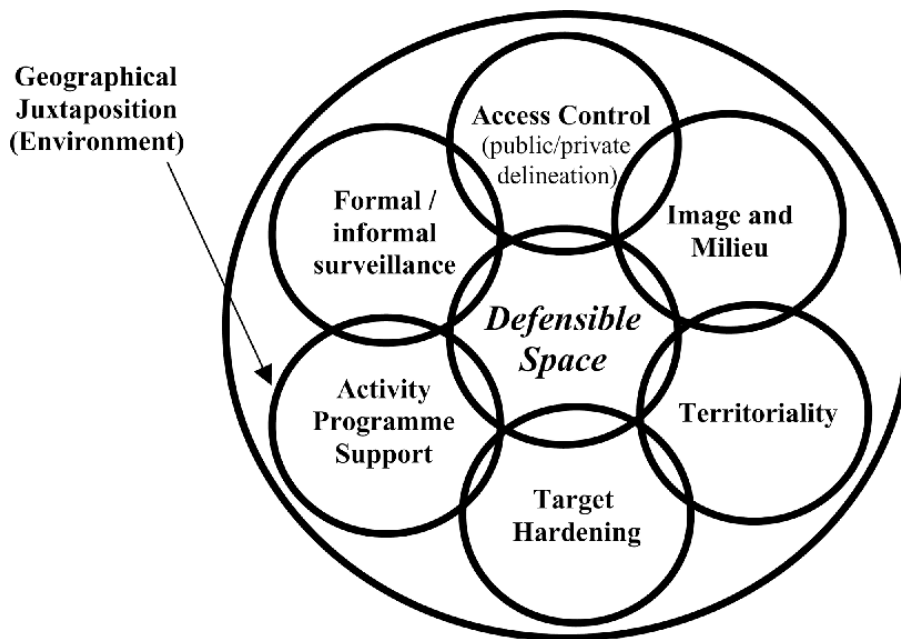
Figure 2.2 Defensible space model showing geographical juxtaposition

Source: (Paul Cozens, 2001)

2.3 CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN

International Crime Prevention Through Environmental Design (International CPTED Association) defines crime prevention through environmental design (CPTED) as a

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multidisciplinary approach to crime prevention that includes urban and architectural design, as well as organisation of both constructed and natural ecosystems. The idea was sparked by a 1961 article by journalist Jane Jacobs, who claimed that we might use physical environments to reduce criminal activity. Even though Professor C.Ray Jeffery was the first to use the term CPTED in 1971, it was later built upon by architect Oscar Newman in his book "Defensible Space" in 1982. The concepts of CPTED are focused on predicting a potential offender's cognitive processes and establishing an atmosphere that inhibits follow-through. Crowe as cited by (Love, 2015) stated that through good design and efficient use of the built environment, fear and the occurrence of crime may be minimized. The extra benefit of CPTED is that it instils a sense of security and well-being in employees and tenants (Deutsch, 2019). When CPTED is effectively implemented, it results in an environment that discourages criminal behaviour while also encouraging residents to remain vigilant.

2.3.1 Principles of CPTED

2.3.1.1 Natural Surveillance

Natural surveillance as an element of CPTED is the capacity of legitimate occupants of an area to exercise a high degree of visual control over the entire area. It works with the idea that criminal do not wish to be observed. The possibility of being spotted, apprehended or prosecuted deters the offender from offending even though they are not necessary being observed (Cozens P.M, 2005). Surveillance can also foster territoriality by increasing legitimate users' level of informal social power (Love, 2015). Natural surveillance can be achieved through the placement of windows and open area with a clear line of sight thereby increasing the visibility of space. There are two forms of surveillance; natural of informal and artificial of formal (Agbola, 1997).

Natural surveillance occurs as a direct result of architectural design. The most effective crime prevention designs are those that minimize obvious impediments and remove place of concealment for potential assailants. The following are some of the design strategies that are fall under natural surveillance as identified by (Agbola, 1997)

a. Ensure that landscape elements such as trees, bushes, and flower beds do not block legitimate property users' views and do not create hiding spots for intruders to engage in illegal activity.

b. Ensure that there are no trees, telephone or electric poles, or other obstacles blocking access to the building's upper floor.

c. Endeavour to use glazed windows, expensive windows or other forms of windows that allow for see through wherever the building's occupants are.

d. Ensure that the fence materials do not provide any blind spots or hiding places. (Agbola, 1997) defined artificial surveillance as the employment of a variety of security devices/personnel to maintain visible control over an area. He listed many solutions, including the employment of permanent guard (human guard) posts, organized security patrols such as vigilante groups, and the use of guard dogs or security dogs. Other strategies as identified by (Kelly, 2019) which promote natural surveillance on school campuses includes: window placement in places with views of walkways and parking lots, choosing fencing that allows the occupants to see through to the other side, Improve visibility by lighting walkways, stairwells, entrances, exits, parking lots, and campus ATMs properly. To improve landscape visibility, keep huge bushes and trees appropriately trimmed.

2.3.1.2 Natural Access Control

Natural access operates by restricting access to possible criminal targets. If illegal activities do occur, the access control system makes it simple for law abiding people to notice and report the crime to the authorities. By taking steps to clearly distinguish between public and private area, it lowers the chance for criminality. Another similar concept is known as target hardeners, it focuses on using physical barriers such as fence, gate, security door and locks to deny or limit access of crime. It is often considered to be access control in a micro scale (individual buildings). In application to a school setting, natural access can be incorporated by reducing the number of accesses into the building and guiding students and vehicles in such a way that you control the access points to your building site and building (Nandita P. Mishra, 2018).

2.3.1.3 Territorial Reinforcement

Territoriality reinforcement can be incorporated through design strategies such as landscaping, signage, decorative paver and lighting, defined property lines, clear distinction between public, semi public and private spaces. These strategies work together to create a sense of ownership and place around the building site and perimeter of the building. In relation to this study (Nandita P. Mishra, 2018) noted the importance of incorporating inconspicuous security which creates a human centre environment. These can be accomplished by equipping all student-occupied spaces with the ability to lock the room from the inside, by incorporating lockdown features into the design, by concealing ballistic fabric behind drywall, by installing hidden cameras to monitor access points, and by establishing an emergency plan for all students, teachers, and administrators in the building. The author also noted student show more respect to their academic environment when they have a sense of proprietorship.

2.3.1.4 Maintenance

According to the CPTED program it is critical that users view urban spaces as a well-maintained space because a deterioration indicates that the intended users of a site have less control and more tolerant of disorder, therefore, an ill maintained environment attracts crime. This concept is linked with the theory known as the "Broken window syndrome". The concept of maintenance of urban space refers to the need for management plans, cleaning, repairing and gardening of public spaces (Rau, Cartes, Neira, & Pascoe, 2018). It aims to promote a positive image and regular maintenance of the built environment in order to ensure the physical environment's continued successful functioning and to send a positive signal to all users. There are many studies which supports this idea.

2.4 THEORIES RELATED TO DEFENSIBLE SPACE THEORY

2.4.1 Rational Choice Theory

According to rational choice theory, most opportunistic criminals make rational decisions and notice, assess, and respond to a range of environmental cues. (Endro SUNARSO, 2018). These are environmental factors and signals that relate to the perceived danger, benefits, and effort connected with committing a crime and are crucial to the offender's decision-making process.

2.4.2 Situational Crime Prevention Theory

Situational crime prevention (SCP) is a crime-prevention strategy that aims to "limit chances for certain types of crime by raising related risks and obstacles while lowering incentives. It is a multi-stage procedure based on a theoretical framework that aims to explain where, when, and how criminal occurrences occur. (Guerette A. S., 2018)

2.4.3 Broken Window Theory

The concept of the broken window theory comes from criminologists James Q. Wilson and George Kelling's paper from 1982. According to their belief, signals of disturbance will lead to even more chaos. A building with an unfixed broken window conveys the appearance that no one cares or is in charge. Vandals will shatter the remaining glass and put graffiti on it because no one appears to care (study.com, 2016). This shows that a neighbourhood with more damaged windows is more likely to be a crime hotspot.

2.4.4 Environmental Criminology

Environmental criminology is the study of crime, criminality, and victimization in relation to specific locations and, secondarily, the way individuals and organizations change their actions in response to a physical location or spatial element (Endro SUNARSO, 2018). According to (U.S. Department of Justice, nd) crime is not randomly dispersed across urban environments but rather clusters in specific locations and times. Thus, environmental criminology focuses on the geographical location of crime and fear of crime, as well as the ways in which place-based variables impact individual behaviour.

2.5 HISTORY OF EDUCATION IN NIGERIA

Education was introduced into Nigeria during the colonial era, at this time the first primary school was developed in Badagry during the 19th century. The first secondary school was established by the church missionary society on June 6 1859, in Lagos state. The school was named and modelled after the CMS Grammar school in Freetown, Sierra Leone. The missionary who was the primary educators where tasked by the colonial government to teach the local population western style education. The education was necessitated by the need for more personnel to spread gospel to the

increasing audience. After a few decades of progress in basic education, the government began to pay attention to secondary education, particularly when the need for primary school graduates to continue their studies in secondary schools became critical. The colonial administration introduced the Education Ordinance in 1882, with the goal of having complete control over education. This was their first formal schooling statement in Nigeria. Then, schools were divided into two categories: public and private. The federal, state, and municipal governments are in charge of education. The Federal Ministry of Education is in charge of general policy development and quality assurance, but it is largely focused on tertiary education. State (secondary) and municipal (elementary) governments are primarily responsible for school education (Staff, 2017).

2.5.1 Secondary Education in Nigeria

Secondary education is defined as the completion of elementary school education and seeks to build the foundations for lifetime learning and human development by providing more subject-or skill-oriented training (Olajire, 2019). Secondary education is a necessary level of education that serves not only as a transitional stage between elementary and higher levels of education, but also as the foundation of the country's labour force and workforce (Tabotndip, n.d). Secondary education attempts to develop a child beyond the basic level of education, as reading, numeracy, and communication skills alone are insufficient for children (Mathew, 2013). Secondary school lasts six years, with three years in JSS (Junior Secondary School) and three years in SSS (Secondary School) (Senior Secondary School) (Yahaya, 2019). After which the senior secondary students are required to write the WASSCE examination which marks the end of Senior Secondary School and provide opportunity for tertiary education. The SSS curriculum consists of six core topics plus two or three electives.

English, mathematics, economics, one major Nigerian language, one elective from biology, chemistry, physics, or integrated science, one elective from English literature, history, geography, or social studies, agricultural science, or a vocational subject from commerce, food, nutrition technical drawing or fine arts

2.6 SECURITY CHALLENGES IN NIGERIA

Security unavoidably stands as a major policy challenge to decision makers as well as communities and groups around the globe. This is so because the concept of security remains a complex phenomenon that unarguably require not just counter-measures to deal with but concrete preventive and resilient decisions to manage in order to avoid loss of lives and properties (Onyebukwa, 2016). Since the country became democratic, there have been new forms of violent crimes which include: kidnapping for ransom, pipeline vandalization, political violence, terrorism and the Fulani herbs men killings among others (Ukpere, 2012) Despite efforts to alleviate the situation, the situation has worsened. This statement is supported by the Global Peace Index's classification of Nigeria as one of Africa's eight least peaceful countries, based on its assessment of peacefulness in three domains: safety and security, continuing conflict, and militarization (Olaiya, 2021). In Nigeria, violent crime has its foundation and history, according to Olabanji and Ese (2014) it may go back to the age of 1960-1970. Security issues may be attributed to the early years of military administration when the great numbers of weaponry were brought to Nigeria for military purposes, some of which came into civilian hands. After the civil war, citizens and ex-military personnel utilized these weapons for evil ends, including violent robbery (Olabanji and Ese, 2014). In Nigeria, internal reasons of insecurity are major challenges to social and economic development, rather than exterior sources of insecurity. These causes have been categorized in internal and external cases.

2.7 NATURE AND CHARACTERISTIC OF SECURITY PROBLEMS ASSOCIATED WITH A SECONDARY SCHOOL ENVIRONMENT

As previously discussed, we can ascertain to the fact that there are challenges of insecurity in Nigeria. With all that is going on, educational institutions such as schools appear to be the primary target of insecurity, making the fundamental business of schools, efficient teaching and learning, difficult to achieve. Educators and students are unable to successfully fulfil their goal of attending school because a rise in the number of incidents of insecurity in schools leads to an increase in the number of cases of insecurity. On daily bases in Nigeria, voice media and print media reports give accounts of one form of violence or the other in schools. These manifest in different forms including bullying, shooting, sexual harassment, kidnapping and hostage taking among others

The security threats in school can be categorized into: Internal security threat and external security threat (ALIMBA, 2018)

2.7.1 Internal Security Threat

This kind of threat is introduced into the system. Examples include bullying, physical assault, crimes, fighting, name-calling, gangsterism, extortion, hate speech, and violent conflict. Students, teaching and non-teaching personnel, and anyone who operate within the system pose a danger to internal security. Violence is defined as the use of physical force to injure, harm, or kill someone or something. In the school system, violence has become an issue of central concern among teachers, students, and the general public including parents, governmental and non-governmental organizations as well as policymakers. School violence has serious repercussions, with fatalities occurring in severe situations. This is well described in (OBILOR, 2021) study that revealed consequences of school violence which includes destruction of

school property, moral decadence, inadequate human capital development, an increase in crime rate, and instructors' and students'/pupils' disregard of teaching and learning. The author further revealed that insecurity and fear are created by violence in schools, which harms the overall school climate and infringes on students' right to learn in a secure setting. If students are not in a safe setting, schools will not be able to fulfil their duties as places of learning and socializing. Long-term consequences of violence on children include long-term disabilities, disordered interpersonal relationships, such as difficulty trusting others with adult relationships or violent relationships; a predisposition to emotional disturbance, feelings of low self-esteem, depression, and increased potential for child violation as a parent. Violence in the school inhibits adolescents from attaining their dreams and aspirations especially as it relates to their academic performance.

2.7.2 External Security Threat

Outside the school, there is an external threat. It can be caused by a variety of factors, including parents, PTAs, government officials, community members, and so on. External security threats have the ability to reduce employee productivity and student learning results. It has the potential to lower school attendance and performance, and, in the long term, to lead to the closure of whole schools. Domestic and international governing bodies' rules might also pose a threat in the classroom. Such policies can give rise to unrest and clashes in the educational system. Some of the most devastating occurrence of external security treat in school are exemplified in kidnapping of school children and their teachers, especially in the northern parts of Nigeria. There have been media reports of violence against school children, some of the devastating occurrence include the killing of about 59 male students in Federal Government College Yobe state on the 25th of February 2014, within the same year in April 15th 2014 about 276

female students at chibok were kidnapped in Borno state. On the 19th of February

2018, about 110 girls were abducted from their school in Dapchi, Nigeria and the

recent kidnapping of about 344 male students in kankara. From observation made,

past as well as recent events highlight kidnapping of students as well as staff as the

major and most devastating threat faced by schools in Nigeria. All the is attack are not

only limited to secondary education alone as this also affect tertiary institutions.

(Tom Schneider, 2000) revealed that school encounter vulnerabilities to their safety

and security in four major area:

1. Supervision of the school's design and usage of the area

2. The school's administrative procedures and practices

3. The school's immediate neighbourhood and nearby communities

4. The behavioural characteristics and backgrounds of the school's students

The issue of insecurity in Nigeria is massively complex and requires the attention of

several factors to be addressed. Architects have an important role to play in the current

fight against crime and terrorism as revealed by (Samuel O. Ebong, 2017). This role

arose from the realization that the environment may be influenced via design to

minimize and/or prevent criminal and terrorist activities, as well as to lessen the impact

of such assaults. This study examines how defensible space might help to minimize

insecurity in the academic environment

2.8 ARCHITECTURE AND DEFENSIBLE SPACE IN SCHOOL

ENVIRONMENT

It is anticipated that basic standards are followed in the design of the building and

surrounding spaces due to the architect's expertise. The planning and design of a

school should be able to guide against both natural and man-made elements while yet

adhering to the regulations that keep the place safe. When it comes to crime prevention, excellent architecture has the potential to save money. This has been particularly noticeable in the defensible space and CPTED programs throughout the years. Armitage (2014) considers crime prevention to be the responsibility of the planner, architect, developer, and administration of public space.

Design can be used to achieve the four elements of defensible space (natural surveillance, territoriality, image and milieu) in various ways. This includes limiting access and exist and through movement around the building ii) encouraging both formal and informal surveillance by occupant whereby intruders feel an unease ii) design that give room for future maintenance v) define ownership of space in the design by the occupant.

2.8.1 School Design and Security

In the course of adopting design concepts, methods and architectural design that assure safety and security while minimizes the environmental negative effect of buildings, greater attention is being paid to sustainable architecture today. This implies that there is a connection between a building's design and security, most notably in the layout of interior rooms, the placement and amount of fenestration, and the interaction between exterior and internal areas.

2.8.2 Use Of Building Materials and Security

It is critical to evaluate the materials used in the building of a school that can give a level of security to the tenant in this study's content. This has necessitated the employment of steel reinforced doors, burglary proofing, security fences, and access barriers. Apart from enhancing security, these materials may have an influence on the building's environment. The security problems of the twenty-first century need a focus

on the usage of building materials that contribute to crime prevention through environmental design. This means that greater emphasis should be placed on the construction materials that enable academic institutions to create defensible space. Security window films are self-adhesive protective glazing materials that are professionally applied to the interior of glass windows. This glazing was developed to mitigate the risk of glass failure due to bomb explosions, forced entry, and adverse weather. The film is intended to keep the pieces of glass together. When an attacker attempts to break through the glass, it does not shatter, allowing the intruder to enter. Rather than that, it sustains punctures and breaks but stays intact within the window.

2.8.3 Building Maintenance and Security

Building maintenance is necessary to guarantee the safety and comfort of everyone who works, resides, or visits the structure. A structure that isn't well-maintained might cause issues for individuals who live and work there. Regular maintenance helps to guarantee a safe and tranquil atmosphere for the building's residents, whether it's inadequate air circulation, improperly positioned equipment, or an uneven path (Stephens, 2020). A study done by (Hamilton-Ekeke & J-T, 2017) revealed a lack of maintenance culture of school facilities which resulted in dilapidation in Bayelsa state. The author also revealed no security measures is place in the participating primary school. Another study done by (Oluwatoyin, et al., 2017) found that maintenance attempts were made however, there were no definite strategy or maintenance manual in place. The study also highlighted the lack of maintenance fund as a major factor to the dilapidated condition of secondary school buildings. The studies done therefore reveals high level of vulnerability of secondary school to security treats.

2.9 SCHOOL DESIGN AND CRIME PREVENTIVE STRATEGIES

As seen in the time saver standard for building types, schools require a greater level of safety than other types of buildings due to their occupancy and use. The primary emphasis is life safety, which influences the whole design in terms of layout, construction, and material selection (Callender, 1983). Environmental design can help avoid crime. CPTED is one architectural approach that may successfully integrate the physical and psychological needs of students at school. (Daniel J. Lamoreaux, n.d). A study done by (Guerette, Shariati, & T., 2019) on student safety perception on campus facilities indicated that high CPTED facilities were perceived to be safer than low CPTED facilities. The size of the school community has a direct link with learning, according to Thomas Blurock, AIA, Principal of Thomas Blurock Architects, with smaller schools of 500 students or less giving greater learning opportunities and security. When students accept responsibility for one another, interaction improves, and the learning environment becomes safer. The intelligent design of circulation areas, hallways, administrative offices, common spaces, classrooms, restrooms, and locker rooms, in combination with school operating standards, enhances school security.

2.9.1 Physical Security

Physical security is described as the aspect of security dealing with physical measures designed to protect people and prevent illegal access to equipment, certain parts of the school, and key documents (FEMA, 2012). While security technologies are not a panacea for all school security concerns, when implemented properly, they may enhance security, free up administrators to focus on other critical responsibilities, and even save money. (Green, 1999) identified five component of physical security which are; Deterrence, Detection, Delay, Response/ investigation, Consequences.

(Timm, 2021) defined deterrence is as the act of discouraging someone from participating in illegal activity. Some forms of deterrence include fencing, signs, bright exterior lighting et.c. (Green, 1999) also emphasized the necessity of detecting an incident in order to effectively communicate such incident to the proper authority as soon as they are detected. Next is to limit or delay the harm that can be caused by a intruders or activities which manage to breach the physical barriers put in place in order for response forces to arrive. This can be achieved through locked door, fences, bolted down computer on to large heavy desk as it applies to a school et.c. finally the proper authority must respond to the incident and enforce consequences which becomes an additional deterrent for the future.

2.9.1.1 Layer Of Defense

One of the cores CPTED methods is layer of defence, often known as protection-in-depth, which seeks to safeguard assets behind several barriers. In this approach, many layers of protective measures are placed in concentric rings around a school. They start at the exterior of the school and make their way inside to the most susceptible sections. Each layer is meant to keep the assault as long as possible delayed and disabled. (FEMA, 2012) identified three layers of defense which are

1. First or outer layer

   This comprises both natural and man-made barriers, which are often found along the property boundary or along the sidewalk/curb line. The school border is often defined only by a fence and is frequently entirely open.

2. Second or middle layer

   The Second or Middle Layer often stretches from the site's perimeter to the exterior face of a school building.

3. Third or inner layer

The third, or inner layer, starts at the building's exterior and extends into the interior of the school.

2.9.2 School Ground

2.9.2.1 Site Design

Site design may make a significant contribution to defending against assaults perpetrated by inside or outside offenders who, for whatever reason, target a school and its occupants. From observation made, past as well as recent events highlight kidnapping of students as well as staff as the major and most devastating threat faced by schools in Nigeria. site security has been defined as the integration of conventional planning activities such as building placement and parking, as well as site infrastructure design, with security requirements (FEMA, 2012). As a result, one of the most important considerations in school site design is the clear delineation of the school property limits. This definition can be achieved by the use of layered edge treatments such as fencing, landscaping, and ground surface treatments, among others (Toth, 2018). It is also beneficial to employ symbolic delineators such as archways, entry posts, and student artworks to help students understand where they are in relation to the campus' perimeter and boundaries psychologically.

a. Location And Size

The first chance to set proper standoff distances and security perimeters is to plan where the building(s) will be placed on the site. (FEMA, 2012) also indicated that the size of the site is usually proportional to its position in a metropolitan region, a suburb, or a recently created area. This means that because of the increased cost of land in urban areas, school locations are generally smaller and schools have at least two to three floors. Sites in the suburbs and recently developed regions on the outskirts are

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substantially larger, with low lot-coverage ratios, allowing the school to be built far away from roadways and other public places.

b. Topography

In terms of surveillance, topography may be advantageous or detrimental depending on the conditions. Elevated locations may improve monitoring of the surrounding region from within the facility, but they may also allow opponents to observe onsite areas. Buildings located close to higher surrounding terrain may be unduly vulnerable to unwanted observation. The form, placement, and landscaping of a building can assist define the line of sight, making it easier to manage any hostile monitoring. Increasing the security of school buildings and their inhabitants by denying aggressors a line of sight, whether from onsite or offsite.

c. Vegetation

On-site vegetation can be used for a variety of purposes, including security and aesthetics. It can open or impede views, provide shade, and enhance the appearance of the site. In addition, the landscaping must be kept in good working order. Landscape design, if not properly managed, can actually contribute to a hazardous school environment by creating hiding places, limiting illumination, and interfering with lines of sight necessary for natural surveillance, all of which can contribute to student safety

(Toth, 2018). Finally, poorly situated landscape components may serve as an invitation for vandalism.
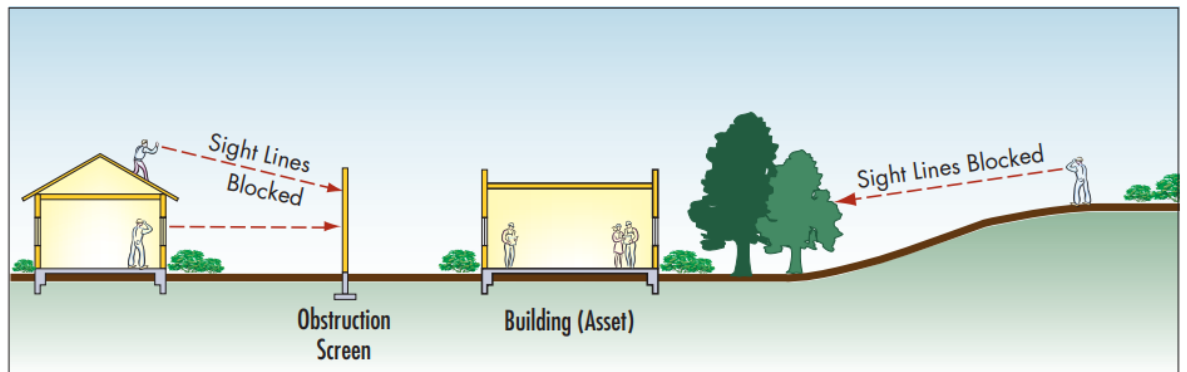
Figure 2.3 Trees and screens blocking sight lines into the site

Source: (FEMA, 2012)

d. Stand Off Distance

Schools have several layers of security, of which parking and barriers are two important elements. More appropriate for situations where explosives are present. Parking restrictions and barriers, on the other hand, can assist prevent people from launching armed assaults, identify them early from a safe distance, and delay assailants from accessing vulnerable and/or densely crowded areas on school grounds. Stand-off space has become a part of CPTED target hardening and 'fortress architecture.' Since the 1970s, it has been employed to combat terrorism in Northern Ireland. Stand-off space is a zone of over-fortification and access restriction that surrounds structures and constructed resources. The standoff distance is determined by the distance between the charge's centre of gravity in the vehicle or other vessel and the face of the building in question. The standoff distance, or simply standoff, is the distance between the front of the buildings and the closest point from which an explosive device might reach from either side, assuming all security measures are in place (FEMA, 2012). Viewing the parking lot using security cameras, employing onsite security staff to

perform patrols, or keeping accidental visual contact through windows can all be used to monitor parking spaces for suspicious or unlawful car placement. Vehicle screening methods may potentially reveal firearms intended for use in active-shooter assaults.

2.9.3 School Building

2.9.3.1 Building Configuration

The overall layout of a school can help school and security authorities maintain a safe atmosphere and deter vandalism, trespassing, and break-ins. According to the author, managing a campus-style organization with numerous single-story buildings scattered throughout the school grounds is highly challenging unless a single, restricted admission point is maintained and controlled at all times. Even yet, the scattered school is susceptible to attack from any direction. A more compact arrangement of multiple school buildings, often with a central courtyard, according to the author, allows for easier monitoring and access control by confining access to the inner courtyard and providing a secure perimeter. Other multi-story arrangements, such as U, H, or I shaped layouts, are also affected. larger educational institutions are typically organized as a campus, with a number of different buildings connected by open or closed pathways. Smaller schools may just have one building, which is common in rural areas.
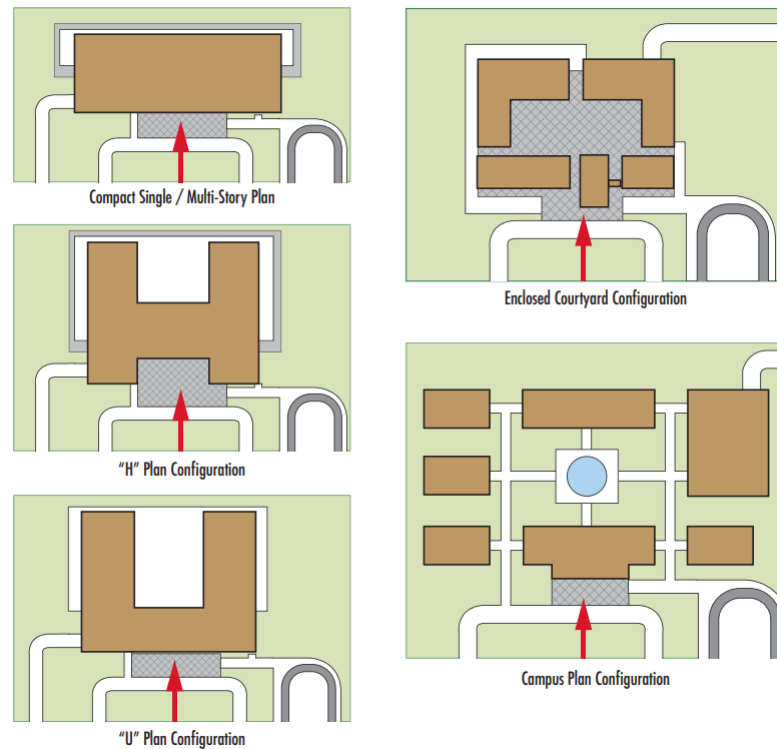
Figure 2.4 School building configurations

Source: (FEMA, 2012)

Securing the exterior of the building is the only defence that many schools can employ. It is critical to keep intruders off school grounds and away from children, teachers, and other school personnel for a variety of reasons. At a minimum, the US Department of Education recommends installing safe locks with quick-release capabilities to enable for evacuations and numerous escape routes. Protective coatings should be put to windows that face traffic to increase their resilience.

There are very few defensive measures that may be placed into the interior of the building to prevent an intruder from harming the inhabitants. Securing external doors and windows limits access to the building to particular restricted entries that can detect weapons. Weapons detection zones should be constructed to confine intruders and prohibit uncontrolled access to other parts of the school.

2.9.3.2 Interior Design Recommendations

Some design recommendations highlighted by (FEMA, 2012) with regard to internal security in school building include; Ensuring access is controlled and intrusion is minimized, visitors should be directed to a single control point and expected to proceed immediately to administrative reception rooms upon arriving or departing the school. The combination of a main entrance and a well situated and continuously staffed administrative centre can increase surveillance of school entry, stairwell, and hallway surveillance without the need for an extra appointed monitor. The primary entry area should be positioned such that unimpeded observation of lobby doors, stairwells, and perpendicular corridors is possible. By situating the administrative area against an external wall, extra surveillance and a distant view of exterior regions, particularly visitor parking, drop-off locations, and exterior pathways leading up to the main door, are enabled. Consider putting security cameras in the lobby for electronic surveillance and access control.

Administration areas should be located near key entry points and constructed in such a way that they serve as a visible link between administrators and students or visitors through windows. This area should be equipped with a safe door as well as a functional phone. Furthermore, two remote exits from the principal's office should be provided, with one of them possibly being a window to the outside world. Faculty' offices and student data should be kept isolated from the reception area and only accessible through secure hallway doors. To defend against armed intruders, access to classrooms and other interior spaces should be restricted. Entry control mechanisms that prohibit or delay access to classrooms, offices, libraries, and other commonly used areas by students should be installed on doors. The doors and walls should be made with materials that are difficult to breach easily. The central control station will be able to

restrict the intruder's mobility and lead students to a safe exit if access control is effective.

This student restroom is designed to provide students privacy while allowing staff to readily watch them in the restroom and when washing their hands. Window placement near student bicycle racks and guest parking spaces also improves visibility on campus while reducing unwanted seclusion and blind corners. By carefully selecting plants that complement the chosen building design, line of sight may be greatly enhanced (Safe Havens International Inc, 2014).

2.10 GAPS IDENTIFIED IN LITERATURE

I. There were little studies carried out on defensible space in relation to school's environment in Nigeria.

II. Most of the studies on defensible space were carried out in relation to housing.

III. Many of the studies on defensible space were carried out in developed countries.

The listed gaps identified in pervious literature was what provided the direction for this study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 CHAPTER OVERVIEW

This chapter discusses the techniques and processes that were employed to achieve the research's end goal and how they were achieved. There are several topics covered in this area, including: research design; study population; sampling strategy; information gathering methods; data collection instruments; and data analysis methods.

3.2 RESEARCH DESIGN

In order to accomplish the objectives of the study, both qualitative and quantitative research methods were used. To achieve the aims of the study, questionnaires were administered and structured observation guide was used, which combined to form the survey techniques employed. These techniques will make it possible to acquire important data from the selected secondary school users, as well as data on the physical security features of the selected secondary schools.

3.3 THE STUDY POPULATION

The study population consisted of selected public and private secondary school in Ota, Ogun state Nigeria. The study population included the teachers and students of selected public and private schools in Ota, Ogun state. It is important to note that during the course of this research staffs present where given the questionnaires at the point of visit while the estimated population of the student was gotten through average classroom to learner ratio.

3.4 SAMPLING TECHNIQUE

For the purpose of this study, the sampling technique most suited to accomplish its objective was purposive sampling technique. The selection was based on public and private secondary school in Ogun state, Nigeria. The study was provided with relevant

information on public and private secondary schools in Ogun state from the Education Management Information System (EMIS) of the ministry of education.

The case studies selected where based on the following criteria's

    i.   A secondary school with senior secondary facilities.

    ii.   A secondary school rated by google as on the highest rating schools in Ota, Ogun state.

    iii.   Accessibility into the building.

3.4.1 Sample Frame

The sample frame for the study is a representation of the elements of the population of interest. The study was limited to four secondary schools in Ogun state. The four secondary schools selected were purposefully sampled to include two public secondary school and two private secondary school. The secondary schools that constituted the sample frame of the study include Iganmode grammar school, Ansar-ud-deen, Ambassadors college and Faith academy.

Table 3.1 List of Selected Schools

	Selected secondary schools	Population
1	Iganmode grammar school	2520
2	Ansar-ud-deen	2170
3	Ambassadors school	378
4	Faith academy	960
	Total	6712

Source: Author's compilation (2021).

3.4.2 Sample Size

To calculate the sample size of the student, the following statistical formula was adopted, as recommended by Asika (2004)

n= N/[1+N(b)²]

Where: n= required sample size

     N=population size

b=maximum acceptable error margin of (10%)

however, the study adopted a margin error of 8% to allow for a more accurate result

n= N/[1+N(b)²] =152

Table 3.2: Sample size calculation

	Selected secondary schools	population	Proportional sampling strategy	Student sample
1	Iganmode grammar school	2520	2520/6028 x 100%= 42%	42% of 152= 64
2	Ansar-ud-deen	2170	2170/6028 x 1000%= 36%	36% of 152=55
3	Ambassadors school	378	378/6028 x 100%= 6%	6% of 152= 9
4	Faith academy	960	960/6028 x 100%= 16%	16% of 152= 24
	Total	6028	100%	152

Source: Author's compilation (2021).

3.5 METHOD OF DATA COLLECTION

The study acquired data from both primary and secondary source. Quantitative data were collected from the public and private secondary school users through structured questionnaires. Qualitative data were also obtained through the use of well-structured observation guide which was used to survey the existing conditions of the public secondary school building and general environment. Secondary data were obtained through maps, literatures, journal, thesis, newspaper, and downloaded information from various website. The attribute that makes an environment to be defensible were the area of focus for data gathering.

3.5.1 Data Collection Instruments

The study generated data from two sources, which are primary and secondary sources. The primary sources are:

i. Questionnaire

The procedures of questionnaire administration should be a consideration to researchers. The questionnaire was developed to extract information from the staffs

and students selected in the study. The questions were brief but loaded enough to provide a robust data.

ii.   Observation Schedule

The study made use of well-structured observation schedule to survey the physical feature of the case studies selected. The observation schedule was designed using element of defensible space as a guide to evaluate the existing features present in the schools selected.

Furthermore, the secondary data collection instrument was obtained from various literatures, journals, thesis, newspapers as well as information from websites.

3.6 METHOD OF DATA ANALYSIS

Micro soft Excel and Statistical Package for Social Science (SPSS) was used for statistical analysis. Result and discussion were presented using percentage, table to represent the hypotheses.

3.7 DATA COLLECTION, CHARACTERISTICS AND ANALYSIS BY OBJECTIVES

In this section data collection and analysis are presented in relation to the stated objectives of the study

Objective 1

Identify the elements of defensible space and CPTED strategies applied in the design of secondary school in ota, Ogun state, Nigeria.

i.   Data characteristics

Both qualitative and quantitative data was used to data was used to accomplish this objective. Qualitative data were obtained through structured observation guide while quantitative data were obtained through questionnaires. Respondents were asked to rate in a 5-point Likert-type scale ranging from 1 representing strongly

disagree and 5 representing strongly agree which represented their perception of the aspect of defensible space in operation in their school.

ii.   Sources of data

Data for this objective was supplied through questionnaire administration to faculty members as well as students in the selected case studies. Structured observation was also used for each school and photographic were taken.

iii.   Data analysis for objective 1

Descriptive statistic was used in analysing the responds, the result was then presented using tables and charts

Objective 2

Investigate the level of satisfaction with the security experienced by the staffs and students.

i.   Data characteristics

The data used to investigate the respondent's satisfaction with security within the school were mainly qualitative. The level of security within the school was obtained through administration of questionnaire.

ii.   Sources of data

The data for this objective were derived from the staff and students of selected public and private secondary schools using questionnaire.

iii.   Data analysis for objective 2

Descriptive statistics was used, such as frequency and percentage to analyse this objective.

Objective 3

Design a secondary school building using the principle of defensible space.

i. Data analysis for objective 3

This objective will be achieved through the design of a secondary school which applies defensible space principles as well as CPTED Principles. This designed will be presented as architectural drawings and model animation.

Table 3.3 Operationalisation of Appendix 1

s/n	Code	Description	Scale of measurement	Range of value
1	Gender	Gender	Nominal	Male, female
2	Age	Age	interval	12-16, 16-21, 22-27
3	Status	Status	Nominal	Sss1, Sss2, Sss3,
4	Age	Age	Interval	20-30,31-40,41-50,51-60, Above 60
5	Education	Education	Nominal	WAEC/SSCE, ND/NCE, BSc/HND, Msc/MBA, PHD
6	Duration	Duration	Interval	1-5, 6-10, 11-15
7	STRANGERS	I am able to recognize strangers within the school environment	Ordinal	Strongly disagree, Disagree, Undecided, Agree, strongly agree.
8	ZONING	Public and private space are clearly demarcated in the building	Ordinal	Strongly disagree, Disagree, Undecided, Agree, strongly agree.
9	LEBEL	The school spaces are adequately labelled	Ordinal	Strongly disagree, Disagree, Undecided, Agree, strongly agree.
10	ACCESS	Access to spaces around the building is regulated	Ordinal	Strongly disagree, Disagree, Undecided, Agree, strongly agree.
11	OWNERSHIP	I feel ownership of the school spaces during use	Ordinal	Strongly disagree, Disagree, Undecided, Agree, strongly agree.
12	SECURITY PERSONNEL	The presence of security personnel is tangible within the school environment	Ordinal	Strongly disagree, Disagree, Undecided, Agree, strongly agree
13	EXTERIOR VIEW	I can clearly look over the external surrounding even when I am inside the school building.	Ordinal	Strongly disagree, Disagree, Undecided, Agree, strongly agree
14	INSPECTION	I immediately inspect the surrounding area whenever I overhear loud or suspicious noise	Ordinal	Strongly disagree, Disagree, Undecided, Agree, strongly agree

Table 3.4 Contd. Operationalisation of Appendix 1

15	DETERIORATION	The school building has physical deteriorations	Ordinal	Strongly disagree, Disagree, Undecided, Agree, strongly agree
16	HYGIENE	I am satisfied with the general cleanliness of the school environment	Ordinal	Strongly disagree, Disagree, Undecided, Agree, strongly agree
17	APPEARANCE	I am satisfied with the physical appearance of the school environment	Ordinal	Strongly disagree, Disagree, Undecided, Agree, strongly agree
18	LOCATION	The school building is located in a crime prone environment	Ordinal	Strongly disagree, Disagree, Undecided, Agree, strongly agree
19	PLANNING	The school building layout is easily comprehendible	Ordinal	Strongly disagree, Disagree, Undecided, Agree, strongly agree
20	ENVIRONMENT	The road around the school is well constructed	Ordinal	Strongly disagree, Disagree, Undecided, Agree, strongly agree
21	SAFE ENVIRONMENT	I feel safe within the school environment	Ordinal	Strongly disagree, Disagree, Undecided, Agree, strongly agree
22	SATISFACTION	I am satisfied with the general level of security in the school	Ordinal	Strongly disagree, Disagree, Undecided, Agree, strongly agree

Source: Author's compilation (2021)

Table 3.5 Summary of Research Design

s/n	Research question	Objectives	Research method		
			Data Gathering	Data analysis	Data presentation
1	How does Defensible space manifest in the design of secondary school buildings in Ogun state, Nigeria?	Identify the elements of defensible space principle and CPTED applied in the design of secondary school in Ota Ogun state, Nigeria.	Questionnaires	Descriptive analysis and content analysis	Frequency tables and descriptive approach with the aid of photographs
2	To what extent are the staffs and students satisfied with the level of security within the school?	Investigate the level of satisfaction with the security experienced by the staffs and students.	Questionnaire	Descriptive analysis	Frequency table
3	How can defensible space theory be implemented in the design of a secondary school buildings?	Design a secondary school building using the principle of defensible space	Content analysis	Qualitative: Document review	Descriptive approach with Architectural drawings, model and 3d animation

Source: Author's compilation (2021).

3.8 ETHICAL CONSIDERATION

I.   Anonymity and confidentiality: To guard the privacy of respondents, the responses are kept confidential and the findings are utilized exclusively for academic purposes.

II. Voluntary participant and informed consent: Participants and respondents in the study all gave their consent voluntarily and were informed of the study's purpose and methodology in a suitable manner. Prior to the event, authorization was obtained from the school administration to allow the student to participate.

III. Plagiarism: All thoughts or writing that do not belong to the author are appropriately credited in the text and referenced.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSIONS

4.1 CHAPTER OVERVIEW

This chapter present the data obtained from research field work. It discusses the result of the copies of questionnaires distributed and case studies carried out. The analyses were carried out in accordance with the objective of the project in the same order.

4.2 STUDENT PERCEPTION OF DEFENSIBLE SPACE IN THE SCHOOL ENVIRONMENT

4.2.1 Profile Of Student in Selected Schools

The data collected from the respondent's profile were subjected to descriptive statistical analysis. The results are presented in table 4.1. From the result it was shown that 55% of the respondent were male while 45% of the respondent were females, this is to indicate that majority of the respondent were male. The result also shows that 51.7% of the respondent were between the age of 12-16 while 48% of the respondent were between the ages of 16-21. This indicates that majority of those who participated in this research are between the age of 12- 16. The educational status of the respondent revealed that 53% of the participant were in SSS 3, this group made up the majority of the response in the study. The second largest participant in the study were in SSS 1 making up 29.5% of the respondent and SSS 2 making up 17.4% of the total respondent.

Table 4.1 Profile of students in selected schools

	Variables	Frequency	Percentage
Sex of respondents	Male	82	55.0
	Female	67	45
Age group of respondents	12-16	77	51.7
	16-21	72	48.3
	22-27		
Status	Sss 1	44	29.5
	Sss 2	26	17.4
	Sss 3	79	53.0

Source: Author's compilation (2021).

4.2.2 Student Assessment on Territoriality

Questions relating to territoriality were asked and the response are shown in table 4.2 The questions were based on the respondent perception on territoriality. Form the data analyses it was shown that 37.6% of the respondent agreed to being able to recognize strangers within the school environment, 52.3% agreed that private and public spaces were clearly demarcated in the building, 81% agreed that the school spaces were adequately labelled, 47.7% agreed that access to spaces around the building is regulated, 34.2% indicated that they felt ownership of the school spaces during use and 46.3% agreed that the presence of security personnel is tangible within the school environment. Based on the response analysed.

Table 4.2 Student assessment of territoriality.

S/n	Item	SD	D	UD	A	SA
1	I am able to recognize strangers within the school	13 (8.7%)	42 (28.2%)	23 (15.4%)	56 (37.6%)	15 (10.1%)
2	Public and private spaces are clearly demarcated in the building	11 (7.4%)	33 (22.1%)	20 (13.4%)	78 (52.3%)	7 (4.7%)
3	The school spaces are adequately labelled	8 (5.4%)	33 (22.1%)	15 (10.1%)	81 (54.4%)	11 (7.4%)
4	Access to spaces around the building is regulated	9 (6.0%)	32 (21.5%)	21 (14.1%)	71 (47.7%)	14 (9.4%)
5	I feel ownership of the school spaces during use	23 (15.4%)	51 (34.2%)	33 (22.1%)	35 (23.5%)	6 (4.0%)
6	The presence of security personnel is tangible within the school environment	10 (6.7%)	33 (22.1%)	24 (16.1%)	69 (46.3%)	13 (8.7%)

Source: Author's compilation (2021).

4.2.3 Student Assessment on Natural Surveillance

Table 4.3 below represent respondent perception of natural surveillance experienced in the school environment. The result shown reveals that 40.3% of the respondent agreed to being able to look over the external surrounding even when they were inside the school building, this is an indication of natural surveillance. 43% of the respondent claimed to immediately inspect the surrounding area whenever suspicious activities occur.

Table 4.3 Student assessment of natural surveillance

S/n	Item	SD	D	UD	A	SA
1	I can clearly look over the external surrounding even when I am inside the school building	21 (14.1%)	40 (26.8%)	13 (8.7%)	60 (40.3%)	14 (9.5%)
2	I immediately inspect the surrounding area whenever I overhear loud or suspicious noise	16 (10. 7%)	39 (26.2%)	20 (13.4%)	64 (43.0%)	10 (6.7%)

Source: Author's compilation (2021).

4.2.4 Student Assessment on Image

Table 4.4 below represent image which is part of the principle of defensible space measured in the school. It was revealed from the data analysed that 54% of the

respondent reported that the school building had physical deteriorations, this indicated that the schools where not well maintained. 55% reported that they were satisfied with the general cleanliness of the school environment and 43.6% claimed to be satisfied with the physical appearance of the school environment.

Table 4.4 Student assessment on image

S/No	item	SD	D	UD	A	SA
1	The school building has physical deterioration	12 (8.1%)	29 (19.5%)	32 (21.5%)	54 (36.2%)	21 (14.1%)
2	I am satisfied with the general cleanliness of the school environment	23 (15.4%)	42 (28.2%)	20 (13.4%)	55 (36.9%)	7 (4.7%)
3	I am satisfied with the physical appearance of the school environment	26 (17.4%)	32 (21.5%)	20 (13.4%)	65 (43.6%)	6 (4.0%)

Source: Author's compilation (2021).

4.2.5 Student Assessment on Milieu

Questions regarding milieu revealed that 32.9% percent of responder disagreed that the school facility is located in a crime prone environment, 44.3% reported that the school building layout is easily comprehendible and 31.5% percent strongly disagreed with the statement that the road near the school is well constructed.

Table 4.5 Student assessment on milieu

S/n	Item	SD	D	UD	A	SA
1	The school building is located in a crime prone environment	30 (20.1%)	49 (32.9%)	25 (16.8%)	35 (23.5%)	10 (6.7%)
2	The school building layout is easily comprehendible	8 (5.4%)	27 (18.1%)	36 (24.2%)	66 (44.3%)	12 (8.1%)
3	The road around the school is well constructed	47 (31.5%)	36 (24.2%)	17 (11.4%)	37 (24.8%)	12 (8.1%)

Source: Author's compilation (2021).

4.3 STAFF PERCEPTION OF SECURITY AND SAFETY IN THE SCHOOL ENVIRONMENT

4.3.1 Profile Of Staff in Selected Schools

The result showed that 63% of the respondent were male while 33.3% where female, this indicate that majority of the responder were male. 36.4% were between the age

20-30, 51.5% were between the age of 31-40, 9.1% were between that age of 41-50 and 3% where between the age of 51-60. This shows that majority of the responder where between the age of 31-40. When asked on their level of education 63.6% which made up the majority where B.Sc level holders. It was revealed that majority of the responder 48.5% had employed in the school for a duration of 6-10 years

Table 4.6 Profile of staff in selected schools

	Variables	Frequency	Percentage
Sex of respondents	Male	21	63.6
	Female	11	33.3
Age group of respondents	20-30	12	36.4
	31-40	17	51.5
	41-50	3	9.1
	51-60	1	3.0
	Above 60		
Level of Education	OND/NCE/A Levels	5	15.2
	B.Sc Level	21	63.6
	M.Sc Level	7	21.2
Duration of stay in the school	1-5 years	5	15.2
	6-10 years	16	48.5
	11-15 years	11	33.3

Source: Author's compilation (2021).

4.3.2 Staff Assessment on Territoriality

36.4% reported that they could recognize strangers within the school, 42.4% indicated that public and private spaces are clearly demarcated in the building, 48.5% agreed that the spaces in the school were adequately labelled, this will enhance wayfinding around the school environment. 57.6% reported that access to spaces around the building is regulated, 33.3% were uncertain if they felt ownership of the school spaces during use and 39.4% reported that the presence of security personnel is tangible within the school environment.

Table 4.7 Staff assessment on territoriality

S/n	Item	SD	D	UD	A	SA
1	I am able to recognize strangers within the school	4 (12.1%)	6 (18.2%)	4 (12.1%)	12 (36.4%)	7 (21.2%)
2	Public and private spaces are clearly demarcated in the building	3 (9.1%)	6 (18.2%)	6 (18.2%)	14 (42.4%)	4 (12.1%)
3	The school spaces are adequately labelled	3 (9.1%)	4 (12.1%)	1 (3.0%)	16 (48.5%)	8 (24.2%)
4	Access to spaces around the building is regulated	3 (9.1%)	5 (15.2%)	2 (6.1%)	19 (57.6%)	4 (12.1%)
5	I feel ownership of the school spaces during use	4 (12.1%)	7 (21.2%)	11 (33.3%)	8 (24.2%)	3 (9.1%)
6	The presence of security personnel is tangible within the school environment	1 (3.0%)	11 (33.3%)	3 (9.1%)	13 (39.4%)	5 (15.2%)

Source: Author's compilation (2021).

4.3.3 Staff Assessment on Natural Surveillance

36.4% revealed that they could clearly look over the external surrounding even when they were inside the school building and 39.4% clamed to immediately inspect the surrounding area whenever they overhear loud or suspicious noise.

Table 4.8 Staff assessment on natural surveillance

S/n	Item	SD	D	UD	A	SA
1	I can clearly look over the external surrounding even when I am inside the school building	5 (15.5%)	7 (21.2%)	5 (15.2%)	12 (36.4%)	4 (12.1%)
2	I immediately inspect the surrounding area whenever I overhear loud or suspicious noise	5 (15.2%)	8 (24.2%)	3 (9.1%)	13 (39.4%)	4 (12.1%)

Source: Author's compilation (2021).

4.3.4 Staff Assessment on Image

Table 4.9 describes image which is an element of defensible space which describes the physical image/appearance of the schools. It was revealed that 27.3% agreed that the school building had physical deterioration, 42.4% disagreed to being satisfied with the general cleanliness of the school environment and when asked on their level of satisfaction with the physical appearance of the school environment 33.3% agreed to being satisfied with the physical appearance of the school environment.

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Table 4.9 Staff assessment on image

S/No	Item	SD	D	UD	A	SA
1	The school building has physical deterioration	7 21.2	7 21.2	5 15.2	9 27.3	5 15.2
2	I am satisfied with the general cleanliness of the school environment	3 9.1	14 42.4	4 12.1	8 24.2	4 12.1
3	I am satisfied with the physical appearance of the school environment	5 15.2	7 21.2	5 15.2	11 33.3	5 15.2

Source: Author's compilation (2021).

4.3.5 Staff Assessment on Milieu

Table 4.10 below show staff perception on milieu. 36.4% strongly disagreed to the statement my school building is located in a crime prone environment, 48.5% agreed that the school building layout is easily comprehendible and 36.4% disagreed that the road around the school is well constructed.

Table 4.10 Staff assessment on milieu

S/n	Item	SD	D	UD	A	SA
1	The school building is located in a crime prone environment	12 (36.4%)	9 (27.3%)	3 (9.1%)	7 (21.2%)	2 (6.1%)
2	The school building layout is easily comprehendible	1 (3.0%)	3 (9.1%)	5 (15.2%)	16 (48.5%)	8 (24.2%)
3	The road around the school is well constructed	9 (27.3%)	12 (36.4%)	2 (6.1%)	8 (24.2%)	2 (6.1%)

Source: Author's compilation (2021).

4.4 SATISFACTION WITH SECURITY

4.4.1 Staff Level of Satisfaction with Security

To fulfil the objective of the study, staffs were asked if they felt safe within the school environment, the result are shown in table 4.11 below. 45.5% indicated that they felt safe within the school environment and 51.5% claimed to be satisfied with the general level of security in the school.

Table 4.11 Staff level of satisfaction with security in the school environment

S/No	Item	SD	D	UD	A	SA
1	I feel safe within the school environment	3 (9.1%)	5 (15.2%)	6 (18.2%)	15 (45.5%)	4 (12.1%)
2	I am satisfied with the general level of security in the school	3 (9.1%)	5 (15.2%)	4 (12.1%)	17 (51.5%)	4 (12.1%)

Source: Author's compilation (2021).

4.4.2 Student Level of Satisfaction with Security

To fulfil the objective of the study, students were asked if they felt safe within the school environment. Table 4.12% below revealed that 44.3% of the student reported that they felt safe within the school environment and when asked on the general satisfaction with security in the school 37.6% disagreed. This shows that although majority of the student felt safe within the school environment, they were not satisfied with the general level of security in the school.

Table 4.12 Student level of satisfaction with security in the school environment

S/No	Item	SD	D	UD	A	SA
1	I feel safe within the school environment	16 (10.7%)	31 (20.8%)	31 (20.8%)	66 (44.3%)	5 (3.4%)
2	I am satisfied with the general level of security in the school	22 (14.8%)	56 (37.6%)	14 (9.4%)	47 (31.5%)	10 (6.7%)

Source: Author's compilation (2021).

4.5 CASE STUDY ANALYSIS

4.5.1 Introduction

The study carried out case studies of selected secondary schools in Ota, Ogun state in term of defensible space. The aim of these case studies is to examine the physical conditions of selected secondary school. The study looked at the school ground, building exterior and interior in terms of defensible space.

4.6 CASE STUDY: FAITH ACADEMY

4.6.1 Background of the School

It is a privately owned boarding school with over 1800 students. The school is located within covenant university, Ogun state and the school was established in 2020.

Figure 4.1 Map showing location of Faith Academy

Source: Google earth (2021).

4.6.2 The School Ground

The school ground in zoned in such a way that academic buildings such as the administration block, classrooms, library, and labs are located in the front, while other amenities such as the dormitory and eating area are located at the back, separated by the auditorium. There is a fence that entirely encloses the school as shown in Plate 4.3, as well as a security post at the front entrance. This will assist to establish the property boundary and prevent outsiders from accessing the school without first passing through the main entry gate. This contributes to territoriality by separating outside

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public activities from the school (academic) activities. The school perimeter fencing is made with concrete and was generally in good condition. Although, there is visibility in the type of gate used Plate 4.2. Vehicular routes are clearly marked and made with bituminous felt Plate 4.4. The car park provided for the school is located at the front of the administrative block, this enhances natural surveillance of vehicles by staff. Walkways in the school ground are made with interlocking paving blocks demarcated with kerbs to separate the walkway from the road. The walkways provide a link to the building entrance points from the car park area and access road, which contribute to wayfinding. Athletic field in the school ground are yet to be constructed and are restricted for use Plate 4.5. Although the field is not being used, it still experiences some level of natural surveillance due to placement of other building facilities such as the auditorium and dining hall. The school ground is easily viewed from the administrative blocks as well as the classroom which give opportunity for both staffs and student to conduct natural surveillance. General cleanliness that was observed on the school ground was good. Planting and vegetation in the school ground are well maintained and do not create obstruction of view. The use of landscape demarcation with shrubs and flower is very minimal.

Plate 4.1 Picture of speed bumps

Source: Authors field work (2021).

Plate 4.2 View of gate and gate house

Source: Authors field work (2021).

Plate 4.3 View of perimeter fence

Source: Authors field work (2021).

Plate 4.4 View of vehicular route and walkway

Source: Authors field work (2021).

Plate 4.5 View of restricted sporting facility

Source: Authors field work (2021).

4.6.3 The exterior of the school building

There are two buildings dedicated to classroom activities which accommodate the junior secondary student differently from the senior secondary student. The building consists of two floors with a well-defined entry designed with architectural features, potted planting and light Plate 4.6. The façade of the school building comprises of concrete masonry wall painted with emulsion paint, cream colour and brick which enhances image of the building. The door types used in the main entrances of the academic blocks were double-leaf, single swing door which were in good condition and could be locked after school hours. Sliding aluminium windows protected with burglar-resistant material where used. Secondary entrance and exist where also locked and secure which further aided access control. The building exterior was aesthetically appealing with little signs of vandalism. Stairs were will lite and could be easily monitored.

Plate 4.6 View of main entrance

Source: Authors field work (2021).

Plate 4.7 View of reception

Source: Authors field work (2021).

Plate 4.8 Windows facing the road for easy viewing

Source: Authors field work (2021).

4.6.4 The Interior of the School building

The school interior is provided with two courtyard and classrooms arranged along it Plate 4.13. The open nature of the planning provide opportunity for natural surveillance of spaces. Staff preparation room is located close to the entrance which provided opportunity for continuous monitoring of entrance. Each classroom is equipped with secure doors which could be locked from within. The interior door used were panelled steel door and where generally in good condition. Sliding aluminium windows protected with burglary resistant materials were used in the interior Plate 4.11. Classrooms were provided with lockers which gave opportunity for students to keep their belonging and thus provided sense of ownership in the space. Although, it should be noted that those lockers did not possess the opportunity to be locked. Natural

light could be achieved from the courtyard which aided in providing visibility around the lobby Plate4.9. There was little sign of vandalism in the interior spaces.

Plate 4.9 View of courtyard

Source: Authors field work (2021).

Plate 4.10 View of classroom

Source: Authors field work (2021).

Plate 4.11 View of interior door and window

Source: Authors field work (2021).

Plate 4.12 View of interior stair

Source: Authors field work (2021).

Plate 4.13 Floor plan of typical academic block

Source: Authors field work (2021).

4.6.5 Design Appraisal of the school

The structure allows for natural surveillance of the school grounds, and enough illumination is brought into the structure through the use of the windows and courtyard. To prevent entrance into the classroom, all classrooms featured door locks that could be secured from either side. Visitors to the school (i.e., parents or anyone other than faculty and staff) are physically not allowed to enter the school beyond the initial main entry. They must state their purpose to the school administration to confirm they are whom they claim to be. However, the school does not provide visitors with any form of distinctive nametag once allowed into the school premises.

4.6.6 Design Critique of the school

It was observed that spaces within the building were not adequately labelled

Table 4.13 Observation result for Faith Academy

Element	Low (1)	(2)	(3)	(4)	High (5)	Comments
Natural surveillance					✓	
Territoriality				✓		
Image					✓	
Milieu				✓		

Source: Author's compilation (2021).

4.7 CASE STUDY 2: AMBASSADORS COLLEGE

4.7.1 Background of the School

The school is located in 1-7 Igberen Road, off Idiroko Road, Oja Ota bus stop, Ota, Ogun State. The Ambassadors School, which began as a nursery and primary school in 1998, has grown into a comprehensive educational institution. The college/secondary school first opened its doors in 2003. It is a school with a strictly Christian foundation. The case study used in this study is that of the senior secondary school.

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Figure 4.2 Map showing location of Ambassador college

Source: Google map (2021).

4.7.2 School Ground

The school site is completely enclosed by a perimeter fence which serves as way to define the property line and act as the first layer of defence to the school Plate 4.14. There is presence of security post (gate) house at the entrance to aid in access control Plate 4.15. The fence is made with sandcrete blocks. Due to the small area of the site, there are no open spaces for sporting and recreational activities. The school ground is easily viewed from the administrative area but not from other part of the building like the classrooms and laboratories Plate 4.16. This is due to the adjoining building around which obstruct natural surveillance. There are minimum signs of vandalism which indicate that the area is cared for. The school ground is finished with interlocking paving blocks but there is no clear difference between vehicular travel route, parking

and walkways. Planting and vegetation in the school ground are well maintained and do not create obstruction of view.

Plate 4.14 View of perimeter fence

Source: Authors field work (2021).

Plate 4.15 View of gate and gate house

Source: Authors field work (2021).

Plate 4.16 View of school ground

Source: Authors field work (2021).

4.7.3 The exterior of the School Building

The building has three floors, ground, first and second floor. The main entrance of the building is separated into two sections, one for students and the other for guests Plate 4.18. The exterior finishes used on the building are tiles and alucobond cladding which enhances the image of the building Plate 4.17. The exterior doors are made with Tempered glass with metal frame and appear to be in good condition. The doors are equipped with a secure lock which can aid access control. Secondary entrance and exists are secured. Exterior windows are protected with burglary resistance materials. There is presence of exterior lighting fixtures which are in good condition. Exterior stairs, balconies and ramps are well lite and in good condition. It was also observed that there was no sign of vandalisms.

Plate 4.17 exterior View of Ambassadors college

Source: Authors field work (2021).

Plate 4.18 View of the main entrance

Source: Authors field work (2021).

Plate 4.19 View of Exterior Stairs

Source: Authors field work (2021).

4.7.4 The Interior of the School Building

When entering the building, visitors are guided by a valet rope directing them towards the principal office. It was observed that spaces within the building were provided with signage. Two general access staircases are provided in the building. Each of the staircases can be accessed from the general circulation corridor around the courtyard. The first stair is located closer to the entrance lobby and the second staircase is located at the rear of the building. The staircase located at the rear of the building is provided with a single- leaf, single swing steel doors at the entry point of the stairway for security reasons, the doors are incorporated in a cage like burglar proof barricade Plate 4.21. The interior door is made with panelled steel and where in good condition. Sliding aluminium windows protected with burglary were used in the interior Plate 4.23. The interior windows provided opportunity for natural surveillance within the

building. Classrooms were provided with lockers which gave opportunity for students to keep their belonging and thus provided a sense of ownership in the space. There was minimum sign of vandalism in the spaces. The labelling of space was also observed within the school which helped eliminate excuses for illegitimate users of a space, therefore reducing the opportunities for crime within the school building and compound Plate 4.22.

Plate 4.20 View of building interior

Source: Authors field work (2021).
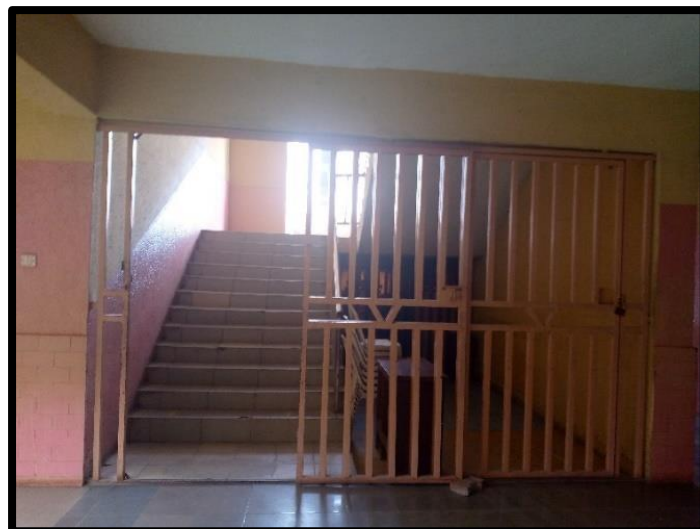
Plate 4.21 Staircase protected with barricade

Plate 4.22 Signage within the building

Plate 4.23 view of doors and windows
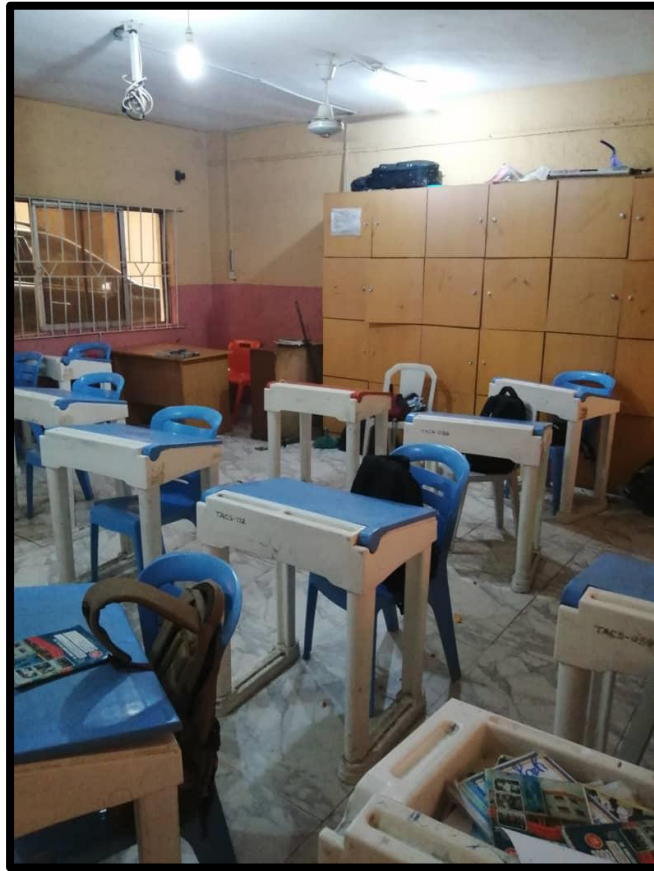
Plate 4.24 View of classroom

Source: Authors field work (2021).

4.7.5 Design Appraisal

Wayfinding within the school vicinity is easy because of proper signage as well as painted arrows markings on the floor. The building is aesthetically pleasing and this enhances image in the building. Access and exist points are well controlled and there is opportunity for natural surveillance within the school building and general environment.

4.7.6 Design Critic

Due to the size of the site, there was no athletic field provided. Natural lighting within the school is not adequate, this is due to the adjoining buildings within the site

Table 4.14 Observation result for Ambassador college

Element	Low (1)	(2)	(3)	(4)	High (5)	Comments
Natural surveillance		✓				
Territoriality					✓	
Image					✓	
Milieu				✓		

Source: Author's compilation (2021).

4.8 CASE STUDY 3: ANSAR-UD-DEEN COMPREHENSIVE COLLEGE (SENIOR)

Figure 4.3 Map showing location of Ansar-ud-deen

Source: Google map (2021).

4.8.1 Background of the School

The school is located at ilaro, Ota, Ogun state. It is a public owned school that was founded to impact knowledge, educational training and experience to the youth. The school was established in the year 1946.

4.8.2 The School Ground

The site was zoned in such a way that junior and senior spaces were completely different, with each having its own play field, entry and administrative block but connected by a gate The haphazard placement of buildings surrounding the ground indicated that there was no formal planning done on the site, as evidenced by the observation. This makes distinguishing between public and private space on the site challenging. There is a fence that entirely encloses the school, as well as a security post at the front entrance Plate 4.26. This will assist to establish the property boundary and prevent outsiders from accessing the school without first passing through the main entry. This contributes to territoriality by separating outside public activities from the school (academic) activities. The concrete perimeter fencing around the school was observed to have peeling paint and worn-out finishes. There is no discernible distinction between a vehicular travel route, parking, and pedestrian pathways. The car park provided for the school is located at the front of the administrative zone, this enhances natural surveillance of vehicles by staff. There were undeveloped plots present that were not being utilized Plate 4.27. As a result of the lack of care, the plots' vegetation had grown thick, providing a hiding spot for intruders. Natural surveillance tends to be very ineffective over the unaccounted spaces which are not being used. The athletic fields on school grounds are not properly defined, and the spaces intended for such activities are not adequately kept, with overgrown weeds Plate 4.25. The school ground is easily viewed from the administrative blocks as well as the classroom which give opportunity for both staffs and student to conduct natural surveillance. General cleanliness that was observed on the school ground was fair but could be improved on. It was also observed that there are tall trees around the site which could hinder opportunity for natural surveillance

Plate 4.25 View of athletic field

Source: Authors field work (2021).

Plate 4.26 View of perimeter fencing

Source: Authors field work (2021).

Plate 4.27 View of unused plot

Source: Authors field work (2021).

4.8.3 The Exterior of the School Building

The building configuration employed in the case study is campus style configuration. This configuration type makes it difficult to secure the school ground. It comprises of several single floor building spread around the school site. Many of the building were seen to be in deplorable state needing renovation. This could have adverse effect on the level of security as explained in the broken window theory, which indicate that lack of maintenance of building can encourage persons with criminal intent to gain access into the facilities. It was observed that some classroom blocks (mostly the SSS1 classes) did not have doors. The doors which were available were made with aluminium. Aluminium casement windows were use and they were not protected with burglar-resistant material.

Plate 4.28 Exterior view showing academic block of Ansar-ud-deen comprehensive

college

Source: Authors field work (2021).

Plate 4.29 Exterior view showing academic block of Ansar-ud-deen comprehensive

college

Source: Authors field work (2021).

4.8.4 The Interior of the School Building

Classrooms were provided with lockers which gave opportunity for students to keep their belonging and thus provided sense of ownership in the space. Although, it should be noted that those lockers did not possess the opportunity to be locked and where in deplorable state. There was sign of vandalism in the interior spaces especially in the SSS1 block. The ceiling was sagging in most of the classes and others had no ceiling as well as large holes in the ceiling Plate 4.31. It was observed that there was a form of signage within the school building which were in good condition and helped with wayfinding.

Plate 4.30 View of classroom

Source: Authors field work (2021).

Plate 4.31 View of classroom

Source: Authors field work (2021).

Plate 4.32 View of door

Source: Authors field work (2021).

Plate 4.33 View of window

Source: Authors field work (2021).

4.8.5 Design Appraisal of the School

The structure allows for natural surveillance of the school grounds, and enough illumination is brought into the structures through the use of the windows. Spaces around the school are labelled with paint markings indicating the classroom name.

4.8.6 Design Critic

The plan configuration of the school makes it difficult for school authority to effectively monitor and enforce access control. The haphazard placement of the academic blocks makes way finding difficult. The condition and absence of doors and windows in the building provided easy access for intruders into the academic blocks. The lack of maintenance of the school ground provides hiding spots for intruders as well as hinder the image of the school.

Table 4.15 Observation result for Ansar-ud- deen comprehensive college

element	Low (1)	(2)	(3)	(4)	High (5)	comments
Natural surveillance				✓		
Territoriality			✓			
image		✓				
Milieu				✓		

Source: Author's compilation (2021).

4.9 CASE STUDY 4: IGANMODE GRAMMAR SCHOOL

4.9.1 Background of the School

Iganmode grammar school is a public secondary school located along Idiroko road, Ota, Ogun state. It has over 2000 students and established in the year 1960.

Figure 4.4 Map showing location of Igamode grammar school

Source: Google map (2021).

4.9.2 School Ground

The haphazard placement of buildings surrounding the ground indicated that there was no formal zoning done on the site, as evidenced by the observation. This makes

distinguishing between public and private spaces on the site challenging. There is fence that entirely encloses the school, as well as a security post at the front entrance. The gate and fence were also found to be in poor condition, including characteristics such as worn out metal and peeling paint finishes Plate 4.35. The athletic fields on school ground were not properly defined, and the spaces intended for such activities are not adequately kept, with overgrown weeds Plate 4.36. In certain places on the ground, there were refuse piles Plate 4.38. It was also observed that there were tall trees around the site which could hinder opportunity for natural surveillance Plate 4.37. There is no discernible distinction between a vehicular travel route, parking, and pedestrian pathways Plate 4.39. The car park provided for the school is located at the front of the staff room block, this enhances natural surveillance of vehicles by staff. Spaces around the site where well labelled which aided in way finding Plate 4.40.

Plate 4.34 View of perimeter fence

Source: Authors field work (2021).

Plate 4.35 View of gate house

Source: Authors field work (2021).

Plate 4.36 View of athletic field

Source: Authors field work (2021).

Plate 4.37 View of tall tresses

Source: Authors field work (2021).

Plate 4.38 View of refuse pile

Source: Authors field work (2021).

Plate 4.39 View of allocated parking

Source: Authors field work (2021).

Plate 4.40 Labelling of spaces

Source: Authors field work (2021).

4.9.3 The Exterior of the School Building

The building configuration employed in the case study is campus style configuration. This configuration type makes it difficult to secure the school ground. It comprises of several single floor buildings spread around the school site. Many of the building were seen to be in deplorable state needing renovation Plate 4.41 and Plate 4.42. This could have adverse effect on the level of security as explained in the broken window theory, which indicate that lack of maintenance of building can encourage persons with criminal intent to gain access into the facilities. The windows were in various stage of poor conditions, with some classes having broken windows while others didn't have windows frames at all Plate 4.43. In all the windows were observed to be in poor condition Plate 4.38. It was observed that majority of the window had their louver blades removed or broken.

For security reasons, solid doors are required for any building especially for secondary school that will be empty after school hours. It was observed that the some of the buildings had doors while others didn't and classes that had doors were partly or completely broken. It was also observed that doors in relatively good condition could not be locked. The material of the doors was made from metal

Plate 4.41 Exterior view showing academic block of Iganmode grammar school

Source: Authors field work (2021).

Plate 4.42 Exterior view showing academic block Iganmode grammar school

Source: Authors field work (2021).

Plate 4.43 View of windows

Source: Authors field work (2021).

4.9.4 The Interior of the School Building

Interior spaces were not attractive or cheerful, natural lighting in the spaces was relatively fair, and there where sign of vandalisms in the interior spaces. The ceiling was either in disrepair or completely nonexistence Plate 4.44 and Plate 4.45. It was observed that there was a form of signage on the wall which indicated the spaces, this will aid in wayfinding.

The school building was old and this could be a factor that contributed to the deteriorating state of the building.

Plate 4.44 View of dilapidated ceiling

Source: Authors field work (2021).

Plate 4.45 View of non-existent ceiling

Source: Authors field work (2021).

4.9.5 Design Appraisal of the School

The building allows for natural surveillance of the school grounds, and enough illumination is brought into the structures through the use of the windows. Spaces around the school are labelled with paint markings indicating the classroom name which will aid in wayfinding.

4.9.6 Design Critic

The plan configuration of the school makes it difficult for school authority to effectively monitor and enforce access control. The haphazard placement of the academic blocks makes way finding difficult. The condition and absence of doors and windows in the building provided easy access for intruders into the academic blocks. The lack of maintenance of the school ground provides hiding spots for intruders as well as hinder the image of the school.

Table 4.16 Observation result for Iganmode grammar school

element	Low (1)	(2)	(3)	(4)	High (5)	comments
Natural surveillance				✓		
Territoriality			✓			
image		✓				
Milieu				✓		

Source: Author's compilation (2021).

4.10 CONCLUSION

Finally, owing to the comprehensive analysis of the collected data mentioned in the preceding chapters, the study was able to reach a reasonable conclusion while offering answers to the research questions addressed in this study.

The study concludes that, based on an analysis of data collected on defensible space strategies in the study area, it was discovered that the concept of defensible space was largely known for its benefits, which include providing opportunities for natural

surveillance, a clear definition of public and private zones, and the elimination of spaces that allow for concealment. The study also discovered that while some secondary schools in the study area use defensible space, it was not completely implemented to improve security in the case studies.

4.11 RECOMMENDATION

The findings of this study revealed the extent to which defensible space strategies are being used in secondary schools in the study area. The level of implementation of defensible space in the interior and exterior of secondary schools; and the level of student and staff satisfaction with general security within the selected case studies are some of the study's particular contributions to knowledge. Natural surveillance and natural territoriality were found to be applied within the study area, according to the findings from the respondent. However, elements like Image and Milieu were found to be inadequate. Although, observations made showed that feature which indicated territoriality on the school ground were not adequality implemented. Based on the result, it is recommended that more attention should be made on the maintenance of the general school environment this is due to the fact that deteriorating and unkempt buildings and facilities may either indicate that criminal behaviour is acceptable in an area or suggest that the likelihood of being arrested for unlawful activities is minimal, a badly maintained environment may directly encourage criminal behaviour. In order to enhance security within the school ground the following are recommended:

I.   Clear establishment and definition of school property lines.

II.   Differentiate and identify parking spaces for faculty, staff, and visitors

III.   Provide clearly marked transitions from parking areas to pedestrian routes.

IV.   Provide multiple enclosures around recreational areas to achieve greater access control

V.   Design signage to eliminate spaces that permit concealment.

4.12 SITE AND ENVIRONMENTAL ANALYSIS OF THIS STUDY

The site provides a physical context for the design. The site analysis offers information on the geographical, physical, and environmental aspects of the site, all of which impact the design decisions that result in a functional design for the site.

4.12.1 Ado Odo/Ota, Ogun State

The research area is Ado Odo/Ota in Nigeria's Ogun State. It has an area of 878 square kilometres and a population of 526,565 people according to the 2006 census. The Local Government Area is the second largest in Ogun State, and it is headquartered in Ota (or Otta), which is located to the north of the Area at 6°41′00″N 3°41′00″E. It was established on May 19, 1989, when the old Ifo/Ota Local Government and the Ado-Odo/Igbesa Areas of the Yewa South Local Government combined.

4.12.2 Site Location of this study

The proposed secondary school is located along Osuke Iyesi road Ota, Ogun state. It occupies a rectangular land area of about 28,240 Square meter.

Figure 4.5 location of site

Source: Google map (2021).

4.13 SITE CHARACTERISTICS OF THE STUDY

Plate 4.46 secondary access to site

Source: Author's Field work (2021).

Plate 4.47 Primary access to site

Source: Author's Field work (2021).

Plate 4.48 view of site

Source: Author's Field work (2021).

4.13.1 Site Selection Criteria

This entails the assessment of the proposed site to determine how suitable it is in meeting all the conditions required to accommodate a school.

4.13.1.1 Accessibility

Access to the location is accessible by road, whether by vehicle or on foot. This makes it possible to maintain a steady flow of traffic. There is a substantial correlation between the desirability of this location and its closeness to users and residents in the residential zone. This close proximity to users shortens the amount of time it takes to go to the site or lowers the distance travelled to the site. In addition, the simplicity of access allows for a high frequency of connections to the site, which is beneficial.

4.13.1.2 Availability Of Land

There is adequate land mass within the social premise for siting a secondary school facility. The chosen site is a virgin land with dense vegetation.

4.13.1.3 Topography Of Site

The terrain of the site is an important consideration with regard to the choice of the site, however, the terrain of the proposed site is relatively flat

4.13.2 Site Justification

The site is accessible and is located in a mixed-use development area. It is situated in a serene and quiet setting; nevertheless, the region surrounding the site is experiencing development, with many new residential areas popping up; as a result, academic facilities will be required in close proximity to serve the neighboring children.

4.13.3 Climate Data and Weather

4.13.3.1 Temperature

Between December 2 and April 24, temperatures frequently reach over 89°F on an average daily basis for a total of 4.7 months. On February 22, the average high temperature is 91°F and the average low temperature is 78°F, making it the hottest day

of the year. From June 26 to September 23, the cold season lasts for 2.9 months, with an average daily high temperature of less than 84°F. On August 6, the average low temperature is 74°F and the average high temperature is 82°F, making it the coolest day of the year.
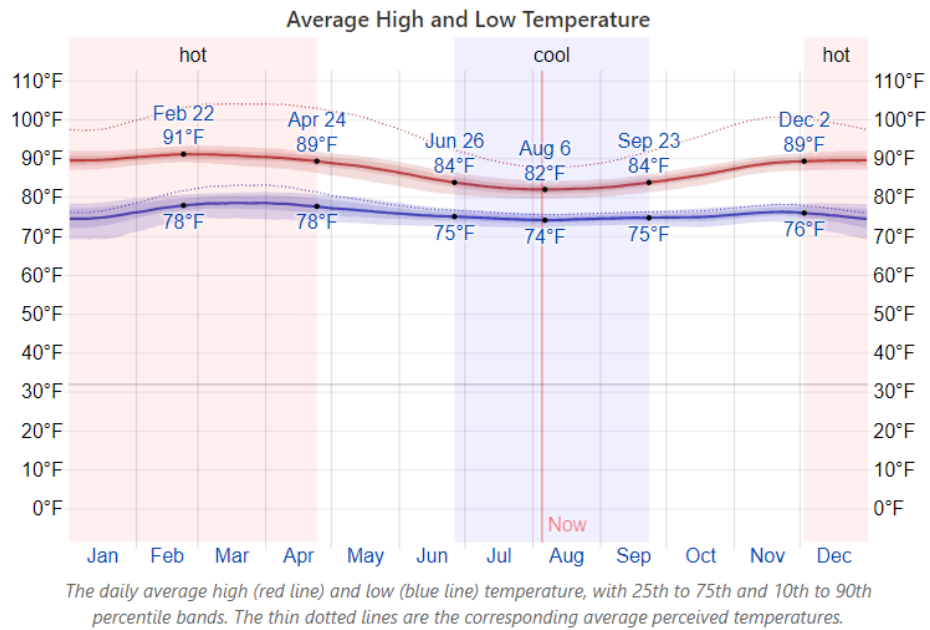
Figure 4.6 showing average high and low temperature

Source: (Weather Spark, n.d) retrieved (2021).

4.13.3.2 Rainfall

The amount of rain that falls in Ado Odo each month varies greatly depending on the season. The rainy season lasts 10 months, from February 1 to December 2, with an average 31-day rainfall of at least 0.5 inch. The most rain happens in the 31 days leading up to June 19, with an average of 7.2 inches.

The average rainfall (solid line) accumulated over the course of a sliding 31-day period centered on the day in question, with 25th to 75th and 10th to 90th percentile bands. The thin dotted line is the corresponding average liquid-equivalent snowfall.
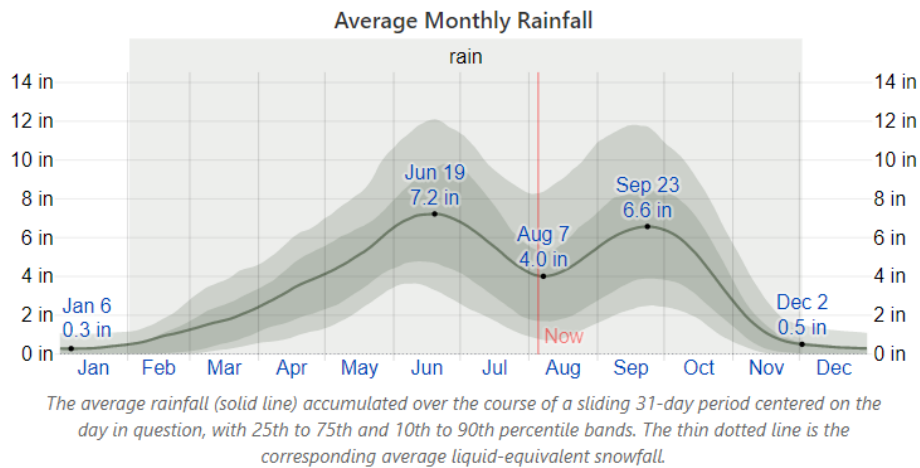
Figure 4.7 showing average monthly rainfall

Source: (Weather Spark, n.d) retrieved (2021)

4.13.3.3 Wind

Wind speed and direction are strongly reliant on local terrain and other factors at any given location, and immediate wind speed and direction vary more than hourly averages. The average hourly wind speed at Ado Odo varies substantially throughout the year. The windier season lasts 4.1 months, from June 1 to October 4, with average wind speeds reaching 6.7 miles per hour. The windiest day of the year is August 2, with an average hourly wind speed of 8.7 miles per hour. The calmer season lasts 7.9 months, from October 4 to June 1. December 16 is the calmest day of the year, with an average hourly wind speed of 4.6 miles per hour

The average of mean hourly wind speeds (dark gray line), with 25th to 75th and 10th to 90th percentile bands.
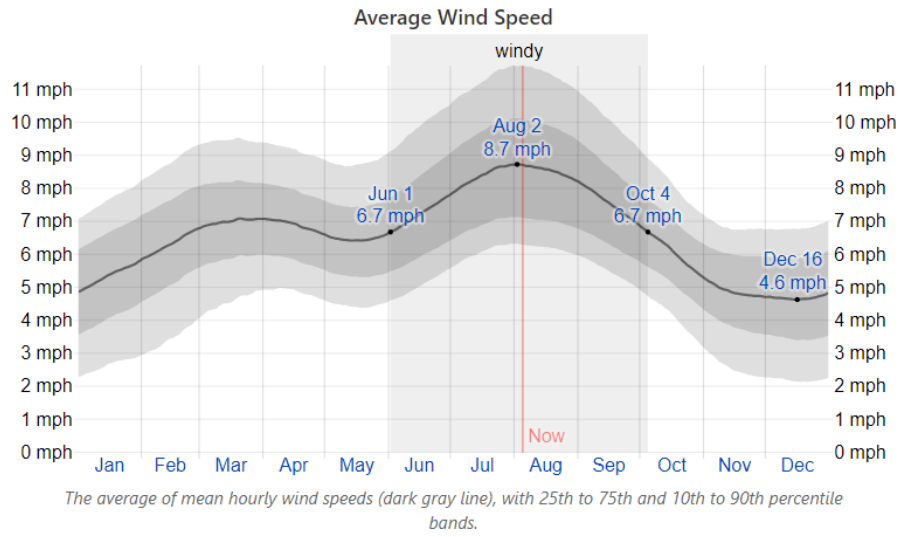
Figure 4.8 showing average wind speed

Source: (Weather Spark, n.d) retrieved (2021).

CHAPTER FIVE

DESIGN CRITERIA AND APPROACH

5.1 CHAPTER OVERVIEW

This chapter itemizes and discusses factor peculiar to the design, including factors that should be considered in the design and how these factors should and would be implemented in the final design.

5.2 DESIGN BRIEF

In this day of widespread terrorism, schools' security has become a major course of concern. This is because schools are singled out for attack by terrorist, resulting in the destruction of school properties and abduction of students and staffs. This proposal desires to meet the security needs in the school environment through strategically placed architectural features without sacrificing the building aesthetic. The proposed school is expected to house classrooms for both junior and senior secondary student, staff preparation room, administrative block, laboratories, computer room and multi-purpose hall.

5.3 CLIENT

Enko Education is a fast-growing network of African international schools that offer affordable quality education in order to provide access for young Africans to the best universities worldwide

5.4 DESIGN GOAL

The aims of this research are to design a secondary school building in Ogun state, Nigeria by applying the elements of defensible space with the view of enhancing security within the school environment without sacrificing the building aesthetic. The design has to undergo the following objectives;

1   To design a secondary school that would factor in security and safety for the students and staff

2   Apply the element of defensible space and CPTED which are; Natural surveillance, natural territoriality, image and milieus and access control

5.5 DESIGN CONSIDERATION

In order to accomplish the above stated objectives, certain factors should be taken into consideration, they include:

5.5.1 Security And Safety

Providing a safe learning environment should be a top focus. Designs must create a safe environment for users, including minimizing the risk of occupational violence against students and staff, where applicable. Theses can be achieved by;

5.5.2 Aesthetics

The value of a school's physical appearance should not be overlooked. A beautiful school building instils pride and ownership in students, staff, and the surrounding community. The façade should blend in with the surrounding area and represent the ideals of the community. The interior should enhance the learning process.

5.5.3 Functionality

It is critical to understand the spaces and functions of spaces that occur in a school setting. A well-planned school will improve performance of activities carried out in a school environment.

Students' sense of belonging and individuality should be instilled as follows: To encourage active leadership and student engagement, arrange classrooms around common areas and visually connect them with colours and patterns. Platform places

for meeting, sitting, and presenting, as well as alcoves for reading and studying, should be established.

5.5.4 Sustainability

Sustainable Architecture is a term that describes environmentally conscious design techniques which aims to lessen their impact on the environment through energy and recourse efficiency. The three tiers of sustainability can be met when the building is easy to maintain thereby contributing to economic sustainability, when the building does little damage to its surrounding environment and is powered by renewable energy, it contributes to its environmental sustainability and when the building successfully and continually meets the social needs of the people, thereby contributing to its social sustainability.

5.5.5 Natural Lighting

Natural light should be introduced within the circulation spaces, office spaces and classrooms. Ambient/ indirect natural light should also be provided in the spaces. Consideration should be given toward incorporating artificial and natural lighting within the space to allow ease of activities

5.5.6 Ventilation

The interior spaces of the school should be properly ventilated. Artificial ventilation (Air conditioning) should be provided for the school. Also, good ventilation within the school promotes a good thermal comfort for the staff and the students.

5.5.7 Accessibility

Design spaces to meet the specific needs of students and teachers with disabilities. The staircase will be provided at strategic positions for easier movement of people on

different levels and also in case for any fire outbreak in the complex. Staircase should be wide enough to accommodate up to 2-3 people freely to achieve effective circulation in the school essentially in times of peak period.

5.5.8 Circulation

The facilities circulation should be able to give satisfaction to all no matter their physical or mental abilities and disabilities. In order to achieve effective circulation in the school and its services; stair and ramps requirements will be considered.

5.6 FUNCTIONAL AND SPACE CRITERIA

In order for the secondary school to function effectively there are some key functional units that need to be considered in the design of the secondary school. These spaces can be classified into the following categories: administrative space, academic spaces and outdoor spaces. The tables below show the break down.

Table 5.1 spatial requirement

Spaces	
Administrative spaces	Offices (administrator, account officer, principal, vice principle, Conference rooms Staff rooms Financial office Book store
Academic spaces	Classrooms Chemistry laboratory Biology laboratory Physics laboratory Computer room Library Multipurpose hall Cafeteria
Outdoor spaces	Parking Football field Volley ball field Basket field

Source: Authors compilation (2021).

5.6.1 Administrative Spaces

The administrative spaces should be close to the entry and clearly visible from the entrance doors because they are the initial point of contact for all guests. The greeting area, exhibition spaces, principle and vice principal offices, finance/accounting office, conference room, staff room, counsellors' office, book shop, and sick bay are all located in this unit.

Table 5.2 Spatial program for administrative spaces

S/N	SPACES	ESTIMATED NUMBER OF USERS	NUMBER OF SPACES REQUIRED	AREA
1	Waiting/ reception area	Undecided	1	91m^2
2	Principle office	1	1	51m^2
3	Vice principal office	2	1	35m^2
4	Finance accounting	2	1	30m^2
5	Conference office	20-30	1	90m^2
6	Staff room	20-25	2	157m^2
7	Counsellors' office	1	1	35m^2
8	Book store	10-20	1	124m
9	Sick bay	5-10	1	86m^2
10	Toilet	20-40	2	

Source: Authors compilation (2021).

5.6.2 Community Zones

The commeunal zone is designated for recreational activities. The spaces in zone include playgrounds (football field, volley ball court and basket court)

Table 5.3 Spatial program for community zones

S/N	SPACES	ESTIMATED NUMBER OF USERS	NUMBER OF SPACES REQUIRED	UNIT SIZE (SdqM)	
				MIN	MAX
1	Football field	150-200	1	3000	6000
2	Basketball court	20-30	2	420	500
3	Volleyball court	10-15	1	162	200

Source: Authors compilation (2021).

5.6.3 Academic Spaces

Academic space is the physical setting for a learning environment, a location where teaching and learning take place. Classrooms, scientific labs, libraries, computer labs, music and theater studios, and art and cultural studios are all examples of academic spaces.

Table 5.4 Spatial program for Academic spaces

S/N	SPACES	ESTIMATED NUMBER OF USERS	NUMBER OF SPACES REQUIRED	AREA
1	Classroom	25 per class	24	74.00m^2
2	Science laboratories	20-30	3	131.1200m^2
3	Library general resource centre	100-150	1	245m^2
4	Computer (ICT) laboratory	20-30	1	138m^2
5	Music and drama studio	10-15	1	74.00m^2
6	Art and cultural studio	10-15	1	74.00m^2

Source: Authors compilation (2021).

5.7 TECHNOLOGY AND ENVIRONMENTAL CRITERIA

It is necessary to have a good knowledge and understanding about the appropriateness of technology and its functions.

5.7.1 Materials And Finishes

The following are some significant materials that might be used in the design of the school building.

5.7.1.1 Wall Materials and Finishes

I. Concrete: Because of its outstanding fire-resistant characteristics and wide variety of uses, both internally and externally, concrete would be utilized in the construction of the school. Concrete is a strong, versatile material that can be shaped into almost any shape. It has a very long lifespan and may also be rather stiff.

II.   Bricks: Bricks would also be utilized in the building because they are a long-lasting and low-maintenance material. Brick is a timeless, attractive, and diverse material.

5.7.1.2 Floor Material and Finishes

I.   Terrazzo floor finish: Terrazzo is recognized for its durability and esthetic characteristics; therefore, it would dominate this type of floor finish in regions of high traffic.

II.   Vinyl floor tiles: the floor would be used almost throughout the building especially around the administrative area

5.7.1.3 Doors and Windows

I.   Door: the doors that would be considered in the building include steel door, aluminum door and glass door

II.   Windows: windows considered in the design include sliding windows protected with shatter resistance film.

5.7.2 Services

The lighting and ventilation of the spaces would be achieved through natural and artificial means. The natural means involves the inclusion of operable windows and openings, while the artificial means involves the provisions made for artificial heating and cooling equipment.

CHAPTER SIX

DESIGN PHILOSOPHY, CONCEPTUALIZATION AND PROPOSAL

6.1 INTRODUCTION

Numerous strategies may be used to create excellent architectural designs. By establishing and developing a design idea, design schemes can evolve from point to point, assuming answers to actual issues as they occur. Design concepts are developed in a sequential manner that results in a comprehensible expression of the architectural form and spatial relationships, thereby accurately representing the scheme's goals and objectives as they are expected to manifest themselves in the building upon its practical completion, subsequent use, and occupation.

6.2 DESIGN PHILOSOPHY

Modernisms, also known as International Modern or International Style, are a kind of modernism that originated in the United States. Plans would be loosely arranged often with open-plan interiors. The movement's leaders were Walter Gropius (1883-1969) and Le Corbusier (1887-1965).

It's linked to an analytical approach to building function, a rigorously logical use of materials, a willingness to try new structural ideas, and the removal of decoration. Crime Prevention Through Environmental Design techniques were also integrated into the design. These methods appear in school buildings in a different way than they did in C. Ray Jeffrey's initial research, when he created the term "Crime Prevention Through Environmental Design." Natural Surveillance, Access Control, Territoriality, and Maintenance are the four fundamental concepts.

6.3 SITE ZONING

The site zoning arose from the desire to apply CPTED and defensible space strategies. The site was zone based on public, semi public and private areas in the site.

Figure 6.1 Showing site zoning

Source: Authors Field work (2021).

6.4 BUBBLE DIAGRAM

6.4.1 Ground Floor Plan
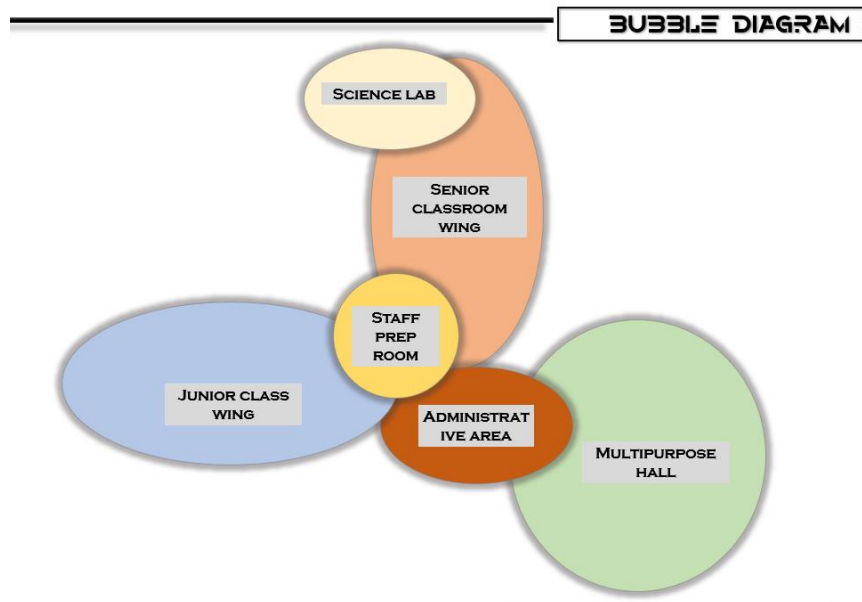
Figure 6.2 Bubble diagram showing first floor spatial relationship

Source: Authors Field work (2021).

6.4.2 First Floor Plan
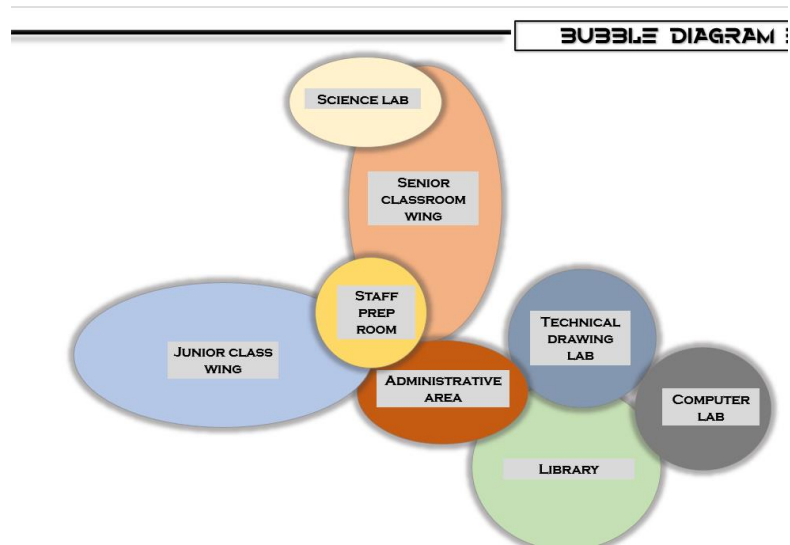
Figure 6.3 Bubble diagram showing second floor spatial relationship

Source: Authors field work (2021).

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esign%20(CPTED)%20is%20a%20set%20of,crime%20and%20promote%20

building%20security.&text=CPTED%20principles%20are%20bas

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APPENDIX 1

QUESTIONNAIRE

COVENANT UNIVERSITY
DEPARTMENT OF ARCHITECTURE
EVALUATING THE APPLICATION OF DEFENSIBLE SPACE
STRATEGIES IN THE DESIGN OF A SECONDARY SCHOOLS BUILDING
FOR OTA, OGUN STATE, NIGERIA

Dear Respondent,
I am an M.Sc students from the Department of Architecture in Covenant University, Ota, Ogun state, Nigeria. I hereby request your participation in our study on the Evaluating the Application of Defensible Space Strategies In your school by filling this questionnaire. The information you provide will be used strictly for academic purposes and treated anonymously. Thank you.
Yours sincerely,
Ayara Efe Joanna

SECTION A

Please tick the box ✓]that tally with your response to the following questions
Personal characteristics of Respondent

1. Gender: 1. Male[ ]   2. Female[ ]

2. Age: 1. 12-16[ ]   2. 16-21[ ]   3. 22-27[ ]

3. Status: 1.SSS1 [ ]   2. SSS2 [ ]   3. SSS3[ ]

For school staff only

1. Gender: 1. Male[ ]   2. Female[ ]

2. Age: 1. 20-30[ ]   3. 31-40[ ]   4. 41-50[ ]   5. 51-60[ ]
    6. above 60[ ]

3. level of education   1. WASC/GCE/O level[ ]   2. OND/NCE/A' level[
    ]   3. B.sc level[ ] M.sc level[ ]

4. Duration of stay in the school: 1. 1-5 years[ ]   2. 6-10[ ]   3. 11-15[ ]

SECTION B

User perception of security and safety in the school environment

Please rate by ticking (√) the level of satisfaction with these aspects of the school.

s/n		Strongly disagree	Disagree	Undecided	Agree	Strongly agree
	a. Territoriality					
1	I am able to recognize strangers within the school environment					
2	Public and private space are clearly demarcated in the building					
3	The school spaces are adequately labelled					
4	Access to spaces around the building is regulated					
5	I feel ownership of the school spaces during use					
6	The presence of security personnel is tangible within the school environment					
	b. Natural surveillance					
7	I can clearly look over the external surrounding even when I am inside the school building.					
8	I immediately inspect the surrounding area whenever I overhear loud or suspicious noise					
	c. Image					
9	The school building has physical deteriorations					
10	I am satisfied with the general cleanliness of the school environment					
11	I am satisfied with the physical appearance of the school environment					
	d. Milieu					
12	The school building is located in a crime prone environment					
13	The school building layout is easily comprehendible					
14	The road around the school is well constructed					
	e. satisfaction					
15	I feel safe within the school environment					
16	I am satisfied with the general level of security in the school					

APPENDIX 2

OBSERVATION GUIDE

THE SCHOOL GROUND

1. Name and location of school

_____

2. Zoning of school   1. Present[ ]   2. non -existence[ ]

3. School layout   1. Properly planned[ ] 2. Haphazard[ ]   3. Spacious[ ]
   4. Crowded[ ]

4. Presence of perimeter fencing   1. nonexistence[ ]   2. in disrepair[ ]

    3. in good condition[ ]

5. is the perimeter fence adequately illuminated?   1. Yes[ ]   2.No[ ]

6. Any presence of open space   1. Available[ ]   2. none available[ ]

7. Presence of security post (gate house) at entrance of school   1.Yes[ ]
   2.No[ ]

8. is the security post adequately illuminated?   1. Yes [ ]   2. No[ ]

9. Presence of dead end conners within the school ground   1. Yes[ ] 2. No[ ]

10. Presence of sporting/recreational facilities within the school   1.Yes[ ]
    2. No[ ]

11. Condition of sporting/recreational facilities   1. Very poor[ ]   2. Poor[
    ]   3.Fair[ ]   4. Good[ ]   5. very good[ ]   6.Excellent[ ]

12. General cleanliness of the school ground   1. very poor[ ]   2. Poor[ ]
    3.Fair[ ]   4. Good[ ]   5. very good[ ]   6. Excellent[ ]

13. Is there presence of blind spots and ambush point around the building?
    1. Yes[ ]   2. No[ ]

14. Is there visibility in the type of fence or edges around the building?   1. Yes[ ]
    2. No[ ]

15. Is the ground easily viewed from school building?   1. Yes[ ]   2. No[ ]

16. Are there signs of vandalism?   1. Yes[ ]   2. No[ ]

17. Walk ways flows are orderly.   1. Yes[ ]   2. No[ ]

18. Vehicular travel routes are clearly marked.   1. Yes[ ]   2. No[ ]

19. Parking areas are easily monitored.   1. Yes[ ]   2. No[ ]

20. Pedestrian pathways and gathering areas are easily monitored.   1. Yes[ ]
    2. No[ ]

THE BUILDING
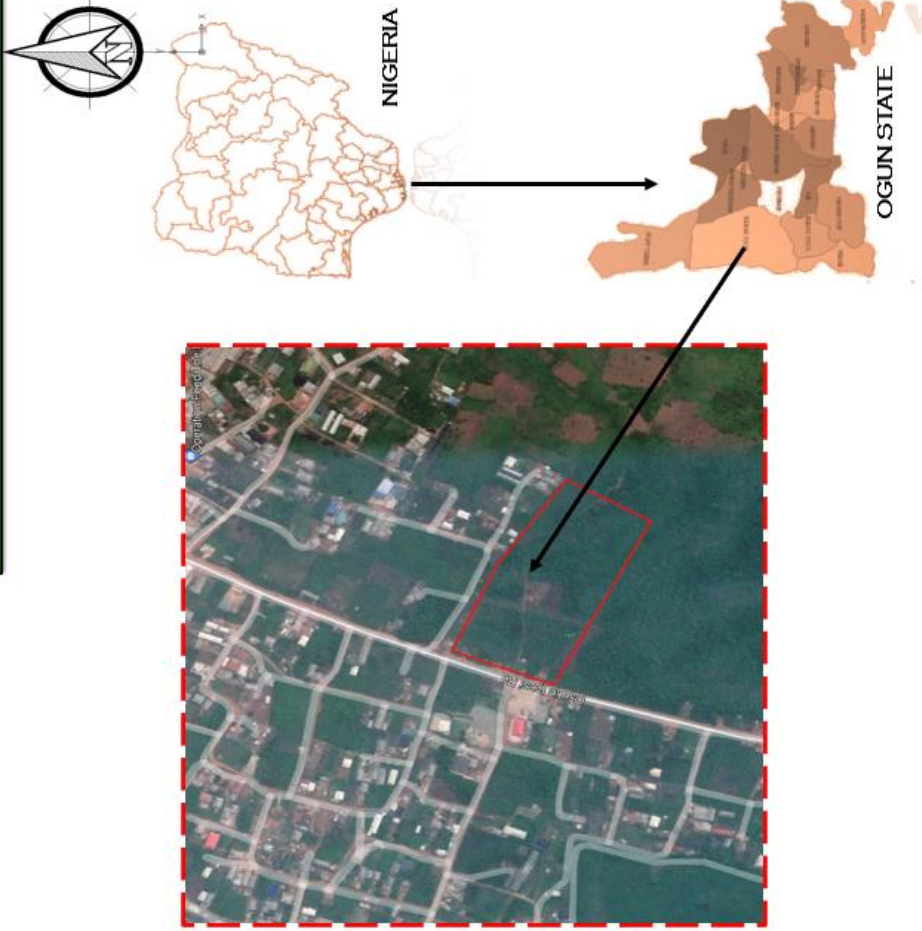
Building(s): Exterior

21. Building configuration   1. Campus style configuration [ ]   2. Compact configuration[ ]

22. The public entry is well defined with architectural features, signs, lighting, artwork, landscaping and/or landmarks such as flags.   1. Yes[ ]   2. No[ ]

23. Condition of exterior doors.   1. nonexistence[ ]   2. in disrepair[ ]
    3. in good condition[ ]

24. Material of exterior doors_____

25. Is each door equipped with a secure locking device?   1. Yes[ ]   2. No[ ]

26. Condition of windows.   1. nonexistence[ ]   2. in disrepair[ ]
    3. in good condition[ ]

27. Are windows protected with burglar-resistant material/film?   1.Yes[ ]
    2, No[ ]

28. Secondary entrance and exit doors are secured.   1. Yes[ ]   2. No[ ]

29. Presence of exterior lighting fixtures.   1. Yes[ ]   2. No[ ]

30. Are the exterior light in good working condition?   1. Yes[ ]   2. No[ ]

31. Exterior stairs, balconies, ramps, and upper-level corridors are well lit.
    1. Yes[ ]   2. No[ ]

32. Are there signs of vandalism?   1. Yes[ ]   2. No[ ]

33. State of repair of the building?   1. Dilapidated[ ]   2. Major repair[ ]
    3. Minor repair[ ]   4. Sound[ ]
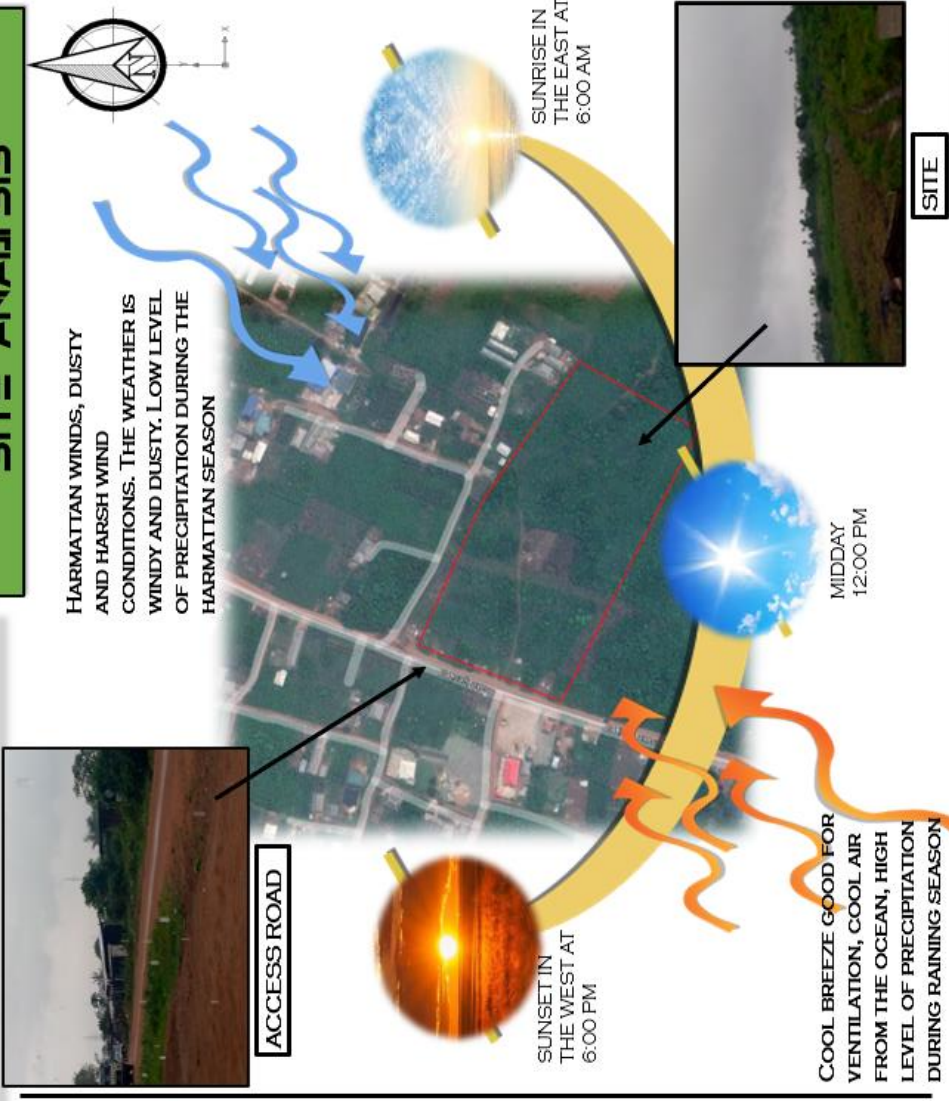
Building: interior

1. Condition of interior doors.   1. nonexistence[ ]   2. in disrepair[ ]

   3. in good condition[ ]

2. Material of interior doors_____

3. Are each door equipped with a secure locking device?   1. Yes[ ]   2. No[ ]

4. Condition of windows.   1. nonexistence[ ]   2. in disrepair[ ]
    3. in good condition[ ]

5. Are windows protected with burglar-resistant material/film?   1. Yes[ ]
   2. No[ ]

6. Condition of artificial lighting within interior spaces.   1. Very poor[ ]
   2. Poor[ ]   3. Fair[ ]   4. Good[ ]   5. very good[ ]
   6. Excellent[ ]

7. condition of natural lighting in interior space.   1. Very poor[ ]   2. Poor[ ]
   3. Fair [ ]   4. Good[ ]   5. very good[ ]   6. Excellent[ ]

8. Interior spaces are attractive and cheerful.   1. Yes[ ]   2. No[ ]

9. The organization of interior spaces is easily comprehended.   1.Strongly
   disagree[ ]   2. Disagree[ ]   3. Undecided[ ]   4. Agree[ ]
   5. Strongly agree[ ]

10. Visitors have distinctive and highly visible nametags.   1.Yes[ ]   2. No[ ]

11. Staff and teachers have highly visible nametags.   1. Yes[ ]   2. No[ ]

12. Security personnel wear distinctive clothing and have distinct, visible
    identification badges.   1.Yes[ ]   2. No[ ]

13. Prescence of Interior security equipment.   1. Yes[ ]   2. No[ ]

14. State of repair of the interior space?   1.Dilapidated[ ]   2. Major
    repair[ ]   3. Minor[ ] 4. repair[ ]   5. Sound[ ]

15. Are there signs of vandalism in interior spaces?   1.Yes[ ]   2. No[ ]

16. Obsolete or underutilized spaces are secured to prevent access by
    unauthorized persons. 1.Yes[ ]   2. No[ ]

ADDITIONAL OBSERVATIONS

Any additional observations regarding the school environment

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

APPENDIX 3

ARCHITECTURAL DRAWINGS

SITE ANALYSIS

HARMATTAN WINDS, DUSTY AND HARSH WIND CONDITIONS. THE WEATHER IS WINDY AND DUSTY. LOW LEVEL OF PRECIPITATION DURING THE HARMATTAN SEASON

SUNRISE IN THE EAST AT 6:00 AM

SITE

MIDDAY 12:00 PM

ACCESS ROAD

SUNSET IN THE WEST AT 6:00 PM

COOL BREEZE GOOD FOR VENTILATION, COOL AIR FROM THE OCEAN, HIGH LEVEL OF PRECIPITATION DURING RAINING SEASON

LOCATION:
THE SITE IS LOCATED AT KM6, OSUKE IYESI ROAD, OTA, NIGERIA. THE SITE HAS A TOTAL AREA 39,012.28 SQUARE METER

SITE DESCRIPTION
- THE SITE IS RELATIVELY FLAT
- THERE IS PRESENCE OF EXISTING VEGETATION
- THE SITE IS MAINLY SURROUNDED BY RESIDENTIAL BUILDING

SOLAR ORIENTATION
THE BUILDING SHOULD BE PLACED PROPERLY IN RELATION TO THE SUN IN ORDER TO MAXIMIZE THE AMOUNT OF HEAT GAINED THE COLDEST MONTHS AND MINIMIZE THE AMOUNT OF HEAT GAINED DURING THE WARMEST MONTHS

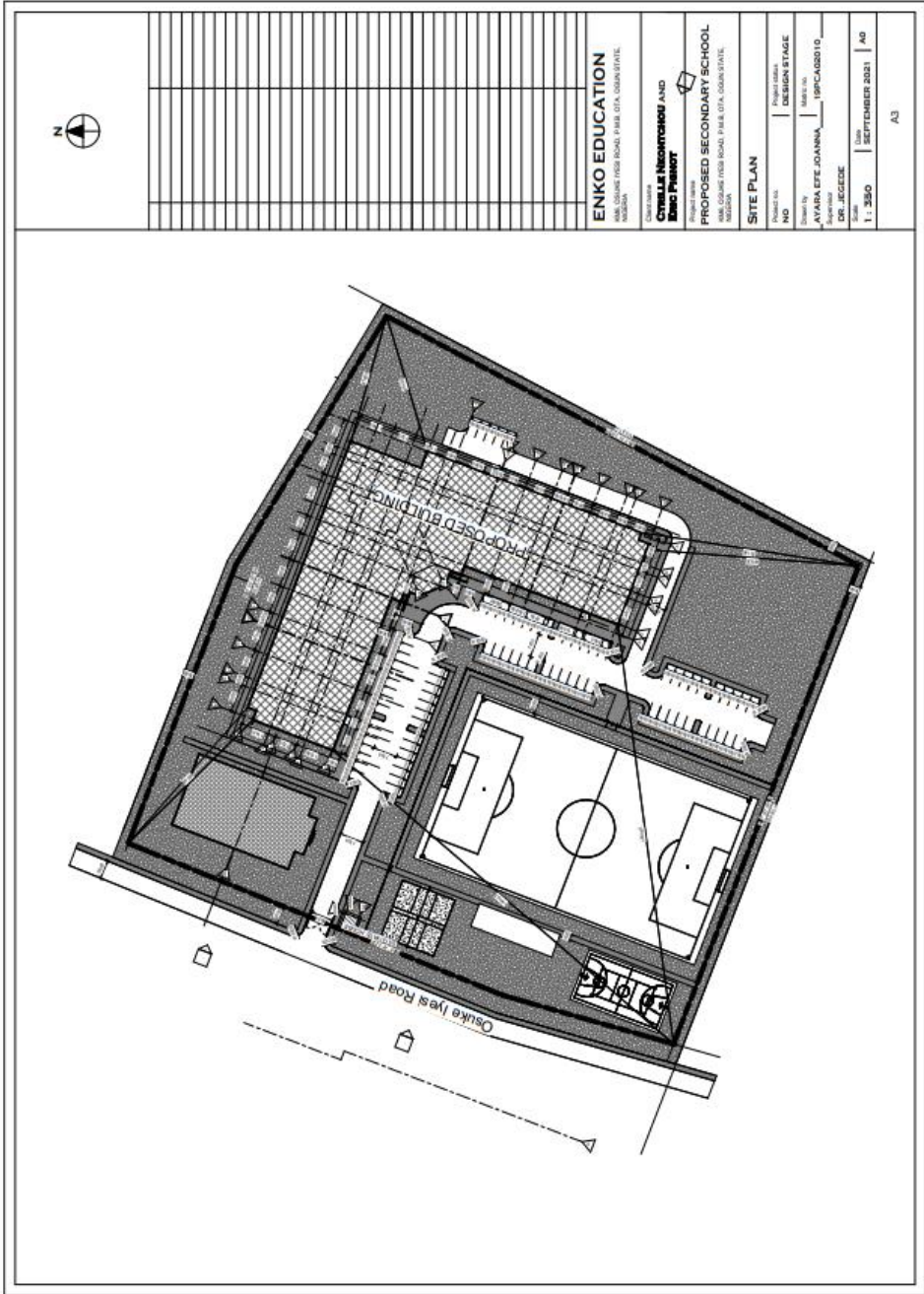TRESS SHOULD BE PLANTED AS SHADING DEVICES

PROPOSED SECONDARY SCHOOL		
SUPERVISED BY: DR F. O JEGEDE		**11**
AYARA EFE JOANNA	M.SC 2	N.T.S	JUNE 2021
19PCAO2010		

BUBBLE DIAGRAM

FIRST FLOOR

- Computer Lab
- Technical Drawing Lab
- Library
- Science Lab
- Senior Classroom Wing
- Administrative Area
- Staff Prep Room
- Junior Class Wing

GROUND FLOOR

- Multipurpose Hall
- Senior Classroom Wing
- Administrative Area
- Science Lab
- Staff Prep Room
- Junior Class Wing

AYARA EFE JOANNA	SUPERVISED BY: DR F. O JEGEDE	PROPOSED SECONDARY
19PCA02010	M.SC 2 N.T.S JUNE 2021	SCHOOL

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Front elevation

Rear Elevation

Left Elevation

Right Elevation

ENKO EDUCATION
KM6, OSUKE IYESI ROAD, P.M.B. OTA, OGUN STATE,
NIGERIA.

Client name
CYRILLE NKONTCHOU AND
ERIC PIGNOT

Project name
PROPOSED SECONDARY SCHOOL
KM6, OSUKE IYESI ROAD, P.M.B. OTA, OGUN STATE,
NIGERIA

UNNAMED
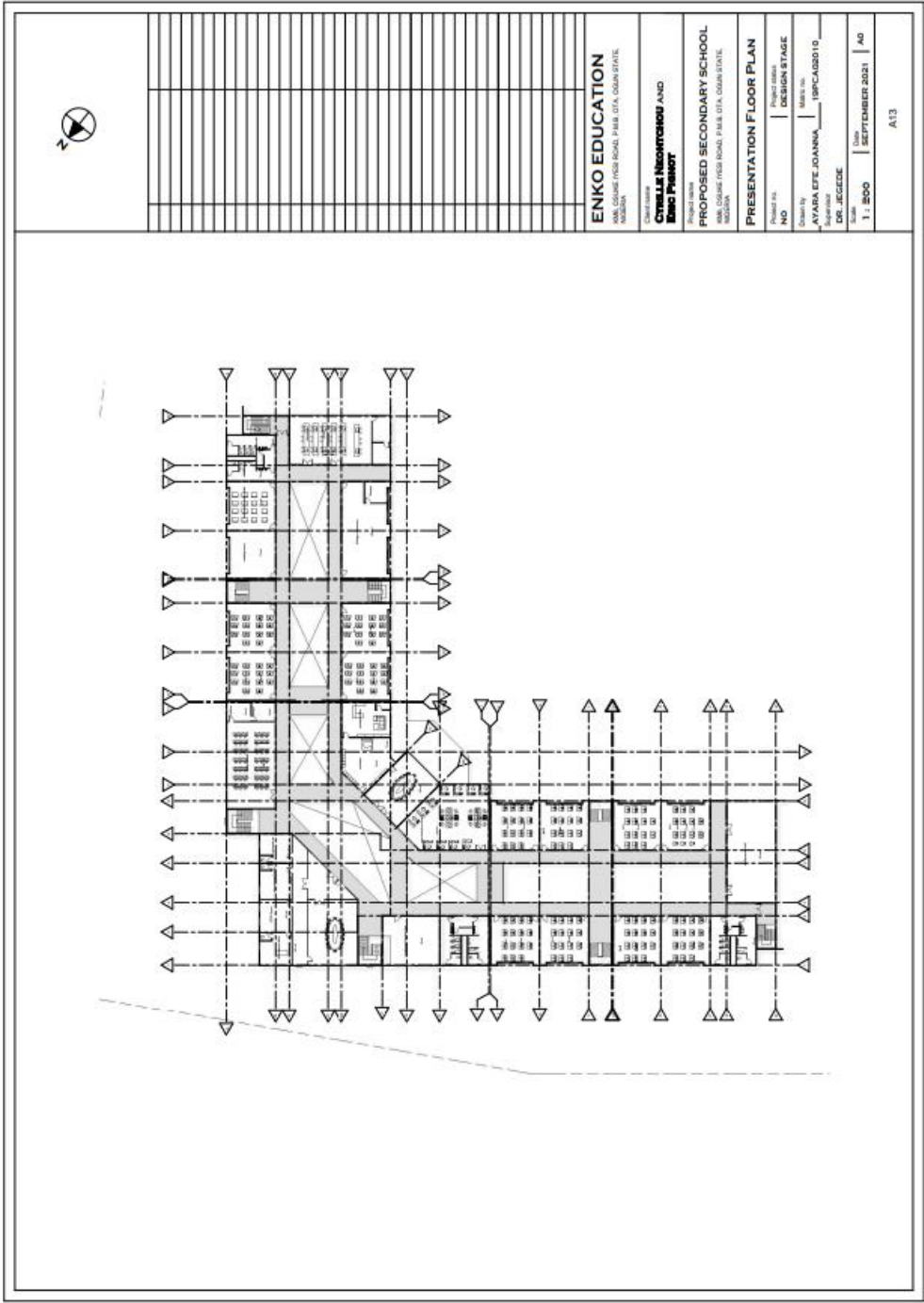
Project no.	Project status
NO	DESIGN STAGE
Drawn by	Matric no.
AYARA EFE JOANNA	19PCAO2010
Supervisor	
DR. JEGEDE	
Scale	Date
AS	SEPTEMBER 2021

INDICATED   SECTIONS

AO

N

Section X-X
1 : 200

Section Y-Y
2 : 100

Section Z-Z
3 : 100

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EXTERIOR PERSPECTIVE

PROPOSED SECONDARY SCHOOL

1

SUPERVISED BY: DR F. O JEGEDE

M.Sc 2   N.T.S   JUNE 2021

AYARA EFE JOANNA
19PCAO2010

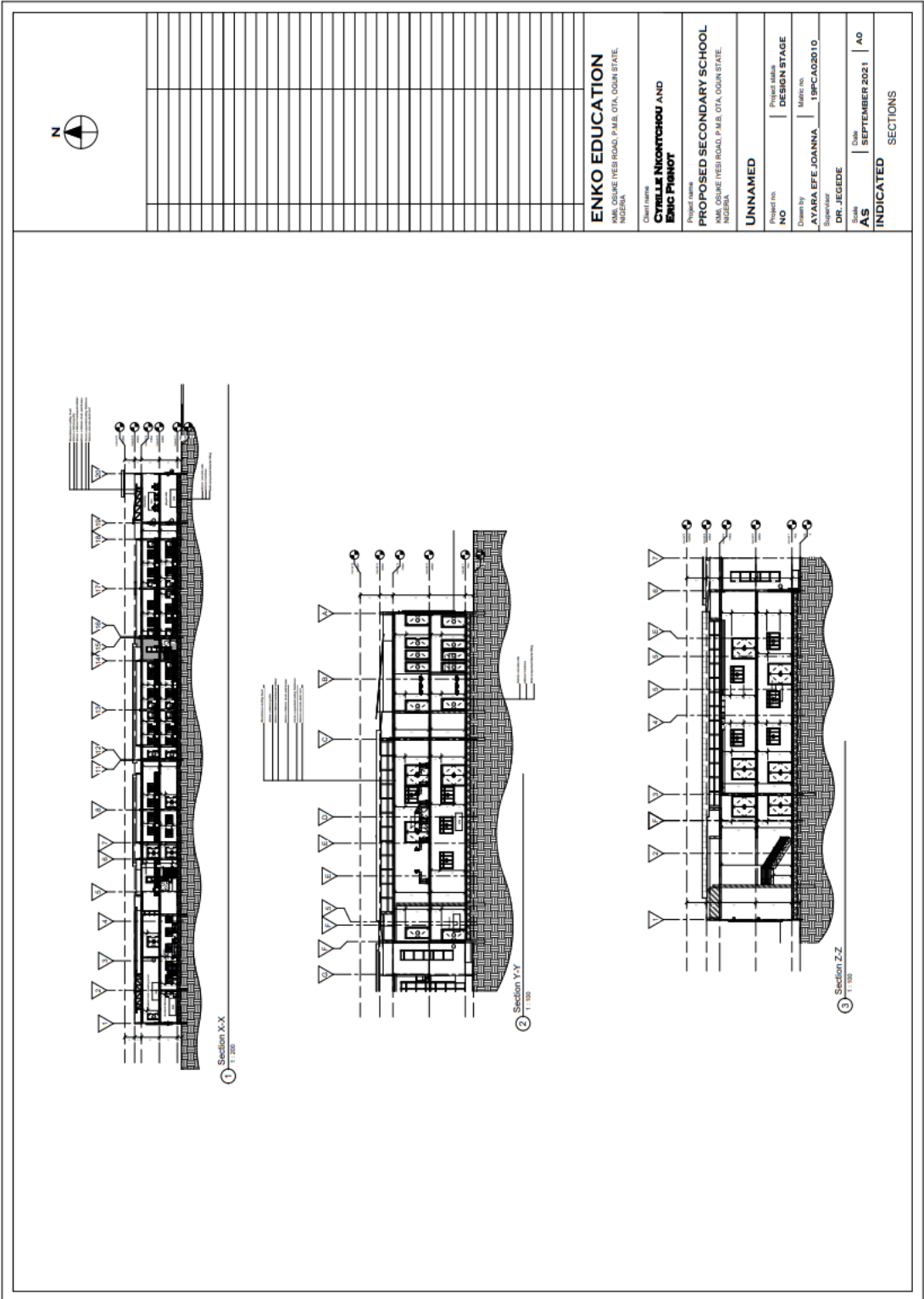INTERIOR PERSPECTIVE

PROPOSED SECONDARY SCHOOL

1

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M.Sc 2   N.T.S   JUNE 2021

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