

# Architectural Design for Security and Safety in Nigeria: A case of Selected Institutions in South-West, Nigeria.

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**Abstract-** More recently, the protection of the environment has received growing attention with the integration of different security measures considering the nature of the built environment, and a drive on the need to take responsibility for its design, construction, and operations. The aim of this study was to explore architectural design as a means to solve the safety and security challenges of the built environment towards surviving extreme antisocial behaviour in Nigeria. The study employed a qualitative research approach and combined, observations and content analysis. The result of the study showed that the institution under analysis used several elements considered in designing for safe living. From the analysis of findings, passive security measures were applied to deter potential threats around buildings. The passive security features which were employed include access control, perimeter fencing, adequate stand-off, hardened landscape elements, and barricades. All the studied facilities employed perimeter fencing to activate the first line of defence and define their boundaries, while the application of concrete planters as a hardened anti-intrusion element was not imminent. Conclusively, proper architecture design stands at the centre stage of responsibly thinking through design in addressing the security needs of the building and its occupants, depending on the scope and functionality.

**Index Terms-** Security, Safety, Architecture, Design and Design

## I. INTRODUCTION

The fundamental principle of designing for safety and security in built form is to ensure that building occupiers are safe and secured either in case of emergency events or normal living conditions (Farzaneh, et al., 2021). Architecture in its real sense provides comfort, yet provides an integrated approach to improve the building design such that it is safer to construct and operate, thus providing a feeling of safety and security (Zahid, Elmansoury, & Yaagoubi, 2021). Security gaps and trials certainly do manifest and for a while have been a major concern in so many states in Nigeria. Public places or functions of large gatherings are often targeted, probably because they attract a lot of traffic and are easily accessible (Adedayo, Ailoyafen, & Adebayo, 2017). All manners of attacks ranging from insurgency and terror attacks, kidnappings and hostage-takings for monetary ransoms, and shooting among others have been observed to be a common occurrence in facilities with functions ranging from administrative to religious as well as commercial establishments. The first abduction involving the kidnap of school children in Nigeria took place in 2014 when 276 girls were taken from the Government Secondary School in Chibok. Ever since, similar attacks had spread across the northern part of the country, and abductions of students have grown in numbers (Kaalu, 2021).

According to Adedayo et al., (2017), building security takes into consideration the actions of people planning to cause an attack. This emphasizes the concept of security as it relates to the concept of safety and reliability. Building security protects the building, its facilities and users from potential threats that can cause any further damage to the building or its inhabitants (Sowemimo, Okon, Ugwoke, Oyewole, & Akande, 2021). To this end, the issue of security and the need to identify intruders goes beyond installing high-technology electronic systems in buildings, rather focus should be on the need to conceptualize the design stage to capture the process of planning and designing to wade off attack or at least delay possible occurrence (Pal, Zhang, & Siyal, 2021). Possibly, there might not be a well-structured preventive measure or a perfect solution when considering design for safety and security, but there are multi-disciplinary design approaches that could be employed to create a safer environment and improve quality of life.

Unarguably, we are living in a time where various threats exist all around us, and these must be accounted for without recourse. Critical thinking then becomes crucial to combat these threats as much as possible. This way, it becomes imperative to consider an inclusive architectural design at the forefront of an attempt to contain all aspects of spatial vulnerability and environmental security. Therefore, the objectives of this study are to:

- i. identify the parameters considered in designing for safety and security;
- ii. highlight building design and planning practices that are more proactive rather than reactive.

## II. METHODOLOGY

This study employed the use of personal observation (in form of a physical survey) and scheduled interviews. The non-probability sampling method was used to select 3 private universities from 3 different states. The three states were picked at random out of the six states within the southwest geo-political zone of Nigeria. The state and bases of selection were on the condition that they share common characteristics with Nigerian states that have experienced (external/insurgent) attacks in time past or strictly because of their geographical, economic, and political importance. See table 1 for site justification.

**Table 1: Justification for Site Selection**

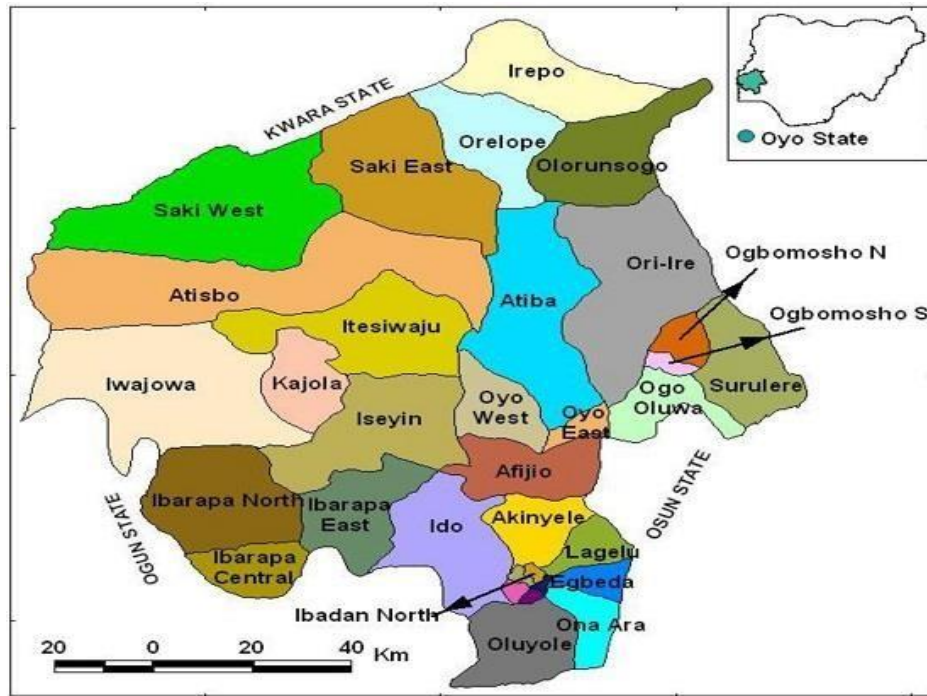
S/N	State	Justification for selection
1	Ogun	Border town, industrial zone and has a high number of higher institutions of learning
1.	Oyo	Political influence and has a lot of agrarian land supposedly under attack by
2.	Kwara	Geo-political location (North central)

### Overview of Study Area

The study area will include three (3) states from the South Western part of Nigeria, namely; Oyo, Ogun, and Kwara state. Oyo state is a traditional city and has the premier University, Ogun state is a border town and industrial hub, and Kwara state because it exhibits and often identifies with Northern Nigeria.

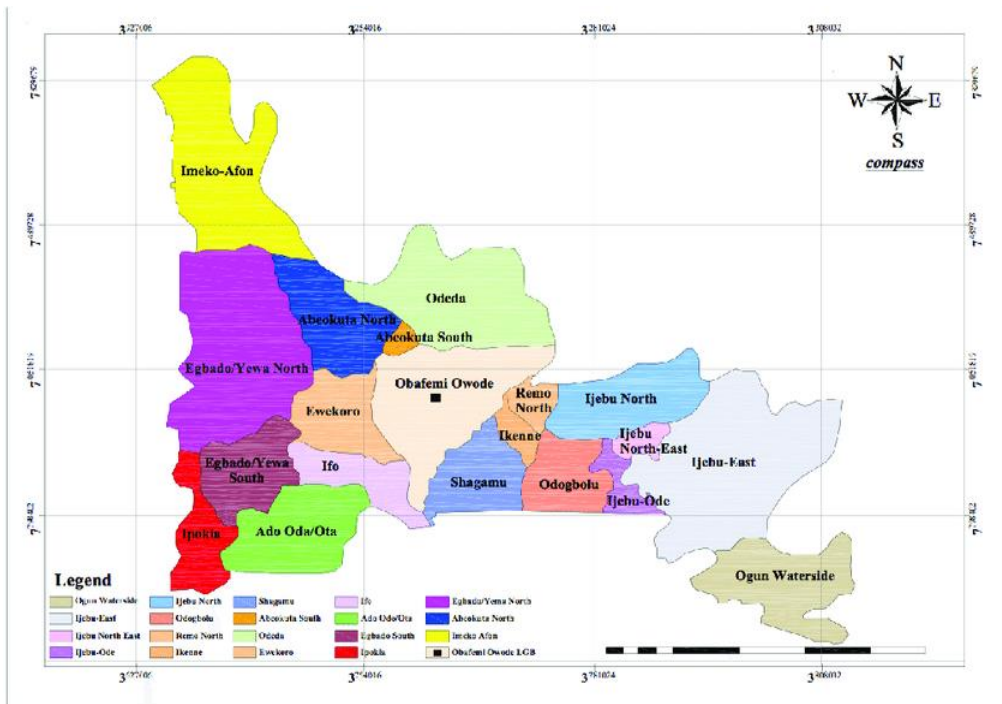
### Oyo State (Ibadan)

Oyo State is one of the fastest developing states, located southwest of Nigeria between latitude 6<sup>0</sup>45'N 7<sup>0</sup>15'N and longitude 2<sup>0</sup>30'E 4<sup>0</sup>30'E. Judging by its size, the state is ranked 14<sup>th</sup> in the country with a total land area of about 28,454km<sup>2</sup>. The state is predominantly agrarian, complimented by other small businesses and commercial towns – with a population of 5,591,589 people according to the 2006 population census. It is characterized (by a predilection for living in high-density urban centres (Adegoke and Jegede, 2016). Oyo state is geographically located about 128 km from Lagos - a city attested to have birthed formal planning. Ibadan is the capital of Oyo state and was the colonial administrative headquarters for the south-western region (fig.1).



**Figure 1: Map of Oyo State (Google images, 2021) Ogun State (Ota)**

Ogun state also referred to as “the Gateway State”, is majorly considered a manufacturing hub because it has a high concentration of industrial estates; the largest industrial centre with significant industrial capacity in West Africa. Considering its land mass, the state covers an area of 16,409.26 km<sup>2</sup>, which is 80% arable land suitable for agriculture, grazing, and industrialization. This provides a ground for partnership and cooperation with the private sector to cater to its population of 3.751million. However, the study focus of the study will be Ota (an industrial hub of Ogun State) which is the capital of the Ado-Odo Local Government Area. It covers an area of 878 square kilometers and lies between latitude 6°41'N, 6°68'N and longitude 3°41'E, 3°68'E (fig.2)



**Figure 2: Regional settings of Ogun State showing the LGAs (Google images, 2021) Kwara State (Ilorin)**

Ilorin performs the dual role of being the commercial and administrative capital of Kwara State. Ilorin city occupies an area of about 468 km<sup>2</sup> and it is located at latitudes 8°30', 8°50'N and longitude 4°20', 4°35'E (fig.3). The growth has been attributed to the centrality of Kwara state, which thus impacts commerce, industrialization, and other social aspects. Moreover, the state is sometimes regarded as Northcentral because of its geographical location which is about 300 km<sup>2</sup> away from Lagos and 500 km<sup>2</sup> away from Abuja the Federal Capital of Nigeria.



Figure 3: Regional map of Kwara State (Google images, 2021)

### Sample Frame

The purposive sampling technique was used which gave access to selecting 3 private higher institutions, one from each state. The schools considered for the study are Bells University of Technology, Ota, Lead City University, Ibadan, and Al-Hikma University, and Ilorin.

### Sample Population

The scheduled interview was conducted among postgraduate students of architecture from the selected higher institution of learning. Student perceptions of risk and safety, and violence were assessed. The interview which doubles as a dialogue session was used to assess active and passive design considerations and to quantify how well the physical elements of each school correspond to ideal Crime Prevention through Environmental Design (CPTED) principles.

## III. RESULTS AND DISCUSSION

Data collected from the survey and observation schedule carried out in the course of the research are presented in tables. Table 2 shows the available security design in the case studies.

**Table 2: Observable Security Elements**

	Physical control		Standoff Zone			Natural surveillance		Site zoning	
	Security	Access control	Planter	Low-screen	Bollards	Landscape	Trees and Shrubs	Defined territory	Set-back
Bells Tech	√	√	-	√	√	√	√	√	√
Lead City	√	√	-	√	-	√	√	√	√
Al- hikma	√	√	√	√	-	√	√	√	√

Even though there are several urban design features that can be applied to mitigate security threats in public places, there are yet a considerable number of these elements that are absent based on the facts presented in table 2. All the schools sampled did not satisfy all the security elements that were assessed as concrete raised planter was missing in Bells University, likewise, Lead City University. This does not justify that they lack adequate security and safety measures, as there are other passive and active design measures to be considered. Assessments of these elements are done by following the CPTED principles, whilst addressing their level of usage.

**Table 3: Elements of physical barrier**

Observation	Features
	<p><u>Bells University</u></p> <ul style="list-style-type: none"> <li>- Gated access/security post</li> <li>- Security personnel</li> <li>- Controlled access</li> <li>- Standoff distance</li> <li>- Perimeter fencing</li> </ul>
	<p><u>Lead City University</u></p> <ul style="list-style-type: none"> <li>- Reinforced gated entry point</li> <li>- Stand-by security</li> <li>- Setback/standoff zone</li> <li>- Pathway is well defined</li> <li>- Per</li> </ul>
	<p><u>Al-Hikma University</u></p> <ul style="list-style-type: none"> <li>- Gated entry point</li> <li>- Stand-by security guards</li> <li>- Setback/standoff zone</li> <li>- Pathway defined with bollards</li> <li>- Reinforced perimeter</li> </ul>

The elements of physical barrier that were applied have been simplified and presented in table 3 which indicated that all the study sites employed similar physical control measures. Entry into the premises can only be possible through the pathways provisioned for vehicular and pedestrian movement through the gated entrance which is also manned by security personnel. The elements that were used to define the pathways are similar but yet different, but often between low-screen grasses and shrubs or bollards. It should be noted however that there is enough setback before the gate, which likewise serves as a standoff zone for intruders.



**Table 4: Elements of safety control**

Observation	Remark
	<p><u>Bells University</u></p> <ul style="list-style-type: none"> <li>- Territorial reinforcements is obtainable</li> <li>- Nature defense strategy is visible</li> <li>- Pathway is well defined</li> </ul>
	<p><u>Lead City University</u></p> <ul style="list-style-type: none"> <li>- Defined territory and pathway</li> <li>- Nature defense strategy is visible</li> </ul>
	<p><u>Al-Hikma University –</u></p> <ul style="list-style-type: none"> <li>- The building perimeter is well defined</li> <li>- Pathway allows for easy entry and exit</li> <li>- Combines nature and passive defense mechanism</li> </ul>

Table 4 highlights the elements of control obtainable and shows the extent to which it was applied in each case. It was observed that physical measures of security were present and the site defined through circulation paths, whilst serving as modalities to apply a level of control to the users. This informs the study that the security and safety design in these study sites responded well to nature design.

**Building elements and safety concern**

The result of the survey showed that different on-site security design elements were used at Bells University, Lead City University, and Al-Hikma University. It is also important to evaluate the effectiveness of these elements in relation to building design, the safety of the users, and security measures in case of an emergency. This was viewed from the positioning of openings, types of window, stairs design, use of smoke stop lobby, and also distinguishing between sensitive and non-sensitive areas to restrict movement, among other design possibilities.

**Table 5: Safety concern for emergency considerations**

	Entry		Openings		Circulation		Site zoning	
	Manned	Unmanned	Entry	Emergency exit	Lobby	Walkway	Defined Territory	Set- back
BellsTech	**	*	**	*	**	**	**	**
Lead city	*	-	**	*	**	**	**	**
Al-hikma	**	-	**	*	**	**	**	**

**Key:** \*\* very significant, and applicable in all buildings  
\* slightly applicable

Table 5 shows the degree how which many safety considerations were added to the building elements in all the site studies. It however indicated that most of the buildings do have entry points planned to allow ease of movement for building users. Most of these entry points are manned by security personnel as in the case of bells, while manned entries are very common to highly populated or sensitive zones (library, ICT centre, Senate building, for all the schools). The same situation is observable for building with an emergency exits.

**Table 6: Assessing building emergency measures**

S/N	Variable checklist	Level of application			Remark
		Bells	Lead city	Al-hikma	
1	Wayfinding	*	**	**	Fairly applied
2	Alarm system	*	*	*	Fairly applied
3	Emergency exit	*	*	*	Fairly applied
4	Mustard point	-	-	-	Not applied

**Key:** \*\* very significant, and applicable in all buildings  
\* slightly applicable

Table 6 expresses the degree of building responses to security concerns using a variable checklist including wayfinding, alarm system, provision of emergency exit, and allocation of mustard points. It was observed that wayfinding elements were not so significant in Bells University, while it is common practice to see inscriptions on the walls showing direction and exit signs in Lead city and Al-hikmah university. An alarm system and emergency exit are slightly applicable and only provisioned in the building of facilities that are used for administrative functions or fall within supposed sensitive zones – this is the case in all the study sites. Additionally, the mustard point was not visible at any of the sites.

#### IV. CONCLUSION AND RECOMMENDATION

Since security concern is considered an intentional measure, it is imminent to develop and incorporate key architectural considerations into crime prevention through environmental design theories. Concussively, the responsibility of ensuring a safe and secured environment should rather be a joint effort involving all allied professionals involved in environmental design and planning. In all, architecture stands at the centre stage of responsibly thinking through design in addressing the security needs of the building and its occupants, depending on the scope and functionality. Therefore, the study recommends all building development must comply with security standards, which can obviously be prepared to contain the security classifications of buildings, probably a case-by-case situation – private resident, educational building, office complex, or any other public building. There is also a need to balance the security variables base on the security needs of the building and its occupants.

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