A PROJECT REPORT

ON

PROPOSED DENTAL CLINIC

FOR

OLOJE COMMUNITY ILORIN, KWARA STATE.

By:

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ND/23/ARC/FT/0018

Submitted to:

THE DEPARTMENT OF ARCHITECTURAL TECHNOLOGY

INSTITUTE OF ENVIRONMENTAL STUDIES (IES) KWARA STATE POLYTECHNIC, ILORIN

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF NATIONAL DIPLOMA (ND) IN ARCHITECTURAL TECHNOLOGY

JULY, 2025.

DECLARATION

I declare that this design project/Dissertation is a project of my personal work. It has been presented for the award of any National Diploma in any Polytechnic. The ideas, observation, comment, suggestions herein represent my own convictions, except quotations, which have been acknowledged in accordance with conventional academic traditions.

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ND/23/ARC/FT/0018

_____

DATE/SIGNATURE

CERTIFICATION

I certified that this design entitled **"DENTAL CLINIC"** was carried out by **YAKUB WASIU MOBOLAJI** with Matric Number **ND/23/ARC/FT/0018**, under the supervision of **ARC. OLAREWAJU F. A** and has been approved as meeting the requirements for the award of **NATIONAL DIPLOMA (ND)** in ***Architectural Technology***, Kwara State Polytechnic, Ilorin, Kwara State.

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I will also like to appreciate my project supervisor in person of ARC. OLAREWAJU whose contribution prepares me for the challenges in the field and for his immense contribution in all ramifications towards the completion of this research work. He encouraged me and opened the door of interaction with him. I pray Almighty God will shower his blessing and mercy over him, your family and may you live to reap the fruit of your labour.

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Precious Friends: Olayinka, Omokayode, Almighty God shower his Blessing, Grace, Happiness with Sound Health over you all and answer all our prayer. (AMEN)

DEDICATION

This project work is dedicated to Almighty God who has been providing all my needs for His blessing and mercy over me all through the programme. And my parents, Mr. Abdulrahman Yakub and Abdulrahman Yakub, my brothers, friends, love one's and my supervisor who assist me financially, spiritually, mentally and guide me through my academic pursuit. May Almighty God shower his blessing and mercy over you all.

ABSTRACT

This project focuses on the design of a modern dental clinic that meets the functional, hygienic, and psychological needs of patients and staff. The aim is to create a well-planned and aesthetically pleasing facility equipped to provide high-quality dental services. Key considerations include zoning for privacy, infection control, daylight access, ventilation, and space optimization. The project is based on contemporary healthcare design principles, adapting to current challenges in Nigerian healthcare infrastructure.

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CHAPTER ONE

INTRODUCTION TO DENTAL CLINIC

A dental clinic is a healthcare facility where people receive professional care for their teeth and gums. This project focuses on designing a functional and modern dental clinic that can handle various dental services such as consultations, tooth extractions, cleaning, fillings, and X-rays. The aim is to create a space that is clean, comfortable, and welcoming to patients, while also being easy for staff to work in.

Dental care plays an important role in overall human health, yet in many communities, access to standard dental facilities remains limited. This project involves the design of a dental clinic that combines functionality, hygiene, and modern aesthetics to improve oral healthcare delivery. The clinic will accommodate essential spaces such as treatment rooms, a waiting area, a pharmacy, and staff offices. The goal is to create a safe, clean, and comfortable environment for both patients and healthcare professionals.

1.1 HISTORICAL BACKGROUND OF THE PROJECT

The history of dental practice can be traced back to ancient civilizations such as Egypt, Mesopotamia, and Greece, where basic dental procedures were performed. However, the concept of the modern dental clinic emerged in the 18th and 19th centuries with the advancement of medical knowledge and tools. In Nigeria, dental care began gaining attention in the colonial period, mainly within teaching hospitals. As awareness of oral health increased, private dental clinics began to develop across urban areas. These clinics were established to provide dedicated spaces for dental care, equipped with tools and technology for diagnosis and treatment. Today, dental clinics continue to evolve, combining modern architecture with healthcare requirements to deliver effective services in clean and efficient environments.

Dental care has been practiced for thousands of years, but the idea of a modern dental clinic is more recent. In the past, people often treated tooth problems at home or with traditional methods. As science improved, trained professionals began to handle dental treatment, leading to the development of dental hospitals and clinics. In Nigeria, dental services started

in major hospitals but have now expanded into private and public dental clinics. Today, dental clinics are an important part of the healthcare system, providing clean and safe spaces for oral treatment.

1.2 DEFINITION

A dental clinic is a place where people go to get treatment for their teeth, gums, and mouth. It is run by trained professionals like dentists and dental nurses who help with tooth pain, cleaning, filling, removal, and other dental problems.

A dental clinic is a specialized medical facility designed for the diagnosis, prevention, and treatment of oral health issues. It provides dental services such as check-ups, cleaning, tooth extraction, fillings, and minor surgeries, in a clean and hygienic environment by licensed dental professionals.

1.3 STATEMENT O F THE RESEARCH PROBLEM.

Despite the growing need for oral healthcare, many existing dental clinics in Nigeria face challenges such as inadequate facilities, poor ventilation, inefficient spatial arrangement, and limited accessibility. These issues affect the quality of dental services provided. This project seeks to address these problems by researching and designing a modern dental clinic that meets both functional and architectural standards for effective oral healthcare delivery.

In many parts of Nigeria, dental clinics are poorly designed, lacking proper space planning, hygiene control, and patient comfort. This has made it difficult for people to receive quality oral care. The problem this project addresses is how to design a dental clinic that provides a clean, functional, and welcoming environment for both patients and staff, while also meeting healthcare standards.

1.4 AIM AND OBJECTIVES

1.3.1 AIM OF THE STUDY

The aim of this project is to design a functional, hygienic, and patient-friendly dental clinic that meets modern healthcare standards and provides quality oral care services in a safe and comfortable environment.

1.3.2 OBJECTIVES

- To create a well-planned dental clinic with clearly defined zones for treatment, waiting, and staff areas.
- To ensure good hygiene and infection control through proper space layout and material selection.

- To provide a comfortable and welcoming environment for patients of all ages.
- To design for accessibility, allowing ease of use for physically challenged persons.
- To incorporate natural lighting and ventilation into the building design.

1.5 JUSTIFICATION.

The need for a well-designed dental clinic is very important because many existing clinics in Nigeria do not meet modern health and design standards. Some clinics lack proper ventilation, enough space, and a clean environment, which can affect the quality of service and patient comfort. This project is justified because it will help provide a better space for dental care, where patients feel safe and relaxed, and staff can work effectively.

The justification for this project arises from the increasing demand for quality oral healthcare services and the lack of standard dental clinic facilities in many urban and semi-urban areas. Poorly designed clinics often result in overcrowding, lack of privacy, and inefficient patient flow. By designing a functional and well-organized dental clinic, this project addresses critical issues such as hygiene, accessibility, and user comfort. It will contribute to improving healthcare delivery and setting a model for future dental facility design.

1.6 SCOPE OF THE STUDY

This project covers the architectural design of a dental clinic. It includes the planning of all necessary spaces such as the reception, waiting area, consultation rooms, treatment rooms, X-ray room, pharmacy, toilets, and staff areas. The project also covers the site planning, circulation, lighting, ventilation, and landscape design to ensure a safe and comfortable environment for both patients and staff.

The scope of this study includes the complete architectural design of a standard dental clinic facility. It involves the spatial planning and arrangement of core functional areas such as the reception and waiting areas, consultation rooms, treatment rooms, X-ray section, sterilization room, pharmacy, administrative offices, and sanitary facilities. It also includes the design of external elements such as entrance points, parking spaces, green areas, and service access. The project takes

into account environmental factors, building orientation, ventilation, lighting, circulation flow, accessibility, and patient comfort.

1.7 LIMITATIONS OF STUDY

The limitations experienced during this course of study include:

I. Time constraints limited the number of physical case studies that could be visited.
II. Access to detailed health facility regulations was partially restricted.
III. Budgetary concerns for full digital system implementation were assumed, not actualized.

1.8 RESEARCH METHODOLOGY

In order to archive a well-functioning and organization farmstead and to know what the farmer need; the research was done.

- **Case Studies:** Existing dental clinics were visited to evaluate their spatial organization, design merits, and operational challenges.
- **Literature Review:** Relevant architectural texts and healthcare design manuals were consulted to understand the spatial, technical, and functional requirements of dental facilities.
- **Internet Research**: Online platforms were used to explore modern dental clinic designs globally, with emphasis on digital integration and user-centered layouts.
- **Personal Observation**: Direct site visits and informal interviews were conducted to observe real-life clinic operations, document activities, and gather user feedback for informed design decisions.

CHAPTER TWO

2.1LITERATURE REVIEW

2.1.1 Introduction

This literature review explores the architectural design principles, functional requirements, and modern innovations relevant to the development of a dental clinic. As oral healthcare facilities require both clinical precision and patient comfort, the review draws on established architectural standards, case studies, and technological trends to guide the proposed design.

The review aims to understand how dental clinics have evolved in terms of spatial planning, digital integration, infection control, and environmental design. It also considers how current practices in Nigeria compare with international standards, with the goal of designing a dental clinic that is efficient, user-friendly, and adaptable to local needs.

2.1.2 IMPORTANT ISSUES AND PROBLEMS PECULIAR TO DENTAL CLINIC TYPOLOGY

1. Variants of the Building Type

Dental clinic designs can vary significantly depending on their scale, function, ownership, and location. These differences directly affect the design approach, spatial planning, and technological integration.

a. PRIVATE VS. PUBLIC DENTAL CLINICS

Private Clinics

- **Design Focus:** Emphasis on patient comfort, aesthetics, and personalized services.
- **Scale:** Typically smaller, with 2–4 treatment rooms.
- **Flexibility:** Greater freedom in spatial layout, design style, and digital system integration.
- **Limitations:** May lack advanced surgical facilities due to space or budget constraints.

Public or Teaching Clinics

- **Design Focus:** Efficiency, high capacity, and compliance with government standards.

- **Scale:** Larger, with multiple consulting rooms, teaching spaces, and diagnostic units.
- **Zoning Needs:** Clear separation of clinical, academic, and administrative functions.
- **Challenges:** Overcrowding, complex circulation, and high maintenance demand.

b. STAND-ALONE VS. HOSPITAL-BASED CLINICS

Stand-Alone Clinics

- Operate independently, typically located in residential or commercial areas.
- Require full administrative, sterilization, and emergency systems within the same facility.
- Greater emphasis on outpatient flow and street-level accessibility.

Hospital-Based Dental Clinics

- Function as a department within a general hospital.
- Share central facilities such as laboratories, records, and emergency services.
- Design must accommodate multidisciplinary interaction and compliance with hospital-wide standards.

2. ***Environmental and Contextual Issues***

a. URBAN CLINICS

- Space Limitations: Clinics located in urban centers often struggle with compact sites.
- External Noise: Proximity to busy roads affects patient comfort.
- Parking and Access: Limited space for vehicle access and drop-off.

b. Rural or Semi-Urban Clinics

- Infrastructure Gaps: Poor access to electricity, water, or waste disposal services.
- Material Availability: Limited options for hygienic, durable building materials.

2.1.3 TECHNOLOGICAL AND ENVIRONMENTAL APPROACHES FOR DESIGNING A DENTAL CLINIC.

Designing a modern dental clinic requires an integrated approach that leverages both technological innovations and environmentally sustainable strategies. These approaches not only enhance the efficiency and functionality of the clinic but also improve patient experience, reduce operational costs, and promote environmental stewardship.

1. TECHNOLOGICAL APPROACHES

1.1 Digital Integration and Health Management Systems

- Electronic Medical Records (EMR): A centralized, secure system for storing and retrieving patient data, improving record accuracy and minimizing paperwork.
- Automated Appointment Systems: Use of digital scheduling software to manage bookings, send reminders, and reduce patient wait times.
- Patient Self-Check-In Kiosks: Touchscreen kiosks can streamline patient registration and reduce front desk congestion.
- Dental Imaging Systems: Integration of digital X-rays, intraoral cameras, and 3D imaging (CBCT) improves diagnostic accuracy and patient communication.

1.2 IT and Communication Infrastructure

- High-Speed Internet: Essential for cloud-based record systems, real-time consultation, and digital imaging.
- Intranet Systems: For internal communication between departments (e.g., reception to lab or sterilization room).
- Secure Network and Backup Systems: Ensuring data security, confidentiality, and recovery in case of system failure.

1.3 Smart Clinic Features

- Automated Lighting and HVAC Controls: Motion or schedule-based systems to reduce energy waste.
- Voice-Activated Assistants and Touchless Controls: For improved hygiene and workflow in treatment areas.
- Central Display Monitors: Used in consulting rooms for treatment planning, patient education, and real-time imaging display.

2. ENVIRONMENTAL APPROACHES

2.1 Sustainable Building Design

- Passive Cooling and Cross Ventilation: Oriented window openings, openable clerestory windows, and ventilated roofing help reduce reliance on mechanical cooling systems.
- Natural Daylighting: Maximize use of daylight through skylights and wide glazed surfaces, particularly in waiting and circulation areas.
- Thermal Insulation: Use of insulated roofing materials and cavity walls to reduce indoor temperature fluctuation and cooling load.

2.2 Renewable Energy Integration

- Solar Power Systems: Rooftop solar panels can supply energy for lighting, computers, and low-power devices, reducing utility costs and environmental impact.
- Solar Water Heaters: Used for handwashing stations and sterilization rooms.

2.3 Water Conservation Strategies

- Rainwater Harvesting: Captured rainwater can be reused for landscaping, flushing toilets, and exterior cleaning.
- Low-Flow Fixtures: Faucets, toilets, and dental unit water lines fitted with flow restrictors to reduce consumption.
- Greywater Recycling: Where feasible, wastewater from handwash sinks can be filtered and reused for toilet flushing.

2.4 Waste Management

- Segregated Waste Bins: For proper sorting of general, infectious, and sharp wastes in compliance with medical regulations.
- Sharps Disposal Units and Incinerator Access: Essential for hygienic and legal disposal of contaminated waste.
- Digital Communication: Reduces reliance on paper through electronic prescriptions, digital referrals, and online reporting.

3. *Landscape And Environmental Enhancement*

- Healing Gardens and Outdoor Waiting Spaces: Landscaped zones with shade trees, benches, and greenery provide a calming atmosphere for patients.
- Green Roof or Wall Options: Improve insulation and promote biodiversity in dense urban areas.
- Permeable Paving and Drainage Design: Enhances stormwater management and reduces surface runoff around the site.

4. *Cultural and Community Considerations*

- Accessible and Inclusive Design: Ramps, wide corridors, and signage to accommodate all users, including the elderly and physically challenged.
- Locally Sourced Materials: Use of indigenous materials for walls, ceilings, and finishes to promote local economy and reduce environmental impact.

- Community Engagement: Involving staff and community health workers during planning helps tailor design to real user needs, ensuring the clinic serves the population effectively.

CHAPTER THREE

3.0 CASE STUDY

A case study involves an up-close, in-depth, and detailed examination of a particular case or cases, within a real-world context. Case study research is to establish a firm research focus to which the research can refer over the course of a complex phenomenon or object.

Case study can be view as the study of an existing project for a reference purpose in order to determine adjustment point of that particular building. Case study research is to establish a firm research focus to which the research can refer over the course of a complex phenomenon or object.

According to researcher Robert K. Yin, defined case study method as an empirical inquiry that investigate a contemporary phenomenon within its real-life context,

3.1 OUTLINES OF THE CASE STUDIES

1. Optimist Dental Clinic Lagos State
2. Bozid Dental Clinic Ibadan Oyo State.
3. Emirate Dental Clinic Asa-Dam Ilorin Kwara

3.1.1CASE STUDY ONE (1): Optimist Dental Clinic Lagos State

Date of Establishment: 1966

Architect: Unknown

Location: Lagos State.

Brief Description:

Optimist Dental Clinic is a modern private dental facility located in Lagos State. It provides comprehensive dental services such as tooth extraction, cleaning, orthodontics, and X-rays. The clinic operates in a well-structured building that emphasizes hygiene and patient comfort.

Merits:

- Well-ventilated and air-conditioned rooms
- Modern dental equipment and technology
- Clean and welcoming reception area
- Well-zoned spaces (separate waiting, treatment, and sterilization areas)

Demerits:

- Limited parking space for patient
- High service cos
- Small waiting area during peak hours

LOCATION PLAN

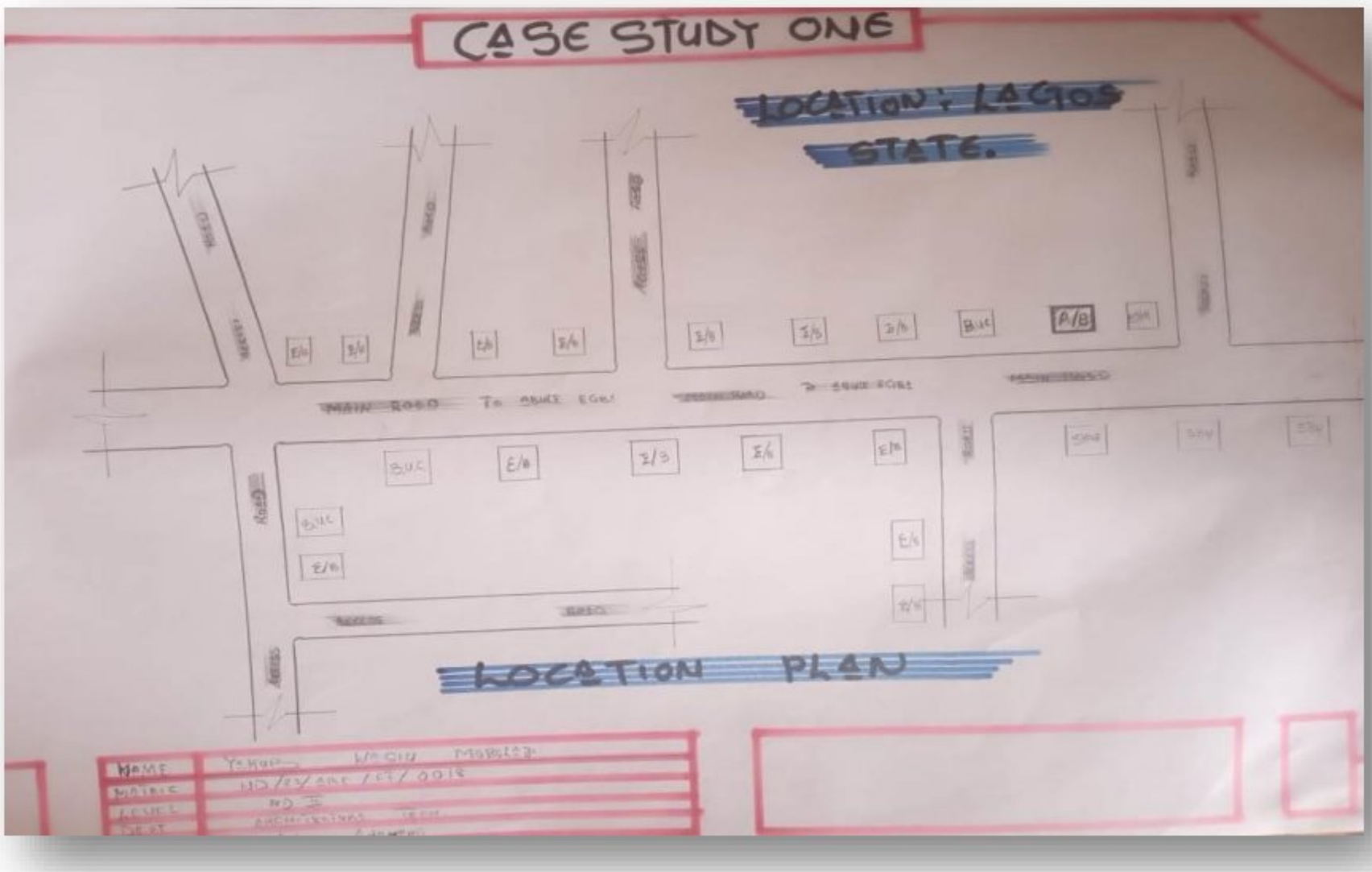

Figure 3:1:1 Location Plan

ROOF & FLOOR PLAN

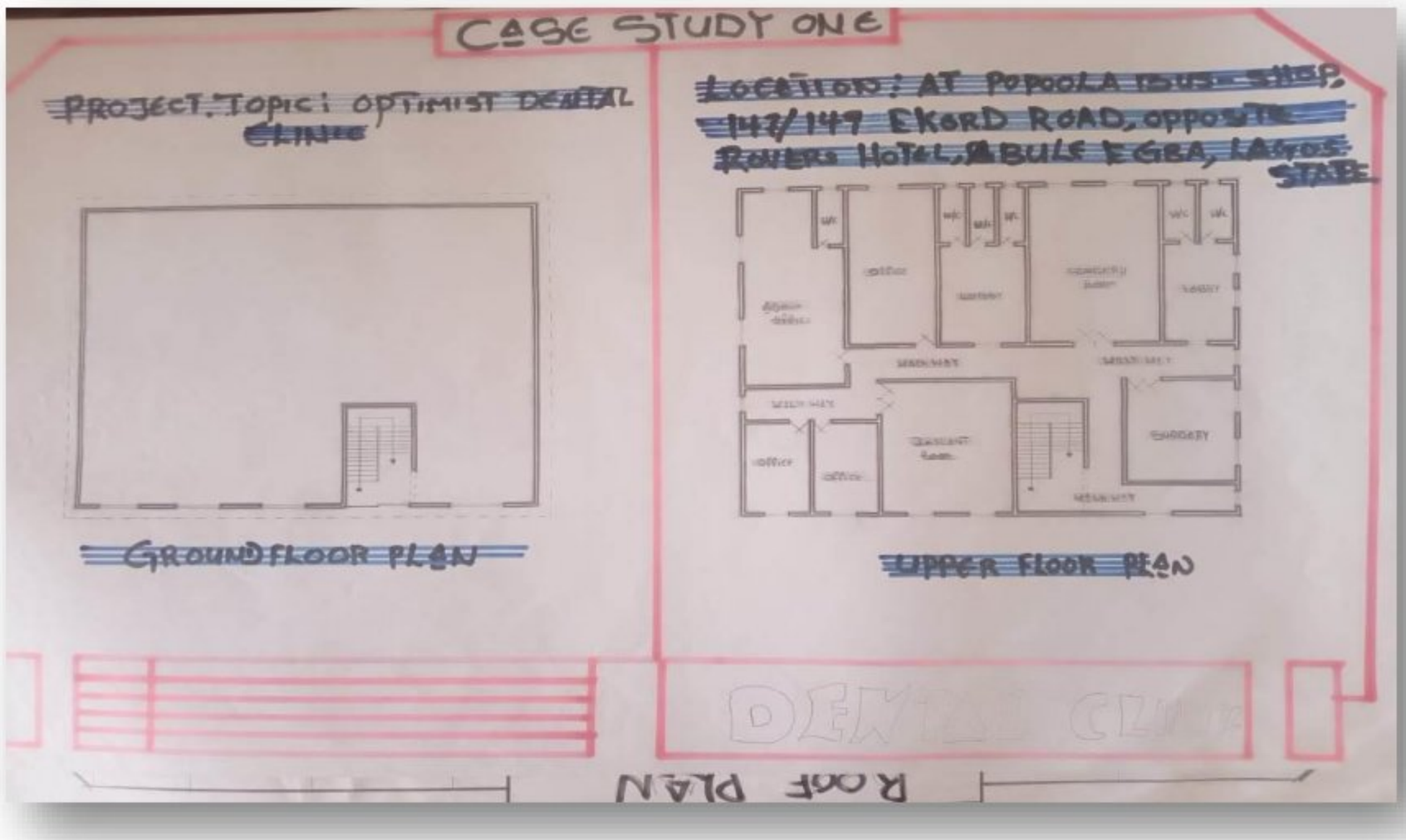

Figure 3:1.3 Roof & Floor Plan

PICTURES

Plate 3.1.2Elevation

Plate 3.1.3 Elevation

3.1.2 CASE STUDY TWO (2): Bozid Dental Clinic Ibadan Oyo State.

Date of Establishment:

Architect: Unknown

Location: Ibadan Lagos State.

Brief Description:

Bozid Dental Clinic is located in Ibadan and serves both private patients and referrals. The clinic offers general dental treatment and some specialized services. It operates from a converted residential building adapted for clinical use.

Merits

- Affordable treatment options
- Accessible location with public transport
- Friendly and professional staff

Demerits

- Poor internal layout due to conversion of residential structure
- Inadequate ventilation in some rooms
- Limited space for future expansion

LOCATION PLAN

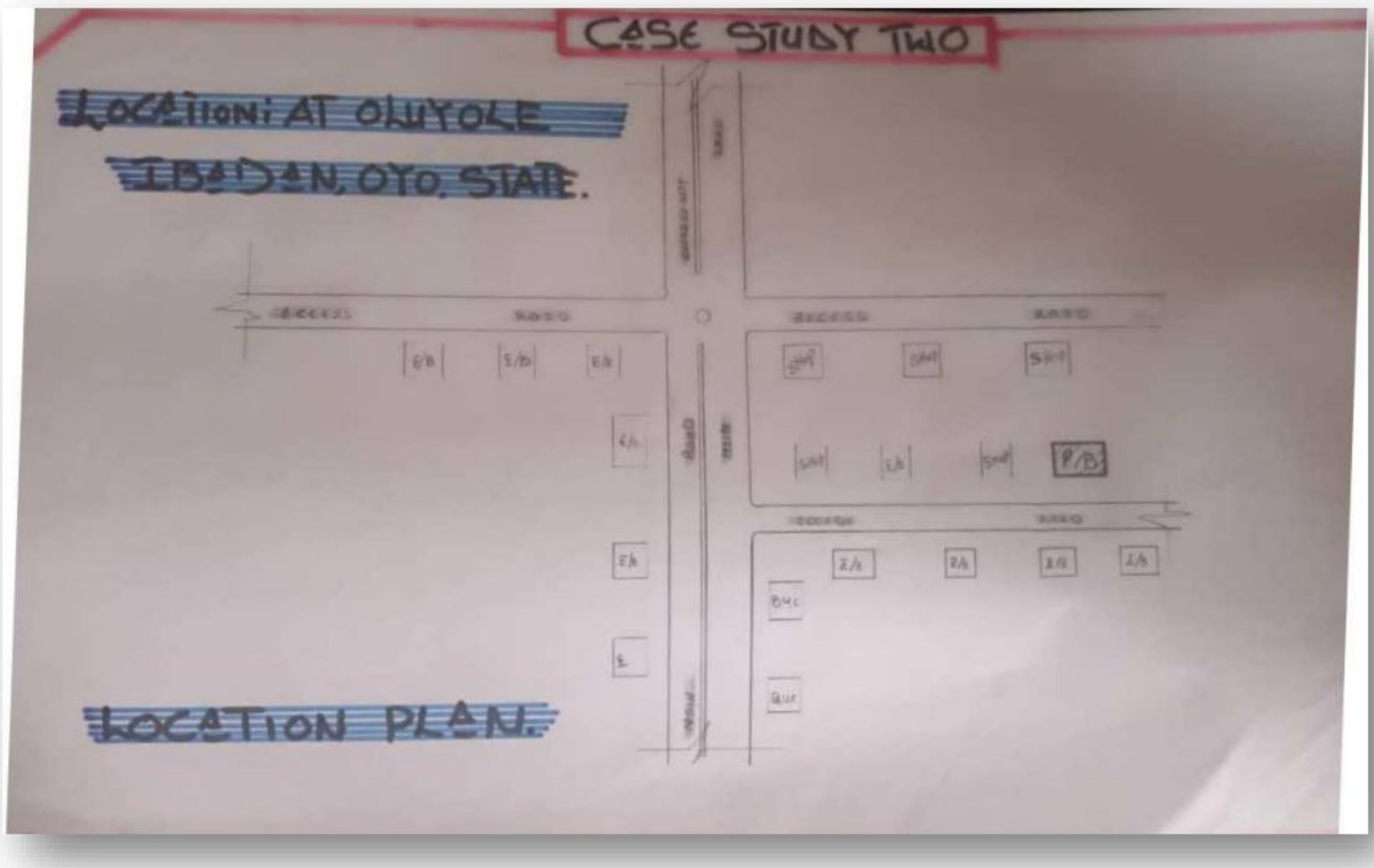

Figure 3.2.1 Location Plan

ROOF & FLOOR PLAN

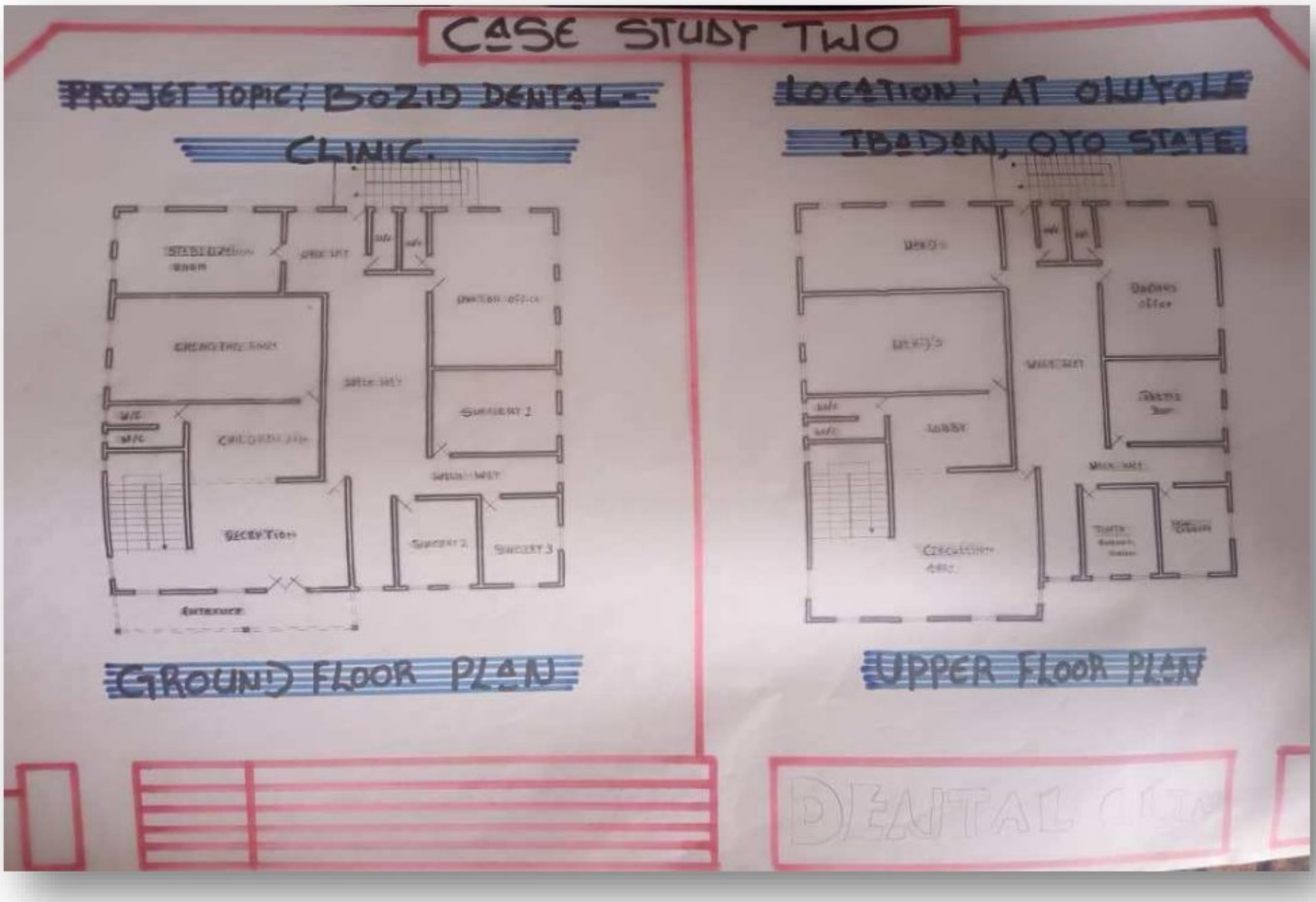

Figure 3.2.2 Roof & Floor Plans

PICTURES

Plate 3.2.2 Elevation

Plate 3.2.3 Elevation

3.1.3 CASE STUDY ONE (3): Emirate Dental Clinic – Ilorin, Kwara State

Date of Establishment:

Architect: Unknown

Location: Ilorin, Kwara State.

Brief Description:

Emirate Dental Clinic is a private dental center located in Ilorin. It provides basic dental care services such as scaling, filling, and extractions. It is popular for its affordability and its proximity to residential areas.

Merits:

- Affordable and community-friendly services
- Clean and well-maintained environment
- Easy access from surrounding neighborhoods

Demerits:

- Small treatment rooms with limited space
- Lack of advanced dental technology
- No dedicated staff lounge or sterilization zone

LOCATION PLAN

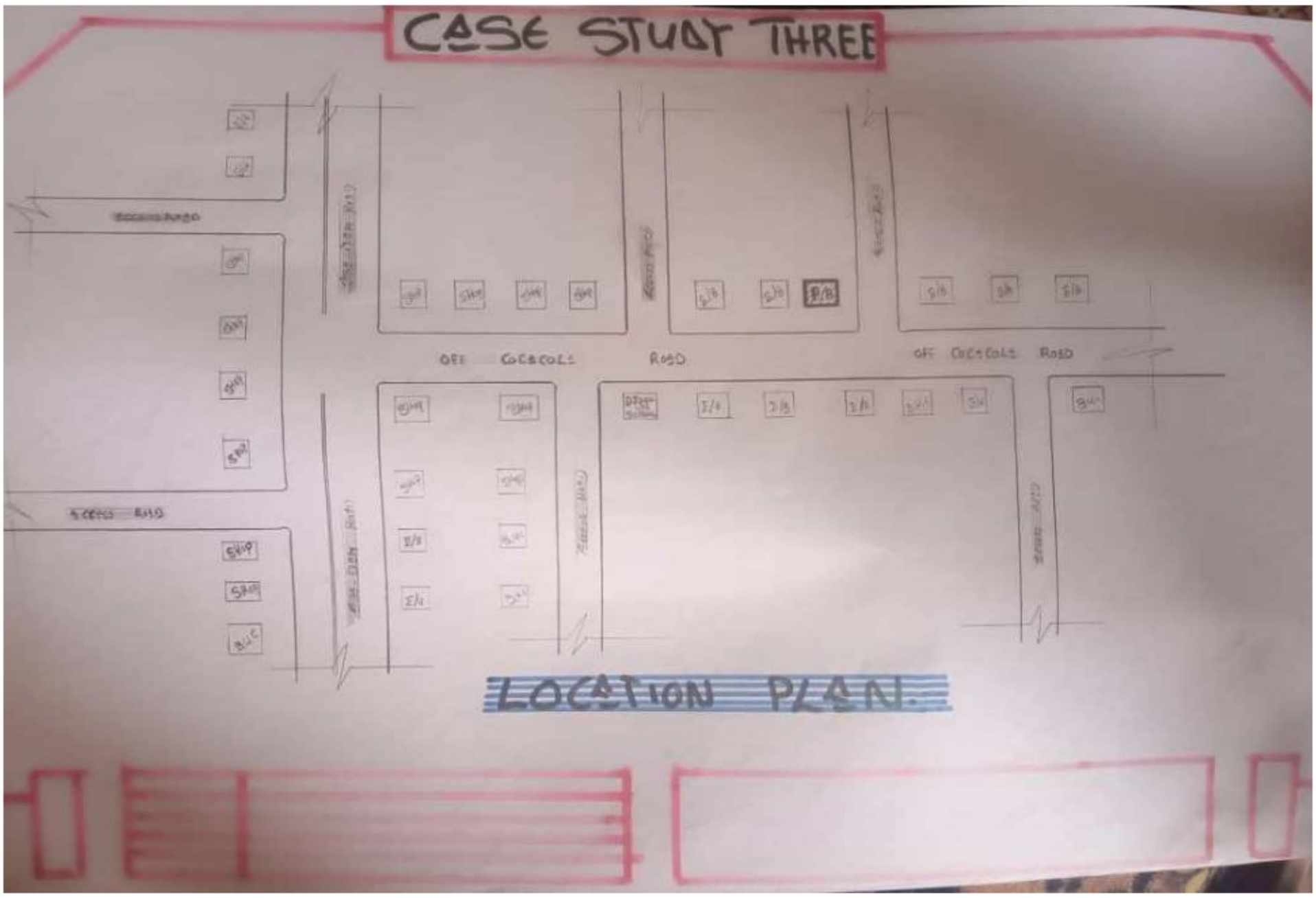

Figure 3.3.1 Location Plan

ROOF &FLOOR PLAN

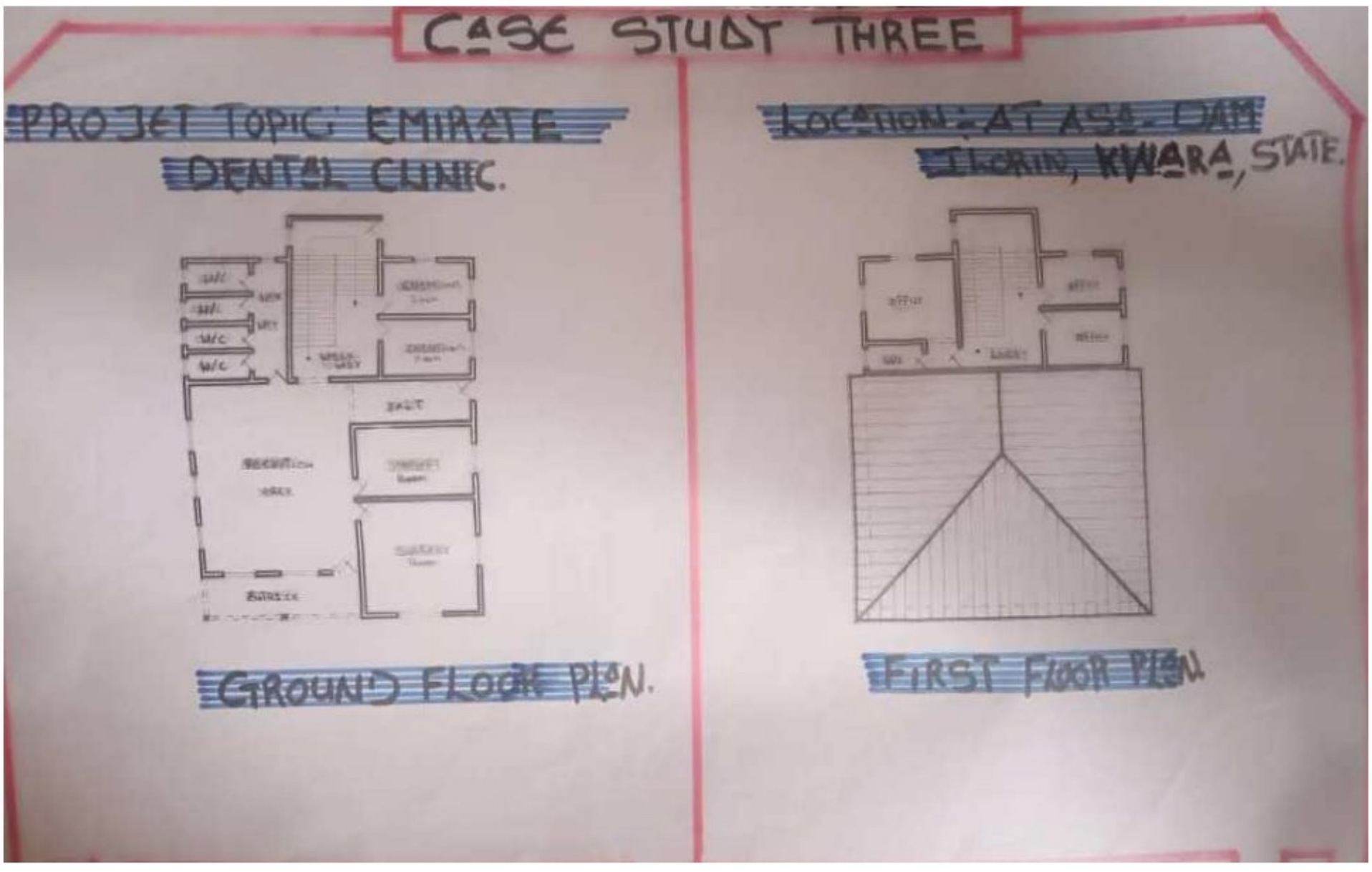

Figure 3.3.2 Roof & Floor Plan.

PICTURES

Plate 3.3.2 Elevation

Plate 3.3.3 Elevation

CHAPTER FOUR

4.1 ANALYTICAL STUDY OF THE PROJECT LOCATION

4.1.1 INTRODUCTION

Ilorin is one of 36 states of federal of republic of Nigeria. Ilorin, the capital city of Kwara State, Nigeria, is a city with a rich historical, cultural, and economic background. Ilorin was founded in 1450 and has a significant historical legacy as a prominent center in the Yoruba and Fulani empires.

Ilorin is a city with a rich historical heritage and cultural diversity, serving as an economic and educational hub in Kwara State. Its strategic location, coupled with ongoing development efforts, positions it as a key city in Nigeria's socio-economic landscape.

4.1.2 SITE LOCATION

This is very important point to be considered before establishing the setting of houses, should take advantage of topographical features speeds and directions should be studied to ensure the best orientation to take advantage of the prevailing wind.

Avoiding site prone to water logging and rain and draught which depends on wind direction and speed in the raining season placement of a building so that the length extends along the East and West direction.

The proposed project is sited at Sobi Road Akerebiata Ilorin, Kwara State. It is surrounded with built up environment with various commercial activities being taken up in the area.

Figure 4.1.11.2 Kwara State Map

Figure 4.1.11.1 Location Plan

4.1.3 SITE INVENTORY

Site analysis is the synthesis of the physical feature and facilities that are present on the site and over the site such as trees, footpath, soil, topography, vegetation, stream and shrubs etc.

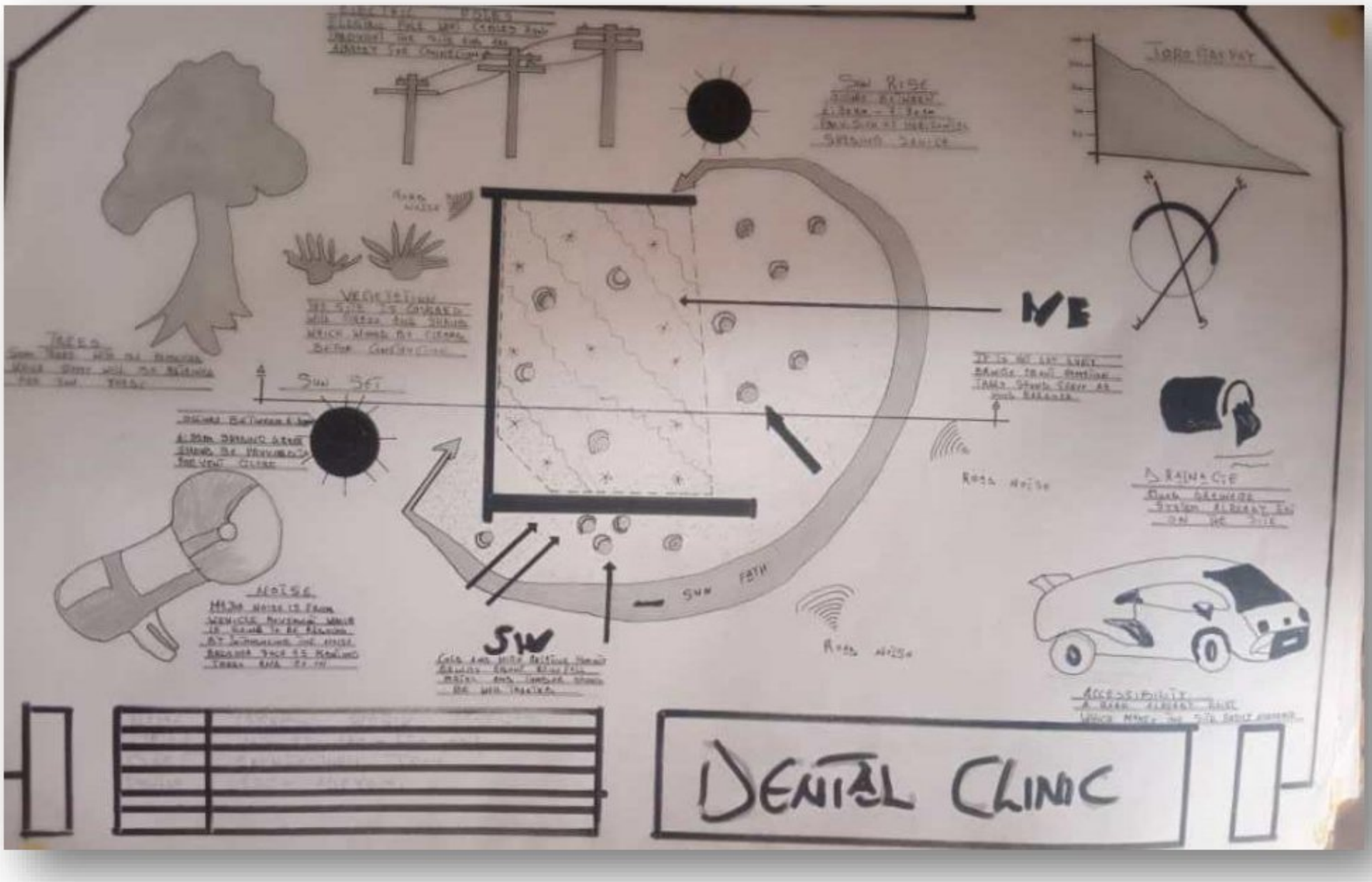

Figure 4.1.12.1 Site Inventory

4.1.4 SITE ANALYSIS

Site Analysis is the process of evaluating how a proposed site system will integrate with the existing site infrastructure by assessing physical obstructions, electrical interference, and noise to identify suitable interrogation zones for coexistence with the infrastructure.

The site selected for the project is a very gentle slope, it is a site that has never been used for any form of building construction i.e. it has not been developed in the past which make it an abode for several trees and shrubs, it is also observed during the course of inventory that some of the trees are to be removed as it could obstruct the construction process during the project, while some are to be retained to help control the adverse of the wind storm.

The soil is well compacted Soil in nature with good soil texture. The sun rises from the eastern part of the site and sets on the western part. The Construction does not need a special type of foundation due to the fact that the site is having a good bearing capacity and strength.

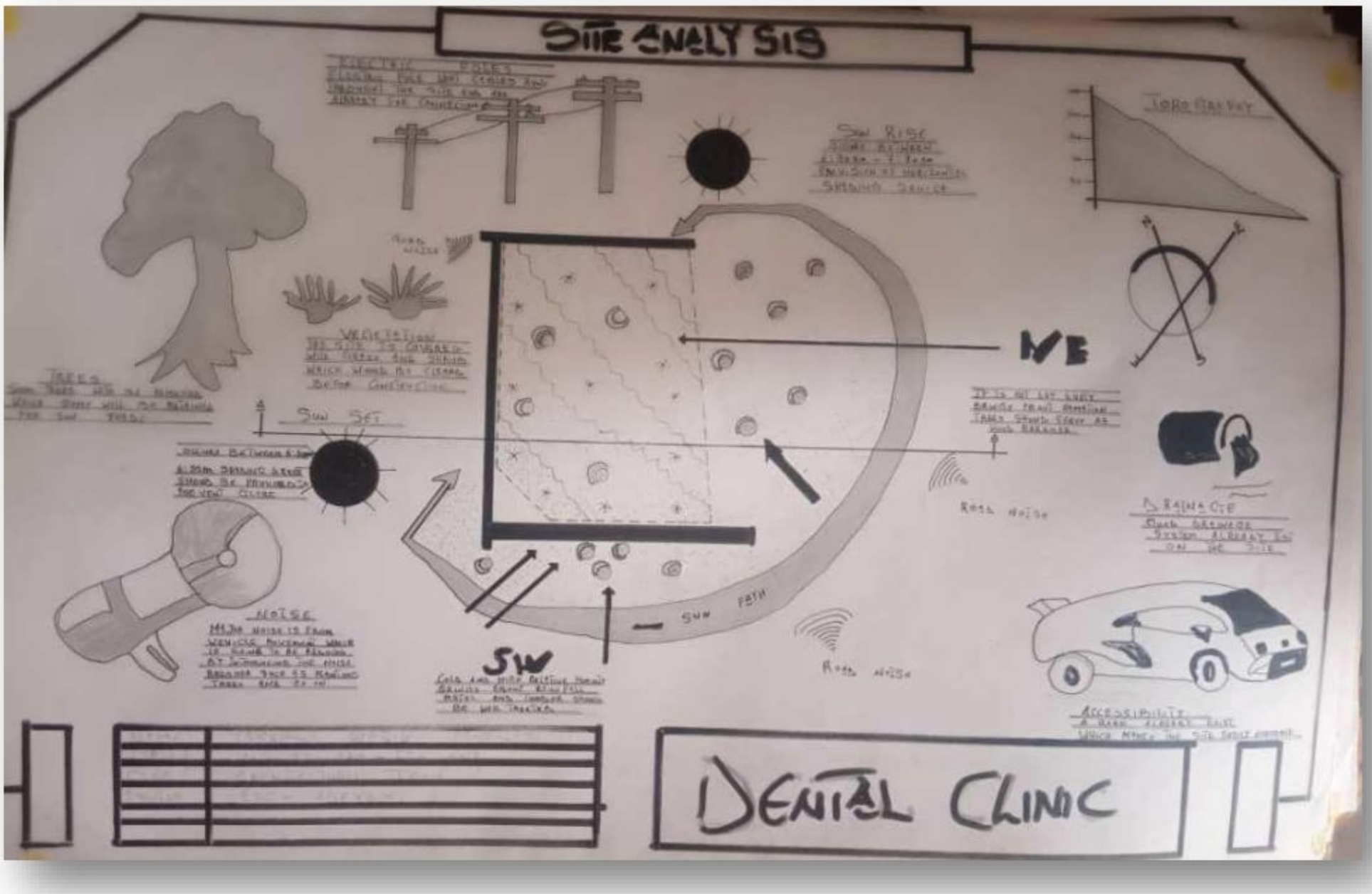

Figure 4.1.12.2 Site Analysis

4.1.5 GENERAL GEOGRAPHICAL CONDITION

Ilorin, the capital city of Kwara State, Nigeria, is characterized by specific geographical conditions that influence its climate, vegetation, and overall environmental features. Here's an overview of the general geographical conditions of Ilorin.

Ilorin is situated approximately at latitude 8.5°N and longitude 4.55°E. The city is positioned at an elevation of about 290 meters (951 feet) above sea level. Ilorin is centrally located in Nigeria, serving as a significant connection between the northern and southern parts of the country.

4.1.6 CLIMATE:

Tropical Savanna Climate: Ilorin experiences a tropical savanna climate (Aw according to the Köppen climate classification), characterized by distinct wet and dry seasons.

Temperature: Average temperatures in Ilorin range from 22°C (72°F) to 33°C (91°F). During the dry season, daytime temperatures can rise significantly, while nights are cooler, especially during Harmattan.

Rain Season: The wet season typically spans from April to October, with the heaviest rainfall occurring between June and September. Annual rainfall averages around 1,200 mm (47 inches).

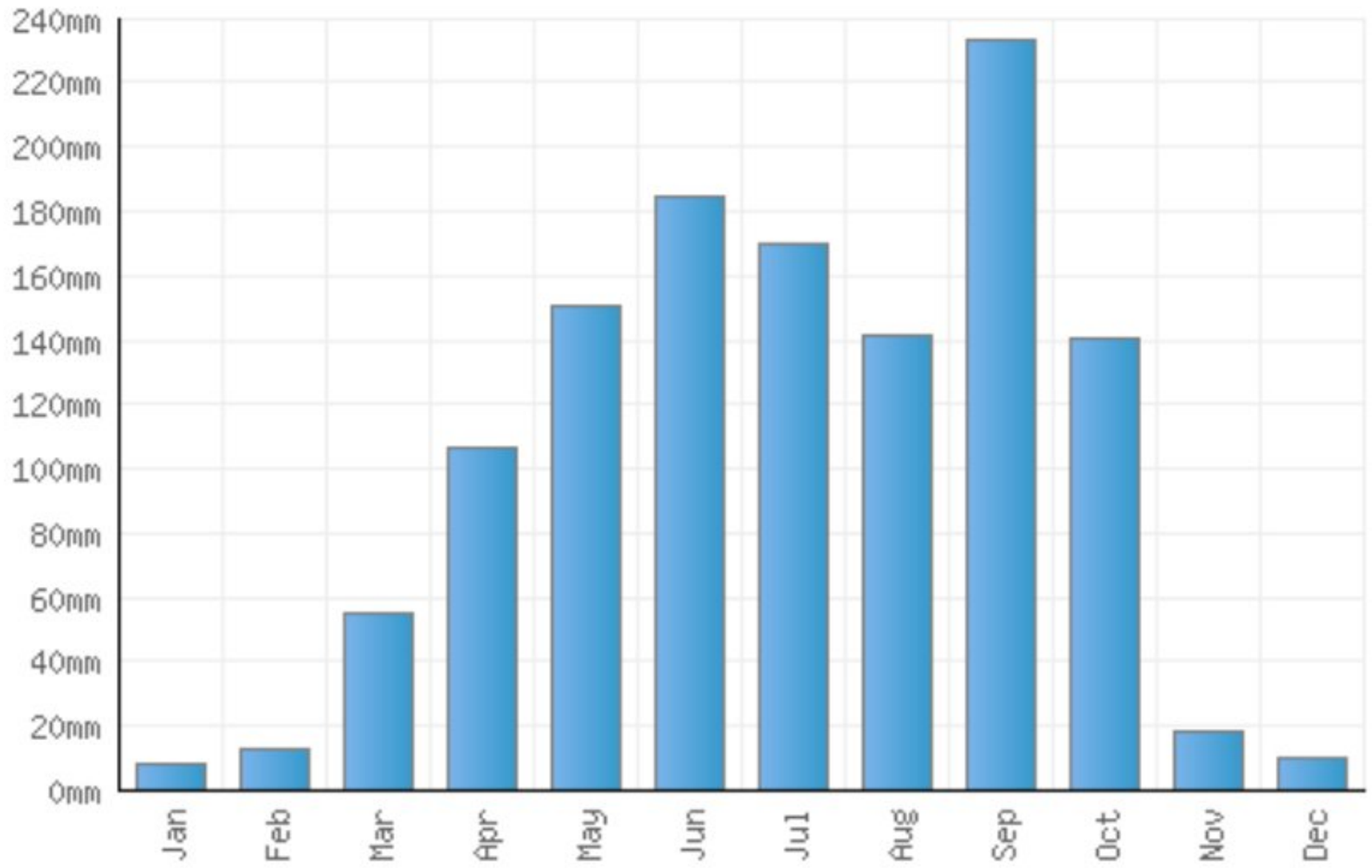

Figure 4.1.3.1 Average Monthly Rainfall in Ilorin.

Dry Season: The dry season lasts from November to March, marked by significantly lower humidity and occasional dust-laden winds from the Sahara Desert, known as Harmattan.

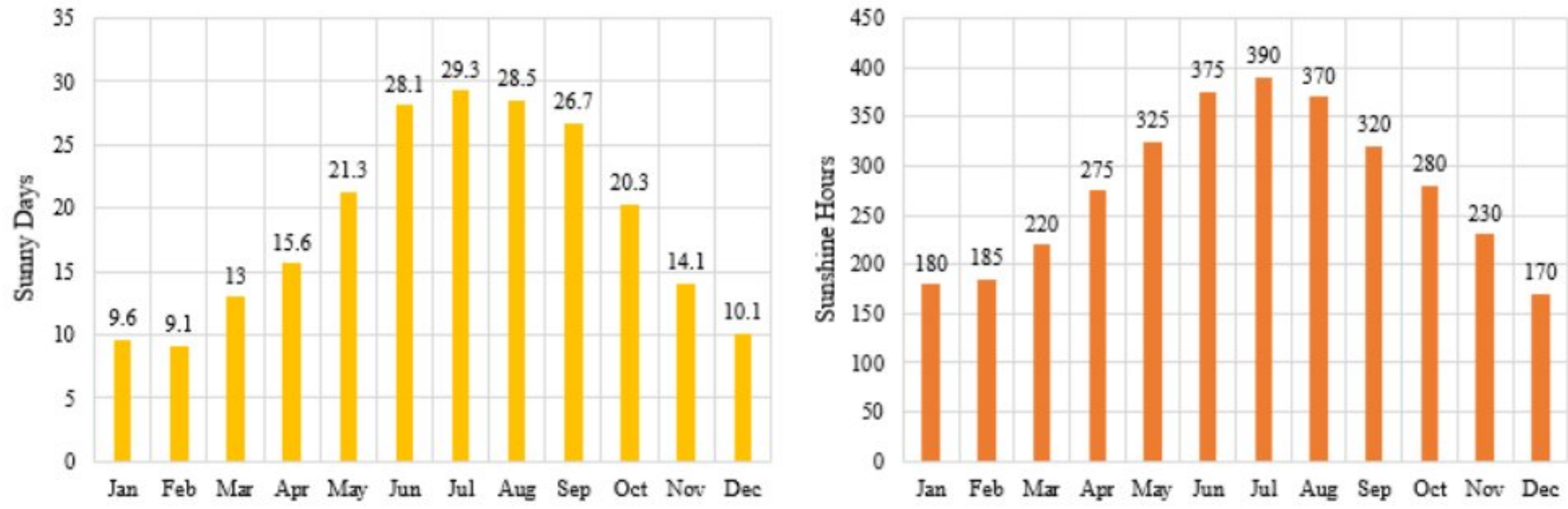

Figure 4.1.3.2 Sunshine Duration in Ilorin.

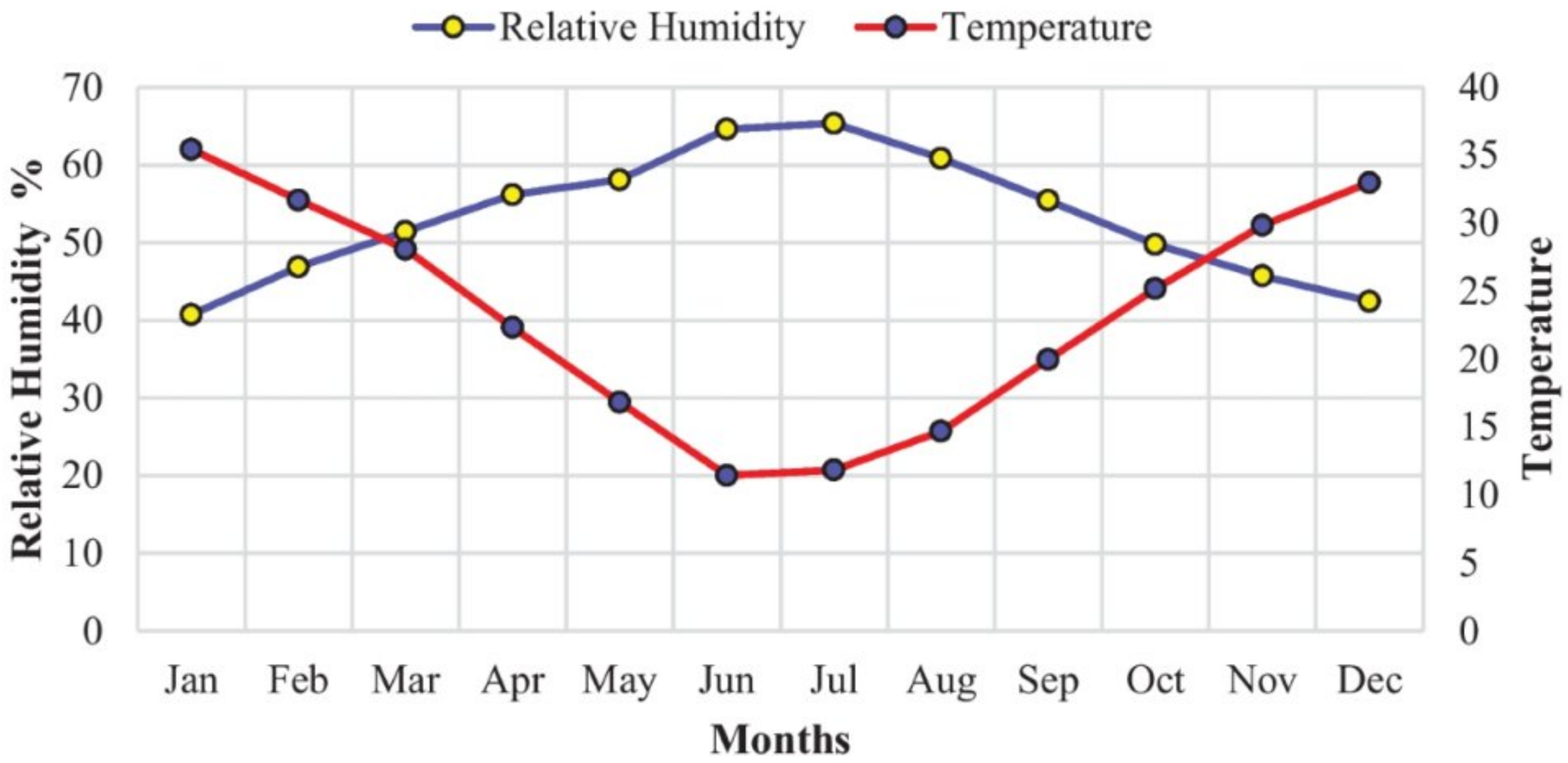

Figure 4.1.3.3 Relative Humidity in Ilorin.

4.1.7 VEGETATION

Guinea Savanna: The predominant vegetation type in Ilorin is the Guinea Savanna, characterized by a mix of grassland and scattered trees. This vegetation type is typical of the transitional zone between the forest regions in the south and the Sahel in the north.

Flora: Common plant species include acacia, baobab, shea butter trees, and various grasses and shrubs adapted to the savanna climate.

4.1.8 TOPOGRAPHY

Gently Undulating Plains: Ilorin's topography consists mainly of gently undulating plains, with occasional hills and low-lying areas.

4.1.9 NATURAL RESOURCES

Mineral Resources: Kwara State, including Ilorin, is endowed with various mineral resources such as limestone, gold, and kaolin. These resources offer potential for mining and related industries.

4.1.10 ENVIRONMENTAL CHALLENGES

Urbanization: Rapid urbanization in Ilorin has led to challenges such as deforestation, waste management issues, and pressure on infrastructure and services.

Climate Change: Like many regions, Ilorin faces the impacts of climate change, including variability in rainfall patterns and increased frequency of extreme weather even.

4.1.11 SITE SERVICES

There are good services around the site, which include good access road, for people coming to Dental Clinic, availability of electricity very close to the site which will be useful before and after construction. Also, availability of pipe born water at the chosen site.

4.1.12 SITE UNIQUENESS AND BENEFIT

- The site is accessible
- Natural factor like, is very useful
- Utility services such as water, electricity, telephone, etc. cause no problem to the inhabitants.

4.1.13 SITE SUITABILITY

The appropriateness or suitability of the site for the construction and planning of the proposed project is based on the fact that is possesses and meets the entire requirements. All the existing features were strictly considered with the intension of making advantage of them to maximum level most especially the geographical, topographical features of the site.

Types Of Forest Region

- Mangrove (Salt Quarter) Swamp Forest
- Fresh water swamp forest
- High forest

4.2. DESIGN CRITERIA

Planning is an important activity which determines the success of any endeavor. It is often said that without plans, purposes are frustrated, planning is the first and most important steps in designing a Dental Clinic, so as to achieve aims of designing and the criteria's and should be take into consideration.

4.2.1 SITE SELECTION

A number of factors necessary for site selection for a farmstead are outlined below:

- Access Road
- Water
- Utilizes and services (electricity, telephone, access drives etc.)

- Orientation (air drainage and maximum sunshine may require orientation on a gentle Southerly slope).
- Expansion.

4.2.2 BUILDING ARRANGEMENT

The arrangement of facilities for maximum efficiency of operation should be a prime concern. Proper arrangement increase efficiency by reducing walking distance to a minimum and providing adequate drive ways and turn around. It is important to note that five protections, safely and security and all influenced by the design planning.

4.2.3 DESIGN SCOPE

These are scope of designing a Dental Clinic which includes the followings;

Security House, Main Building, Mosque, Generator House, Park Lots.

4.2.4 DESIGN BRIEF9ANALYSIS

Entrance, Reception and Card Room, Waiting Area, Pharmacy, Therapy, Nurse Station, Dentist Office, Laboratory, Surgery Room, Recovery Room, Cosmetic, X-ray, Sterilization, Conference Room, Changing Room, Storage, Toilet, Exit.

4.2.5 SPACES DERIVATION ANALYSIS/SCHEDULE FOR ADMINBLOCK

S/N	SPACE	UNIT	LENGTH (M)	BREADTH (M)	AREA (M^2)
1.	Main Entrance	1	2.700mm	6.000mm	16,200,000m^2
2.	Reception Area	1	5.500mm	6.000mm	33,000,000m^2
3.	Card Room	1	2.600mm	3.000mm	7,900,000m^2
4.	Casher Area	2	2.600mm	2.200mm	5,720,000m^2
5.	Consultation Room	1	4.200mm	3.000mm	15,120,000m^2
6.	Pharmacy	2	2.900mm	3.600mm	21,240,000m^2
7.	Drug Room	2	3.000mm	5.200mm	15,600,000m^2
8.	Laboratory Room	1	4.200mm	3.600mm	15,120,000m^2
9.	Sterilization Area	1	4.200mm	3.600mm	15,120,000m^2
10.	Surgery Room	2	4.200mm	3.600mm	15,120,000m^2
11.	Recovery Room	2	4.200mm	3.600mm	15,120,000m^2
12.	Recover Room	1	5.200mm	3.000mm	15,120,000m^2
13.	Office	1	4.200mm	3.300mm	13,860,000m^2
14.	Office	3	3.000mm	3.900mm	11,700,000m^2
15.	Nurse Desk	3	4.200mm	4.000mm	16,800,000m^2
16.	X-Ray	2	5.800mm	3.00mm	17,400,000m^2
17.	Laundry Janitor	2	4.200mm	5.000mm	21,000,000m^2
18.	Staff Room	1	4.200mm	5.300mm	28,260,000m^2
19.	Toilet	1	2.900mm	1.200mm	3,360,000m^2
20.	Exit	1	900mm	1.200mm	1,080,000m^2

Table 4.2.5: Space Allocation

4.2.6 FUCTIONAL ANALYSIS AND RELATIONSHIP

The Main Building plan is well function, the unit are so well related to each other,

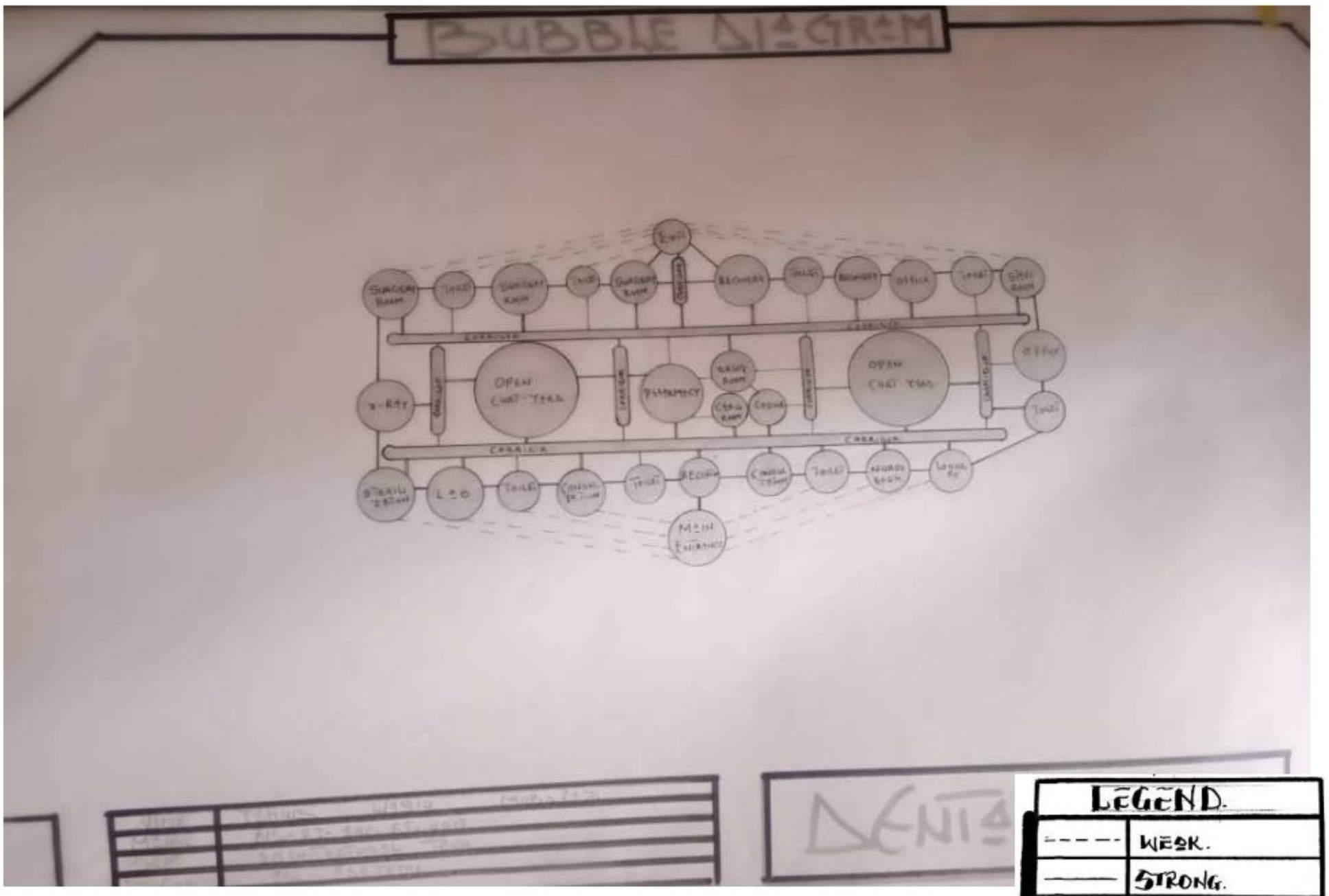

Figure 4.2.6.1: Bubble Diagram

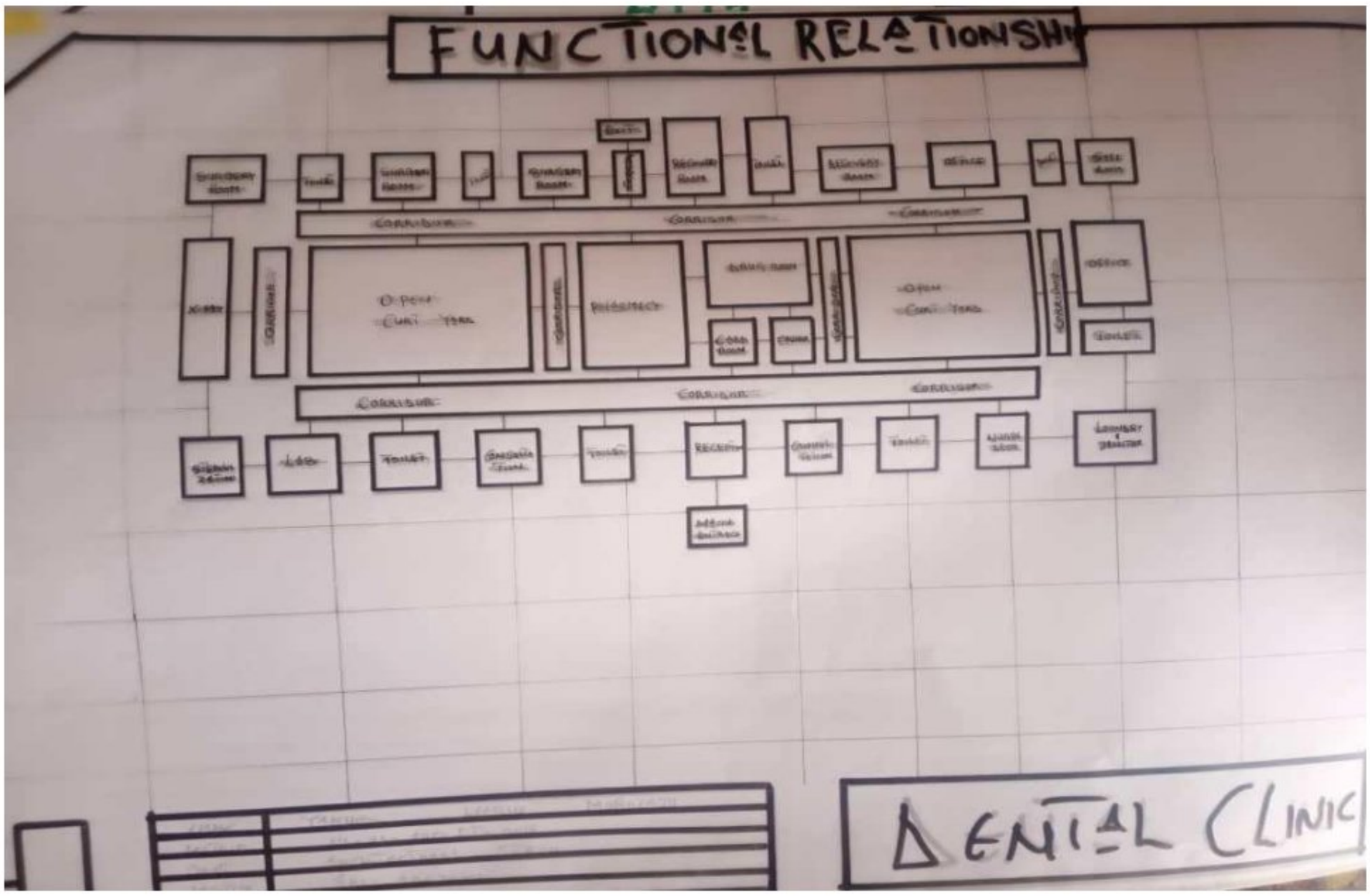

Figure 4.2.6.3: Functional Relationship

CHAPTER FIVE

5.1 APPRAISAL OF PROPOSED SCHEME

The proposed Project is to satisfy the appropriate building regulations. The design is to confirm the aid intended use of building taking into consideration with both natural factors and human factors that earn us a threat on the validity and stability of the building.

5.2 CONSTRUCTION METHODOLOGY AND MATERIALS.

The construction is to be carried out following the due process of construction ranging from:

- Preliminary: This involves the clearing of the site, setting out and excavation of foundation trench and foundation works.
- Sub-Structure: This process also entails the positioning and erection of Columns and beans, masonry works etc.
- Post Structure Stage: Is the stage which has to do with the application and installation of the paints, tiles, other finishes and construction of external works etc.

5.21MATERIALS FOR CONSTRUCTION

1. Sustainable and Eco-Friendly Materials
   - Bamboo and Timber: Renewable and low-carbon materials, suitable for non-structural interior elements like ceiling finishes and decorative wall panels.

- Recycled Materials: Recycled steel, glass, and concrete will be considered to minimize environmental impact.
- Insulating Materials: Eco-friendly insulation such as cellulose or sheep wool may be used in walls and ceilings to enhance indoor thermal comfort.

2. Traditional and Cultural Materials
   - Clay and Adobe: Where applicable, these can be used in landscaping features or accent walls, reflecting cultural identity and promoting thermal comfort in hot climates.
   - Stone: Locally sourced stone may be used for external cladding, boundary walls, or pathways to reflect cultural relevance and add durability.
   - Tiles and Ceramics: Geometric ceramic tiles with Islamic patterns can be applied in interior decor, particularly in waiting areas, ablution spaces, and reception zones, for both aesthetic and cultural expression.
3. Modern Materials
   - Concrete: Reinforced concrete will be used for the main structural framework—foundations, slabs, beams, and columns—for strength and longevity.
   - Steel: Steel will be used for reinforcement and roof framing, offering structural reliability and adaptability.
   - Glass: Aluminum-framed windows with glazed panels will allow natural lighting while maintaining privacy and energy efficiency. Double-glazed options may be used in specific zones to enhance insulation and sound control.

5.2.2 CONSTRUCTION METHODOLOGIES

1. Green Building Practices
   - Passive Solar Design: The clinic is oriented to take advantage of natural sunlight and ventilation, reducing reliance on artificial lighting and cooling systems.
   - Green Elements: Landscaping around the building and potential use of green wall features will enhance the environment, support insulation, and promote healing.
   - Rainwater Harvesting: A system will be integrated to collect and reuse rainwater for landscaping and cleaning purposes, minimizing water waste.
2. Energy-Efficient Construction
   - Thermal Insulation: High-performance insulation materials will be used in walls and roofing to reduce indoor temperature fluctuations and improve energy efficiency.
   - LED Lighting: The building will utilize LED lighting for all spaces, ensuring long-term energy savings and low maintenance.

- Solar Energy: Solar panels may be installed to power essential services like lighting and ventilation, reducing dependency on grid electricity.

3. Cultural and Functional Considerations

- Building Orientation: The layout ensures proper orientation of designated prayer spaces towards Mecca, respecting religious needs.
- Islamic Architectural Features: The design may incorporate subtle Islamic elements such as arches, patterned screens, and courtyards, enhancing both identity and aesthetics.
- Community Engagement: Input from local stakeholders, healthcare workers, and community members will be considered to ensure the facility reflects cultural expectations and serves practical healthcare needs

5.2.1 SERVICE

A building can be said to be good when it performs the service required by it. In order to have well-functioning building. There calls for an installation of underground water pipes in other to provide water to all the restrooms and other necessary units in the building. A borehole system of water supply is to be adopted alongside the government supplied services and a storage facility is to be provided for effective management of water supply.

5.2.2 CIRCULATION

As a healthcare facility designed to serve a significant number of patients and staff daily, effective circulation within the proposed dental clinic is essential. The layout has been carefully planned to ensure smooth movement, reduce congestion, and maintain privacy where necessary.

The building is a single-story structure, making navigation easier and more accessible for all users, including the elderly and physically challenged. Public areas such as the reception, waiting area, and consultation rooms are positioned near the main entrance for easy access, while more private zones like treatment rooms, sterilization units, and staff offices are strategically placed to limit unnecessary traffic.

Clear separation between public, semi-public, and private spaces ensures a logical flow and enhances both functionality and hygiene control within the clinic.

5.2.3 VENTILATION

As it relates to architecture, is the intentional introduction of outside air into a space. It is mainly used to control indoor air quality by diluting and displacing indoor pollutants. It can also be used for purpose of thermal comfort of dehumidification when the introduction of outside air will help to achieve desired indoor psychometric condition.

This could be either mechanical or natural ventilation. As a regard the proposed project design, there is an introduction of a very spacious courtyard in other to make cross ventilation in most of the building units. There should also a provision of wide passage to allow free movement of air, patient and materials. Artificial ventilation is also provided through the installation of air conditioning system and fans.

5.2.4 LIGHTING

The dental clinic is designed to make use of both natural and artificial lighting. Large windows allow natural light into waiting and consultation areas, creating a calm and energy-efficient environment. Artificial lighting, using LED fixtures, is provided in all spaces—especially treatment rooms—ensuring clear visibility, safety, and compliance with healthcare standards.

5.2.5 PLUMBING

The plumbing system in this proposed building is made easy since the building has a courtyard. Water drained pipes are to be installed underground right from the courtyard to the soak away in other to discharge rainwater.

All water or sewage from the toilets are also channeled into their various inspection chambers using good and appropriate diameter PVC pipes, and taken from the inspection chamber to septic tank and soak away pit.

Rain water is also collected from gutter if the roof using 100mm diameter PVC rain water pipes and channeled into various drainage or soak away pits. There shall be no ponding; the size of any channel shall effectively discharge rain and water without causing any over lowing stagnation and mosquito breeding. All rain water channeled shall be laid to fall and shall not cause any pounding or splashing unto the committers neighboring area.

5.2.6 ELECTRICAL INSTALLATION

The type of wiring system chosen should be full conduit system of wiring. Office and other operation areas should be wired with strong, durable and light current resistance cable

because of the careless operate by the students. Also, electrical installation is to be done to allow for the use of quality electrical fittings and fixtures in the whole building.

5.2.7 WASTE DISPOSAL

Waste disposal bins are to put every office of the building and also in some specific necessary area. These water bins should dispose in the incinerator which will be provided within the compound of the station. The waste should therefore be burnt in the incinerator.

5.2.8 FIRE PROTECTION

Electrically, fire alarms and sensors are to be installed in the Dental Building. This should be done in case of fire occurrence; fire extinguisher is to be placed at certain distances in the cobbles and some other necessary area. It is also serving as protector in case of fire.

5.2.9 EXTERNAL WORKS

The external works are to be carned out uncrate Krebs laid and shrubs, flowers grasses and trees planted.

Concrete interlocking tiles to be adopted of hard landscape and parking spaces both for visitors and staffs have been provided on the site.

5.3 CONCLUSION AND RECOMMENDATION

Conclusion

This project was undertaken to design a modern, functional, and sustainable dental clinic that meets the needs of patients and dental professionals alike. Through critical literature review, site analysis, and case study exploration, the design addressed challenges such as poor spatial organization, lack of comfort, infection control, and operational inefficiencies common in existing clinics.

The proposed clinic achieves clear spatial zoning, ease of movement, natural lighting, and integration of technology to enhance service delivery and patient experience. Environmental considerations such as passive ventilation, daylighting, and noise control were embedded in the design. In addition, attention was given to hygiene, accessibility, and regulatory compliance—core requirements for any healthcare facility.

Ultimately, this design proposal represents an academic contribution toward improving healthcare architecture in Nigeria, especially in the area of dental care delivery.

Recommendation

Based on the findings and experiences throughout this project, the following recommendations are made:

- Future dental clinics should be purpose-built with architectural input from the earliest planning stage, rather than converting residential spaces.
- Architects and health professionals should collaborate closely to ensure functional efficiency and regulatory compliance in design.
- Universal accessibility features (e.g., ramps, handrails, signage) must be included as standard in all healthcare facilities.
- Sustainable design strategies should be applied to reduce energy consumption and long-term maintenance costs.
- Further research should be done on the psychological effect of spatial design on dental patients, especially children and people with dental anxiety.
- Government and private developers should invest more in the modernization and expansion of oral healthcare infrastructure across Nigeria.

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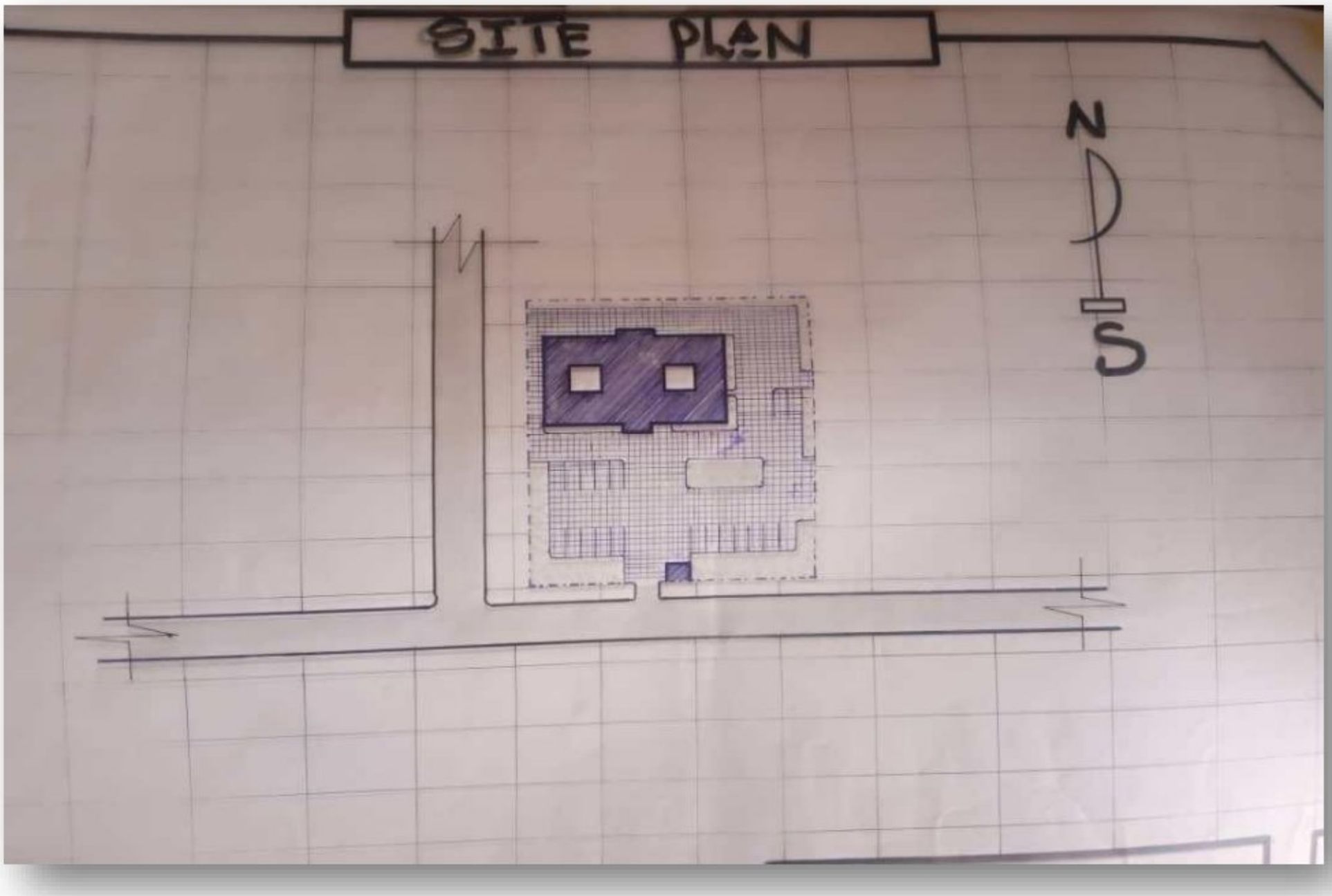
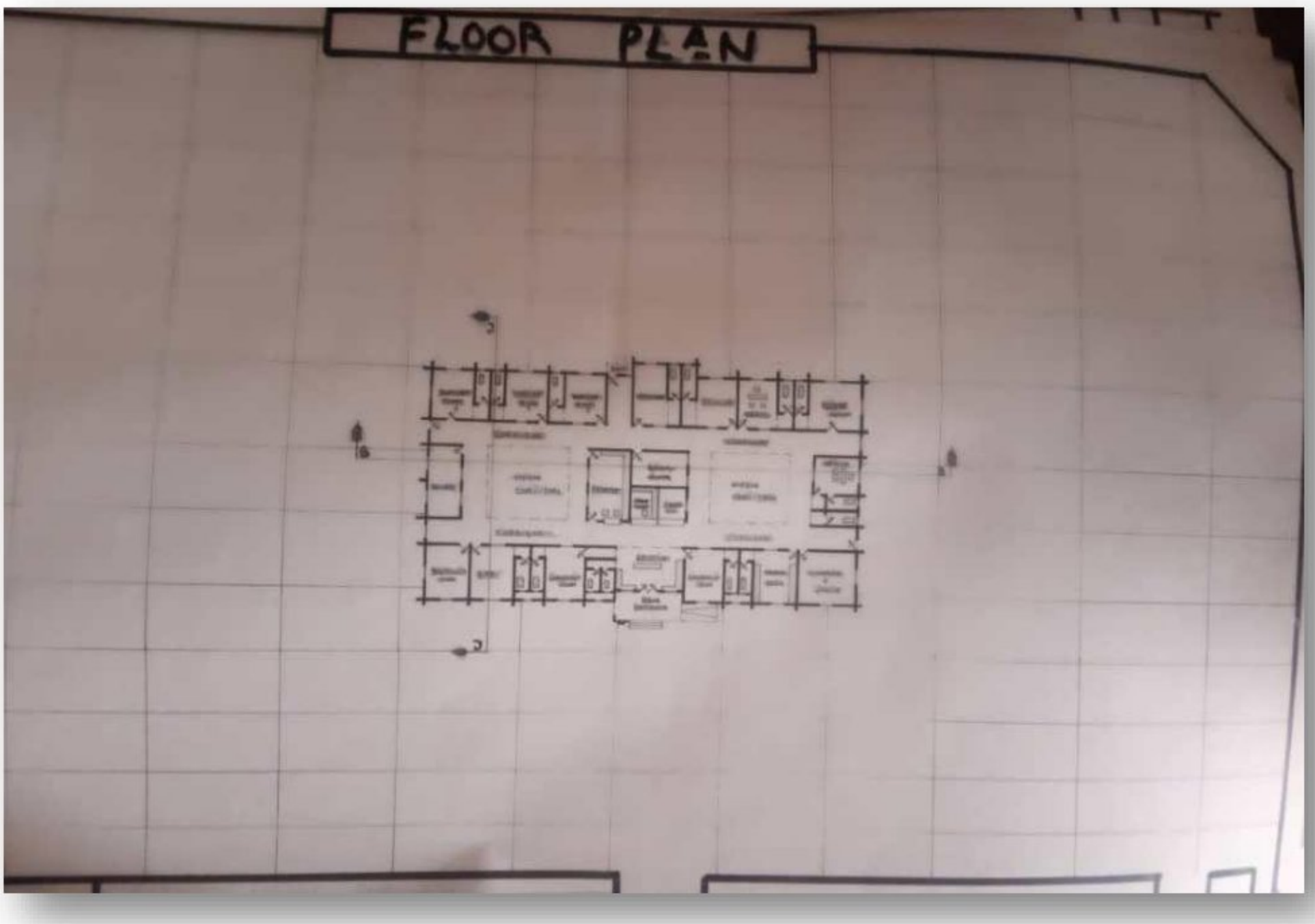
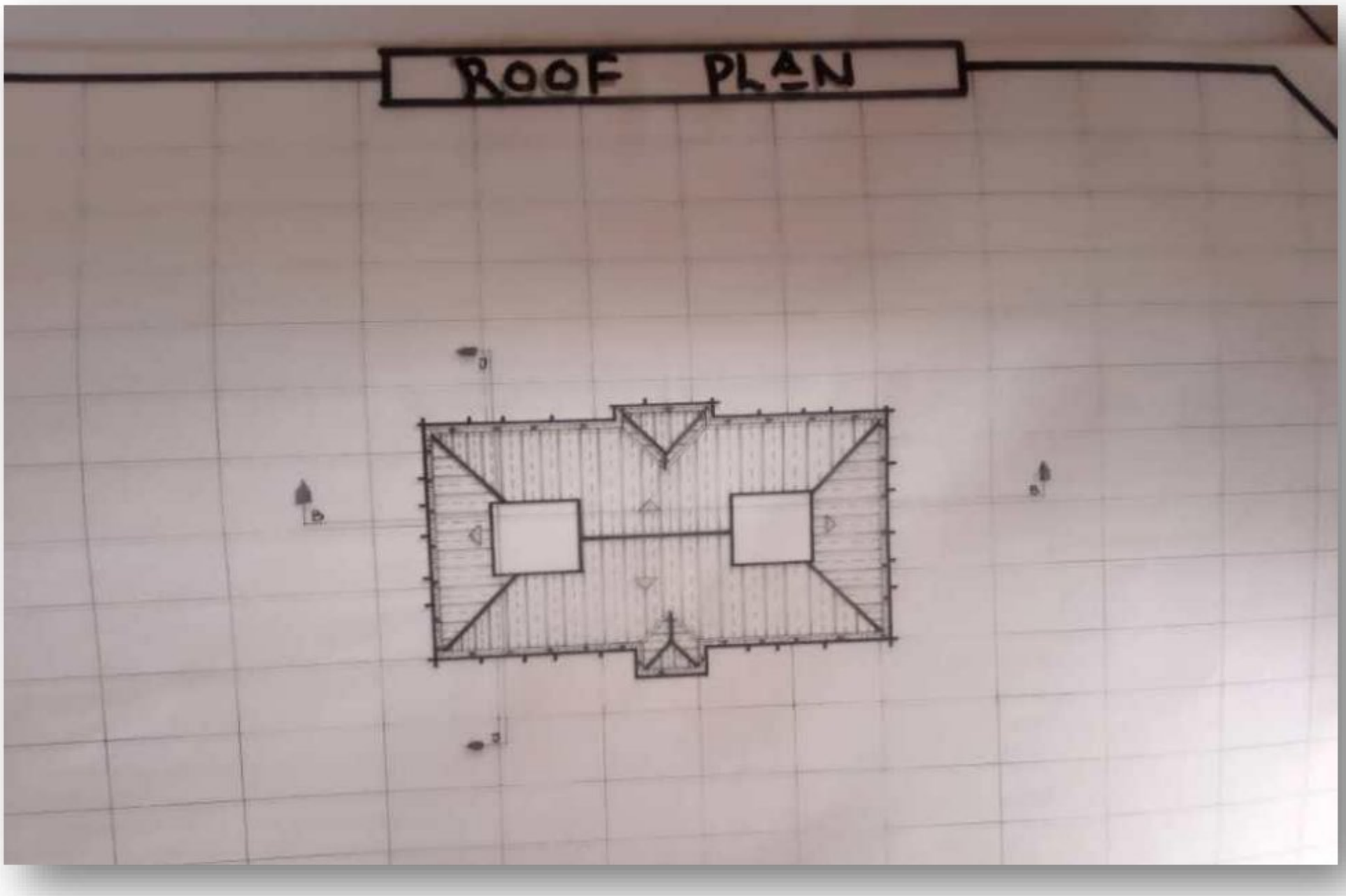


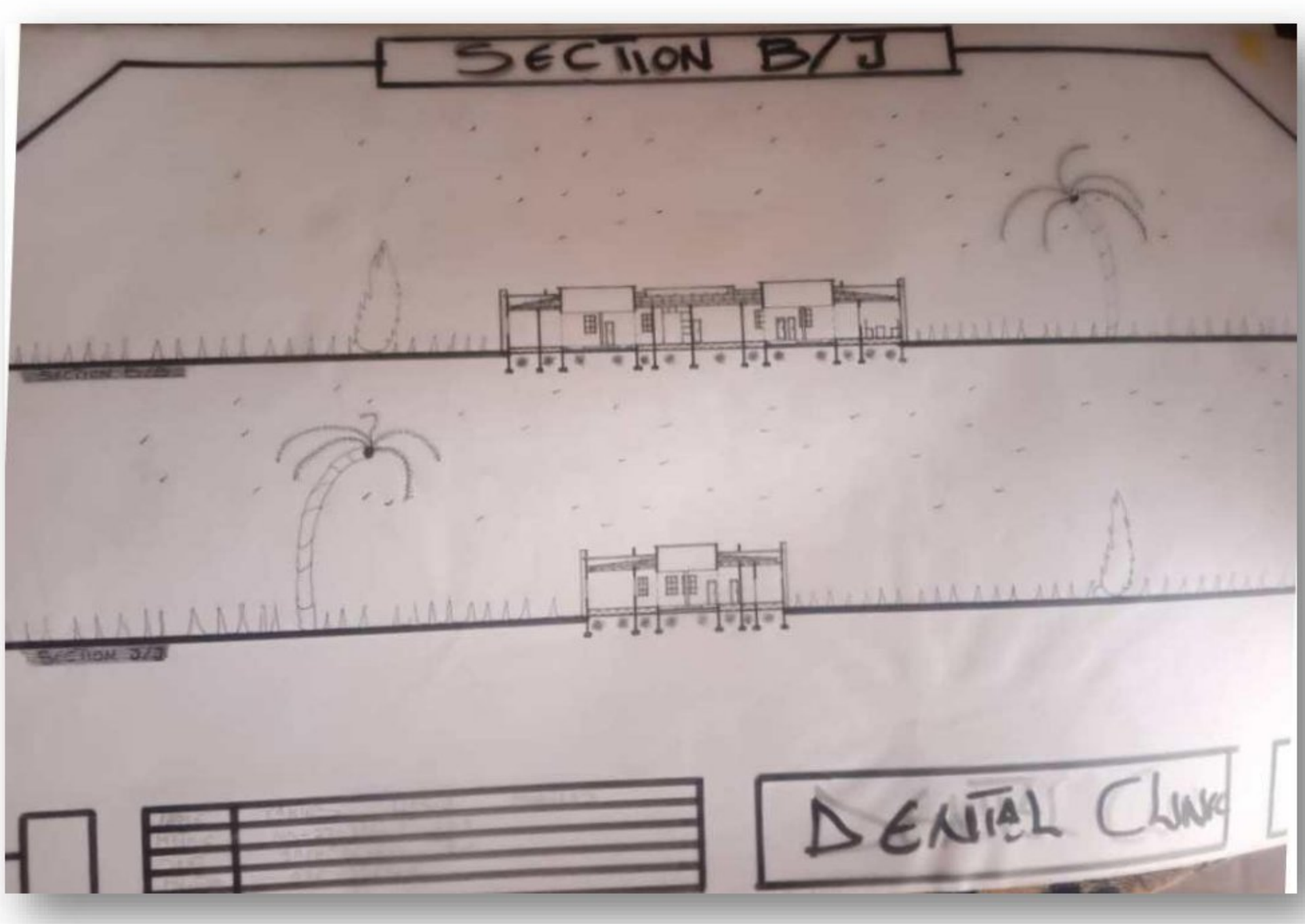
Appendix 5.1: Site Plan



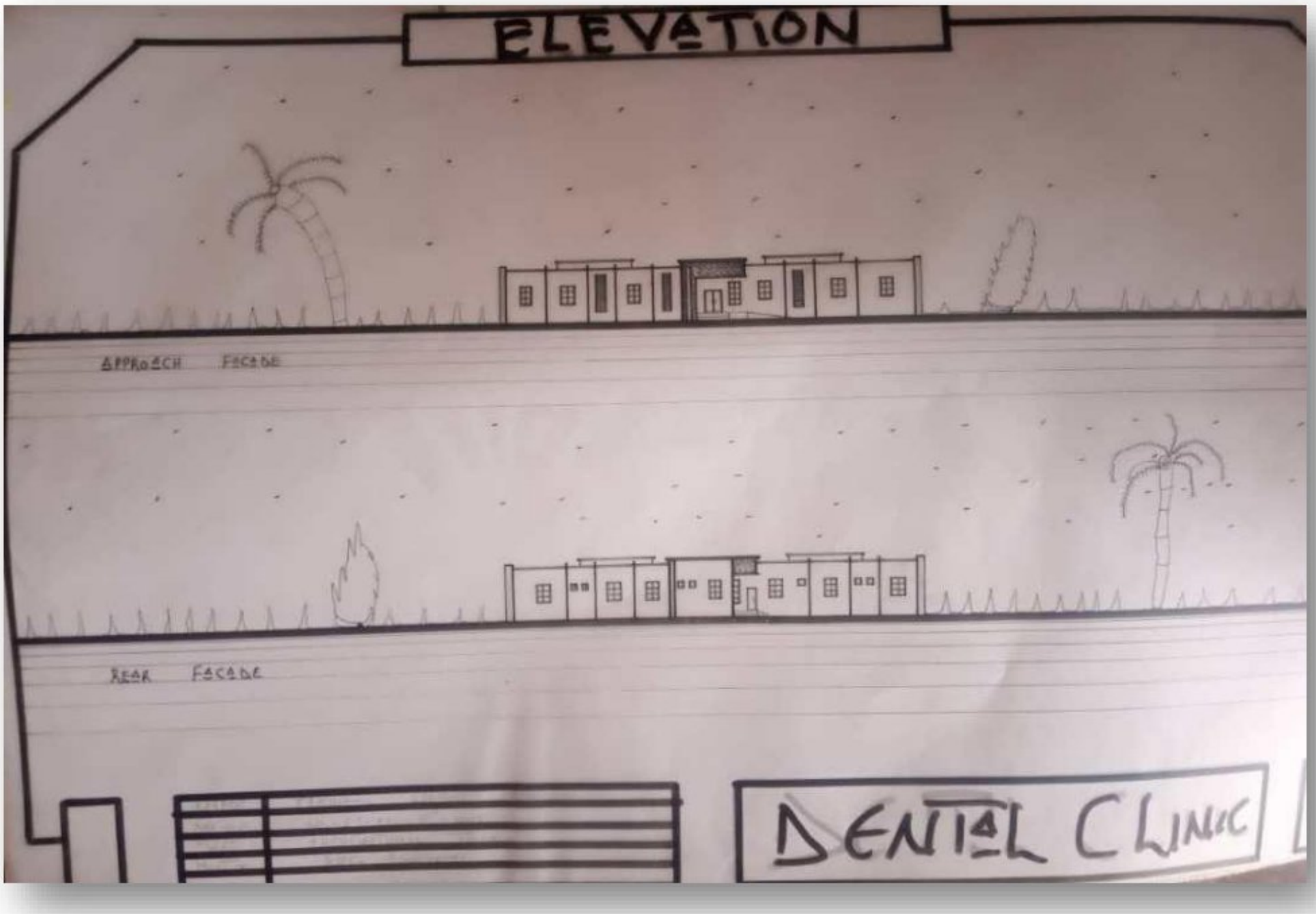
Appendix5.2: Floor Plan.



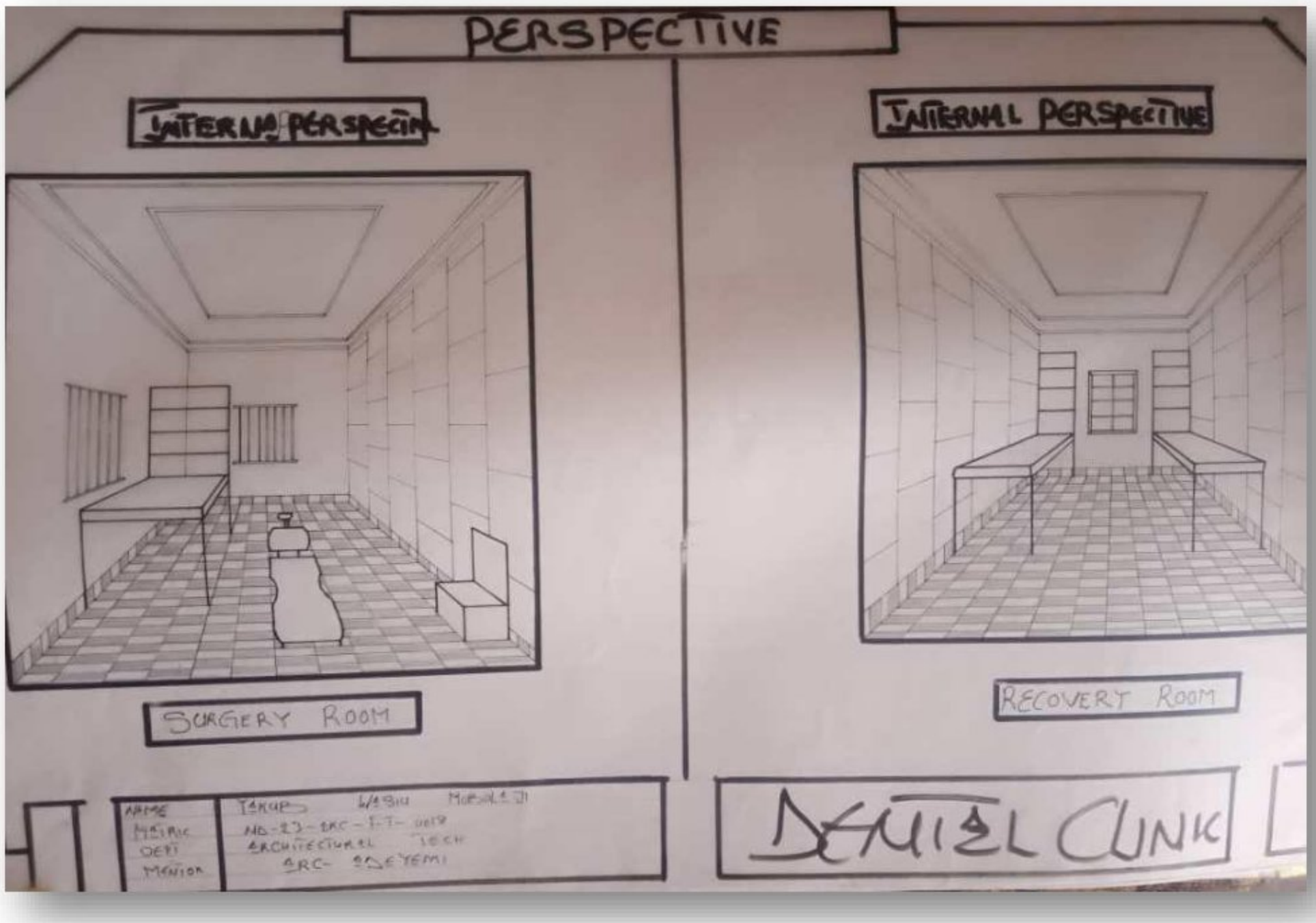
Appendix 5.5: Roof Plan



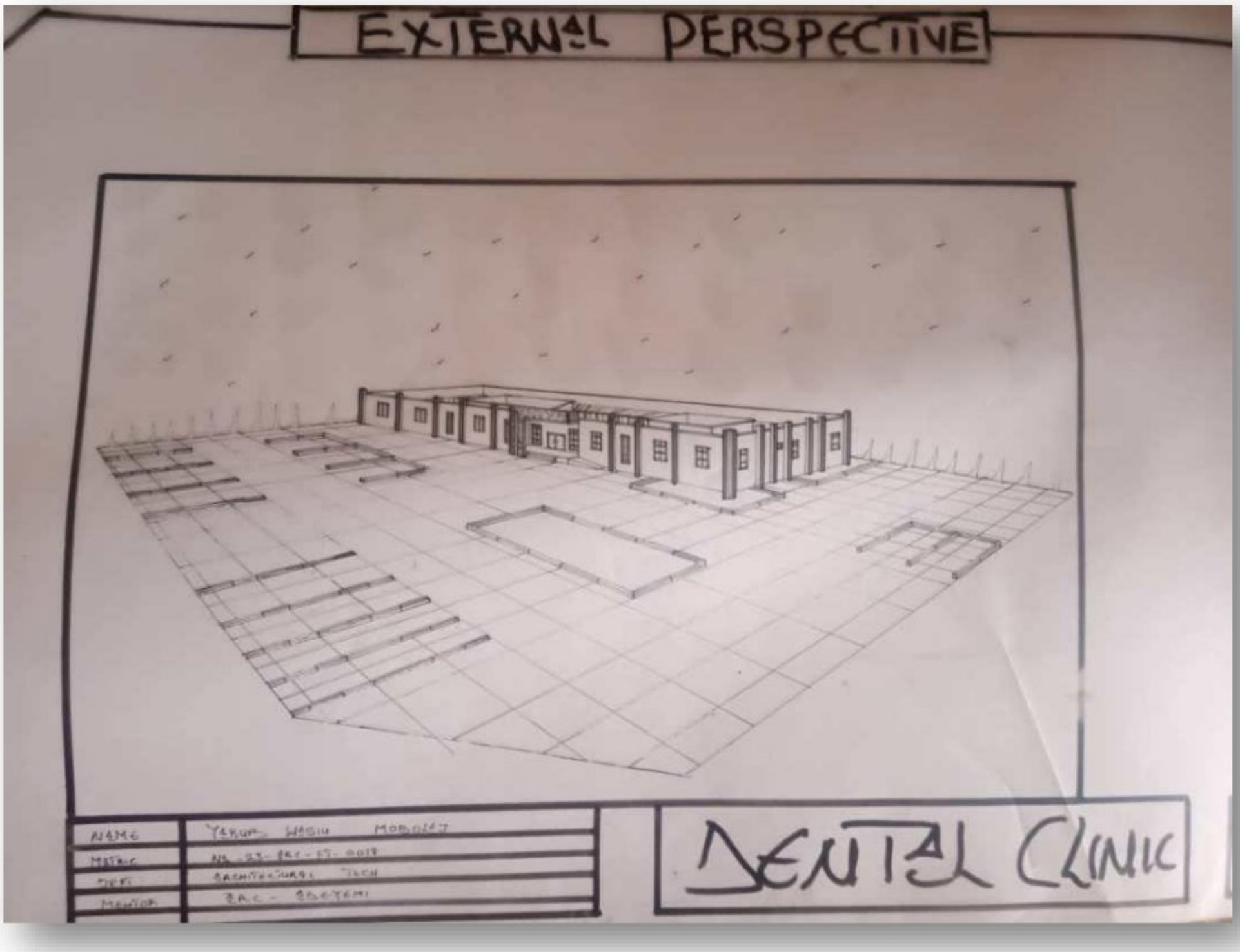
Appendix5.6: Sections



Appendix5.7: Elevation



Appendix5.8: Internal Perspective.



Appendix5.8: External Perspective.