

**ENVIRONMENTAL IMPACTS OF THE DESIGN OF HEALTH FACILITIES
ON USERS' HEALTH- A STUDY OF BRYAN LOWE ORTHOPAEDIC
HOSPITAL, MAMPONG, AKUAPEM.**

by

DAVID AMUGI

(Bsc. Architecture)

A Thesis Submitted to the Department Of Architecture,
Kwame Nkrumah University of Science and Technology
In partial fulfillment of the requirements for the degree of

MASTER OF ARCHITECTURE
College Of Architecture and Planning

October, 2012

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DEDICATION

This work is dedicated to God Almighty for giving me strength to keep me going even in difficult times.

To my parents, Mr. and Mrs. Amugi and my brother Daniel for their love, motivation and care. To my angel sister Angela who passed away to be with the Lord, but is fondly and forever remembered and remains with us. It also goes most especially to my mentor and brother Mr. Eddy Botchway, who has been of great inspiration and profound support. I am forever grateful. I love you all very much.

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ABSTRACT

The health of people is very important as it is very much needed for the sustainable development of any nation. And this is much more relevant especially in developing countries. Growing evidence as per everyday research is lending credence to the fact that the built environment within which we live very much can influence our health directly or otherwise. In other words the way in which our environments are designed can very much impact our health and indeed it is possible that the employment of certain design interventions with respect to our built environment can help address some of those environmentally-linked health issues.

This research aims at examining the extent to which design within the context of a hospital setting (Bryan Lowe Orthopaedic Hospital) affects or influences its users and how some of those design interventions meet current trends with respect to design of hospitals. The methodology for this research essentially was qualitative as it involved verbal descriptions of characteristics of the place and the sample population for the research. The research approach was that of a descriptive case study.

A body of literature was also very much explored to expatiate on the need for the gradual movement from intuitive design of the built environment within which we live to evidence based design which is much more humane as it meets the needs of users which are as diverse as the users themselves. In other words it explored global views, theories and debates on the various aspects of environment (design in particular), its features and the ways in which those features affect our daily lives. Some key findings of the research was the fact that colour schemes very much affects users of a particular

environment and at BLOH careful colour scheme selection has helped create a home-like environment which helped users to feel very much at home. Again there was a lot blank walls which could otherwise have been embellished with representative wall-mounted art pieces rather than the few abstract ones they had there. The research also revealed that when patients have an encounter with nature, however brief it may be, their healing and recovery process is improved and expedited.

In summary, the research examined some design features at BLOH and how some of those features come in to play with respect to impact on users.

CHAPTER ONE

INTRODUCTION

1.1 Background

The health of individuals is a key factor in the building of any nation. This fact is much more relevant, especially in the context of a developing country such as Ghana. Health is defined as a state of complete physical, mental, psychological and spiritual, emotional and social well-being and not merely the absence of disease (World Health Organization, 1946). For a developing economy such as Ghana's, the synergy between the people and health as two indispensable factors cannot be overemphasized: the **human resource** is needed to sustain and grow the economy while **health as a resource** is needed for the sustenance of the people. This symbiotic relationship is an inherent wherewithal of any economy that is growing. It is a positive concept which emphasizes social and personal resources as well as physical capacity (Ottawa Charter for health promotion, undated). To this effect, there are quite a number of health institutions across the country which sees to the health needs of the masses. It is however noteworthy that for a population of a little below 23.5 million people, there are only 1,439 health care facilities (IRIN, 2008). And it is no news that they have chalked some success as well as failures (Ghana News Agency, 2009). A study by Van den Boom *et al* (2004) noted that access to these facilities remained a problem: Medical facilities were not evenly distributed across the country, with most rural areas lacking basic facilities such as hospitals and clinics as well as doctors and nurses. There are approximately 1.5 hospital beds per 1,000 people across the country (MOH, 2006).

The fact that the causes of ill-health are wide-ranging is very much understood as is the idea that enjoying good health implies more than simply not being ill. As Jackson (2003) put it, when

problems such as depressive disorders or other heart-related conditions are suffered by individuals, the cause for their ill-health is unlikely to be only personal. Indeed it may also be linked to the built environment they inhabit (Jackson, 2003). These illnesses are linked to lifestyle and environmental health issues, and can often be curtailed.

Therefore, to support health-promoting initiatives that focus on changing life habits, there is a need to provide communal and personal environments designed to encourage the implementation of a healthier lifestyle, for example, by providing green spaces for walking, cycling and relaxation. Improving personal health may not be in the power of all individuals as other aspects of life, such as poverty, social exclusion, lack of employment and education, and poor housing have also been recognized as having a significant impact on human health (Molyneux, 2001; Crown, 1998).

1.2 Research Problem

‘What is not fully appreciated by many in the building industry is that the built environment can significantly affect human well-being; and that environmentally-linked ill-health can be addressed through intervention in the built environment.’ (Sassi, 2006).

This research analyses the above prelude on a smaller scale in the context of a hospital. It sought to explore the relation between spatial design and healing by focusing on recent developments in the design of hospitals in the Ghana. It is important to note that medical care cannot be separated from the buildings in which it is delivered. The quality of space in such buildings affects the outcome of medical care, and architectural design is thus an important part of the healing process as expressed by Jackson, who states that,

‘As Hippocrates, the Romans, and Jung knew, our physical environment affects our physical and mental health. We physicians focus well on our patients as individuals with health problems, but when so many of our patients have the same problems, such as cardiovascular disease, diabetes, and depression, we must realize that their poor health is not caused only by a lack of discipline but may be the result of the built environments in which we live.’ (Jackson, R. 2003).

In times past (nineteen seventies to late nineties), hospitals were often designed around specialties and departments rather than patients (Hillman, 1999). Hospital architects focused on providing adequate space for new technology and on maximizing functional efficiency for the hospital staff. The hospitals built during this period were efficient, but little attention was paid to the spatial qualities (environment) that are an essential component of good architecture. More recently, however, the patient’s perspective has gained more attention, a development encouraged by recognition of the benefits of shared care for complex conditions. Hospital design has begun to focus on patients and their families; the consumers of hospital services. This redirected focus has resulted from the increasing competitiveness of the health care marketplace and the realization that pleasant, user-friendly facilities can help patients heal better and whilst affecting the overall well-being of general users of such facilities. These factors are leading to the creation of care models that are based on syndromes, flows of patients and care processes (Boluijt, 2006). Yet, despite the increasing complexity of care pathways, in many hospitals the flow of patients is inefficient, dislocated and disorganized (Hillman, 1999).

Here in Ghana, there is the problem of accessibility to health care facilities which in themselves are saddled with attendant issues such as inadequate logistics, staff and unsanitary conditions all of which do not augur well for users of such facilities. A study by Van den Boom *et al* (2004) revealed that “Ghanaians on average live about 16 km from a healthcare facility where they can

consult a doctor, but half of the population live within a 5 km radius. By the same token, the other half cannot consult a doctor within 5 km, which corresponds to a 1 hour walking distance."

This revelation is quite debatable however credible it may be. In the rural areas, perhaps, it could be so, but it definitely cannot always be the case in the cities.

To make matters worse there are often reports of patients being maltreated and not properly cared for ultimately infracting the purpose for which the health facilities are built in the first place. Such unfortunate happenings are the ripple effects of some of the above mentioned issues as well as other poor sanitary conditions. To that effect, many people in the country still rely on self-medication Van Den Boom *et. al.*, 2004: 1, 4, 20, 21). They would rather self medicate than attend a hospital as such an environment is "sickening (M.O.H).

To solely lay the blame at the doorsteps of governance for not doing enough to address the issue will perhaps be contentious yet, not altogether unwarranted. Indeed, governments both past and present have played various roles in this regard. The Government of Ghana embarked on a health sector reform in the early 1990s to improve the accessibility and quality of services. However, "the health situation in Ghana is still far from satisfactory." (Van den Boom et al., October 2004) Projects to raise accessibility, however, are underway: The Minister of Health told Parliament in December 2007 "that the Ministry has established 176 health infrastructure projects within a period of five years. This includes 50 Health Centres comprising 22 District Hospitals and 26 Community Health Planning Scheme (CHPS)" (Ghana Parliament, 2007).

The question then is are these health centres designed according to current standards and trends in order to function optimally and satisfactorily meet needs of users? Or do they merely echo the

cliché they are often “architectural nightmares” (Healy & McKee, 2002a) and “hardly ever functional” (Wagenaar, 2006)?

The fact is that there are high impact, evidence based and result oriented design interventions that could be incorporated into the everyday health care delivery system in order to achieve the needed balance in optimization of health service delivery. For example, growing medical evidence shows that access to the natural environment improves health and wellbeing, prevents disease and helps people recover from illness. Experiencing nature in the outdoors can help tackle obesity, coronary heart disease and mental health problems (Natural England, 2009). Mr. Paul Evans Aidoo, Western Regional Minister, mentioned at the 7th annual meeting of the Ghana Medical Assistants Association (GMAA) that ‘government is taking measures to reduce the inequality in access to healthcare while promoting the creation of better therapeutic environments within existing health care facilities through the adoption and incorporation of modern trends that enhance the overall user experience of such facilities’ (Ghana News Agency, October 2009).

1.3 The Research Setting

Bryan Lowe Orthopaedic Hospital (BLOH), previously known as Kunta Kinte Orthopaedic Hospital, is a charitable, non-profit initiative of the International Save Our Souls Society (ISOSS). The hospital is located in Mampong Akuapem, about 25 miles from Accra and near the Aburi Gardens (isoss.com).

This research setting (BLOH) was chosen because the facility is relatively new and most likely to have some current hospital design trends incorporated in it. This makes it more suited to the objectives of the study as its evaluation vis-a-vis modern trends more appropriate. Moreover it is

the largest of its kind in the West African sub-region with staff strength of one hundred and a bed capacity of two hundred.

A judicious enquiry into the current condition of the facility and occupants' perception of how well the facility is suited to their needs and satisfaction forms the basis for this research.

1.4 Research Questions

The study seeks to address three research questions

- What are the design attributes and considerations of the facility (BLOH) that promote the creation of therapeutic environment with regards to:
 - a. **Orientation**
 - b. **Scale**
 - c. **Nature (gardens)**
 - d. **art**
 - e. **Colour Schemes**
 - f. **Accessibility(circulation)**
- How do those conditions measure up to current trends in user sensitive approach in design?
- What is the impact of those conditions on occupants (patients, employees and visitors)?

1.5 Research Objectives:

The objectives of this study include:

- To examine the design character in relation to creating a therapeutic environment at the BLOH
- To evaluate those design elements vis-à-vis established current trends
- To identify the effects of the design elements on occupants

1.6 Research Aim

With respect to the effects of the environment on our health, there are current trends and debates about how hospitals can be designed and organized so as to provide the most appropriate environment to deliver their core business of diagnosing and treating patients. Key considerations in the design of health facilities include making them sustainable while creating therapeutic and supportive environments for patients, staff and visitors (Rechel *et al.*, 2009).

This research seeks to provide an insight into the performance of the environment within the BLOH with regards to user experience of the place at any given point in time. The aim is to ascertain the facility's ability to create environments that enhance wellness and promote healing.

1.7 Justification

Built environment characteristics, which range from the chemical make-up of building materials to the spatial and semantic characteristics of a building design, affect people. In other words the physical, chemical and biological make-up of buildings has the tendency to affect the physiological and psychological health and well-being of occupants. There are a number of difficulties in studying the impacts of a built facility on health. Some are by virtue of the fact that

certain building-related disease agents are not promptly identifiable. To some extent the medical profession has not arrived at a generic conviction as to risk levels associated with certain agents (Geisler, 2001). Indeed, Saunders (2002) asserts that though certain researchers warn of the significant health impact of radioactivity, the effects of certain forms of radiation is very much disputed. Despite these difficulties, there is an increasing body of research into environmental health and the related field of environmental psychology that points to a number of building-related health issues (Sassi, 2006). Based on findings of such research, evidence based and result oriented design interventions that could be incorporated into the everyday health care delivery system in order to enhance health service delivery have been developed.

This research will give insight into some of these interventions and debates. It will create a better understanding and awareness of the significance of creating enabling environmental conditions as it is explored within a local context. Furthermore, it will also be particularly relevant to the design of the proposed health village (design thesis). Its importance can further extend to the application of the findings in other architectural projects other than health facilities as it will provide the basis and guidelines with respect to user-oriented design.

1.8 Conclusion

In this chapter I have presented an overview of issues confronting health delivery in general. These have led to the development of research questions which I seek to answer through this research. The next chapters will therefore, present a critical review of the body of literature required for identifying issues and concepts useful for conducting an in-depth study of the research issue.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In 2002, 30 per cent of deaths globally resulted from communicable diseases, 60 per cent from non-communicable diseases, and 10 per cent from injuries (WHO, 2003a). In other words, 70 per cent of deaths are related, not to infectious and parasitic diseases, including respiratory infections, but to environmentally and socially linked aspects of life. In fact, many aspects of sustainable communities and buildings are thought to contribute to good health and well-being (Srinivasan *et. al.*, 2003).

This chapter explores global views, theories and debates on various aspects of the environment, with particular reference to the design of the built environment, its characteristics and features and ways in which they influence behavioural patterns and ultimately impact our daily lives. It also covers literature on how buildings can provide healthy environments, both external and internal, for living and working that enhance human well-being and help prevent ill-health.

2.2 The Built Environment

Conceptually, the built environment includes all of the physical structures engineered and built by people; the places where we live, work, and play. These edifices include our homes, workplaces, schools, parks, and transit arrangements (Dearry, 2004). In other words, it is the human-made surroundings that provide the setting for human activity, ranging in scale from personal shelter and buildings to neighbourhoods and cities that can often include their supporting infrastructure, such as water supply or networks. The built environment is a material, spatial and

cultural product of human labour that combines physical elements and energy in forms for living, working and playing. It is extensive; it is everywhere; it provides the context for all human endeavours. More specifically, it is everything humanly created, modified, or constructed, humanly made, arranged, or maintained. Second, it is the creation of human minds and the result of human purposes; it is intended to serve human needs, wants, and values (Bartuska, undated).

2.2.1 Components of the Built Environment

Due to the variety and scope of the built environment, its diverse content, and its subtle contexts, it is organized into four interrelated components: products, interiors, structures and landscapes. These define the scope of the total built environment for a better understanding of the term.

- **Products:** these include materials and commodities generally created to extend the human capacity to perform specific tasks: graphic symbols such as the Western alphabet (letters form words, sentences combine into paragraphs and chapters, such as in this study); tools (pen and pencil, hammer and saw, peace pipe or weapon); materials (bricks and mortar, wood, concrete and steel, polymers and plastics); machines (radios and stereos).
- **Interiors:** interior spaces are defined by an arranged grouping of products and generally enclosed within a structure. They are generally created to enhance activities and mediate external factors (living room, workrooms, private rooms, public assembly halls, stadiums, etc.) (Bartuska, undated).
- **Structures:** these are planned groupings of spaces defined by and constructed of products; generally, related activities are combined into composite structures (housing,

schools, office buildings, churches, factories, highways, tunnels, bridges, dams, etc.).

Generally, structures have both an internal space and an external form.

- **Landscapes:** Landscapes are exterior areas and/or settings for planned groupings of spaces and structures (courtyards, malls, parks; gardens, sites for homes or other structures; farms, countryside, national forests and parks). Landscapes generally combine both natural and built environments (Bartuska, undated).

How we design and build where we live has changed dramatically over the past century. This enabled the connections between urban design and health and disease to be clearly recognized, and planners and public health practitioners often worked together to deal with problems related to poor sanitation and housing conditions. In the United States, increasing movement away from urban locales over the last 50 years led to lower-density developments, segregation of land uses, and extensive roadway construction. The phenomenon sometimes referred to as “urban sprawl,” is characterized by huge increases in urbanized land area and vehicle miles travelled (U.S.EPA, 2001a). These changes have both direct and indirect impacts on our environment and on public health.

Built environment characteristics, which range from the chemical make-up of building materials to the spatial and semantic characteristics of a building design, affect people (Sassi, 2006, p.97).

Public health has traditionally addressed the built environment to tackle specific health issues such as sanitation, lead paint, workplace safety, fire codes, and access for persons with disabilities. ~~We now realize that how we design the built environment may hold tremendous potential for addressing many of the nation’s greatest current public health concerns, including~~

obesity, cardiovascular disease, diabetes, asthma, injury, depression, violence, and social inequities (Jackson, 2003, p.93).

Here in Ghana, the extensive low-density land use and stark absence of elements that encourage walking has to some extent necessitated private motor transportation. The absence of policies on transportation and non-compliance with existing ones has led to the proliferation of eco-unfriendly and road-unworthy motor vehicles on our streets. These factors in our built environment have implications for our health. For example vehicle exhaust degrades air quality, motor vehicle injuries increase, and mental health and social capital are adversely affected. More so, people are less active because they walk less.

Perhaps, as Richard Jackson (2003) asserted, it is time for a shift to communities intentionally designed to facilitate physical and mental well-being. He purported that in order to effect this change, there was the need to draw upon the unique ability of humans to plan creatively for healthy communities. The initial step to that change is having a better understanding of the elements of the built environment that promote health. From the limited research to date, the public health community knows that some environments encourage walking, biking, and social interaction more than others do (Putnam, 2000). According to the Accident Prevention Journal (2001), they very much are aware that many traffic injuries can be prevented and that increasing motor vehicle exhaust exacerbates pulmonary disease (JAMA, 2001, p.285). But overall, there is still much to learn about the effects of the built environment on health. To address the multitude of questions, public health professionals must work closely with experts in other fields: architects, planners, policymakers (Jackson, R. 2003, p.94). The onus now is to try and have a

better understanding of the broad impact of our built environment on health and then to build future communities that promote physical and mental health.

2.3 The Concept of Environmental health

According to Paola Sassi (2006), the depth of the impact of the social and physical environment is best described by the US Department of Health and Human Services' definition of environmental health, to be found in their 2001 document *Healthy People 2010*, which states:

"In its broadest sense, environmental health comprises those aspects of human health, disease, and injury that are determined or influenced by factors in the environment. This includes not only the study of the direct pathological effects of various chemical, physical, and biological agents, but also the effects on health of the broad physical and social environment, which includes housing, urban development and land-use... (DHHS, 2001). It is defined as "those aspects of human health determined by physical, chemical, biological and social factors of the environment" (CDHAC, 1999, p. 3)

As already discussed in the preceding chapter, the concept that enjoying good health implies more than simply not being ill is well understood; as is the fact that the causes of ill-health are very wide-ranging. This is because the ways in which the effects of our daily routines catch up with us is as diverse as our pursuits. Indeed there are various factors which dictate and determine our health status. This has prompted the need, almost inherently to achieve a balance between our hectic lifestyles and our health which are very much influenced by our environment. A research was conducted at the Universiteit Utrecht (Netherlands) to ascertain the possible positive relationship between green spaces and people's health. "We found that green space is related to perceived general health as well as to morbidity. People with more green spaces in their living

environment feel healthier and less often visits the general practitioner with complaints like depression, diabetes and COPD.”(Maas J., 2009)

2.3.1 Built Environment and Health

Places have certain environmental characteristics, such as the availability of healthy foods, health-affirming services, community norms and so on, which influence health behaviour. Health disadvantage is exacerbated in socially and economically disadvantaged settings. For instance people with disabilities are not only marginalised by social and political structures, but these same structures are reflected in the built environment. These built forms serve to reinforce the physical and psychosocial isolation associated with their disability. Health promotion strategies need to take into consideration the impact of social structure, place and time on people's health-related knowledge, attitudes and behaviours (Butterworth, 2000).

Aesthetics of Place

Spaces, places and buildings are more than just props in people's lives; they are imbued with meaning and resonance, as they symbolize people's personal histories, interpersonal relationships, and shared events in people's extended relationships, families, communities and wider culture. Sense of place refers to the feeling of attachment or belonging to a physical environment, such as a place or neighbourhood, and the sense of personal and collective identity that comes from this sense of belonging. When cherished places, spaces, and settings are destroyed or irrevocably changed beyond our control, we feel a sense of loss and grief (Butterworth, 2000). People usually experience mental health issues arising from grief associated

with forced and often hurried removal from homes, land, and culture. Forced removal from place and land has been catastrophic for many indigenous peoples.

Here in Ghana for example, people who lose treasured places, such as their suburban homes, surrounds or even slum dwellings to freeway expansion or due to some other government policy have often resisted such actions (Ghana News Agency, 2009).

Safety and danger

Satisfaction with features of the local built environment has been found to play a major role in predicting perceived neighbourhood safety, and to act as stronger predictor of safety than experiences of property violation or personal victimization. Urban planning that encourages pedestrians is likely to reduce crime. Provision of local shops, benches, trees, garden beds and recreational facilities amongst residential areas encourages walking, exercise and neighbouring activity. Mixed housing, which ensures that a variety of people from different backgrounds will be present at any one time in an urban space, ensures that informal surveillance and 'safety in numbers' occurs. Built environments that promote social interaction and participation will also afford the development of social networks, social ties, social support, sense of community, community cohesion and competence, and sense of place, all seen as important determinants of community mental well-being (Butterworth, 2000).

Sense of Community

Sense of community has been defined as a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through their commitment to be together (McMillan and Chavis, 1986). The concept of 'community' has traditionally referred to a geographical region, such as a neighbourhood, town or city. However, the term increasingly has come to reflect the reality of industrial society in which people, due to their increased mobility and communications technology, relate to each other outside of any territorial boundary by their shared interests and skills. Butterworth (2000) articulates that sense of community emerges from the common symbols people use to designate their sense of belonging to and shared membership in a particular territory, as well as designating their particular personal territory. And that it enhanced by urban planning that encourages visual coherence, diversity and attractiveness of houses and other buildings. It further affords sufficient privacy while ensuring residents have easy access to amenities, parks, recreation facilities and a town or neighbourhood centre. In other words it offers pedestrian-friendly spaces.

2.4 Health-related Behaviour and the Built Environment

A feature often overlooked in everyday discussions of health and community affairs, perhaps because it forms the setting and backdrop by which we live our lives, is the impact of the physical and built environment on our senses, our emotions, our sense of community, participation in community life, and general wellbeing. Focusing on health-related behaviour without considering the expanse of contextual factors in which that behaviour occurs - such as

urban planning, architecture, economics, institutional arrangements and services, politics, demographics, land values and usage, recreation, education, law, and policing will yield an incomplete and misleading understanding of the people in that context, and the forces affecting their health-related actions and choices (Sarason, 1974, p. 150). Below are accounts of instances of the various effects of the built environment on peoples' lives.

2.4.1 Jonas Salk story and the Polio Vaccine

In an article on neuroscience by Emily Anthes (2009) in the April edition of Scientific American, a narrative is told of an incident in the 1950s where prizewinning biologist and doctor Jonas Salk was working on a cure for polio in a dark basement laboratory in Pittsburgh. Salk claimed that it wasn't until he left his basement lab in the States and went to clear his head in a monastery in Assisi, Italy that he became able to solve the puzzle of polio as progress in the lab was agonizingly slow. In Assisi, he spent time in the 13th-century monastery, where he suddenly found himself inundated with new revelations and discernment, including the one that would eventually lead to his successful polio vaccine. He was of the strong conviction that Assisi's colonnaded walks, serene architecture and hillside views had provided the right mental conditions for the necessary creative and intellectual leap. He had drawn his inspiration from the contemplative setting.

He came to believe so strongly in architecture's ability to influence the mind that he teamed up with renowned architect Louis Kahn to build the Salk Institute in La Jolla, California, as a scientific facility that would stimulate breakthroughs and encourage creativity.

2.4.2 The Case Studies of Cathall and Keir Hardi Communities

The following study was done in 2001 by Vicky Cattal on Keir Hardie and Cathal estates, both in East London, north of the Thames. The study demonstrates the health impacts of design and how architecture of project housing (built environment) affects the health attitudes of the people who live there.

When **Cathall** was built in 1972, it comprised of two 20-storey concrete tower blocks and a group of eight storey concrete block of flats. The community quickly became one of Britain's poorest areas and grew a reputation as a troubled neighbourhood to live in. This was due to the emergence of local gangs and related violence. Cathall became what was referred to as 'Broken Broken'. The story of a 19-year-old woman who was thrown from a tower window on the 18th floor, and the murder of a 14-year-old boy by a teen gang calling themselves the "Cathall Boys" constituted two of the many notorious gang-related incidents at the place.

Residents interviewed reported little sense of pride in the area. The author of the document described the architecture of Cathall as alienating and ugly, with elongated low rise blocks and endless concrete walkways which were not conducive to building social networks. Residents were said to complain about how the dark lifts and 'horrible' corridors made visiting the place too intimidating for their families. Ultimately the impact of these physical features resulted in distrust between residents, family dispersal and emotional strain.

Feelings of isolation, depression, stress, and poor physical health were the resultant implications. As one resident described, "Health on this estate is poor, because it is very stressful here. People would move in happy, and three or four months later would be chasing each other with hammers". Things got so grim at Cathall that in 2002, the twin concrete tower blocks were

eventually demolished. A lot of the blame for the project's failure fell on its architectural problems.

On the other hand, the two-storey redbrick **Keir Hardie** estate housing, built in Canning Town after the World War Two (WWII) Blitz, was designed with an idea of providing pleasant living conditions for residents in mind. Rather than looming tower blocks made of concrete and steel, houses in Keir Hardie are inconspicuous and pleasant. It is also interspersed with appropriate landscaping. According to the author, residents in that neighbourhood have a sense of pride about their working class backgrounds, and they construct their identities around the tradition and history of the area. They attribute their health and general sense of wellbeing to the mutual aid and sense of belonging created by their supportive community.

Despite similarities to Cathall in terms of poverty, unemployment, and deprivation, residents of the Keir Hardie estate don't share the urban decay, isolation and depression, but rather appear to participate in a vibrant and healthier community.

But the design of the building, both in terms of architecture and materials used, will have an impact on the health of an already at-risk group. If the impact on health and community is negative, economic impact will also be negative; sick people can't work, and poor people will use publicly funded resources if they can't afford private health care. It is worth taking note of the fact that badly designed public housing could cause problems that can potentially extend across economic barriers.

2.4.3 Strategies for Safer Communities

On account of such negative incidents at Cathal and other communities across the world, various agencies and arms of governments in countries around the world have formulated strategies and policies on the design of the physical environment to aid in crime prevention. The policies are based on some research in that regard. One such example is the United States Department of Justice's research report titled "Physical Environment and crime". The report attempts to answer questions like "Can physical features of the environment prevent crime or reduce problems thought to be crime related, such as fear of crime or residents' concerns about neighbourhood viability? A body such as the Crime Prevention through Environmental Design (CPTED) focuses on the settings in which crimes occur and on techniques for reducing vulnerability in such settings.

In the research, they explored how physical features influenced behaviour with respect to crime. It was discovered that offenders often operated in a rational fashion, in that they preferably commit crimes that require the least effort, provide highest benefits and pose the lowest risk. In other words crimes are most likely to occur when potential offenders come into contact with a suitable target where chances of detection by others are thought to be minimal. Even in instances where they are detected, criminals could easily exit without detection or being apprehended (Clarke, 1992). According to the Taylor and Harrell report Offenders may decide whether or not to commit a crime in a location after the following have been determined:

- How easy will it be to enter an area?
- How visible, attractive, or vulnerable do targets appear?
- What are the chances of being seen?

- If seen, will the people in the area do something about it?
- Is there a quick, direct route for leaving the location after the crime is committed?

Depending on a range of circumstances, residents may respond to potential offenders.

Physical features as an important factor may influence reactions to potential offenders by altering the chances of detecting them and by shaping the public versus private nature of the space in question.

2.4.3.1 Policies

Based on the above factors that represent offender perspective of conducive environment for crime perpetration, a four-fold approach to making a location more resistant to crime or crime-related problems have been formulated. These are outlined as follows:

A. Housing design or block layout: Making it more difficult to commit crimes by

- reducing the availability of crime targets;
- removing barriers that prevent easy detection of potential offenders or of an offense in progress; and
- increasing physical obstacles to committing a crime (Clarke and Cornish, 1985)

B. Land use and circulation patterns: Creating safer use of neighbourhood space by reducing routine exposure of potential offenders to crime targets. This can be accomplished through careful attention to walkways, paths, streets, traffic patterns, and location and hours of operation of public spaces and facilities (Clarke, 1992).

C. **Territorial features:** Encouraging the use of territorial markers or fostering conditions that will lead to more extensive marking to indicate the block or site is occupied by vigilant residents. Sponsoring cleanup and beautification contests and creating controllable, semiprivate outdoor locations may encourage such activities. This strategy focuses on small-scale, private, and semi-public sites, usually within predominantly residential locales (Taylor, 1988).

D. **Preventing Physical deterioration.** Controlling physical deterioration to reduce offenders' perceptions that areas are vulnerable to crime and that residents are so fearful they would do nothing to stop a crime. Physical improvements may reduce the signals of vulnerability and increase commitment to joint protective activities. Physical deterioration, in all probability, not only influences cognition and behaviour of potential offenders but also shapes how residents behave and what they think about other residents (Skogan, 1990).

2.5 Overview of Occupants' Comfort in Buildings

According to the Oxford Dictionary, comfort is defined as a state of physical ease. Many factors contribute to comfort of occupants in a building. The past couple of decades have brought a shift towards a more comprehensive, but also more flexible, approach to creating comfortable spaces. A lack of comfort is generally not life-threatening. Indeed, there is no clear cut difference between unhealthy and uncomfortable environments. Continuous exposure to certain uncomfortable environments for extended periods can significantly impact the health of an

individual (Wilkinson *et. al.*, 2000). Some influential factors of comfort in buildings include temperature, humidity, air movement and quality, lighting, noise.

2.5.1 Importance of Environmental Health in Buildings

As already mentioned, the ways in which the effects of the built environment catch up with us is as diverse as our pursuits. Research has shown that certain building characteristics, whether positive or negative are not easily detectable as they are elusive. This is because the effect of a building on an individual is often the result of many different building characteristics acting together (Sassi, 2006).

The Sick Building Syndrome (SBS) is an example of such a phenomenon. The term SBS is used to describe situations in which building occupants experience acute health and comfort effects that appear to be linked to time spent in a building, but no specific illness or cause can be identified (Boxer, 1990). The complaints may be localized in a particular room or zone, or may be widespread throughout the building. It is caused by a combination of factors such as poor thermal, visual and aural comfort condition, the presence of gaseous pollutants, microbiological contamination, dust and fibres, and tobacco smoke.

There also is another related condition known as the Building related Illness (BRI). This, however is used when symptoms of diagnosable illness are identified and can be attributed directly to airborne building contaminants. Both conditions are indeed associated with immediate health problems (Hanie *et. al.*, 2010). Due to the fact that buildings have physical, chemical and

biological characteristics that affect the physiological and psychological health and well-being of their occupants, it has been observed that sealed air-conditioned buildings are more prone to complaints of SBS than buildings ventilated and lit by natural means (Hedge *et. al.*, 1996).

Here in the tropics, and in Ghana for that matter, where the use of air-conditioners in most public commercial buildings have become almost synonymous with “modern” architecture, there is most likely to be the prevalence of SBS and BRI. There have been instances where entire buildings have been fitted with non-operable fenestration, in that the entire building is extremely dependent on artificial ventilation. Recent reports of occupants complaining of the discomfort they experience as a result of inhabitation in such buildings are prevalent (Ghana News Agency). The fact is that in as much as buildings have tended to become more highly sealed to control unwanted air filtration, with reduced ventilation rates, the low level toxicity inside become more critical to the well being of building occupants. Therefore, in Ghana, buildings that are overly dependent on artificial ventilation should not be encouraged in this era where energy conservation has become more important. The fact is that, people have the tendency to spend most of their lives indoors, so there is the need to ensure the quality of the internal environment as it affects mental and physical health.

Some pollutants are certainly the result of design decisions, others stem from the nature of maintenance or management contracts, and others are introduced by the occupants themselves (Hanie *et. al.*, 2010). The task of designing SBS free buildings is particularly difficult (Hedge *et. al.*, 1992), as data on the rate at which pollution is given off by certain materials is not readily available.

Paola Sassi asserts that healthy buildings indirectly benefit the community as a whole. Healthy and happy individuals are more likely to live a fulfilling life, allowing them to enjoy, but also to participate in and contribute to their community and country at large.

2.6 Current Hospital Design Trends

(Vis-à-vis built environment and health)

The primary function of hospitals is clearly the delivery of medical care (diagnosis and treatment) to inpatients or outpatients and this can either take the form of elective or emergency care. This means that hospitals should provide an environment “where patients can receive medical treatment and support from doctors, nurses, relatives and friends” (Wagenaar, 2006).

However, according to the United States Institute of Medicine, a visit to a U.S. hospital is dangerous and stressful for patients, families and staff members. Medical errors and hospital-acquired infections are among the leading causes of death in the United States, each killing more Americans than AIDS, breast cancer, or automobile accidents (Ulrich *et. al.*, 2008) According to the Institute of Medicine in its landmark Quality Chasm report: “The frustration levels of both patients and clinicians have probably never been higher. Yet the problems remain. Health care today harms too frequently and routinely fails to deliver its potential benefits” (IOM, 2001). Generally, problems with health care not only influence patients, but staff is also much affected.

For many years, the key driver influencing the design of the built environment in the health sector has been the need to optimize clinical efficiency, such as patient observation and traffic and the movement of people and goods. The emphasis today adds the patient's experience of

their health care journey to the drivers of design. This approach to design not only supports the well-being of patients during their stay and may speed recovery, but also increases the wellbeing and motivation of staff. It is to be noted that staff spend much longer in the facility than any patient.

There is an increasing volume of research from an architectural perspective on the ways that the built environment contributes to the healing of patients and well being of staff. Four features of hospital buildings that have been considered components of healing environments are: nature, daylight, fresh air and quiet (Van den Berg and Wagenaar, 2006). This new approach to design of health care facilities is described as evidence-based design. According to the Commission for architecture and the built environment report (2003), the design of hospitals is often dominated by the consideration of clinical functionality at the expense of the quality of the health care environment, neglecting the importance of a positive working ambience. To that effect there is a new paradigm, "relationship-centred care", introduced by Rachel Naomi Remen, attempts to shift from the focus on the patient to a focus on the relationship between care providers and patients, a significant differentiation (Suchman, 2007). Improved design can enable staff to do their jobs more effectively while improving patient healing experience, with less strain (Ulrich, 2006).

2.6.1 Design Strategies

As already mentioned the design should be staff and patient oriented. In that regard there is the need for designs that would be:

- **therapeutic** : to help reduce stress and improve outcomes

- **staff centred:** by reduction in staff stress and fatigue and increase effectiveness care delivery
- **patient centred:** by reducing patient anxiety and weariness while improving patient safety
- **innovative:** to enhance overall healthcare quality

Environments are considered therapeutic (with healing qualities) when there is direct evidence that a design intervention contributes to improved patient outcomes. The characteristics that make up a therapeutic environment are considered to be the creation of non-threatening facilities through site planning, way finding, landscaping, human scale, thermal comfort, fresh air provision, natural daylight, control of the environment, privacy and dignity, reduced risk of infection, acoustic quality, art and colour (Rechel *et. al.*, 2009). There is evidence to support the view that staff morale is lifted when they move into new well-planned environments, particularly when staff have been involved in the design process (CABE, 2004).

As already mentioned, the design of healthcare facilities is often dominated by the consideration of clinical functionality at the expense of the quality of the health care environment. It is important to note that, patient throughput and motivated staff is key requirements for sustainable health care. There is the need, for that matter for architects, especially, to create spaces that enhance clinical efficiency whiles providing a therapeutic environment. Literature suggests that landscaping within a hospital environment can have therapeutic effects on patients as indicated by a study conducted by Roger Ulrich (1984) which showed that, patients recovering from surgery had better outcomes when ~~nursed~~ in rooms overlooking a small stand of trees rather than a brick wall. Also, in the book *Why Zebras Don't Get Ulcers*, patients with views of trees heal

more quickly and with less pain than those with views of blank walls. The studies revealed that patients exposed to nature required fewer analgesic pharmaceuticals, made fewer demands on nurses and usually needed shorter lengths of stay.

According to Lawson and Phiri (2000), there was another study in the United Kingdom (2000), where a comparison between old and new environments for two groups of psychiatric and orthopaedic patients was made. It revealed that both patient groups, treated in the new or upgraded units, rated the same treatment significantly higher than that in old the facilities. Generally, patients in the new facilities reported less pain which was evaluated by the use of analgesics. The psychiatric patients on the other hand, showed less verbal abuse and threatening behaviour and were discharged much earlier. Consequently, both groups were of the conviction that the environment had contributed to their recovery and that colour and decoration had particularly influenced their well-being.

Another key issue of concern to patients included noise and the ability to control the environment, particularly with regard to ventilation and lighting. Since the 1950s noise levels in hospitals have been identified as a concern. Noise has been shown to create stress by heightening blood pressure and heart rate (Baker, 1992) and affects sleep quality of patients (Van den Berg, 2005). In hospitals, noise is largely generated by people and equipment. Where possible, sources should be eliminated by finding noiseless solutions to call systems, pagers and telephones (Rechel *et. al.*, 2009). The spread of noise can be mitigated by acoustic environmental design, particularly when focused on surfaces.

Current trends characterizing therapeutic environments also require the need to ensure that patients are not harmed whilst they are in a hospital environment.

According to the World Health Organisation (WHO) research, over 1.4 million people worldwide suffer from hospital acquired infections. According to the research, risk of healthcare acquired infections in developing countries was 2 to 20 times higher than the developed countries, of which Ghana was not exceptional. The Deputy Minister of Health, Mr. Robert Joseph Mettle Nunoo, noted that approximately 1 in 10 hospital patients would acquire an infection after admission, which also increases patients' length of stay in the hospital. He added that due to these factors, patients are required to take additional diagnostic and therapeutic interventions which increase their hospital costs, stating that, 'This affects the cost of healthcare, hence, increasing the burden of cost on the National Health Insurance Scheme' (modernghana.com/news, 2010).

It is possible to design hospitals in ways that minimize the risk. Infections are transmitted via five main routes: direct contact, droplet transmission (for example from coughs and sneezes), airborne transmission (for example through ventilation systems), common vehicle transmission (for example equipment not disinfected between patients) and vector-borne infection.

Appropriate design can reduce the risks associated with each of these routes. Ideally, it would take a holistic approach, involving the design, operation and maintenance of all relevant processes, based on an ongoing discussion with the infection control team.

Again, the value of access to outdoor space is explored in the study by Cooper Marcus and Barnes (1995) for the United States-based Centre for Health Design. Patients, visitors and staff

all felt that they benefited from access to outdoor space, which provided a contrast to indoor space and provided a sense of getting away. During a trial of light therapy in the care of depressed patients in Edmonton, Canada, Beauchemin and Hays (1998) observed that those patients in rooms on the sunny side of the building stayed on average 15% less time than those in rooms on the non-sunny side. Several studies strongly support that bright light, both natural and artificial can improve health outcomes such as depression, agitation, sleep, circadian rest-activity rhythms. The length of stay in demented patients and persons with seasonal affective disorders (SAD) is significantly reduced.

One such study took place over four years in a cardiac intensive care unit where four beds faced north and four faced south. A comparison of directly admitted patients with similar diagnoses showed that those in bright rooms stayed 2.3 days on average, while those in dark rooms stayed 2.6 days. Furthermore exposure to bright morning light has been shown to reduce agitation among elderly patients. There is also strong evidence that exposure to bright light improves sleep and circadian rhythms (Chaudhury *et. al.*, 2003).

The use of nature as a positive distraction is also very vital. Positive distractions refer to a small set of environmental features or conditions that have been found by research to effectively reduce stress. Distractions can include certain types of music, companion animals such as dogs or cats, laughter or comedy, certain art, and especially nature (Ulrich, 1991). The focus here is on the last, nature. As background relevant to assessing the credibility of nature findings in healthcare environments, it is worth mentioning that many studies of populations other than hospital patients have produced strong evidence that even fairly brief encounters with real or simulated nature settings can elicit significant recovery from stress within three minutes to five minutes at most (Parsons and Hartig, 2000). Researchers have consistently reported that stress-

reducing or restorative benefits of simply viewing nature are manifested as a constellation of positive emotional and physiological changes. Stressful or negative emotions such as fear or anger diminish while levels of pleasant feelings increase. Research is providing convincing evidence that visual exposure to nature improves outcomes such as stress and pain. For example, a study in a Swedish hospital found that heart-surgery patients in ICUs who were assigned a picture with a landscape scene with trees and water reported less anxiety/stress and needed fewer strong doses of pain drugs than a control group assigned no pictures (Ulrich, 1991).

Hospital gardens not only provide restorative or calming nature views, but can also reduce stress and improve outcomes through other mechanisms, for instance, fostering access to social support and providing opportunities for positive escape and sense of control with respect to stressful clinical settings (Cooper Marcus and Barnes, 1995; Ulrich, 1999).

Another trend is the use of Art in healthcare environments. A small number of studies on art in hospitals have yielded findings parallel to those from nature research. Results suggest a consistent pattern where the great majority of patients respond positively to representational nature art, but many react negatively to chaotic abstract art (Ulrich and Gilpin, 2003). For example, Carpman and Grant (1993) studied the preferences of 300 randomly selected inpatients and concluded that the patients consistently preferred nature images but disliked abstract art.

Although nature pictures and other emotionally appropriate art elicit positive reactions, there is also evidence that inappropriate art styles or image subject matter can increase stress and worsen other outcomes (Ulrich, 1991). It should not be expected that all art is suitable for high-stress healthcare spaces, as art varies enormously in subject matter and style, and much art is

emotionally challenging or provocative. However, Ulrich (1991) purported there are certain setbacks with emotionally challenging art works in a healthcare environment. In the research, a unit was extensively furnished with a diverse collection of wall-mounted paintings and prints. Interviews with patients indicated strongly negative reactions to artworks that had elements of ambiguity, were surreal, or could be interpreted in multiple ways. The same patients, however, reported having positive feelings and associations with respect to nature paintings and prints.

In conclusion, the literature pretty much covers general design issues within the built environment and the extent to which some of those design considerations or otherwise affects persons within the environment. A study by Vicky Cattal on the Cathall and Keir Hardi Communities in the United Kingdom is discussed. The study emphasizes the essence of an often overlooked feature in community and health affairs, which is the extent to which the design of the built environment impacts our sense, emotions, sense of community and general wellbeing. This has essentially been the underlying theme throughout the entire literature body.

It further explores aspects of current hospital design trends which are more user-oriented. To that effect, the parameters along which modern hospitals are designed include the need for it to generally help reduce stress and improve clinical outcomes, improve patient safety and ultimately enhance overall healthcare quality. Some of the issues raised would serve as concept variables that would be examined and evaluated in the research setting which the Bryan Lowe Orthopaedic Hospital. Based on the research objectives, the concept to be considered in this particular research is the design consideration of the facility and the extent to which those

considerations create a therapeutic environment. In that regard, it will be evaluated in terms of **orientation, scale, nature and gardens, art, colour schemes and accessibility.**

The next chapter gives an insight into the methodology to be used to conduct the research. It essentially presents the approach for data collection and analysis.

data collection methods would be appropriate. Also there was the need to clearly identify target population (Cohen and Manion 1989: p.88). For this reason, a case study approach was adopted to investigate the effects of the hospital environment on the users of the Bryan Lowe Orthopaedic hospital at Mampong, Akuapim.

3.3 Research Approach

As mentioned earlier, the Case Study approach was used in this research. The Case study approach allows for a systematic gathering of information to effectively understand a phenomenon (Berg, 2004) thus enabling the researcher to empirically investigate the phenomenon in its real life context (Yin, 2003).

The descriptive case study approach was used. The reason being that, it gave a detailed exploration and description of the built environment (conditions) at the Bryan Lowe Orthopaedic hospital and its effects on the users of that facility (Yin, 2003), without which it would have been difficult to evaluate the situation and consequently propose any meaningful intervention by the researcher.

3.4 Sampling/ Sampling Technique

This research was conducted on the Bryan Lowe hospital and so the sample population was already identified. Essentially, the sample population was deliberately selected across a spectrum of users of the facility to ensure all viewpoints are adequately represented. Purposive sampling method was used based on the holistic issues that the research demands and the case in question

presented. It also helps to achieve experimental diversification. The users (staff, patients and visitors) of the Bryan Lowe hospital were the working sample group during a week of study within the facility and its environment. The reason for this sample group was because each individual had a unique experience of the impact (physical, psychological and social well being) of the Bryan Lowe hospital and its surroundings on their lives on a micro or personal level.

Fourteen (14) people were sampled for this research. Twelve (12) of them were interviewed within the research setting (BLOH premises) while the other two (2) were interviewed outside of the setting at a later date. It is worth noting that, the sample size was derived based on the available number of people at the research setting as of the time and their willingness to participate in the research. People were not coerced or forced to participate as it is against the ethics of conducting research.

Out of the fourteen people interviewed four (4) of them were staff of BLOH. This included a doctor of physiotherapy (DPT), two (2) nurses and one (1) medical assistant. Six (6) patients in all were interviewed on the premises while two (2) others were interviewed outside of the premises. Two (2) visitors were interviewed as well.

3.5 Instruments for Data Collection

The study was based on focus group interviews with the staff and patients within the hospital to obtain holistic data. It is worth mentioning that some interviews were also conducted with persons outside of the premises but who have had previous experience of the place. Focus groups allow for nonverbal cues and behaviour such as body postures and facial expressions to be

observed. This provides additional information about the topic under discussion beyond what participants might say. There's the added advantage of group dynamics where participants are able to build on each other's ideas and comments, providing more extensive input than would otherwise be possible. Indeed, the researcher can also dynamically adjust and modify their plans and types of questions asked and means of evoking response from participants.

Observation was also carried out as part of the visual inspection of the hospital layout, facilities and the environmental conditions. Other sources of data collection media was employed as well.

3.5.1 Primary Source of data collection

Information was gathered for the study based on focus group interviews, personal observations of the Bryan Lowe hospital, its setting, layout, design considerations, environmental conditions etc. Also photographs were taken to aid in visual description.

In order to address the outlined aims and objectives for this research, there was the need to assess the state of the built environment (physical and environmental) at the BLOH. Findings were obtained through observations and interviews as already mentioned in preceding chapters. These findings are evaluated vis-à-vis some trends with regards to hospital designs. The reason being that just as medicine has increasingly moved toward "evidence-based medicine," where clinical choices are informed by research, healthcare design is increasingly guided by rigorous research linking the physical environment of hospitals to patients and staff outcomes and is moving

toward “evidence-based design” (Hamilton, 2003). He postulated that improved physical settings can be an important tool in making hospitals safer, more healing, and better places to work.

This study therefore assesses the state (characteristics of the physical setting) of the BLOH and its role in patient and staff outcomes.

The research setting is evaluated in terms of its ability to create a therapeutic environment or otherwise and how that affects the users of the facility. The variables that will be used in that regard are grouped as follows: **orientation, scale, nature gardens and art, colour, sense of control and comfort levels** as mentioned in the preceding chapter.

3.5.1.1 Interviews

The staff of the facility (who tend to spend more time at the facility more than any patient ever would), the patients and other users (families, friends) were engaged in various interview (semi-structured interview questions and focus group discussions) sessions. The interview schedule was designed to acquire information on human comfort, the external and internal conditions (environment) of the facility.

3.5.1.2 Observations

Observation was carried out as part of the visual inspection of the Bryan Lowe hospital and its environment. This investigation tool allowed for a critical visual analysis of some design factors/ considerations such as location/ choice of site, building design/ventilation, landscaping etc and the effects of these design factors on the composure/ health of the staff, patients and visitors

within the hospital. In order to assist with the descriptions and to paint a clearer picture of elements under discussion photographs were also taken.

3.6 Data Analysis

The researcher examined the pattern of data which, according to Morse and Field, (1995), are categorized into a set of themes. All interview data was recorded and transcribed and accordingly analyzed using **thematic** and **narrative** analysis. Corel Draw and AutoCAD applications were used to generate Charts and schematic diagrams.

3.7 Limitations

The researcher experienced some difficulties which are outlined as follows:

- Access to certain parts of the facility were not allowed
- Time allowed for the study was limited.
- Despite assurance by the researcher, some participants were not willing to fully partake.
- Some relevant books and articles were not readily accessible over the internet because they either had to be bought or subscribed to.

3.8 Ethical Issues

Research ethics are a set of widely accepted moral principles which offer rules and behavioural expectations about the most correct conduct towards experimental subjects and respondents (Strydom, 2001), irrespective of the nature of the research (covert or overt). To that effect the following ethical considerations were thoroughly observed by the researcher:

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- Permission was sought from the Bryan Lowe Orthopaedic Hospital before access into the study domain was granted.
- Participants were not forced, coerced or by any means influenced to participate in the research. Participation was voluntary. This was necessary to elicit genuine and unbiased responses from participants.
- All participants were given the assurance by researcher that responses (findings) and results are solely for the purposes of research and will be treated with absolute confidentiality for that matter. And under no circumstance whatsoever would their identity be disclosed.

CONCLUSION

With this chapter, the detailed plan of work or framework within which the research has been conducted has been presented. The research approach, sample techniques, data collection instruments, data analysis techniques and the ethical considerations used for the research have also been spelt out. The next chapter is a presentation of the findings and discussion of the gathered data from the research site. It is based on the concept variables mentioned in the second chapter.

CHAPTER FOUR

FINDINGS AND DISCUSSION

4.1 Introduction

Observation and interviews (qualitative research) are used to evaluate the environmental conditions at the Bryan Lowe Orthopaedic Hospital with the outlined aims and objectives in mind. The chapter begins with a brief background of the facility and subsequent presentation and interpretation of gathered data.

4.2 Background of Bryan Lowe Orthopaedic Hospital

The Bryan Lowe Orthopaedic Hospital (BLOH) which was previously known as Kweku Kunta Kinte Orthopedic Hospital (Alias 3K) is located in Mampong Akuapem in the Akuapem North district, about 25 miles from Accra and near the Aburi Gardens. It is a 200-bed facility and covers an area of 120,000 sq. Foot. Work on the BLOH which is touted as the largest orthopaedic hospital in the West African sub-region started in October 2001. The hospital started operation in October 2007. Its location is a lovely tourist site where, apparently, the Queen of England often stays when she comes to Ghana, which speaks a lot about the location. The project is a charitable and non-profit initiative of the International Save Our Souls Society - ISOSS. The project was funded by Mr. Oswald Lowe who also happens to be the founder of the ISOSS.

The facility primarily is concerned with provision of professional medical care and rehabilitation for polio victims and the physically disabled. There are well trained staff that assist the

physically disabled in learning to walk as well as the acquisition of vocational skills. The process involves physical therapy, emotional and psychological support. The BLOH is also equipped with necessary equipment for diagnosing, treatment, as well as surgical procedure to help improve most common conditions. The justification for the choice of setting is very well elaborated in the 'research setting' section of the first chapter.

4.3 Respondents' profile

As mentioned earlier, the respondents targeted for this research were the patients, staff and visitors of the BLOH. The reason being that they constitute the users of the facilities and for that matter were more likely to experience the implications of the facility's environment. A total of twelve (12) people were interviewed within the hospital premises while two (2) others were interviewed outside of the premises at a much later time. As already noted in chapter three (methodology), the sample population was derived based on the willingness of people to participate as they were not to be forced or coerced as the ethical principles with regards to research stipulated.

4.3.1 Respondents' demographic Characteristics

The statistics with respect to the age and gender of the respondents are as follows:

A. Gender

the participants are grouped as follows:

- **Staff:** four (4) persons in all were interviewed. Three (3) were female and one (1) male.
- **Patients:** six (6) persons were interviewed. Two (2) females and four (4) males.
- **Visitors:** a total of two(2) visitors were interviewed. Both were female.
- **Other (outside of premises):** a man and his wife were interviewed in this instance.

There were a total of fourteen (14) respondents. Eight (8) females representing 57.14% and six (6) males representing 42.86%.

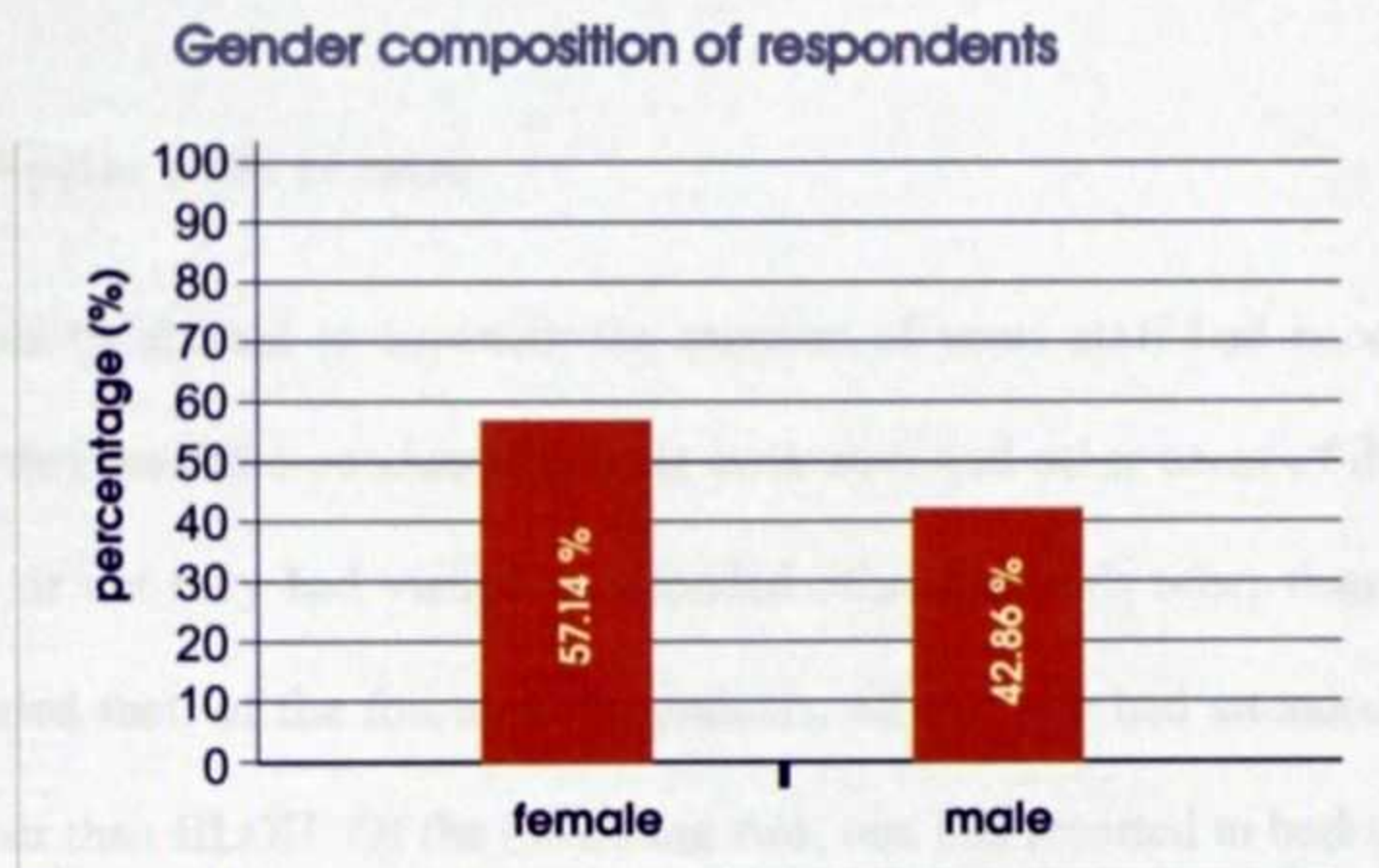


Fig. 4.1: Bar chart showing the gender composition of interviewees (Source: Author, 2011)

B. Age

The respondents have an age distribution range as follows: three (3) of them were between 20-30 years of age representing 21.43%. Four (4) were between the 31-40 age range representing 28.57%. Another four (4) fell between the 41-50 years range, representing 28.57%. The last three (3) were within the 51-60 years range which represents another

21.43%. there however were no sixty years plus respondents. This information is shown in the table below.

age range (yrs)	frequency	percentage (%)
20-30	3	21.43
31-40	4	28.57
41-50	4	28.57
51-60	3	21.43
60 +	none	none

Table 4.1: age distribution table (Source: Author, 2011)

B. Places of prior visits or work

A survey was conducted to ascertain the number of years staff had been working at the BLOH. Another was also conducted among both staff and other users of the facility to find out whether or not they had visited or attended other hospitals other than the BLOH. The survey revealed that, of the fourteen respondents, all but two had attended or visited other hospitals other than BLOH. Of the remaining two, one had resorted to herbal medicine in the past, while the other had tried both.

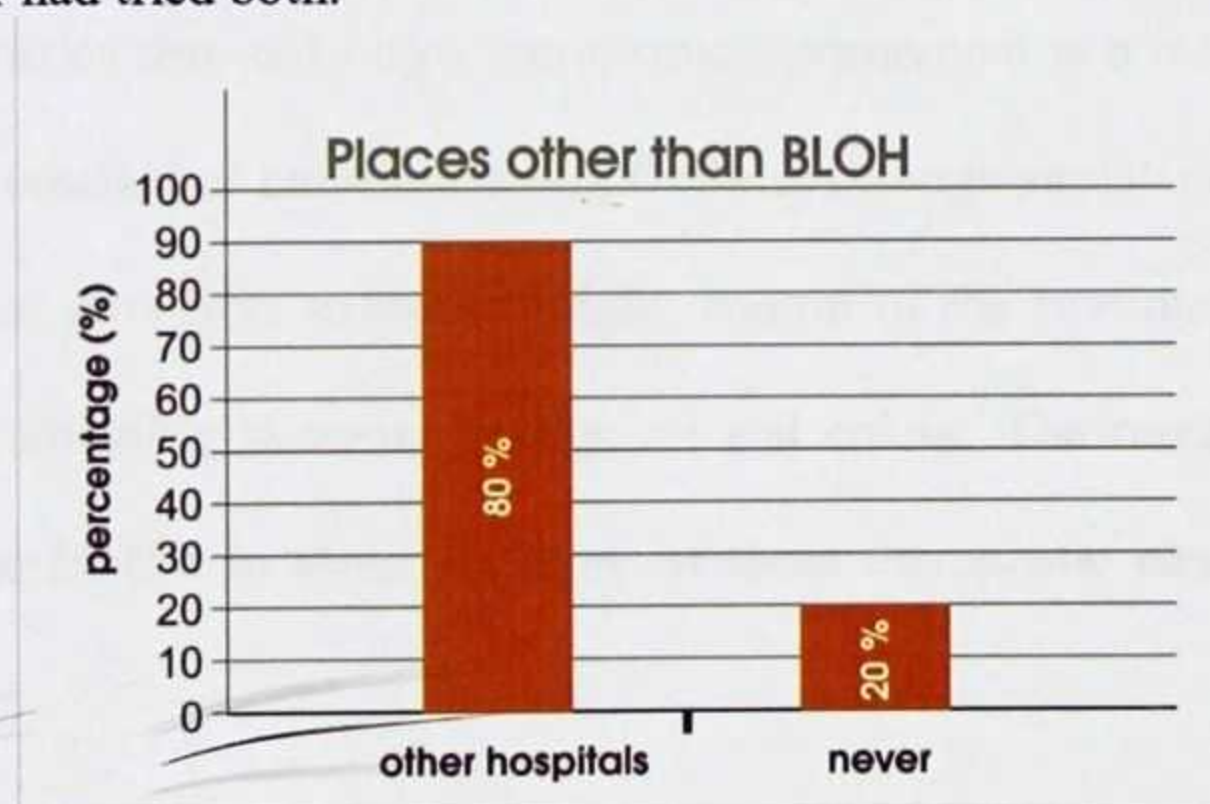


Fig. 4.1.1: Bar chart showing the places of prior visits or work (Source: Author, 2011)

Out of the four (4) staff interviewed, one (1) had been working there for a year while another one (1) had been working there for two years. The other two (2) had been working there since the facility was opened. These represent 25%, 25% and 50% respectively. This is shown in table 4.2 below.

years at BLOH (yrs)	frequency	percentage (%)
1	1	25
2	1	25
3	2	50

Table 4.2: working years at BLOH distribution table of interviewed staff (Source: Author, 2011)

4.4 Therapeutic Characteristics

Environments are considered therapeutic, that is having sanative or healing qualities, when there is direct evidence that a design intervention or elements contributes to improved staff and patient outcomes. The characteristics that make up a therapeutic environment in a modern day hospital are considered to be the creation of non-threatening facilities through site planning, landscaping, thermal comfort, fresh air provision, natural daylight, control of the environment, privacy and dignity, reduced risk of infection, acoustic quality, art and colour. The research evaluates the current conditions at the BLOH in terms of some of these therapeutic elements outlined as follows:

- **Orientation**
- **Scale**

- Nature/gardens
- Art
- Colour schemes
- Accessibility (circulation)

a) Orientation

Orientation is the property of space that communicates to the user its physical relation to other spaces. It includes access, the ability to find and gain entrance to a building, and internal orientation, the ability to locate a destination within a building.

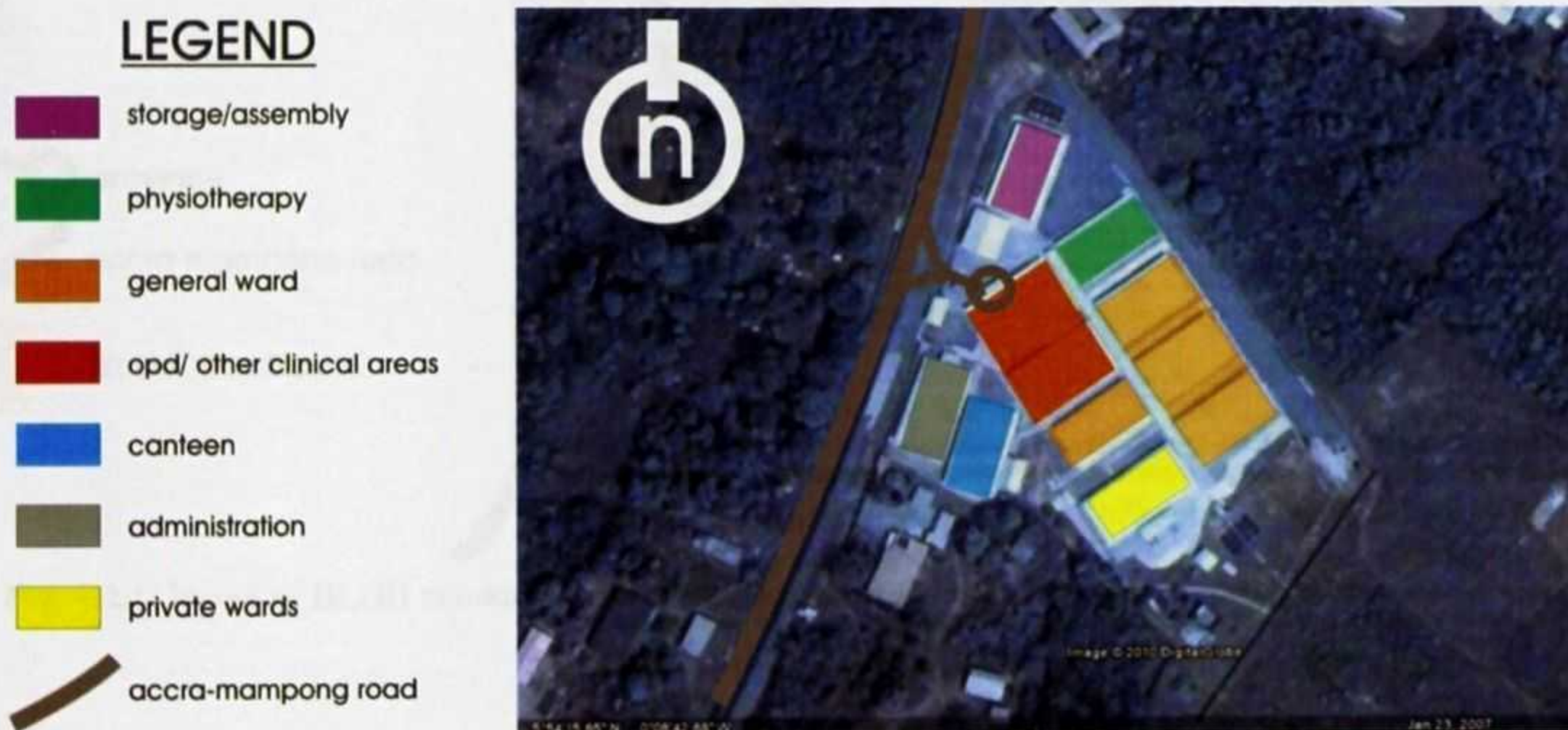


Fig. 4.2: layout of BLOH (Source: Google Earth, 2010)

The facility makes use of grid pattern layout consisting of a series of blocks and a single connection spine that links the blocks together. This is shown in the figure 4.2. The OPD/ IPD and emergency room are located within the first block, which happens to be the first point of call on entering the facility. The BLOH has a very successful orientation in that regard since it has a

clearly identifiable and legible—entrance into the facility. Entrance into the in-patients/ out patients (OPD/IPD) is located straight ahead as one enters the premises while the ambulance bay which leads to ER (emergency room) is separately located to the left of the same block. As mentioned in the literature, designing a "way-finding" process into every hospital facility is very important. This is because patients, visitors, and staff all need to know where they are, what their destination is, and how to get there and return. A patient's sense of competence is encouraged by making spaces easy to find, identify, and use without necessarily asking for help. This is exactly what the entrance at BLOH offers; easily identifiable and clearly defined entrances. This perception is echoed in the responses of almost all of the participants.

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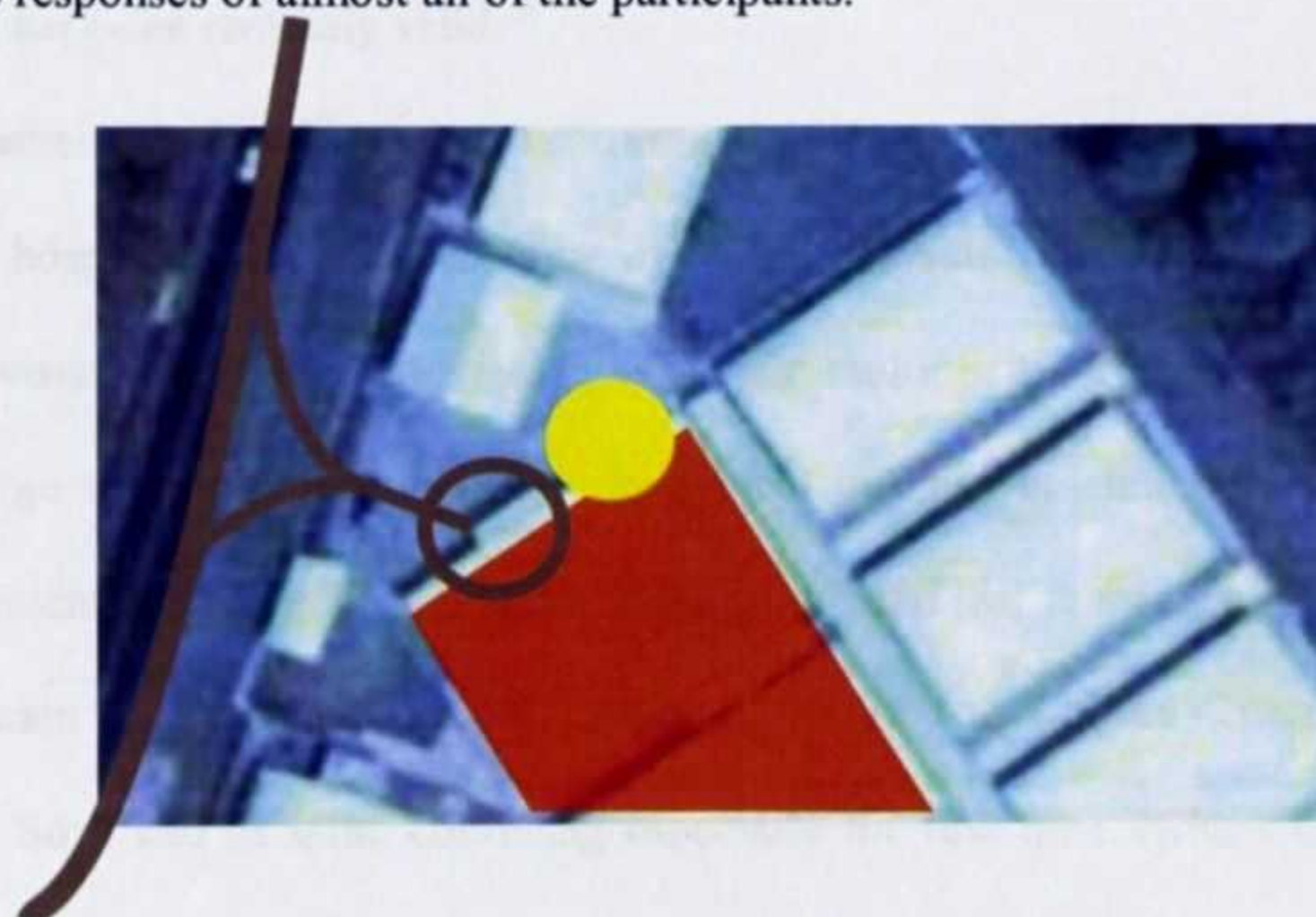


Fig. 4.2.1: layout of BLOH showing locations of entrances (Source: Google Earth, 2010)

Approximately 85.7% of the sample population felt the entrance was legible and well defined, while the other 14.28% (a mother and her son) found it rather daunting the very first time they visited the facility. She thought there are no external building cues that offer clear-cut direction such as signage. The truth is that, there is signage and the driveway naturally leads one to the frontage of the OPD/IPD/ ER block.



Plate 4.1: Ambulance bay (Source: BLOH, 2010)

Perhaps it is the legibility and the location of signage, rather than its absence that could prove elusive to visitors, making her point remotely valid.

Once inside the hospital, patients and visitors are not confronted with a choice of numerous paths as with the case of other hospitals (according to some of the participants). This feature to an extent helps reduce the visual confusion associated with such multiplicity of choices. The entrance opens onto a large waiting area which has the typical benches or similar furniture arranged in rows where patients sit and wait their turn. It must be noted that the waiting area is surrounded by the registration area, patients' records, consulting rooms 1 to 5, x-ray department as well as the laboratory. So it can be quite confusing especially for first time visitors of the place. I noted that layout of this waiting area is not very different from other hospitals I have visited. Some of the participants shared similar views. The way finding system here consists of a legible physical setting, visible and easy-to-understand signage as well as verbal directions and cues from staff and sometimes other patients all of which are well coordinated to provide assistance to patients of the facility as to where to go.



Plates 4.2 and 4.2.1: signage within facility (interior and exterior) (Source: BLOH, 2010)

When respondents (patients and visitors) were asked what they felt about the way-finding system here, 70% said it was no different from other places they had been to because they sometimes have had to ask for directions from staff and sometimes other patients. In other words their sense of self-reliance is not enhanced as they have had to make demands on staff. 20% was indifferent as that was the only hospital they had ever visited. Another 10% thought the signage and other cues were legible enough to enhance their sense of orientation. The participant staff on the other hand also mentioned that patients have sometimes had to ask for directions from them which they felt was normal as it happens in most hospitals, and confirmed that others did find their way about the place with little or no help.



Fig. 4.3: patients/visitors opinions on orientation (Source: author, 2011)

b) Scale

Architectural scale refers essentially to the relation of sizes to one another, and particularly to the relation between the size of architectural forms and spaces and that of the human figure. As the architectural historian Talbot F. Hamlin observed in 1940, "The hospital is not a house, nor is it a factory; its character must have a subtle balance of human scale and community scale . . . the quality of the surroundings of the sick person may be as important in the cure as the specific therapeutic measures themselves." In the U.S, 180 beds is the hospital average with respect to scale, while variations between 200-250 beds is the average across the U.K. The BLOH is a 200 bed facility. To that effect the BLOH is very much in very good company comparatively with standards around the world. At such a capacity, it permits the integration of hospital functions without sacrificing human scale. In other words it allows for efficient functionality of the hospital without necessarily compromising the people component of the setup. To that effect, the BLOH is apparently the largest of its kind in the West African sub region.

Nonetheless the facility makes use of single storey structures that are positioned along the slope of the site allowing for the use of a ramped spine that connect the various blocks in the facility. The facility preserves that balance between human scale and community scale. Users of the facility especially visitors, easily identify with the environment as was reflected in the responses from participants. One particularly mentioned that *"I feel a great sense of place and identity when I'm here. At a place like korle-bu, I sometimes tend to feel lost and not know where to start from."* *"Yes that's true."* was the response of the other participants in agreement with the statement during a focus group session. They intimated that they are reassured by the small, intimate environment, not far from the ground and that their connection to surrounding nature is maximized, and orientation is straightforward.

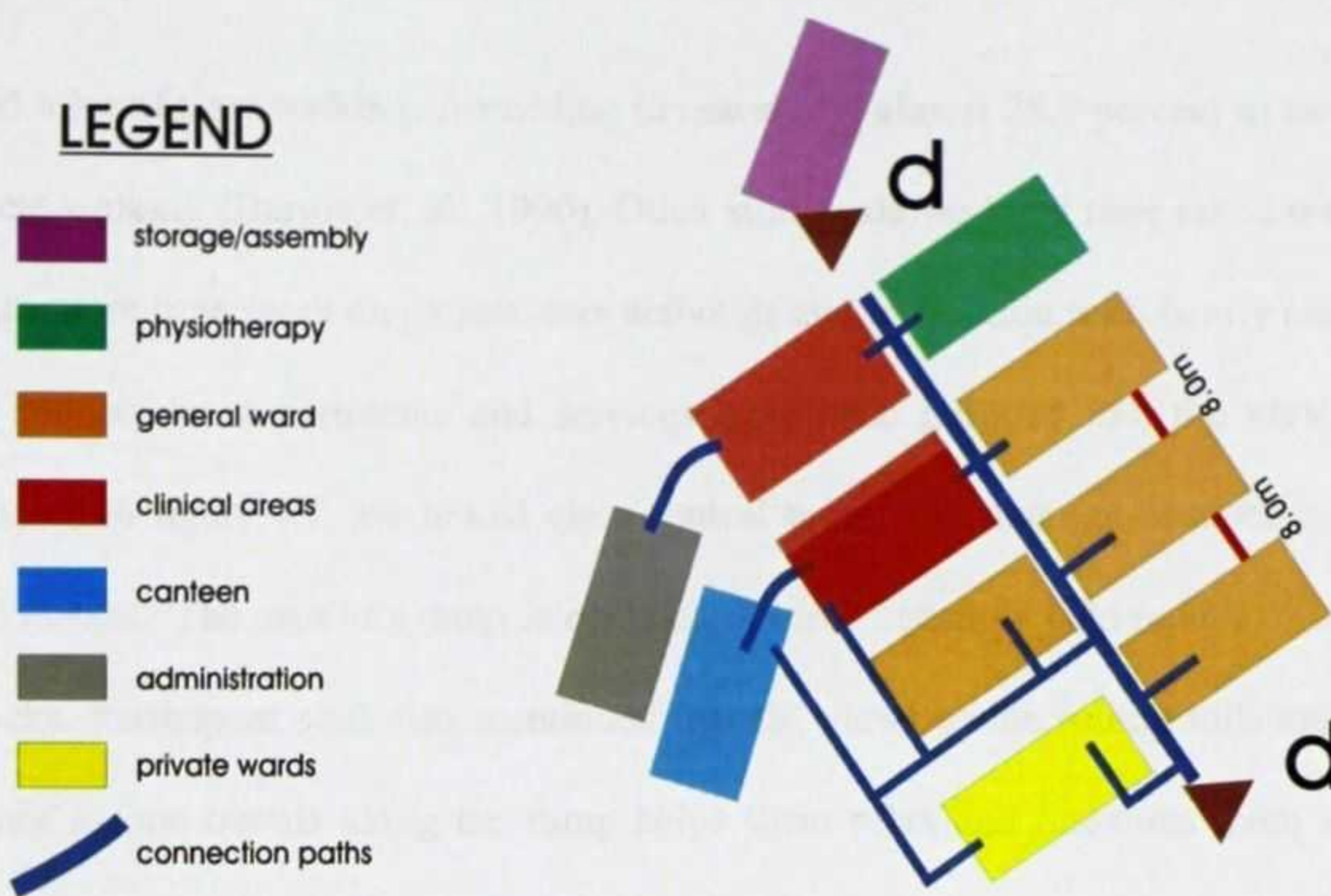


Fig. 4.4: central connection spine linking various blocks along slope (Source: author, 2011)

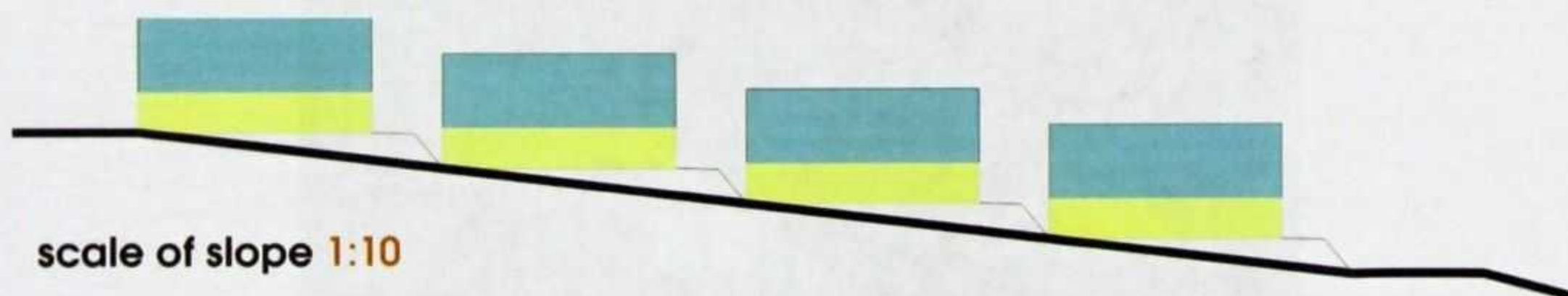


Fig. 4.4.1: Conceptual section **d-d** showing central connection spine between various blocks (Source: author, 2011)

In every hospital, hallways and lobbies are busy pedestrian environments, and their scale should be appropriate to pedestrians. Such scale is usually defined by the indoor and outdoor pedestrian environment, where distances must not be so great that users especially staff are discouraged from visiting other areas. This need for pedestrian scale in hospitals has led to the concept of "**mall hospital**", where like in a mall situation, pedestrians do not have to travel long distances to visit some shops otherwise there was the tendency of them feeling discouraged to do so.

Nurses spend a lot of time walking. According to one study, almost 28.9 percent of nursing staff time was spent walking (Burgio et. al., 1990). Other studies showed that time saved walking was translated into more time spent on patient-care activities and interaction with family members. At the BLOH, the various departments and services have been grouped into the various blocks which, as shown in figure 4.7, are linked via a central spine. The average distance between the blocks is 8.0 metres. The uses of a ramp in connecting these distances help reduce travel time in-between blocks. Participant staff also mentioned that the views of the rolling hills and greenery in the distance as one travels along the ramp helps them relax and reassures them as they go about their work.



Plate 4.3: view of the central connection spine (Source: BLOH, 2010)

One good thing worth mentioning is that though the various wards are separated, the nurses' stations are decentralized so that there is a nurse's station within the various blocks to see to needs of patients in those blocks. More importantly is the decentralization of some of the supplies. This system effectively has reduced staff walking and increased patient-care time.

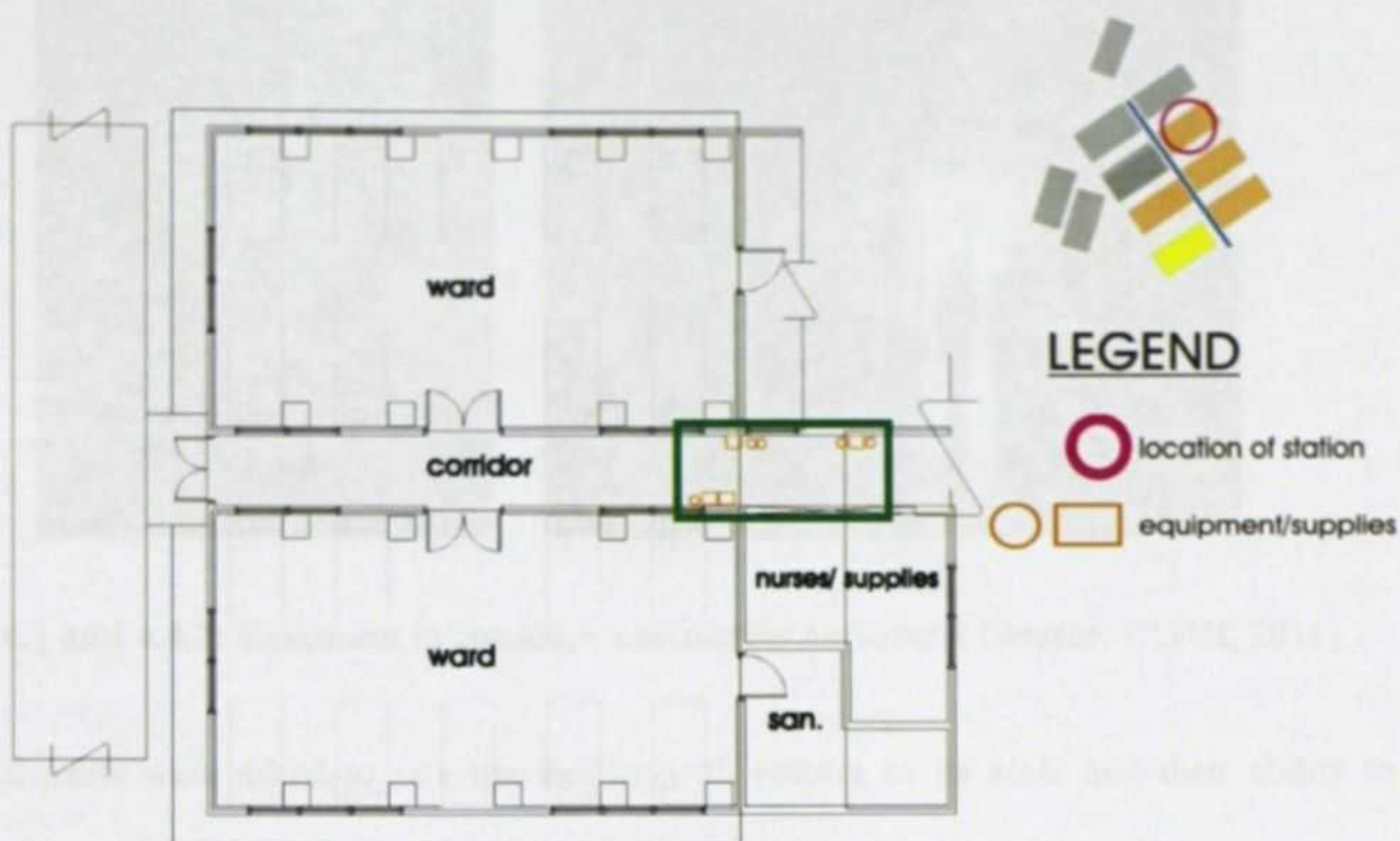


Fig. 4.4.2: portion of typical ward (Source: BLOH, 2010)

The problem however is that, due to the size of some of the equipment and supplies (decentralized) coupled with inadequate spaces to accommodate them some of the supplies are placed in corridors and pathways. This situation reduces effective width of corridors, obstruct movement creating uncomfortable situation for patients as well as staff.



Plate 4.4: view of nurses' station as indicated on plan (Source: BLOH, 2010)



Plates 4.4.1 and 4.4.2: equipment in corridors, obstructing movement (Source: BLOH, 2011)

The participants were asked to rate the facility with respect to its scale and their ability to identify with it ranging from very good, good, ok, poor and very poor. 78.57% rated it as very good, 14.28% said it was good, and a mere 7.14% thought it was ok. This is shown in the figure below.

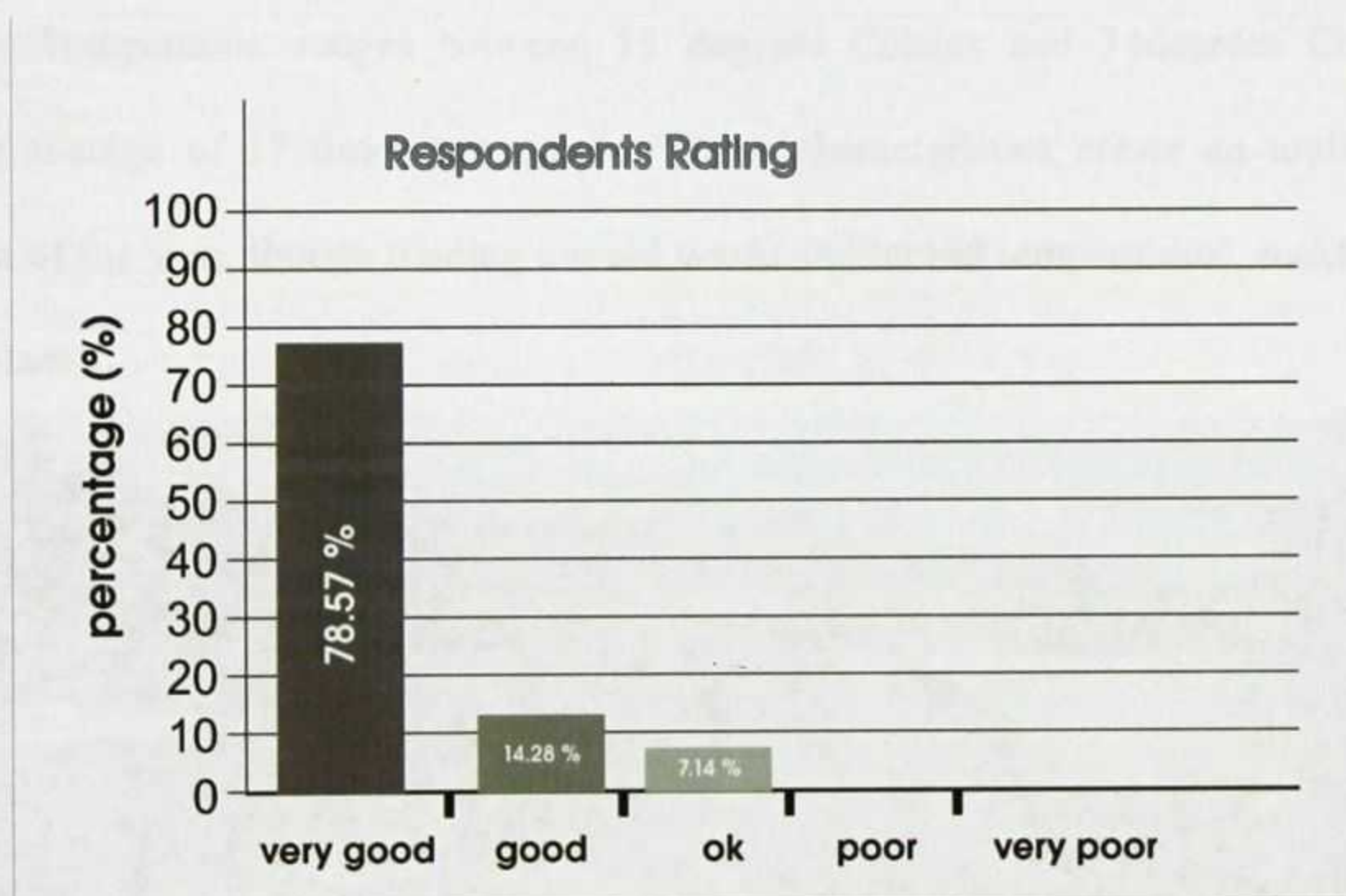


Fig. 4.4.3: effect of scale of hospital on users (Source: author, 2011)

c) Nature /gardens

From personal experience there seem to be a general sense of peace and quietude on entering the premises of the BLOH. I indeed could not point to what it was that made it so. Perhaps, it was the location, Mampong Akuapem. “We really can’t tell what the environment does, but we do know it does something.” was the response of the participant staff during the focus group session. I think their assertion underscores the importance of nature in a hospital setting. It might interest one to know that there are really no planned gardens or green landscaping on the premises particularly designed for the use by staff and particularly patients in advancement of their health. However the choice of site, with the natural greenery and rolling hills that serves as a backdrop to the entire setting arguably compensates for that omission. According to the Ghana Tourist Board, the site has air that is ten times cleaner and fresher due to its extensive vegetation and altitude. Temperature ranges between 18 degrees Celsius and 24degrees Celsius with precipitation average of 1750mm per annum. These characteristics create an idyllic weather through most of the year, though tending toward warm and humid temperatures, making the area an inviting place.



Plate 4.5: view of lush green backdrop around site (Source: BLOH, 2011)

Studies of populations other than hospital patients have produced strong evidence that even fairly brief encounters with real or simulated nature settings can elicit significant recovery from stress within three minutes to five minutes at most (Parsons & Hartig, 2000; Ulrich, 1999). That assertion could perhaps explain the overall calmness that staff at the BLOH exudes. A vast lush of greenery and hills with sparse residential development constitute the surroundings of the site. These seemingly scattered buildings could be aptly described as blots on the otherwise serene natural landscape setting. The benefits, however sublime, are not compromised to that effect. A **staff** participant who comes out once in a while to relax, stroll or visit with a patient responded, *"You can get away from the fluorescent lights, sounds, and sometimes the smells that come with the hospital; watch the scenery, the breeze. It's a good sight that helps to unwind."* As already mentioned there are no planned gardens on site. That however does not prevent the users of the facility to enjoy the green elements the site naturally offers. As part of the therapy staff brings out some of the patients so that they just sit outside in groups and enjoy the breeze and the open air whiles they share their experiences with one another. One participant responded *"I like the openness, the grass, the fresh air. Sometimes there are a lot of people around, but there's this quietness about the whole experience"*. When respondents were asked if they felt any different after spending time in the open, the most frequent and consistent response was: *"Yes. Feel relaxed."*

Nature reduces stress and pain. It serves as positive distraction that diverts patients from focusing on their distress or predicament.



Fig. 4.5: lush of natural green landscaping envelopes site (Source: Google Earth, 2010)

To some extent, some of the external landscape views can be enjoyed from certain spaces within the buildings. In other words not all the spaces can afford occupants views of the outside greenery. One would have expected that some greenery would have been brought to the interiors by use of potted plants for example. There was not a single space that had natural elements within. That notwithstanding it is worth mentioning that spaces such as the wards in particular afforded some degree of views. This implies that some patients, but not all, within some of the wards can connect with nature outside. Another area that also benefits from a connection with nature from within the building is the physiotherapy area. This is very good because a lot of the patients spend a lot of time in the physiotherapy area.

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Fig. 4.5.1: ratio of soft to hard landscaping on site and around site (Source: Google Earth, 2010)

However, I believe the idea of experiencing nature within the site would have been more complete essential if properly planned gardens were created and incorporated into the site layout. As it stands, users' have to make do with the vast lush green outside of the site's perimeter and the scanty patches of greenery on site. The ratio of hard landscaping to soft landscaping is hypothetically 65% to 35% as depicted in figure 4.9 above.

As mentioned earlier, respondents were asked if they felt any different after they had spent time out in the natural setting. The language in their responses was used to determine the range of mood changes which were escape from work, relaxed, refreshed and so on. 58.33% mentioned relaxed, 16.67% mentioned refreshed and reassurance, 8.33% cited escape from work whiles another 8.33 felt indifferent.

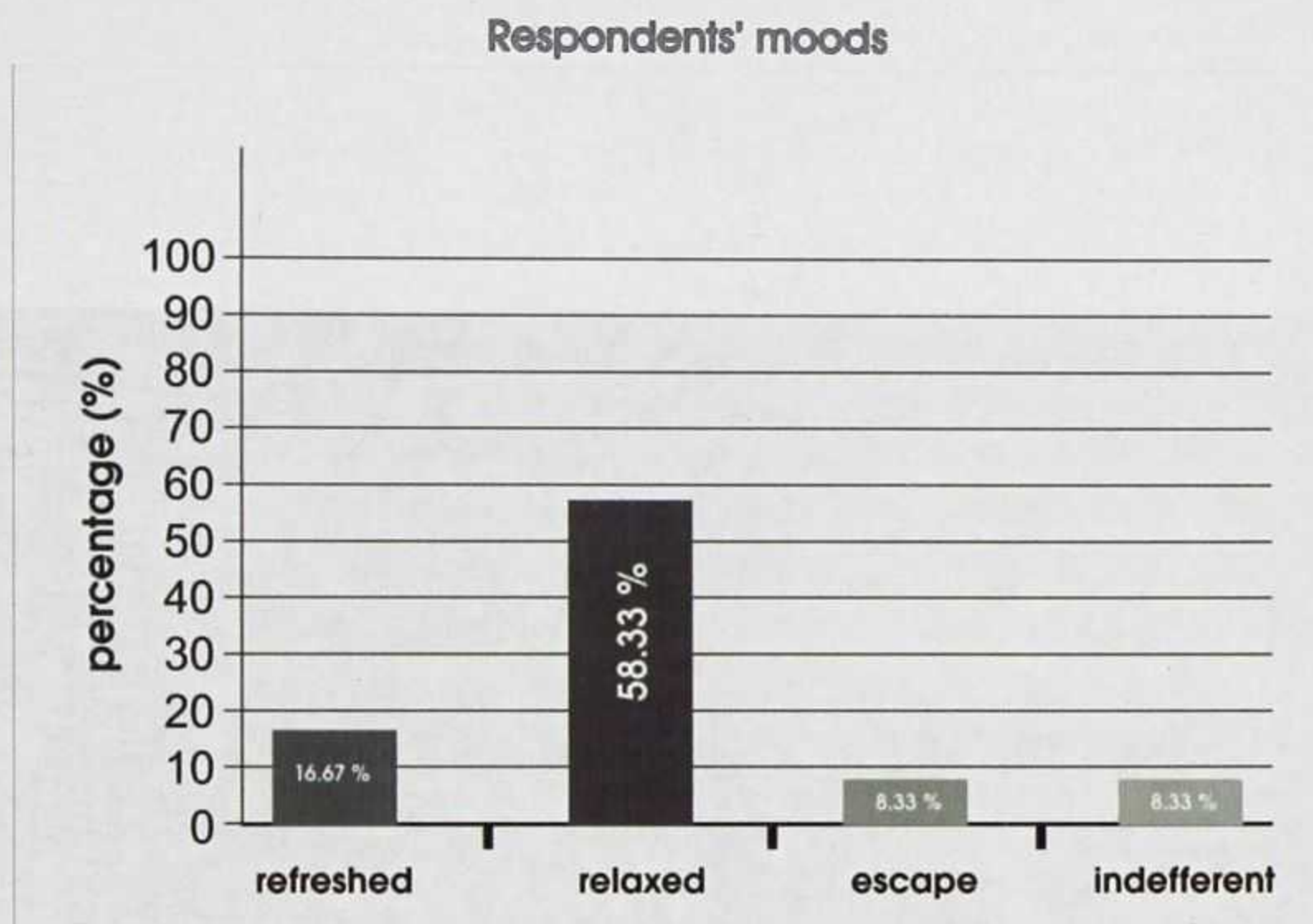


Fig. 4.5.2: types of mood changes (Source: author, 2011)

The spaces between the buildings could have been treated with soft landscaping even on the retaining walls instead of the predominant hard landscaping. This would have allowed for a more wholesome experience for those with views onto the spaces in-between the buildings.



Plate 4.5.1: areas in-between buildings where landscaping can be enhanced marked in red (Source: BLOH, 2011)



Plate 4.5.1B: areas in-between buildings where landscaping can be enhanced marked in red (Source: BLOH, 2011)

d) Art

Another keen observation was the complete lack of art pieces in the facility. Art pieces are very scanty and their placement is such that they could even go unnoticed. According to The New York Times, Rikshospitalet University Hospital in Oslo, Norway is being used as a model for the rest of Europe, and designers from all over the world have been coming to Oslo to learn from it. Its art collection is the largest public collection of art in Norway outside a museum. The reason being that research studies on art in hospitals have yielded findings parallel to those from nature research. Indeed patients feel more at home in hospital settings with a lot of art and tend to heal quicker. It must be noted that, art must be representational rather than chaotic or abstract as patients react positively to the former and negatively to the latter (Ulrich & Gilpin, 2003).



Plate 4.6: the only art piece in the reception area (Source: BLOH, 2011)

At BLOH however, there notably was only one art piece in the whole of the reception area as shown in plate 4.8. The drab blank walls could have been embellished with a lot more art pieces since the reception is essentially the first point of call for patients and visitors alike. It also has a large waiting area which means it holds a significant density so a generous display of representational art and sculptural pieces could have been ideal as it would help occupants relax.

On the other hand, the few art pieces that are located in the corridors of the wards are essentially abstract. There was not a single piece of art in any of the general wards visited. Carpman & Grant (1993) studied the preferences of 300 randomly selected inpatients and concluded that the patients consistently preferred nature images but disliked abstract art. In other words, although nature pictures and other emotionally appropriate art elicit positive reactions, there is also evidence that inappropriate art styles or image subject matter can increase stress and worsen other outcomes.

Based on these findings, it could be said that the choice of art pieces especially in the wards is fundamentally inappropriate. As much as possible ambiguous or surreal art should be avoided. Wall-mounted representational art and particularly nature art should be displayed as it would help patients have positive feelings and associations with them. The wall-mounted art pieces in the wards are shown in plate 4.9.



Plate 4.6.1: abstract art and prints in the corridors of wards (Source: BLOH, 2011)

Samples of wall-mounted nature art and representational art are located in the children's section of the physiotherapy block. This is a very positive element of the design attributes of the BLOH as it would have a positive impact on the kids, however subtle it may be. These are depicted in the plates below.



Plate 4.6.2: representational and nature art in children's ward (Source: BLOH, 2011)

The fact that there has been an attempt to incorporate some art in the facility is a very positive and commendable effort as it is a prominent feature in current trends with respect to hospital design. However the idea needs to be properly and thoroughly carried through with a selection of

a good number of appropriate art pieces that could be wall-mounted in certain vital spaces such as wards.

e) **Colour**

According to an article by Linda Trent (1994) on the importance of colour in health facilities, the way a place looks and its aesthetics always plays an important role in how people respond to time spent there. In a health facility such as a nursing home, for example, that response can have much to do with an occupant's comfort and wellness. She asserts that it is no longer enough to "paint everything blue" in an attempt to provide a calming and comforting effect. There is the need to think through the colour scheme in order to create a healing environment.

Recent trends in healthcare facility design have emphasized the need to create a home-like surrounding, even though the materials used must have the "industrial strength" quality required to weather the use of medical and assistive equipment and the routine application of strong cleaning agents.

At BLOH, colour is a prime factor in the aesthetics of the rooms. Indeed, there are no hard and fast rules as to how colour should be applied (Trent, 1994), but the basic guidelines have been implemented. Colour can significantly influence human behaviour. At the nurses' station at wards for example, cool and reflective colours have been used so as to elicit a sense of calmness among the nurses. This could possibly among other factors, explain the fact that has been no

reports of verbal abuse from any member of staff on patients. At least none since the facility was officially opened. This fact is attested to by the sample population.

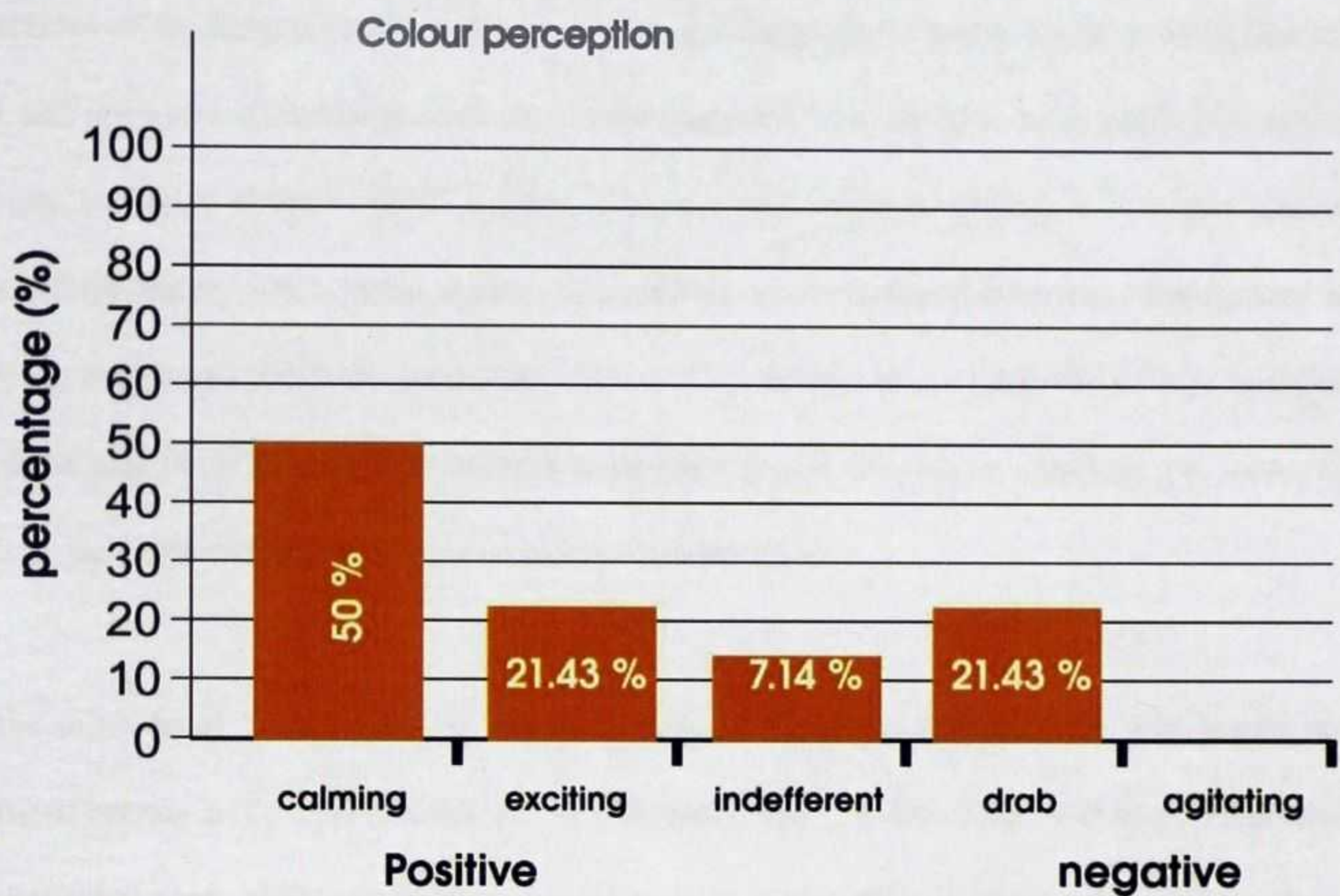


Fig 4.6: respondents’ perception of colour schemes (Source: author, 2011)

Respondents were asked what their perception of the general colour scheme was. The response chart was grouped into negative and positive. The colours’ calming (peaceful) and visually exciting (cheerful) effect were on the positive end of the spectrum while it’s wearisome (depressing) and boring effect were on the negative end. 7 of them felt it is calming (50%), 3 and thought it is exciting (21.43%). Surprisingly, another 3 also felt it was drab and boring (21.43%) which just goes to underscore how different people perceive the same set of colours in an

environment differently. 1 person (7.14%), however felt indifferent about the scheme as shown in figure 5.0.

In sections of the hospital such as the reception and out-patients areas, social colours that reflect light and are more stimulating such as creams and dark browns have been used. The reflective property of these colours helps reduce shadows and improve visibility, thereby enhancing productivity among staff. These colours further help create a non-distracting environment while reducing stress and eliminating tension. Since those areas can typically hold large numbers of people at any point in time, the colours encourage social interaction amongst the users of the space at the point in time creating a sense of reassurance.

On the other hand, sections of the hospital such as the physiotherapy area and wards have a palette of neutral and pastel colours with a few visual accents. The colours at some areas are mix of contrasting tones whiles they are a compliment of one another in other areas. Within the same block for example, each ward has a different colour schemes. Ward A has a pink colour scheme, ward B has a green colour scheme and ward C has a blue colour scheme. These are very cool colours which help to soothe and calm occupants of the wards. They also make the spaces feel lighter and spacious which gives occupants a psychological lift. Apart from that, they also serve as a way finding and orientation technique within the blocks, acting as visual aids that help patients in particular to find their way about without much assistance. This helps reduce patients stress and anxiety.

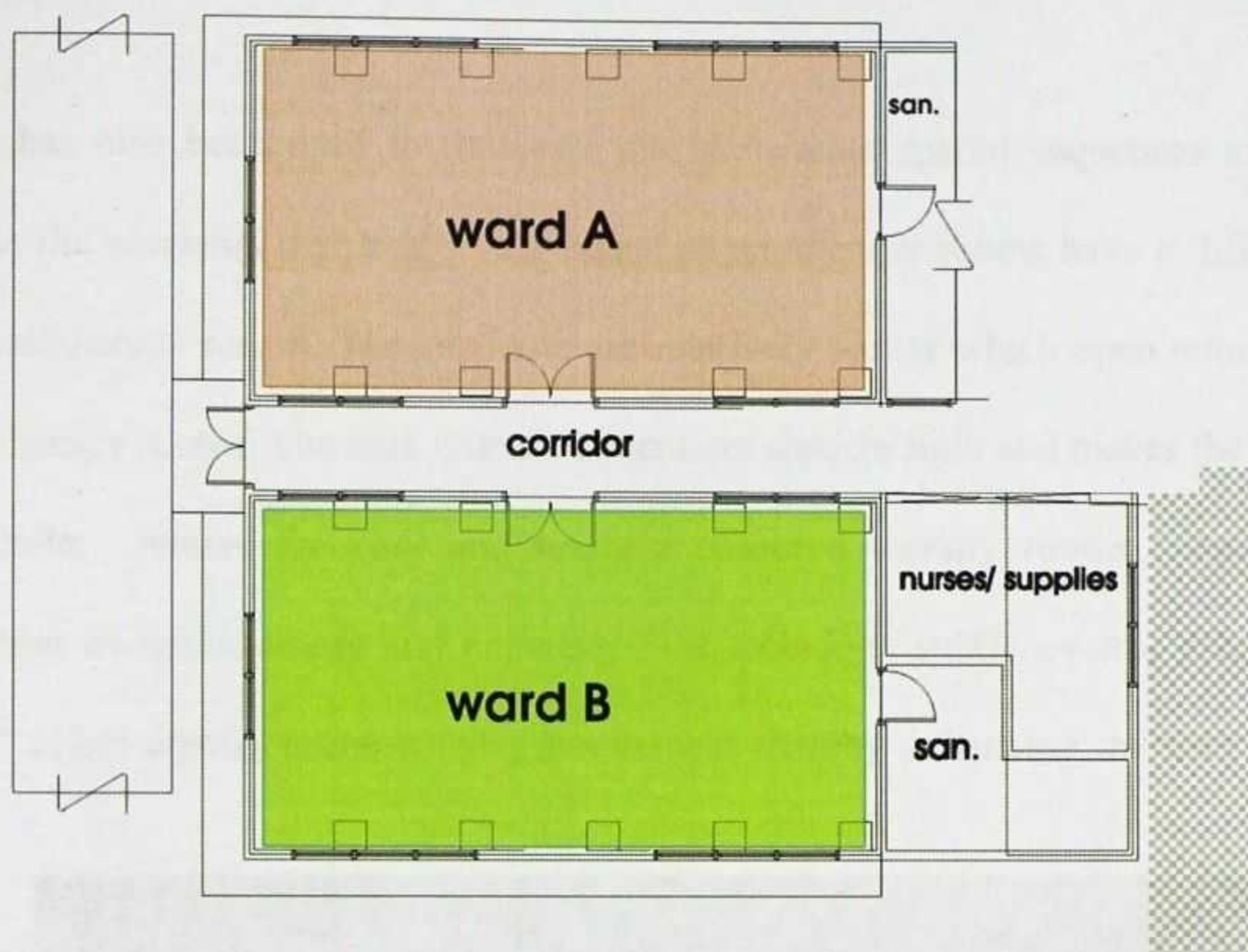


Fig. 4.6.1: different colour schemes for wards (Source: BLOH, 2010)

All the ceilings throughout the facility have white steel ceilings and roof. The bright coloured roof and ceilings helps to reflect heat and cut out solar insolation thereby keeping the temperature of the wards very cool and comfortable.



Plate 4.7: views of various wards showing different colour schemes (Source: BLOH, 2010)

Colour has also been used to delineate and demarcate spatial sequences and hierarchy. For example the corridors that lead to the actual physiotherapy rooms have a different colour from the physiotherapy rooms. The corridors are relatively darker which open onto brightly coloured and lit therapy rooms. The dark coloured corridors absorb light and makes the space feel heavier and smaller while the cool and brightly coloured therapy rooms create a psychological impression of spaciousness and expanse. This technique subtly evokes a brief “suppress and relieve” effect among users, causing excitement thereby enhancing the user experience of the place.



Plate 4.7.1: view of relatively dark corridor opening onto a bright lit room in the background (Source: BLOH, 2010)

In sum, colours scheme is generally good as is reflected in the colour perception chart. It however resonates the fact that colour selection should be done with the users of the particular space in mind. That as much as possible colour palette should be selected taking cognisance of factors such as type of patient and length of stay as patients have peculiar needs and perception.

The idea is to keep space looking refreshing and interesting, day-in day-out with clearly defined visual cues (Trent, 1994).

f) Accessibility (circulation)

According to James Curl (2000), accessibility in architecture is essentially design for those with physical or other disabilities, involving the provision of alternative means of access to steps, for example, ramps and lifts (elevators) for those with mobility problems. It is also called barrier universal or barrier-free design. The concept of barrier-free design has been around for over 20 years, and its meaning continues to evolve (Glynn and Millar, 2012). It is an approach to design which recognizes the range of people that make up our society. It is based on the recognition that people who use the built environment are not all of the same shape, size and strength.

At a facility such as BLOH, this assertion strongly comes to play as it is primarily concerned with rehabilitation for polio victims and the physically disabled. There has been a conscious effort to make the environment accessible and useable by all persons. This has to some extent created an atmosphere that is safe, dignified and functional for all users of the facility. To begin with, the site (location of the facility) slopes such that certain site adaptations had to be made in order to accommodate the facility and make it habitable for that matter. Evidently, a lot of cutting and filling was made during the construction phase as some of the buildings had sub-basements which are being used as storage spaces as shown in plate 4.7.2 below.



Plate 4.7.2: view of sub-basement as storage spaces (Source: BLOH, 2010)

Essentially, different vertical levels were created between the buildings at certain intervals that required a connective or circulation (vertical) element for easy movement between the levels. To that effect a ramp is provided which also acts as a central connection spine between the rows of blocks. The ramp is what is used to connect between the various buildings at the varying levels created by the site slopes and the resultant adaptations.

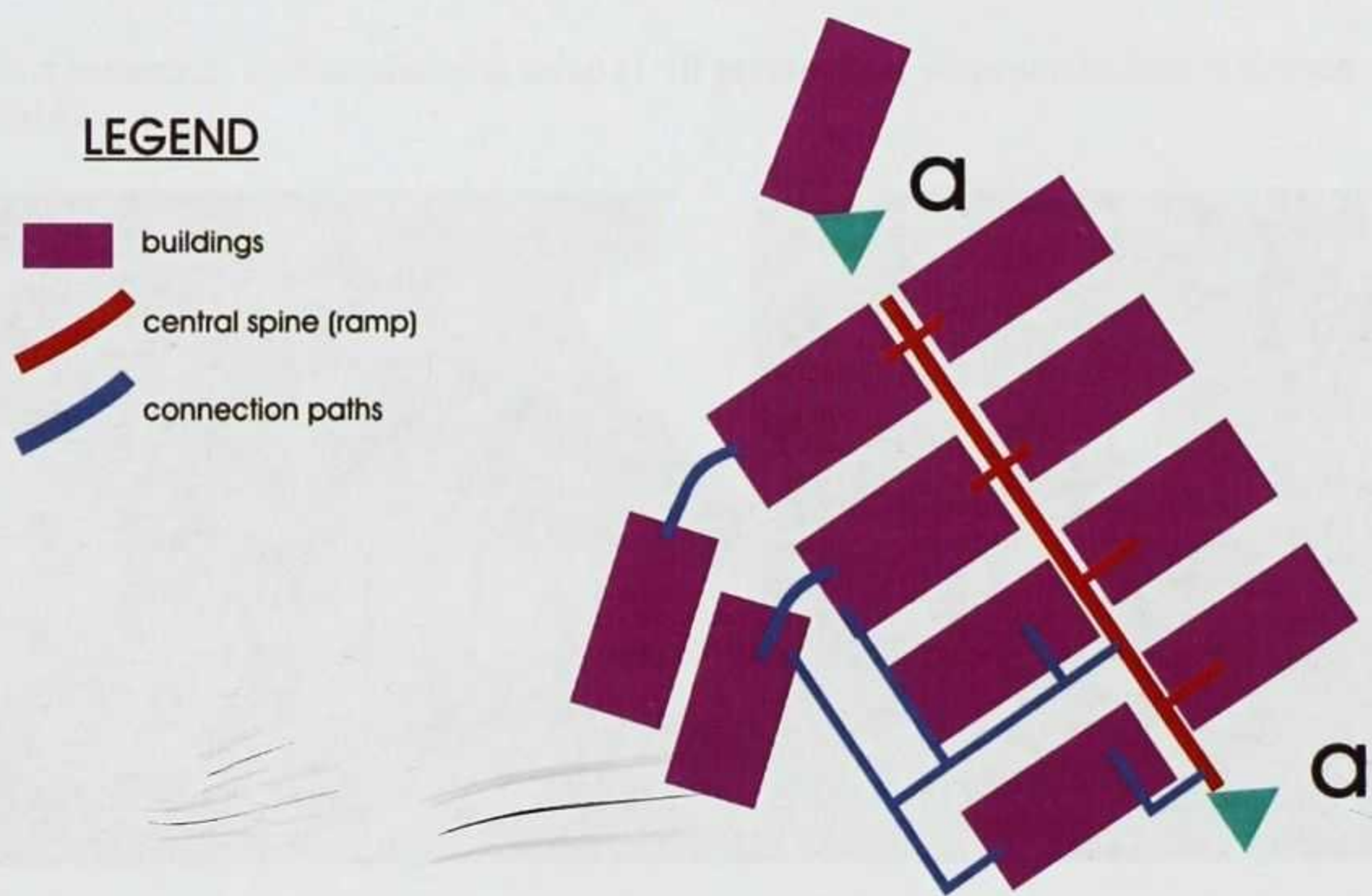


Fig. 4.6.2: central ramp as accessibility element connecting different levels on site (Source: BLOH, 2010)

The above figure (4.6.1) is a schematic representation of the buildings on site and how they are connected via a central ramp which is indicated in red. It must be noted that the central ramp is also covered which ties the entire setup into one compact and functional entity. Other walkways and paths on site that lead to other locations within the setting are also connected to the main central spine. The gradient of the ramp is one in ten (1:10). This allows handicapped patients especially wheelchair users to easily traverse between the levels with little or no assistance. It also allows staff such as nurses and doctors alike to efficiently vertically connect between the various blocks along the spine. It also has a textured non-slip finish. The ramp is schematically represented in the figure below.

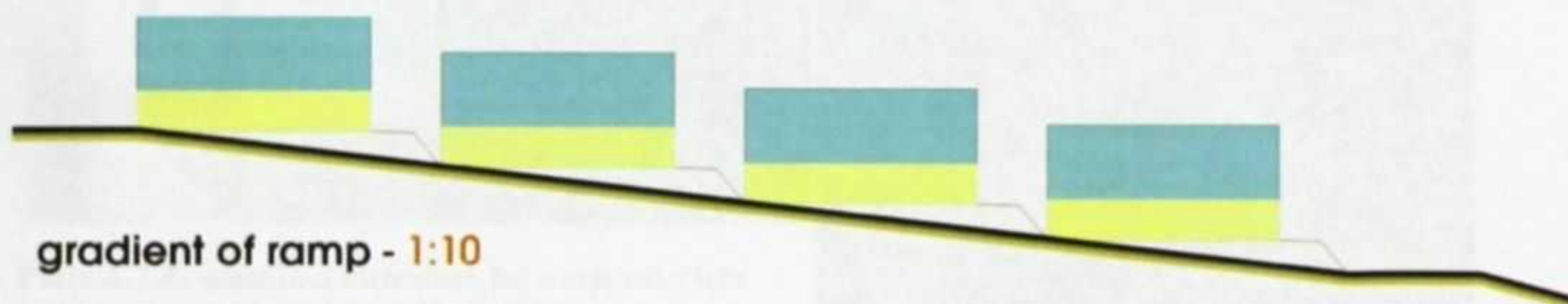


Fig. 4.6.3: a schematic section showing ramp (1:10 gradient) as vertical circulation element (Source: BLOH, 2010)



Plate 4.7.3: central ramp as accessibility element within hospital (Source: BLOH, 2010)

Another notable accessibility feature is the connection between exteriors and interiors such that the change in level is almost non-existent. The spaces seamlessly glide into each other in a way that there is no physical obstruction to the change in level. This was achieved through the use of very gentle ramps or the floor levels were made the same between the spaces (exterior and interior) making all the spaces very accessible and barrier free in that regard.



Plate 4.7.4: seamless transition between exteriors and interiors (Source: BLOH, 2010)



Other accessibility features include the provision of sanitary facilities that have allowance for wheelchair manoeuvres. There also were installations of hand railings in toilets that aid handicapped users when they used the facility. These are illustrated in the plates below



Plate 4.7.5: large sanitary spaces fitted with handrails to accommodate and aid wheelchair users
(Source: BLOH, 2010)

It can be concluded that BLOH has accessibility interventions that make the facility very user-friendly and useable by all persons. The barrier-free elements make it very accommodating, supportive and convenient.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusion

Undeniably, every design decision with respect to our environment very much affect our wellbeing and our lives as a whole. Evidence of the relationship between our surroundings and our wellness is stronger than ever. To that effect, current trends with respect to the design of hospitals and health care facilities have emphasized the need to migrate from intuitive design approach to one that is evidence based (evidence-based design). More often than not the former approach reflects ideology rather than empirical evidence. Evidence Based Design (EBD) is proving to be more result oriented on a win-win disposition. In the sense that inasmuch as it looks to enhance clinical outcomes it also is very much user-centred. In other words, it emphasizes the need to add patients' experience of their health care journey to the drivers of design.

The idea is to create a therapeutic environment within health facilities which is premised on the assertion that healing should start with the design of the facility itself rather than that doctor or nurse and drugs patients come to see and receive. And as has been demonstrated by the literature, a number of interventions have been developed which has further evolved to the question of how to combine the range of interventions available to achieve desired results. Imperatively, stakeholders in the design field in Ghana need to adapt to EBD approach to health facilities especially. The findings of this research interestingly lend credence to the fact that there is the need to incorporate and apply some of these modern evidence based design interventions to our hospitals and essentially other design projects.

One key message that has emerged from this research is that, as some of these interventions have been applied at the BLOH, there has been an evident establishment of a link between these variables and staff stress and effectiveness, patient safety, patient stress and healing and improved overall health care quality and satisfaction. It must be noted that, the idea of these interventions and approach is not to simply create fanciful or nicer hospitals and facades, but rather to create hospitals that help rather than hinder recovery. So that we create environments that can support activities of patients, visitors and friends while encouraging staff to do their jobs better.

In summary, what is required is a new way of looking at health facilities (hospitals) and approach to their design. They should not be solely viewed from the perspective of just buildings, beds or specialties, but from that of the healing path taken by the patients who are treated in them and the processes delivered by the health professionals who spend their working lives in them. This should help improve the patient and staff experience and support clinical and operational efficiency and effectiveness. Lizette Alvarez (2004) aptly summed it up in an article in the New York Times:

"The idea is obvious: Build inviting, soothing hospitals, graced with soft lighting, inspiring views, single rooms, curved corridors, relaxing gardens and lots of art, and patients will heal quicker, nurses will remain loyal to their employers and doctors will perform better."

5.2 Recommendations

The issues raised in this research immediately point to a number of recommendations and actions that can be considered:

- As the findings from the research revealed, there is no planned and carefully thought out garden on the BLOH premises to further advance the healing process and enhance the user experience of the place. As it stands, the ratio of hard landscaped areas to soft landscaped areas on the site is 65% to 35%. However the vast lush of natural greenery that envelope the site on the north-east through to the south-west of it compensates for it only so much. And the fact that some of the respondents suggested the creation of a garden on site goes without saying that when it is provided, it will richly enhance the users' journey through their healing process as it would allow them to engage with it on a personal level.
- Further on the issue of landscaping, the spaces between the buildings that have concrete patches and brick pavers as retaining wall finishes could be replaced with green grass field and a plants. To that end, patients in rooms that have windows overlooking those spaces can enjoy those views and enjoy the benefits that come with it.

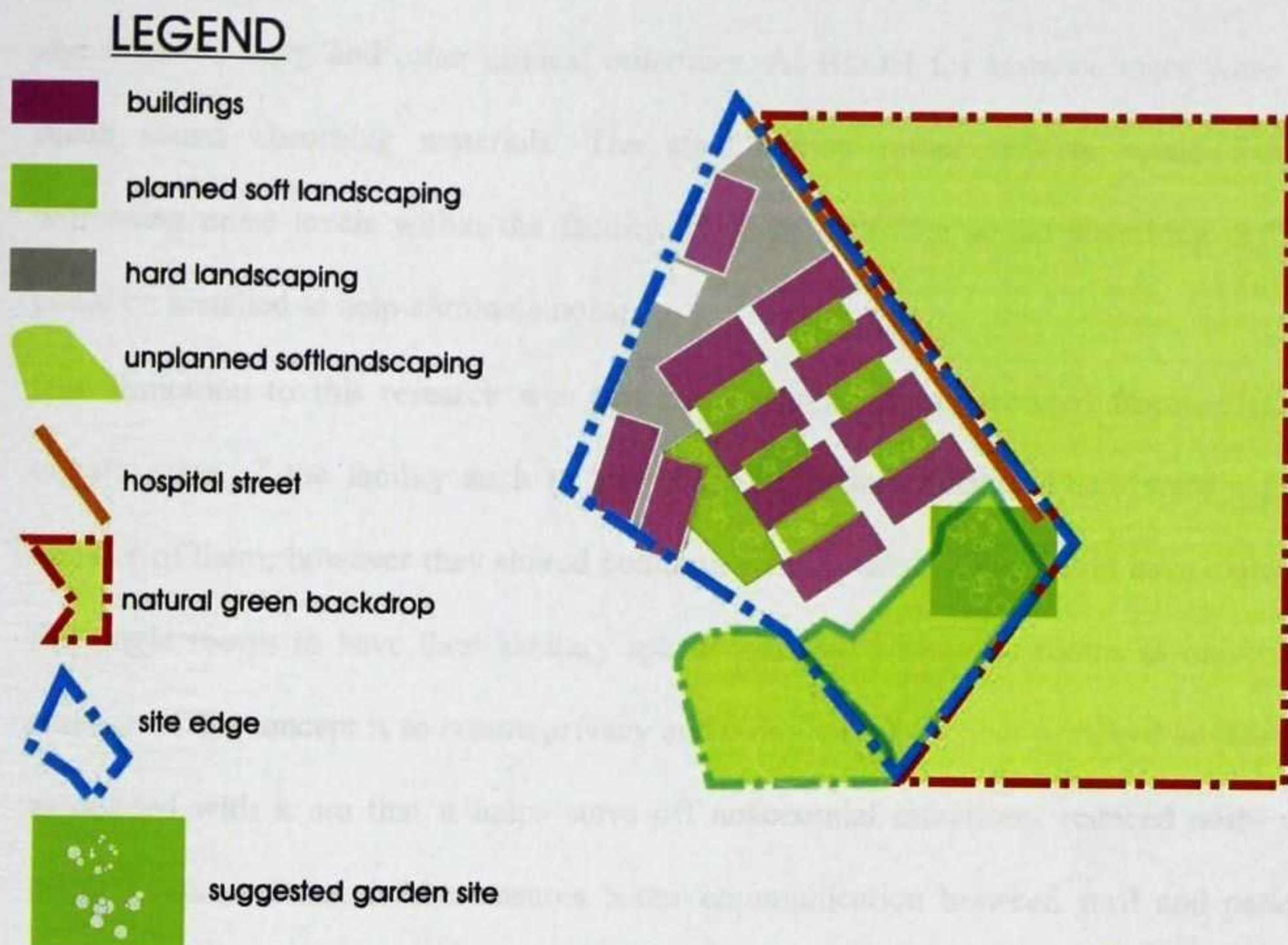


Fig.5.0: landscape suggestions (Source: author, 2012)

- Another revelation to be addressed is inadequate art pieces which could have been used to embellish the numerous blank walls throughout the facility. The findings also revealed that there was not a single art piece in any of the wards. The wall-mounted ones in the corridors also are abstract art that has the tendency to agitate patients. Representational art of nature scenes for example, could be used to help reduce stress as well as serve as a positive distraction. Art could also be displayed on the walls in the wards to make the spaces feel more humane by creating an environment that contributes to therapy of the occupants (patients).

- There should be a conscious effort to make new hospitals much quieter to reduce stress and improve sleep and other clinical outcomes. At BLOH for instance there were not much sound absorbing materials. The steel ceiling rather reflects sound thereby worsening noise levels within the facility. High-performance sound absorbing ceilings could be installed to help eliminate noise.
- One limitation to this research was that the researcher was restricted from accessing certain areas of the facility such as the single occupancy rooms. There were a good number of them; however they shared common sanitary areas. One would have expected the single rooms to have their sanitary spaces installed within the rooms as one major essence of the concept is to ensure privacy and confidentiality. Other principal advantages associated with it are that it helps stave off nosocomial infections, reduced noise and fewer medical errors. It also ensures better communication between staff and patient, draws more visits from friends and family members as well as providing superior accommodation for them. Ultimately, there is higher satisfaction with overall quality of care.
- Regular maintenance should be carried where necessary to sustain sanity and avoid deterioration. There is strong evidence that design changes that have the tendency to make the environment more comfortable, informative and aesthetically pleasing helps relieve patients stress and fatigue as well as an increased satisfaction with care provided. Another study revealed that environmental satisfaction had a telling effect on response to treatment and overall satisfaction. Essentially, renovating a waiting area in a clinic for example, by making little alterations furniture, colour scheme and general layout results in positive environmental appraisal of exponential proportions. Patients in such an

environment experience improved moods, reported greater satisfaction as well as an altered physiological and psychological state (Leather *et. al.*, 2003)

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APPENDICES

This section carries information on aspects of the research issues and findings that have been applied in the design thesis. For the purposes of clarity, it has been categorized into the design concept variables that were considered and evaluated with respect to creation of therapeutic environment within the Bryan Lowe Orthopaedic Hospital facility. The categories are as follows:

- **Orientation**
- **Scale**
- **Nature/gardens**
- **Art**
- **Colour schemes**
- **Accessibility (circulation)**

The thesis is a design of a rejuvenative health village.

appendix A:

a) Orientation

Orientation is the property of space that communicates to the user its physical relation to other spaces. At BLOH, this has been created taking into account the slope of the site. So that spaces such as administration and waiting areas are located up hill, while the more private spaces such as wards are located downhill towards. This allows patients to find their way by the hierarchy created. A similar approach is used in the design thesis. Spatial hierarchy is

created by segregating areas into **public, semi-public and private spaces**. The public spaces generally are located up the hill in succession, while the private spaces, occasionally interspersed with the semi-public ones are located midway, through to downhill the site towards the rolling hills. After the parking lot, the administration block is the next point of call from where guests are ushered into the facility. It opens up behind it onto a courtyard that links it to the main block that houses the clinical and alternative health forms that are administered indoors. The block is also flanked to the north by the restaurant and the water fall side eating areas and to the south by the recreational areas. This sequence allows for easy way finding. Clear and legible signage is also used where necessary. Spatial hierarchy is shown in block plan below.

Block plan



Plate 6.0 the block plan (source: author, 2011)

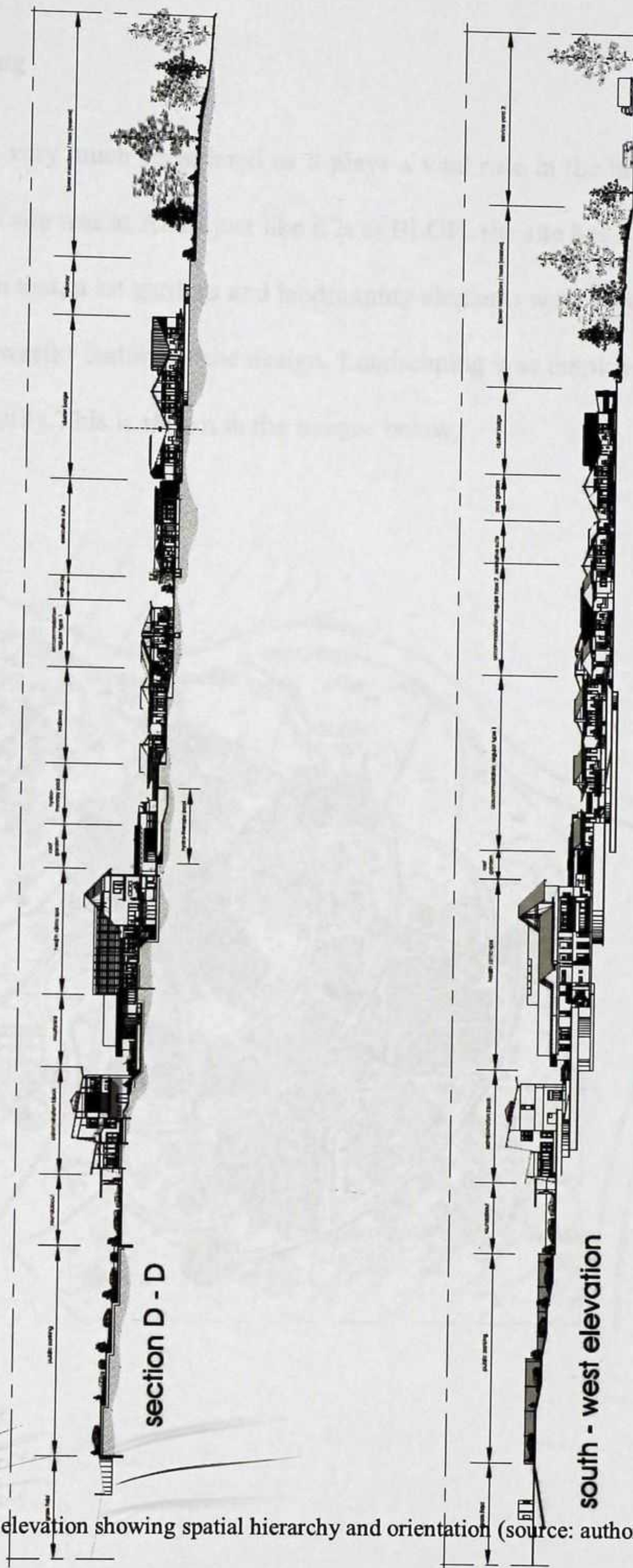


Fig 6.0 site section and elevation showing spatial hierarchy and orientation (source: author, 2011)

b) landscaping

Landscaping was very much considered as it plays a vital role in the healing process. To begin with, the choice of site was at Aburi just like it is at BLOH. the site has a natural green landscape setting. Apart from that, a lot gardens and landscaping elements were created and incorporated in the design as a powerful feature of the design. Landscaping was employed both in interiors and exteriors of the facility. This is shown in the images below.

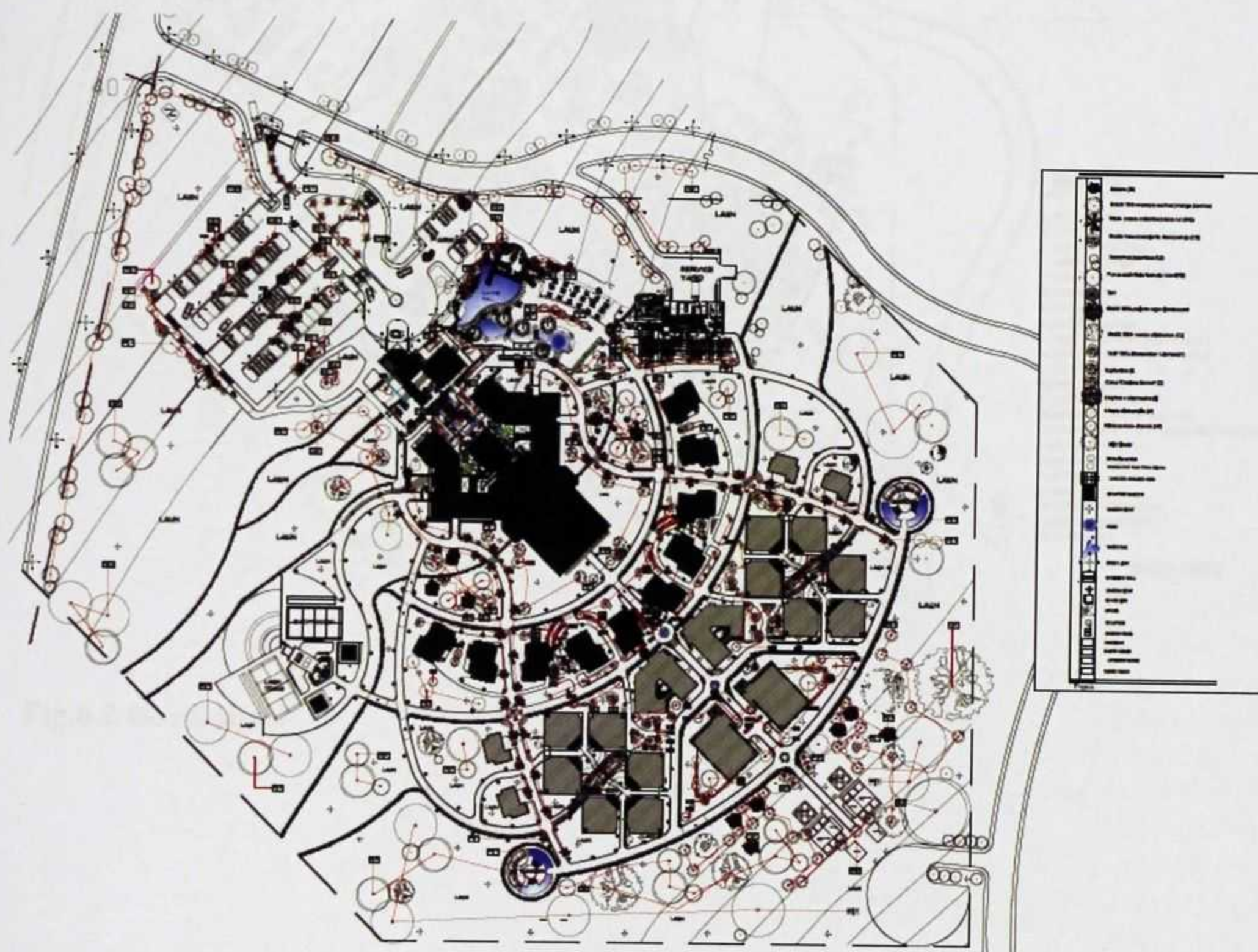


Fig.6.1 landscape layout

appendix B:

Drawings (line works)

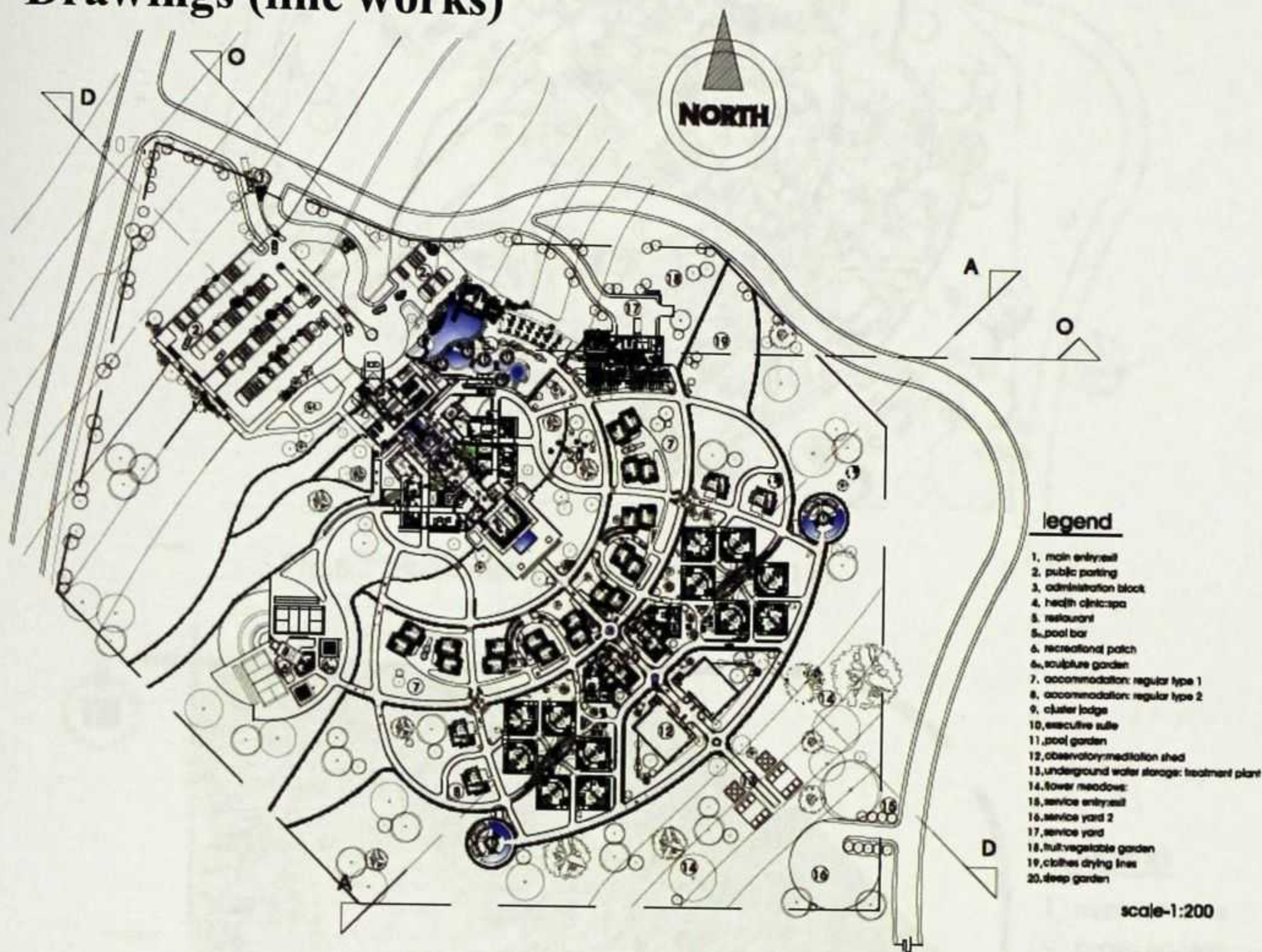
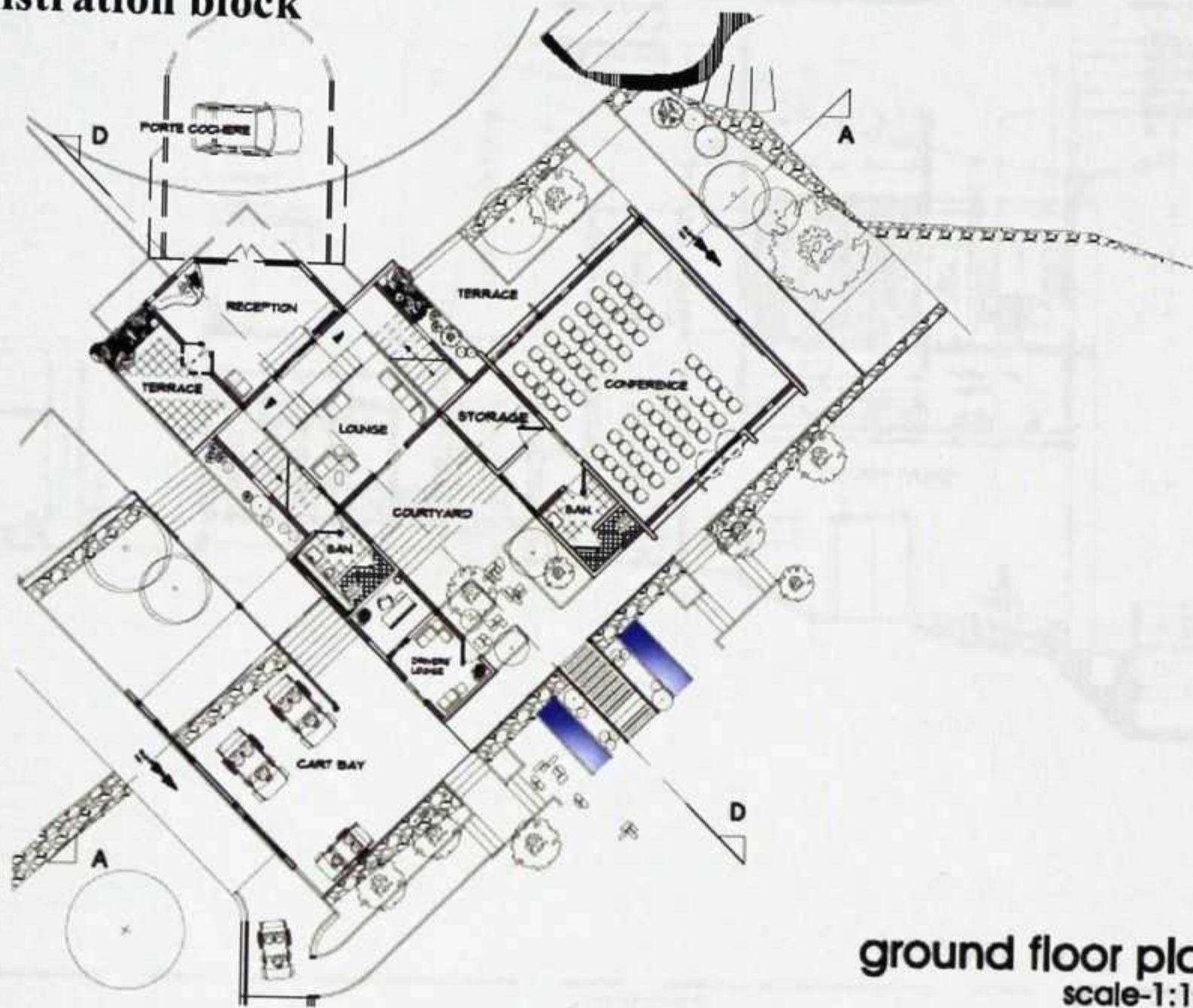


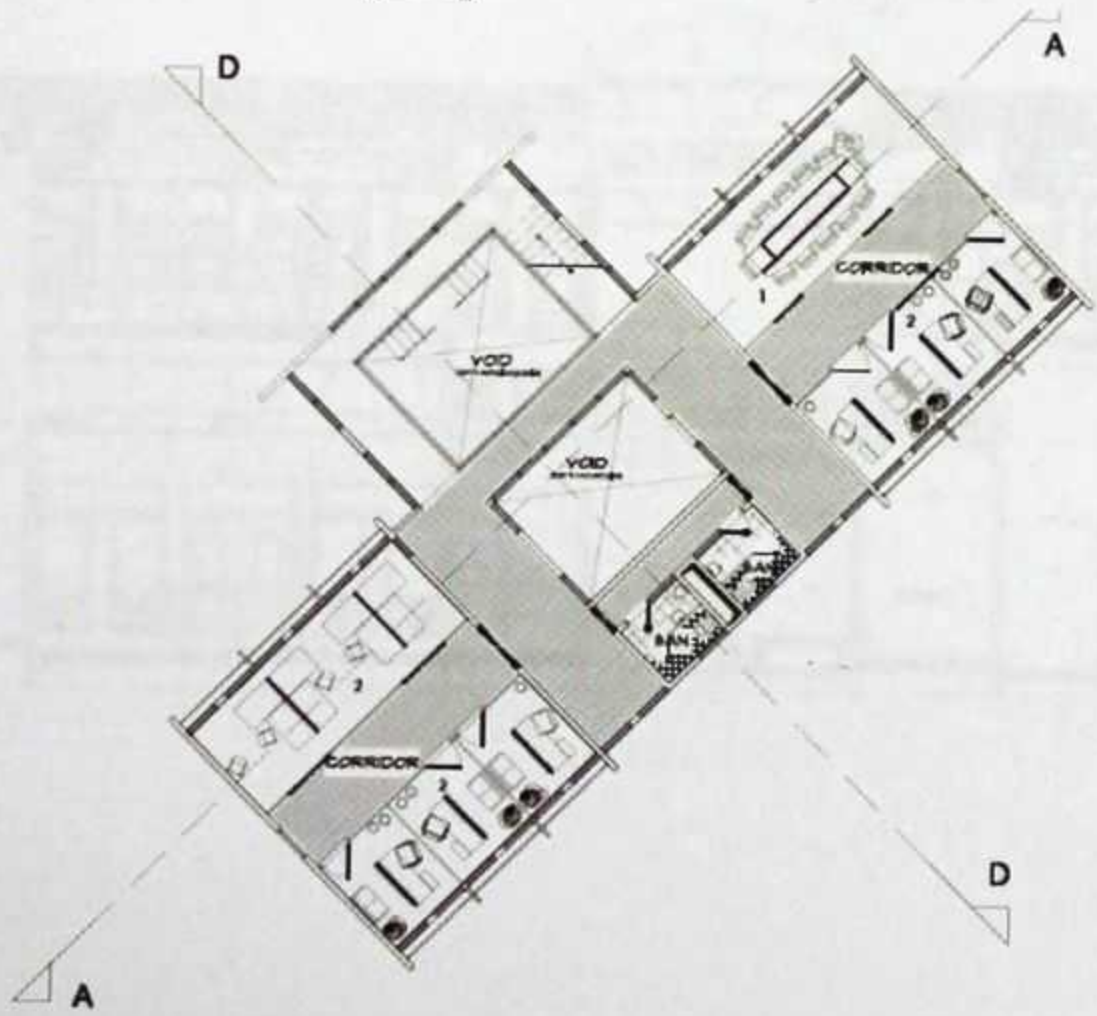
Fig.6.2 the site layout

Floor plans

Administration block



ground floor plan
scale-1:100

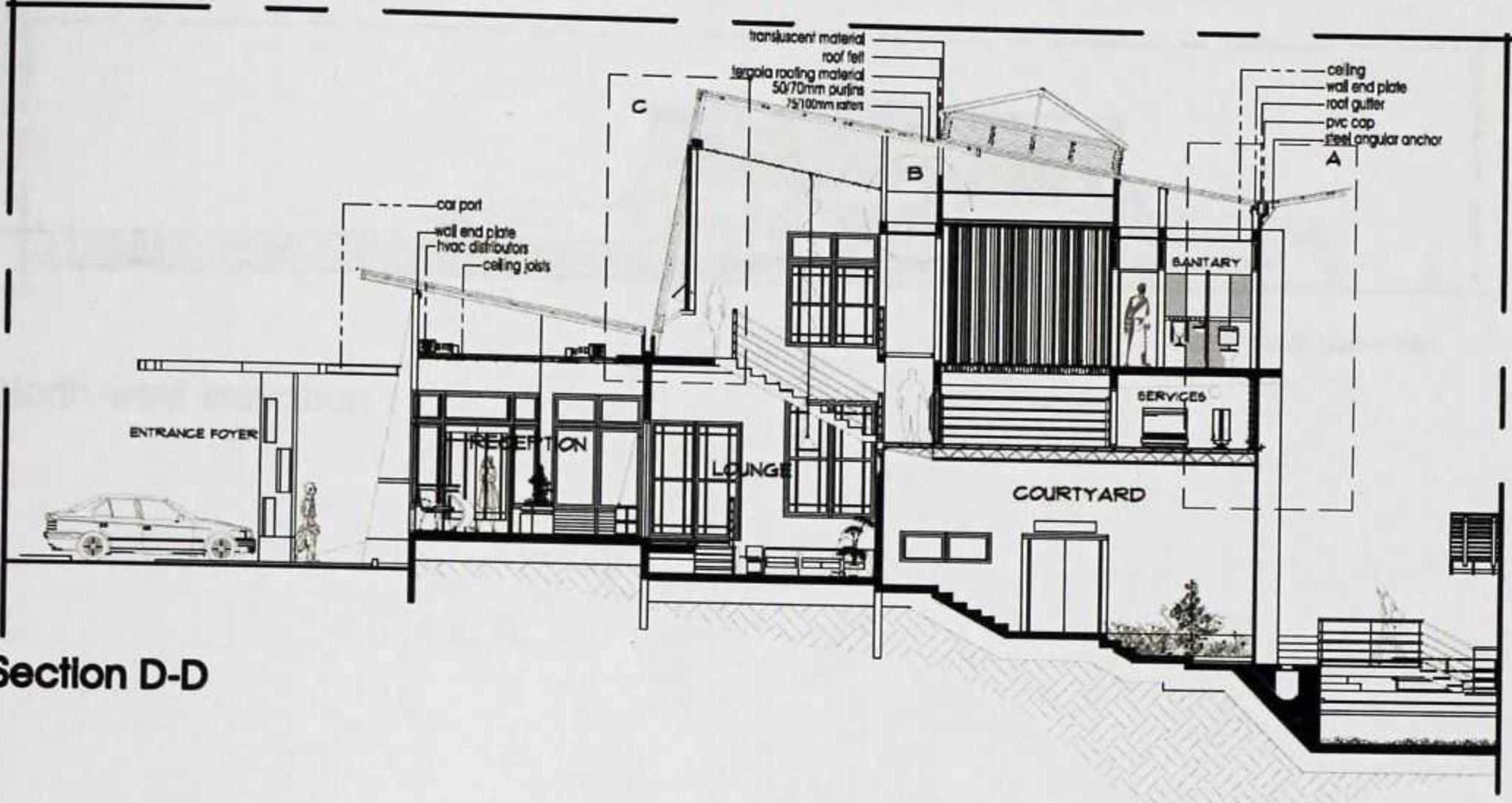


legend
1 conference room
2 offices

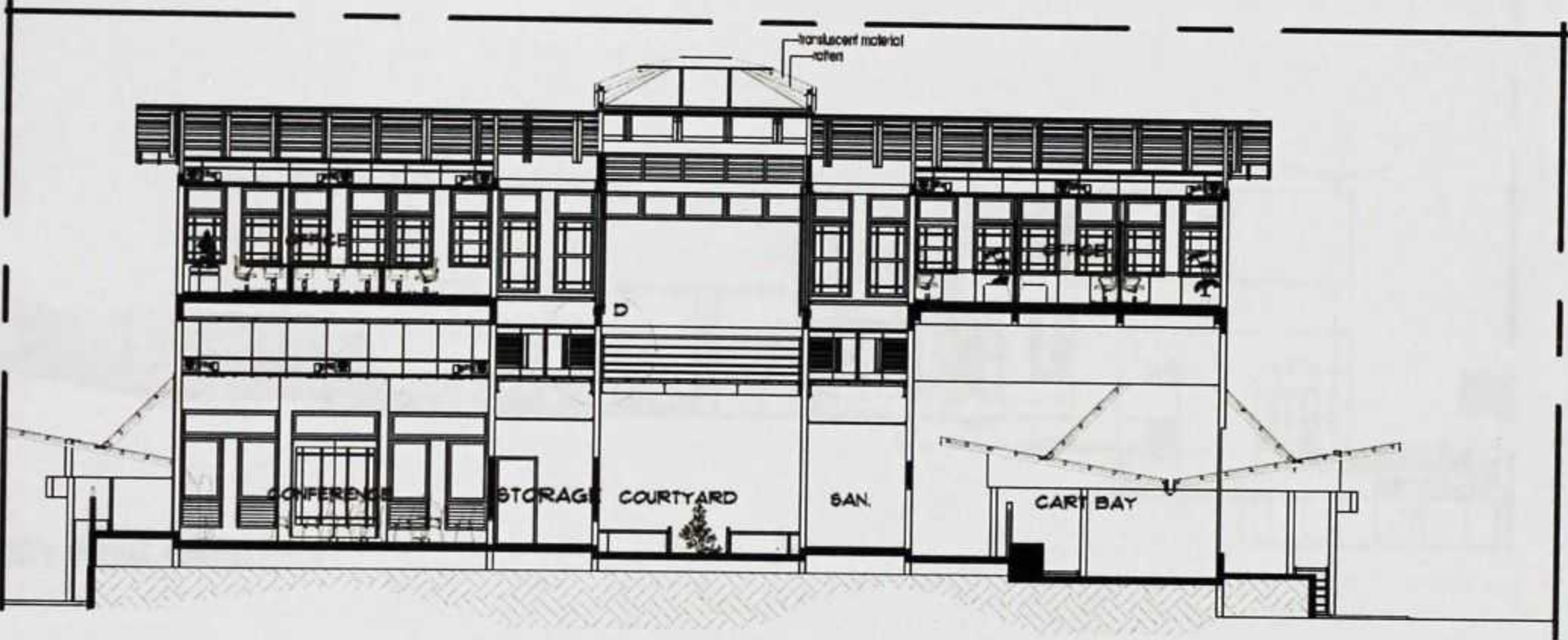
first floor plan
scale-1:100

Fig.6.2.1 floor plans

sections



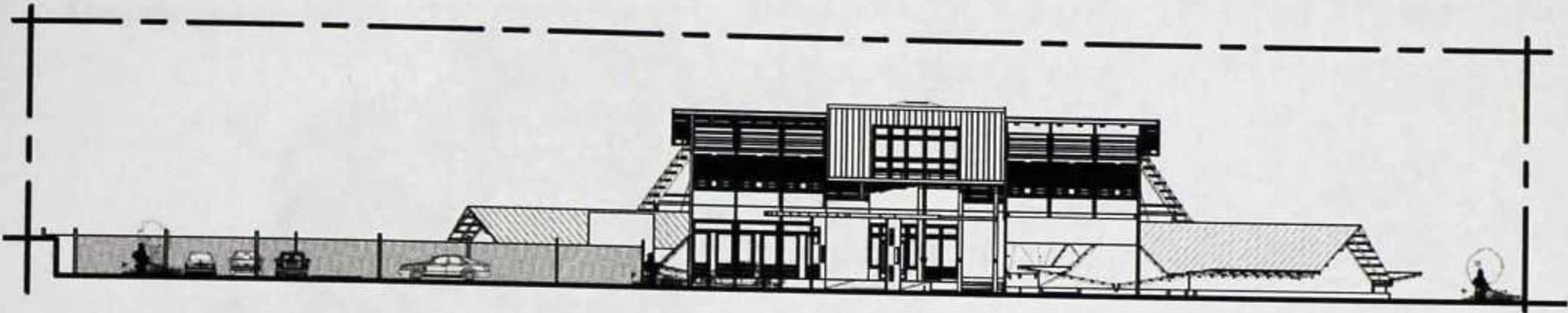
Section D-D



Section A-A

Fig.6.2.2 sections

Elevations



north west elevation
scale 1:100

North-west elevation



south-west elevation

Fig.6.2.3 elevations

Floor plans

Health spa and Clinic

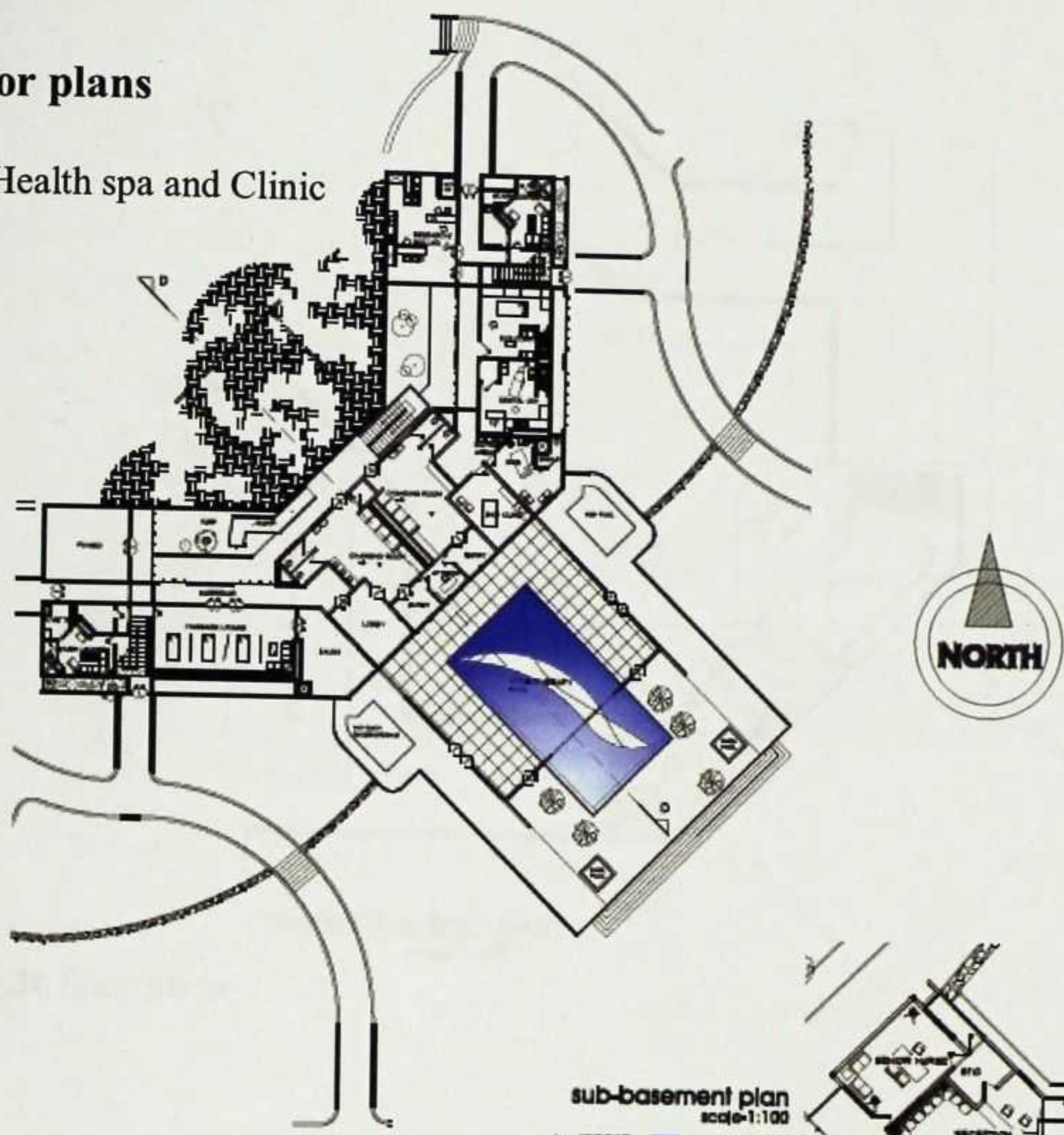
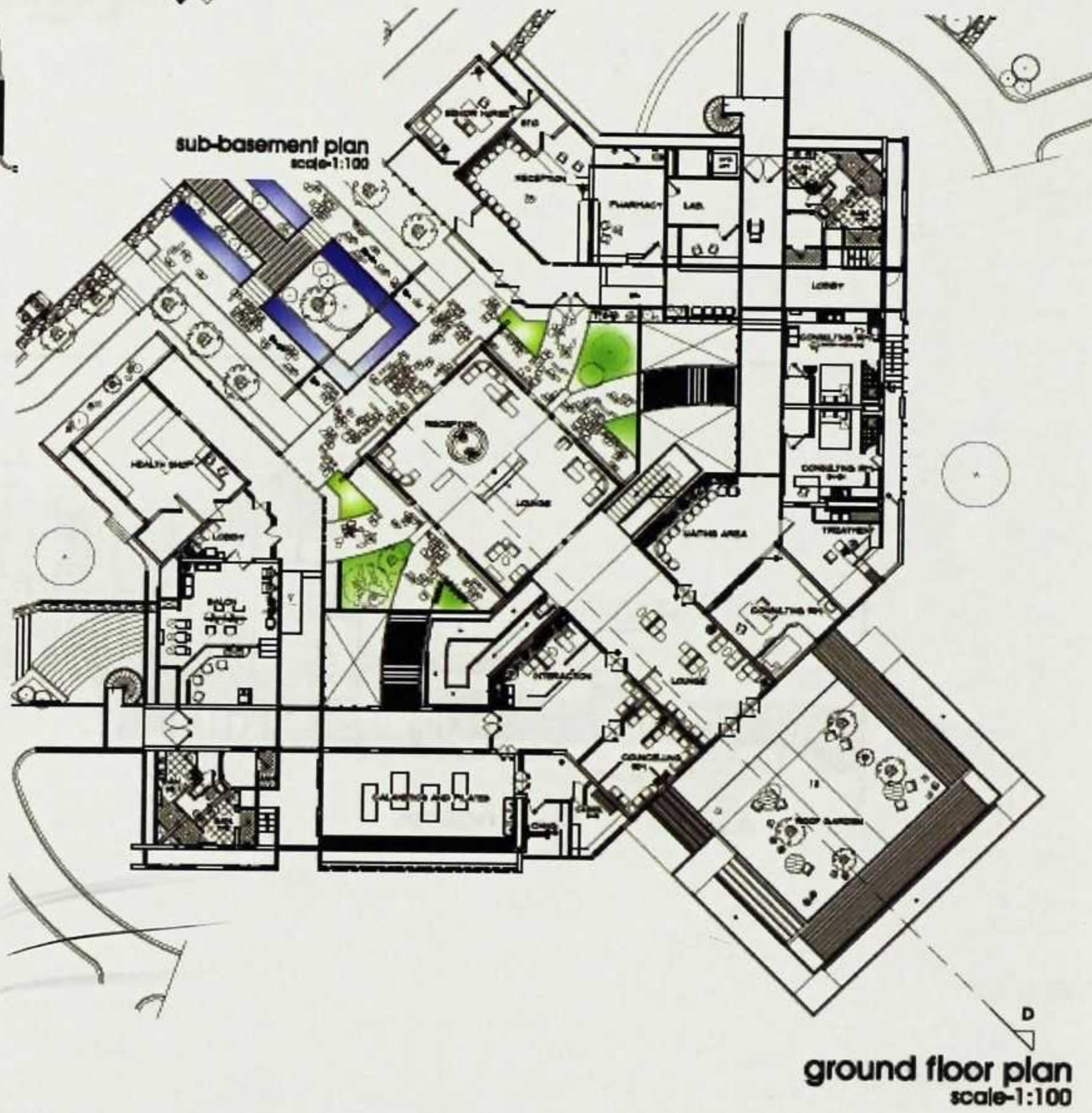


Fig.6.3 floor plans

Fig.6.3b floor plans



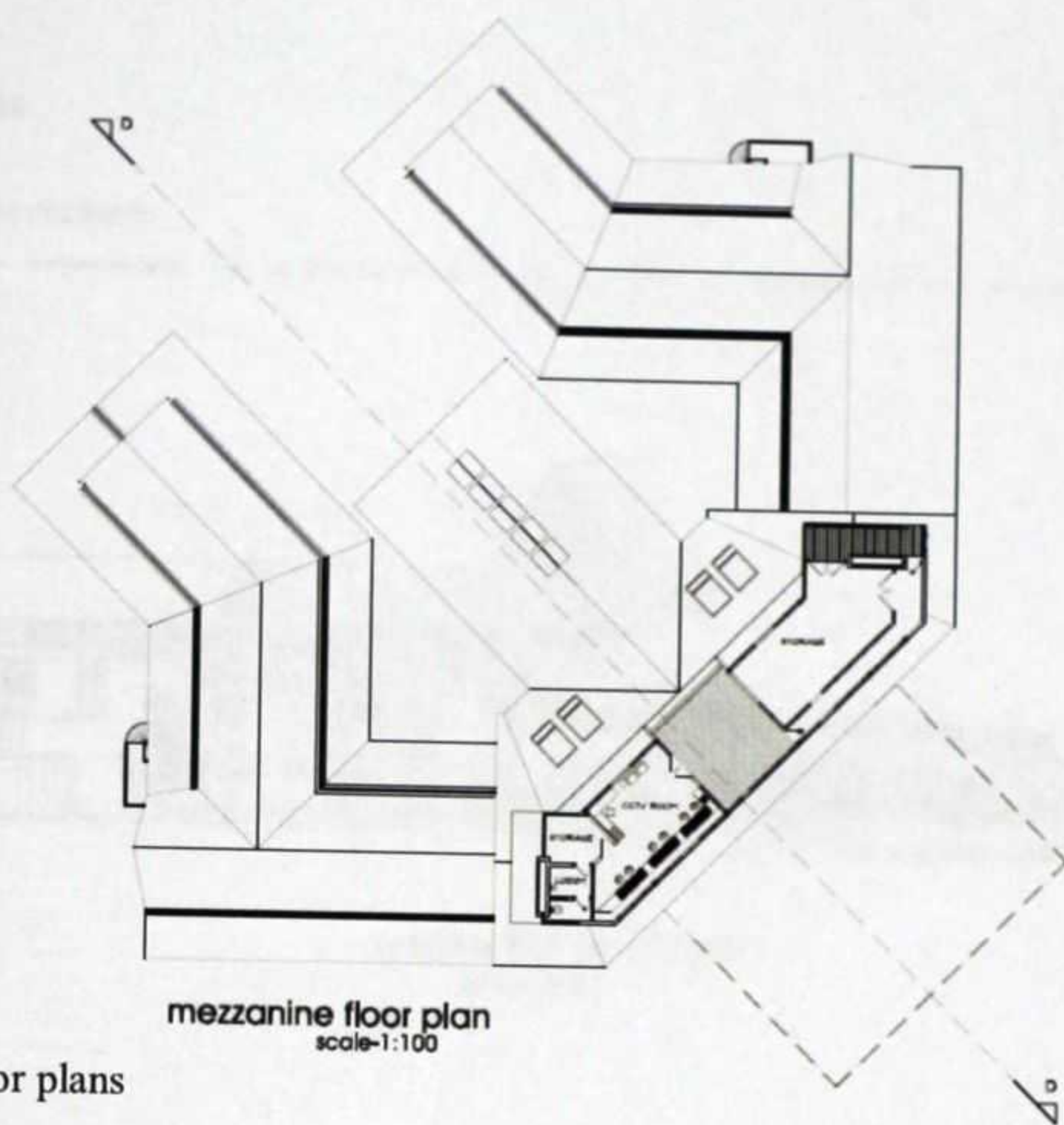


Fig.6.3c floor plans

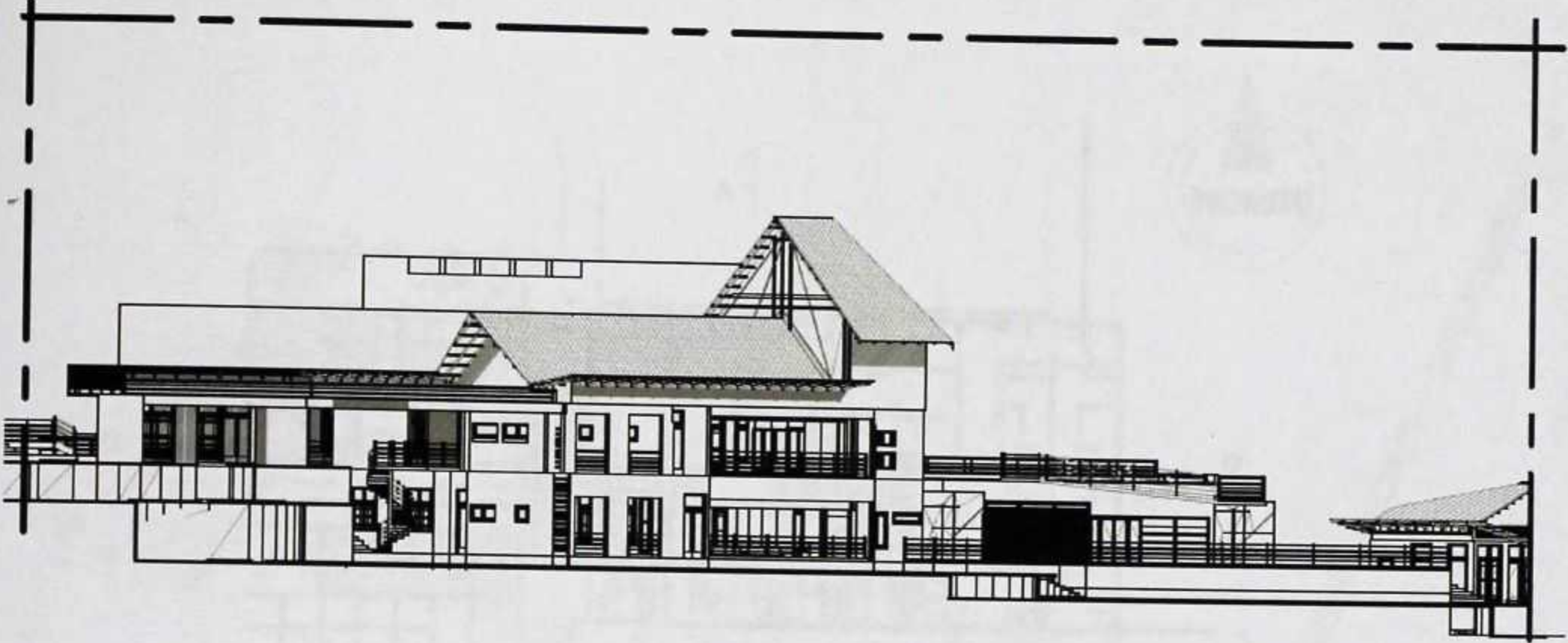
sections



Fig.6.3.1 sections

Elevations

Fig.6.3.2 elevations



south west elevation
scale 1:100



south east elevation
scale 1:100

Floor plans

Restaurant: bar

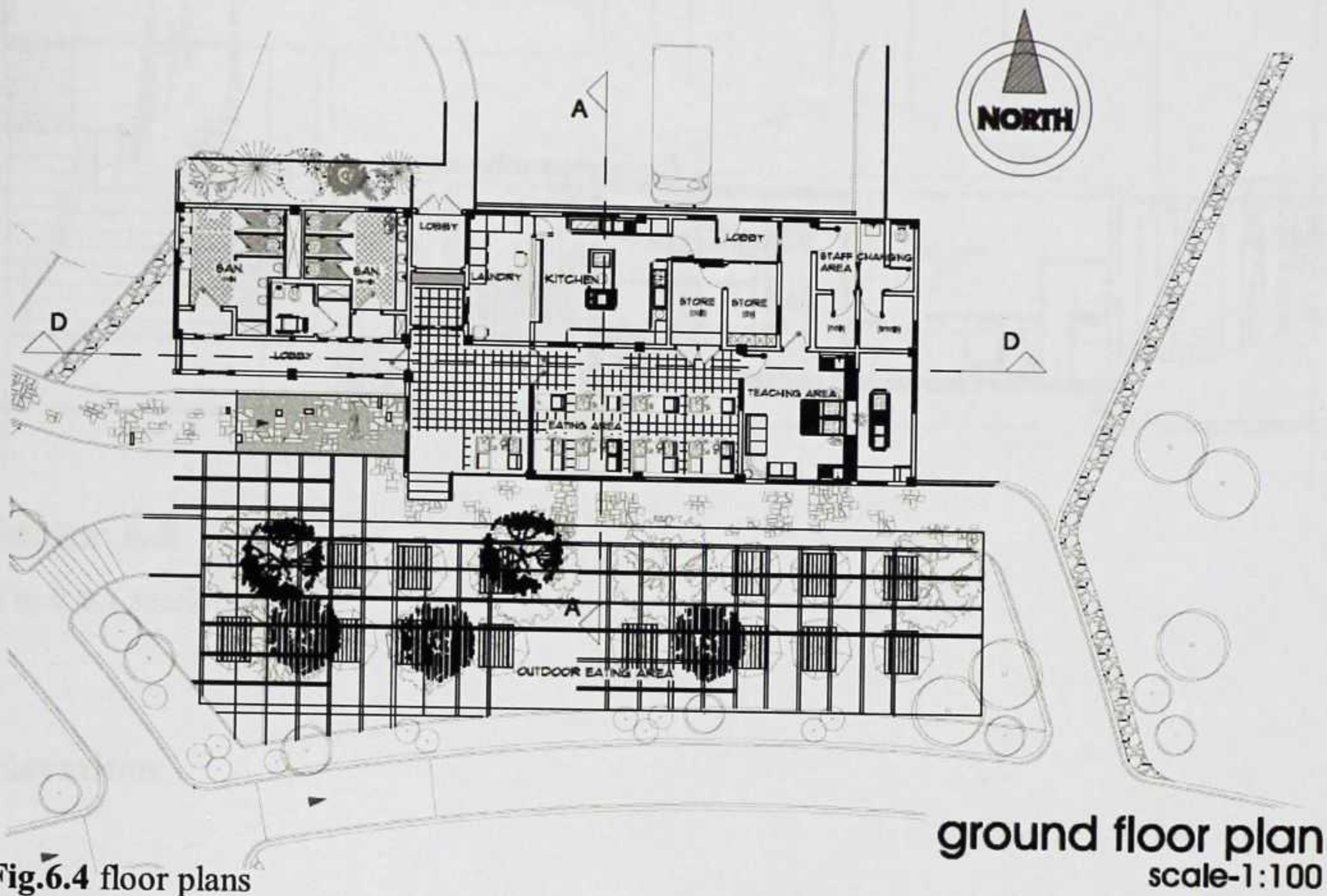
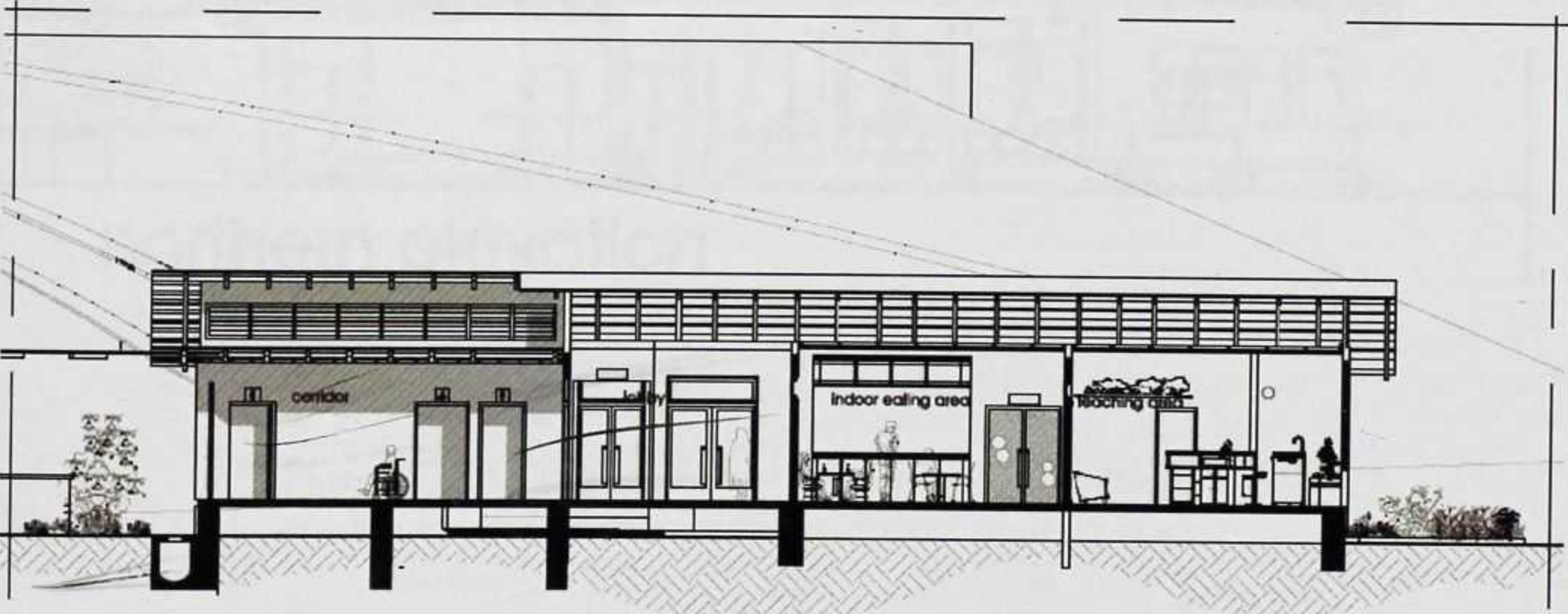
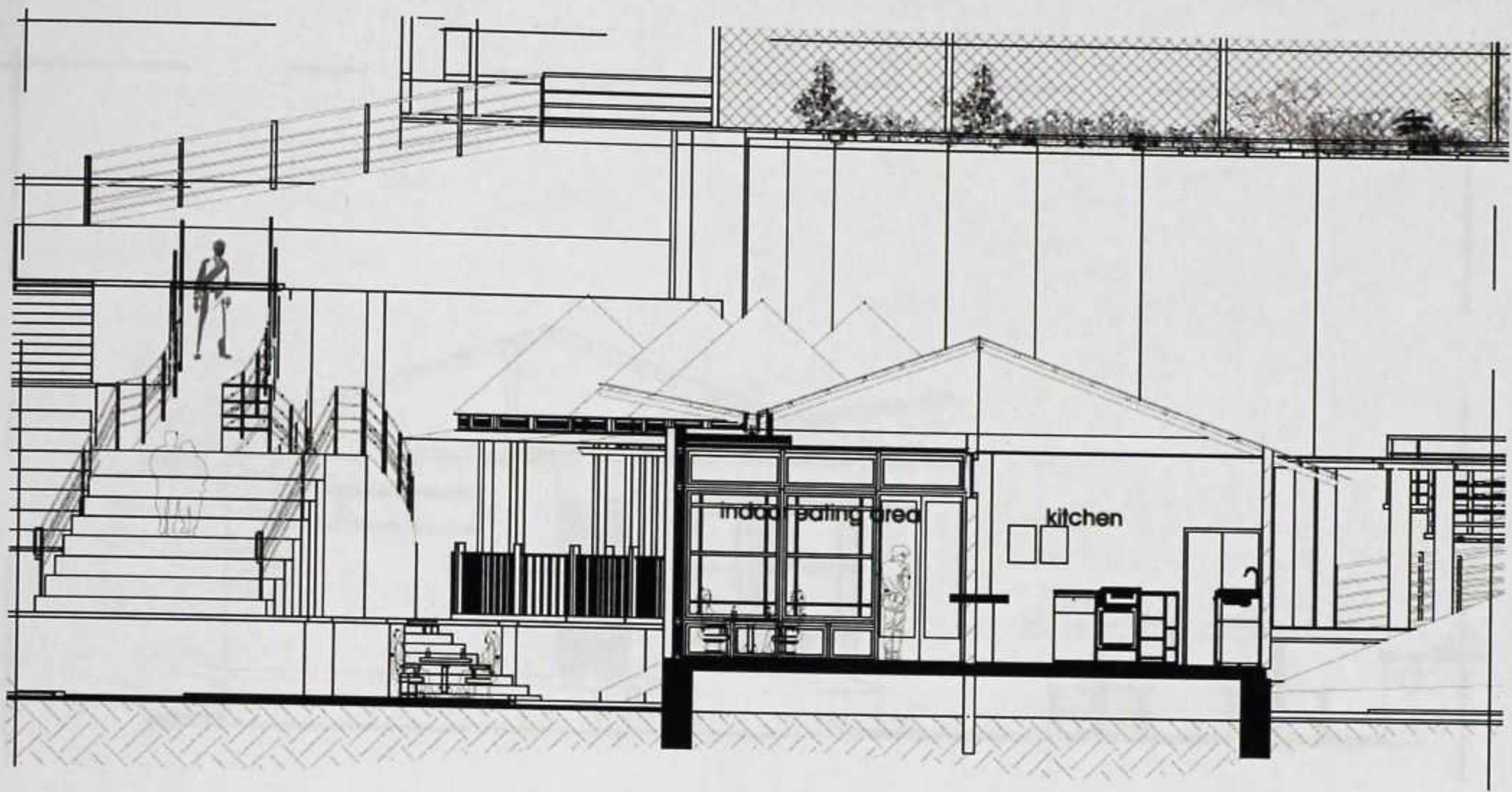


Fig.6.4 floor plans

sections

Section D-D





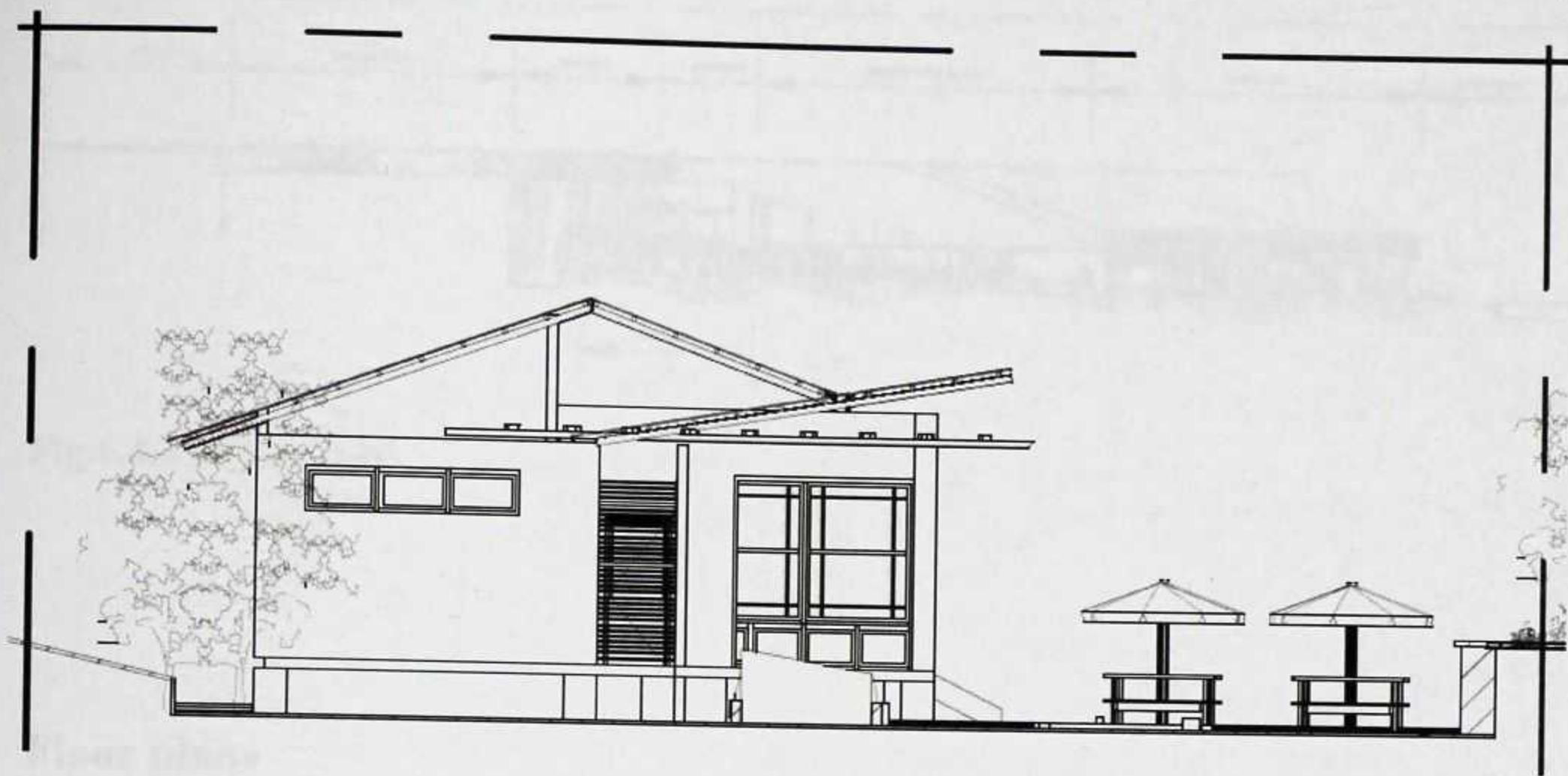
Section A-A

Fig.6.4.1 sections

elevations



northern elevation



Western elevation
 Fig.6.4.2 elevations

Layout: bar



Fig.6.4.3 layout

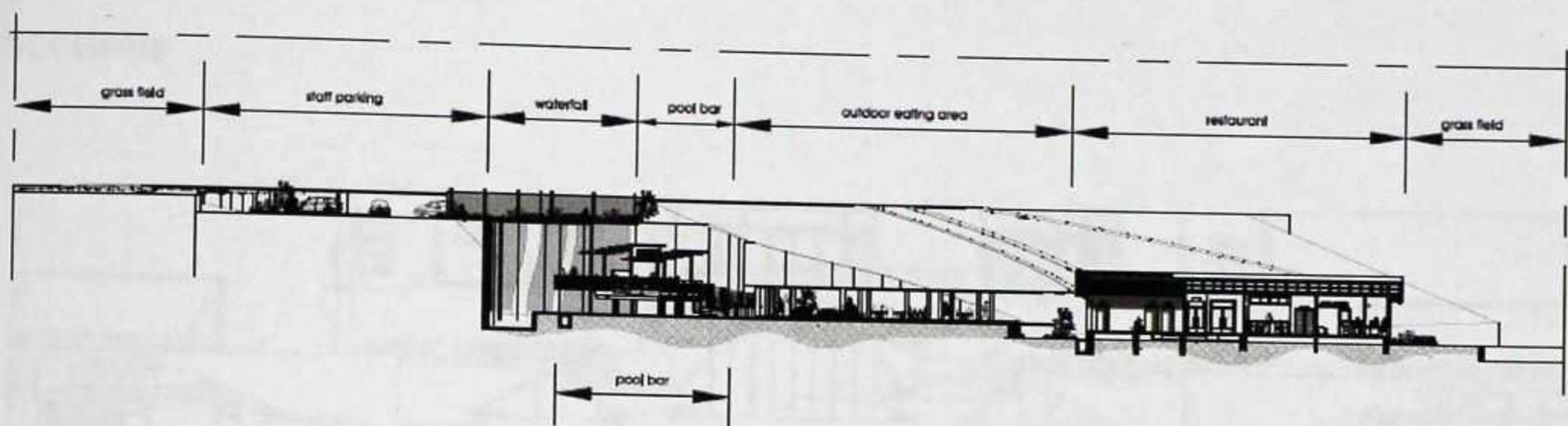


Fig.6.4.4 section 0-0

Floor plans

accommodation (Executive Lodge)

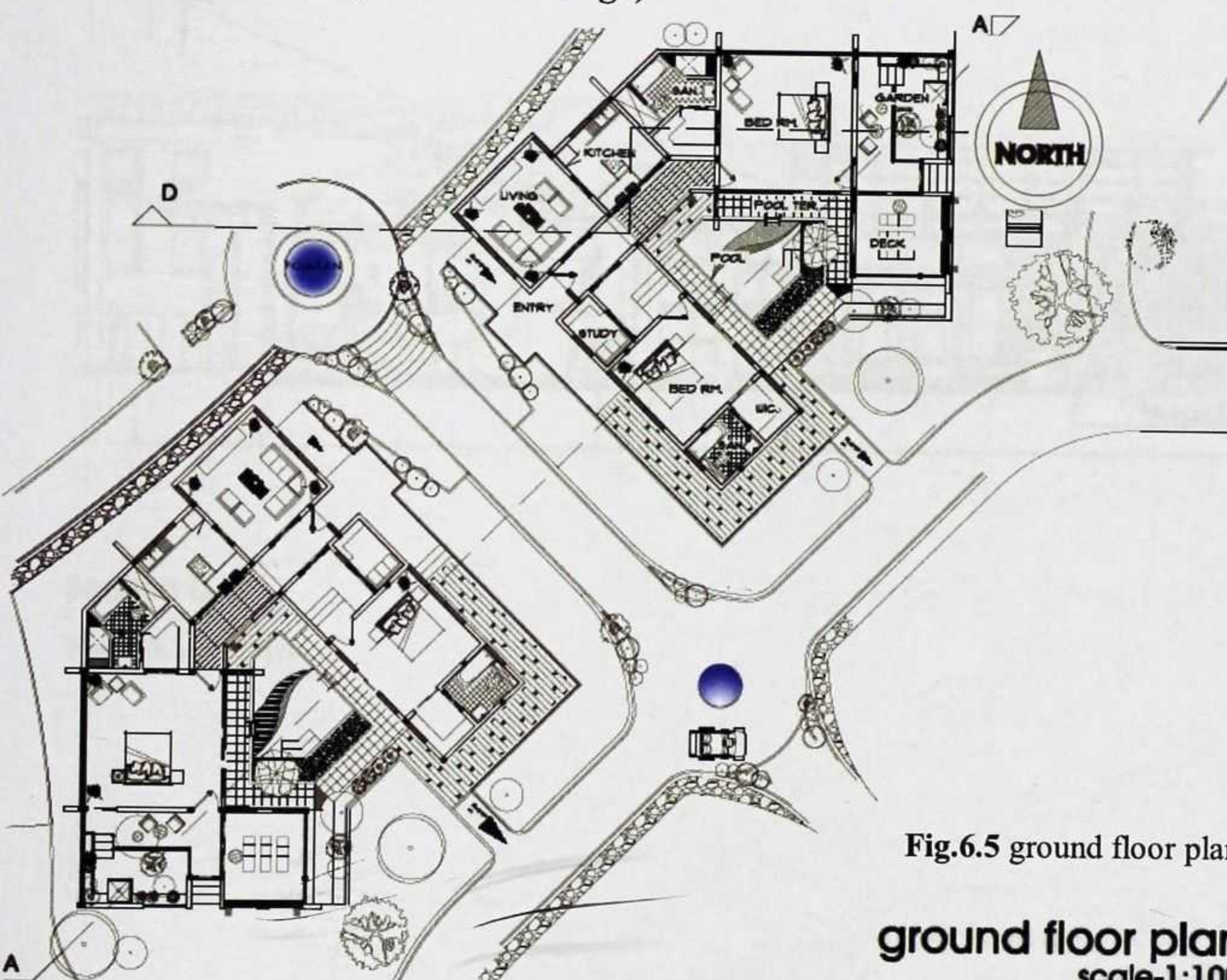
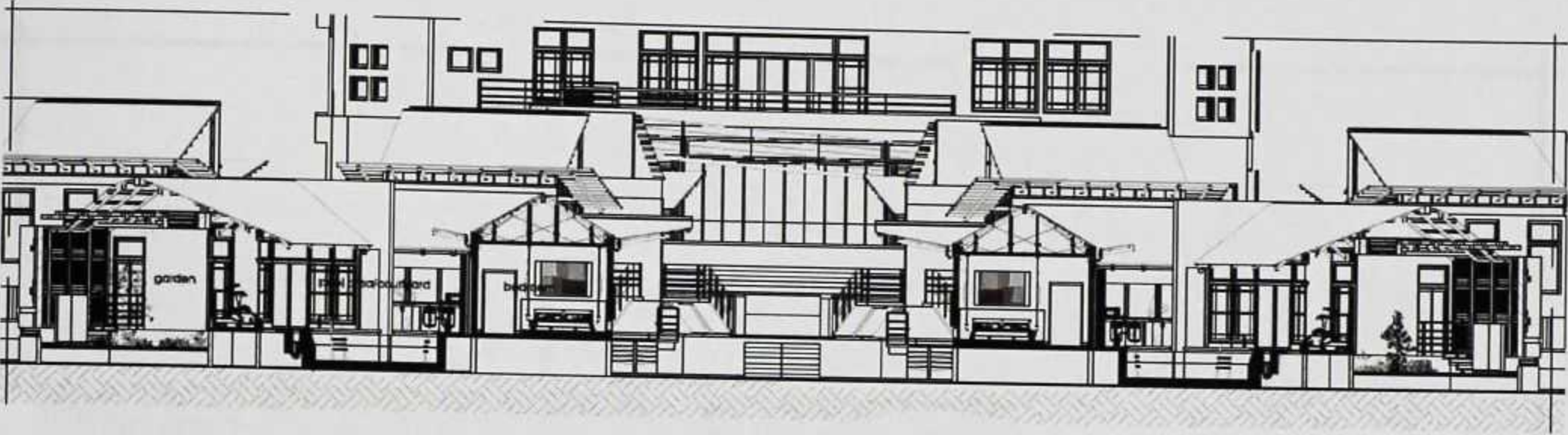


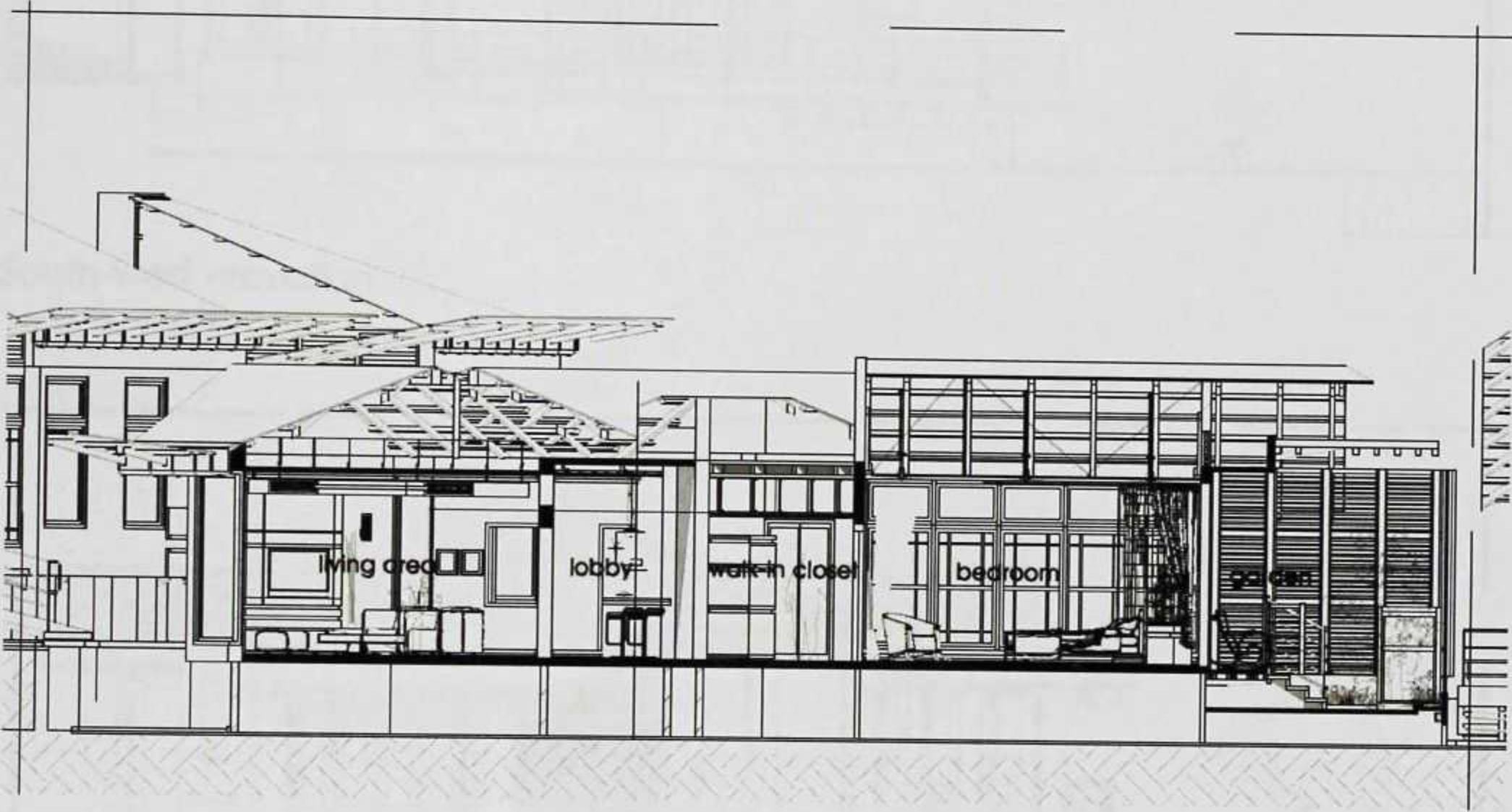
Fig.6.5 ground floor plan

ground floor plan
scale-1:100

sections



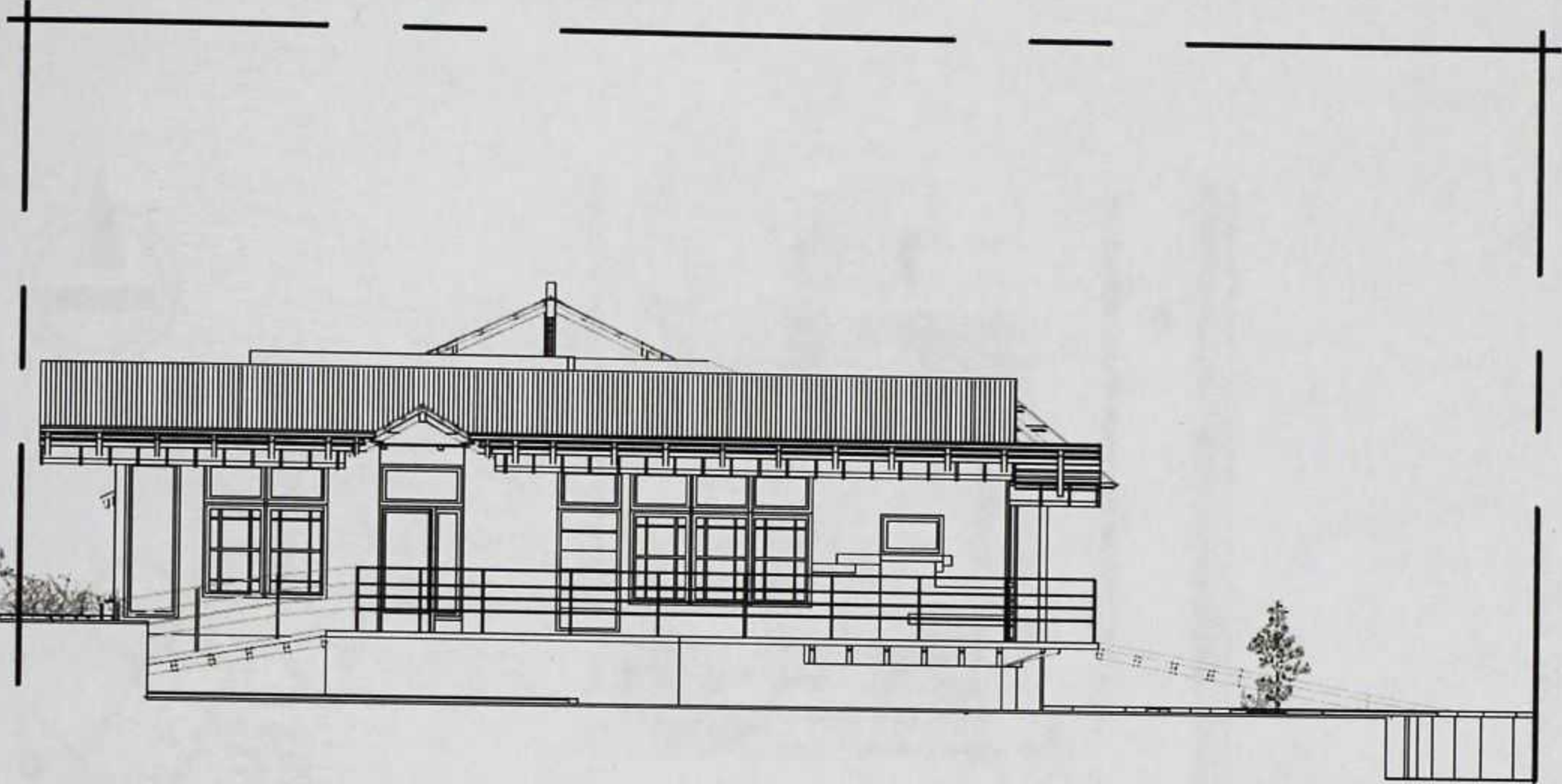
Section A-A



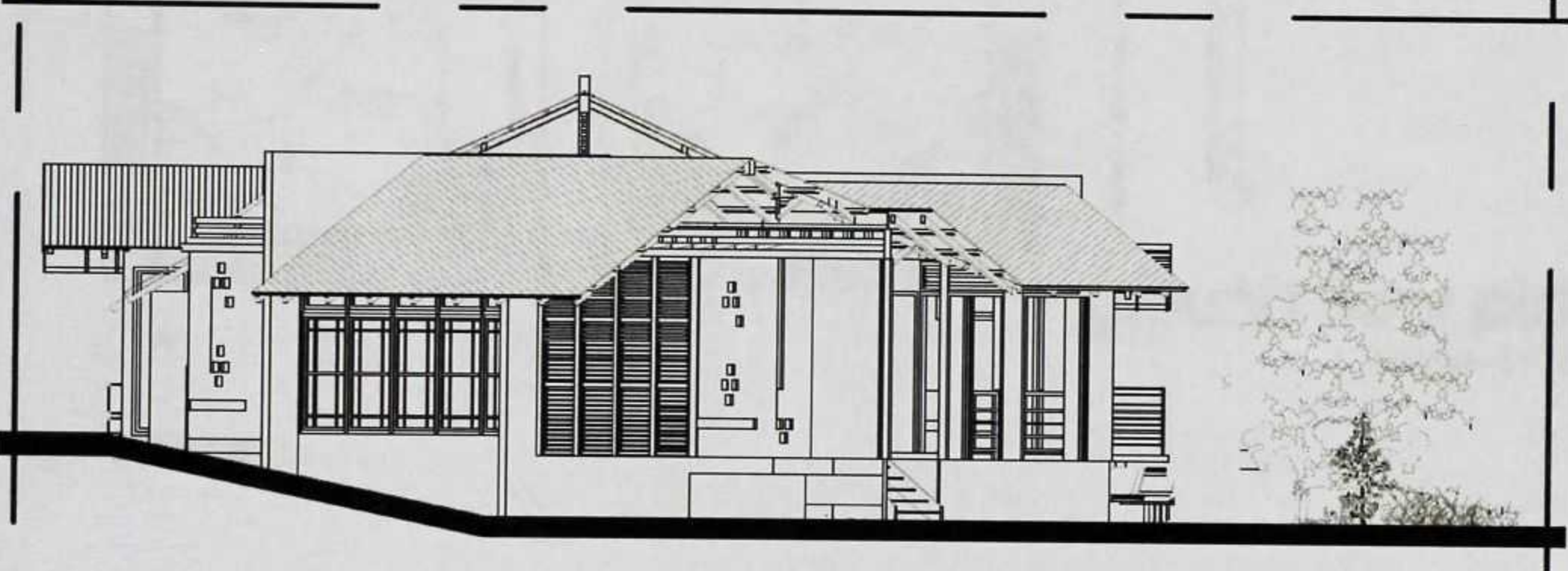
Section D-D

Fig.6.5.1 section

elevations



South-west elevation



North-east elevation

Fig.6.5.2 elevations

Floor plans

accommodation (cluster lodge)

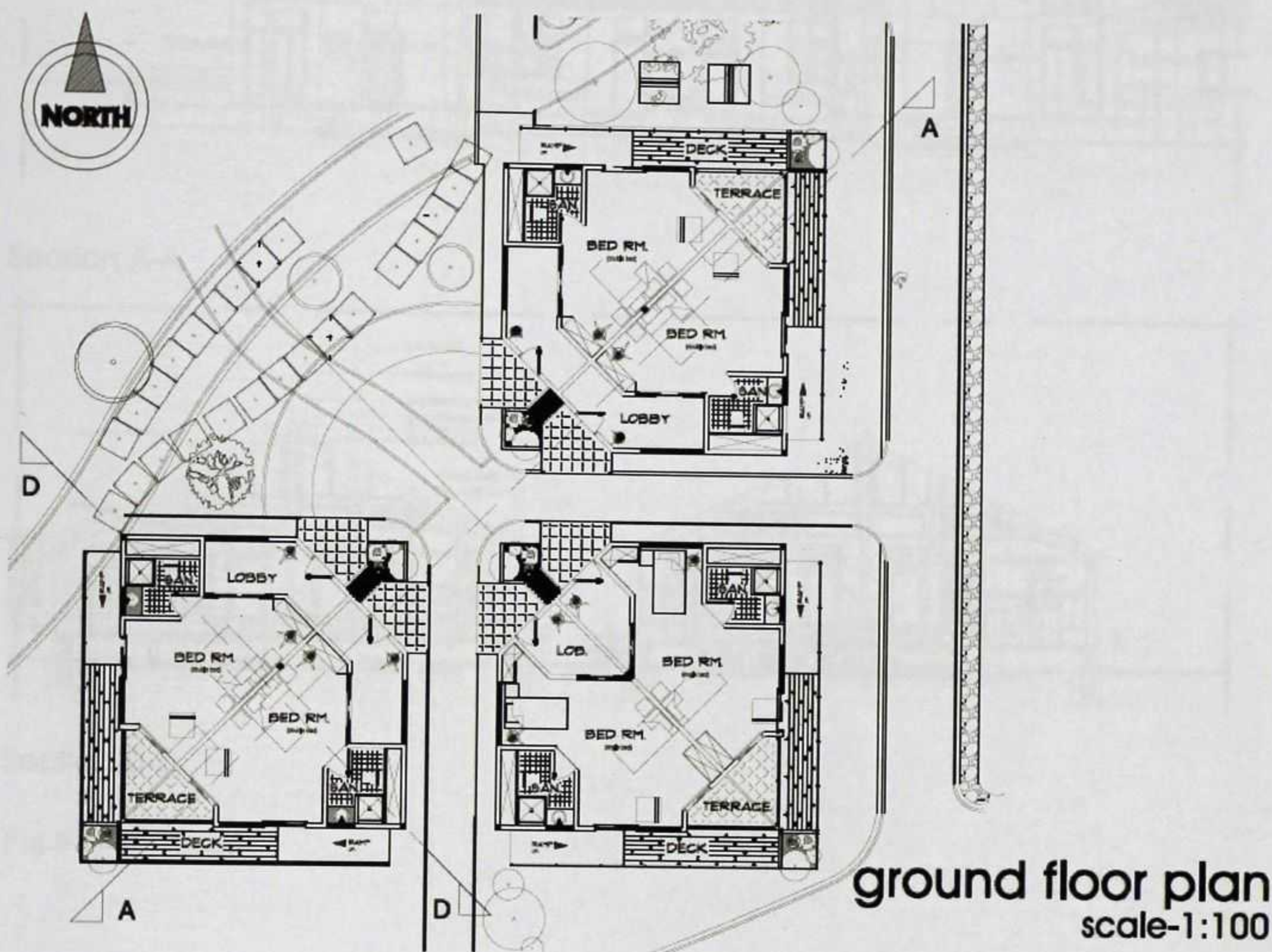
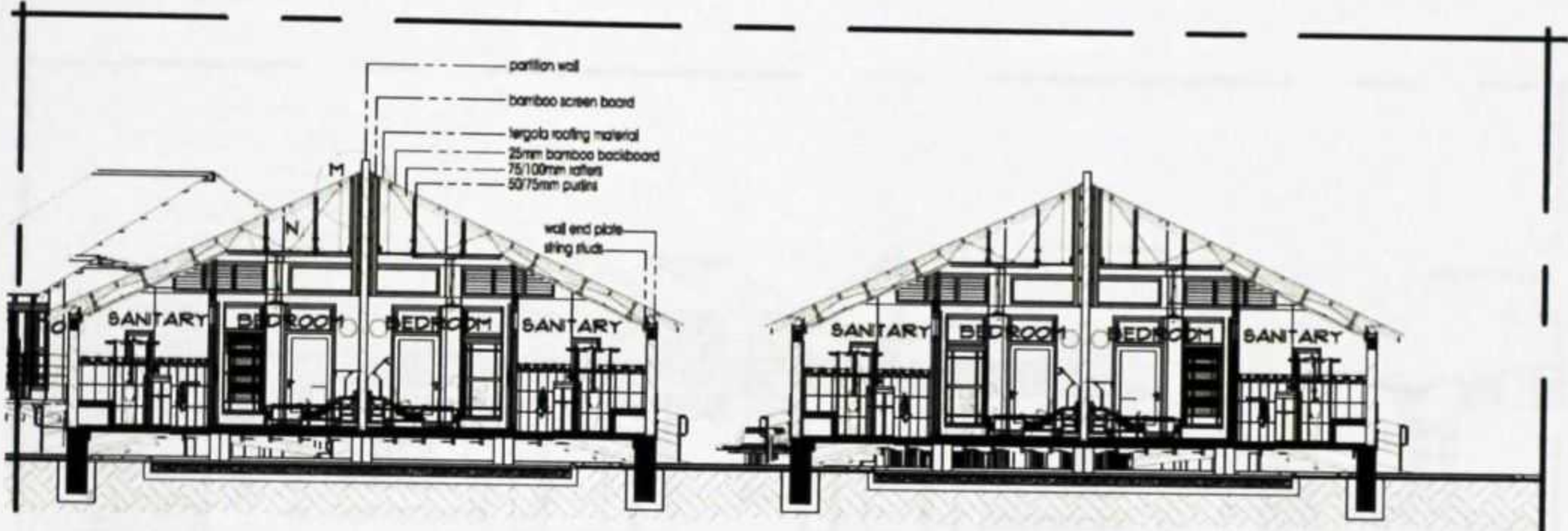


Fig.6.6 floor plans

Sections



Section A-A



Section D-D

Fig.6.6.2 sections

Elevations



East elevation



South-west elevation

Fig.6.6.3 elevations

Floor plans

Accommodation (Regular type 1)

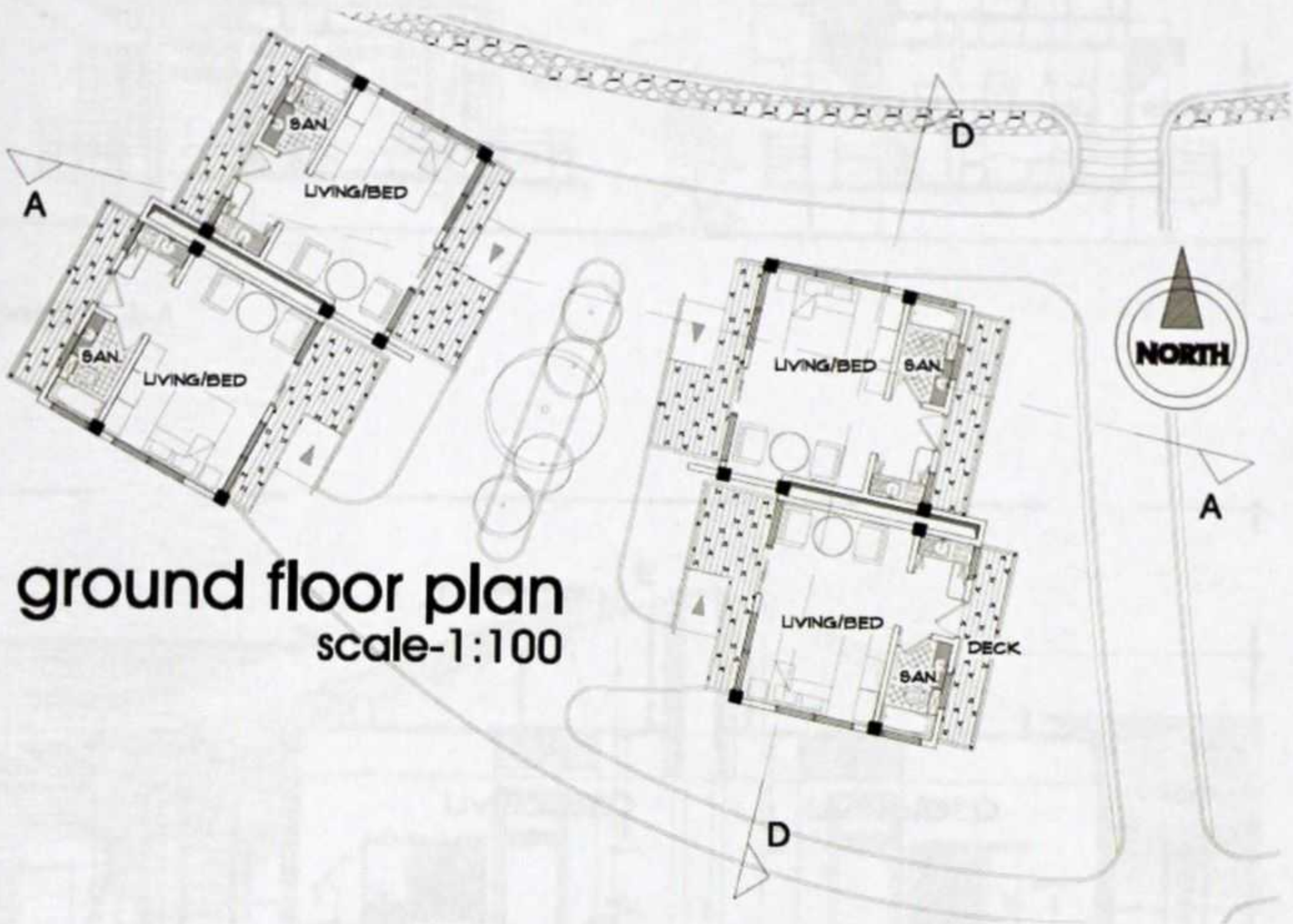
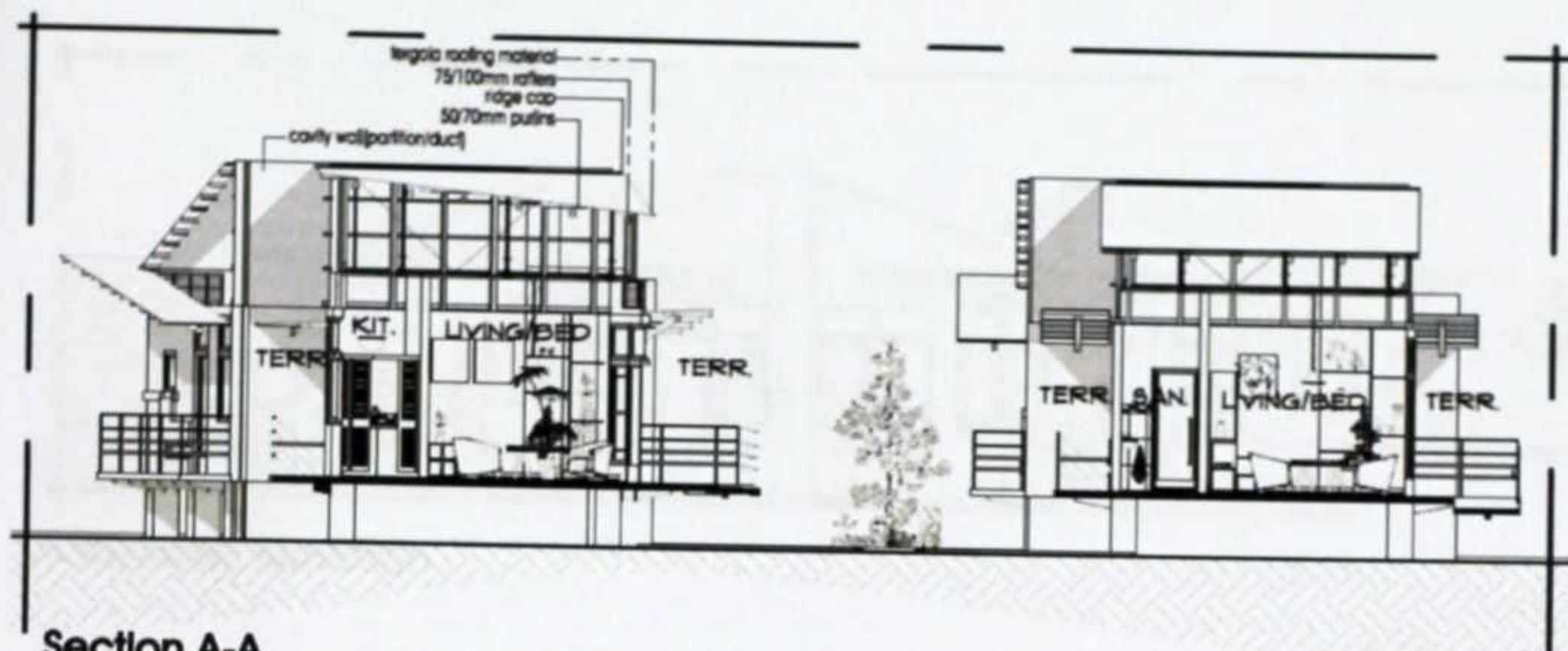
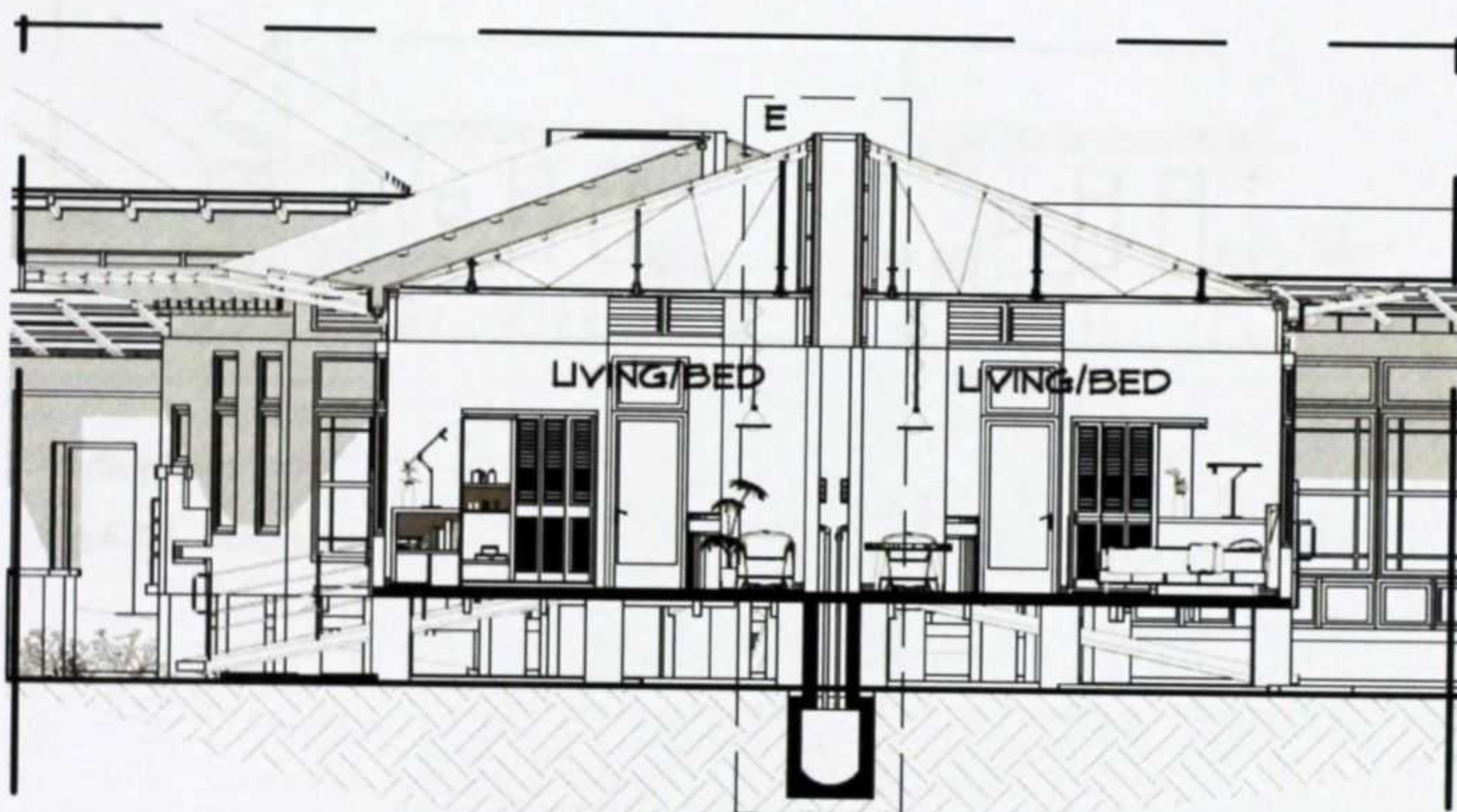


Fig.6.7 floor plans

sections



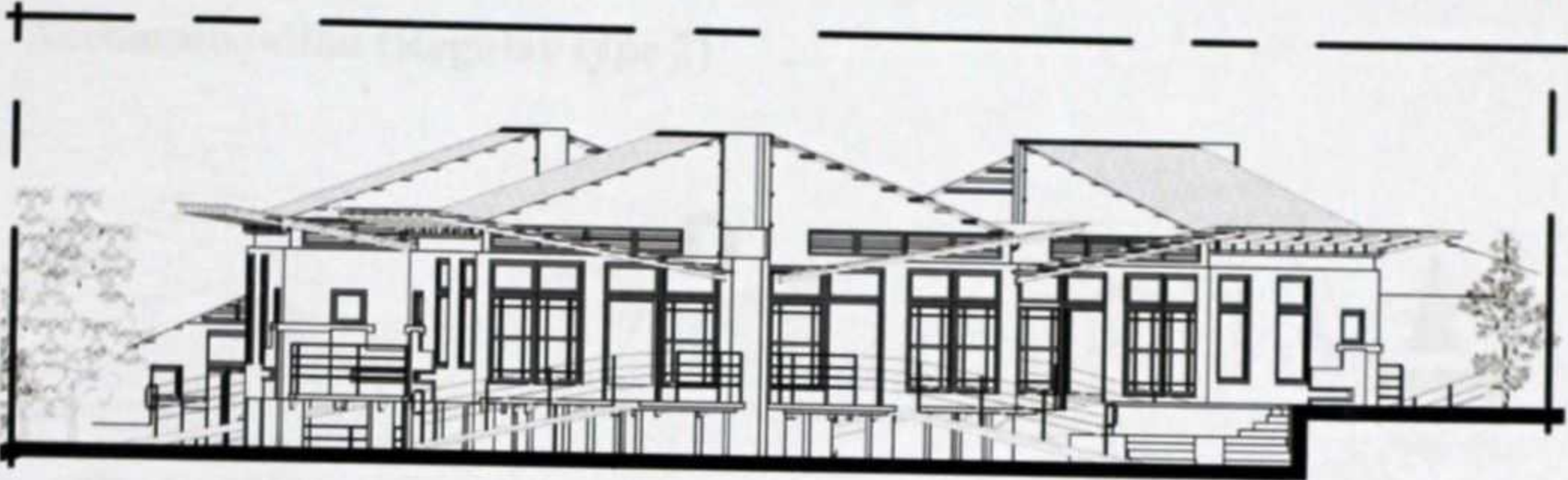
Section A-A



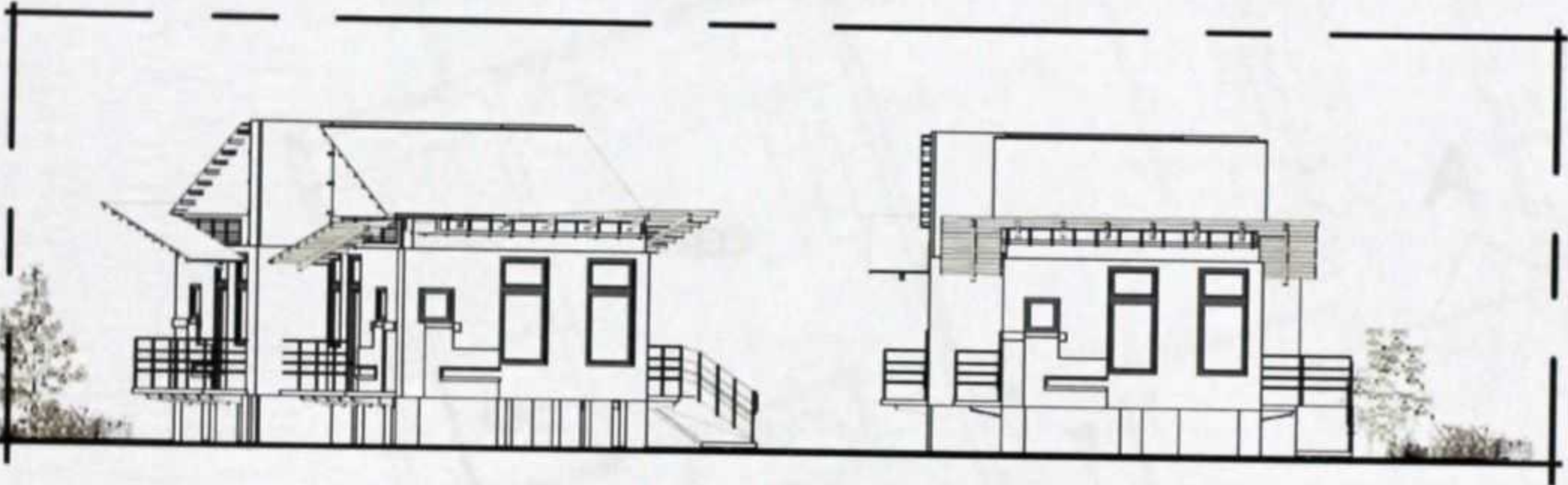
Section D-D

Fig.6.7.1 sections

Elevations



South west elevation



north elevation

Fig.6.7.2 elevations

Floor plans

Accommodation (Regular type 2)

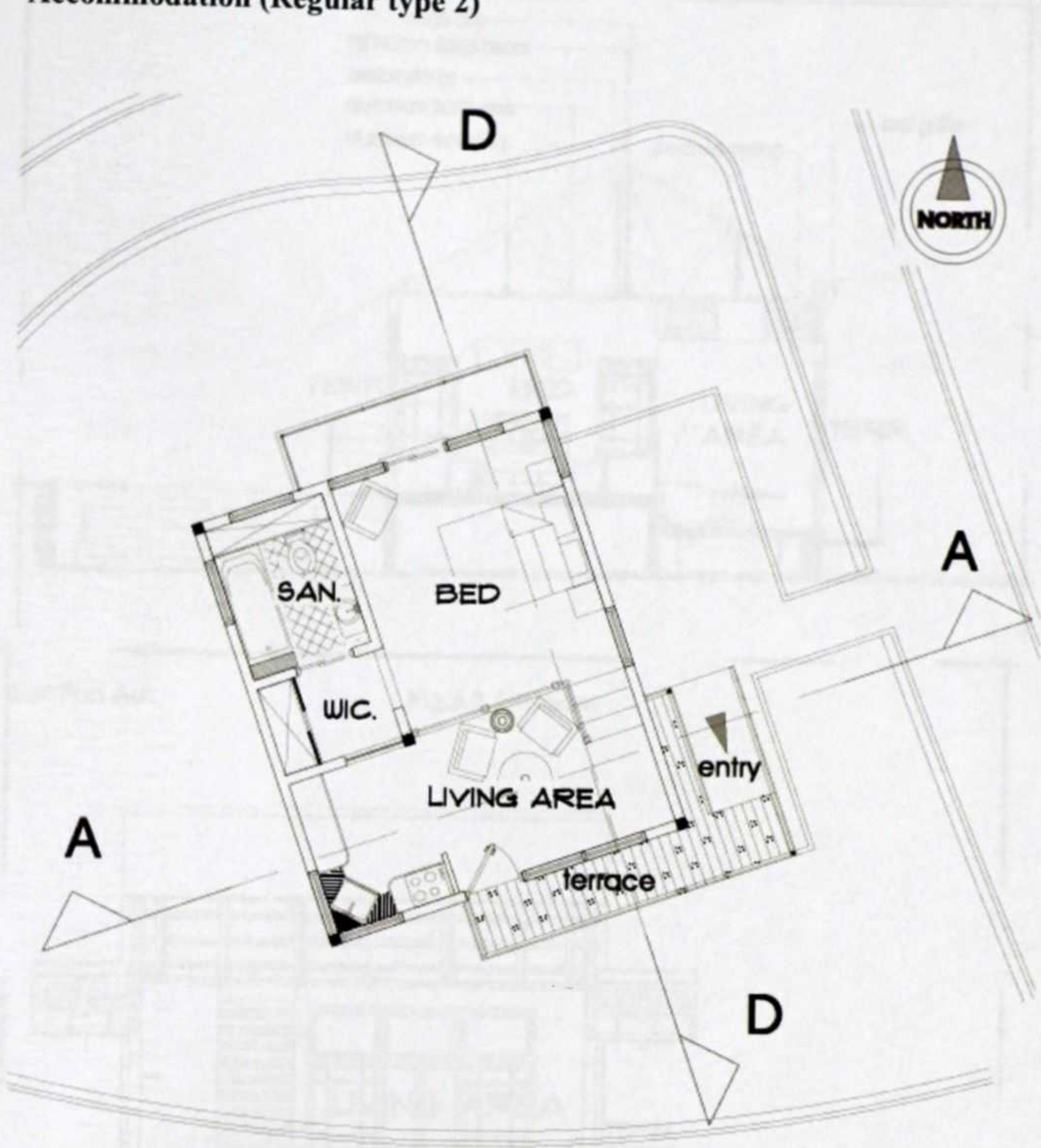
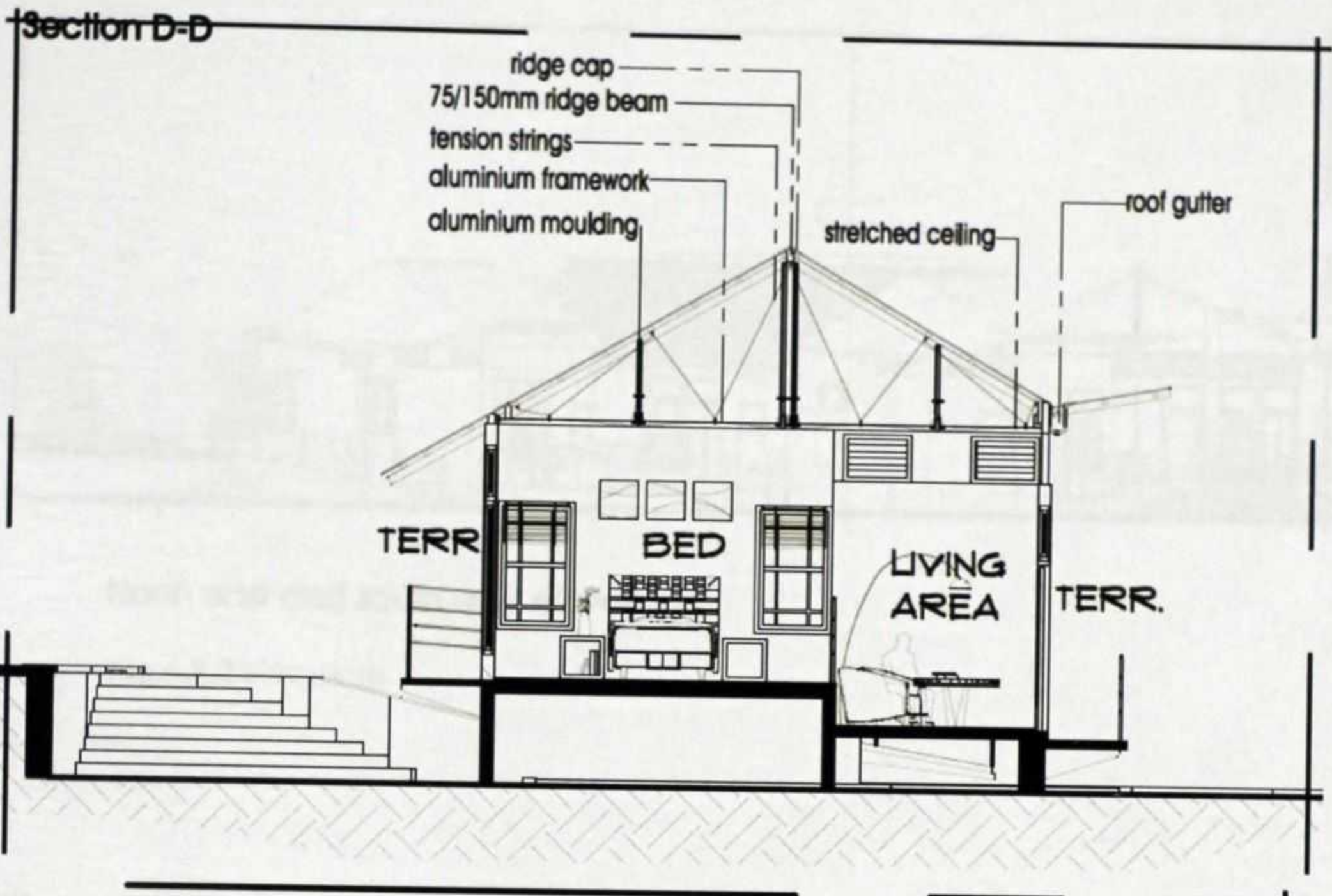


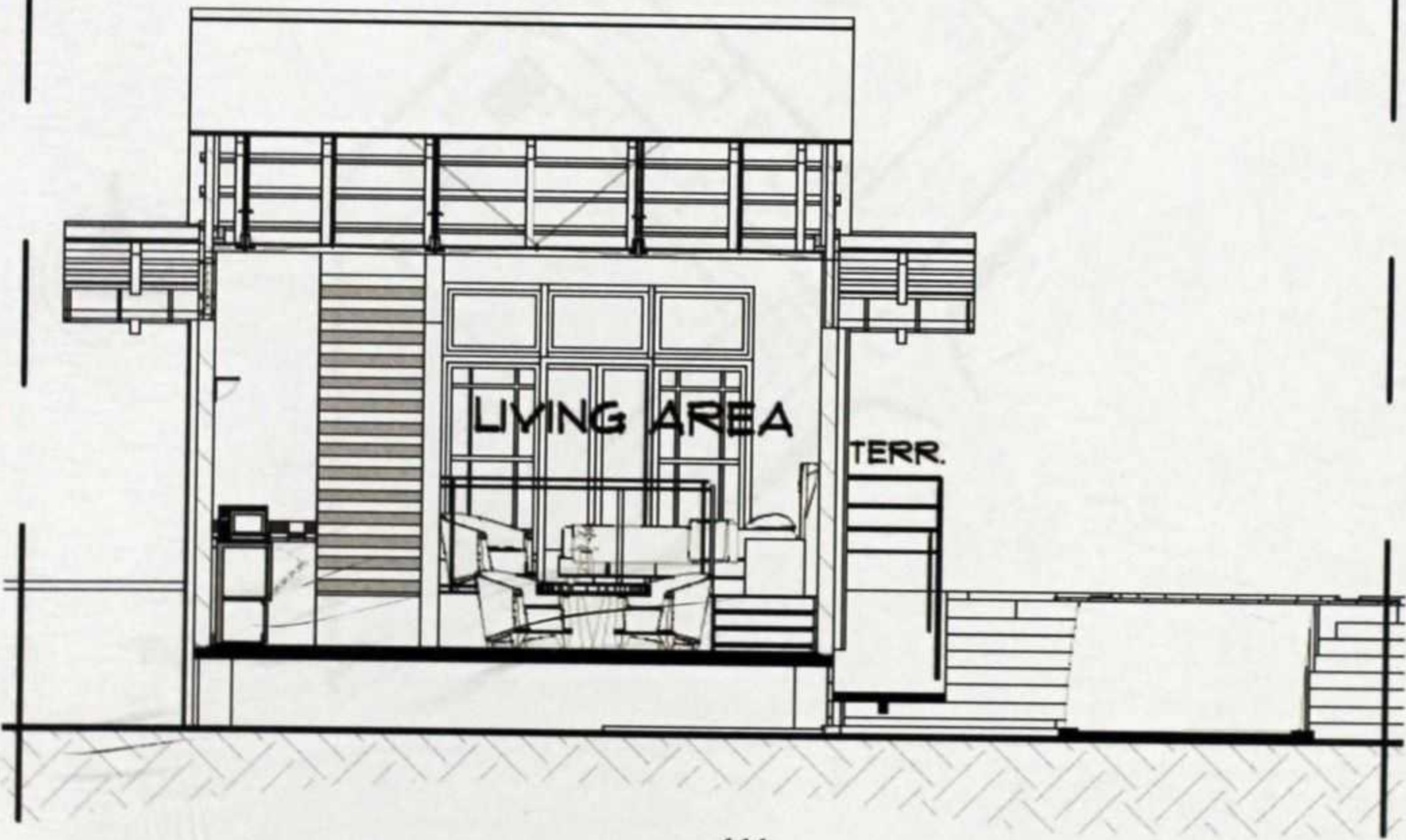
Fig.6.8 ground floor plan

sections

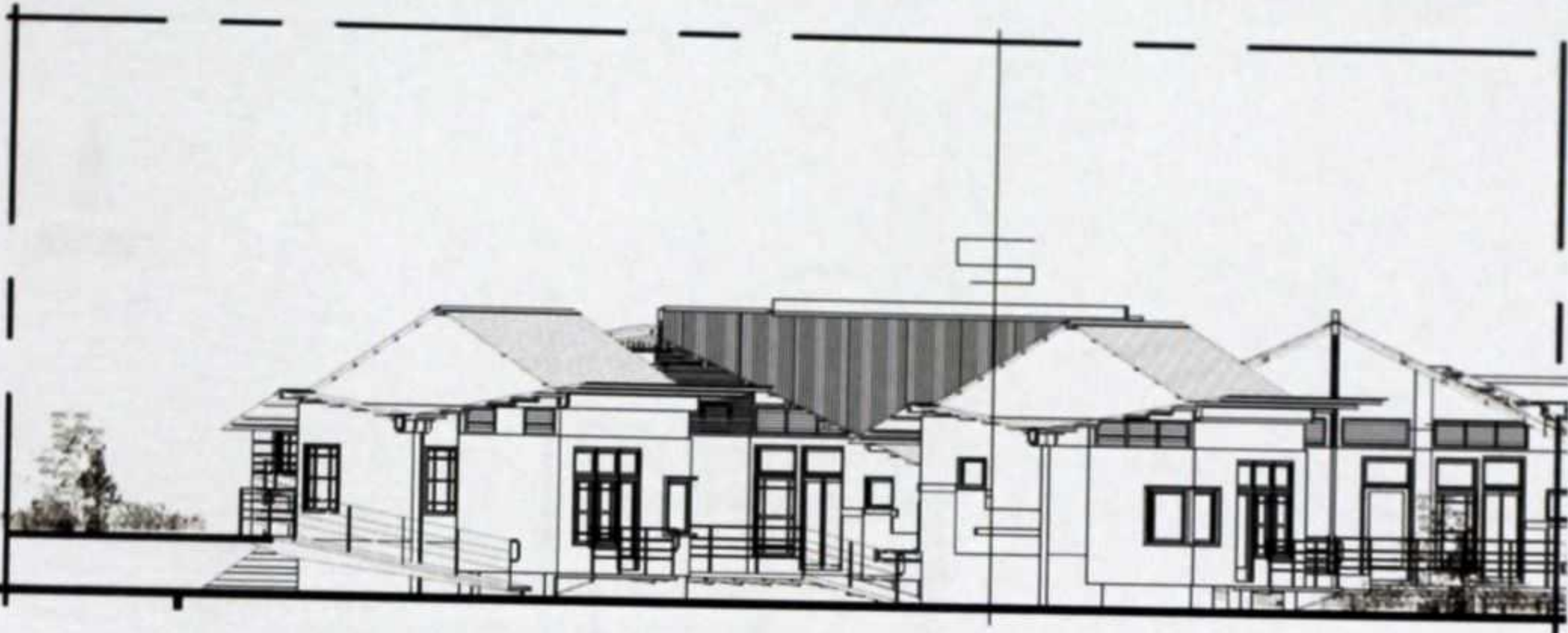


Section A-A

Fig.6.8.1 sections



Elevations



North east and south west elevations

Fig.6.8.2 elevations

Floor plans

Meditation shed

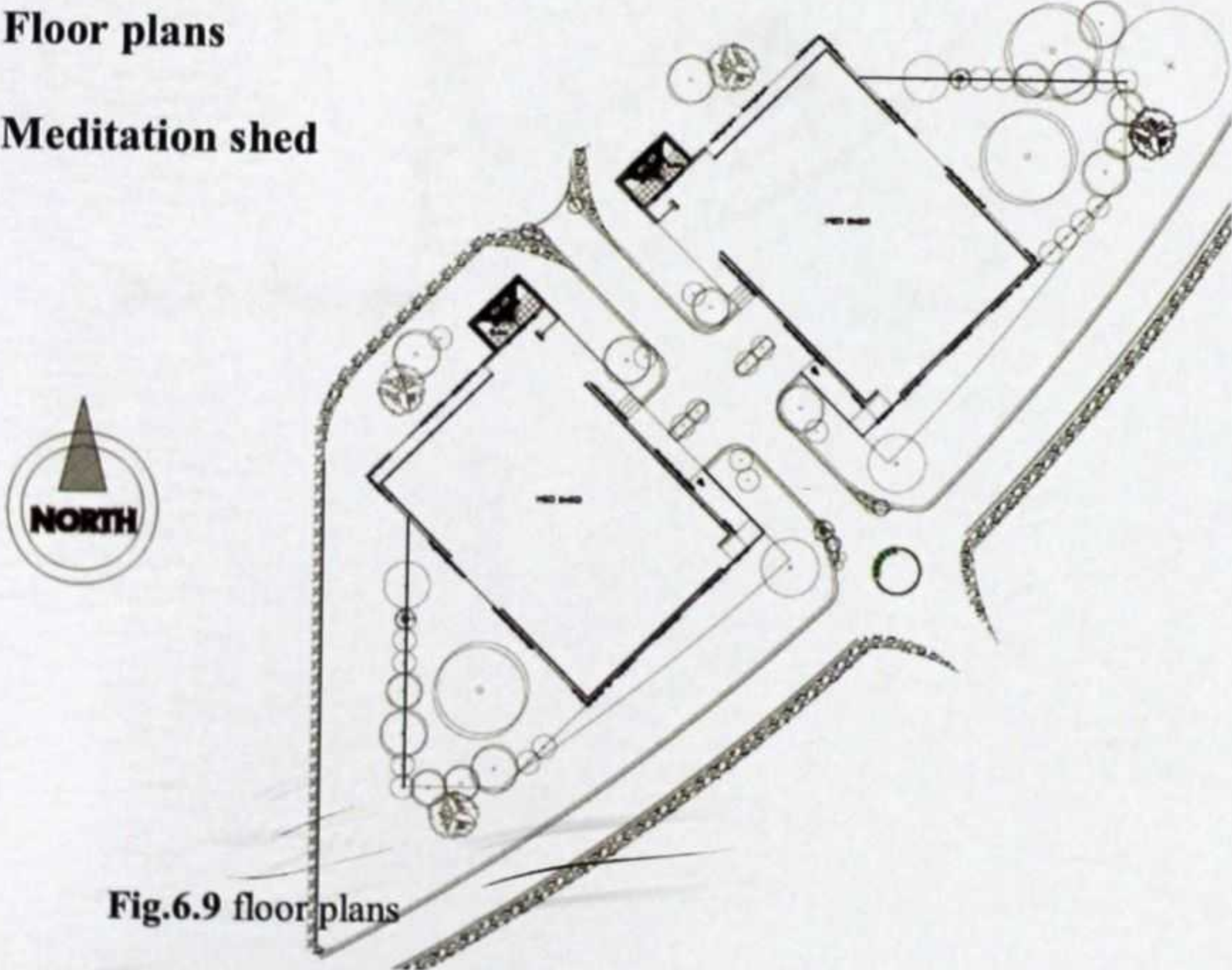


Fig.6.9 floor plans

Recreational patch

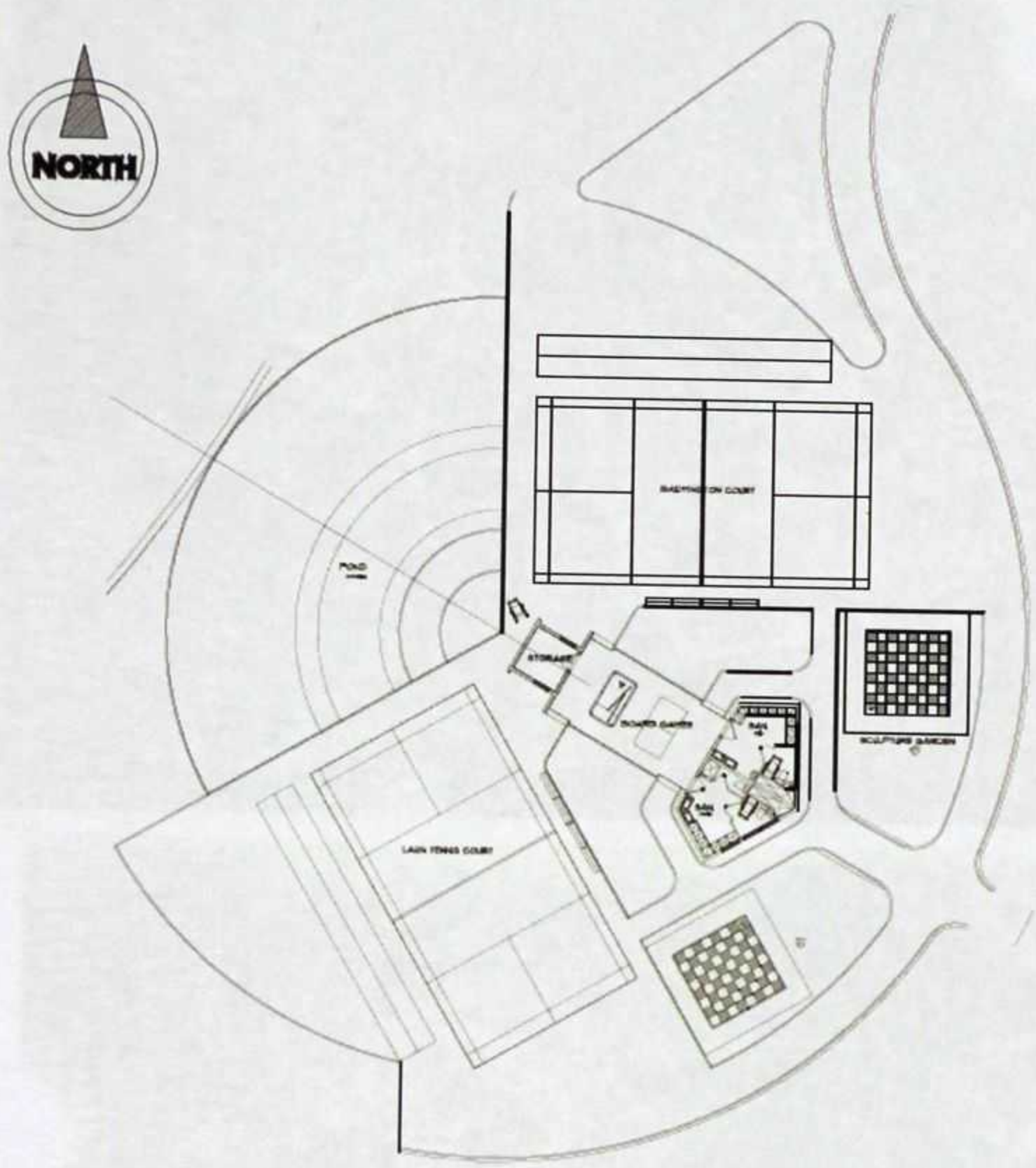


Fig.6.9.1 floor plans

appendix C: three dimensional views



Plate 6.1 aerial views of rejuvenative health village (source: author, 2011)

Plate 6.2 accommodation regular type 2 (source: author, 2011)



Plate 6.2.1 accommodation regular type 1 (source: author, 2011)



Plate 6.3 cluster lodge (source: author, 2011)

Plate 6.4 executive lodge (source: author, 2011)





Plate 6.5 views of bar and waterfall areas (source: author, 2011)