NATIONAL CENTRE FOR DESTITUTES REHABILITATION MINNA

WITH EMPHASIS ON LOW-COST BUILDING MATERIALS

BY

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DECLARATION

I Usman U.A. (M-Tech/696/SET/2002 solemnly declare in my honour that this thesis has no similarity or is not in any form a person or group of persons which had been presented and accepted for a higher degree. It has been in its entire whole written and composed by me and is a record of my research work.

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25/02/02

DATE

CERTIFICATION

This M.TECH. Thesis "NATIONAL CENTRE FOR DESTITUTES REHABILITATION MINNA" by Usman, Usman Alhaji (M-TECH/696/SET/2002 meets the requirements of regulations governing the award of the degree of Masters of Technology in Architecture and approved for its contribution to knowledge and literary presentation.

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DEDICATION

This thesis is dedicated to Allah, (the most might and merciful) for making me fortunate in this life and for me to have under taken this service.

It also goes to my brother Ya Datti Usman Muhammed for all your patience support and understanding.

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Indeed, patience is better than wisdom for wisdom without patience is like a garden full of weeds.

ABSTRACT

Housing provision is an acute and multi-dimensional problem in Nigeria, which calls for addressing such general issues as economic development, population control, raising per capital incomes, but at the same time brings into focus the actual process of production in relation to housing as a commodity for people's consumption.

Three major components of cost for building construction include land, building materials and labour. The building materials component compresses about 50-70% of actual construction cost and considerable cost reduction can be achieved using different alternatives while choosing materials for construction.

This has been extensively carried out based on available documents, in form of journals, magazines and personal interviews. The results of these researches made earlier, however, are at best presented in conference papers, rarely published but as a rule, are in technical report, which has always been the problem inadequate dissemination of information on achievements in relation to alternative construction materials development.

Therefore, there is an urgent need to bridge the gap between the theoretical knowledge accumulated through research and the actual production and most importantly use of these materials, such as utility, cost and potential consumers need to be examined to identity the most effective means of incorporating them in present day construction.

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CHAPTER ONE

1.0 INTRODUCTION

"It is more blessed to give than receive" Apart from food. the privacy of shelter as one of the necessities of mankind is indisputable. The shelter and poverty crisis facing the world community is widely understood. But despite man's unprecedented technological advancement, basic shelter and standard of living affording good job and protection against the forces of economic decline is still beyond the reach of human race. most especially the poor and the disadvantaged and the jobless youth. Yet causing chaos in the name of religious wars. economic sabotage and poverty.

This issue of economic deprivations had sparked off conflicts at the slightest provocation. How safe is the country in the event that the crisis takes another dimension? The concerted efforts of the international community to find solutions in ameliorating the problems of human settlements on a global dimension had yielded neither satisfactory nor desirable results.

Studies indicate that destitution in the country is growing at 5% daily. Nigerian society as it exists today has made some laudable effort towards tackling social problems in the society, these ranges from schools for the unskilled. handicapped schools. programmes to eradicate poverty such as National Directorate for Employment (N.D.E) poverty Alleviation programme, structural Adjustment Programme (S.A.P) and others. Even the state recently has come up with a Youth Empowerment Scheme (Y.E.S). There is skill however some group of destitute that have had little or no attention paid to them and as such the problem has been an escalating social disorder. These are the jobless graduate that finished their National Youth service corps and are still redundant waiting for anything that cross their path. On which some turn to armed robbers, black marketers, taxi drivers to mention but a few.

The Nigerian society has done little or nothing to solve the problem of these category of destitutes. Where solution have been proffered, they have fallen short of achieving the desired solutions either due to wrong policy formulation or a lack of understanding of what the problem really is, as a solution that work for one group will not necessarily work for the other group. The best way for finding a lasting solution to any problem is first and foremost understanding that problem and its psychology.

The situation of destitutes in Nigeria as it stands today is, a never going away problem and it is a permanent thorn in the flesh of the most Nigerian states. It has been the responsibilities of the Federal Government to manage and organise the growth and development of such centres. This burden, having other socio-political agendas as a priority, with N.Y.S.C. as the only and major programme that will keep the graduate busy for a year after which the redundancy period will begin to run. This, coupled with those street boys that have not gone to school, make the situation even worse. They will be waiting for any little conflict and they will surely escalate it to the highest, just for them to make fortune out it. This is surely due to lack of job, redundancy, poverty and hunger, causing chaos every where.

With something doing, and responsibilities, no one will indulge himself in such act, when he is out there trying to make his living.

Besides the socio-political consequence world-wide, the world bank in an economic assessment has estimated that 10 million people (especially Youth and children) across 80 countries will be impoverished by next year (2002) out of which the majority will come from developing countries.

We have seen the human toll .... But there is another human toll that is largely unseen and one that will be felt in all parts of the developing world especially Africa.

Sensing this danger ahead, the Federal Government should cautioned against allowing the crisis of destitution to go beyond its present stage. Hence the need for more centres like the National Youth Destitues centres at national, state and local levels.

11. MOTIVATION

Imagine this : You have sent your child to school up to higher learning (Universities). He graduated as a qualified engineer or accountant only to become a mere taxi driver, black marketer, petty trader or turned into armed robber due to the effect of joblessness. What will you ask yourself? Your son's knowledge has become a waste, he is no mere than a more street beggar. Hence the government can not come up with proper plan to do away with this life threatening issue. Yet, the number of students enrolment into various academic institution is also at an increasing rate every year, which is even more scaring related to the present Nigeria economic and social decline.

These youth believe that for them, what ever comes their way or what ever they do to sustain life, is a way of life, that they are entitled to because of their destitution. They are on the streets as a way out of salvation of others and encouraged by some hoodlums or hooligans. It is a well-known fact, that redundancy encourages lack of ettiquette world wide as a way of salvation, and it is upon this premise that these destitutes base their whole life. If poverty and hunger is ordained, then there have to be people to strive for survival, and who is better than them, and who even have a reason (the redundancy and poverty). Their cause is also enhanced by gullible and privileged individual who can not but to oppress them with the worldly things, materials things. Thus encouraging them to remain on the streets and do anything to see they have that material thing.

1.2 APPROACH TO SOLUTION

There is a saying that says, "For every possible problem there is always a possible solution" It depends on how one approaches his problem that makes the solution last or not.

To find a long-lasting solution to the destitution in the country in general, it is pertinent to first study and determines these people reason's for being what they are, which is widely understood.

Studies has shown that a large percent age of the students graduated every year turn out to be jobless after the one year services (N.Y.S.C.). There are other categories of destitutes. The youths never goes to school, or rather mostly are school drop outs, whom actually are on the streets doing black-marketing business at the same time, the one that are very sensitive in escalating any conflict. They do almost anything to influence other jobless youth to increase the intensity of any chaos.

What really differentiates these destitutes, that is the jobless graduates from their counterparts is the knowledge that they had acquired, though it seems to be a waste. But being less privileged is not the end of the productiveness of these destitutes, and such people can bring some dignity and meaning into his/her life away from the streets as well as redounds the nation.

Having discovered the nature of the problem the solution to such a problem could be proffered. The solution in this situation is going to be in 3 phases thus:-

1. Education
2. Mobilisation
3. Job Opportunity

1. **EDUCATION:** This is for the destitutes them selves who have not already had any training or are not engaged in any profession. They shall be trained in various technical,

semi-formal or formal education. At the end of this stage, these destitutes should be aware of the wrongness of what they do and willing to alter their course in life, but without a way out.

2. **MOBILISATION:** The destitute who would be encourage to enroll in the schools for the training from all over the country to gain some form of training, either technical, semi formal or formal education or training. They would be shown the way forward towards solving their predicament of getting off the streets. Services of social workers would be employed in this stage. They would be encouraged and motivated to get off the street and into the rectitude centres willingly.

   With this method a large percentage of them would be willing to go for the centre, but for the few ones who refused and whom have already thought it better to live their old method. Periodic raids can be conducted by the government to round them off to the centre. If these first two (2) stages are implemented well, the their stage will not be onerous task to put into reality.

3. **JOB OPPURTUNITY:** This is a method on which the Government shall employ the destitute after receiving the training. For the qualified individuals, an interview shall be conducted by officials in the rectitude centre, after which they shall be given appointment. There is going to be various offices for different discipline of profession. This shall be a kind of temporary appointment before the destitute established their selves or seare a more sufficient job. To have sufficient vacancies to accommodate the number of destitutes in Nigeria within this category, this centre will be large project at all the 3 tiers of government vis-à-vis, Federal, State and Local government area. These will in away make them feel very important and their services is needed by the nation, and

which indeed is. Thus making them have responsibilities not to have socio-political scandals or havoc, there by reducing the rate chaos within the country.

After the successful completion of their wishing to return areas, shall do so and set up their trades there and those wishing to remain can do so with the help of the relocation and monitoring unit of the centre which is charged for relocation and monitoring their progress in the society by continuos social interaction with them.

FINANCING AND MAINTENANCE

Since the centre is going to be owned and run by the government, it is important to out line the funding procedure if it is not to go the way of other government institutions of it kind that have ground to a halt due to lack of funds.

Basic funding for feeding and training and running of the centre shall come from government. Aid and assistance will also be welcome individuals and organisations. To reduce the burden on government, however, the centre shall have special arrangement for sourcing fund from what the destitutes would produce. Business centres shall be set up. Farming will be done to produce food. For their own consumption.

Proceeds derived from these sales shall be divided into two. 50% shall be put back into the running of the centre, while the other 50% shall be held in trust for the stabilization take-off funds for them when they eventually graduate and wish to return to their areas to settle into normal society where they can earn a living off their training skill.

1.3 AIMS OF THE STUDY

AIMS: The rectitude centre Minna aims:-

1. To discover ways of improving the shelter and neighbourhood of the poor and disadvantaged, particularly those below the poverty line.

2. To try to infuse some dignity and respect into the life's of the destitutes by providing them with adequate teaching and training of meaningful source of livelihood to enable tem fed for themselves respectfully.
3. To curb and eventually control the spread of and alleviate the suffering of destitutes.
4. To create new environment and societies by realizing values which are indispensable to all human being and by establishing the primacy of dignity and respect with love and togetherness of mankind.
5. Bringing them to a point of self realisation and exposing them to some right concepts for growth and development while broadening their out lock in community service and social responsibility.
6. Creating in the destitutes the capacity for friending and happy group relation the formation of healthy habits, the ability to take care of self, to work skillfully and to take pleasure in doing so irrespective of their disadvantage imposed on them.

OBJECTIVE:

The completion of the centre and eventual implementation of its programmes and principle should help in advising some objects, some of which are:

1. Help in dealing and restoring the nation to its expected glory by dealing with these destitutes off the streets and areas that are affected with their liter styles permanently as opposed to the periodical approach which was the practice in the past.
2. To give every individual, even destitutes the chance to make some meaningful contribution towards the advance in development of the country.
3. To provide more skilled labour force in the country in general.

4. To prove to the rest of the society and even them selves that destitution is not the end of hope in life or independence.

5. Evolving socially and emotionally balanced people and society.

6. Creating a better society where the destitutes are better appreciated and respected and thus have better relationships within themselves and society at large.

7. To protect the destitutes from neglect exploitation cheap labour and abuse.

1.4 RESEARCH METHODOLOGY (DESCRIPTIVE SURVEY RESEARCH

After the choice of topic for which due to consideration and reasons were enumerated research into the topic was carried out to enable and simplify the production of an adequate and acceptable design that would suit both the purpose for which it shall be used be acceptable to the nature of the users and also fit into the natural and man-made environment of the area for which it is intended.

Research into the topic was carried out in several stage, the first being to find out:-

1. What are the factors that lead one to destitution and why is it happening the way it does.

2. What if anything has been done towards the rehabilitation and prevention of destitution in the past and its success rate.

For answers to these questions it was imperative to carry out visits to the areas where the destitutes are mostly found and ascertain why they chose that life, what they would do given chance about their situation, their willingness to restitution and why restitution had failed in the past.

Discussion with social workers and organisations were also conducted to try and map out strategies for arriving at solutions to the problem. Individual reactions to these destitutes were also sought.

The next step would be visit such centres where they exist, to find out how they are run and their success rates as well as problems encountered and overcome. Since the rectitution of destitutes is a social service that requires special education, treatment and consideration.

1.5 SCOPE AND LIMITATION OF STUDY

Most of these social welfare services of this type meant for the enjoyment of these destitutes involve programmes that provide little or no supervision of these destitutes, thus they are left to their own devices almost all day long.

The facility shall make concerted efforts to correct this anomaly by providing trained supervision for group activities designed to eliminate idleness, which may range from social to religious events as well as vocational training. Guidance and counselling services will also be provided on more individual basis to meet the personal, social, religious and vocational need of these destitutes.

The centre will emphasise simplicity in design, operation and services. This has been found to be better for the destitutes because it will not be too drastic a change from the streets where they came from at the same time preparing them for what to expect to be able to get acquired for themselves with the skills that they will acquire at the centre. Duration of stay at the centre shall be 6-12 months for those uneducated youth. This can be exceeded in some cases until rectitution has been achieved depending on the peculiarity of each individual case.

For those jobless graduate shall be 1-3 years. In some cases, until graduate has a more steady and profitable work or job.

The word destitute in this context means "The graduates that are less opportune (jobless) and the uneducated youth on the streets' with nothing doing". The centre shall how ever not cater for other categories of destitution.

For the purposes of this centre, the project is divided into two broad groups:-

1. Literature
2. Design

Past literature on related matters were also reviewed and their inputs noted and analyzed to help in the designing of a centre capable of solving the problems for which it was conceived.

Site selection and visit to site resulted from the above research conducted. The visit to site is mandatory as well as notes any details that may affect construction such as soil condition and factors that may enhance natural appearance such as terrain and topography, others include vegetation drainage and accessibility. To utilize available resources, both natural and man made.

1.6 IMPORTANCE OF THE STUDY

The importance of this study can not be over emphasised. The present global predicament as it is today threatening the human survival with chaos being the order of the day. In Nigeria, it was not what we use to know before. Today no one is sure from where problem is going out break or even what will be the cause of that trouble. Life seems to be at a high risk due to the ugly massacre that is happening everyday from different part of the country with youth being the majority participant, escalating the chaos at the slightest conflict. Yet poverty and hunger being the principal factors that agitate the public into such act.

With the provision of this centre all over the country at the three (3) different government levels. Federal, State and Local Government with its initial aims and objectives achieved by implementing its purpose fully well, it will drastically reduce the participation of youth in such act, since they will be occupy with how to make life easier and better further more boosting the economic activities of this nation by cultivating the knowledge of the graduates acquired during

their school days. Hence forth stabilizing and raising the standard of living of the individuals as well as the nation as a whole.

1.7 DEFINITION OF TERMS

i. **DESTITUTE:** Extremely poor, with out means to live.

ii. **RECTITUDE:** Correctness of behaviour or the procedure of correcting some ones behaviour through a special procedure.

iii. **REHABILITATION:** The act of restoring to a normal condition or good normal life.

CHAPTER TWO

2.0 LITERATURE REVIEW

The situation of destitute in Nigeria and its other counterparts all over the world is a never going away problem and it is a permanent thorn in the flesh of the world's population. The National council for the destitutes a non-governmental organisation, under the chairmanship of group captain (Dr) Usman Jibrin (rtd) has moved to combat the scourge of street begging in the country by identifying the remote courses of this phenomenon and its possible remedy. Recently it organised a book launch on "Almajirai" in Kaduna during which a cream of Nigerian scholar's, businessmen and politicians participated.

The contemporary practice has since abandoned the original ideals and has become something else. It has, for example, introduced material motives in an endeavour that was hardly originally worldly worldly. It has also led to misinterpretation or mis-representation of destitution for destitution have clearly shown that begging and any other mischeavous act is prohibited except in very special circumstances and for a particular need.

This has portrayed destitutes not the hard working people they ought to be but a lazy lot who live off begging or alms, stealing and fraud. This represents a colossal loss of the productive capacity of the destitutes as other wise useful members of the community rest on their oars and wait for someone to feed them.

Earlier, chairman of the National Council for the Welfare of the Destitute (N.C.W.D), group captain Usman Jibrin (rtd) said the N.C.W.D was a non-governmental organisation with national spread, and it started operations barely two years ago. He explained that the main objectives of the council include rehabilitation of Almajira, people with disability and special

destitution course by poverty, so that in the final analysis, the target groups will be lifted from poverty and dependence on charity to a position of self-reliance.

"We are not unaware of the enormity of the problem, but we believe a start must be made. This is what we have done"

It is dangerous to allow millions of our future leaders to the vagaries of uncaring and what appears to be decadent society. We believe that the community and governments at all levels must be alive to their responsibilities. This is a national problem and must be viewed as such.

2.1 HISTORICAL DEVELOPMENT OF REHABILITATION CENTRES

The first rehabilitation and training centres (RTC), as it is popularly called is one of such centres set up in the country by the Federal Government, through the federal ministry of social development, youth sports and culture. These centres are located at Lagos, Anambra, Kaduna, Kano, Oyo, and Sokoto State.

The centres were constructed with fund from the Federal Government and run by the individual states with some subvention by the Federal government. The centre was commissioned on the 26th May 1983.

Niger State school for the handicapped, Minna is a school which deals mainly with special education of the handicapped. It is geared toward training these youngsters school level. There are no forms of vocational training offered in the institution. It was also established in May 1983 by the State government.

From this, the development of such centre spread widely with programmes by both the federal government and state governments, such as:-

1. Poverty alleviation programme (P.A.P)

2. Social adjustment programme (S.A.P)

3. Youth empowerment scheme (Y.E.S)

With other rehabilitation centres allover the country.

CHAPTER THREE

3.0 LOW COST BUILDING MATERIALS

Almost all developing countries need to provide cheap and decent shelters for the masses. The cheap shelters can not be provided due to high prices and shortage of conventional building materials like burnt day bricks, Portland cement, Asbestos and corrugated galvanized iron roofing sheets and other building materials. This chapter discusses the work carried out for the development of new building materials from agro-industrial wastes for low cost housing viz. Cement and building bricks from rice lrusk ash and roofing sheets from agricultural wastes for replacing conventional building materials including fire retardant paint for thatch roofing and flooring tiles from industrial waste development of common services facilities e.g cheap portable water supplies and sanitation are also discussed.

3.1 INTRODUCTION

In a developing country the welfare of the down-trodden and economically weaker section of the society brings the major objectives of the social goal. It is imperative that efforts have to be unreservedly directed towards providing basic amenities and cheap housing therefore assumes a major dimension in developing countries. The phenomenal increase, shortage and rising prices of building material. Have come in the way of providing cheap shelters. In an agricultural and rural oriented developing country, such as Nigeria a substantial number of population a having substandard living and hence can not afford to have costly houses made of reinforced cement concrete, brickwork and Asbestos/Galvanized iron sheets. How ever we can not ignore the basic requirement of such a large number or population. If brick or R.C.C. houses are provided using conventional building materials, enormous amount of money is required for all houseless persons in Nigeria done(approx. of the order of ₦5,30m000 millions) which is

beyond the means of any developing country. It is therefore, evident that developments of alternate cheap building materials are more likely to provide a solution for cheap shelters. With this view and objective work had to be initiated world wide to develop various building elements such as bricks, cementitious materials roofing elements, tiles for flooring in the construction of low cost housing. In addition, development of suitable water filters and cheap sanitary services from waste materials was also under taken.

3.2 DEVELOPMENT OF NEW BUILDING MATERIALS

Economic pressure and need to preserve the environment created by accumulation of wastes have led to the problem to utilizing these wastes into profitable ventures. The wastes have also an advantage of being replanishable without creating any shortage when utilized as raw materials.

Research and development work undertaken at various research institutes have demonstrated the possibility of utilising commonly available wastes such as road picking for making roofing elements, rice lust ash for cement and building bricks and asbestos cement wastes for flooring tile.

3.3 PAPER CORRUGATED ROOFING SHEETS

Millions of people in developing countries are living in temporary and sub-standard shelters. A very large population also jet displaced every year due to flood, earthquake and cyclone. The problem of providing immediate shelters to those people bring lot of pressure on government and other agencies due to high prices of building materials especially A.C and G.I roofing sheets.

Paper corrugated rooting sheets was, therefore developed joinlly by general building research institute, Roorkee and RRL-y with a view to provide cheap alternate rooting material. These sheets are ideal roofing materials for such rehabilitation programme as well as for the masses who made out of road sweeping paper grass or straw. The process of making these sheets consists of mechanical beating of the waste paper or other cellulose wastes obtained from cities and other sources with certain chemicals such as silicate rosin, in a beater to obtain pulp of certain freeness value. The pulp thus obtained is fed into a continuos sheet forming plant and wet sheets of desired thickness are obtained. These sheets are cot and further pressed to remove surplus moisture and subsequently corrugated in machine or hand moulds. The sheet are sun-dried or dried in controlled drying chamber.

After drying the sheet are further impregnated and treated with asphalt and fire-retardant pants to render them water and fire-resistance properties. It has been used to ascertain the comfort conditions. Fig 1 and 2. The sheets have been found very suitable for low cost housing, with the minimum life span 10 years and structurally sate. A plant of capacity 8 tonner (2000sq.m) per day can be set up. And a capacity of 50sq.m sheets per day can also be set up which will not only help improve the environmental conditions but at the same time provide cheap roofing material. Cost of production will how ever be (11.00) per sq. m. see fig 1a and 1b.

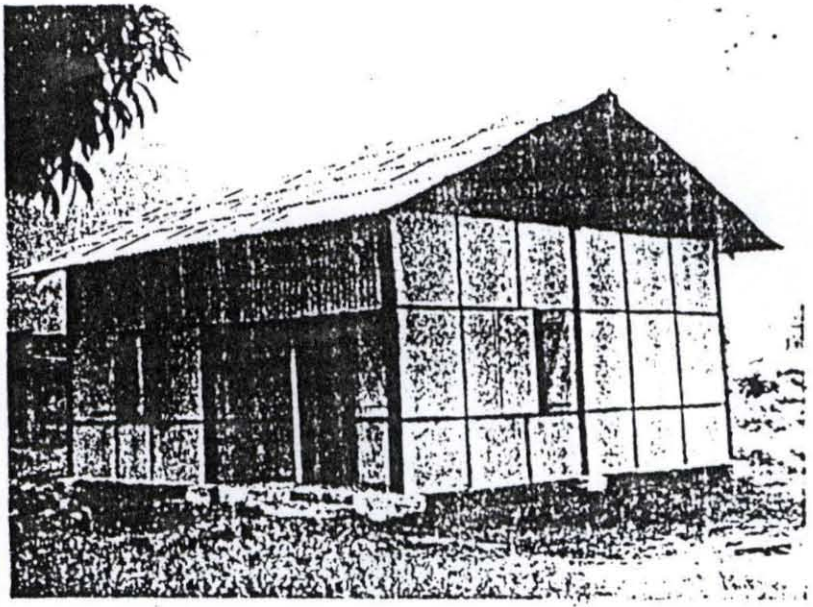


FIG. 1

Paper Corrugated Roofing Sheets
Low Cost House.

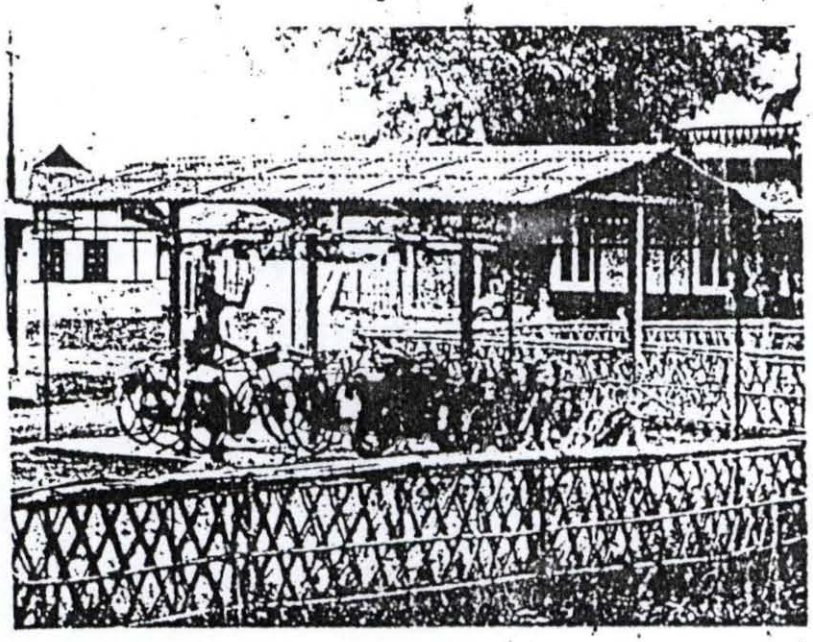


FIG. 1a

Paper Corrugated Roofing Sheets
Cycle Stand

TABLE 1

PHYSICAL PROPERTIES OF PAPER CORRUGATED ROOFING SHEETS.

TESTS	VALUES
1. Size	Length 101 cm Breadth 61 cm Thickness 3.5 - mm
2. Corrugation	Pitch 9.0 cm Depth 3.5 cm
3. Water absorption	24 hrs wetting 10 - 15 %
4. Breaking Load (dry sheets)	30cm span 130 - 145 kg 60cm span 65 - 75 kg.

Source: S Angel, S. Benjamin and K.H. Degoede, the low - income Housing System, Ekistics 44, 79

3.4 FLOORING TILES FROM ASBESTOS CEMENT WASTES

Asbestos cement factories produce lot of wastes during the production of asbestos cement products. This wastes contains considerable quantities of materials mixed with hydrated cement and asbestos fibres. It is reported that for every 40 tonnes capacity of asbestos product 2 - 2½ tonnes a day of wastes is available. R and D work at RRL-Y demonstrated the use of this wastes for production of flooring tiles which can be used as flooring materials for low cost housing. The physical properties of the tiles develop are given in Table II. The cost of setting up a factory is ₦25,000, having a capacity of 2000 tiles a day. The cost of per 100 tiles works out to (₦3.75). By adoption of the process the flooring tiles viz. terrazo plain and nonskid tiles can be manufactured see Fig 2.

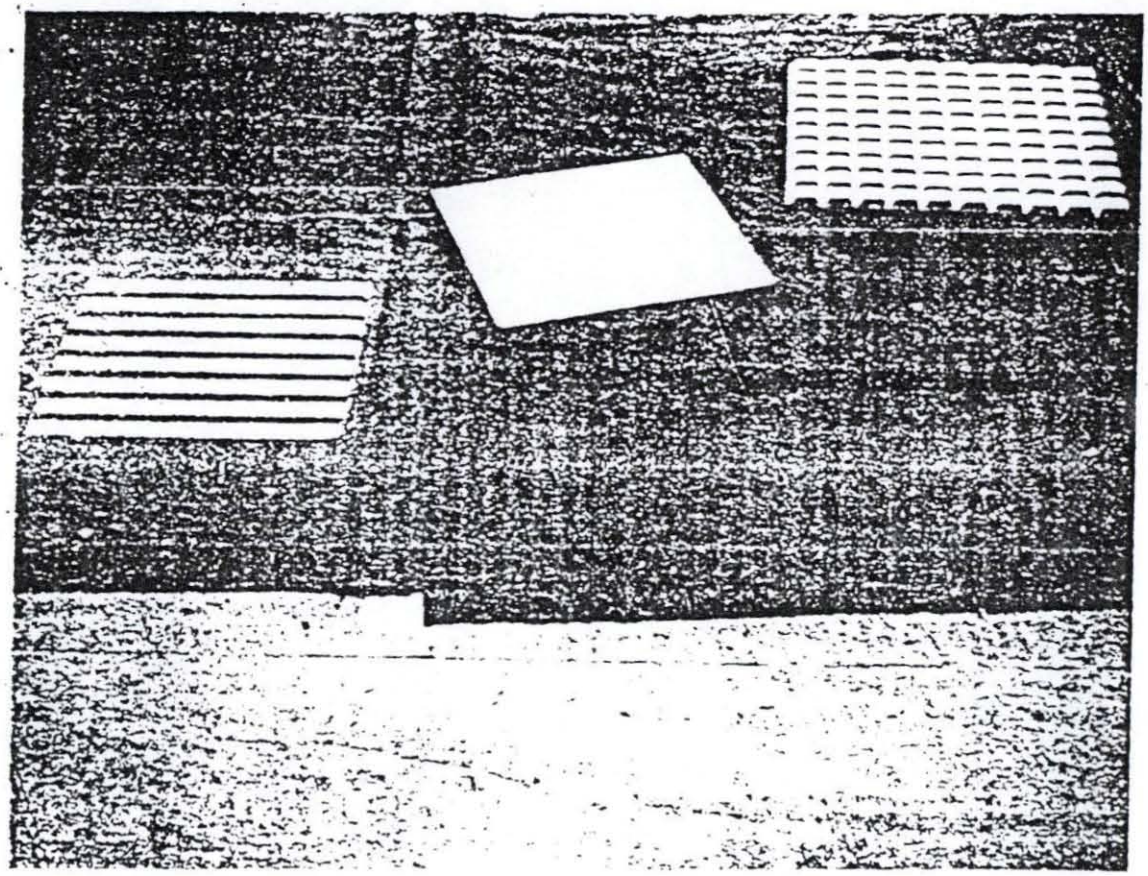


FIG. 2

Flooring Tiles

TABLE II

Physical Properties of Flooring Tiles

Tests	Actual value at different moulding pressure	Specified value at 140kg/cm^2 moulding pressure.
1. Transverse breaking load		
i. Dry Test	107 - 159kg	Not less than 106kg
ii. Wet Test	160 - 238kg	Not less than 71kg
2. Water absorption	4.3 - 7.8%	Not more than 10%

Source: Regional Research laboratory council of scientific and industrial research journal

3.5 FIBRE REINFORCED CONCRETE

Another approach to the provision of low-cost roofing material is to develop concrete reinforced with fibres from local agricultural products. The roof can then be constructed in the form to slabs from this fibre -reinforced concrete.

In developing countries, therefore, an approach to the provision of a low-cost roofing materials is the use of fibre-reinforced concrete. Instead of steel, local agricultural produce in the form of vegetable fibres can be used as reinforcement. These includes bast (e.g jute, hemp, flax), leaf (e.g sisal, abaca, henequen) and seed and fruit (e.g cotton) types see Table III.

Vegetable fibres are produced in most developing countries and require only a low degree of industrialization for their processing. Compared with the equivalent volume or weight of steel the energy required for their production is small. In addition, a random mixture of vegetable fibres in concrete should lead to concrete producing technique, which requires only a small number of trained personnel in the construction industry.

TABLE III

Material	Tensile strength MNM^{2}	Young Modulus GNM^{2}	Elongation at failure	Density
Sisal	830	26.5	3.0	-
Hemp	550	57.0	1.5	1.5
Cotton	280.830	5.5-11.0	5.0-10.0	1.35

Source: L. Nillson Reinforcement of concrete with sisal and other vegetable Fibre Swedish council for Building Research Document D.4 1995.

The principle of producing fibre-reinforced concrete is that short fibres are added when the concrete is being mixed. In this way concrete in an already reinforced state can be placed in the formwork in a simple manner. The use of reinforcement of small diameter at a close spacing produces and improvement in strength, which is proportional to the quality and quantity of the reinforcement, employed. This is because the well-dispersed reinforcement prevents the formation of micro-cracks and micro-fissures, which occur in concrete prior to fracture. The dynamic and thermal properties are also satisfactory. Fig3.

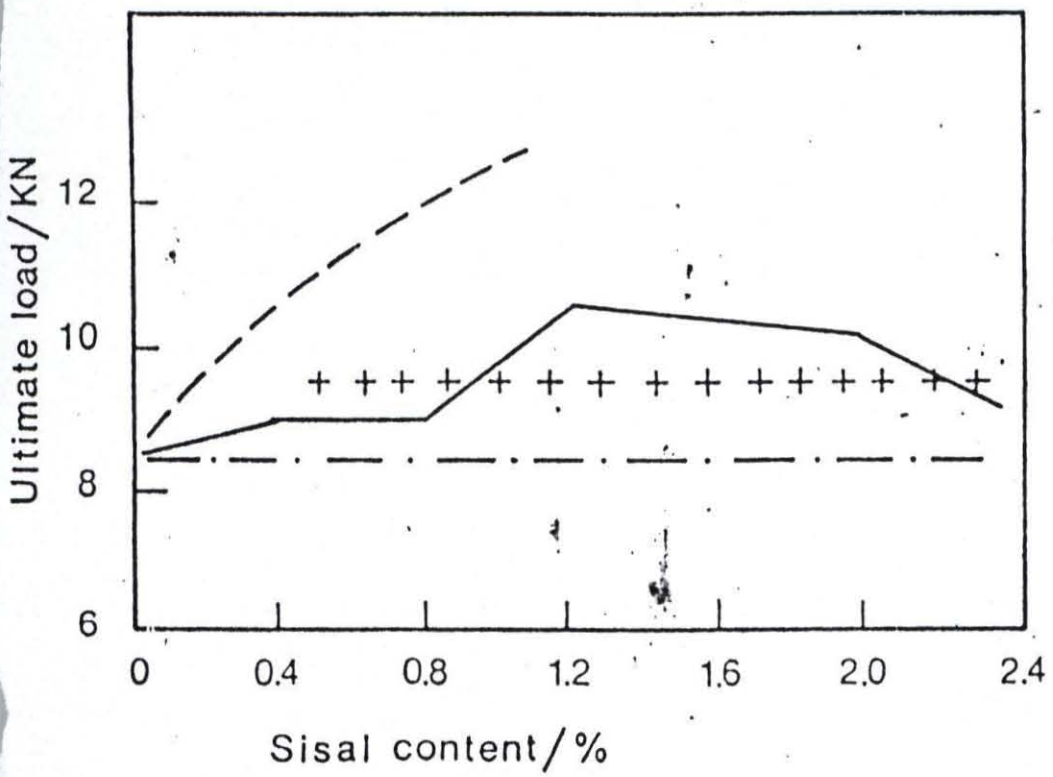
TABLE IV

Effect of incorporation of coconut husk fibres on properties of concrete

Amount of fibre	Tensile strength	Compressive strength	Modulus of toughness at 85% max. load
70 by weight	MNM^{-2}	MNM^{-2}	JM^{-3}
0.00	1.85	14.69	358.59
0.08	2.58	20.62	703.39
0.16	2.13	12.96	572.37

Water-cement ratio, 0.82 and sand-cement ratio, 4.00 (all ratio by weight)

(Source: F.O. State Engineering Journal of Singapore, 3 (1), (51(1996).



Sisal-reinforced concrete beam flexural strength tests after aging for 28 days (4)
Mean values for beams with 1-3cm fibre length

\+ Admixture of random lengths and quantities of fibres

– Plain concrete beams

· Mean values of two tests with longitudinally-aligned fibres.

The conclusion from those and other studies is that the effective method for reinforcing concrete with vegetable fibres is not to use the fibres as a concentrated reinforcement in the tensile zone of the concrete (as steel is used) but to disperse them uniformly in the matrix thus forming a homogenous composite material. This then results in a high degree of stress re-distribution by the fibres, which then act as crack arresters.

3.6 BURINT CLAY BRICKS AND TILES

The use of burnt clay bricks and tiles has an age old traditions and is preferred for low-cost housing in many rural as well as urban areas. However, one can not simply get away from the fact that bricks and tiles are expensive due to very high cost of the fuels used. Attempts therefore have been made to produce good bricks and tiles at a lower cost.

The non-availability of good soils for making bricks is also a problem. The C.B.R.I (central Building Research institute of India) has developed several techniques to improve the quality of bricks from traditionally unsuitable soils such as black and red soils and tiles from alluvial soils. These techniques are used on commercial basis in many parts of India. The "Grog" (Precalcined clay) as an admixture in black soil has been especially adopted very widely. The institute has also developed a high draught brick kiln (Fig 4).

Recent trails in the use of admixtures such as fly ash with soils, and firing the bricks with agricultural wastes like rice husk has shown a new approach for small scale manufacture of burnt clay bricks and tiles with considerable saving in traditional fuels.

3.7 COIR FIBRE CEMENT BOARDS/SHEETS

Development work has been completed in the C.B.R.I on the utilization of coin wastes, rice husk, ground not hulls and others, for making building boards. Theses wastes are now becoming more and more available with the debvelopment of agro-industrial complexes. The

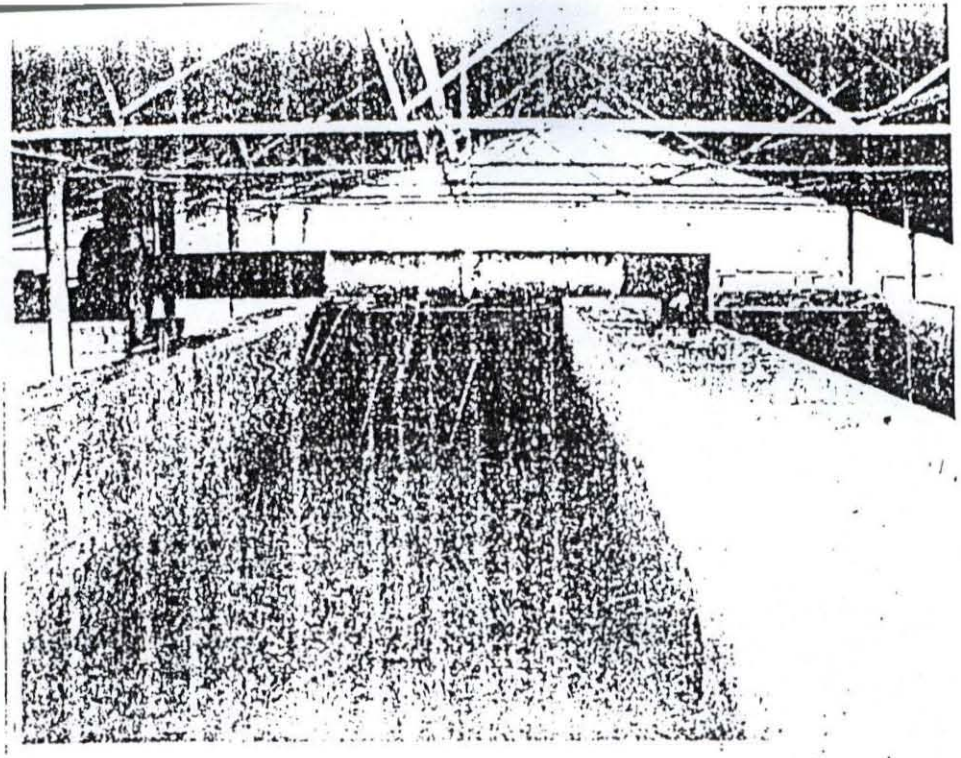


FIG. 4i HIGH DRAUGHT BRICK KILN

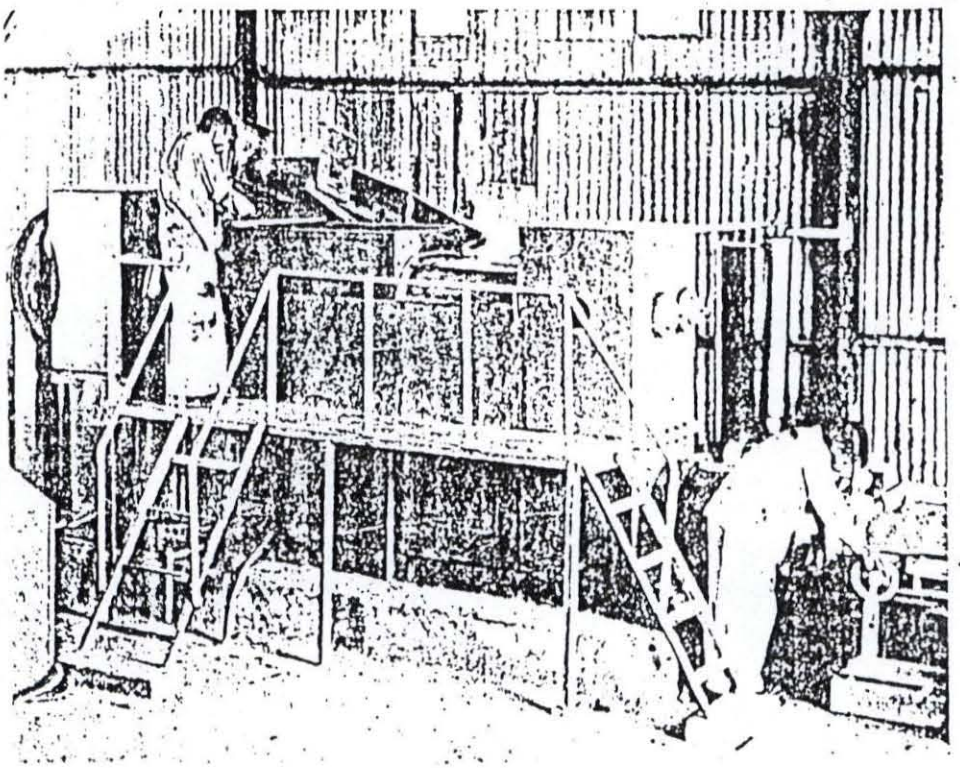
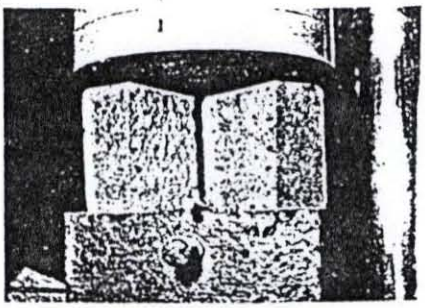
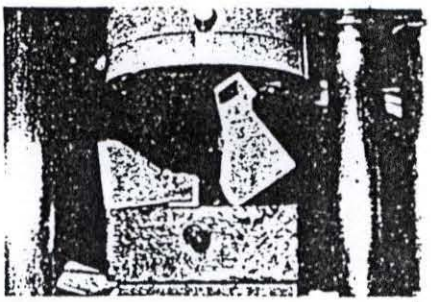
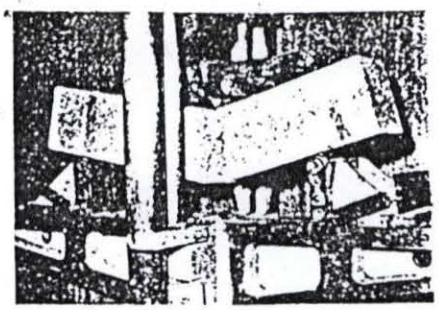


FIG. 4j SEMI-MECHANISED BRICK MACHINE

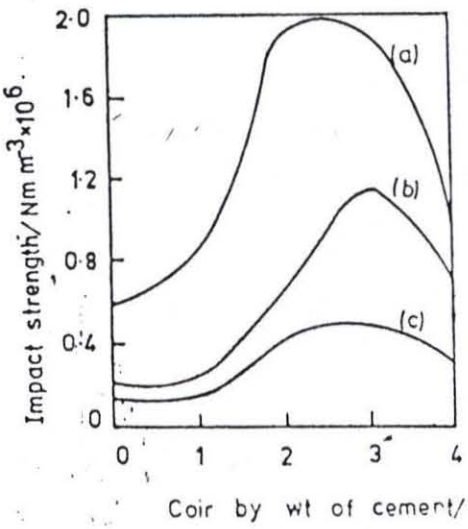






Moulding of Paddy Husk Ash Bricks in Brick Making Machine

Paddy Husk Ash Bricks Wall



Variation with coir content of impact strength of coir-reinforced concrete beams at different ages. Beams aged for 90 days (a), 21 days (b) and 7 days (c).

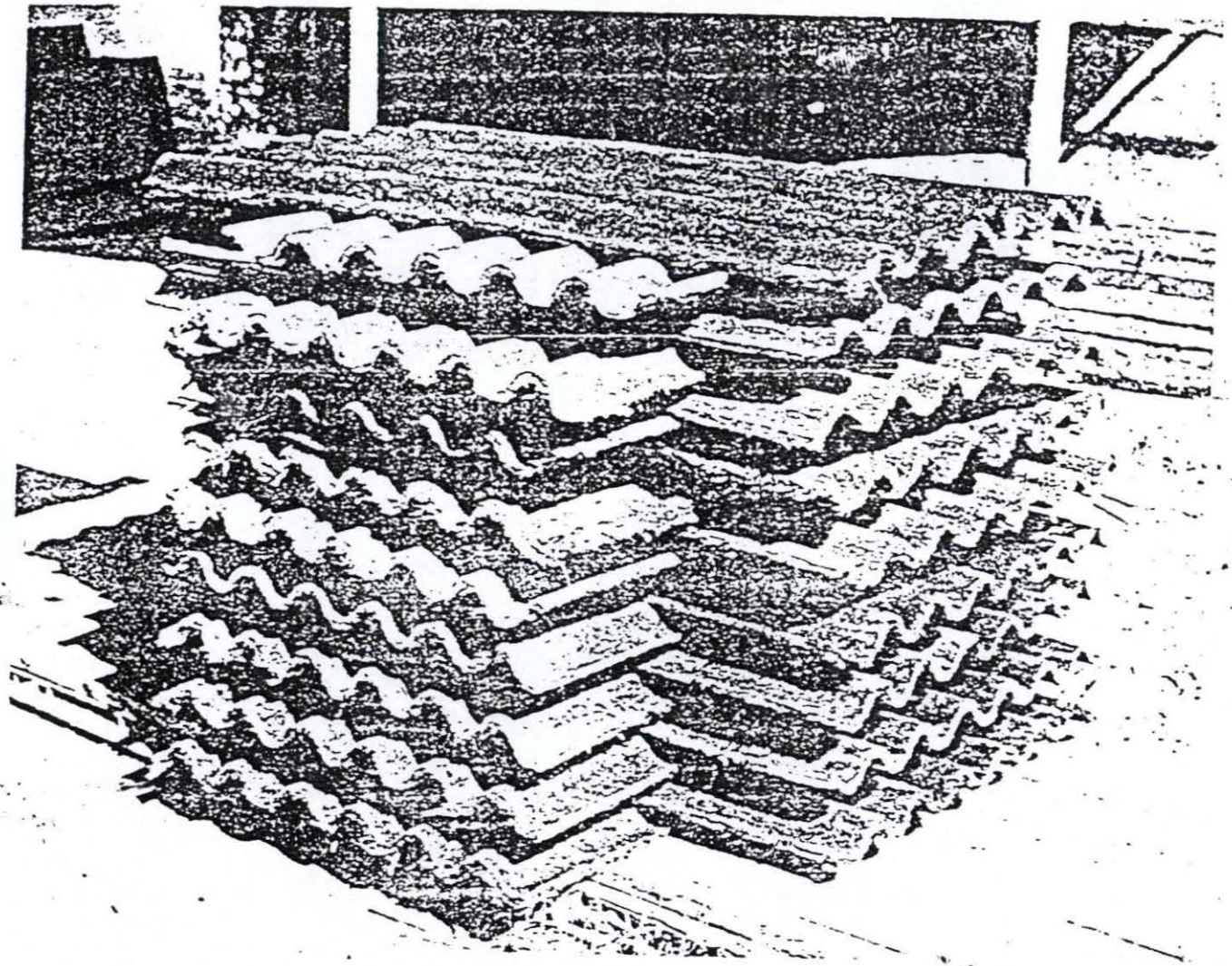


FIG. 5. WOOD-WOOL-COIR-CEMENT ROOFING SHEETS

C.B.R.I has developed a building board from fibre and cement. This flat board could be used as until panels for timber or RCC or metal frame structures, as permanent stuttering for concrete, erection of free standing and sound proof partitions for false ceilings as well as roofs see fig 5.

3.8 CARDBOARD CEILING BOARD

There are three paper-mills in Nigeria, which are producing among others cardboard of various sizes, thickness and qualities. The cardboard are produced as cartons (boxes) for various customers on pre-order basis. Used only for packaging of manufactured products. It has not hitherto been ordered for ceiling use.

In November 1994, a visit was made to one of the factories at Jebba. The largest size of the cardboard produced by the factory is 1200x1200mm (^{1}x4^{1}). This is the exact size of the commonest ceiling sheet. The availability of cardboard in this size has the advantage of being nailed to the usual spacing of ceiling noggins.

The cardboard sheet is produced from pulps of Malina, Oak, bamboo pine. The fibres of the timber are 100sened out with chemicals after the bark and gumming substance called lignin have been removed. The fibres are then beaten into pulp and passed into the cardboard production system (Machine). The production capacity of the machine at the mills is at the speed of 600ft/min (180m/mim). This rate is 150 sheets/min. The sheets are available in low medium and high grades depending on the number of piles in a sheet and the chemical treatment.

The standard required for the ceiling works is the high-grade quality sheet. The high grade is obtained by toughening the sheets with chemicals during the production process. The high-grade sheet can have life span of forty or more years.

The economy of the cardboard ceiling sheets as at November 1994 when the visit was made to the factory-Jebba paper mills, the cost per sheet of the high grade 1200mm square board

was put at ₦61.00. The market price of the 1200mm square asbestos cement sheet, was ₦200.00 at the same period see Table V. The price reduction from ₦200.00 to ₦61.00 is 69.5%.

Apart from the high reduction in cost, the cardboard has the added advantage of its flexibility. It is not as rigid and breakable as the asbestos cement sheet. It does not suffer any known aesthetic defect. However, there are certain demerits of the cardboard, which though may be overcome with additional financial commitment.

First among the demerits is the susceptibility of the cardboard to termite and fire attack. Termite is common in most parts of Nigeria. The cardboard may have to be treated with antis termite chemicals before it is fixed into the ceiling.

The second is the fact that, with the current production rules of the paper mill, large quantity (minimum of 10,000 sheets) must be ordered for before the factory can undertake the production process of the high grade (toughened) sheet. This can be over come when increased orders are received and economies of large-scale production are realised. The minimum waiting time to receive the order, which is three weeks, can be well accommodated with proper scheduling of purchases. This minimum 10,000 sheets order condition is not helpful to individuals who want to reduce cost of house construction.

TABLE V

Market prices of some selected building materials 1990. February, 1999. All prices are in Naira.

Material	Jun 87	Jun 88	Jun 89	Jun 90	Jun 91	Jun 92	Jun 93	Mar 94	Sep 94	Jan 98	Feb 99
Cement (50lg bag)	13	22	45	50	55	100	120	180	230	430	8500
Gramile droppings ($3.8m^2$ tipper)	250	300	580	680	1300	1430	2000	2260	2400	8800	8500
16mm mild steel (tonnes)	1300	2500	600	5000	8000	14000	12000	15000	28000	31000	30600
50x50 Hardwood (3.66mm/cm)	2.70	4.20	5.85	8.10	11.25	13.5	15	18.9	20	85	80
Super high weight 2400x1050mm asbestos roofing sheets	N/A	N/A	N/A	95	N/A	112	155	N/A	260	N/A	N/A
1200x1200mm asbestos cement ceiling board	11.50	N/A	N/A	30	60	65	90	N/A	TTO	N/A	230

3.9 CONCLUSION

The vast problems of providing cheap shelters and building materials including basic service facilities to economically weaker sections of our society in developing countries is a challenge. In any programme of providing food and education, provision of cheap housing assumes great importance. The need for housing and cheap building materials is most intensely felt in developing countries. Development of new building materials from wastes not only utilises the wastes into a profitable ventures and solve the problem of shortage of materials but provides solution to socio-economic problems, i.e. health hazards and pollution risks created by accumulation of wastes.

CHAPTER FOUR

4.0 CASE STUDIES - DESIGN APPRAISAL

4.1 INTRODUCTION / CRITERIA

CASE STUDIES are studies taken as a sort of information gathering or investigation under taken on existing structures (similar or related to the proposed design) in order to discover new facts, get additional information and discover general trends and problems associated with such design. These existing trends and problems will them serve as a guide to the proposed design in the determination of functions and facilities to be provided.

Although this category of destitution in Nigeria and perhaps most African continent and the entire world wide, is a basically black people's (African) problem, that is an overwhelming majority of these destitutes are found from this region of the world. Selection case studies was not limited to institutions within Nigeria. This variance of case studies is to enable a glimpse of how the problem is tackled in other parts of the world.

Facilities student were of a general overview as not only destitute centres were studied, but also centres that deal with and run social services and or special education, both by Government owned and run by private organisations.

Some objectives in carrying out these case studies surveys and analysis are:

1. To evaluate the degree of response of the destitutes to the existing provided facilities.
2. To evaluate the users, requirements of facilities provided, the existing spaces and the relationship between them, as well as in relation to required space standards.
3. To evaluate the structural and functional performance of such facilities studied.

4.2 CASE STUDY 1

DESTITUTE REHABILITATION CENTRE IKORODU LAGOS, STATE

HISTORICAL BACKGROUND:-

Social services in Lagos State generally emerged as a result of post 2nd world war problems which produced a lot of youths on the streets coupled with their anti-social habits which led to destitution.

The centre is located at Majidun in Ikorodu Local Government area of Lagos State. It is located on the out skirt of the town, on a dirt road off the main road leading from the heart of Lagos and Ikorodu, some distance away from a small fishing humanity.

The rehabilitation and training centre (RIC) Majidun as it is popularly called is one of 6 such centres set up in country by the Federal Government, through the Federal Ministry of social development, Youths sports and culture. The other centres are located at Anambra, Kano, Oyo, and Sokoto State.

The centre were constructed with funds from the Federal Government and run by the individual states with some subvention by the Federal Government. The centre was commissioned on the 26th May 1983.

The objective of the centre was the training of disabled persons in vocational trades and re-settlement back into their communities to earn a living and be self-reliant. Admissions were to be on application and training courses were time bound and to be paid for. The population of destitutes comprised of beggars, the handicapped able-bodied destitutes, and an over whelming large number of mentally ill destitutes. The centre veeved from the main objective principally due to the population make-up and method of admission. This also changed the method of admission, which now became by force after viands were conducted to round them off the street.

FACILITIES

The facilities at the centre are:

1. Administrative block
2. Assembly Pavilion
3. Workshop Unit
4. Maintenance Unit

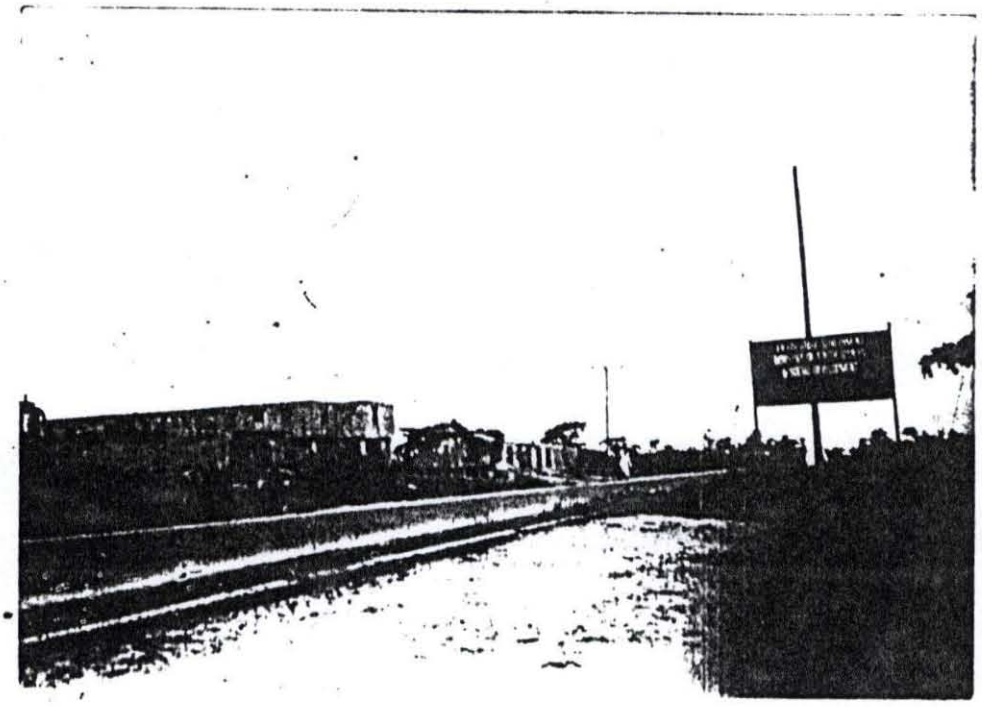
All the buildings are single structures enclosed within the walls with open courtyards in all the dormitories. All buildings are bungalows except that the administrative blocks which happens to be a storag building

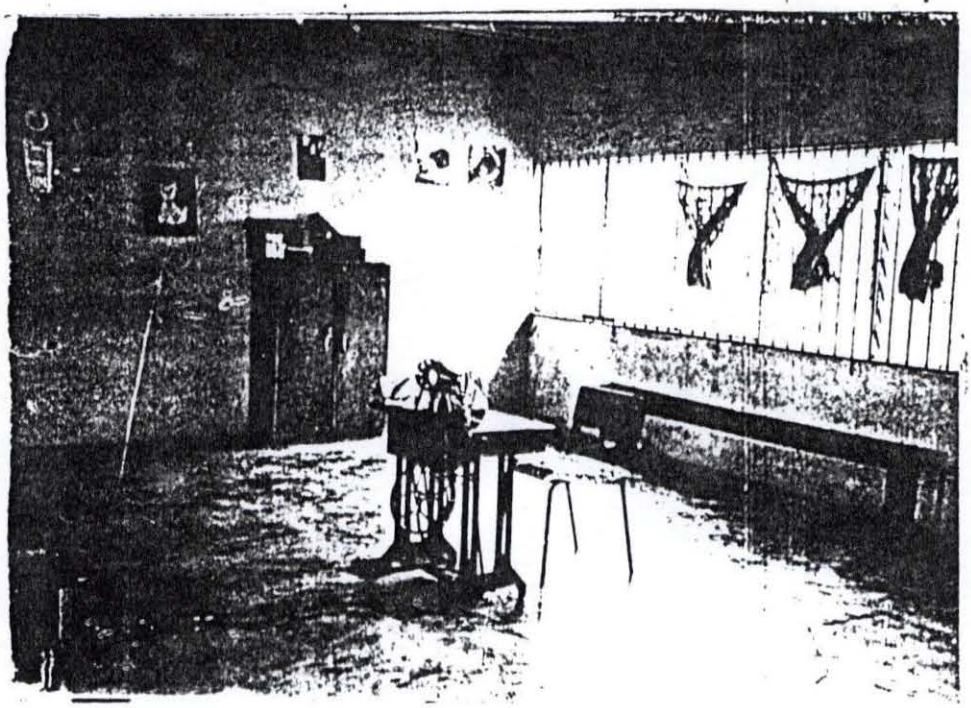
DEMERITS

1. Access to the area id difficult with unsuitable location.
2. Restricted prison like appearance due to high surrounding walls.
3. Facilities are limited and over stretched
4. Facilities lack proper maintenance
5. No well defined reception area
6. Non application of aesthetic features
7. No room for further expansion

MERITS

1. Well laid out and maintained lawns
2. Well functioning lay out of centre activities
3. Good ventilation and natural lighting within most building
4. Structurally sound buildings.





CASE STUDY TWO (2)

YOUTH SMPOWEREMENT SCHEME (PROJECT Y.E.S) NIGER STATE

HISTORICAL BACKGROUND:-

His is a project that is motivated by her excellency, Hajiya Zannab Kure, it is dream for a youth oriented programme as a channel of addressing the plights of our young teeming future leaders and a means of making them more efficient to the development of their communities and the society at large.

This dream was occasioned by the plights of the youths in Niger State. During a tour of the state, she found that most of the youths in the state were roaming the street without jobs or were engaged in dangerous trades like prostitution. drug abuse. fuel hawking and many others. This situation led to the dream and the conception of youth Empowerment scheme in Niger State.

Project YES is a youth Empowerment scheme as distinct from youth employment scheme. It is a Non-Government organisation (N.G.O) for the children and youths of Niger State. It is a scheme aimed at all aspects of youth development such as education, self-guidance, acquisition of vocational skills and employment.

OBJECTIVE OF PROJECT Y.E.S.

1. To foster the overall development of the youth in all it ramification-social, psychological educational and career wise.
2. To provide avenues for re-education and re-orientation for the youths.
3. To provide functional guidance and counselling for all categories and groups of youths.
4. To equip the youths with the necessary social-psychological skills for healthy living and exploration of self-potential.

5. To re-categories of youths that project Y.E.S target. Are:-

1. Pupils in the last stage of their primary education.
2. Junior and senior secondary pupils.
3. Students of tertiary institution.
4. School drop outs within the age bracket 10.35 years.
5. Non-literate young couples.
6. Youths engage in criminal activities drug abuse and trafficking.
7. Children and youths in institutional setting (Remind homes, schools for the disables).
8. Social works and youth organizers.
9. Teachers in both formal and non-formal schools.

FACILITIES:-

1. The scheme consider only the Niger State origin.
2. The centre has not enough facilities to accommodate all the beneficiaries. Some of them have to go to individual shops, factories, workshop and offices to under take training skills.
3. There is no 100% proper monitoring of the youth involve.

MERITS

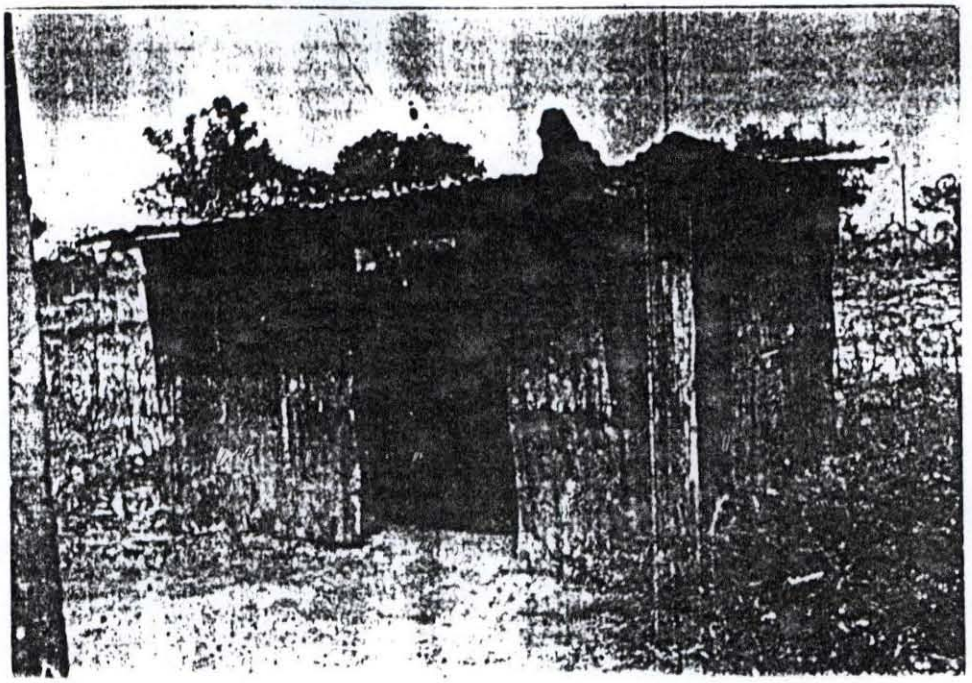
1. The youth centre is adequately and properly located along Minna - Chanchaga road, opposite Niger State Trust fund well defined and easily accessible.
2. It is aesthetically okay.
3. Many trades and vocational training are undertaken.
4. Both make and female are given equally opportunity.

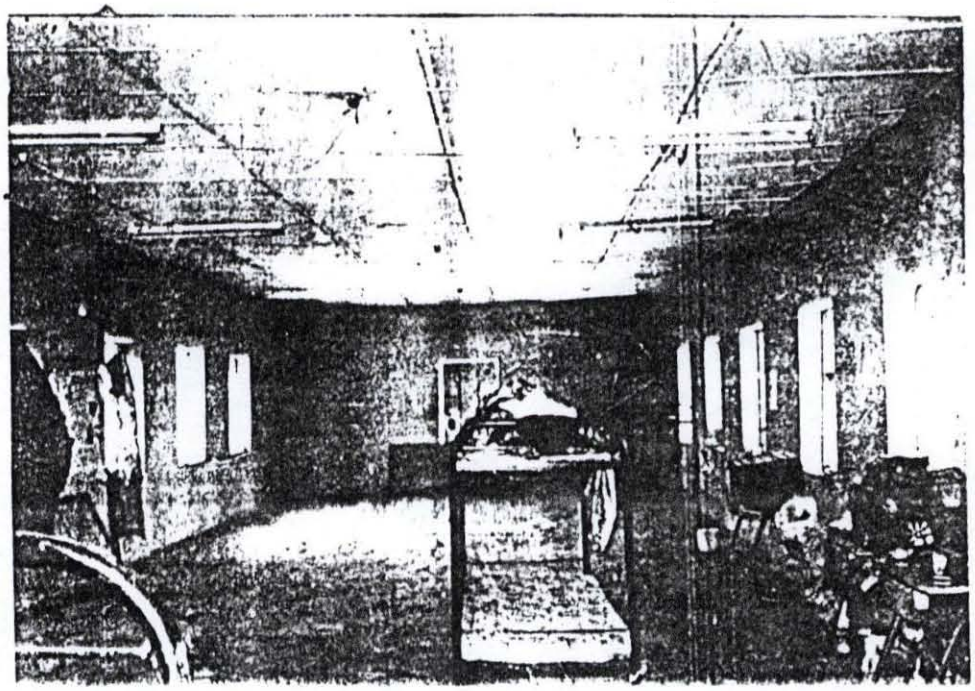
TABLE VI

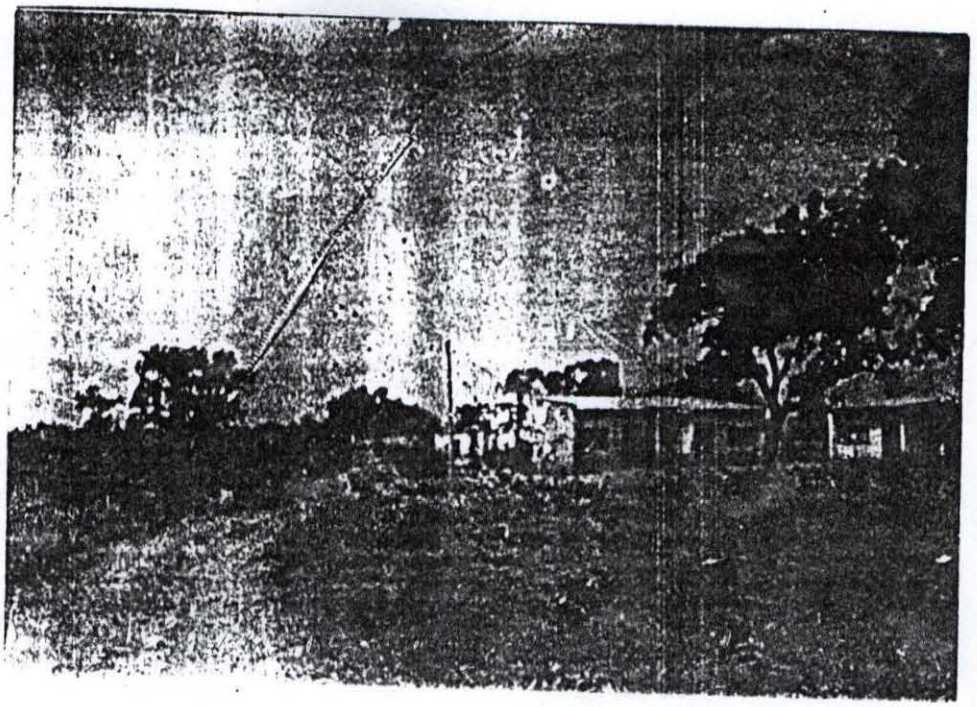
Statistical Distribution of Beneficiaries

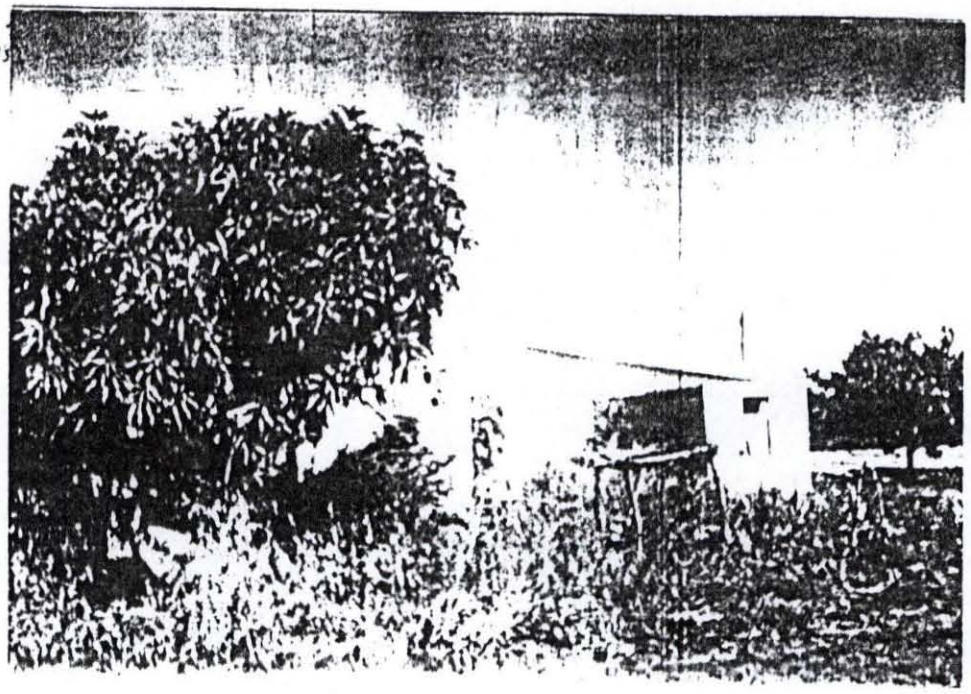
Trade/Field	Segmentation	No per trade
Education	-Scholarship	140
	-Remedial	15
	-Computer	160
Guidance and	-All benefit	
Counselling	-Ciaries	
Vocational skill	-Electrical installation	31
	-Barbing/Hairdressing	19
	-Tailoring	218
	-Mechanics	9
	-Shoe making	11
	-Poultry	15
	-Sineart	4
Home Management	-Knitting	14
Skills	-Catering	14
	-Soap Making	13
Photography	-Photography and Video Coverage	8
Total		671

Source: Youth Empowerment Scheme, the Journey so far by Hassan Nuhu.









CASE STUDY THREE (3)

DESTITUTE TRANSIT CAMP, BWARI, ABUJA

HISTORICAL BACKGROUND:-

The destitute transit camp. Bwari. Abuja was set up by the Federal Government to house destitutes who were cleared off the streets prior to important occasions like O.A.U Summit, visits of some world leaders and other important occassions. It is meant to serve as a deterrent to destitutes from going back to the streets and also prepare them for a return to their home towns. The location of this transit camp is outside of Bwari town. some distance after the new location of the Nigerian law school. the road which was formerly tarred breaks off and a dirt road takes over. One goes through a number of small hamlets before finally arriving at the camp.

There are overgrown grasses all over the place and the only structures are 3 long rows of buildings what were discovered to be rooms to house these destitutes 2 sets of some structures which were male and female toilets and another small set of 2 rooms probably for the security officer.

It is obvious to an observer from the first instance that care and planing of this camp was not really considered from its inception. Upon interviewing some of these destitutes whom the camp is meant for on their reasons for always abandoning the camp the explanation was that upon their being taken to the camp. they are left alone without food, water and no means of getting these basic necessities.

DEMERITS

1. No defined demarcation or reception
2. No defined walkways and path
3. Absence of water and electricity

Table B

S/ NO.	TOPICS	LECTURERS
1.	**Self Medication Control and Guidance**	- Mohammed Alh. Audi - Hamza Tijjani Yahaya *From General Hospital, Minna.*
2.	**Career/Vocational Development**	- Mr. Chidawa, *Ministry of Education Minna.*
3.	**Workshop Safety and First Aid.**	- Mal. Yunusa Zarumai, *Nigeria Red Cross Society, Niger State.*
4.	**Counselling on Human Needs**	- Mal. Bala A. Shehu, *College of Education, Minna*
5.	**Drug Abuse Prevention Among Youths**	- Dr. J. Yekeens, *Ministry of Education, Minna*
6.	**ETIWUETES I & II**	- Mrs. Mariam A. Khaleeb, *College of Education, Minna.*
7	**Drug Abuse and the Nigerian Citizens**	- Mrs. E .J. WEY, *Isebav Pharmacy, Minna.*
8.	**Business Ethics and Practice**	- Hassan Nuhu, *P.R.O. Project YES*
9.	**Contracts and Business Registrations. The Legal Perspective**	- *Chambers.*
10.	**Customer Relations**	- Mr. Shaka Adaba, *Manager, F.M. Radio.*
11.	**Drug Trafficking and Abuse**	- *Zonal Commander, NDLEA, Minna Zonal Office*
12.	**Road Accidents**	- *State Commander FRSC, Minna.*
13.	**Environmental Sanitation**	- Mal. Abdullahi Suleiman, *NISEPA.*
14.	**The Challenges Ahead**	- Dr. A.U. Babaji, *Executive Director NSTSB.*

Table C **STATISTICAL PRESENTATION OF THE FIRST GRADUATING BENEFICIARIES**

S/ NO.	TRADES	SPECIALISATION	NUMBER IN CLASS	INSTRUCTORS
1.	COMPUTER SKILLS	- Spread Sheet - Word Processing - Deskstop Publishing - Computer Appreciation - Operating System	160 D0 D0 D0 D0	- Mal. Sagir Moh'd - Moh'd SUleiman - Mr. Daniel Iroegbu - Bala Ahmed Kure - Mal Hussani Ibrahim - Mal. Lawal Ibrahim
2.	KNITTING SKILL	- Casting on and off - Basic Stiches - Pulling - Garter Stiches -Weaving and Designs	13	- Haj. Goguo Adamu - Haj. Tasallah Ibrahim
3.	SOAPING MAKING	- Bar Soap - Detergent Powder -Pomade	14	- Haj. Ladi Shambo
4.	FINE ARTS	- Screen Painting Process -Collarge -Drawing - Lettering and Numbering - Use of Colours	4	- Mal. Sabo Dangana - Dep. Director Arts - Production NSLB

4. Inadequate security at the camp
5. No landscaping
6. Inadequate structures to meet demands
7. Poor structural quality of structures present
8. Poor location of camp, making accessibility difficult
9. Isolation of destitutes and virtual imprisonment

MERITS

1. Availability of land for development within the camp.

CASE STUDY 4

CENTRE FOR SOCIAL PREVENTION AND READAPTATION

(HERMOSILLO) MEXICO

HISTORICAL BACKGROUND

This centre is owned by the Government of the Mexico. Its construction began in the year 1973 and uptill date it is not completed. It is a centre for social readaptation for those that are in conflict with the government law, and those that are metally retarded. Its capacity is 1024 in mates with 1055 beds.

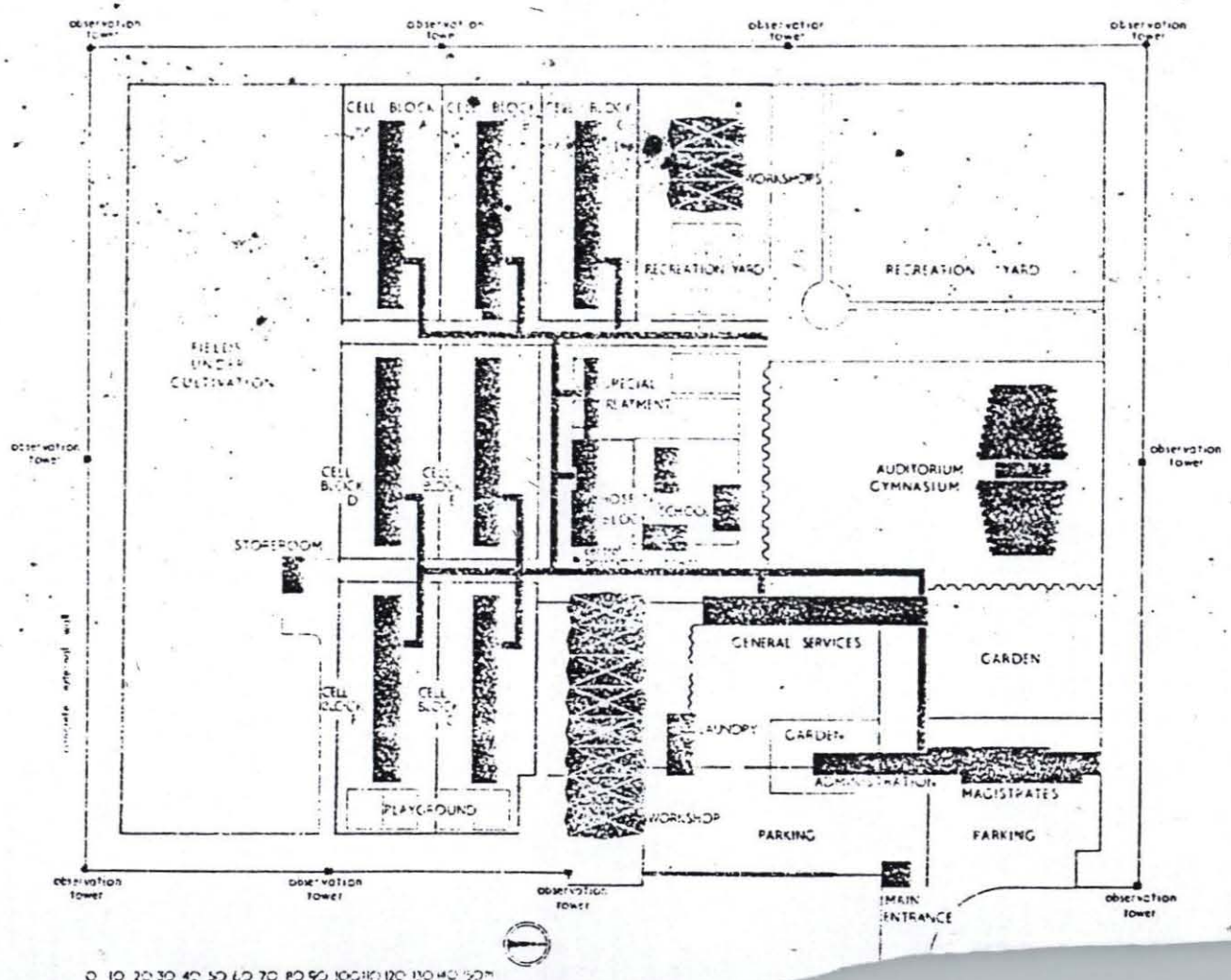
The total enclosed area of the site is 138600m^2 with building site area/inmate covered 1611om^2. The percentage of site covered by buildings 11.5%. The centre has a total building area at all floors of 23.860m^2.

FACILITIES

1. Accommodation/dormitories blocks -8.500m^2.
2. Hospital
3. Eating facilities/kitchen

17 MEXICO Hermosillo

Centre for social prevention and readaptation for 1024 men



SITE PLAN

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150m

DETAILS

General

Name of institution	HERMOSI
Country	MEXICO
Type of institution (Centro de prevención y readaptación social)	Centre for ventilation for
No. of inmates	1 024 inm.
No. of beds	1 055 bed
Year of completion	[illegible]

Site data

Enclosed site area	138 600 m
Site area/inmate	135 m²
Area of site covered by buildings	16 110 m²
Percentage of site covered by buildings	11.5%
Area of site covered by building/inmate	15.5 m²

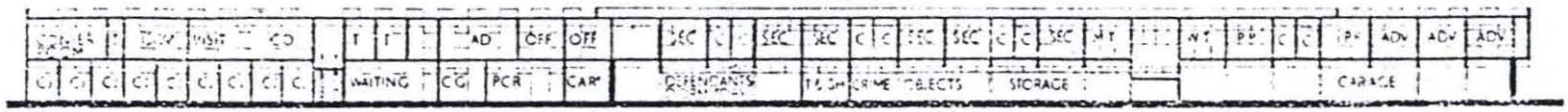
Buildings data

Total building area at all floors	24 680 m²
Building area/inmate	23 m²/inm.
Building area of cell and dormitories (including access)	8 500 m²
Area of cell and dormitories/inmate	8.5 m²/inm.
No. of floors of cell blocks minimum	2 floors
maximum	2 floors
Hospital location	Separate b
Kitchen location	Separate b
Special provisions	
Eating facilities	Limited ass
No. of cells. Ordinary inmates	$C_o = 236$
Special treatment	$C = 8$
Defendants dormitory	$D_o = 1$
Conjugal cell	CJ = 19
Wards	SW = 2
	$GW_{50} = 1$

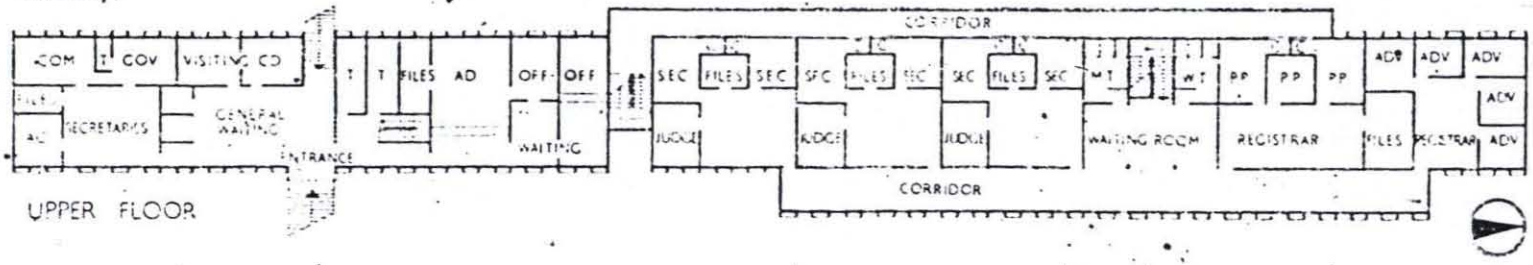
17 MEXICO Hermosillo

Centre for social prevention and readaptation for 1024 men

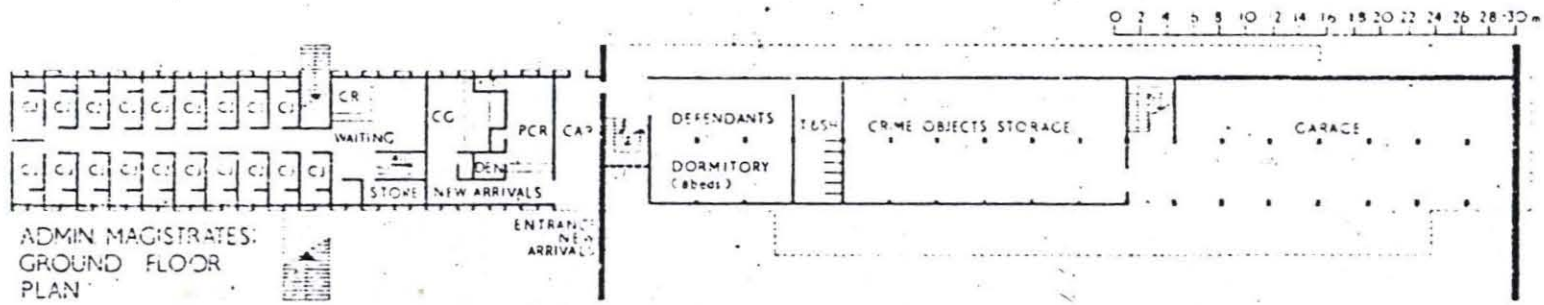
Hermosillo



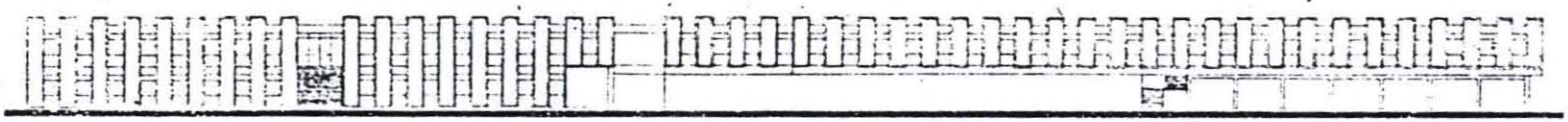
SECTION



UPPER FLOOR

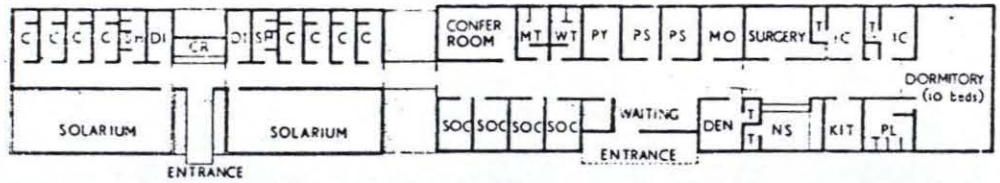


ADMIN MAGISTRATES: GROUND FLOOR PLAN



ELEVATION

SPECIAL TREATMENT BLOCK & HOSPITAL BLOCK: PLAN



KEY

AD	Accounting department
ADV	Advocates
AG	Assistant governor
C	Single cell
CD	Commander
CG	Change
CJ	Conjugal cell
CR	Control room
DEN	Dental room
DI	Dining room
GOV	Governor
IC	Isolation cell
IF	Information
KIT	Kitchen
MO	Medical officer
MT	Men toilet
NS	Nurse
OFF	Office
PCR	Prisoners checking room
PL	Prisoners lavatory
PP	Public prosecutor
PS	Psychologist
PY	Psychiatrist
SEC	Secretary
SH	Shower
SOC	Social worker
T	Toilet
WT	Women toilet

4. Auditorium/Gymnasium

5. Recreational yard

6. General Services/workshop

7. Administration

8. Other auxiliaries (Garden, Laundry and parking).

DEMERITS

1. The accommodation are inform of prison cell block.

2. The centre has no provision for flexibility of destitution category.

3. The site or centre is well security with observation towers, which has a psychological effect on the inmates, which will make them feel like a maximum security prison inmate.

MERITS

1. The centre is well located and easily accessible to people.

2. The centre is well laid out, and the site planing is well organised.

3. There is adequate provision of inmates accommodation to meet up with the target number.

4. Enough rehabilitation facilities are put in place for the adequate and proper re-adaptation of these inmates.

5. The centre is aesthetically sound and safe.

4.6 DEDUCTION FROM CASE STUDIES TAKEN

(A) Most of the centres visited either completely omit the recreational facility or the provision of it was not adequate.

(B) The centres are located at a vintage point for easy out side identification.

(C) Maintenance work is highly lacking in all most all the centres.

(D) Landscaping of the centres are not adequately done or completely neglected.

(E) Conformability of the users are averagely considered.

CHAPTER FIVE

5.0 DATA COLLECTION

5.1 GEOGRAPHICAL LOCATION

Niger State was created in April 1976 from the former North-Western State, with Minna as its capital it is situated in the middle belt region of Nigeria, with location between latitude 3^0 40^1 east, and 8^0 00^1 and 11^0 30^1 North. It has a total area of 74,244 square kilometers which is approximately 8% of the country's total land area.

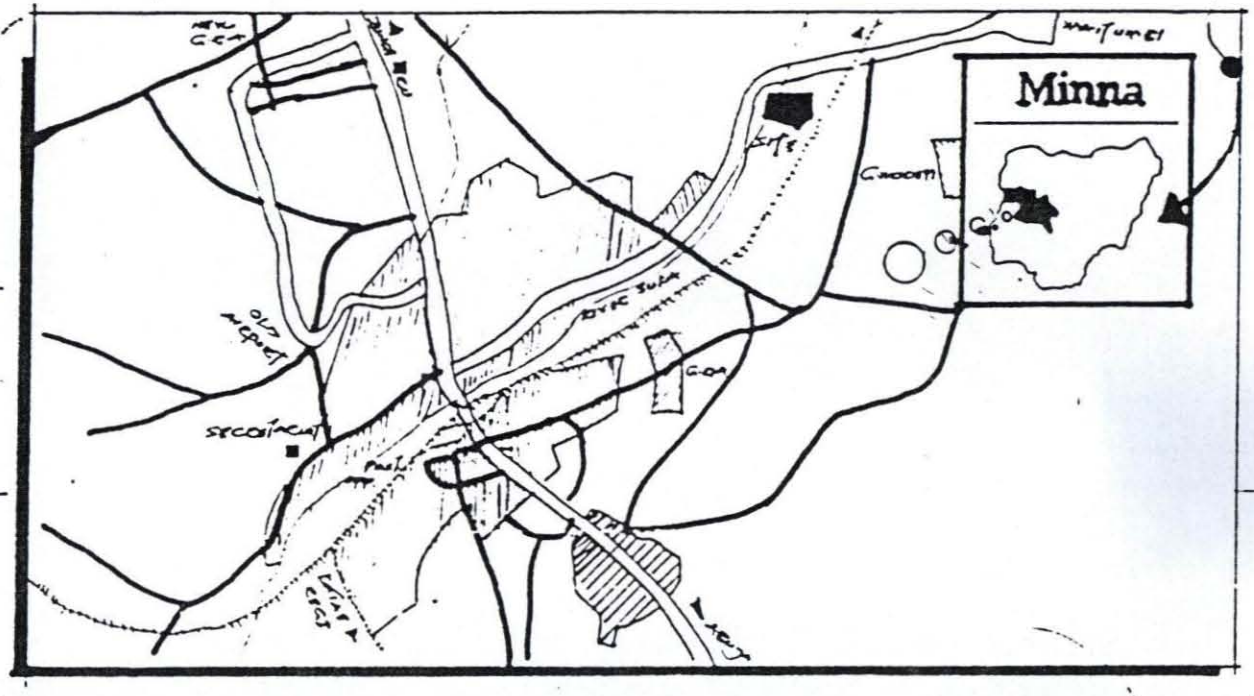
Niger State has boundaries with Abuja (The Federal Capital City) at the south West, Kaduna State in the North Kwara and Kogi State at the South (with River Niger separating them) and Sokoto State at the North West.

5.2 MINNA TOWN

Minna is characterized by widely dispersed major road that runs from Chanchaga in the South being refereed to a Paiko road to Maikunkele in the North, and Known as Bosso road. It covers a distance of approximately 16 kilometers.

An international airport is situated off the Bosso road in Maikunkele. The main Lagos - Kano railway line cut across at the centre via a narrow gap in the steeply rising granite hills to the east of the town. To the South of the railway lines lies many low density public properties such as the railway station, army headquarters, police compound (Barracks) and old G.R.A.

To the north of the railway lines are the high density quarters, main Minna market and Sabon Gari. Investment by the Government in Institutions and housing has tended towards the northern side of the high-density area. This creates an even greater strain on the road over the railway line. The location of the parliament and secretariat building south of the railway line has relieved congestion a little.



** MINNA STREET GUIDE (SHOWING THE SITE LOCATION)

The presence of this proposed University Games Village will add to the glamour and social significance to Minna as more athletes will come to the national and international limelight through the town via the Games Village.

5.3 PHYSICAL CONSTRAINTS

To the North-east of the town, a more or less continuos steep outcrop of granite occurs limiting any urban development in that direction. A major drainage valley flows from the centre of the town south-west ward with many minor drainage channels feedings into it with storm water run off them from the hills to the East. In some places these streams form large areas of flood land. There are large but isolated rock out crops in this landscape and also some area of scattered rocks. In other words land beyond the presently developed strip is situated for development. But would need careful planing keep down the high cost of bridges, emba.

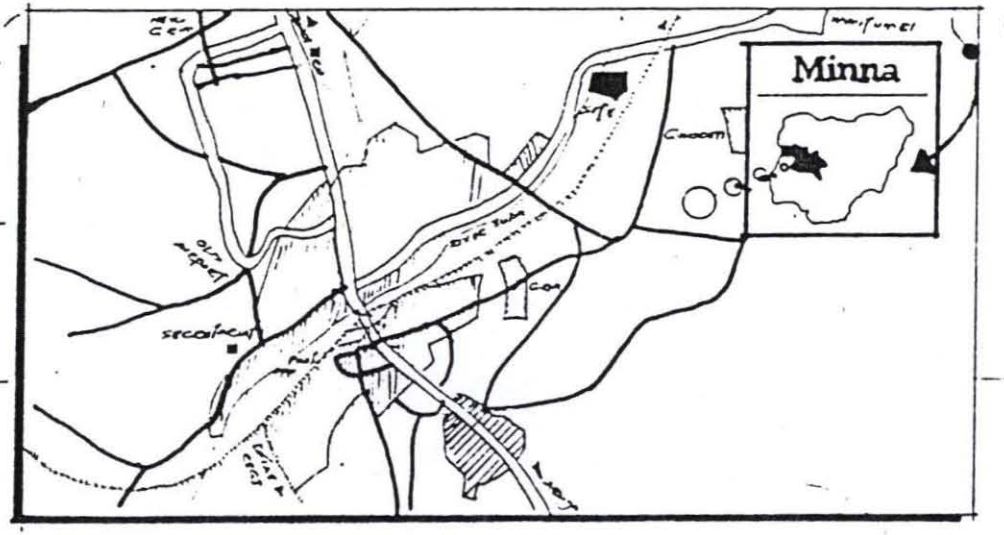
5.4 THE SITE LOCATION

The proposed rehabilitation centre is to be located in a strategically vintage position for its effective functionality and economic viability. A site with some evolutionary trend in terms of Youth and commercial activities.

The fact that Minna, being the capital has the highest concentration of potential youth both men and women. The increasing rate of commercial activities makes her a focal point. There by rendering hope and brighter prospects for its utilisation, as some of the set goals, it would be use for promotion, organisation and advertisement of destitutes potentialities in the state to actualise its economic viability.

The proposed site for this project along Minna-Maitumbi road, therefore has been intentionally proposed for the project. The choice of site teem with the need for destitutes rehabilitation, can never be over emphasized.

LOCATION MAP



** INNA STREET GUIDE (SHOWING: THE SITE LOCATION)

Fig6, shows the town map of Minna with the site located on it.

5.5 CLIMATIC CONDITION

5.6 RAINFALL

Minna town has a mean annual rainfall of 1334mm taken an exceptionally long record of 54 years. The highest mean monthly rainfall is September with almost 300mm. The rainy season starts on average between 11th - 20th April and last between 190 - 200 days of a year.

The rainy season is characterised at the starting by wind storm and slight drizzles. This terminates by May ending. By wind October, the wind storms returns again indicating the coming of the end of the raining season.

The implication here, Architecturally means having a safe and durable structure or building that can over come the rainfall effects. Wind screens, bracing and parapets with a sloppy root to protect the building from storms. Selected plants would be planted to act as wind breakers.

TABLE VII

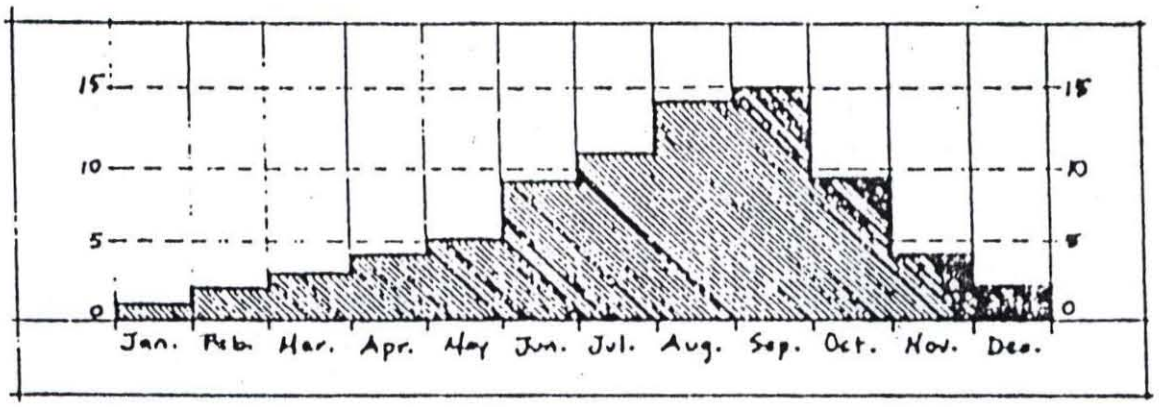
ANNUAL RAINFALL

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
MM	0.4	6.4	13.8	51.4	125.3	166.3	242.3	274.6	298.7	230.3	7.4	1.3

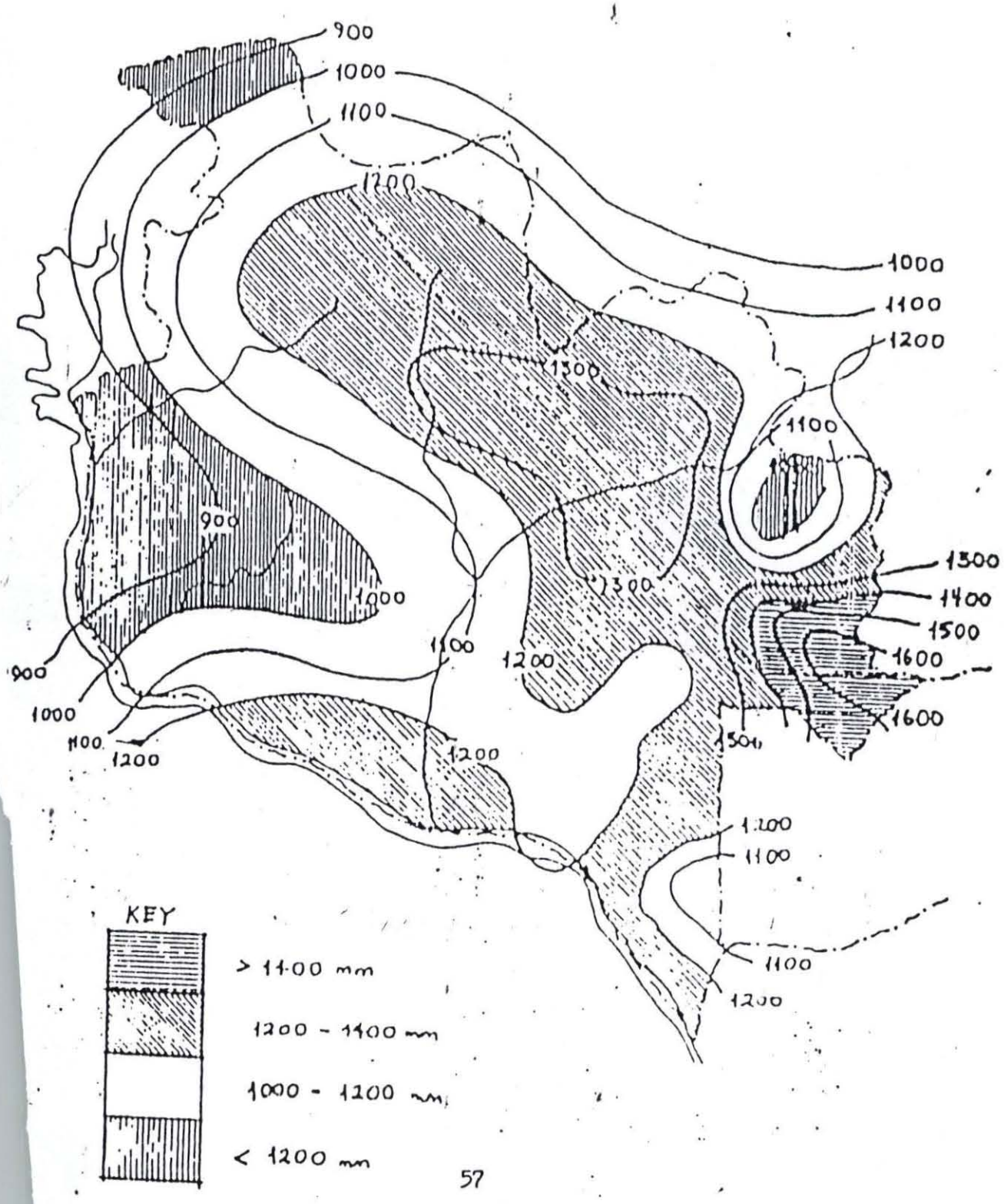
Geography Department Federal University of Technology, Minna

5.7 TEMPERATURE

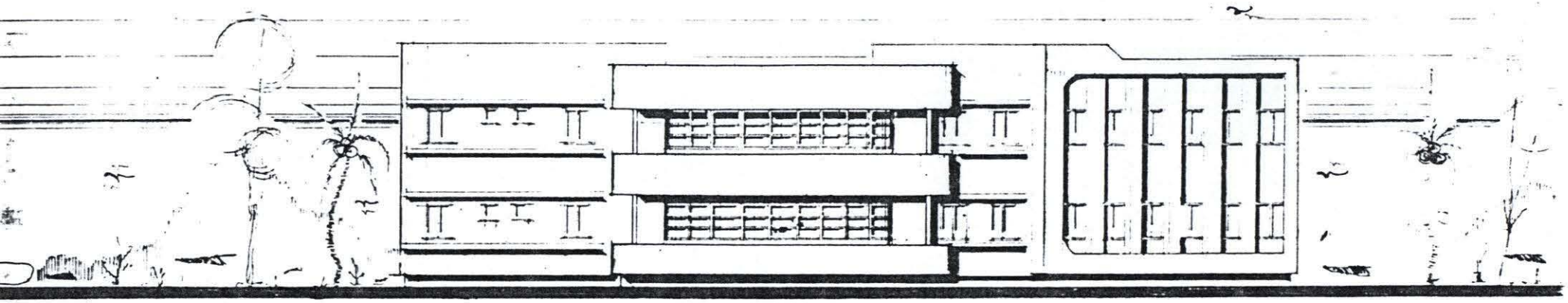
The mean monthly temperature is highest in March at 30.5^{0}c (87^{0}F) and the lowest in August at 25.1^{0}c. The temperature falls during the rainy season due to cloud cover increased vegetation, there by causing cooling effect.



AVERAGE MONTHLY RAINFALL IN INCHES



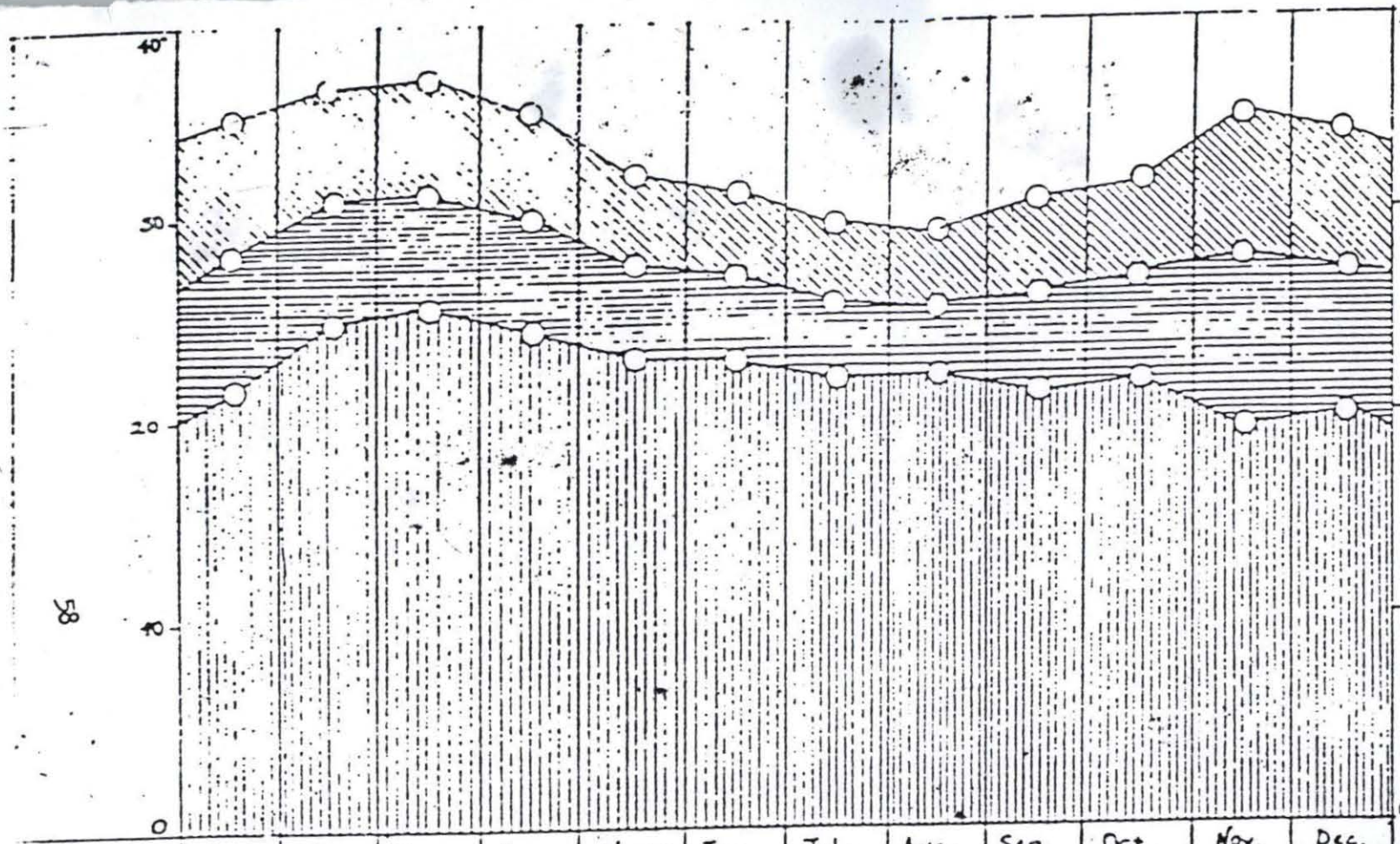
MEAN ANNUAL RAINFALL (IN mm)



END ELEVATION

TION CENTRE FOR DESTITUTE,

n Low Cost Building Materials



MONTHS	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
MAX. TEMP. °C	35·4	37·4	37·6	35·6	31·8	31·6	29·7	29·0	30·8	31·7	35·4	34·1
MEAN TEMP. °C	28·4	31·0	31·6	30·0	27·4	27·1	25·9	25·6	26·0	26·6	27·4	26·8
MIN. TEMP. °C	21·4	24·6	25·6	24·4	23·0	22·8	22·1	22·2	21·1	21·6	19·5	19·6

TEMPERATURE DATA

Temperature variation is tackled architecturally by means of natural cross ventilation and artificial ventilation. Landscaping elements apart from aesthetic function will also be used to achieve temperature balance. Fins and balconies will be use, so as solar radiation effect would be reduced by the use of proper selection of materials for flooring finishes roofing, walls, glazing and paints.

5.8.0 WIND

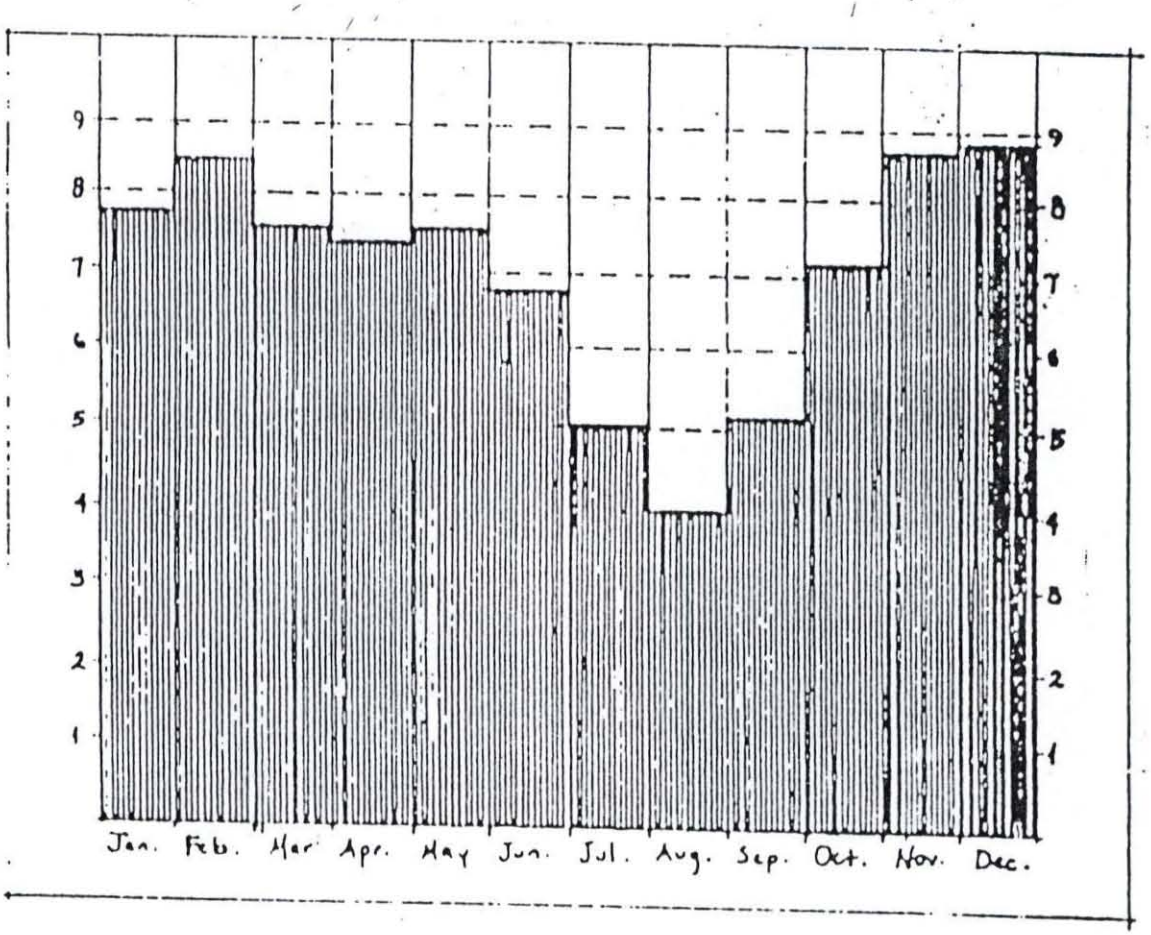
Minna town is characterised by two aim masses, the tropical maritime air mass (Shown in Fig - 7) and the tropical continental air mass (Shown in Fig 7). The tropical maritime dominates over the Atlantic ocean to the south of the North west to south west.

The changes or variations in seasonal weather condition is attributed to the two air masses. The tropical maritime create wet season and is termed the south-west trade wind. While the tropical continental is associated with dry season and is termed the north west trade wind, which produces harmattan. The duration and intensity of each wind over an area, is a function of the interfaces between the two air masses.

Orientation of building and the use of landscaping trees would be used as screen to neutralise the effect of the wind. This how ever is determined in the selection of types, sizes and position of windows and also the roofing materials.

5.8.1 SUNSHINE AND CLOUD FORMATION

During the dry month (November - April). The annual monthly variation of sunshine follows a general trend which is 214 hours in the state. The approach of rainy season increases the trend in cloudiness. The sunshine hours experiences a major decline as the rainy season reaches its lowest value in the month of August.



MEAN MONTHLY SUNSHINE DURATION

5.9.0 GEOLOGY AND TOPOGRAPHY

Minna is under lined by undifferentiated basement complex of mainly gneiss and magnetite. The igneous rocks are mainly granite while the metamorphic sediment include quartzite and schist. The igneous rock (granite) is prevalent in the North east of the town. This has limited or constraint on any effective urban development in this direction. The metamorphic sediments are foundly mainly in the season stream and rivers. These factors of geology are necessary for foundation design of the structure and the landscaping elements.

5.9.1 VEGETATION

Generally, Minna lies within the Savannah region. The basic characteristic is the Sudan Savannah type of vegetation. The vegetation is mostly scanty clustered tree mingled with shrubs and grasses, Green land dominate this area. Among some of the trees that thrive in Minna are Dogonyaro, Manila and Mango trees. But thick forest vegetation exist along some of the rivers and streams valley.

The indiscriminate cutting down of trees and frequent bush burning has adversely affected vegetation. Incessant filling of the soil has plundered her of the required fertility and also reduced her bearing capacity. Investigation of the site revealed that the vegetation within and around the site has a very good vegetation. This would required only a little proper landscaping to protect the building from weather effect.

5.9.2 DEMOGRAPHIC DATA

Minna like every other city in Nigeria is growing in population at a fast rate due to natural development factors. Demographic surveys carried out by the United State Agencies, 1988 and National Population Commission, 1986 have shown that there had been increase in the

Niger State and the country birth rate and a decline in the death (Mortality) rates estimates based on 1963 population census.

The 1992 census figures show that Niger State has a population if 1,194,508. An annual growth rate of 5% for local government headquarters and 2.5% for other towns and villages. The population density as at 1963 was estimated at 16 persons per square kilometers (km). How ever with the recent growth in population, this figure was nearly doubled in 1995 with an average density of 31 persons per square kilometer.

The 1995 figures show that Niger State population has increased to 2,239,225 which is about 92% increase against the 1962 figures with the analysis of figures above, it shows that the situation is necessary to set a machinery in motion to discover, harvest and polish them for national and international use.

5.9.3 TRANSPORTATION AND TRAFFIC FLOW

Transportation in Minna has come of age. There are Four (4) motor garage in existence now, namely

1. Minna central garage
2. Abdulsalam Abubakar garage
3. New market (Kuta) garage and
4. Kpakungu (Bida) garage

All of these are public enterprises owned by the government. They serve as a terminal for vehicles flowing from different part of the country, and which makes it more viable for this project to be located here.

Apart from government owned garages, there are other motor parks which, are privately owned, and which gives additional boost to transportation and traffic flow within and outside the state capital (Minna). Thus, these include:-

1. Niger Line Motor Park
2. S.G. Transportation
3. Transline Transport, and
4. U.B.E. transport

The Niger State government has establish a special subsidized transportation for the state masses as well as those from other part of the country where their services reach. This is no other but the Niger State Transport Authority, N.S.T.A.

With all these transportation services in the state, traffic flow in and out side the state is particularly easy as well as cheaper than other part of the country. Hence it enhances the free flow of youths in the National Destitude rehabilitation Minna.

5.9.4 SOCIO-POLITICAL STRUCTURES AND SETTING

Minna town under went four metamorphosis before it became the modern city that it is now. The first was in 1905 when the construction work of the rail line got to the area. As there was no local labour at that time, the construction workers were Gwaris and Nupes and Hausas. The various groups were accommodated in different camps to ensure easy access and to prevent desertion the camps later became permanent settlements and eventually formed some of the present wards of the town.

But before the became settlement areas the chief of Paida, on the hilltop, was asked by the railway authority to provide an arbitrator who would settle the constant dispute that gorses between Labourers. The late Chef of Bosso, Mallam Abubakar Zarmai became the choice with

one Muazu Paiko as his secretary. He transferred from the hilltop to settle near the camps as the Administrator while his father Mallam Godeyize who was then on the throne as the Chief of Bosso, remained on the hill.

In 1908, the second phase lift for the town took place when an Alkali (gudge) was provided for the caps. A permanent house for the Alkali was built and within the compound there was provision for a prison. Later, the first contingent of police was introduced.

The third metamorphosis was in 1910 when the Gwari's inhabitant decided to move from the hill top to settle down on the areas of the present Paida, one of wards of Minna and the abode of the founders of the town.

As the railway worker camps started developing into permanent settlements and gradually over shadowed the influence of the indigenes, the Minna town council was established (in 1934) comprising as members, distinguished representatives of the various settler tribes. This how ever, was short lived and Gwari Federation Native Authority was soon formed. By November 1950 a Chief for the whole of the new Minna area, comprising all settlers was enthroned. He was Alhaji Ahmadu Bahago I.

The fourth change of status of the town came in February 1976 when it was made the state capital of the newly created Niger State since then the Government has been given Minna a face lift and a look befitting a state capital.

CHAPTER SIX

6.0 THE SITE ANALYSIS

The site analysis has been carried out based on the following factors:-

6.1 LOCATION OF THE SITE

The town in which the project has been proposed in Minna, the state capital of Niger State. It is located between the latitude 9^0 371 north and longitude 6^0 331 (see chapter five for details).

The site of the proposed sport village is the permanent site of the Federal University of Technology Minna located along the Bida road, within a "Stone throw" distant from community at the out skirt of Minna town. It is bounded by an expanse of land at all the sides.

6.2 CRITERIA FOR SITE SELECTION

The following environmental and technical factors were found suitable for the proposed project hence, the choice of the site was inevitable.

1. **TOPOGRAPHY OF THE LAND:-** The land slopes gently in all direction, which make it suitable for any sporting activities or development of sport facility.
2. **LAND EXPANSION:-** The land is very vast vast to accommodate all the facilities proposed, with remaining expanse of land for future expansion.
3. **AVAILABILITY OF SERVICES:-** Services such as electricity portable water, good road network within the site it self are already available due to the on-going projects there. Modern communication system is hoped to be available soon.
4. **EASE OF VEHICULAR AND PEDESTRIAN CONTROL:-** The existing good road network around the site, makes it easier for the design and control of traffic flow.

5. **EASY ACCESSIBILITY:-** The site is easily accessible for people coming from the far south and west through Chanchaga and Bosso and Bida road respectively.

6.3 SITE CHARACTERISTICS

The site is characterise by presence of natural vegetation with a relative gentle slope towards the southern direction of the area. Thus accentuating a good directional artificial (man-made) water drainage. The site is bounded on the southern side with a dual carriage road that serves Minna-Maitumbi and vice versa. On the northern side it is bounded by a rail track that runs from Minna to Kaduna and vice-versa. There is no any obvious pollution on the site.

6.4 ACCESS AND CIRCULATION

Two main access routes could be used to get into the site. One is from the Maitumbi road for people coming from Kaduna and other states via Kaduna. The other one is from Minna for people coming from Abuja, Lagos, via Chanchaga and Bida road respectively. The site is accessed through one main gate (proposed). The reason is to separate the activities of the Rehabilitation centre from interfering with the normal people activities, and to maximise security services.

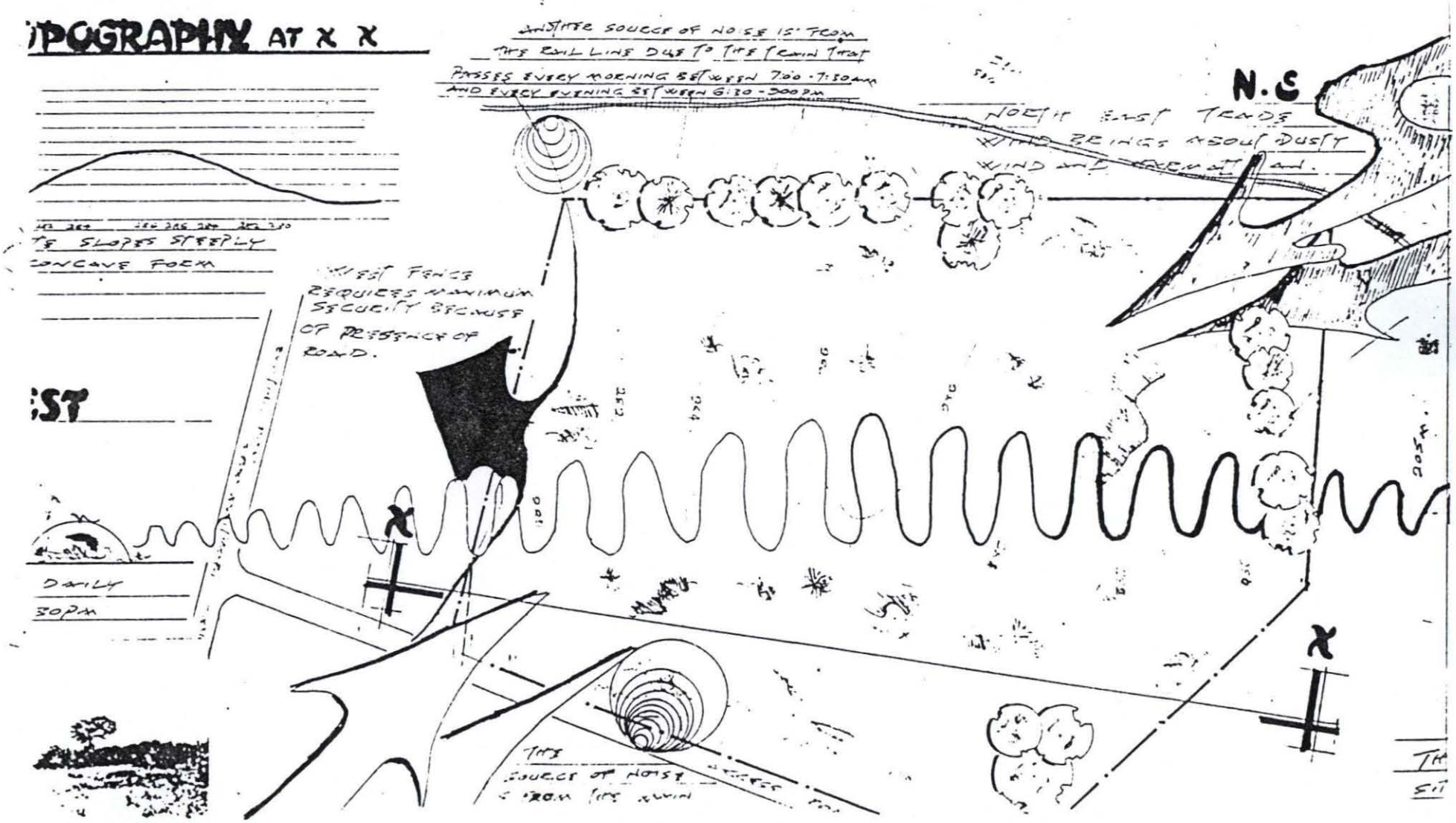
6.5 UTILITIES

Services such as electricity, portable water, good access road network around the site is already available. Modern communication system is hoped to be available soon.

6.6 SITE SURVEY (SCENERY/MAN MADE FEATURES)

Analysis of the site was done visually. The north, south, east and west views were carefully observed and thoroughly analysed. This includes, the visual nature of the vegetation, soil, the north cardinal direction, more so the topography of the site. Thus:

SITE ANALYSIS



1. **VEGETATION**

IT was observed that the site generally is characterised with dense and proper natural vegetation, meaning the land is fertile. This will effect, to higher stand and, the proper landscape proposed, hence give a good climatic condition of the site, proper sun shading device.

2. **SOIL GEOLOGY**

Generally the soil (Grey humus/clay) are associated with Minna. It is an area with high California bearing ratio (C.B.R) value, suited for infrastructure development. The soil contents are 65% ferruginous with abundant Lithosols and some rock out crops.

3. **CLIMATIC CONDITION**

The site experiences the tropical climate of northern Nigeria, with mean annual rainfall of 1,334mm. The rain starts in April and ends in September. The architectural implication here is to have a safe and durable structure that can withstand the rainfall effect. This can be done by channeling the resultant rainwater that may fall on both the roof and the site gentle slope. The mean monthly temperature of the site is highest in March at 30.5^0c and lowest in August 25.1^0c. Which implies that in this period, the weather is hot and uncomfortable. Therefore, the use of fins, wind on opening will be employed to tackled this problem.

4. **SLOPE AND DRAINAGE**

The site slopes gently to the southern direction. Thus accentuating a good directional artificial (man-made) water drainage. This is fully exploited in the project design by providing a central sewage system located at the southern edge of the site. Both soil and

wastewater from all the buildings and the rainwater in the centre shall be chanelled to the centre sewage for proper treatment.

5. SCENERY/MAN MADE FEATURES

The site in which the proposed design is to be located has virtually little or no man made features. The is free from mans act of cultivation, Mining and construction, thus the land is a virgin land giving it the full advantage of utilization in all respect in regards to soil strength and capability.

6.7 ENVIRONMENTAL PROBLEMS

Evidently, the whole community where the proposed site is situated is very under develop, which obviously show that the area is not industrialized, there by indicating that it is free from environmental air pollution as well as water pollution. Furthermore, the site has no any hazardous feature such as radioactive decaying element, any record of occurrence of earthquake or landslide or any other form of land disaster.

6.8 DEDUCTIONS

With the full-collected information and data, the site is fully exploited in the project design to fully take advantage of the site condition and to evolve a well proper and aesthetically pleasing design, which will suit the purpose for which it was built.

CHAPTER SEVEN

7.0 DESIGN CONCEPT AND CONSTRUCTION

7.1 CONCEPT AND DESIGN

THE CONCEPT

There are about four (4) different design approach which are as follows:

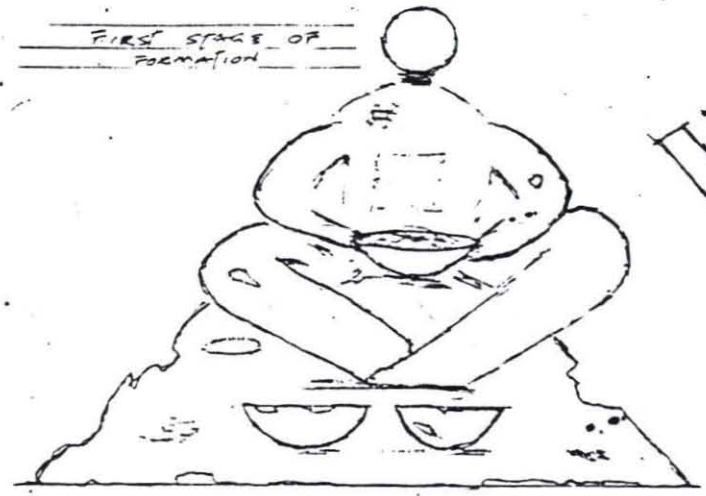
1. Pragmatic design approach
2. Canonic design approach
3. Analogical design approach and
4. Iconic design approach

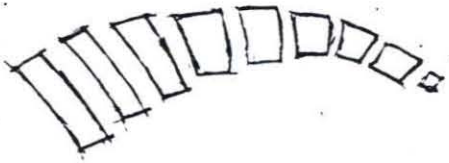
Analogical design approach is the design approach that is employed for this project. This is a design approach, which involve the use of any figure, element or object and relating it to the design.

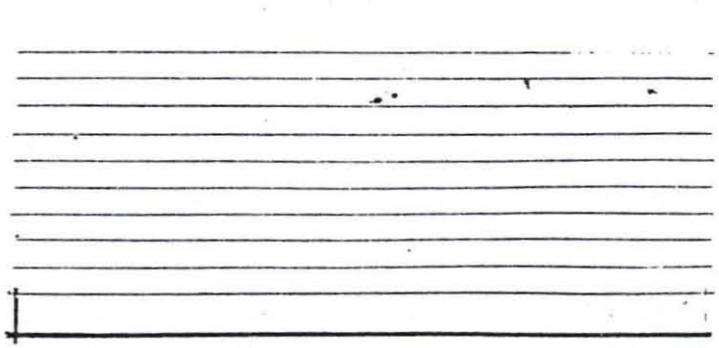
For this project, a beggar, as it is always seen, sitting on the road side is use to depict a normal situation of destitute always in need. A beggar is always the number one person that comes into everybody's mind whenever destitute is mention in the Nigerian contest. Thus, this is use to show how desperate and helpless this destitutes are, and the magnitude of this situation can never be over emphasized.

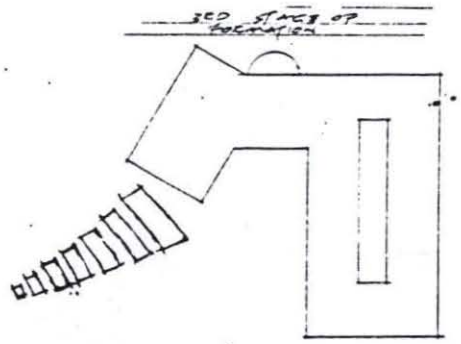
The cove of this project is centered around the philosophy "Even a smile a charity" Unity is all about coming together of different people of different cultural, historical financial, nationality and personal background. This project will serve as the central point, where destitutes will come together to heightened their image and impact within the society. Hence this project need to capitalize on the beautiful terrain and severity of the area, to blend the modern with the traditional architecture to evolve a design that is viable.

CONCEPTUAL ANALYSIS









DESIGN PROPOSAL FOR

NATIONAL REHABILITATION CENTRE FOR DESTITUTES, MINNA, *With Emphasis on Low Cost Building Materials.*

7.2 THE DESIGN AT A GLANCE

The proposed National Rehabilitation centre for Destitute Minna is so designed to meet the requirement of the national building regulation and the requirement of the basic need of the destitutes.

The inmates accommodation are four (4) blocks of profo-type buildings with facilities such as common room games hall, toilets, built in wardrobe, library, reception hall / entrance room.

The official have no provision of quarters due to the fact that the site will not sufficiently accommodate that. Hence, it is assume the official will have their accommodation out side the centre.

Other structures (building) in the proposed centre are, Administrative blocks workshop unit, Mosque / Church, Multipurpose hall, recreational area, out door games area. The site plan is shown in fig below.

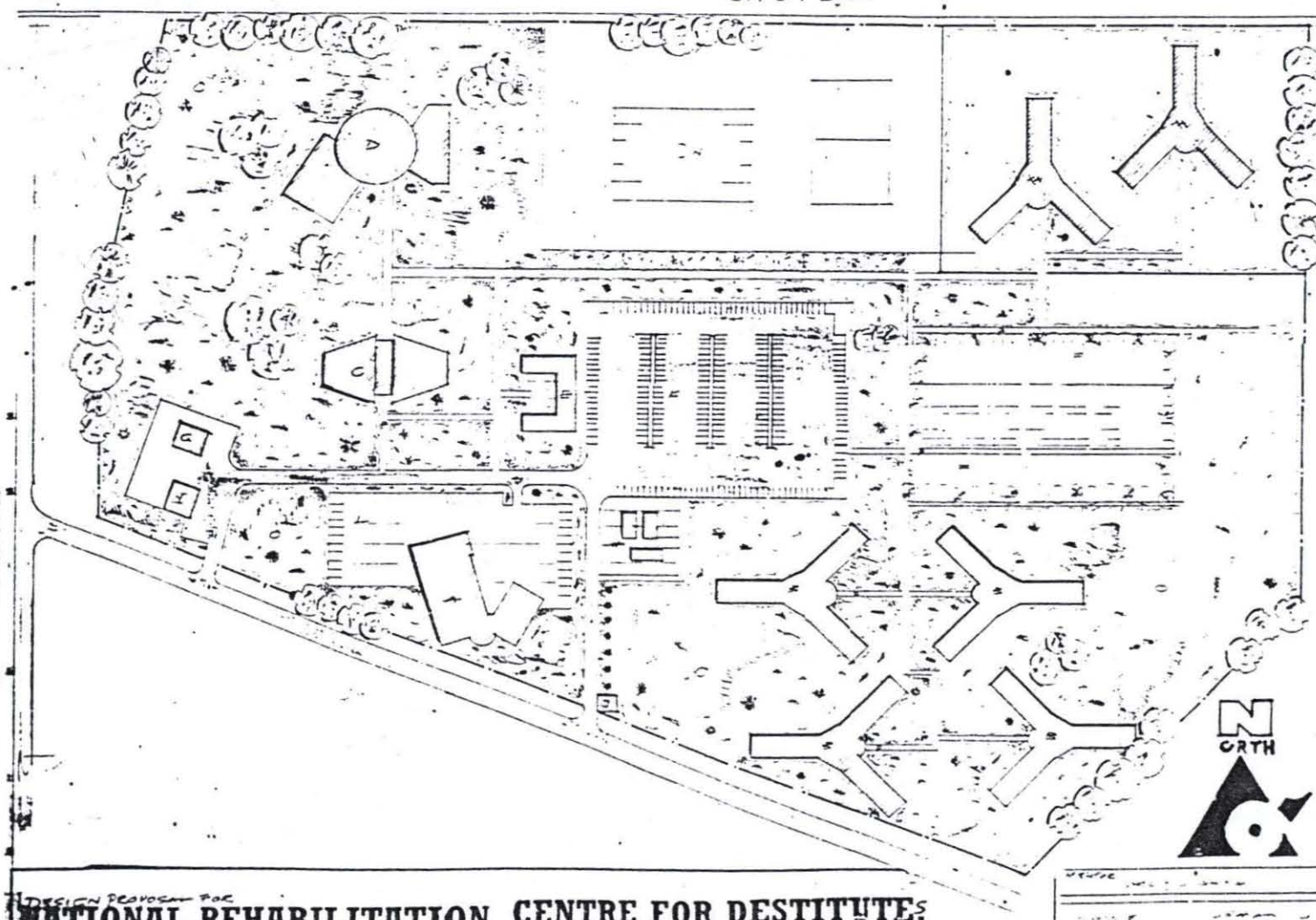
7.3 FUNCTIONAL ANALYSIS AND SITE PLANING

The function and planing of the design out site is done with primary consideration of the relationship between units. For effective planing and functionality, the proposed rehabilitation centre is divided into three zones, thus: public, semipublic and private zones.

The area zoned, as public areas are entrance foyers, workshop area, recreational/Games area, and the general parking area. The semi public areas are the administrative block, games room. The private area constitute the inmates accommodation block.

The parking area is located at a strategically point such that it serve as the general parking area to minimize vehicular movement as well as noise from distracting attention. The noise pollution within the surrounding of the centre; thus to enhance security level.

SITE PLAN



LEGEND
A ADMINISTRATION
B MALE ACCOMODATION
C AUDITORIUM
D WORK SHOP
E RESTAURANT
F GARDEN
G GENERATOR HOUSE
H WATER TANK
I INCINERATOR
J GATE HOUSE
K GENERAL PARKING LOT
L STAFF PARKING LOT
M WOMEN ACCOMODATION
N RECREATION AREA
O GREEN AREAS
P WALK WAYS
Q — BOUNDARY LINE
R — BARB WIRE WALL FOR WOMEN ACCOMODATION
T	
U	

NORTH

Design Proposal for

NATIONAL REHABILITATION CENTRE FOR DESTITUTES, MINNA, *With Emphasis on Low Cost Building Materials.*

7.4.0 MATERIALS AND CONSTRUCTION

7.4.1 MATERIALS

Three main factors are considered in the choice of materials for the construction and execution of this sport village project. This include:

1. The economic factor
2. Structural/stability factor and
3. Aesthetical factor.

The Economic factors are considered on the basis of cost and maintenance cost, faire resistance, replaceability and durability. The structural/stability factors are considered on the basis of the material strength, its stiffness, elasticity, density or hardness, resistance and thermal conductivity properties. The most effective structural materials are those which combine elasticity with stiffness. Elasticity is the ability of a material to deform under stress (bend, stretch or compress) and return to its original shape. Every material has its elastic limit.

The Aesthetic factors are considered on the basis of special requirement and symbolic nature of the sports village, this was given special recognition while specifying the materials for its construction. Good landscaping elements is also considered in this proposal in order to have a pleasing environment for both athletes and spectators.

Materials are now manufactured in standard sizes. These "sock" sizes may vary slightly between manufactures. This was considered and verified during the design and planing phase of the building to avoid unneccessary cutting and waste of materials during construction.

The basic materials specified for the purpose of this project include; cement, concrete block, Aggregate, water, metals, plastic, fibre glass, glass, Timber and many other materials used as finishes on either the walls, floors, ceiling are the roof.

i. **CEMENT:** Ordinary Portland cement is manufactured from lime stone and clay, ground together with water to form a slurry which is burnt to a high temperature and then ground to powder. It is normally sold in 50kg paper bags. This particular type of cement is propose of this project, cement is recommended for use, in casting of concrete as its setting agent, as mortar for wall finishes, in flooring and bonding of blocks.

ii. **CONCRETE BLOCK:** In this project, the requirement of the concrete blocks are divided into two; load and non-load bearing wall. All the exterior walls are the loads bearing walls, while the interior walls are the non-load bearing walls, which only serve as partition. BS6073 (26) prescribes the requirement for concrete block made from gravel to light-weight materials. British standard (BS) recognises three types of blocks, solid, Hollow and cellular, while Hollow block remains the only block used through out this project.

iii. **AGGREGATE:** As aggregate forms the bulk of hardened concrete, it is usually desirable to use local materials. Aggregate must be sufficiently strong, free from constituent, which react with cement, be well graded and have small or no moisture movement. The recommended aggregate are crushed natural gravels, sand and crushed stone such as granite basalt, hard limestone and sand stone, this is proposed in combination with water, cement and bar in the casting of concrete used in floors, roofing gutter, lintels, stairs, sit out and foundation footings.

iv. **WATER:** The water recommended for this project is one that is free from impurities such as suspended solid, organic matters and salt which may react with any other materials in the mixture of whatever is being used for, especially in the casting of concrete.

v. **METALS:** Metals are usually classified as ferrous and non-ferrous that is those that contain iron and those that do not. The metals proposed in this project are cast iron and steel both ferrous and non-ferrous metals such as aluminum and Zinc, window and door frames, roof trusses, sanitary wares, roofing sheets and hand rails. These metals are to be protected by a coat of red lead primer.

vi. **PLASTIC:** Among the many different types of plastic, polyvinyl chloride (PVC) is the only member of plastic family relevant to this project. It does not burn and can be made in rigid or flexible form. It is used for floor and wall tilling, and pipes both plumbing and conduit.

vii. **GLASS:** This is a chemically innert, transparent, hard, brittle material. Glass is used most commonly to glaze a building. For the purpose of this project, glass is recommended for use in all windows-some fixed and some adjustable.

viii. **TIMBER:** In recent years, knowledge of the properties of timber has increased and improved techniques of timber use. Such techniques are laminating joining and framing, seasoning and protection against timber fungi, insects and fire.

Timber used in this project work would be limited to such areas as furniture (wardrobe), roof trusses (hostel), flooring for the indoor sport hall and external works like scaffolding and from work. Before use it must be observed for maximum resound qualities in durability, decorative stability and fire resistance which is most important. Kiln seasoning is recommended to eliminate moisture content to appropriate level for end use.

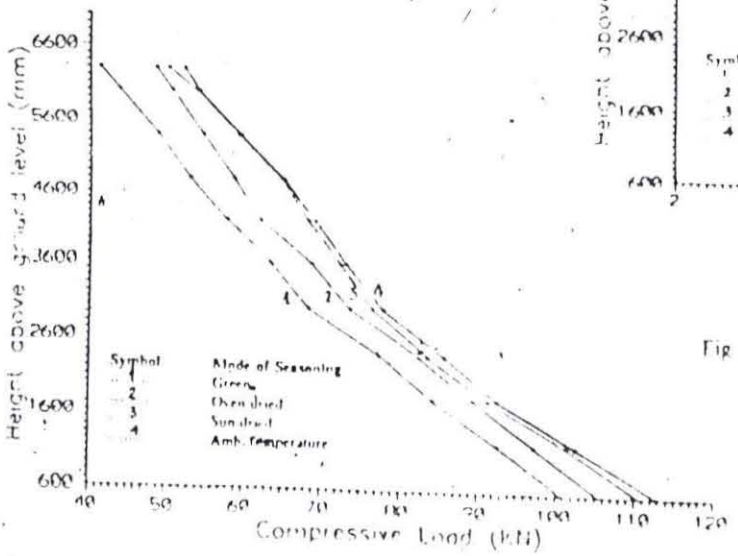


Fig. 3. Variation of Ultimate Compressive Load along the Length of Bamboo Culm

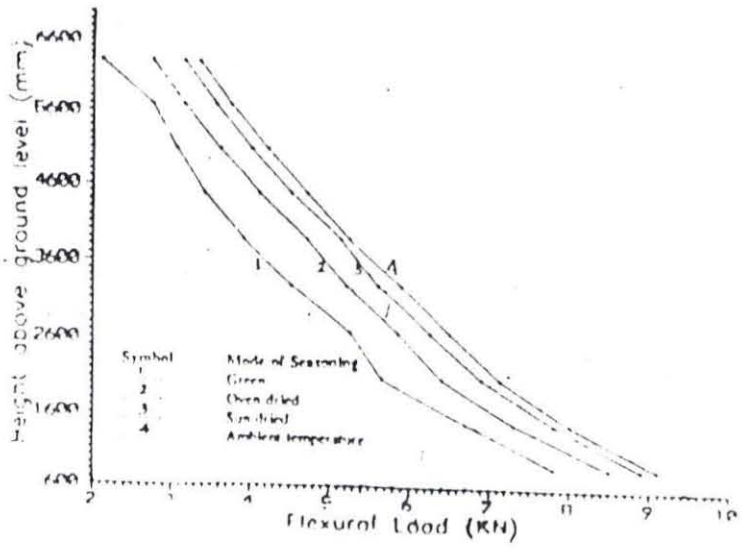


Fig. 4 Variation of Ultimate Flexural Load along the Length of Bamboo Culm

7.5.0 CONSTRUCTION

7.5.1 INTERNAL FINISHES

A coat of cement plaster will be use to render the internal surfaces of concrete and sandcrete block walls, with a ratio of 1:3:1.4, a part of cement, 3 part of clean sand and 1.4 part of lime, to produce a mix that is very plastic which dries out to form a hard smooth surface. These surfaces are then finally finished with (3) coats of point.

Generally, terrazo floor finishes will be used for rooms, offices, common rooms, restaurant, laundry and other similar place, then covered with suitable carpets. The performance area, indoor hall will be finished in wood block. The games room in PVC floor tiles, while the kitchen, medical room and toilets/changing rooms will be finished with ventrified floor tiles.

Internal wall surfaces for kitchen, toilets and medical room are to be finished with white glazed tiles.

7.6 EXTERNAL FINISHES

The concrete and block wall will be rendered smooth by the application of coats of plaster and coat of texcote. Parking lots are finished in asphalt with Precast concrete element as Kerbs and slab for landscaping.

7.7 SITE CLEARANCE

Before any construction work begins on site, the site has to be cleared. Site clearance involves a number of operations which include, removing of existing trees that will affect construction, clearing the ground, setting out the site, locating the buildjng line and so on as well as other necessary operations will be carried out on site before construction begins.

7.8 FOUNDATION

The foundation of building shall safely sustain and transmit to the ground, the combined dead and imposed loads, so as not to cause any settlement or other movement in any part of the building or of any adjoining building. For the purpose of this project, strip foundation will be entirely used due to the good soil bearing capacity of the site, though subject to engineers detail or specification.

7.8.1 FLOORS

All the floors are of reinforced concrete the concrete is a mixture of cement fine aggregate, coarse aggregate and water. They are mixed in the ratio 1:2:4 with a mixer.

7.9 SPACE REQUIREMENT

Analysis of space requirements of the different functional spaces and areas, using standard space requirements, the requirements for the spaces are:

1. ADMINISTRATION

	FUNCTIONS	AREA
1.	Reception	$12m^2$
2.	Directors Office	$20m^2$
3.	Monitoring and Rehabilitation Office	$20m^2$
4.	Staff Room	$40m^2$
5.	Staff Toilets	$12.5m^2$
6.	Visitors Toilets	$12.5m^2$
7.	Visitors/Exhibition Room	$30m^2$
8.	Canteen	$30m^2$
	Total Floor Area	$177m^2$

2. **ACCOMMODATION**

	FUNCTIONS	**AREA**
1.	Hostels (4) 144x4	$576m^2$
2.	Toilets and Bathrooms (showers) (4) 32x4	$128m^2$
3.	Caretaker's (4) 25x4	$100m^2$
4.	Laundry and Store (4) 8x4	$32m^2$
5.	Common Room	$544m^2$
	Total Floor Area	$1350m^2$

3. **TRAINING UNIT**

	FUNCTIONS	**AREA**
1.	Class Room (4)	$100m^2$
2.	Work Shops 4	$120m^2$
3.	Toilets	$12.5m^2$
4.	Maintenance 2	$60.5m^2$
	Total Floor Area	$293m^2$

4. **AUDITORIUM/GYMNASIUM**

	FUNCTIONS	**AREA**
1.	Auditorium	$72.5m^2$
2.	Gymnasium	$72.5m^2$
3.	Toilets	$12.5m^2$
4.	Entrance Area	$26.5m^2$
	Total Floor Area	$202m^2$.

CHAPTER EIGHT

8.0 CONSTRUCTION AND SERVICES

Construction materials and methods are perhaps the single most important aspect in any design conception, form conceptual initiation, right through to construction and acceptation. The actual construction and completion of a building is an Architects dream. and if the methods and materials and materials are not specified or used properly then the dream could be turned into a short-lived one or even into a night mare for both the architect and the clients. Due to this factor, the importance of really studying, understanding and applying the technical knowledge of construction and services cannot be over-emphasised.

8.1 MATERIALS

The act of selection of construction materials for any type of construction (building) need a lot of considerations. For a social rehabilitation service such as this, some of the considerations may be classified into economic, mechanical and aesthetic.

Economic consideration in the use of materials are based on cost maintenance, fire resistance, durability and replaceability. Building materials are characterised by distinct properties of strength, stiffness and elasticity, density or hardness, resistance to wear caused by physical or chemical action, fire resistance and thermal conductivity.

The most effective structural materials are those which combine elasticity with stiffness. Elasticity is the ability of a material to deform under stress (bend, stretch or compress) and return to its original shape. Every material has its elastic limit beyond which it will permanently deform or break. The stiffness of a material is a measure of the force required to pull or push a material to its elastic unit.

Most building materials are manufactured in standard sizes. These "stock" sizes may vary slightly between manufacturers and should be verified during the design and planning phase of the building to avoid un-necessary cutting and waste of materials during construction.

Methods of fastenings and finishing materials should also be given careful consideration keeping in mind the function of the buildings on which they are to be used. Some of the basic materials used in the design of this project are:-

(1) **CONCRETE AND MASON**

Concrete is a mixture of sand, gravel, crushed rock or other aggregates held together by a hardened paste of cement and water. This picture when properly proportioned, is at first a plastic mass that can be cast or mobbed into a pre-determined size and shape. Upon hydration of the cement by the water, concrete becomes stone like in strength, hardness and durability. Characteristics of concrete can vary through the a wide range, depending on the characteristics of the ingredients and proportions of the mixture. The techniques used for mixing, placing, finishing and curing can also affect the quality of the concrete.

Masonry refers to man-made units, which are formed and hardened into modular building units. Masonry units (tiles, blocks and bricks) must be laid up in such a way as to enable the entire masonry mass to act as on entity. Masonry is structurally effective in compression.

The three basic types of concrete blocks are; load bearing, non-load bearing and hollw noon-load bearing units. Sand and gravel are the aggregates used in concrete blocks, which can be manufactured in many shapes to satisfy various construction conditions. The design of the rehabilitation centre employs the use of both concrete and masonry in the construction of wall and floor units in the centre.

(2) **WOOD**

Wood offers strength, durability, lightweight, easy workability natural beauty and warmth to sight and touched and it is used as a construction material in different ways because of its differing qualities. There are two major classes of wood; Soft woods and Hard woods.

Soft woods are the evergreens and are used for general construction such as scaffolding, form work and general temporary structures during construction, while the hardwoods come from deciduous or broad leaf trees and are mainly used for flooring, stairs, panelling, furniture and interior trimmings.

Wood is employed for this particular construction (design) for roof construction in the rafters, for doors, interior cladding and panels, furniture and interior finishes. The wood trussed rafters used in the roof construction from a height, strong, rigid structural unit, capable of relatively large clear spans. Wood trussed rafters permit the use of non load-bearing interior partitions, and flexibility in the design of a building interior space.

(3) **GLASS**

Glass is a ciemically inert, transparent, hard and brittle material. It is used in building construction in various forms. It is used most commonly to glaze a buildings widow, as it is being used in the design of the centre. There are 3 basic types of glass namely: sheet, float and plate glass. The variations of these 3 basic are many and include; Heat-absorbing glass, Tempered glass, safety-laminated glass, wired glass, insulating glass etc.

The use of glass for this project is specified for application in all windows - some fixed and some adjustable and also fixed in some doors especially main entrance doors to building placed around the centre.

(4) CERAMIC TILES

These are relatively small surfacing units made of fired clay and other ceramic materials. This ceramic provides a permanent, durable, waterproof and easily maintained surface for interior walls, floors and ceilings. Tips of ceramic tiles differ according to material composition, manufacturing process, finish and degree of vitrification, (a measure of the tiles density and absorptivity).

For the purpose of this project, ceramic tiles will be applied over sound, dimensionally stable masonry walls, set with organic adhesives mostly in toilets and bathrooms, kitchens and some workshops depending on use of the particular area.

The appearance of ceramic tiles surfaces depend on tile size, laying pattern, finish and colour. Tiles to be used on the walls of toilets, shower stalls, kitchen (ettes), lauding will be of the glazed variety while unglazed tiles shall be used on the floors for their non-slippery performance. This choice of tile type is governed by such factors as cost, ease of maintenance, durability and beauty.

(5) PAINT FINISHES

The purpose of a finish is to protect, preserve or visually enhance the surface to which it is applied. Paint generally refers to an opaque or clear film forming material that acts as a shield or barrier between the material and those elements or conditions that adversely affect or deteriorate it, depending on its end use, the paint film must resist deterioration due to sunlight, heat, temperature variations water or moisture vapour mildew and decay, chemicals and physical abrasion. Paint may also serve to make surfaces more sanitary, improve heating and lighting effects, and promote human comfort and safety.

When using paint, the psychological effects of colour and texture must be considered. Certain colours may be used in this design to reflect light, brighten interior spaces and increase visibility as well as create interest in form and space. Considerations in the selection and use of a paint include; Surface preparation, type of paint, film thickness, coverage method of application and drying time and capabilities.

(6) **ROOFING SHEETS**

Corrugated sheet material may be used as a structural, self-supporting roofing, spanning between linear support members. Long span aluminum corrugated sheets will be used for construction work in this centre. The manufacturers of such sheets should be consulted for material specification sizes, finishes, colour, spanning capability and application details.

The support systems will consist of wood trussed rafters, beams and purlins. Appearance and colour all depend on the material used the profile and the depth of the corrugations. The sheets are mechanically fastened to the support frame through the upper position of the corrugation.

The corrugated sheets play a very important visual role in this project, by helping to enhance the overall appearance of the buildings, because of the restrictions placed on the elevations due to the location and use of the centre. Other materials used in construction are:-

(7) Pre-stressing bars (steel)

(8) Water for mixing and cleaning purposes

(9) Clay perforated bricks

(10) Steel sections for roofing

(11) Nails

(12) Angle clkeats

(13) Water proofing agents

All materials used for construction must undergo thorough inspection to ascertain quality on reception at site of construction.

8.2 CONSTRUCTION

Site Clearance

This is the first step in any construction work, which commences after the signing of the contract between the client and the contractor. Site occupation should take effect immediately after but not before site clearance. The site is cleared of any dirt, shrubs, grass etc in readiness for construction activities. It is imperative to carry out site analysis and surveys before site clearance. This is to ascertain soil type, bearing capacity, drainage, slope etc, a site plan must have also been designed from which, all trees and shrubs, outcrops and boulders and all other obstructions in the perimeter area of the centre are removed. Perimeter marks are also placed in appropriate places, a site office established including materials storage and some form of fencing is done around the site to ensure adequate security.

All available infrastructure e.g electricity, water, access roads, telephone lines etc are fixed to site and materials for construction are now brought on to site in readiness to start construction activities.

(2) FOUNDATION

The foundation system of a building, its sub-structure is a critical link in the transmission of building loads down to bearing ground. Bearing directly on the soil, the foundation system must not only distribute vertical loads so that settlement of the building(s) is either negligible or uniform under all parts of the building.

It also has to anchor the super-structure of the building against uplift and racking forces. The most critical factor in determining the foundation system of a building is the type and bearing capacity of the soil to which the building loads are distributed.

The foundation roofing will be designed to rest directly on the soil and support portions of the building to the engineers specifications. Care will be taken to design the roofing system so that the building loads are transmitted directly to the soil without exceeding the bearing capacity of the soil. The foundation shall be desired by the structural Engineer after statistical calculations and other considerations is:

(a) Building load and distribution system

(b) Soil type and bearing capacity

(c) Lateral loading from soil land ground water

(d) Lateral bracing provided by basement, ground slab and first floor slab systems where applicable.

Allowance should be given for the expansion and contraction of building materials which occur in response to normal temperature changes in the form of expansion joints to prevent distortion, crack, and breaks in the building materials where applicable. These expansion joints must provide a complete separation material land allow free movement while maintaining at the same time the weather-tightness and water tightness of the structure (is both foundation, floor, walls and roof,).

(3) STRUCTURAL FLOOR SYSTEM

Understanding the type and magnitude of the forces acting on a building and how the building might deform when acted upon by these forces give significant dues as to how best to resolve the forces with the buildings structural system.

These are a building primary horizontal planes which support both live loads (a buildings occupants and contents) and dead loads (weight of floors, constituent parts plus possible loading from floors and wall above). Structurally the floor system must transfer these loads laterally to either beams and columns or to bearing walls, while providing at the sometime lateral support for adjacent walls. The floor system must be relatively stiff while maintaining its elasticity since it must support moving loads. The depth of a floor system and the potential cavities within it must be considered if it is necessary to accommodate heating, plumbing, or electrical lines within the floor system.

Since a floor system must support traffic, durability, resistance to wear and easy maintenance are critical factors in the selection of a floor system and its finish. The described flooring and ceiling finishes and their visual properties (material, colour, texture and pattern) help to determine the choice of a floor system which can most easily support these finishes. Suggested floor finishes are:

(a) 50mm O/A thickness in-situ terrazzo finish to approval on cement sand-screed including ebonite strips. Maximum bay size $1m^2$

(b) 50mm O/A 1:2½ Granolithic screed

(c) 50mm O/A 1:3 cement sand-screed treated with approved surface hardener.

(d) Pre-cast concrete slabs to BS 368 laid on sand and pointed in 1:4 cement mortar.

In the internal corridors adjacent the courtyards of the individual units however P.V.C paving slabs shall be used instead of floor systems.

(4) **WALL SYSTEM**

These are, a building primary vertical planar elements. They may be bearing planes of homogenous or composite construction or they may be composed of linear bearing elements

(Posts and columns) with non-structural panels filling in between them. How these walls and columns support either floor or roof systems above and how they are supported in turn by wall, floor, or foundation systems, below is determined by the structural compatibility of these systems, and the type of connection and materials used. Wall elements can also serve structurally as shear walls, which provide lateral stability along the direction of their planar surfaces against horizontal and racking loads as may be caused by wind forces, compatibility of these system, and the type of connection and materials used. Wall elements can also serve structurally as shear walls, which provide lateral stability along the direction of their planar surfaces against horizontal and racking loads as may be caused by wind forces.

Exterior walls serve as a protective shield against exterior conditions for a buildings interior space. The exterior skin, which may be either applied or integral with the wall structure, must be durable resistant to wear and the elements (sun, wind, rain). The exterior wall is also the point at which the control of air, moisture and water vapour flow must take place.

Interior walls and partitions may either be load-bearing or non-structural, and serve as dividers and defining elements of space, visually and acoustically. Their surface must be durable and wear-resistant, and the desired finish. Colour and texture should be compatible with the wall system used. Wall elements may also have to accommodate the vertical and horizontal travel of mechanical or electrical lines as well as their outlets. Some suggested wall finishes are:

(a) 1 cool primer and 2 coats emulsion of 15mm smooth rendering.

(b) 150 x 150 glazed ceramic tiles to BS 1281 bedded and joined in 1:3 cement mortar.

(c) Prime and point 2 coats glass oil paint on 15mm smooth rendering.

(d) Apply sandtex matt finish on 15mm smooth rendering.

(e) Apply texture paint on 15mm smooth render.

The size and location of door and window openings in walls are determined by the type of natural light, ventilation, view and access required. In addition, these opening should comply with the restraints of the wall system construction so that, structurally, vertical loads are properly distributed around the opening and ensure that stresses around the opening are not transferred to the door and window units themselves.

(5) DOORS AND WINDOWS

Doors and Windows provide for physical, visual and light penetration into and through a building interior while enclosing interior space and maintaining the continuity of the buildings skin. Visually, door and window openings are major compositional elements in a wall and can be seen either as punched openings (with the wall plane maintaining its integrity) or as separating elements (voids) between sections of wall.

Form an exterior point of view, doors and windows are important compositional and scale giving elements in a buildings façade. The manner in which they break up a building surface affects the massing, visual height, scale and articulation of the buildings major planes, whether filling spaces within a skeleton structural frame or puncturing a masonry wall.

The size, proportion and location of doors and windows in a building must be carefully planned for so that adequate rough openings with properly sized lintels can be built into the structures wall systems. Since door and window units are normally factory built, manufacturers have standard sized and rough opening requirements for the various door and window types. The choice of doors and windows affects not only the physical appearance of a building, but also the natural lighting, ventilation view potential and spatial quality of a building.

Doors - Interior doors provide for passage, visual privacy, and sound control between interior spaces. Doors into storage spaces are primarily for visual screening although ventilation may also be a requirement.

Windows - provide for light ventilation and view. Windows as doors should provide a weather fight seal when closed, have insulative value and be free from condensation. There are many shapes and sizes of windows, to be chosen from.

(6) **ROOF SYSTEMS**

This functions as the primary sheltering element protecting the interior spaces of the building from the natural elements. It should also control the flow of water (from rain), water vapour, heat and air. In addition, it must be structured to carry its own weight as well as live loads such as rain and wind as well as leaves that may fall onto the roof. The roof system should be fire resistant and may have to accommodate electrical equipment.

The roof system should be compatible with wall and for column systems through which these loads are transferred down to the foundation system since if (the roof) is a primary generator of loads.

Economy of maintenance and erection, durability and potential heat loss and gain should all be considered in the choice of a roof system and its materials. The form of the roof is a critical element in the visual image of the building.

The roof form, and the spacing, span and slope of its structural members, also affect the choice of the finish roofing material, the interior ceiling system and the layout and form of the buildings interior spaces. The type of finish roofing that may be used depends on the roof structure and deck, its slope and the appearance desired. While a sloping roof form easily sheds

waters, a flat roof must depend on a continuous water proof membrane to contain the water while it drains and or evaporates. Some water proofing membranes are:

(a) NT Pardon 4 water proofing laid on C/S screen to fall.

(b) 2 ply bituminous felt on screen laid to fall.

(7) **CEILING**

There provide a finish-ceiling surface. They are usually in the form of boards or tiles that may be applied directly or suspended from the underside of roof or floor constructions. Ceiling materials may be of wood or mineral fibre with perforated, patterned, textured or finished surfaces that absorb sound. Ceilings may be suspended to provide a plenum space for mechanical dust work, electrical conduit plumbing, and recessed light fixtures. The depth of the plenum may vary according to the space requirements of the utilities and the required floor to ceiling height of the interior. Ceiling systems that integrate the functions of lighting, air distribution, fire protection and acoustical control to minimize the depth of the ceiling construction are available.

Some forms of ceiling specification are:-

(a) 590 x 590 x 12mm chip board panel fixed to 50 x 50mm noggins at 600mm C/C both ways - finished with texture paint.

(b) Emulsion paint on R.C slab to approved colour

(c) Texture paint on R.C slab to approved colour

(d) 6mm-fiat asbestos board nailed onto 50 x 50mm noggins at 600mm C/C each way.

(e) 75 x 18mm tongued and grooved selected hardwood strips-polished finish fixed to 50 x 50mm noggins at 900mm C/C

(8) FITTINGS AND FINISHES

Exterior wall surfaces must be weather resistant, durable and relatively maintenance free. Interior walls should be wear-resistant and easy to clean. Floors should be safe, non-ship and durable against traffic wear; ceilings should be maintenance free. The finish material to be used in any case depends heavily on many factors such as its strength, size, acoustical, thermal and fire resistance values.

For visual appearance, all finish materials should be considered in terms of their colour, texture, pattern, scale, modular characteristics and their jointing and edge conditions. In this project the primary consideration for finish materials are based on durability maintenance and cost, considering the users and nature of the facility, the functions it serves and the services it offers.

Plumbing fittings shall be mounted on walls and floors as required. Such fittings can be shower trays, wash hand basins, taps, piping etc. Electrical fittings shall also be mounted on the walls and ceilings as required e.g wall brackets, sockets, fan switches, fans etc. For the kitchen and toilet areas, wall and floor tiles shall be cited on the surfaces.

Hardwood (polished) skirting shall also be applied in the offices and visitors rooms adjacent wall level when sitting, to prevent dirtying or gracing of the walls. Skirting shall also be applied to be base of the walls to take care of dirt and dust.

8.3 SERVICES

8.3.1 PLUMBING

Water supply is essential for human consumption, sanitation and comfort. The efficient disposal of fluid waste and organic water is critical to maintain sanitary conditions within a building and in the surrounding area.

Water supply should be in the right quantity and at the proper flow rate pressure and temperature. Water supply systems work under pressure. The service pressure of a water systems must be great enough to absorb pressure losses due to vertical travel and friction as the water flow through pipes and fittings and still satisfy the pressure requirements of each building fixture. The water pipes should be rust and corrosion resistant. To avoid the dogging of pipes or equipment, water may have to be treated for hardness and excessive acidity.

The sanitary drainage system depends on gravity flow and will require large pipes and adequate installation space. All this will be properly taken care of and the layout of the sanitary drainage system will be straight forward and direct with properly sloped horizontal runs and angular connections.

Water supply in the area is by public council and thus, there can be no direct control over the quantity, rate or quality of water supplied until it reaches the building site, hence the provision of a water storage tank and treatment facilities. Minimum standards and requirements are adhered to in order to ensure adequacy in use.

8.3.2 ELECTRICAL

Electrical systems furnish light, heat and power to run a buildings machines. The electrical body that controls and distribute this power to the points of utilization of its power supply. All equipment used should meet the under writers laboratories (UL) standards.

The power supply authority should be notified of the estimated total electrical load requirements to confirm service availability and co-ordinate the location of the service connection, service switches and switch board. A transformer may be necessary to switch from the supply voltage to the service voltage. An overhead service connection will be used as it will help to save cost, be accessible for maintenance, and carry high voltages over long runs.

Electrical conductors will be run within concrete floor systems for convenient access to floor and ceiling outlets. Light fixtures and wall switches are usually the most visible parts of an electrical system and they will be located for convenience, easy access and in co-ordination with visible surface patterns. Wall plates for these devices will be of insulating plastics for safety.

8.3.3 MECHANICAL

Heating, ventilation and air-conditioning systems condition the interior spaces of a building for the environmental comfort of the occupants. Factors that may be controlled by mechanical systems include. The temperature of the surrounding air, the mean reclinate temperature of surrounding surfaces, the relative humidity of the air, air motion, dust, odours etc.

The air temperature in the building is affected by the mean reclinate temperature relative humidity and air motion. Air temperature requirements are also affected by the age group of the buildings occupants and the level of their activity.

The location of heating and cooling outlets depends on the size and proportions of the space, its cureas of heat loss or gain, its wall, ceiling and floor construction and finish. The type of outlet used depends on its placement within the space its heating or cooling capacity, dimensions and appearance.

8.3.4 ACOUSTICS

This may defined as the science of sound including its production transmission and control of its effects. The acoustic design of a space involves the reinforcement of desirable sounds and the control of undesirable noise. The acoustics of a room is dependent on its shape, form volume and the nature of its surfaces.

The control of noise and sound within any building is very important, the way the sound moves in the room, how it affects the outside etc should all be well planned to ensure comfort within the buildings.

Acoustic elements shall effectively be used to control noise e.g the planting of trees and shrubs as buffer zones. On the inside, the use of acoustic ceilings to control internal noise, positioning of door and window openings, shape of building etc. The main sources of sound and noise from the centre will be basically from human activities as well as from mechanical services in the workshops, water supply and drainage.

8.3.5 FIRE AND SAFETY

For the safety and comfort of occupants in any building, fire prevention and precautionary measures need to be taken to protect the lives and property of the occupants. Fire resistant construction refers to methods of controlling the spread of fire, increasing the length of exposure to fire a material can withstand without damage, and reducing a materials flammability.

Materials used to provide fire protection for a buildings construction must be non-flammable and able to withstand very high temperatures without disintegrating. They should also be of low conductors of heat to insulate the protected materials from the heat generated by fire.

For reasons of safety in controlling the spread of fire and allowing sufficient time for the occupants of a burning building to exit safety before the structure weakens to the extent it becomes dangerous. Fire codes and requirements will be strictly adhered to. Buildings should also have fire extinguishers placed at strategic locations to tackle and control sudden outbreaks of fire that may occur.

To check electrical fires arising from electrical faults ELCB (earth leakage circuit breaker) should be installed to automatically turn off supply of electricity when there are inherent faults or fires in any section of the buildings

8.3.6 SECURITY

The security or lack of it in any building also plays a vital role in the general success of the building. Occupants need to have a sense of security to ensure maximum productivity perimeter fencing and a gate house with security men are provided to ensure adequate control of movement as well as walls around the dormitories to effect some measure of control on activities.

In this facility too many security measures will hinder rather than enhance productivity of centres participants. As such security measures need to be delicately handled to prevent the occurrence of insecurity ceilings.

8.3.7 SOLAR CONTROL

All the units in regard to this project will be oriented in such a way that direct sun rags will be avoided into the interior, and where impossible, shading devices or sun screening devices and natural vegetation will be use to achieve solar control.

CHAPTER NINE

9.0 AESTHETICS AND GENERAL APPRAISAL

Destitute centre have some set of rules that it have to comfort with, in terms of space allocation and to some extent aesthetics. Therefore, in recognition of its special requirement and symbolic nature of the planning of the site, congnisance of the need to maintain a balance between the landscape and the microclimate to achieve a suitable environment was taken.

The provision of extensive open spaces, fields, green lawns, an exhibition of both hard and soft landscape elements are all features that enhances the image of any building or facility. From the entrance of the centre, the hard and soft landscape elements in the form of roads, walkways, green grasses, trees, shrubs and flowers offers a first time visitor and air of serenity and welcome.

The design concept for the centre emphasize peace, serenity, self freedom and dignity of human-life that is propagated in the centre. The use of open spaces and courtyards within the buildings and the relationship of major activities reflects a mixture of historic Nigerian practice blended with contemporary functionalism. Thus bringing the design home making it appeal to the psychological comfort of the users. The open spaces, wide corridor spaces, verandahs and relaxation gardens which are utilized for the purposes of passive recreation (which the users are more familiar with) as well as circulation and distribution of activities go further to emphasize the Nigerian culture in relaxation and evening recreation.

The design and construction all emphasized spacious durable, flexible and easy to maintain spaces, considering the users and uses of these spaces. The simplicity in the design, circulation, functionality, zoning and integration is another important feature.

The materials used in the construction of the buildings are carefully chosen for their strength, durability, cost maintenance. The arrangement and availability of adequate conveniences encourages discipline and tidiness. Cupboards and storages spaces for various functions and activities help keep luggage and other materials out of the way.

Simple aesthetic elements were used in all parts of the building were framed with planters and sun screening devices which also serve as aesthetic elements. Window and door openings (external) also apart from serving as links and lighting and ventilation elements, also serve as elements that break the mass monotony of the wall.

The use of aesthetics elements however was restrictive in that the whole centres appearance is supposed to be subtle and understated with manicured surroundings, so that the aim of the centre is not defeated, as well as blend the centre with the general style of buildings in the area.

9.1 GENERAL APPRAISAL

The importance of any project is in its being a fulfilment of what it originally set out to do. This design, through its concept and philosophy and in attempting to fulfil the out lined goals aims and objectives has worked at creating a facility for the destitutes that can learn to fend for their selves as well as earn some respect and live like human beings should, while also preparing them reabsorption into normal society life.

It is hoped that projects such as this rehabilitation centre will help to open the eyes of all Nigerians of the importance of such social welfare services in order to enhance the building of a more balanced nation for everybody destitute and privileged.

9.2 CONCLUSION

The importance of this destitute rehabilitation centre both politically and economically, can not be over emphasized, because they are tremendously popular throughout the world, nearly all countries have national problems of destitution one way or the other. Provision of such facilities will help promote good will of a nation. Hence economically it provide a forum for acquiring skills, and knowledge for those that are thought to be useless. It also provide income for many destitutes as well as employment.

Therefore, it is dangerous to allow millions of our future leaders to the vagaries of uncaring and what appears to be decadent society. We believe that the community and the governments at all levels must be alive to their responsibilities. This is a national problem and must be viewed as such.

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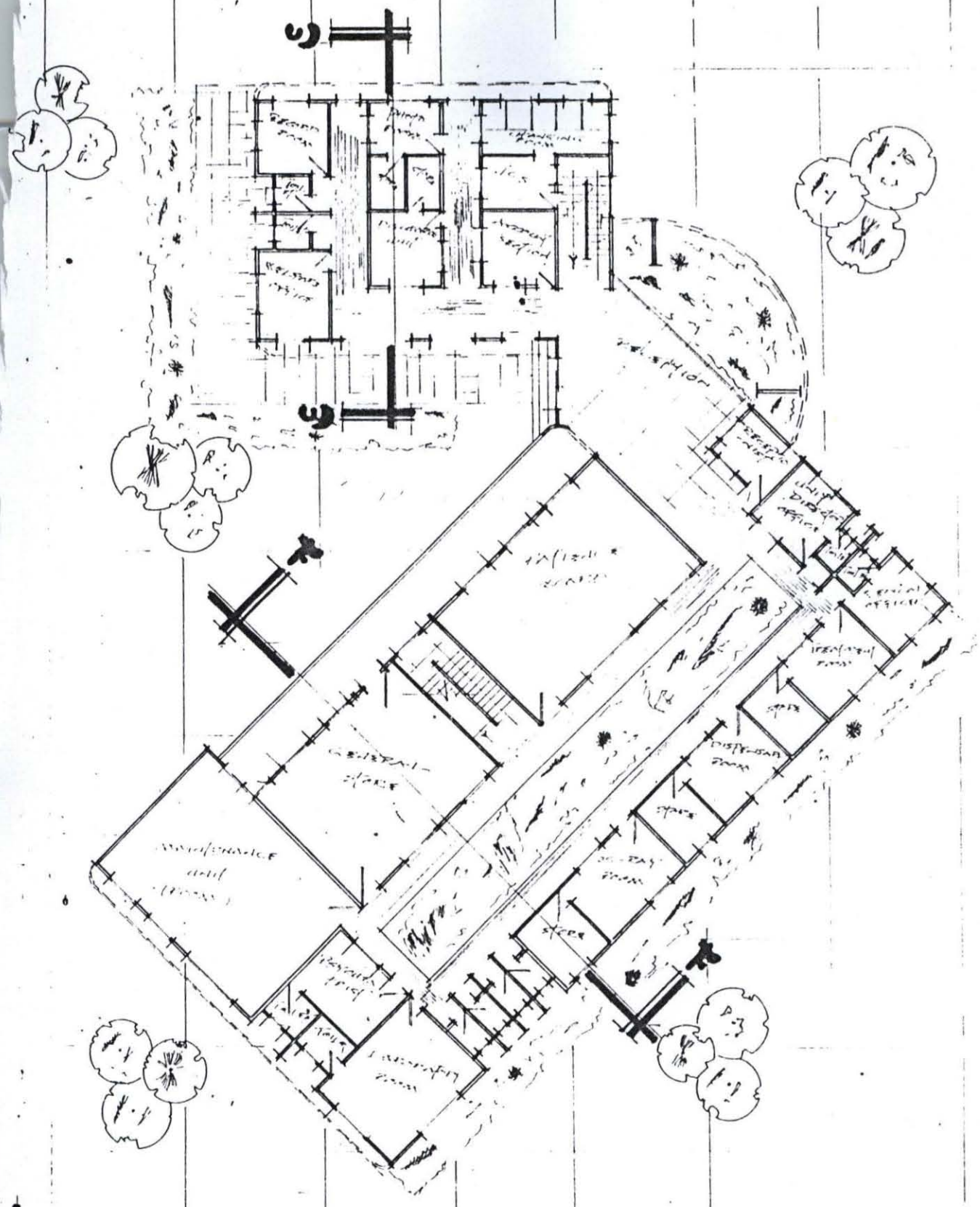

GROUND FLOOR PLAN

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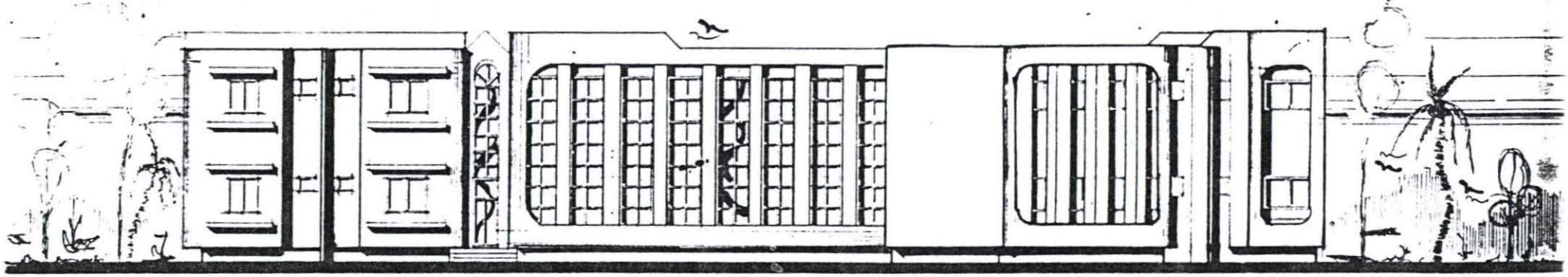
ADMINISTRATION



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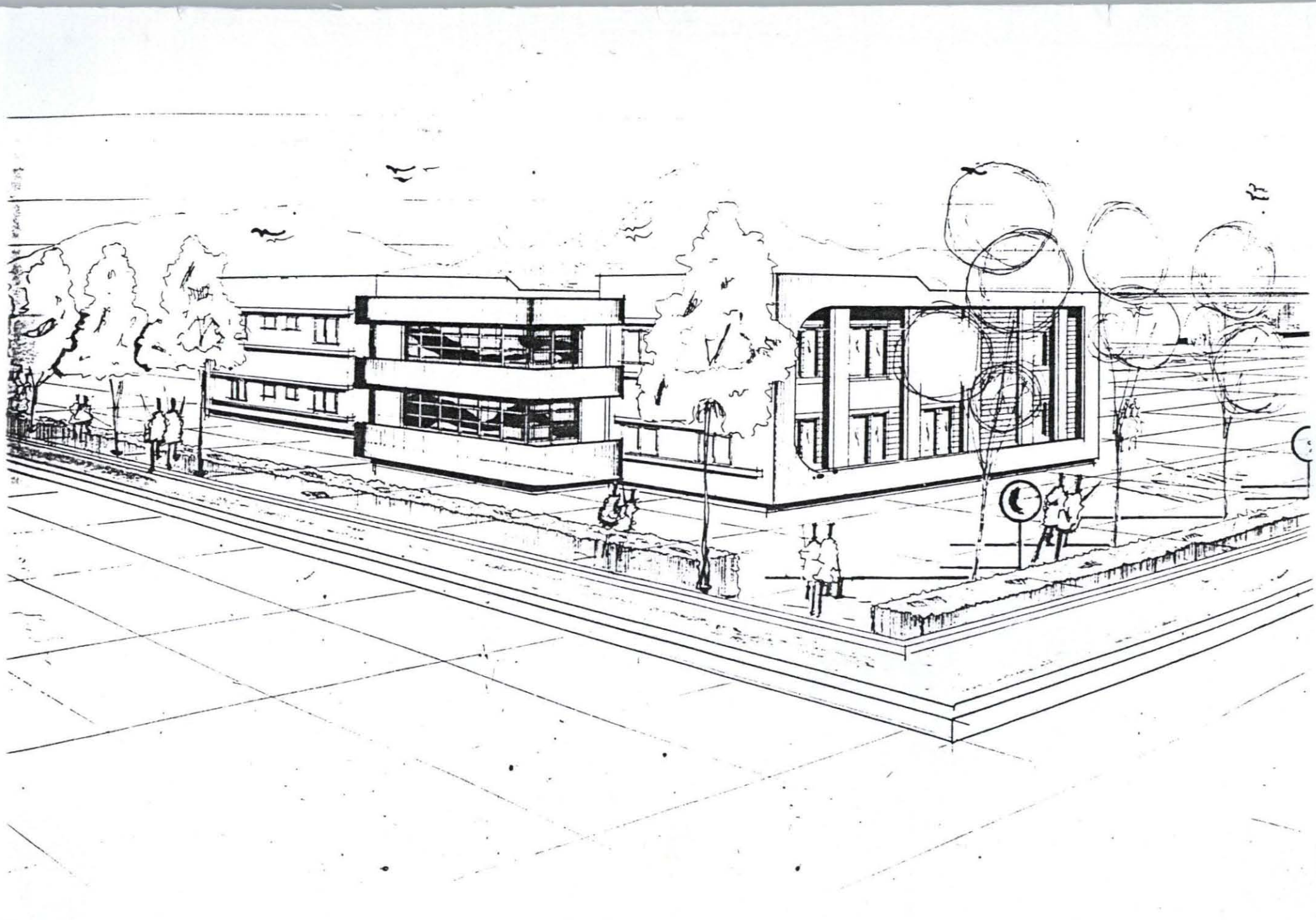

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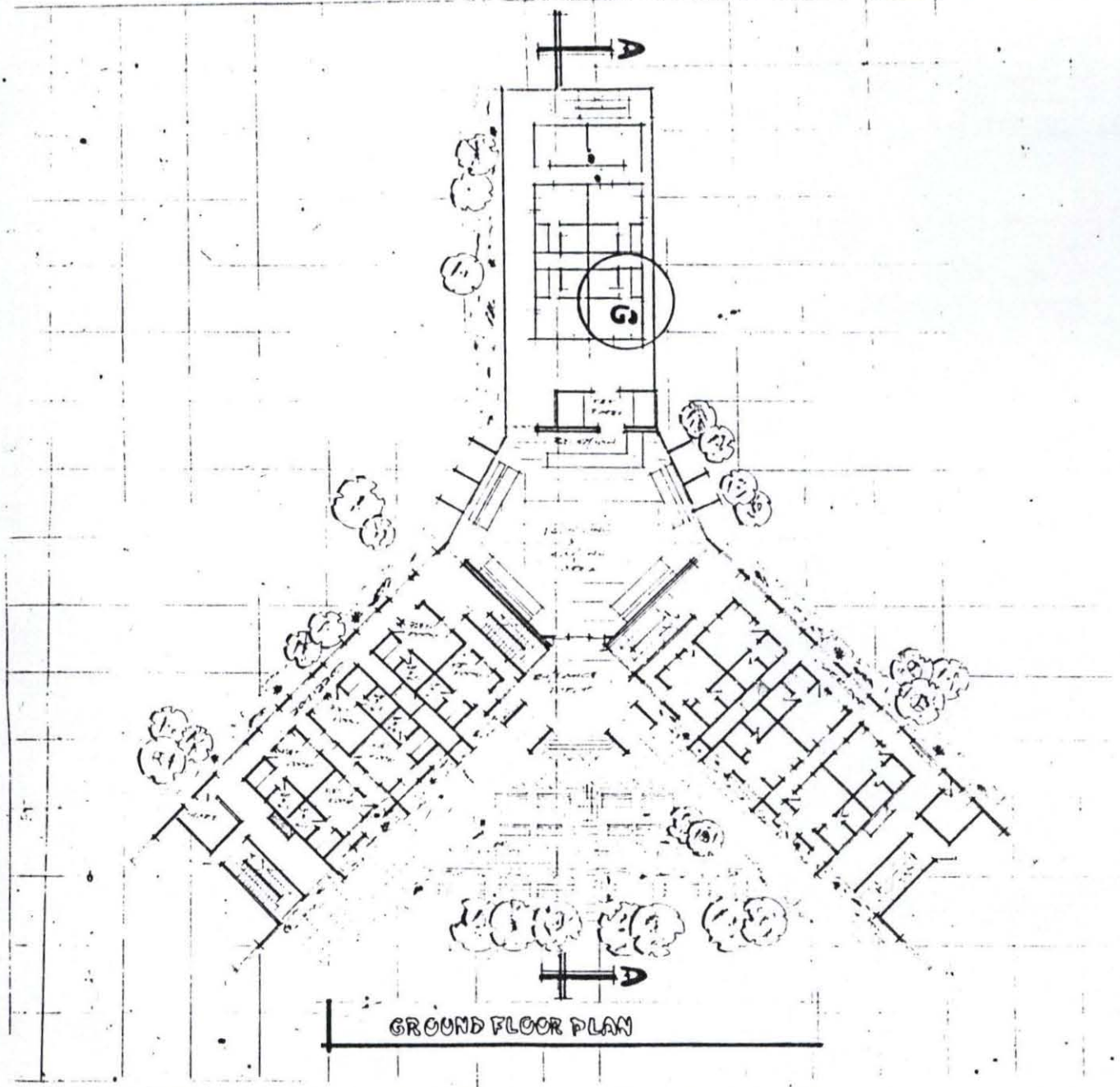

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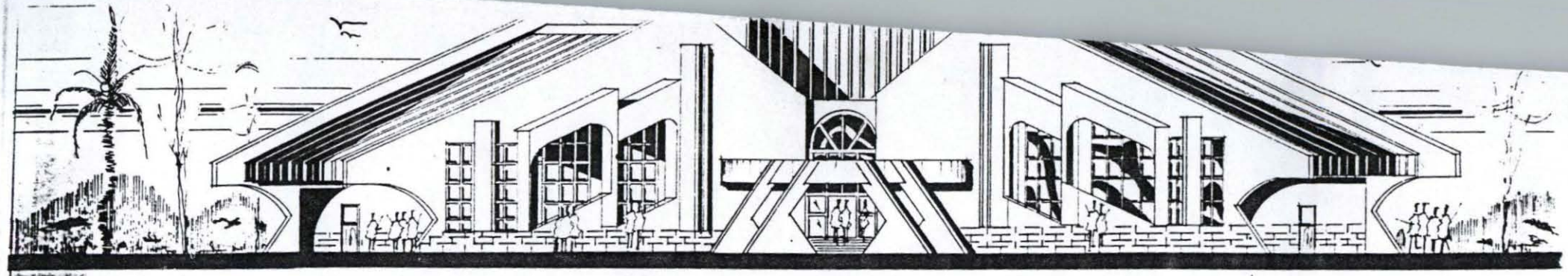

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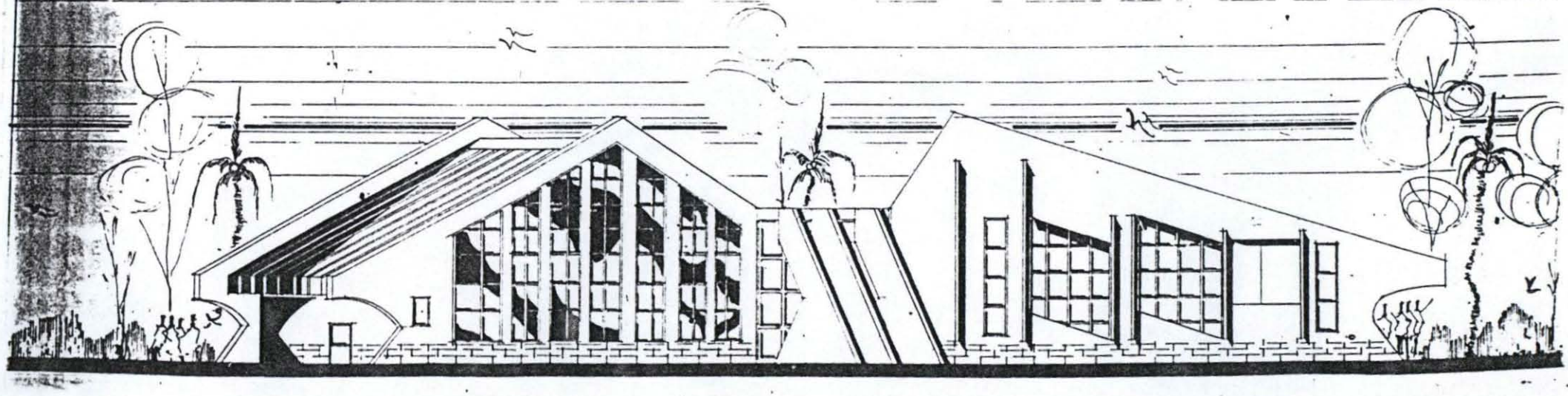

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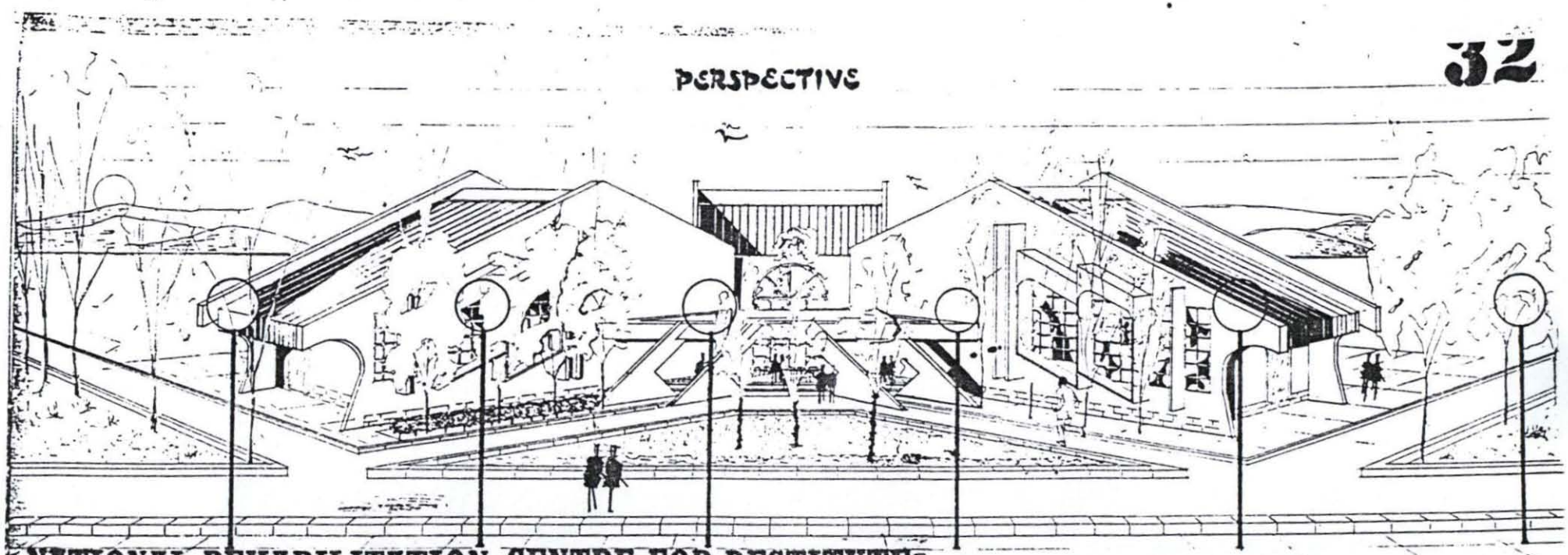
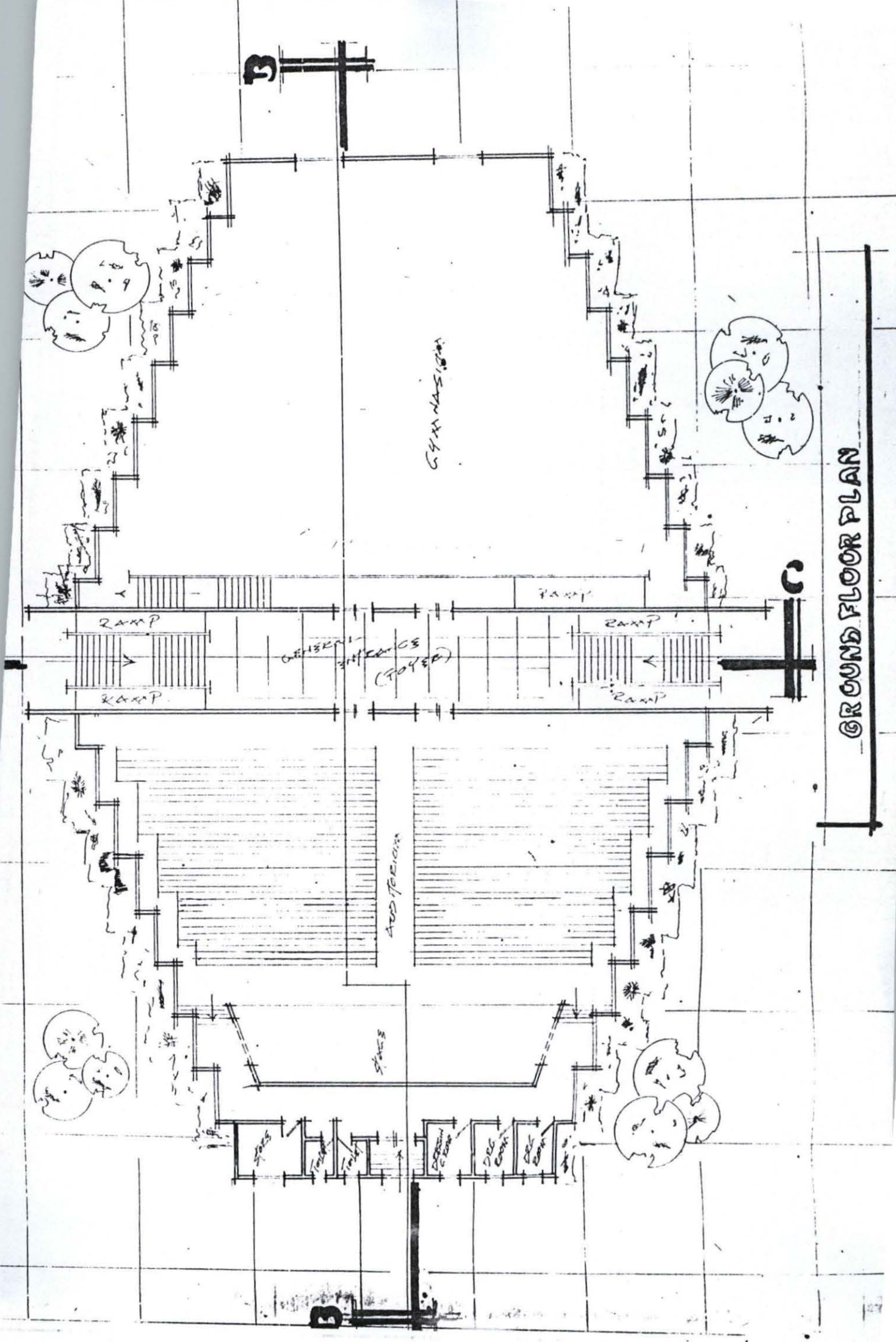


NATIONAL REHABILITATION CENTRE FOR DESTITUTES, MINNA, *With Emphasis on Low Cost Building Materials.*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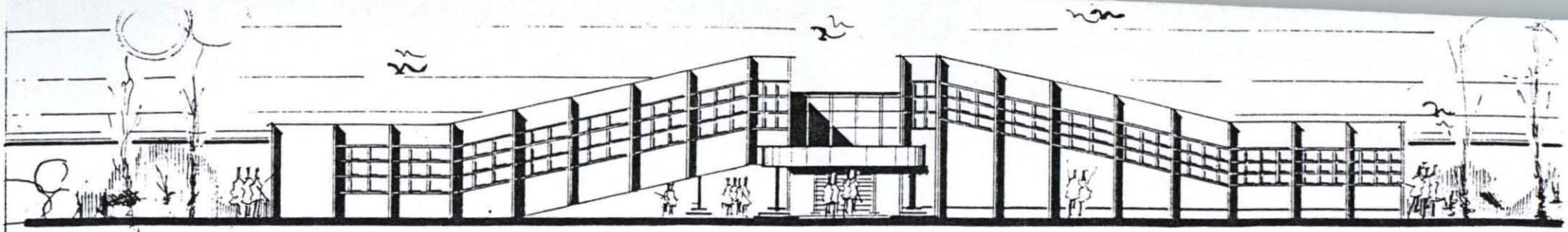

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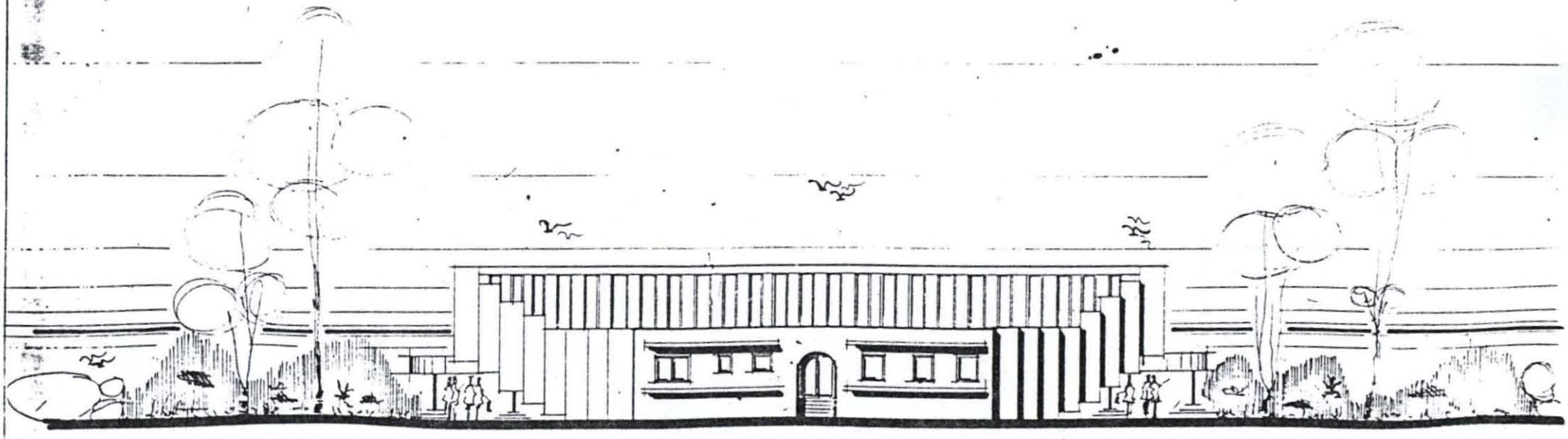

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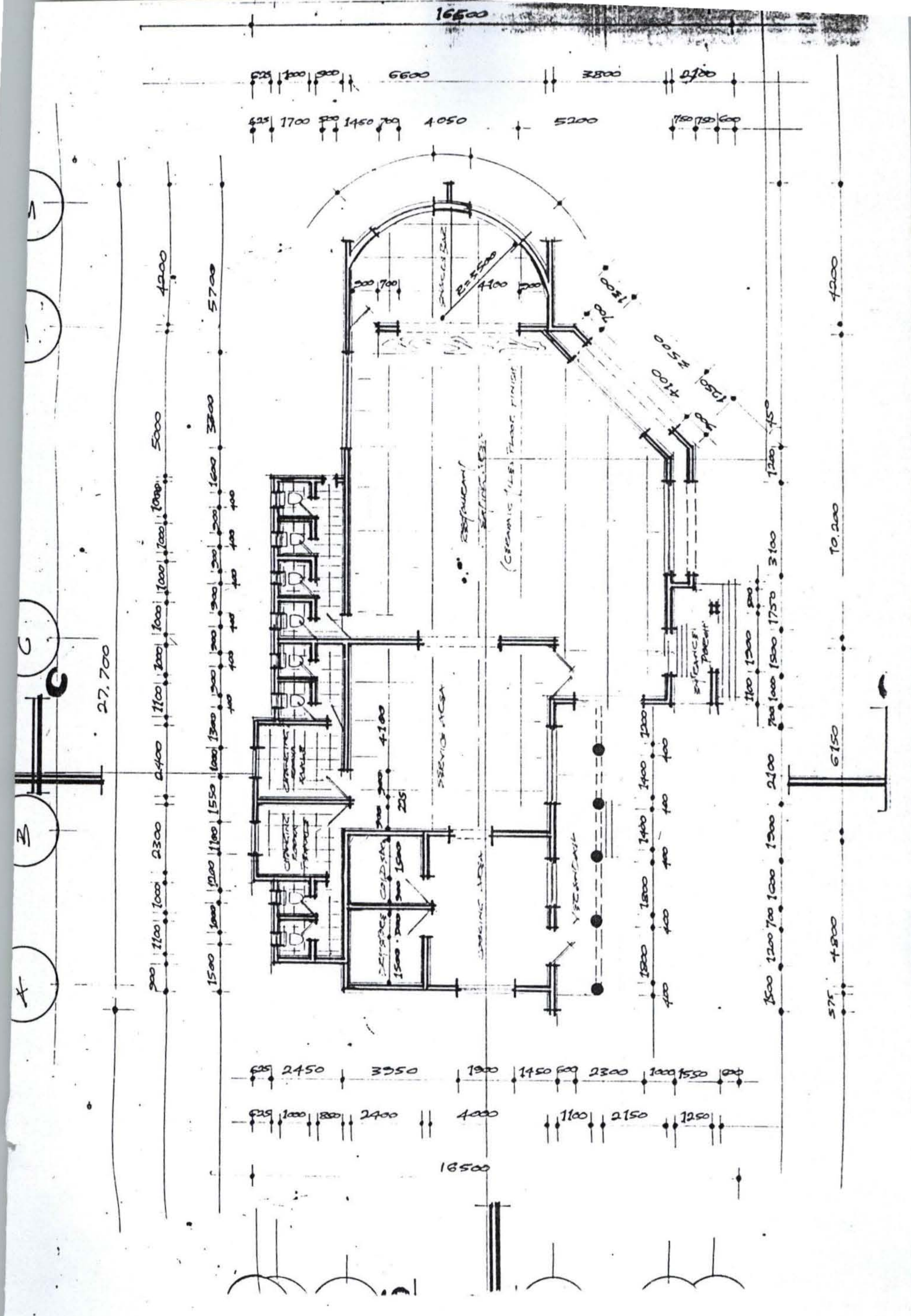
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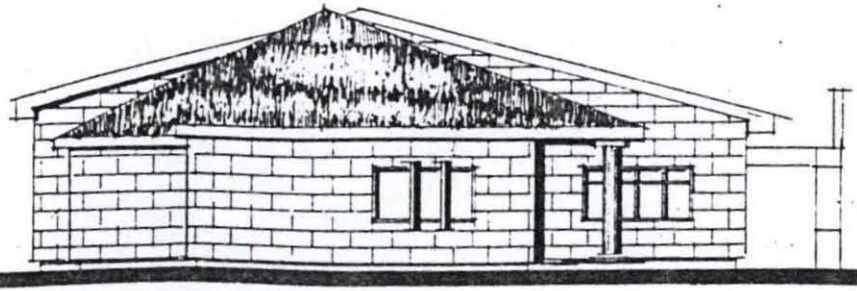

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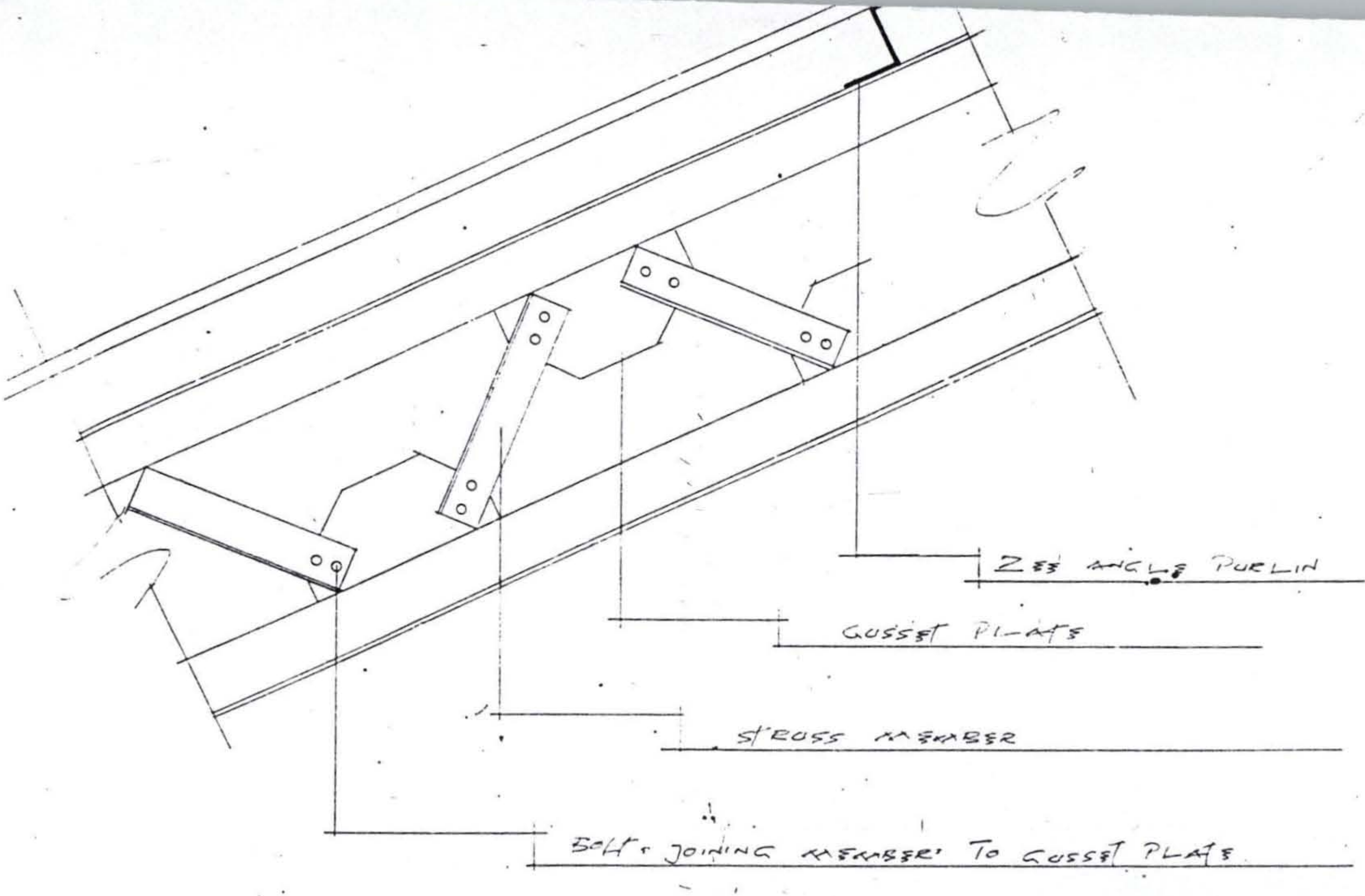

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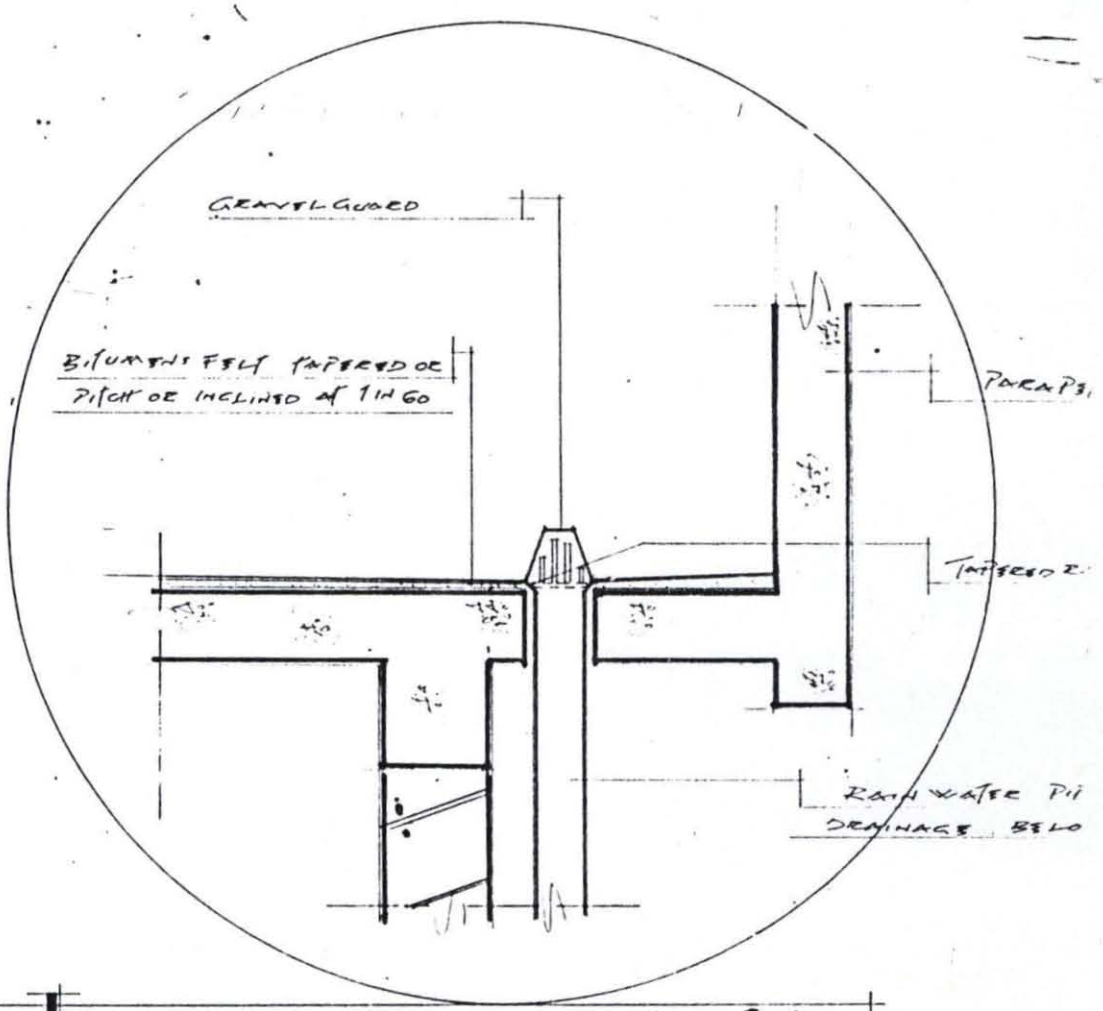

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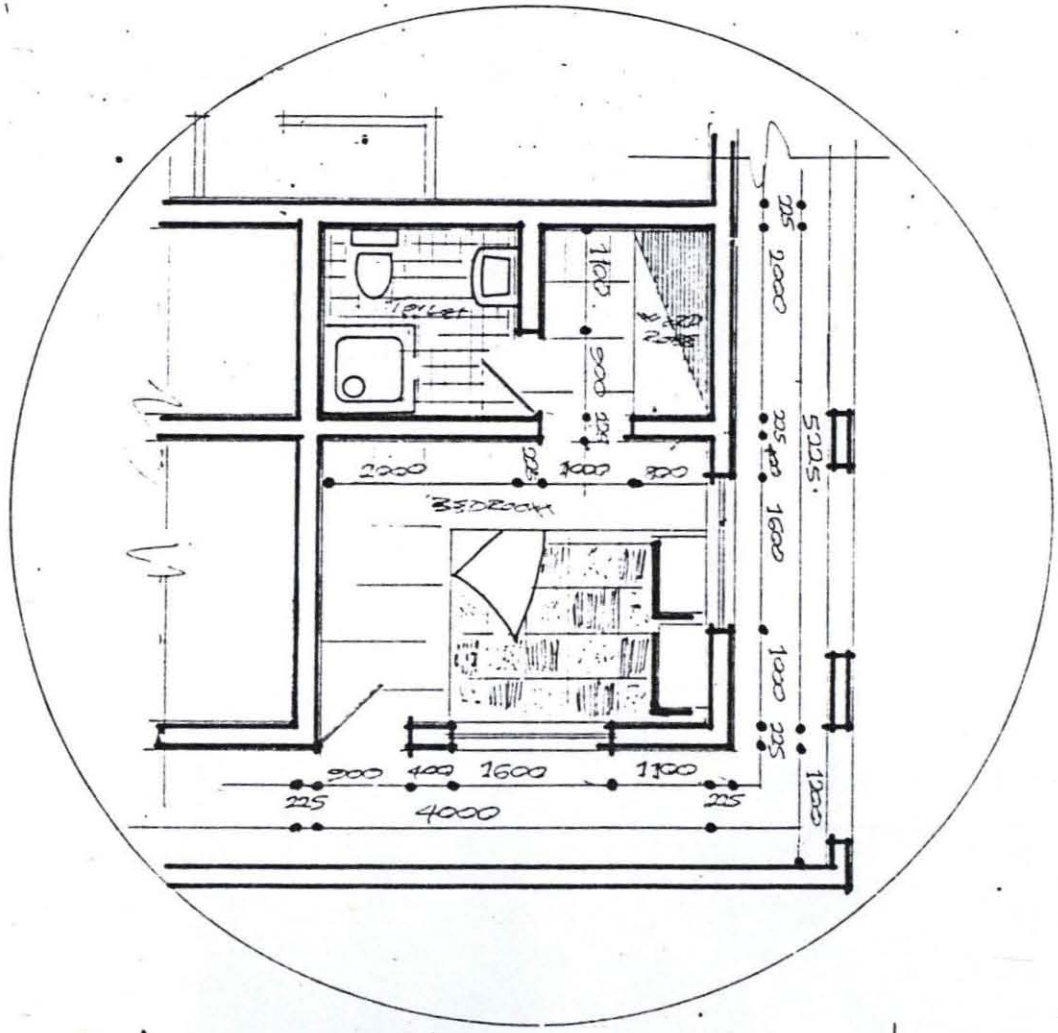

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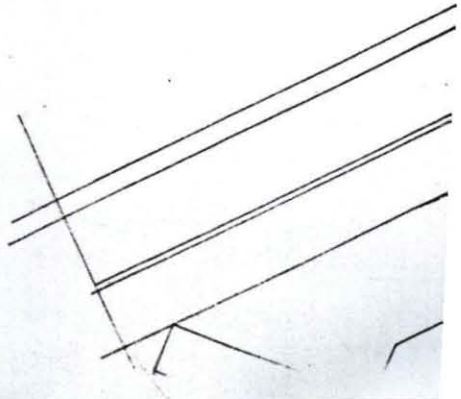

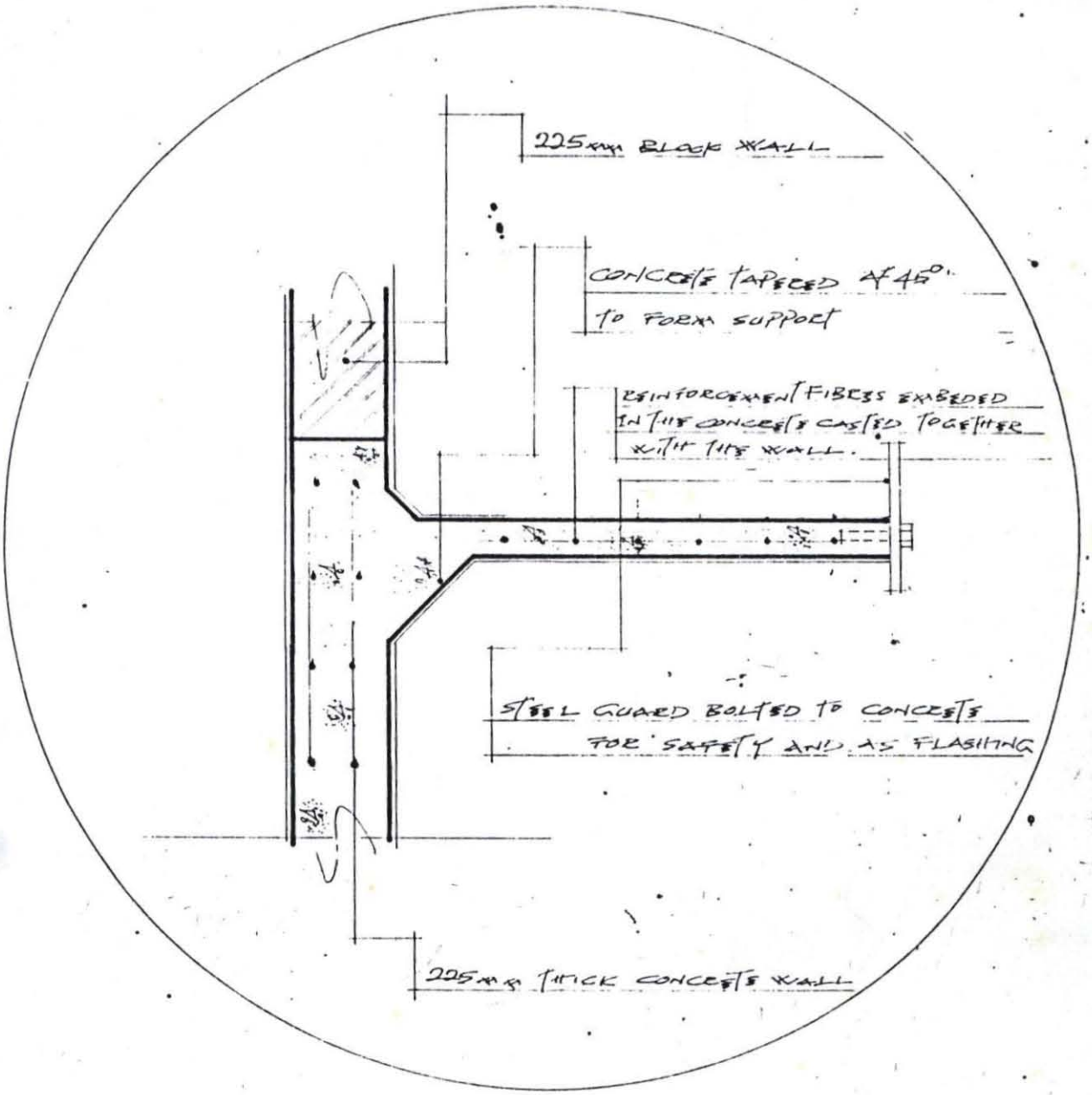

DETAIL OF CONCRETE BED 1:10 "A"

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