UNIVERSITY OF NAIROBI
DEPARTMENT OF ARCHITECTURE
THESIS REPORT

POPULATION CENTRE
CHIROMO CAMPUS.

KIKO, S
B. ARCH. 5
AUGUST 1980
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DECLARATION

This report is my original work and has not been presented in any other University. The report is part of the fulfilment for the degree of Bachelor of ARCHITECTURE of the University of Nairobi.

This report has been presented for examination with our authority as University supervisors.

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ACKNOWLEDGEMENTS

I acknowledge the guidance given to me in the development of this thesis report by the following:-

1. MR. JIM ARCHER
2. PROFESSOR ERIC MEFFERT
3. MR. BRUCE CREAGER (My Tutor).
INTRODUCTION

It is the Government policy to reduce the nation's rate of population growth.

To succeed in its efforts, there must be properly educated demographers who can:-

(i) Educate the masses on the importance of family planning and birth control.

(ii) Carry out demographic research

(iii) Enable free dissemination of demographic information

(iv) Supply up to date demographic data.

It is with this in mind that the Kenya Government decided to finance the construction and running of the population centre at the Chiromo Campus of the University of Nairobi.
2. THE BRIEF

A SCOPE

(i). Providing information on demography.

(ii). Conducting promoting and facilitating demography studies and research.

(iii). Publishing the results achieved.

(iv). Establishing relations with bodies having the same ends in view. e.g. the Family Planning Association of Kenya.

(v). Acting as a link between all related faculties: e.g.

- Medicine (family health)
- Science (human ecology)
- Arts (Geography and Economics)

(vi). Providing the Ministry of Planning with up to date demographic data and assisting the government in preaching the message of Family Planning and birth control.
B. THE SITE

The population centre site is located at the Chiromo Campus of the University of Nairobi.

C. Facilities

C.1. Lecture theatre

Capacity 250 with projection facilities

Area: 300m²

C.2. Two small seminar rooms.

Capacity 60 and 25 persons each with projection facilities 120m²

C.3. Library

(i) Total stacking capacity

25000 volumes.

(ii) Reading area

(iii) Control area

1500m²

(iv) Private property storage

(v) Reference
(vi) Sorting and indexing room 25m²
(vii) Storage facility 12m²
(viii) Newspaper binding 10m²
(ix) Librarians office 10m²
(x) 28 in no. study
carrels 3m² each 84m²
(xi) Cleaners cupboard 4m².

C.4. Entrance hall
Receptionist/telephone operator
Large enough to allow a flow
of people in and out of the building.

C.5. Offices
(i) Administrative assistant 12m²
(ii) Chief technician 12m²
(iii) Cartographic unit 60m²
(iv) Statistical machine room 20m²
(v) Tape/card storage 20m²
(vi) Staff room with tea facilities 60m²
(vii) Office of Director 20m²
(viii) Secretary/filling 12m²
(ix) Office of executive Officer 20m²
(x) Two typing offices 10m² each 20m²
(xi) Board room 25m²
(xii) Staff seminar room 20m²
(xiii) 8 offices for assistant research fellows. 8m² each 64m²
(xiv) 8 offices for research fellows 12m² each 94m²
(xv) 6 offices for senior research fellows. 16m² each 96m²
(xvi) Storage facilities 24m²
C.6. Exhibition spaces

360\text{m}^2

C.7. Utilities

(i) Toilets

(ii) Cleaners cupboards

(iii) Entrance lobbies

(iv) Stores 100\text{m}^2

(v) Stair Cases

(vi) Corridors.

C.8. Total Area

4005\text{m}^2
3. SITE ANALYSIS

3.1. TOPOGRAPHY

Key

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
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<tbody>
<tr>
<td>RESIDENTIAL AREAS</td>
<td></td>
</tr>
<tr>
<td>Plot Boundary</td>
<td></td>
</tr>
<tr>
<td>MASONGAWAI RIVER</td>
<td></td>
</tr>
<tr>
<td>CAR PARKS &amp; ROADS</td>
<td></td>
</tr>
<tr>
<td>WALKWAYS</td>
<td></td>
</tr>
<tr>
<td>SLOPE:</td>
<td></td>
</tr>
<tr>
<td>5% - 10%</td>
<td></td>
</tr>
<tr>
<td>10% - 20%</td>
<td></td>
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<tr>
<td>30% - 50%</td>
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<tr>
<td>EXISTING BUILDINGS.</td>
<td></td>
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<tr>
<td>MAIN SEWER LINE</td>
<td></td>
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</table>

Surface Soil
Red soil
Vegetation
Many different types of
Mature trees.
3.2. THERMAL COMFORT

Conclusions:

a. Radiation is necessary in the hours of
   i. 000 G.M.T.
   ii. 0300 G.M.T.
   iii. 0600 G.M.T.
   iv. 0900 G.M.T.

This can be achieved by partially sun shading the east facade.

b. Radiation is not necessary at the times:
   i. 1200 G.M.T.
   ii. 1500 G.M.T.
   iii. 1800 G.M.T.
   iv. 2100 G.M.T.

Thus 100% sun shading in the west facade.

THERMAL COMFORT

Eastleah Airport station data used. Critical Month is February.
4. CONCEPT DEVELOPMENT

The concept of this population centre is based on a number of design parameters which include:

(i) The slope of the site
(ii) The views
(iii) The existing vegetation
(iv) The main pedestrian route of movement.
(v) Existing buildings
(vi) Existing vehicular circulation.

4.1. THE SLOPE

As shown in the site analysis the slope of the population centre site varies from 8% to 50%. For it to be accommodated there must be a properly planned change of levels within and outside the building. The building should cut across contours only where inevitable.
4.2. VIEWS

There is a very good view almost all round the site; getting deepest to the east, towards the University playing fields and to the west toward the Arboretum.

This calls for a special attention to eastern and western facades of the proposed population centre, as the good views cannot be utilised unless an effective sun shading system is achieved.

4.3. EXISTING TREES

Like other undeveloped parts of the Chiromo Campus site, there are many mature trees.

Such trees give the campus a sense of character and belonging as the surrounding developments are characterised by evergreen mature trees.
This calls for a development that integrates with the landscape penetrating into the trees yet maintaining as many of them as possible.

4.4. SURROUNDING BUILDINGS

Presently, there is no sense of entry into the Chiromo Campus particularly along the main pedestrian spine from the sports ground.

The first building along this route and the nearest to the site of the proposed population centre is the physical sciences complex.

This complex has an entrance addressed to a large tarmed car park. This car park makes this entrance less effective as it lacks that welcoming and entrance containing space necessary for a lobby to have its sense of place.
Attitude to Existing Pedestrian and vehicular circulation.

Note: Vehicular link between the two car parks blocked.

The proposed development should integrate the entrance of the physical sciences complex giving it that sense of space necessary for an effective entrance.

PEDESTRIAN & VEHICULAR ACCESS

Presently, vehicals charge through the campus to the botanical gardens boundaring the University sports grounds.

To avoid possible future shortcut by the public from the riverside drive through the campus, the proposed development should incorporate a break of the vehicular system.

Overall the pedestrians should be given a priority within the development. The existing pedestrian route of movement should be respected with improvements where necessary.
5. DESIGN PROCESS

DESIGN MEDIA

(i) Two dimensional sketches
(ii) Three dimensional sketches
(iii) Models.

5.2. FIRST PROPOSAL

This is a response to the active formative forces or design parameters explained in the concept development. In this proposal, all the facilities are accommodated in one building located to the north of the physical sciences complex. It is absorbed in the slope with the library nearest to the Masongawai river. The offices are tilled northwards off the East West axis due to the following reasons.
(i) To avoid cutting across the contours at this point.

(ii) To help enclose the court to the north.

(iii) To allow optimum utilisation of the view which deepens south east wards towards the University sports grounds.

5.3. GOOD QUALITIES

This proposal has the following qualities.

(i) The different facilities are absorbed by the slope integrating with nature very effectively.

(ii) Views are utilised to the optimum by having glazing in all facades including the east and west.
5.4. BAD QUALITIES

The following are the bad qualities of this proposal.

(i) Offices lack on entrance forcing them to remain closed when the main entrance is closed.

(ii) They look forced to link up with the library.

(iii) Link between main Lobby and secondary lobby of lecture theatre is too weak and undefined.

(iv) Lecture theatre and large seminar room seem forced together.

(v) Walkway from car park to main entrance is too close to the offices.
First Project.

Note: i. There is a level change of 11 M absorbed in the whole project.

ii. View of existing building blocked only to first floor at worst.

(vi) Library toilets are too far from the main body of the library.

(vii) Library is too deep for natural lighting and ventilation.
6. THE FINAL PROJECT

In principle, the final project is development of the first proposal. It maintains the same location point and orientation.

At this level, the project is in four major elements within one building. This include:

(i) The library
(ii) The offices
(iii) The lecture theatre and seminar rooms.
(iv) The exhibition hall.

6.1. THE LIBRARY

This is the heart of the project; in size, location and character. It is located at the most withdrawn part of the site. This is due to the following
Reasons:

(i) Due to its size and character as a place to read in, it has the capacity to contain the great slope at this part of the site.

(ii) Internally generated campus noise is minimum at this part of the site.

6.12. LEVELS

The library has the greatest level changes in the whole proposed centre.

Using the main entrance lobby as a reference point, (±0.000m) the lowest level of the library is (-8.000m.) This means that 8.000m of slope are absorbed in the library. The library store and sorting office are at the level -0.480m. This is for easy
service from the service park which is at the level - 0.640. i.e. a step below the store.

The mezzanine floor is at the level ±0.000.

6.13. UTILISATION OF VIEWS

In this library there are two users.

a. The postgraduate student in the carrels.

b. The undergraduate using the general study area of the library.

There is a conflict in the utilisation of views in this case as the carrels, if located at the periphery would block the view. This is resolved by
cantilevering the study carrel in the eastern and western facades with general study space below them.

(i) Both the undergraduate and postgraduate students enjoy the good view.

(ii) The carrels are used to sunshade the space below it.

(iii) This location of the carrels has the psychological effect of making the undergraduate student work hard towards the study carrels above.

6.14. **NATURAL VENTILATION AND LIGHTING**

Security requirements in a library conflict with the principles of
natural ventilation. To resolve this, a void is created at the centre of the library that is accessible only from the control point.

Big openable windows are used in this void giving it the qualities of a fresh air source. It is also used as a light well.

Permanent ventilation is achieved by having fixed glass louvres at a level too high for any body to drop a book through.

The same void is also used to light the lowest floor of the library by roof light.
6.2. THE OFFICES:

This is basically the heart of research in the centre. The office users have the following responsibilities:

(i) Conducting demographic research.

(ii) Analysing and publishing the data.

(iii) Communicating the data to the relevant authorities effectively.

Thus this is the core of the centre. These offices are developed around a court that has enough privacy for the officers to sit around and discuss any issue.

This small court also gives visual continuity within the offices tying them together.

There is a secondary lobby that is also accessible from the main lobby.
This enables the researchers to use the offices at non-working hours without inconveniences.

6.3. THE LECTURE FACILITIES

This include:

(i) The lecture theatre.
(ii) The large seminar room
(iii) The small seminar room.

These facilities are located just off the physical sciences complex. This is due to the following reasons.

(i) To make it easily accessible to both general students of Chiromo Campus and the Public.

(i') Is used as a buffer zone for noise from other parts of the
Campus; the main beneficiary being the library.

(iii) It gives way for other facilities to utilise the view.

It also has a secondary lobby, that gives it the following qualities.

a. it enables it to be used at odd hours when other facilities are closed

b. students can move out of lectures with minimum disturbance to the rest of the facilities.

6.4. EXHIBITION HALL:

This is a facility to help the researchers communicate their results to the public; free dissemination of information as opposed to the archive; which is only
In addition to exhibitions it can also be used as an examination hall.

Physically, it is planned as a link between the library and the lecture facilities.
7. INTERNAL CIRCULATION

As stated before, there are three lobbies each of which is accessible from the great court.

Linking them is an internal circulation system at the periphery facing the court.
8. **EXTERNAL CIRCULATION**

External pedestrian circulation in this proposed centre is basically a walkway off the main pedestrian route to the campus.

It is at the level +1.600 so there are a series of steps down to the main lobby (level +0.000) or up to the lecture facilities lobby - (level +3.040). Vehicular circulation is maintained within the periphery.

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**ENTRANCE LEVEL PLAN:**

**KEY:**
- External Circulation
- Open Spaces.
9. OPEN SPACES:

There is only one major open space. This is the court between the centre and the existing physical sciences building.

This has the following qualities:

(i) It acts as an entrance lobby into the campus a facility that has been lacking.

(ii) Vehicular circulation is maintained off the court.

(iii) It ties the new centre to the existing physical sciences complex; giving the science complex a sense of belonging.
(iv) It contains the entrance of this complex giving it a sense of place.

(v) It is to scale.

The zone between the centre and the Masongawai river down the slope is left intact. The undergrowth and the trees help the centre integrate with nature giving it that necessary visual continuity.
10. CONSTRUCTION DETAILS

10.1 TANKING DETAIL

The internal change of levels calls for well designed tanking details, otherwise the whole project will be a disaster.
10.2 ROOF DRAINAGE DETAIL

- Pressed Metal Trim
- Fulbora Rainwater Outlet
- Asphalt on two layers of felt
- Lightweight concrete to falls
- 150 φ gi Rainwater Pipe
- Bush Hammered R.C. Beam
- R.C. Roof Slab
- Section A-A
- 150 φ gi Rainwater Pipe cast in R.C. Column
- Plan

Scale 1:20
<table>
<thead>
<tr>
<th>SPACE</th>
<th>FLOOR FINISH</th>
<th>INTERNAL WALL FINISH</th>
<th>CEILING</th>
<th>EXTERNAL FINISHES</th>
<th>NOTES</th>
</tr>
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<tbody>
<tr>
<td>ENTRANCE LOBBIES</td>
<td>End grain timber block. Timber skirting</td>
<td>Brick facing</td>
<td>Suspended timber ceiling</td>
<td>Brick facing</td>
<td>End grain timber blocks used due to their durability and resistance to wears.</td>
</tr>
<tr>
<td>LECTURE THEATRE</td>
<td>Wood block. Timber skirting.</td>
<td>Brick facing. Acoustical tiles at back of theatre. ( R_1 + R_2 - D = 14 )</td>
<td>Timber reflectors, on 80% of ceiling. Acoustical tiles on remaining 20%.</td>
<td>Brick facing.</td>
<td>Acoustical tiles and on ceiling where ( R_1 + R_2 - D \neq 14 ), ( R_1 \neq R_2 ) reflected sound. ( D = ) Direct Sound</td>
</tr>
<tr>
<td>OFFICES</td>
<td>Wood block Timber skirting.</td>
<td>Brick facing</td>
<td>Timber ceiling</td>
<td>Brick facing.</td>
<td></td>
</tr>
<tr>
<td>TOILETS</td>
<td>Mart glazed Ceramic tiles</td>
<td>Glossy glazed Ceramic tiles dado.</td>
<td>Timber ceiling</td>
<td>Brick facing.</td>
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