

Chapter 4 OUTLINE OF CONSTRUCTION SITES

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4-1 ATC/PHC

The site for this facility is located at a corner of the Salaya Campus of Mahidol University and is on the left side of the campus road just passed through the main gate. The main campus of the university is in Bangkok, but this new built Salay Campus is located in western outskirts of Bangkok, and takes about 1 hour by car at present from the center of Bangkok (approximately 30 km). When the motorway, which is now under construction is completed, the distance will be shortened (approximately 18 km) and the time taken will be reduced to half an hour or so.

The conditions of the site are as follows:

(1) Site

- . Address : MAHIDOL UNIVERSITY
PUTTHAMONTOL ROAD # 4, SALAYA,
NAKORNCHAISRI, NAKORN-PRATON
- . Area :
Approximately 56,900 m² (the whole campus area is about 190 ha.)
- . Transportation:
 - School bus: The primary means of transport at present
 - Pick up car: Few services a day (Thailand-type bus by private bus companies)
 - Railway: Station to the north of the site
In future, it is planned to establish a station in the campus constructing a branch line.
- . Site control: By Mahidol University
- . Location:
The site is located near the campus main entrance as shown on the attached map, and judging from the land usage plan, the school area and PHC area are clearly separated, so it is considered to be a suitable location.

Fig. 4-1-1

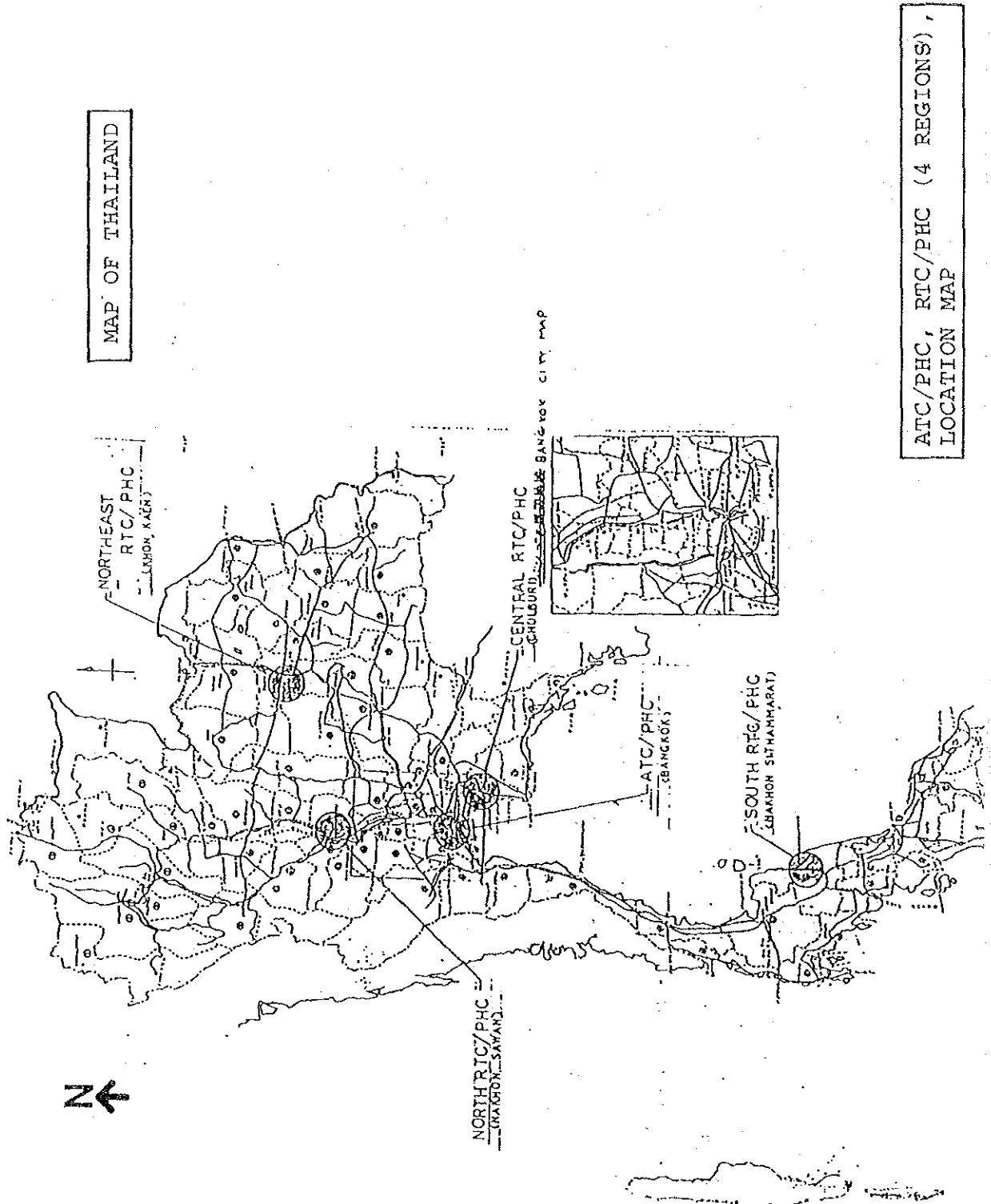


Fig. 4-1-2

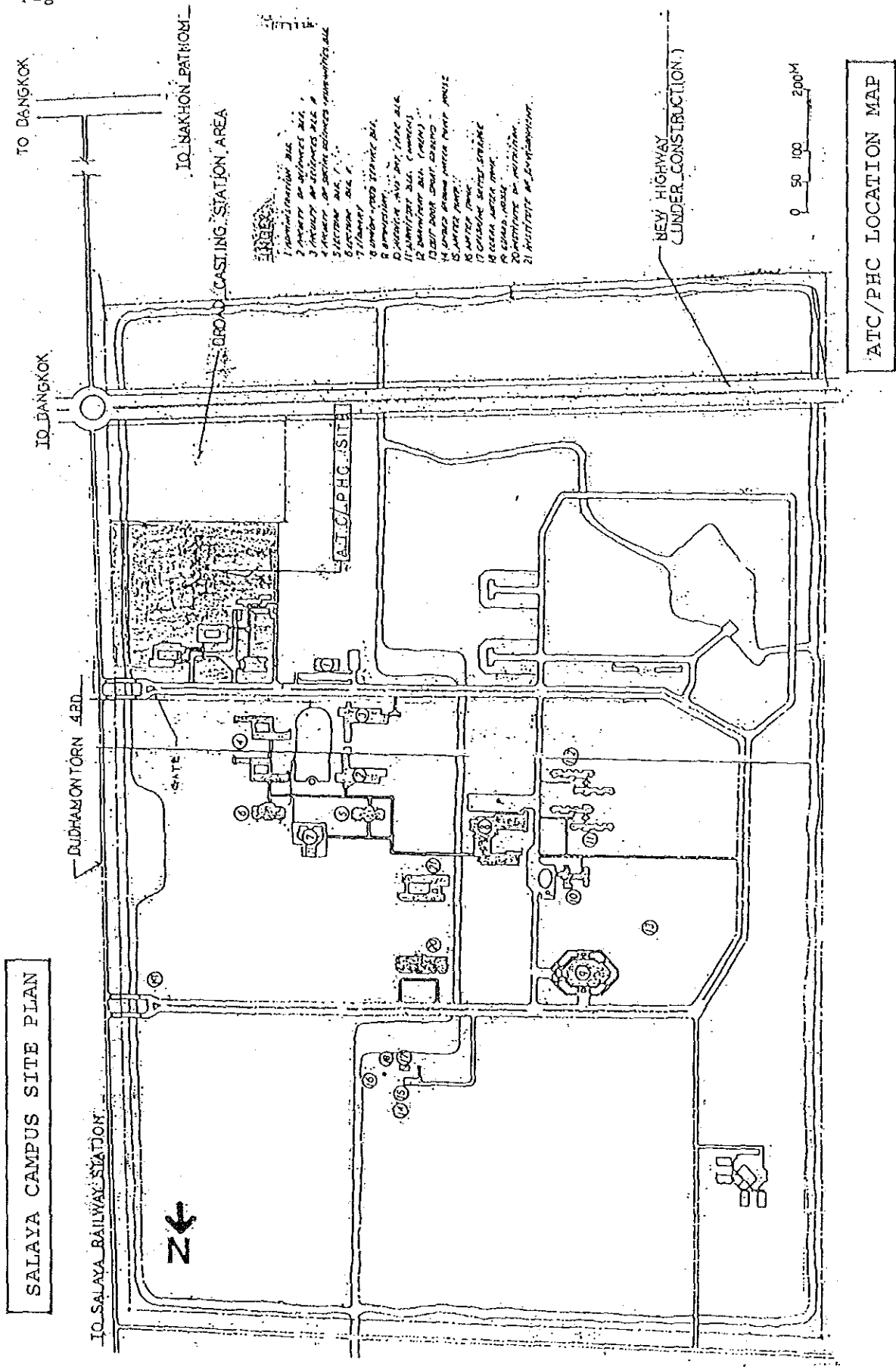
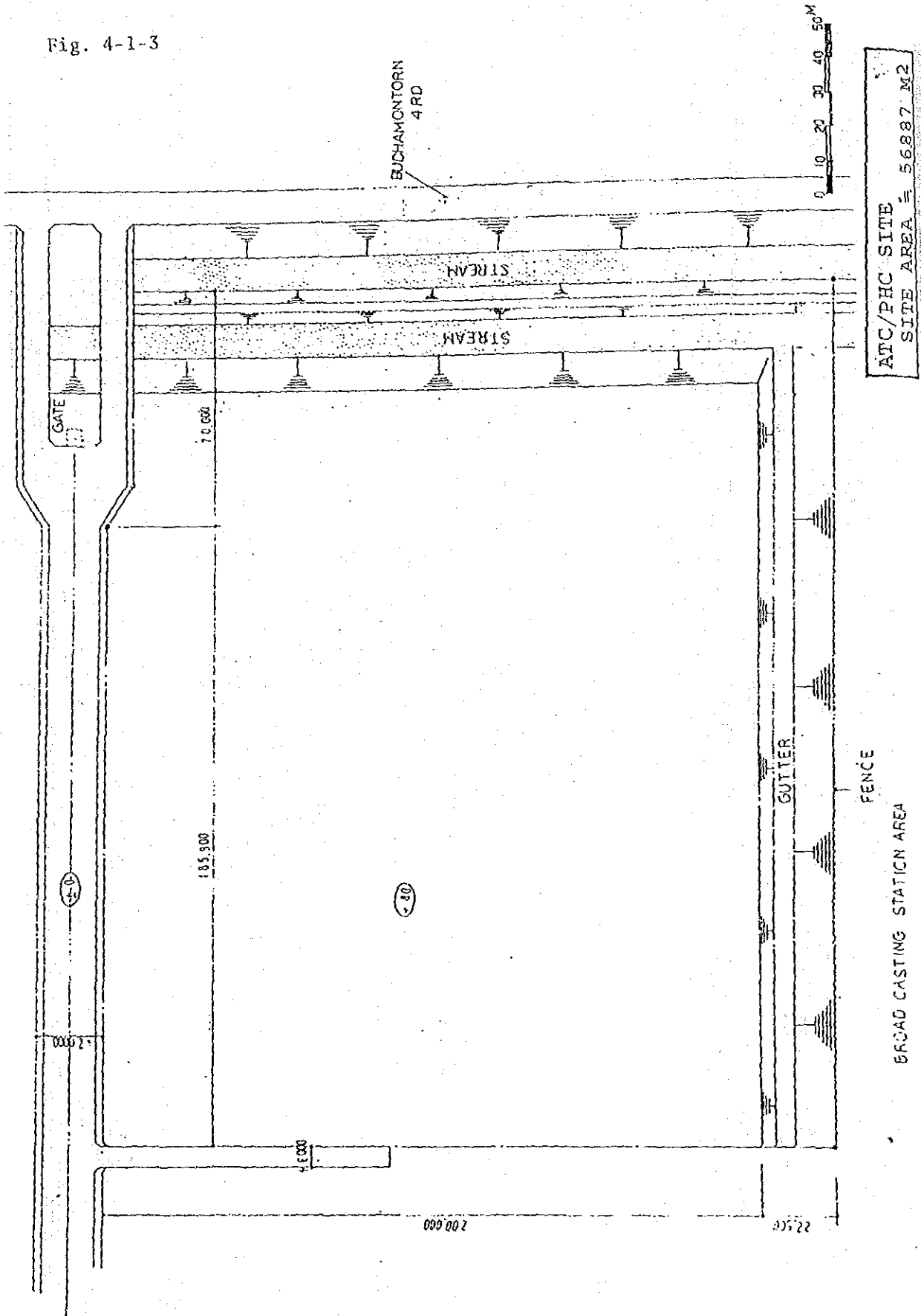


Fig. 4-1-3



(2) Site configuration, soil and environment

. Configuration:

The site is flat, swampy and square-shaped. It is approximately 80 cm lower than the roads in and out of the campus. Filling of at least 1 m is required before construction starts. The site level of the existing campus facilities is about 30 - 50 cm higher than the road.

. Soil:

The soil is fine silt and has little water permeability. When water is introduced, it turns to sludge. From the boring data for the campus facility, the bearing soil level is considered to be at GL-21 m.

. Environment:

Surrounding of the site are wide fields and on the campus, there are rows of lecture buildings and dormitories which accomodates 300 students (see Fig. 4-1-2). A little to the south of the site, a wat named BUDHAMONTHON is under construction, and it is said among local people that after completion many people are expected to come to pray from all over the country.

(3) Situation of the infrastructures

. Water supply:

An existing deep well with a elevated tank supplies enough water to the whole campus facilities.

. Drainage and sewage:

The existing sewage system is not available, thus an independant sewage treatment facility is required.

(rainwater): This is discharged into the drainage channel which runs through the Salaya campus.

. Electricity:

High-tension power supply is available from the overhead cables installed along the campus main road of the north side of the site. The voltage is 22 KV.

• Telephone:

Telephone is scheduled to be available in about six months.
Now it is under construction.

• Gas:

There is no urban gas supply. LPG will be used.

4-2 North-East RTC/PHC

This site is located almost in the center of Khon Kaen city, and is in the campus of the College of Public Health. This is located on the left side of the main gate, and at present the site is used as a football ground.

The conditions of the site are as follows:

(1) Site

• Location:

Refer to the town map and the North-Eastern Region College of Public Health campus map

• Area:

Approximately 5,400 m² (the college campus area is about 4.5 ha.)

• Transportation:

Means of transport in this city are bus and samuro (tricycle).

The major roads in the city are paved.

30 minutes by car from the airport to the site

10 minutes by car from the railway station

10 minutes by car from the bus terminal

• Site control:

The land is owned by the Government.

(2) Site configuration, soil and environment

• Configuration:

The site is used as a football ground now and is flat. The level is average 20 - 30 cm lower than the road in the campus;

Fig. 4-1-4

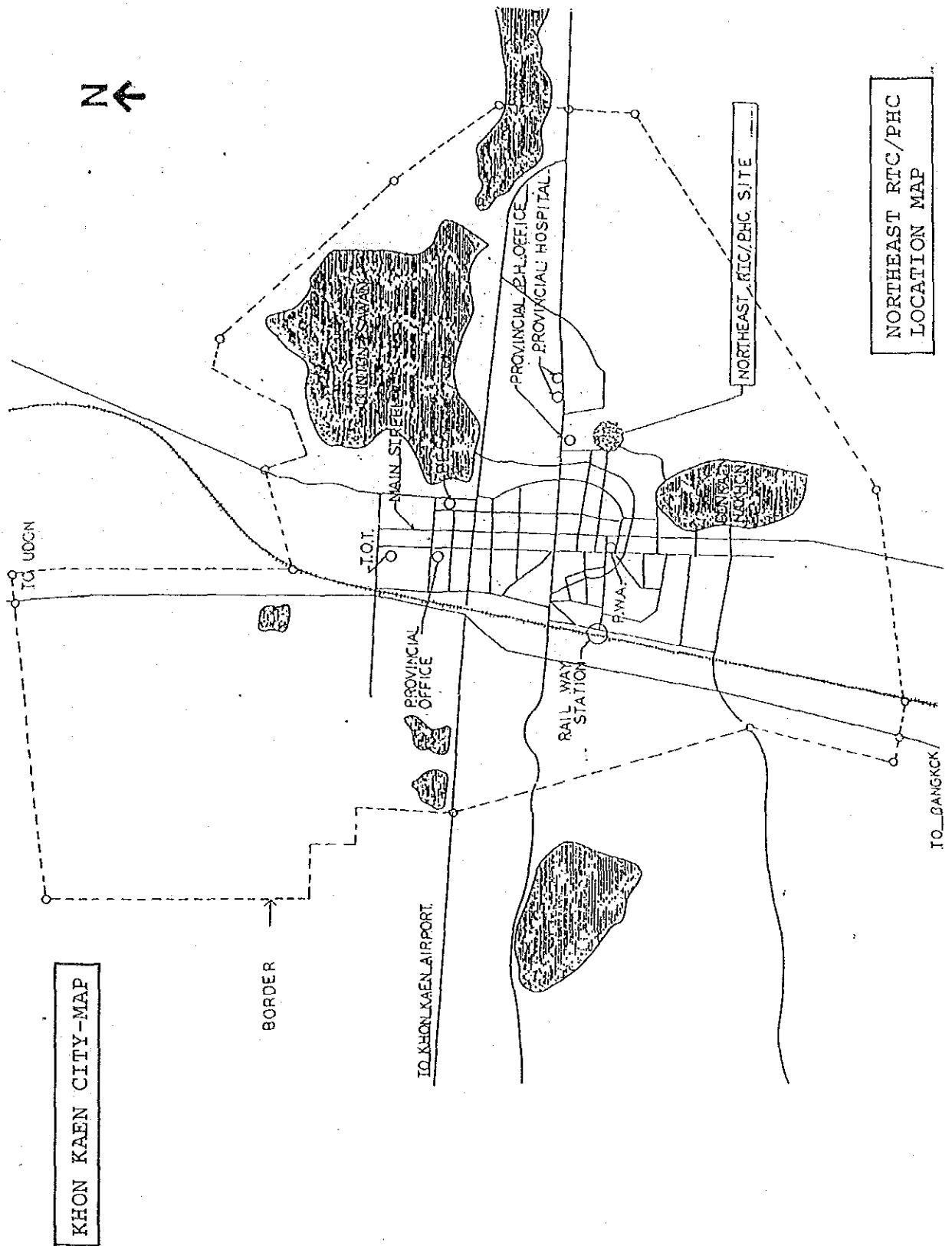


Fig. 4-1-5

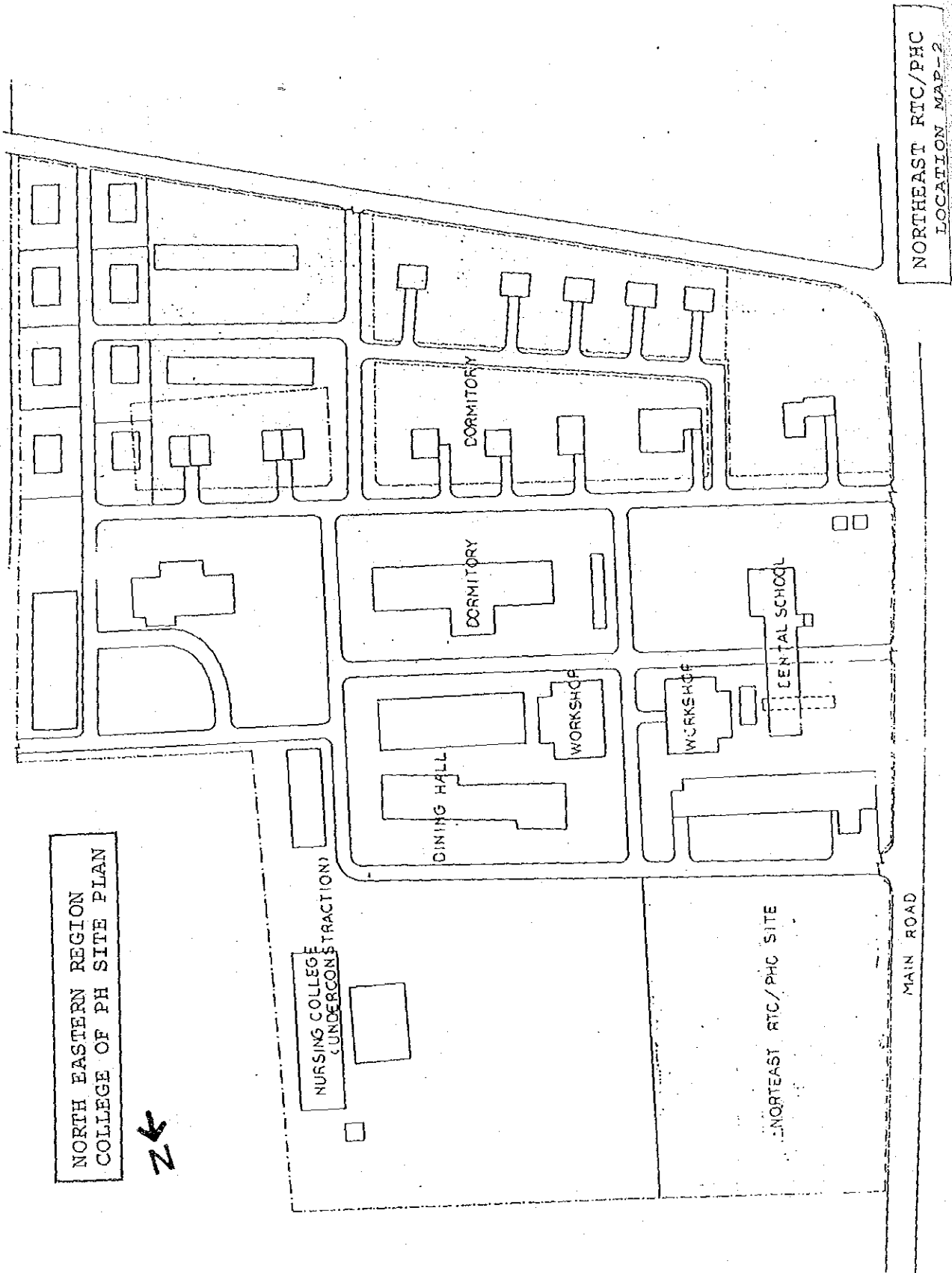
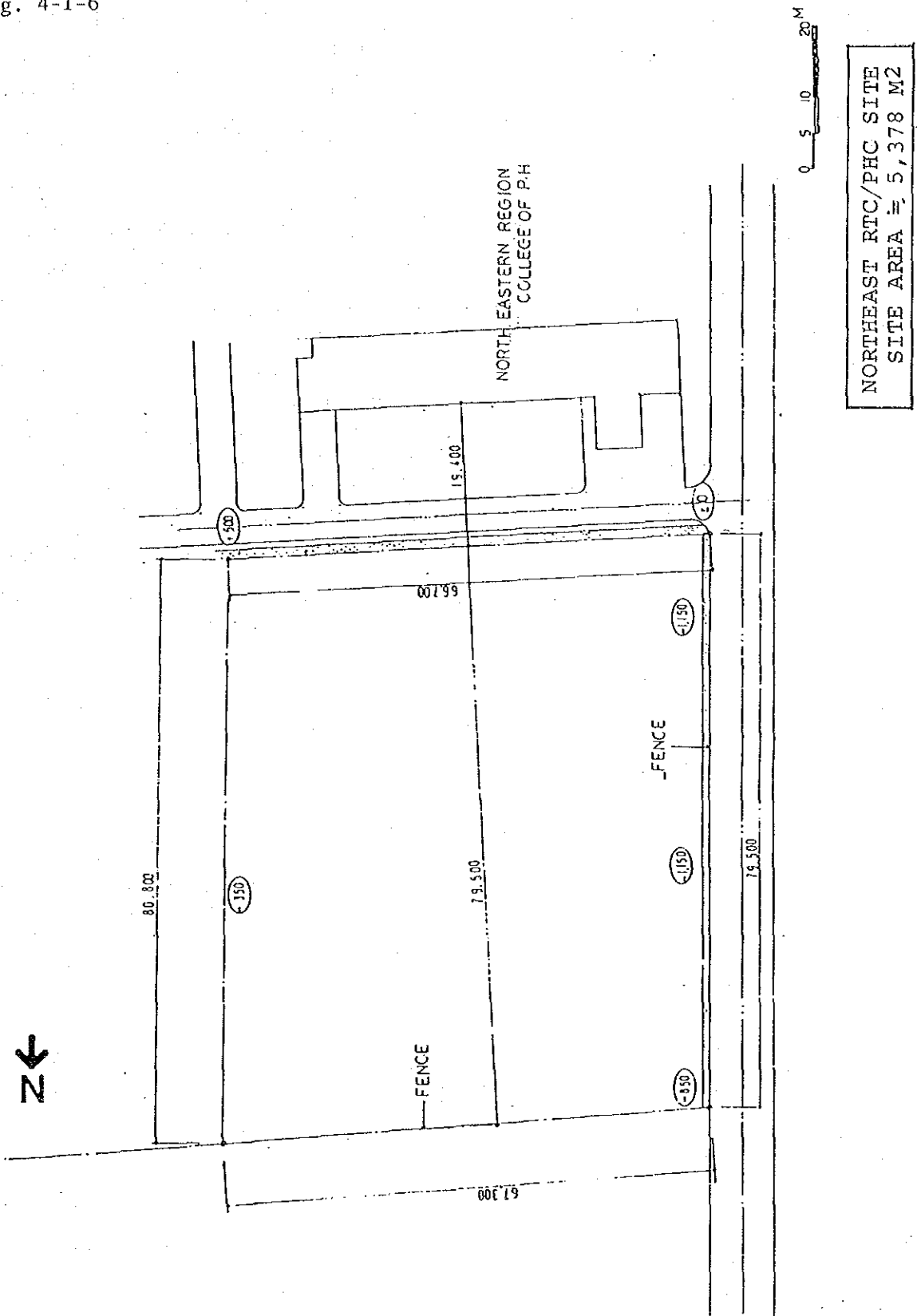


Fig. 4-1-6



however, there is no need for infilling. There is drain pits (1 m in head) used for the whole college at the point where the site borders the access road (approximately 9 m in width) and consideration must be given to maintain it in this project.

. Soil:

The soil is a reddish sandy loam. The existing college buildings (3 and 4 stories, RC) are pile-less foundation, thus as far as low buildings are concerned, the soil has enough bearing capacity.

. Environment:

Near the college there are facilities related to PHC such as the provincial hospital and the provincial Chief Medical Office. In the campus there are the college of public health and the dental hygiene school, and all students are provided with accommodation. The number of students is 250, however, half of them are trained outside the colleges. The staff is usually between 40 and 50.

(3) Situation of the infrastructures

. Water supply

A municipal water supply main pipe is buried in the access road.

. Drainage and sewage:

The public sewage system is not fully equipped, thus an independent sewage treatment facility is required. A ditch which runs along the access road is available for drainage.

. Electricity:

High-tension power supply is available from the overhead cables installed along the access road.

. Telephone:

Telephone lines are installed along the same route of power.

. Gas:

There is no urban gas supply. LPG will be used.

4-3 North RTC/PHC

This site is located in a corner of the premise of the Provincial Chief Medical Office (hereinafter abbreviated as PCMO), which is in Nakhon Sawan city.

The site is on a terrace made by cutting the skirt of a hill. There are also a Public Health Office, a Communicable Disease Office and staff houses in the premise.

The site conditions are as follows:

(1) Site

· Location:

Refer to the town map.

Provincial Health Office Kao-Kard,
Heav Supper Highway Nakhon Sawan, 60,000.

· Area:

Approximately 5,600 m².

· Transportation:

Main transport in the city is by bus. The major roads in the city are paved.

From the railway station to site is approximately 10 km.

From bus station to site is approximately 2 km.

· Site control:

The land is owned by the Government.

· Access to the site:

There are two access roads to the site, one is a paved road (6 m in width) in the premise which lead through the front of the PCMO to a street and the other is an unpaved road of approximately 5 m width. This road is not in use at present, however also lead to the said street. A counterpart had an intention to prefer the latter access.

Fig. 4-1-7

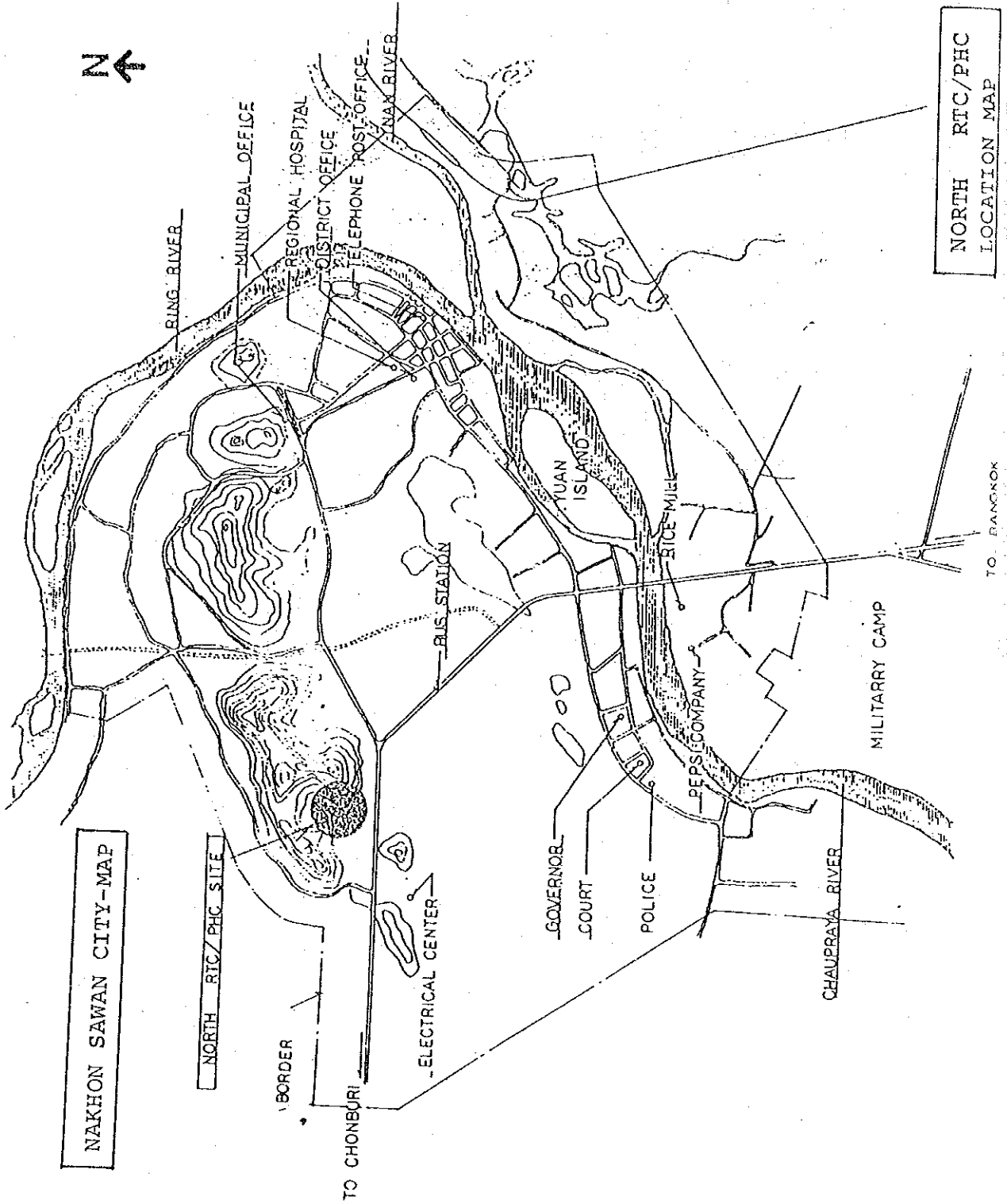
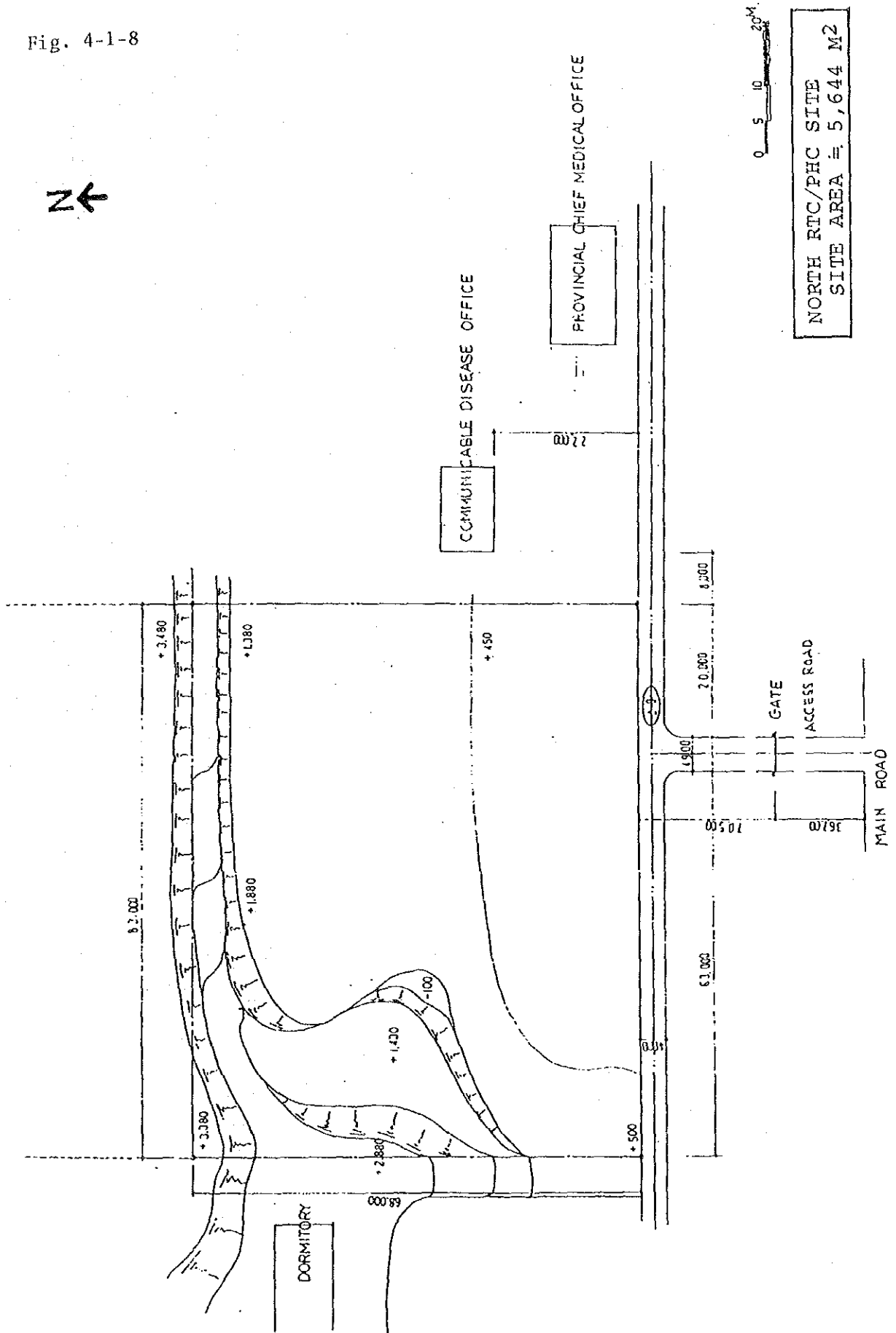


Fig. 4-1-8



(2) Site configuration, soil and environment

. Configuration:

The site is about 10 m higher than the street which lies to the south 100 m away. To the north of the site, it becomes a hill, and there are level differences in site (refer to the site map).

. Soil:

The soil is rock and it has a full load bearing capacity. But there is a difficulty in excavation.

. Environment:

The site is located on a hill, which is north-west of the city. There is some distance from the street, which reduces traffic noise and makes the site quiet.

(3) Situation of the infrastructures

. Water supply:

The water supply system is available in almost everywhere in the city. But the quality of water is poor and cannot be used for drinking. It is expected that in 2 - 3 years, a new filtration plant will be made.

. Sewage:

A public sewage disposal system is not complete, thus a private sewage treatment facility is required.

. Gas:

There is no urban gas supply. LPG will be used.

. Electricity:

High-tension power supply is available from the overhead cables on the street. The voltage is 22KV.

. Telephone:

Installation of telephone lines is possible along the same route as the power cables.

4-4 South RTC/PHC

This site is located in a eastern corner of the Maharaj Hospital premise which is in Nakorn Shithammarat. The second phase of the hospital construction (by Japanese grant aid cooperation) and the construction works of a nursing school (financed by the United States) are under way in the same premise.

The conditions of the site are as follows:

(1) Site:

. Location:

Refer to the Nakorn Shithammarat city map and the Maharaj Hospital premise map.

. Area:

About 18,000 m² (Maharaj Hospital premise is apploximately 41 ha.)

. Transportation:

The major means of transport in the city are buses and taxis.

From the site to the railway station is about 6 km.

The major roads in the city are paved.

. Site control:

The land is owned by the Government.

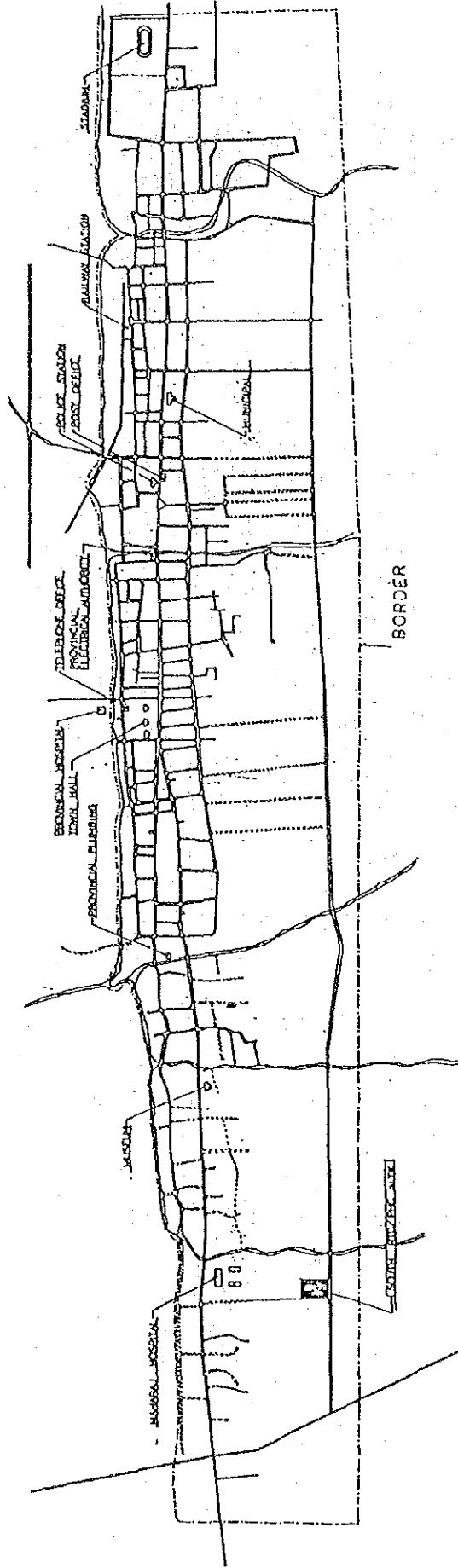
. Access road:

There is an access road (6 m in width) on the premise which lead to the front gate of the hospital and there is a public road as an another access beyond a ditch which borders the eastern side of the site.

The road in front of the hospital is a national road with a width of about 20 m and is surfaced with asphalt. The another public road is also paved by asphalt and the width is 6.5 m. The road on the premise is not yet paved.

Fig. 4-1-9

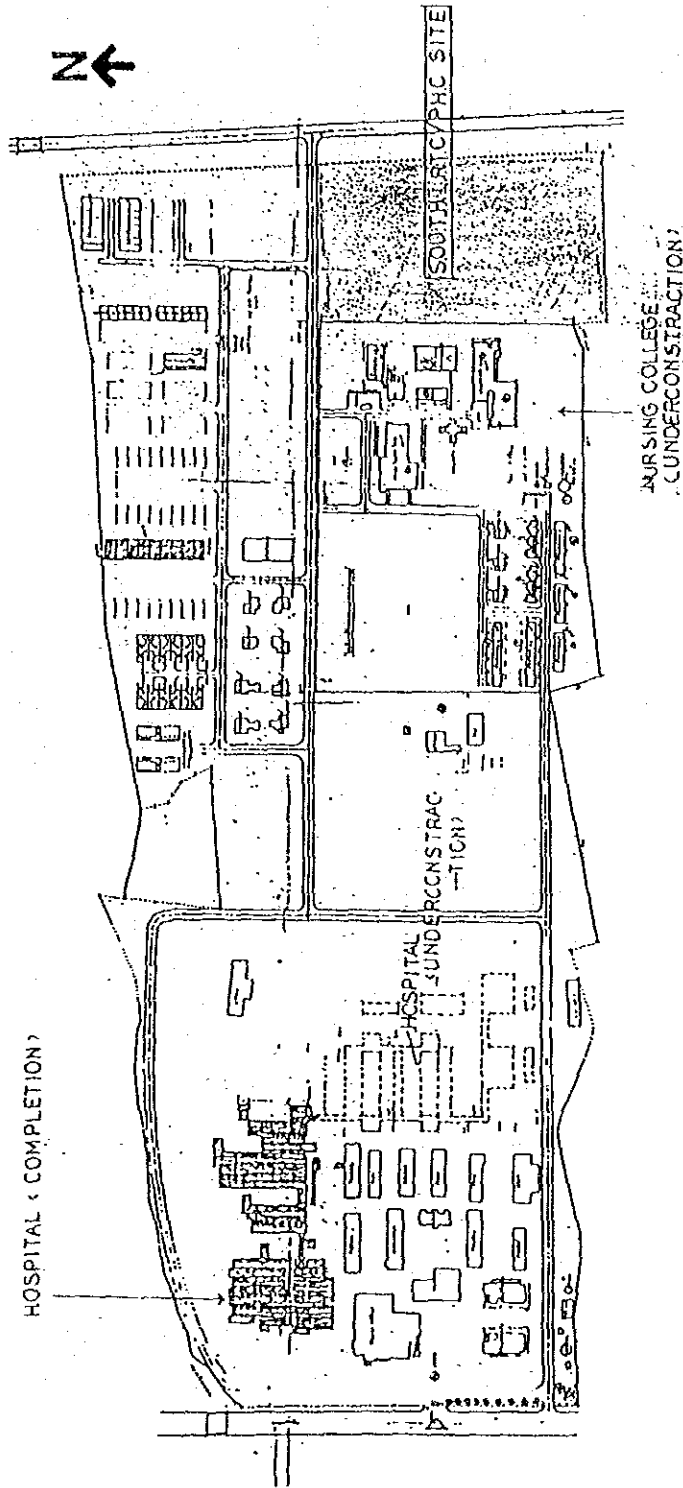
NORTH RTC/PHC LOCATION MAP



SOUTH RTC/PHC
LOCATION MAP-1

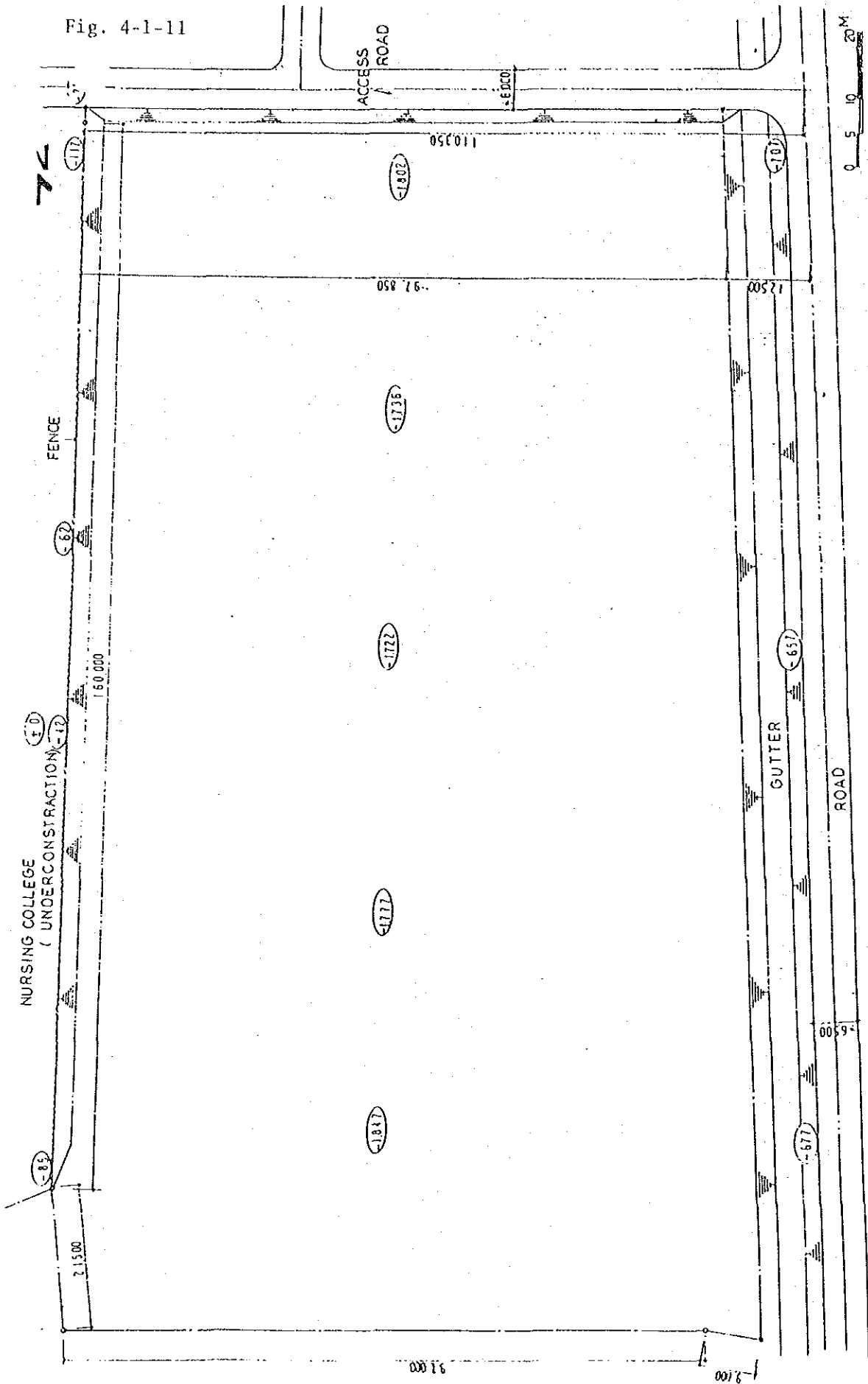
Fig. 4-1-10

MAHARAJ HOSPITAL SITE PLAN



SOUTH RTC/PHC LOCATION MAP-2

Fig. 4-1-11



(2) Site configuration, soil and environment

. Configuration:

The site is a flat paddy field and is a square shape. This is nearly 1 m lower than the front road on the premise and about 1.8 m lower than the nearby nursing school ground level.

Filling is required beforehand, however, the site is so wide that whole site is not required to be filled.

. Soil:

Judging from the boring data of the hospital site, pile foundation is necessary. The bearing soil level is around 9 m below the existing ground level.

. Environment:

The Maharaj Hospital possesses 501 beds at present, but will increase to 1,000 beds when the buildings under construction is completed. (The completion date is March 1983.)

Outpatients totalled approximately 210,000 in 1981. Regarding the nursing school, a dormitory accomodating 230 students is under construction (the completion being expected by August 1982).

(3) Situation of the infrastructures

. Water supply:

There is a water supply tower for the whole hospital, thus the supply is available from this facility.

. Drainage and sewage;

The public sewage system is not complete, thus a private sewage treatment facility is required. As for drainage, it is possible to discharge into a nearby river.

. Electricity:

High-tension power lines run up to a point of approximately 200 m from the site, thus by extending them, power will be supplied.

. Telephone:

The existing lines can be extended to the site.

. Gas:

There is no urban gas supply. LPG will be used.

4-5 Central RTC/PHC

This site is located in a lot in an area which has been developed by a land reclamation project in the southern suburbs of Cholburi city. The developed area has been levelled and basic preparation for infrastructure has been done as well. Next to the site, there is a Communicable Disease Control Unit (hereinafter abbreviated to CDCU). The site is about 6 km away from the PCMO which is in the central area of Cholburi city.

The site conditions are as follows:

(1) Site

. Location:

Refer to the newly developed area map.

. Site area:

Approximately 11,400 m²

. Transportation:

Means of transport in the city are buses and taxis.

Main roads in the city are paved.

. Site control:

The land is owned by the Government.

(2) Site configuration, soil and environment

. Configuration:

As reclamation has not been completed, water accumulates, creating a large pool on the site (depth about 1.5 m). The access road to the site is lower than the local main road and is not paved. About 2 m filling is required.

Fig. 4-1-12

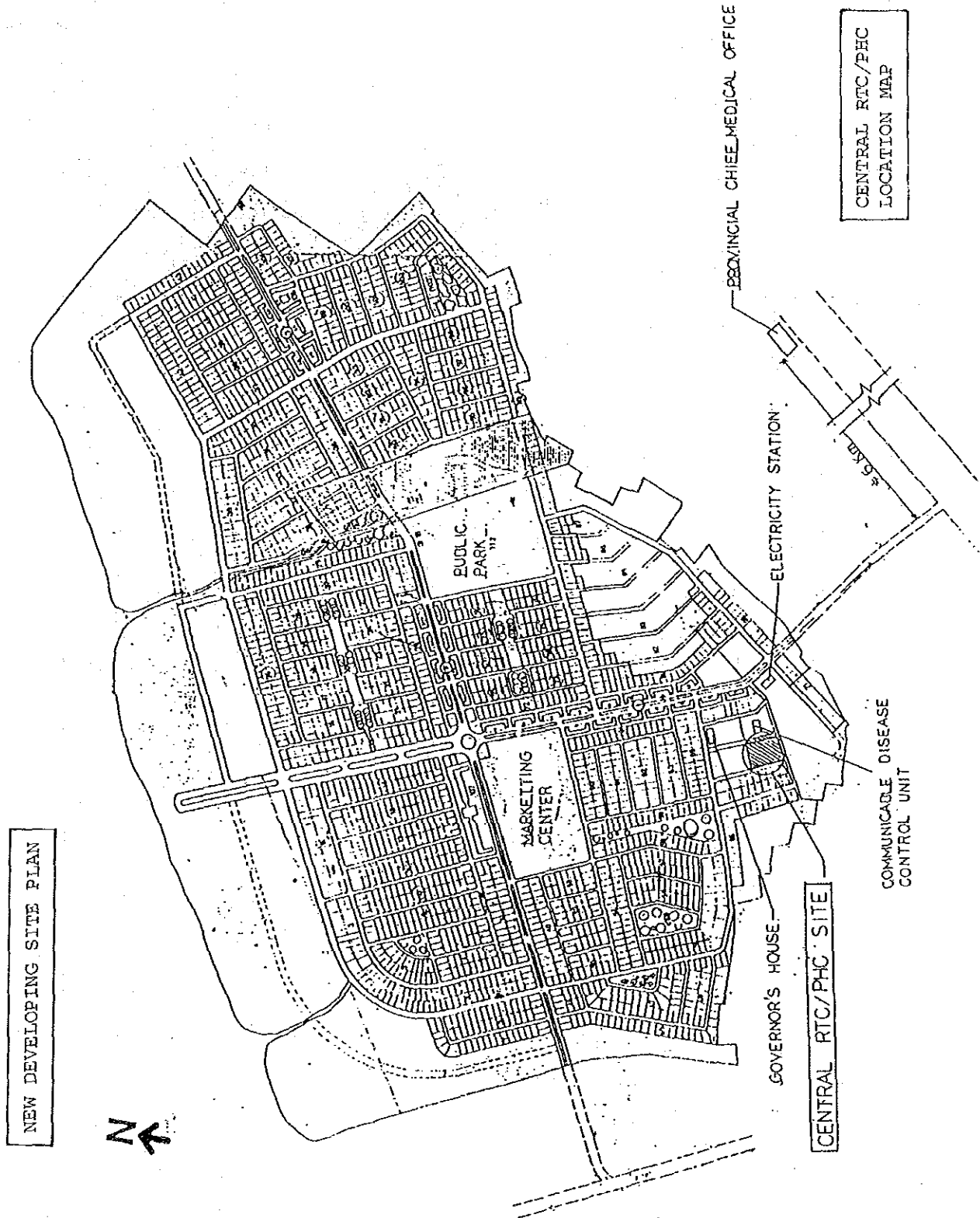
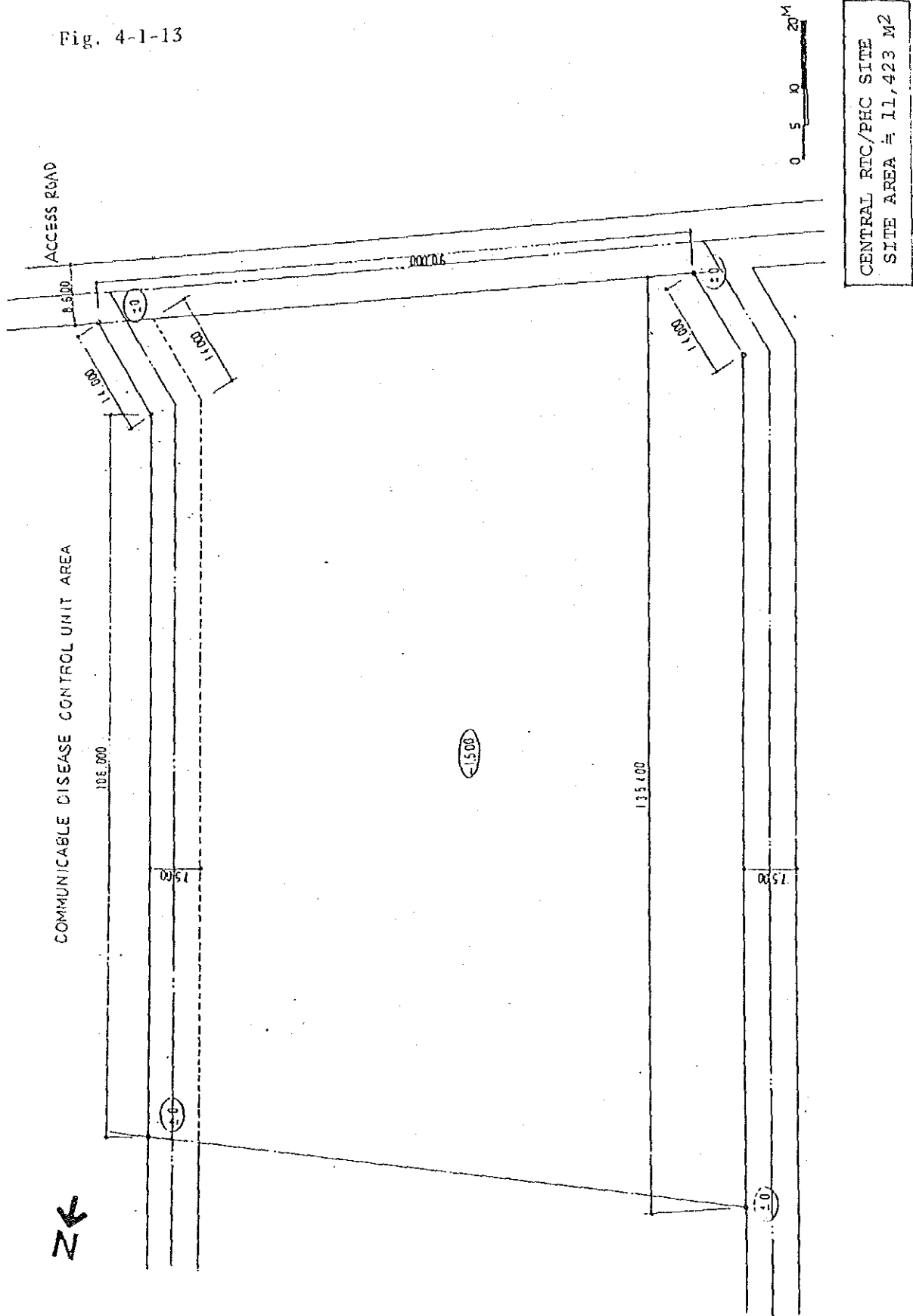


Fig. 4-1-13



ZK

. Soil:

According to the boring data of the buildings of a public power company next to the site, the bearing soil level is 6 m below the existing access road level.

. Environment:

The area is vast, but there is no facility nor residence other than the CDCU, power company and the other governmental residences. According to the development plan of this area this site is about 1 km away from the main road (national road to the south of the area) and is considered to be suitable for a quiet residential area.

(3) Situation of the infrastructures

. Electricity and water supplies in the developed area have been well provided in connection with the reclamation project, and they are also almost completed in the nearby area of the site.

. Water supply:

Water is supplied from the main pipe buried in the access road.

. Drainage and sewage:

The public sewage system is not available, so a private sewage treatment facility is required.

. Electricity:

Power is supplied to the site by overhead cables from the high-tension lines which run above the access road.

The voltage is 22 KV.

. Telephone:

Telephone lines run along the same route as the power lines.

. Gas:

There is no urban supply. LPG will be used.

Chapter 5 BASIC DESIGN

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5-1 Policies for Design

- 1) Following items be considered being important for design
 - (1) To reduce the energy and maintenance costs as possible
 - (2) To make construction costs for both Japan and Thailand as small as possible
 - (3) To incorporate security measures
 - (4) Giving consideration to weather conditions: Enough ventilation and heat isolation effects should be secured.
- 2) Next items be given consideration
 - (1) To avoid functional overlapping with other related facilities which will result in under utilization and at the same time, bear in mind multiple effects for utility of facilities by their appropriate layout
 - (2) Rooms and/or their groups, as well as equipment be laid out and planned in a manner which will secure flexible usages in order to raise efficiency
 - (3) Architectural design should be reflected by the traditional design in order to give psychological comfort to the users. This point came out from the fact that PHC is the project mainly connected to the villages.
 - (4) To make use of rain water as resources
- 3) Items to be noted
 - (1) To check the necessary construction period
 - (2) To pay attention to the actual maintenance conditions of the equipment and its supplemental materials supply
 - (3) To reflect the life style and customs of Thai people on design

5-2 Construction Plan

5-2-1 Outline of Plan

Facilities to be supplied under this grant aid cooperation are as follows:

ATC/PHC

Buildings and their incidental facilities	(floor area, m ²)
main building; 2-storeied	2,088
training building; 2-storeied, partly 1-storeied	1,694
auditorium; 1-storeied	906
dormitory; 3-storeied, partly 1-storeied	1,743
others-garage, connecting corridors; 1-storeied	545
Total	6,976

RTC/PHC

Building and their incidental facilities	(floor area, m ²)
training building including a control block and garage; 2-storeied, partly 1-storeied	
dormitory including a cafeteria block; 2-storeied, partly 1-storeied	
connecting corridors; 1-storeied	
Total	2,004
with 4 RTC/PHCs	8,016

5-2-2 Block Plan

(1) ATC/PHC

ATC will be built within the huge Saraya Campus which covers the area of 190 ha. The site prepared for this facilities is 6 ha. Therefore, this wide environment is the first factor to be looked at in making out a block plan of the buildings. In such consequence, building blocks were finalized to be a main building, a training building, an auditorium, a dormitory and a garage. Every building will be linked by connecting corridors. The decision was made based on following points and reasons.

- 1) Even though the area is wide, it should meet with a reasonable construction cost. Therefore, as a principal policy, the number of blocks should be reduced to the minimum necessity.
- 2) However, as for auditorium, this should be a independent building, because there is no use of adjoining it to the other blocks, judging from architectural planning as well as construction cost. At the same time, considering from the fact that auditorium is usually used by many and unspecified persons, if connected to the other block it might become a nuisance to the people in the rooms of the connected buildings.
- 3) There are two reasons as for a main block and a training block are separated. Offices will be gathered in the main block. So a regular beam span structure, of which span will be suitable for the offices, can be adopted for this block, on the other hand rooms in the training block require irregular beam span with higher ceiling. Therefore, it is economical for the main block to be independent. Also because, many and unspecified persons will use the training block, so the atmosphere of the office area whould be disturbed, if not be separated.
- 4) There are two groups in the training block. One is the group of classrooms, seminar rooms which will be used only for periodical training courses. The other is the group of exhibition room, A/V training room and lecture/conference room which will be used by many and unspecified persons. So, if they were put in one

building, there arises the possibility that the periodical training course group might be disturbed by the other. But this possibility is avoided by putting them to different floors. So this two groups can be planned in one block. And by so doing, the utility of rooms and equipment can be made high.

The above are the main points taken into consideration when the block plan is made. In addition, the steps shown in the Fig. 5-2-1 in the next page were taken in the course of the consultation made between the both counterparts and in the stage of basic design.

By the result of the process, out-door space was cut down and the construction cost was reduced.

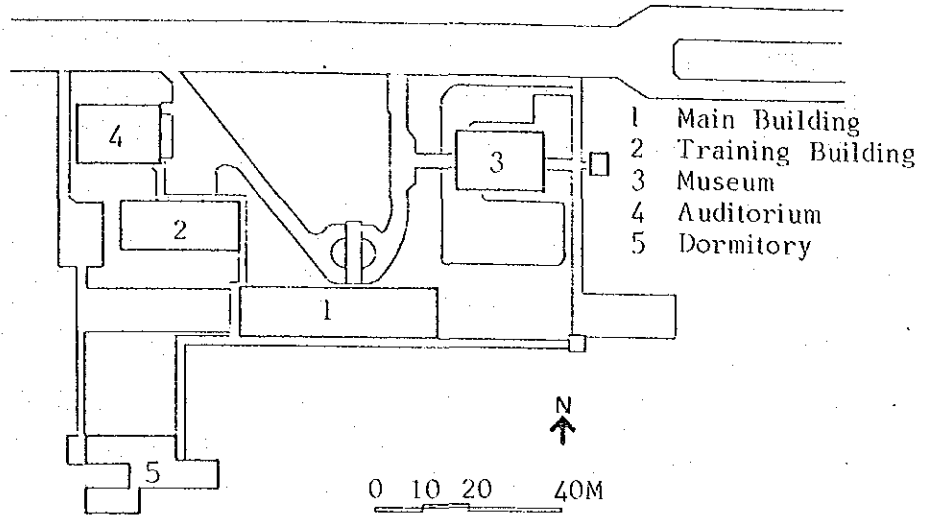
From the view of building layout, it is appropriate to arrange the auditorium and the training building at both sides of the main building. It is also appropriate to locate the dormitory at the southwest corner which is not disturbed.

(2) RTC/PHCs

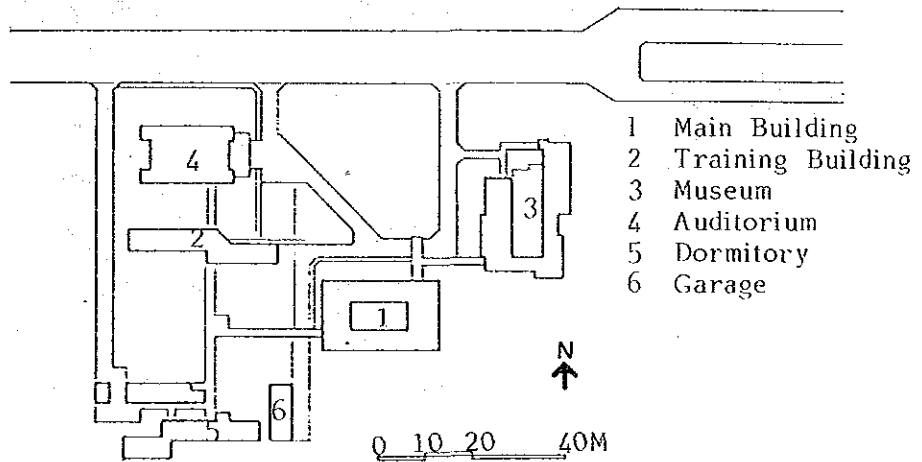
A RTC consist of a main building, a dormitory, a dining room and a garage. Each is linked together by connecting corridors. Rooms for training, research and management, etc. are designed in the main building. Dormitory is composed of bedrooms and its service rooms. Dining room should be in the first floor and requires higher ceiling and relatively long span of beams, so it can not be unified with the dormitory. As a result, it should be an independent building.

Fig. 5- 2- 1

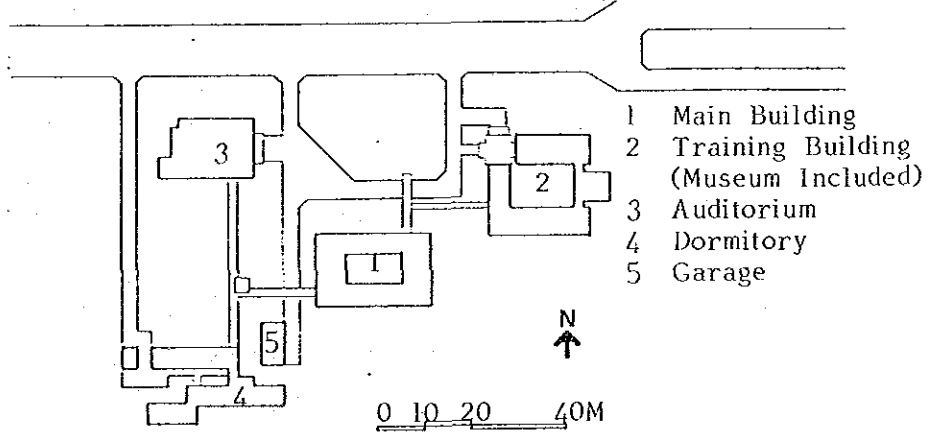
First Plan



Second Plan



Final Plan



The garage is usually planned as an independent building, however, it can be put in the main building, in case the planning requirement allows.

The shading from the sun is the most important factor of the building layout. The buildings should not be exposed to the west. So they are arranged as close to east to west axis as possible.

RTCs are planned to be constructed in 4 different sites. Naturally, each site has its own conditions that unables to apply a design to all. Giving consideration to respective site conditions, each RTC block plan was made as follows.

1) Northeast RTC/PHC

The site has enough length from north to south, but in order to save a space for soccer ground, east to west width must be kept as small as possible. In such consequence, the main building and the dormitory will be arranged in parallel to each other.

The site is in the college campus, but the one side of the site faces to a road. There was an opinion that it is convenient to have a direct access to the RTC buildings from this road.

These two points became the decision-making factors to arrange the buildings connected each other by corridors so that they forms between them a quadrangle (courtyard). Half of the space of the courtyard will be used for demonstration and the rest will serve as a dormitory garden. The control section and the dining room was made one-storey and was palced between the main building and the dormitory to bring about better atmosphere in the whole facilities.

2) North, South, Central RTC/PHCs

Block plans for three RTCs principally take almost the same plan, though there are slight differences among each other. The spaces are wide that those buildings do not have to take a quadrangle shape to secure compactness and the layout can be more free.

Also it is common to all three sites that the entering to the site is made from the southeast direction. In this respect, the main enterance should naturally face against this direction. Owing to these common conditions, same pattern of block plan has been taken up.

The main building is planned at the front and dormitory at the back, then by one connecting corridor, both buildings are linked. In between, the dining room is located. Then there arises a need to have a space which serves as a core of the whole facilities. In order to meet this requirement, a hall which is open to outdoor has been installed near the entrance.

In addition, North RTC/PHC site is situated in a slope where mountain skirt has been cut opened. Rocks expose from the ground. It will cost too much to fill and level the ground flat. Therefore, the buildings have to be built on the slope, and the block plan have to be a little different from the other RTC.

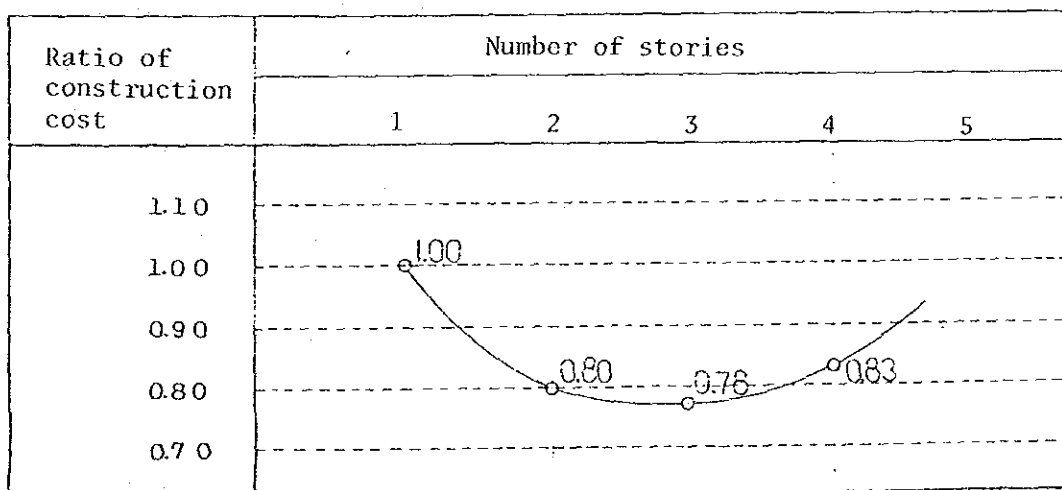
5-2-3 Building Plan

(1) Analysis on Number of Stories of the Building

All the sites have enough space, and because those are not located in the crowded city area, number of stories can be decided only from the viewpoints of economy, function and construction period.

Assuming a structure of about 1,000 m² floor area with simple and economical beam span, relation between number of stories and construction cost was calculated. The result is shown in the next graph. This is a ratio when one story building cost is considered as 1.00.

Fig. 5-2-2 Relation between Number of Stories and the Construction Cost

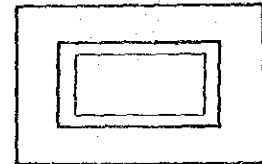
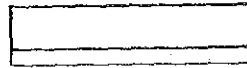


The figures given above were calculated under the assumption when pier foundation was used, but there will be not much difference even if piers are not used. The main factors of the difference of the cost are structure, area of roofs and additional floor area which is increased according to the number of stories.

As a result, it is most desirable to make a portion of one storied building as small as possible from the economical point of view. Even though the three storied building is the most economically advantageous, there remains a problem of construction period. Furthermore, difference in construction cost from 2 storied to 3 storied buildings is only about 2%. Considering the fact that participants to RTC trainings are mainly from villages, it might be preferred to have 2 storied building rather than a higher one.

(2) On types of building plan

Generally, there are three types of building plans as follows.



(a) center corridor type (b) one side corridor type (c) courtyard type

Type (a) can be made by a cheapest construction cost, and if air conditioning (AC) is installed throughout the building, energy cost would certainly be the lowest among those three types. However, AC is essential to the (a) type, if AC is not installed, the environmental condition of the rooms is worst. While this time overall AC system can not be afforded. Then, regarding its bad dwelling condition as well as from the point that lighting becomes necessary all day long which makes the energy cost higher, it is preferable to adopt (b) or (c) types. Corridors should be open-corridors in order to secure better ventilation and lighting effects.

(3) Plan of ATC/PHC

1) Main building

Number of stories is made two. Because 3 storied building is rather

difficult to be planned from the construction period and from a fear that it might increase the construction cost if pushed to make it in the period. As for plan, it is recommendable to adopt courtyard type. By a one side corridor type, inner-path becomes too long and it is not very functional. Rooms allocated are various staff rooms and are mainly used for clerical works and conferences. So pillar arrangements were made regular. Each room has been put to a position where functionally be the most suitable. Office rooms and conference rooms are arranged in the prospect that the number of employees would increase in the future, designing them flexible, so that it makes possible to supply spaces in whatever way as desired in the future. Furthermore, because A/V production studio needs higher ceiling, there is no other choice but to arrange it in the second floor.

2) Training building

Rooms to be arranged in this building are classrooms and seminar rooms for periodical trainings, A/V training room, lecture/conference room, PHC exhibition room and its attached work shop and store room and small rooms supporting the above major rooms. Rooms where many visitors are expected are accommodated in this building.

Groups of the periodical trainings should not be disturbed by the others, so the rooms are arranged in the second floor.

PHC exhibition room and its attached room should be, from their function, placed in the first floor with higher ceiling. It is disadvantageous to make an upper floor on them because of the restriction in the construction period. Since the space of exhibition is not enough, it should take into account of an outdoor space for exhibition purpose and a space for a future extension.

So far is the points necessary in planning the training block. As for the building plan, modified combination of one side corridor and courtyard types will be adopted.

3) Auditorium

This facility is used as a lecture hall for many short-term training and also is used as a large assembly/conference room. Number of seats is 400. At least a depth of 6 meters is necessary for the stage to provide seats for panelists. Windows are put at both sides of the walls for reducing the energy cost. When used for ordinary lectures or conferences, lighting and ventilation are provided through these windows. However, when A/V aids are employed, then the windows are covered by curtain, and air conditioning is supplied. Principally, it is desirable to have a natural ventilation effect as much as possible. Therefore, it should become the subject at working design phase to devise an architectural technic in window design which enables the windows available when A/V aids are used.

4) Dormitory

Bedrooms require not so high ceilings as offices. Arrangement of the rooms are the repetition of the same room plan which makes the construction very rapid. These enable to complete a building of 3 stories which is the lowest in cost by the designated construction period. The reason why the building is made zigzagged is to avoid monotony and to give a proper amount of change to its environment comfortable to live in. Service area is purposely separated from the bedroom wing and planned to be one storied independent building. This is meant to create variety in the dormitory atmosphere.

(4) RTC/PHC Plan

The main building and the dormitory are two stories. This is because the floor area of both buildings are relatively small, so, if those are built in 3 stories, area necessary for toilets and stairways becomes too large, resulting in raising the overall construction cost almost as high as a 2-storied building. Then if the cost is the same, 2-storied building should be chosen as it is certainly more functional and comfortable than 3 stories for RTC participants who comes from the country side.

Type of the buildings is the one side corridor type for the both main building and dormitory. In the main building, quiet rooms on the second floor are provided as lecture rooms, and on the first floor the demonstration room having relevance to the yard for practical training is located. The controller's office and the garage are arranged near the entrance. Toilets should be located at the end of the building in the case of RTC. The rest are located properly within the framework of the main building considering the function of each room.

Dormitory consist of bedrooms for six persons and for two persons, toilets and laundry. The bedrooms for two persons are necessary for the participants in relatively high social standings. In this connection, the room space per person should be wider than that of a room for six persons. Another important factor is that because all the participants are full-fledged members of society, the dormitory should be comparatively higher in grade than the dormitories for college students. In this plan, floor area per person is 9 m^2 for the twin rooms and 7.5 m^2 for the rooms for six persons. Since there is no way of knowing the ratio of men to women, it is not a good idea to divide the dormitory into two wings from the beginning, because, if divided utilization becomes low. In this plan, first floor and second floor have different capacity. Therefore, according to the percentage of men and women they can be accommodated properly in the different floors. This system will save and raise the utilization. However, toilets have to be prepared for both sexes in each floor.

5-2-4 Construction methods and structural design

The building structures, with some exception, are as follows:

Foundation:	Pile foundations;		
	ATC/PHC	Pile length	21 m
	South RTC/PHC	"	8 m
	Central RTC/PHC	"	5 m
	Footing foundations;		
	North-East RTC/PHC		
	North RTC/PHC		
Pillars & beams:	Reinforced concrete		
Floors:	Same as above		
Roof trusses:	Steel trusses.		
Roofs:	Enameled cement roof tile.		
External walls:	brick wall, mortar faced.		
Internal walls:	brick wall, mortar faced, or board wall on wooden frame.		
Ceilings:	acoustic ceiling board or gypsum board under wooden frame, or painted concrete slab finish.		

The main factors controlling the choice of structures are: (a) local circumstances of construction, (b) construction period, (c) cost, and (d) maintenance after completion.

As a result of local surveys and the study of various data, it was decided that local materials and methods should be employed. Generally, the buildings are to be constructed using a rigid framework method of reinforced concrete, with steel roof trusses.

The reasons for choosing this method in relation to the above-mentioned factors are given as follows:

(a), (b), (c)... The buildings must meet public safety requirements. However, as earthquakes and typhoons do not occur in this area, it is perfectly possible to satisfy these requirements using local construction methods. With regard to the construction materials, these are easily obtained locally, and by applying the construction methods practised

locally, cost and construction period problems are minimized.

(d)... Steel frame materials are used. However, by applying rust prevention treatments, the maintenance after completion is simplified.

and exert their

With regard to the structural design, local standards (note 1) are to be applied to loads and material strengths, in addition, if necessary, Japanese standards, i.e, the Building Standard Act and the Standards of Architectural Institute of Japan are to be applied. Regarding structural calculations, Standards of the said Institute are to be applied.

As already mentioned, there is almost no need to consider live loads under an earthquake or a typhoon, so it is very important to carry out a full cost analysis on the basis of dead loads. However, strong wind blows at Salaya campus. So this strong wind should be taken into account for the strength of the roof construction.

With regard to foundations, the methods are chosen according to the data shown in the Chapter 4.

Note 1): Control of the Construction of Buildings 1979.
(Law of the Bangkok Metropolis).

5-2-5 Others

The followings are points of building planning:

(1) Sun shading

1) Shading on the north and south side

In order to reduce the need for sun shades and blinds, the buildings are arranged as much as possible along an east-west axis so that windows can face either the south or the north. To avoid the radiation of the sun, there are two ways, one is shading by horizontal louvres or eaves, and the other is vertical shading by vertical louvres. After the various case studies on the shading of the south and north side, it was concluded that using only horizontal shadings is most practical, for the following reasons.

- . Horizontal shading is required in any case, the combined use with vertical louvres is not economical.
- . Vertical louvres sometimes impede winds depending on their directions.
- . Vertical louvres reflects radiant heat into areas where it will be felt by people in the room.

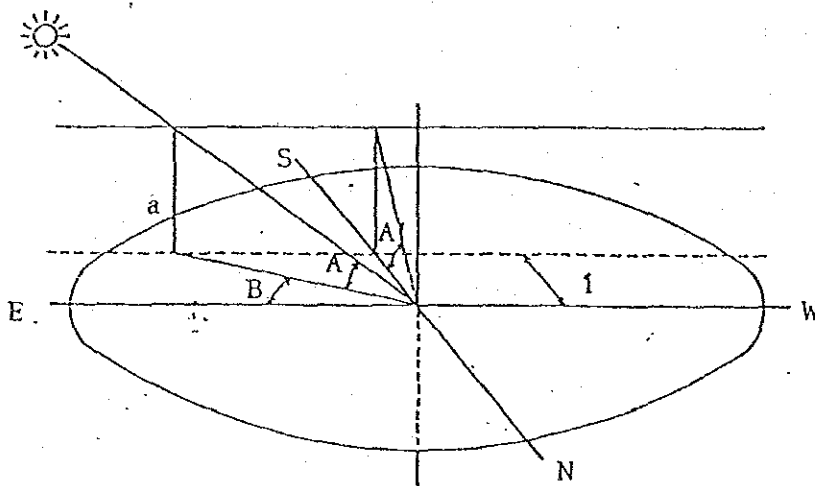
With regard to this choice, a counterpart of Thailand expressed a dislike for vertical louvres. This opinion is understood to be based on experiences and the opinion has been proved to be reasonable as a result of the study on the matter. In the working design phase, careful study for secondary radiant heat which is emitted from heated hot louvers is necessary. In many cases of local buildings it was seen that this secondary radiant heat may be a problem.

The shading range is designed so that the windows and open corridors facing the south and the north are covered from 8 a.m. to 4 p.m. at both winter and summer solstices. If shading is desired beyond this range, costs will increase rapidly from that point and with respect to cost effectiveness this range was deemed appropriate. Followings are the values for design of eaves and horizontal louvres prepared in accordance with the planning standard mentioned-above.

With regard to the open corridors, if the above mentioned standard is strictly applied to them, in some places too much light may have happened to be lost. In such cases, it is necessary to shorten the shading range and to be obliged to accept some direct sunshine.

Fig. 5-2-3 Values for Design of Eaves and Horizontal Louvers

	LAT. N.	
KHON KAEN	16°26'	16°
NAKORN SAWAN	15°48'	
BANGKOK	13°44'	14°
CHOLBURI	13°22'	
NAKORN SITHAMMARAT	8°28'	8°



A: HEIGHT OF SUN

B: DIRECTION OF SUN

$$a = \frac{\tan A}{\sin B}$$

$$= \tan A'$$

$$A' = \arctan a$$

		A	B	a	A'	
					NORTH	SOUTH
LAT. 16° N.	KHON KAEN THE SUMMER SOLSTICE	34°	17°	2.29	66°	
	NAKORN SAWAN THE WINTER SOLSTICE	20°	33°	0.66		33°
LAT. 14° N.	BANGKOK S.S.	33°	20°	1.90	62°	
	CHOLBURI W.S.	22°	31°	0.78		38°
LAT. 8° N.	NAKORN SITHAMMARAT S.S.	30°	23°	1.48	56°	
	W.S.	24°	31°	0.87		41°

2) Shading on the east and west sides

For the windows facing the east or the west, horizontal or vertical louvres have only a limited effect when the sun is low in the sky. Therefore other methods must be used in addition.

When the window is on the ground floor, the most efficient method is by trees planted in appropriate places and this can be employed in addition to eaves and interior blinds.

The rooms on the first floor second floor in Japanese way of expression which face these directions are some rooms in the ATC/RTC main buildings, and these require air conditioning. It is known that, where air conditioning is used, the overall energy costs are minimised by reducing heat loss even if this means relying on full scale artificial lighting. Therefore, these rooms are designed to have a minimum window area, and are fitted with interior blinds, and heat insulating materials are applied to the wall. Of course, eaves or vertical louvres, as long as they are effective, are fitted.

(2) Ceiling height

The ceiling heights, of the main rooms are given below. Because of the difference in climatic conditions, the ceilings are designed to be 10 - 20% higher than those normally provided by Japanese standards.

<u>Room</u>	<u>Ceiling height (M)</u>
Offices	3,000
Ordinary scale lecture/conference rooms	3,300
Comparatively large lecture/conference rooms	3,600
PHC exhibition room	
Auditorium	
Bedroom	2,750
Dining room	3,500

(3) Architectural style

The deep eaves and the horizontal louvres for sun shade are major elements in the external appearance of the buildings. This is also true about the shape of roof, as local construction methods are used.

Because of the close relationship of PHC with villages, a modern

concrete-box style of building would be inappropriate, especially for RTC/PHC buildings. The counterparts of Thailand side expressed a desire that also into the ATC/PHC buildings something of the traditional Thailand architectural style is to be adopted so that visitors from ASEAN countries could feel at home by its likeness to their own.

The traditional Thai architectural style consist of two types, represented by the wat (temple) and the village house, both having their own features in respect of the shape of the roof. Also, the floors are a raised floor type. The roof of the wat is gable roof steeply pitched and characteristic in their multi-layered gablets. The roof of the village house is half-hipped roof and their characteristics lie in the combination of a steeply pitched main roof and a gently pitched lower roof. The entrances of the wat and the village house are both in gable side. The features of the braces being used to support the deep eaves are also unique.

The steeply pitched roof is too expensive to construct and it has no functional significance, so it was decided to adopt not so steep roofs. However, with regard to the other elements, the traditional features are utilized to the maximum extent so that the users of the building will feel at ease. Generally, taking decorative elements aside, the traditional style of architecture has a close relationship to the climate and natural features of the locality. After a study on this matter it was confirmed that incorporating traditional forms dose not affect the soundness of design.

5-3 Incidental Facilities

The following points are considered in the design of incidental facilities.

- . Careful consideration must be given to the climatic conditions and life-style of Thailand.
- . The facilities should have long lives.
- . The facilities should be easy to operate.
- . The maintenance should be easy and its cost should be cheap.
- . Locally purchasable materials and equipment should be used as possible.

5-3-1 Air conditioning/ventilation

Each site has a little difference in season due to the latitude differences, but generally their temperatures are high, and the climates are humid. The average annual temperatures are between 27 - 28.5 °C, D B and a high annual average relative humidity of 70 - 80% is recorded. As a principle, natural ventilation is obtained through the architectural planning in those buildings. The air conditioning/ventilation system must be local system and separate type air cooled packages are installed only in those rooms in which they are indispensable, so as to make partial operation possible.

The rooms requiring air-conditioning are as follows:

(1) ATC/PHC

Main building

- . Director's office
- . ASEAN conference room
- . Meeting rooms
- . Visiting staff room
- . Data processing office and its machinery room
- . Library
- . A/V production studio and control room

Dormitory

- 17 bedrooms on the first floor (in Japanese usage, second floor)

Training building

- A/V training room and its equipment room
- Lecture/conference room
- Lecturer's room

Auditorium

- Auditorium and stage
- Rest and preparation room

(2) RTC/PHCs

- Director's office . Conference room
- Library . Lecture rooms

5-3-2 Water supply and sewage

(1) Water supply facility

Water supply pipes provided to each site are to be connected to the storage tank, and the water is to be transferred by pump to the elevated water tank, then supplied to the required places by gravity water supply.

The design capacities are as follows:

ATC/PHC

MAIN BLDG	130 persons x 100 l/day.person = 13 m ³ /day
TRAINING BLDG	210 persons x 80 l/day.person = 17 m ³ /day
DORMITORY	120 persons x 120 l/day.person = 15 m ³ /day
AUDITORIUM	450 persons x 20 l/day.person = 9 m ³ /day
	<hr/>
	54 m ³ /day

RTC/PHC

TRAINING BLOCK	125 persons x 80 l/day.person = 10 m ³ /day
DORMITORY	100 persons x 120 l/day.person = 12 m ³ /day
	<hr/>
	22 m ³ /day

(2) Sewage and drainage

Drainage and sewage are separated. With regard to sewage, after treated by aeration type septic tanks (included in this project), it is disposed to drainage then, through seepage pits, it is drained away into underground.

(3) Sanitary equipment

With regard to the selection of the equipment, this must be chosen with careful consideration to the life-style of Thailand. With regard to the flushing of urinals and toilet bowl, a flush valve type or low tank type is chosen according to the requirement of each place.

(4) Gas facility

There is no urban gas supply, so LPG should be used. The method of supply is local system providing gas cylinders to each place where they are required.

(5) Fire-fighting facility

There are no local regulations for fire-fighting facilities; however, domestic hydrant and powder fire extinguishers are installed at places considered to be necessary.

5-3-3 Electrical facilities

(1) ATC/PHC

1) Power/transformer

The power is supplied to transformers installed on concrete poles in the site from PEA() by high-tension cables. A low-tension distribution board is installed in the main building as a main board.

Incoming electricity: 3 phase 3 line 22KV 50Hz

Distributed : 3 phase 4 line 400/230V

Transformer capacity: approximately 200KVA

For emergency electricity in case of power failure, a generator and emergency lights with built-in batteries are installed.

Generator: Diesel generator
Voltage; 3 ϕ 4 line 400/230V
Capacity; approximately 50KVA

2) Main distribution network

Network from the main distribution board to the sub-distribution boards in each building is provided with cable on the racks installed under the roofs of the connecting corridors.

Capacities for each building

Main building (including garage):	90KVA
Auditorium	80KVA
Training building	40KVA
Dormitory	20KVA

3) Lighting

Mainly fluorescent lighting is provided.

Luminous intensity in major rooms is as follows:

Main building

Rooms other than below-mentioned:	300 lux
Multi-purpose hall:	150 lux
Corridors, toilets, pantrys, storages, janitor's room:	100 lux

Auditorium

Lobby, corridor, toilets, storage:	100 lux
Auditorium:	150 lux
Office, rest and preparation room:	300 lux

Training building

Rooms other than below-mentioned:	300 lux
Toilets, pantry, janitor's room:	100 lux

Dormitory

Lounge, bedrooms:	150 lux
Dining room, office:	250 lux
Kitchen:	300 lux
Toilets, laundry, storages:	100 lux

4) Telephone

The switchboard is installed in the controller's office of the main building and each telephone is connected through it. To the entrance hall in each building, pipes for public telephone cables are installed.

Switchboard capacity: 8 lines 40 extensions

5) Public address system

An amplifier is set up in the controller's office of the main building so that announcements can be made to all buildings.

Amplifier: Capacity; 180 W
Output system; 10 channels

Local announcement systems are installed in the following rooms.

Main building: ASEAN conference room, multi-purpose hall.
Auditorium: Auditorium
Training building: A/V training room, lecture/conference room.

6) TV aerial and outlets

TV aerials are set up and outlets are installed in the following rooms:

Main building: Multi-purpose hall, A/V control room
Training block: A/V equipment room
Dormitory: Dining room, lounge and office

7) Emergency alarm system

For emergency alarm, push-buttons and emergency bells are installed. Indicator panels are fitted in the main building and lodging block.

8) Lightning arresters

Lightning arresters installed on the major buildings.

(2) RTC/PHC

1) Power transformer

The power is supplied to a transformer installed on a concrete pole the site from PEA by high-tension cables.

Incoming electricity: 3 phase 3 line 22KV 50Hz
Distributed " : 3 phase 4 line 400/230V
Transformer capacity: approximately 50KVA

2) Lighting

Mainly flurescent lighting is provided. Luminous intensity in major rooms is as follows:

Rooms other than below-mentioned:	300 lux
Filing room, lavatories, storages, laundry, corridors, garages:	100 lux
Cafeteria and janitor's room:	250 lux
Bedrooms:	150 lux

3) Telephone system

Telephones are installed in the director's office, controller's office, D/I office, training office, R/D office and janitor's room.

4) Public address system

An amplifier is installed in the controller's office so that announcements can be made to all buildings.

Amplifier:	Capacity;	60W
	Output system;	10 channels

A local announcement system is installed in the cafeteria.

5) Internal phone system

Internal phones are installed in the major rooms.

Number of the phone:	20
----------------------	----

6) TV aerial and outlets

Aerials are set up and outlets are installed in the following rooms:

Controller's office, cafeteria, A/V equipment room

7) Lightning arresters

Arresters are installed on the major buildings.

5-4 Equipment Plan

Based on the agreement between the counterparts, after studying the details, the equipment necessary for ATC and RTCs is compiled as follows. The specifications of the equipment will be made in the working design phase, however, in it, it is required to select types which are commonly used in Thailand as much as possible, or, if it could not, it is indispensable at least to adopt the types for which agents can be found in Thailand so that maintenance and replacement of parts and expendables can be simplified.

5-4-1 ATC/PHC

<u>Equipment</u>	<u>Quantity</u>	<u>Building and Facilities</u>	
(1) Training Equipment			
1. Over head projectors	6	A/V equipment room	1
		Auditorium	1
		Domestic class room	2
		A/V training room	1
		Lecture and conference room	1
2. Opaque projector	1	A/V equipment	
3. Transparency maker	-		
4. 16 mm movie projectors	4	A/V equipment	2
		Auditorium	2
5. 35 mm slide projectors	3	A/V equipment	2
		Auditorium	1
6. Roll back screens	4	Domestic class room	2
		A/V training room	1
		Lecture room	1
7. Screen for auditorium	1	Auditorium	
8. Screens, about 70" x 70"	4	A/V equipment	4

<u>Equipment</u>	<u>Quantity</u>	<u>Building and Facilities</u>
9. 18" color TV video system (Multi type)	1	A/V training room 1
10. Sound tape recorder	1	A/V equipment 1
11. Mini tape recorder	1	Training section office 1
12. Microfilm producer & reader	1	Library 1
13. Word processor	1	Word processor operator 1
14. Electric typewriters (Dual system: Thai-English)	3	Controler, research and development, document and information section rooms
15. Calculating machine		
16. Paper copier (Photo-copy)	1	Printing workshop
17. Paper duplicator (Roneo)	2	Printing workshop
18. Calculating machines (16 memories)	3	Controller section office 2 Training section office 1
19. Amplifier sets	3	ASEAN conference room 1 A/V training room 1 Auditorium 1

(2) Material production equipment

1) Photographic Equipment

1. Camera, 35 mm single lens reflex and its attachments	2	Material production workshop
2. Microscope, micro-photo- graphic adaptor automatic type for photomicrography	1	"
3. Microphotographic set	1	"
4. Duplicating machine	1	"
5. Dry mounting machine	1	"
6. Enlarger for 6 x 6 cm	1	"
7. Dark room set	1	"

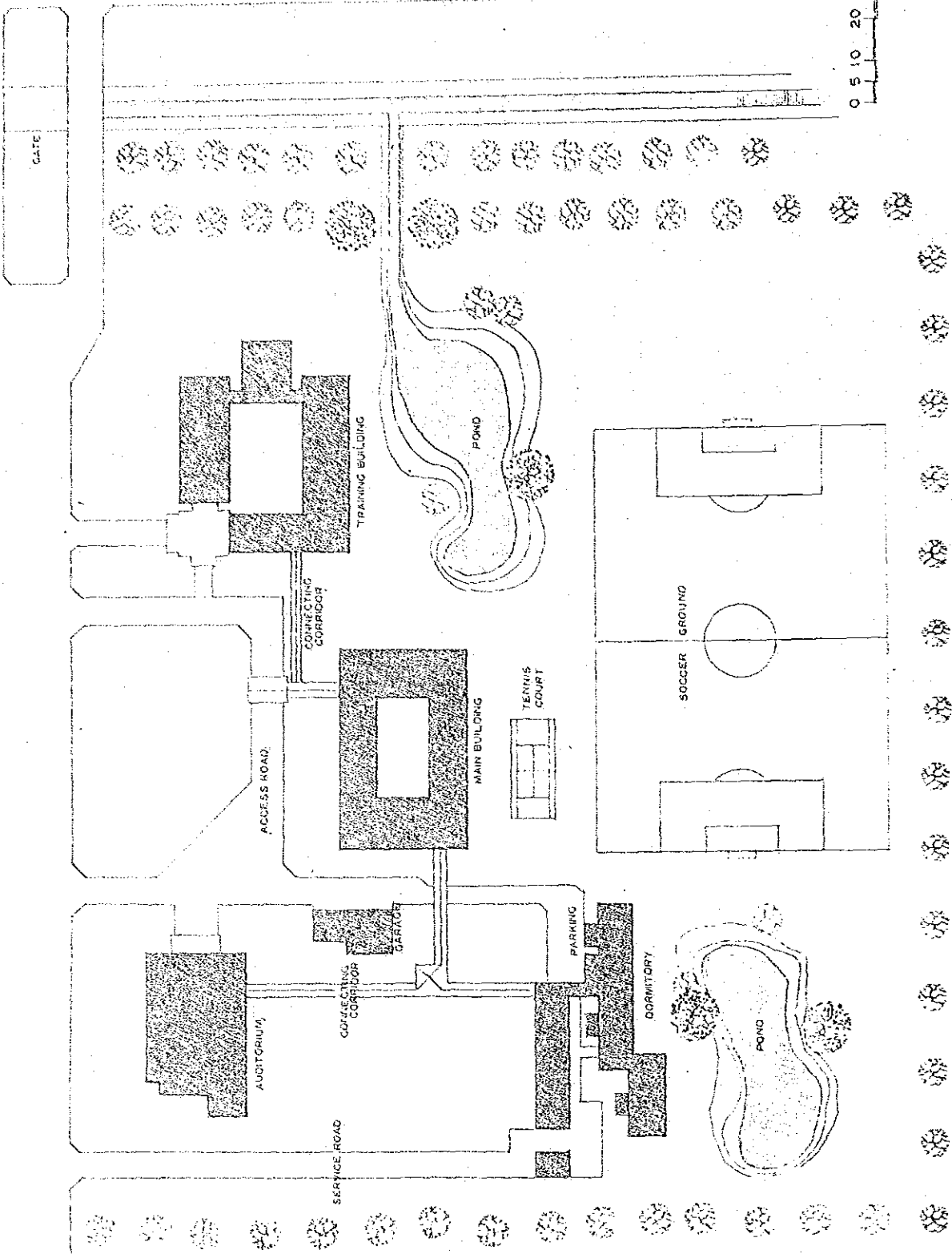
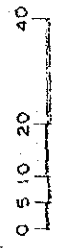
<u>Equipment</u>	<u>Quantity</u>	<u>Building and Facilities</u>
8. Drying & glazing machine 20-24 inches type	1	Material production workshop
9. Polaroid slide maker set	1	"
10. Transparency maker	1	"
11. Portable slide projectors with built-in screen	2	"
12. 35 mm, slide projector	1	"
13. Projection screen 70" x 70"	1	"
14. Rolling background screen (White & blue)	1	A/V production studio
15. 2 lighting stands for studio lighting	1	"
2) Color closed-circuit T.V. equipment		
1. Portable color T.V. cameras for studio use	3	A/V production studio
2. Black/white T.V. cameras	2	"
3. Tripod & dolly	5	"
4. Video cassette recorder 3 system for play back	2	"
5. Portable video cassette recorder	2	"
6. Editing system of video cassette recorder	2	"
7. T.V. receiver/monitor color 18"	3	"
8. Portable color T.V. monitor (9")	2	"
9. Special effect generator	1	"
10. Video/audio distributor	1	"
11. Microphone with stand 5 and wireless microphone 2	7	"

<u>Equipment</u>	<u>Quantity</u>	<u>Building and Facilities</u>
12. Telecine or film chain adaptor or multiplexer	1	A/V production studio
13. 16 mm film projectors for telecine	2	"
14. 35 mm slide projector	2	"
15. Video cassette recorder with remote control (for telecine)	2	"
16. B/W T.V. monitor 4" x 4"	2	"
17. Microphone mixer 8 channel	1	"
18. Integrated amplifier	1	"
19. Stereo cassette deck	2	"
20. Turntable	2	"
21. Open reel tape recorder	2	"
22. Speaker	4	"
23. Boom stand for microphone	2	"
24. Video projector with screen screen	1	"
25. T.V. camera with microscope	2	"
26. Synchronized cassette tape recorder	2	"
27. Audio tape duplicator (1 to 3) cassette and open reel	2	"
28. Headphone	5	"
3) Printing Machine		
1. Printing Machine Offset type for printing textbooks	1	Printing workshop
2. Cutter	1	"
3. Each of assembleing and bounding, boring and drilling machine for doing above textbooks	1	"

<u>Equipment</u>	<u>Quantity</u>	<u>Building and Facilities</u>
(3) Data processing equipment		
1. Minicomputer Hardware: 1 CPU with 768KB memory, 4 magnetic disk drive 63MB, 1 magnetic tape drive 1600 bpi, 2 units of CRT, 25 x 80 each, 1 drivers of floppy disk drive, 1 unit of high speed line printer 600 lpm, 1 unit of serial printer 200 cps.	1	Computer machine room
(4) Vehicles		
1. Station-wagon	1	
2. Microbus	1	
3. Bus	1	
5-4-2 RTC/PHC		
(1) Training equipment		
1. Over head projector	2	A/V equipment room
2. Transparency maker	1	
3. 16 mm movie projector	1	
4. 35 mm slide projectors (sync. sound)	2	
5. Projection screen	1	
6. Amplifier sets (6 microphone)	2	
7. Sound tape recorders (cassette)	2	
8. Mini tape recorder	1	

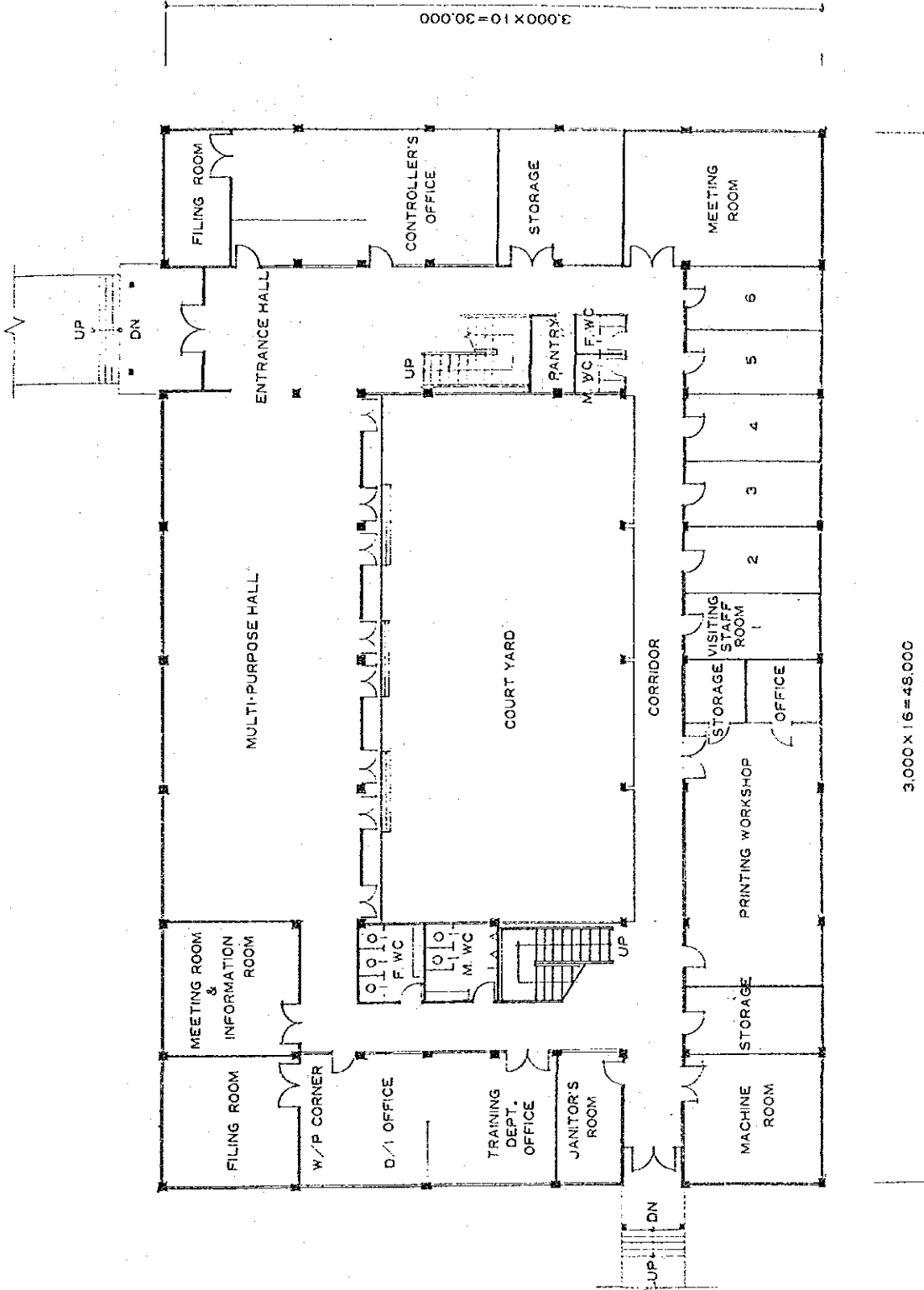
<u>Equipment</u>	<u>Quantity</u>	<u>Building and Facilities</u>
9. Video Cassette Recorders	2	A/V equipment room
10. Monitor Receiver Televisions	2	
11. Color camera sets for VTR	2	
12. Camera Sets (Single Lens Reflex with Electric flash, Zoom Lens and Micro Lens)	2	
13. Electric typewriter (Thai)	1	Documentation and information section office
14. Electric typewriter (English)	1	Research and development section office
15. Paper copier (Photo-copy)	1	Documentation and information section office
16. Paper duplicator (Roneo)	1	"
17. Calculating machines	2	Controller's office
(2) Vehicles		
1. Station-wagon	1	
2. Microbus (15 seats)	1	

5-5 Basic Design Drawings



ATC/PHC PLOT PLAN

1

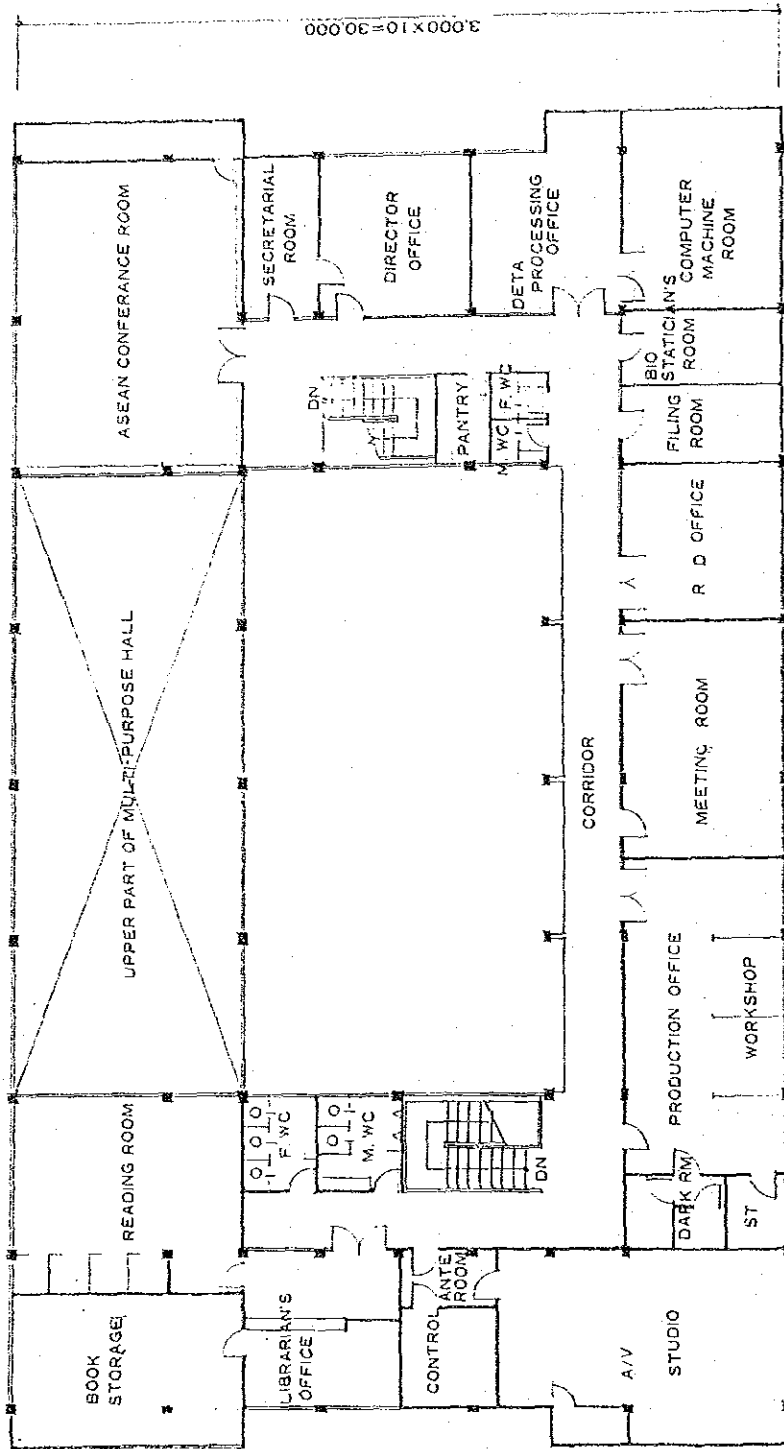


NOTE : 0 1 - DOCUMENTATION & INFORMATION

W. P. - WORD PROCESSOR

DEPT - DEPARTMENT

ATC/PHC MAIN BUILDING 1ST FLOOR PLAN 2



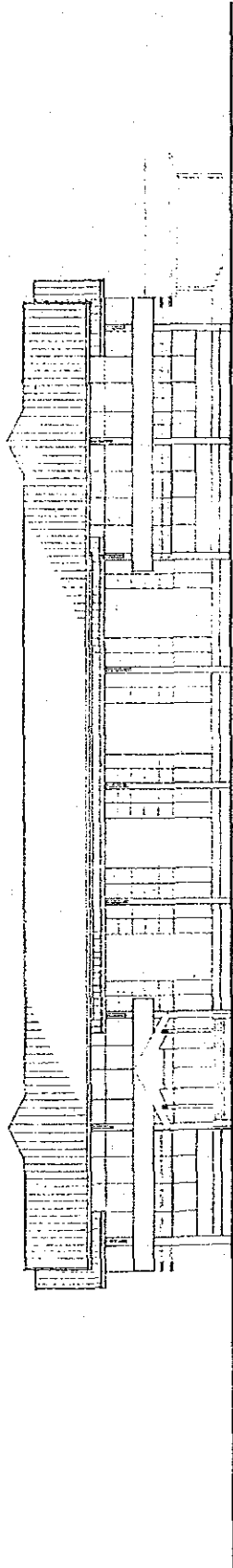
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NOTE : R D = RESEARCH & DEVELOPMENT

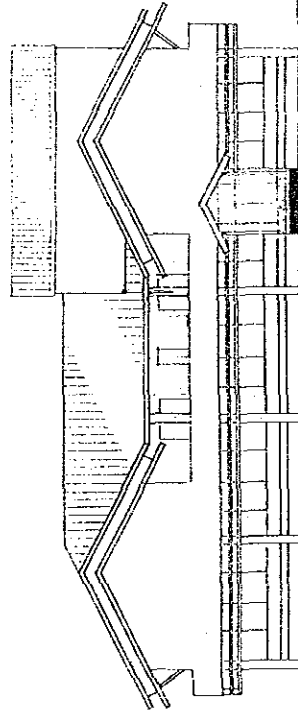


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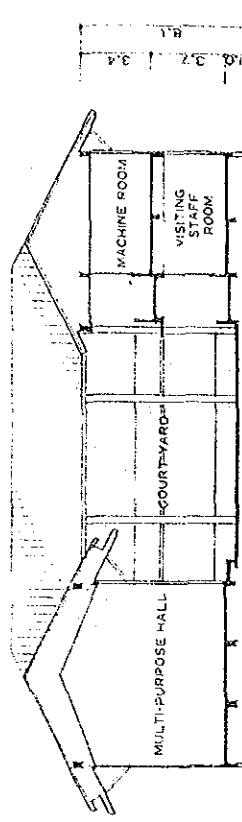
ATC/PHC MAIN BUILDING 2ND FLOOR PLAN



NORTH ELEVATION



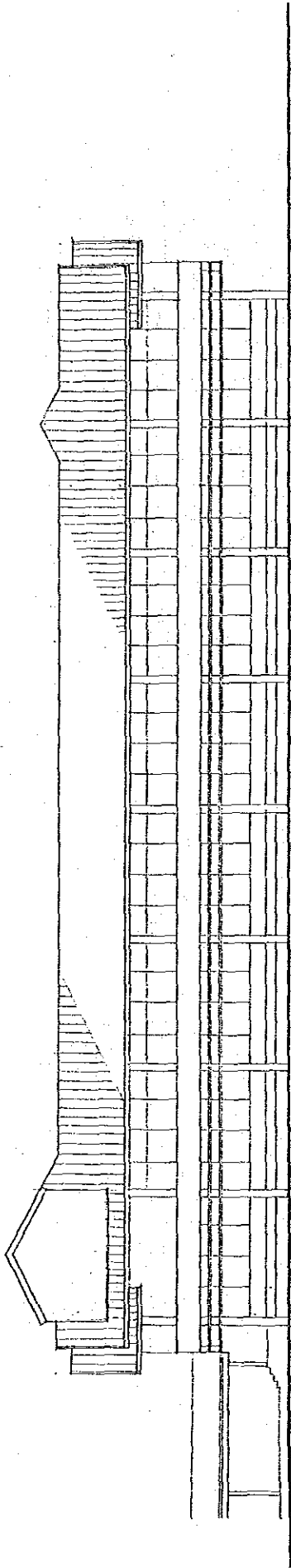
WEST ELEVATION



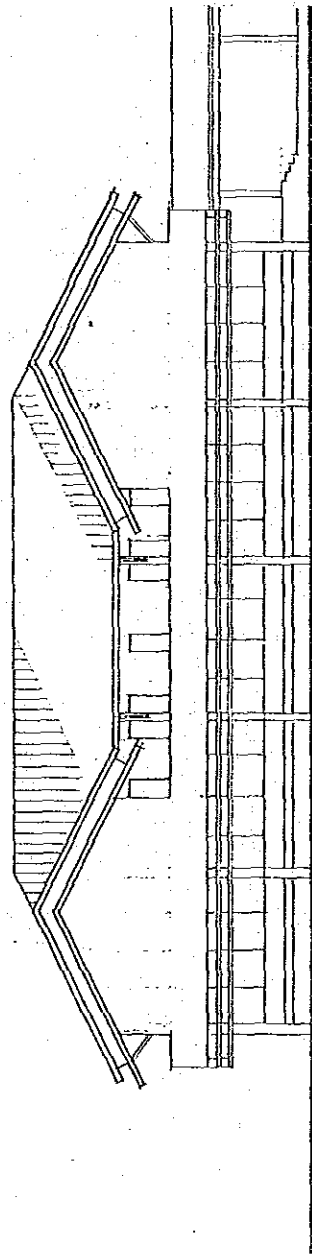
SECTION

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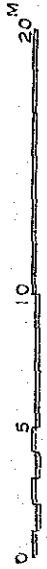
ATC/PHC MAIN BUILDING ELEVATION SECTION



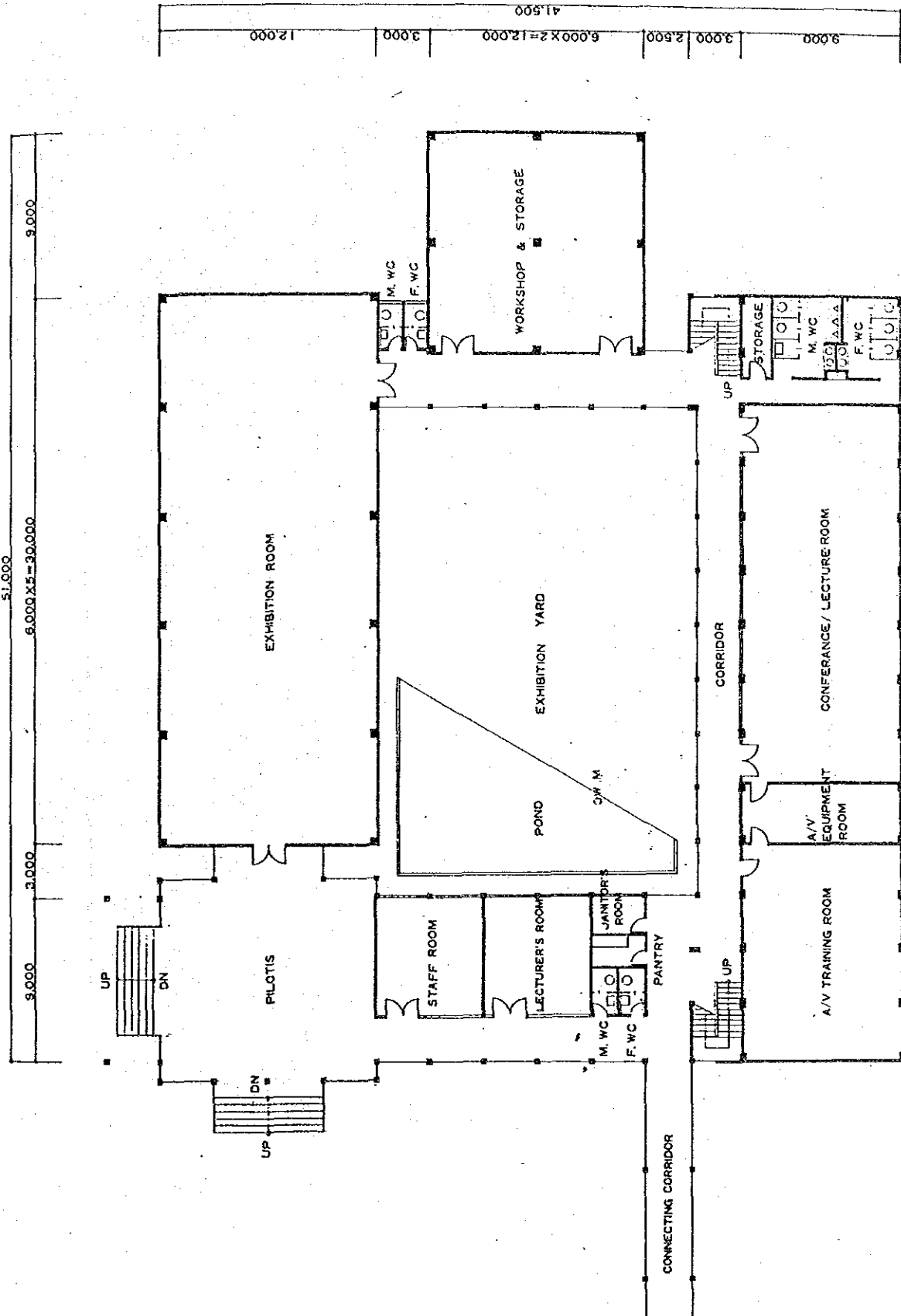
SOUTH ELEVATION



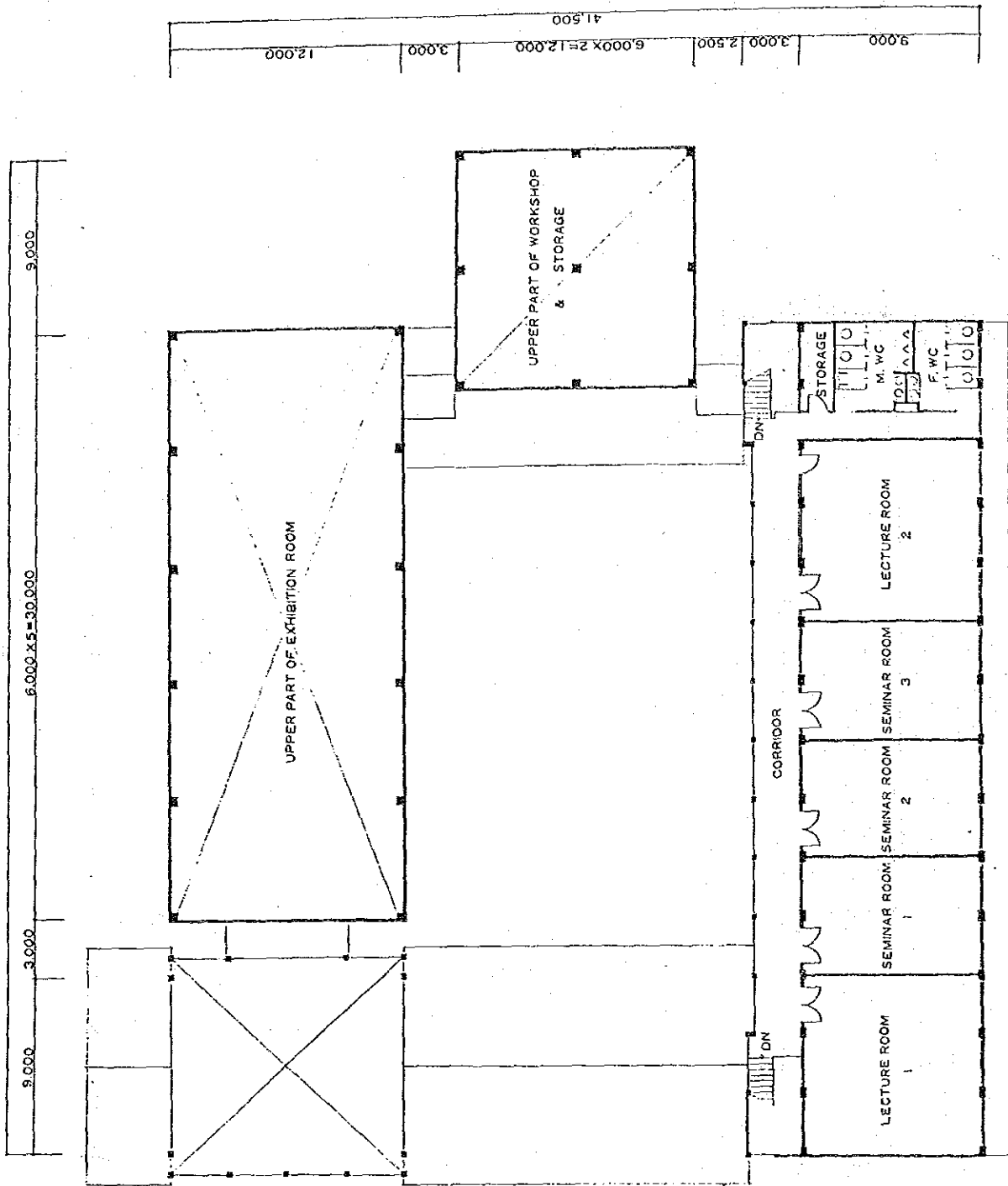
EAST ELEVATION



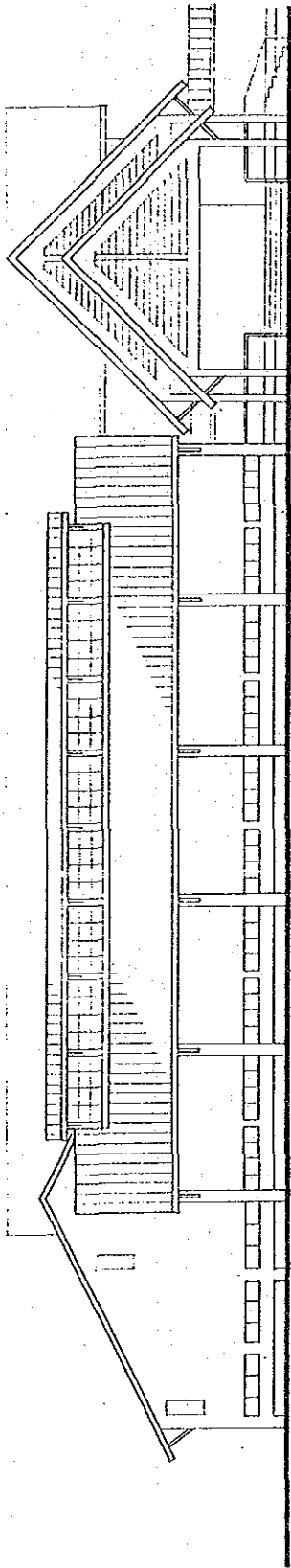
ATC/PHC MAIN BUILDING ELEVATION



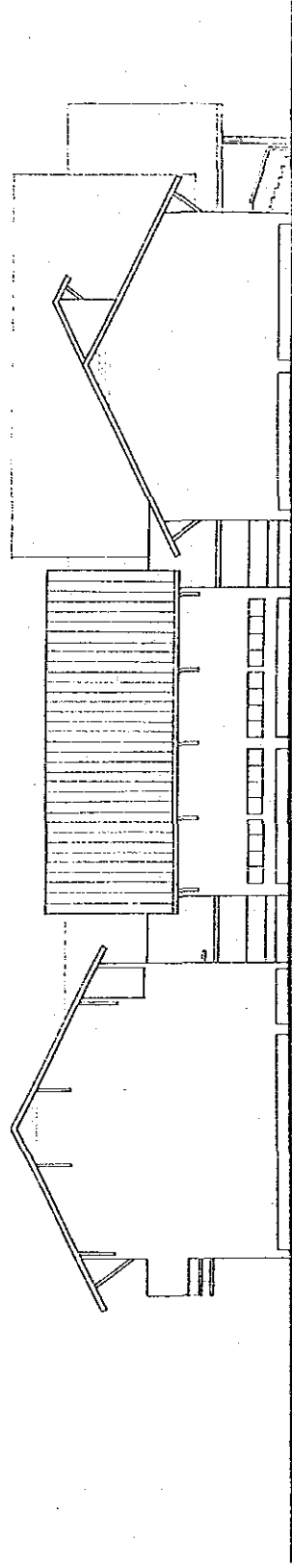
ATC/PHC TRAINING BUILDING 1st FLOOR PLAN **6**



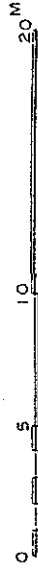
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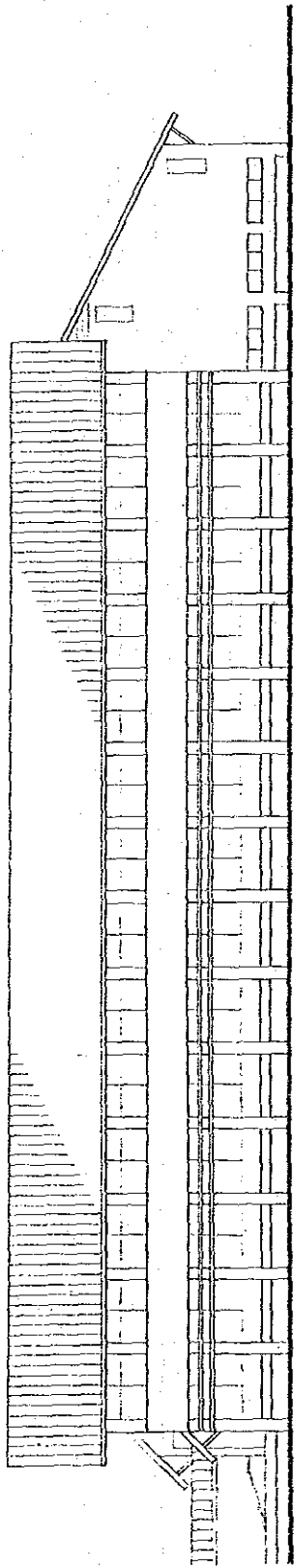
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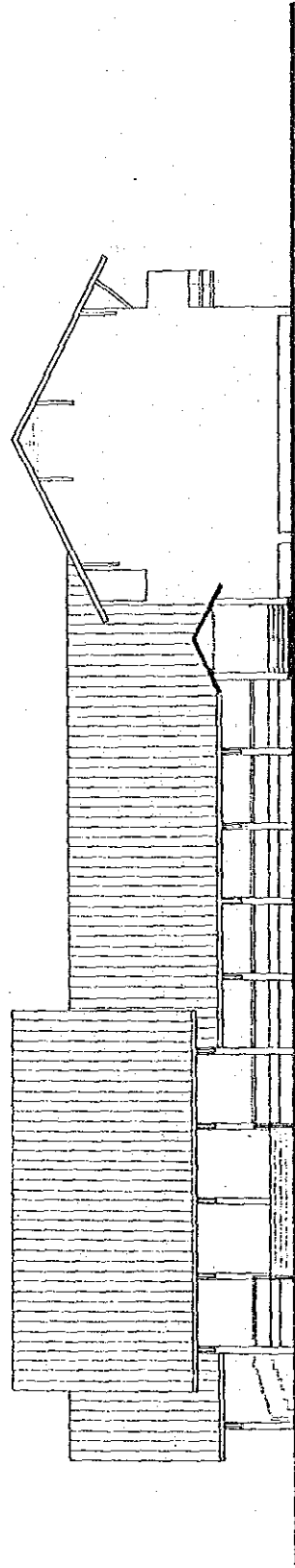
EAST ELEVATION



ATC/PHC TRAINING BUILDING ELEVATION **8**

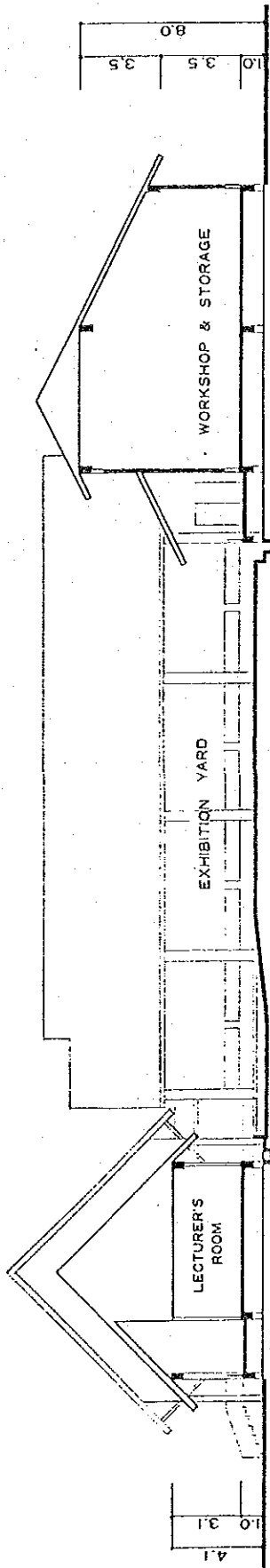


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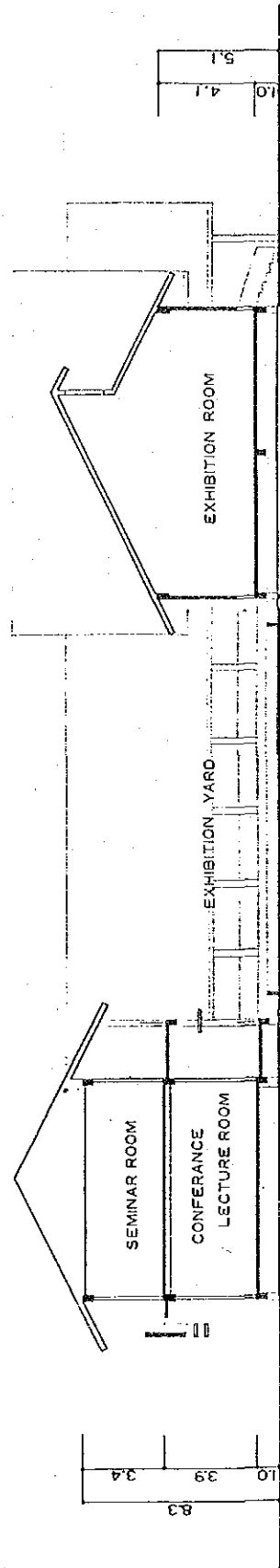


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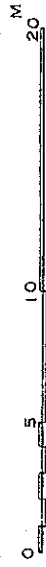


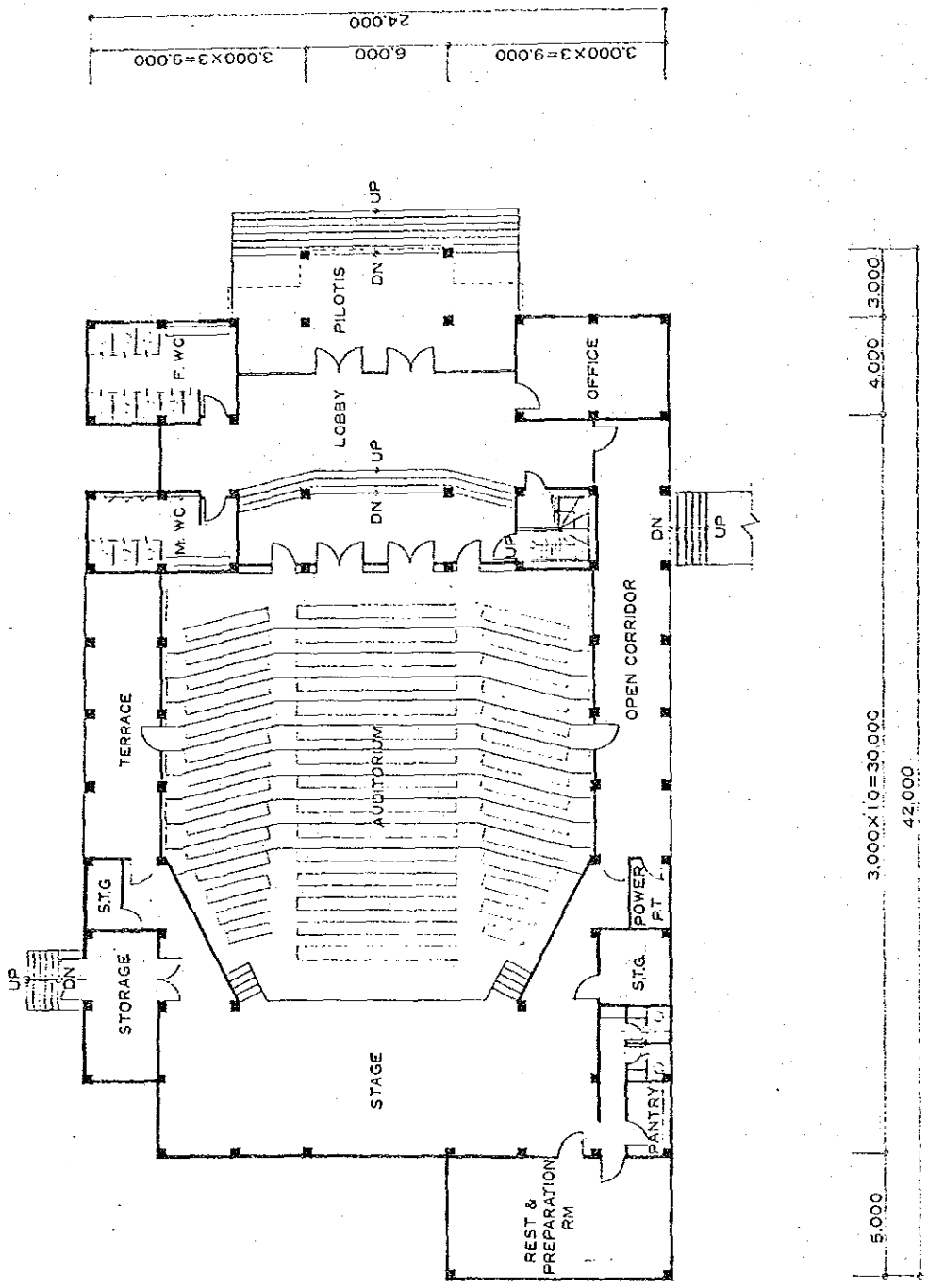


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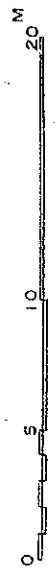
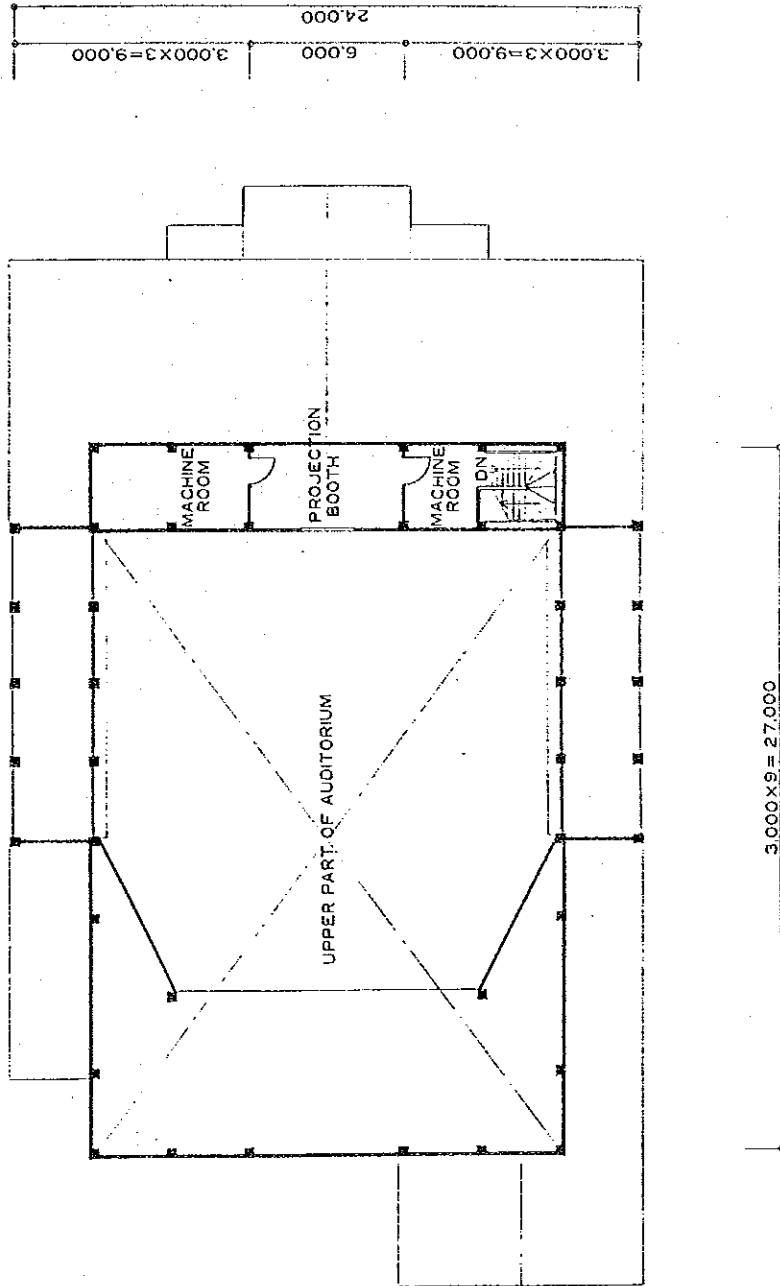


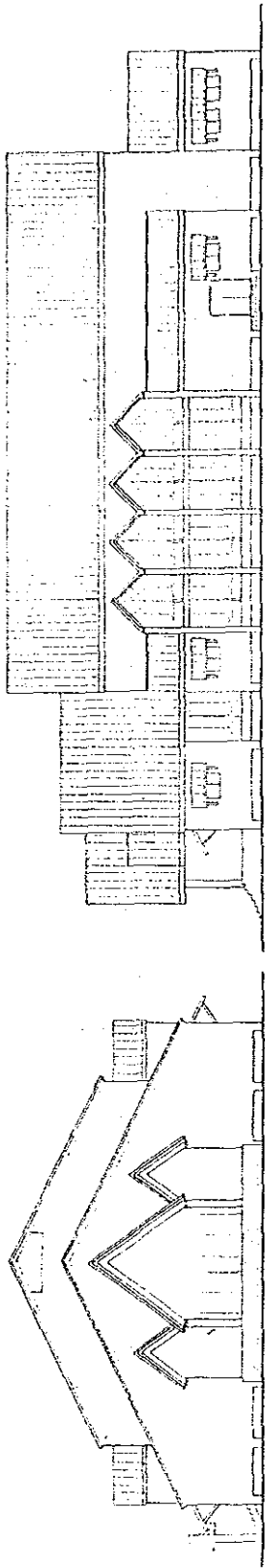
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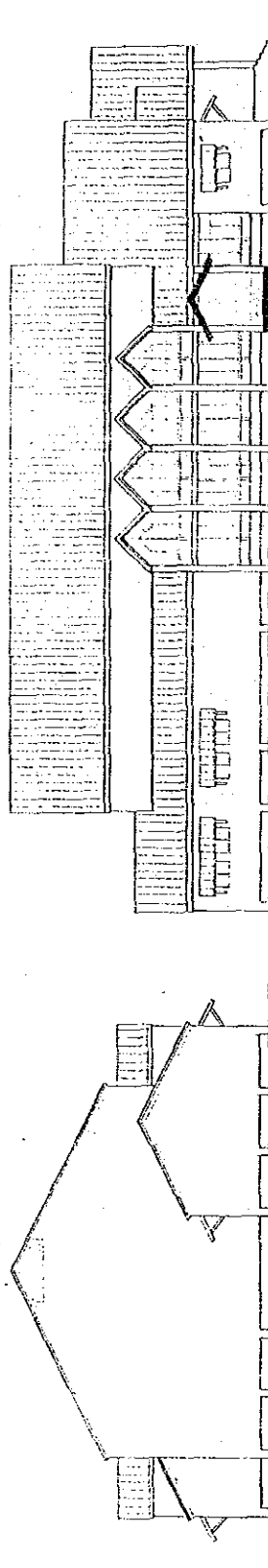
ATC/PHC AUDITORIUM 1ST FLOOR PLAN **11**





NORTH ELEVATION

EAST ELEVATION

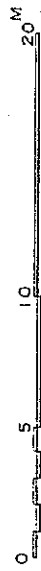
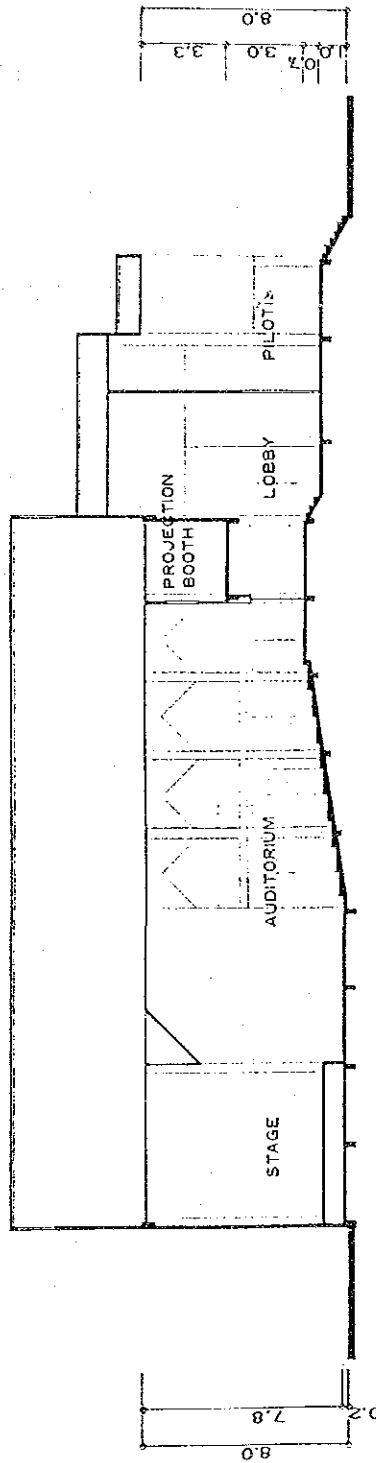
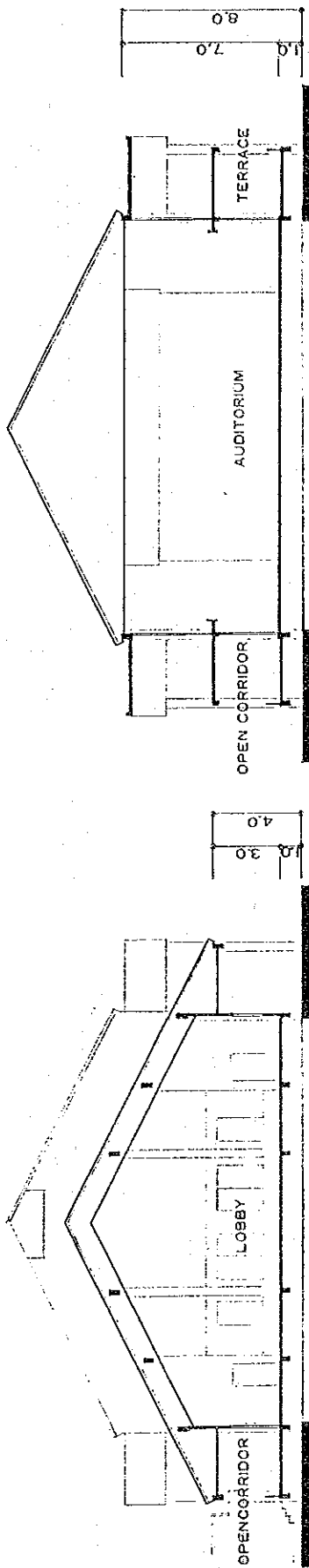


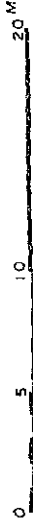
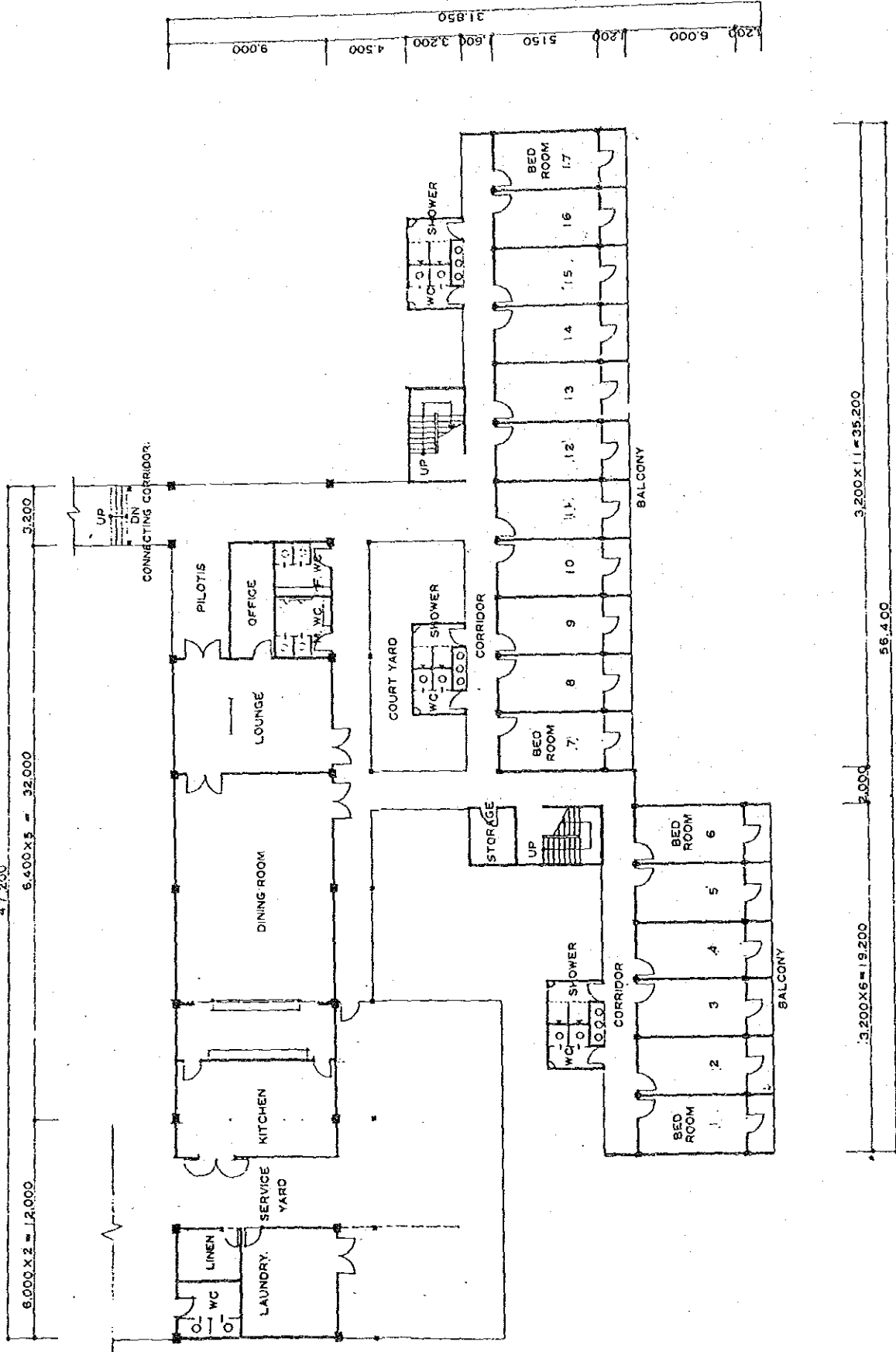
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WEST ELEVATION

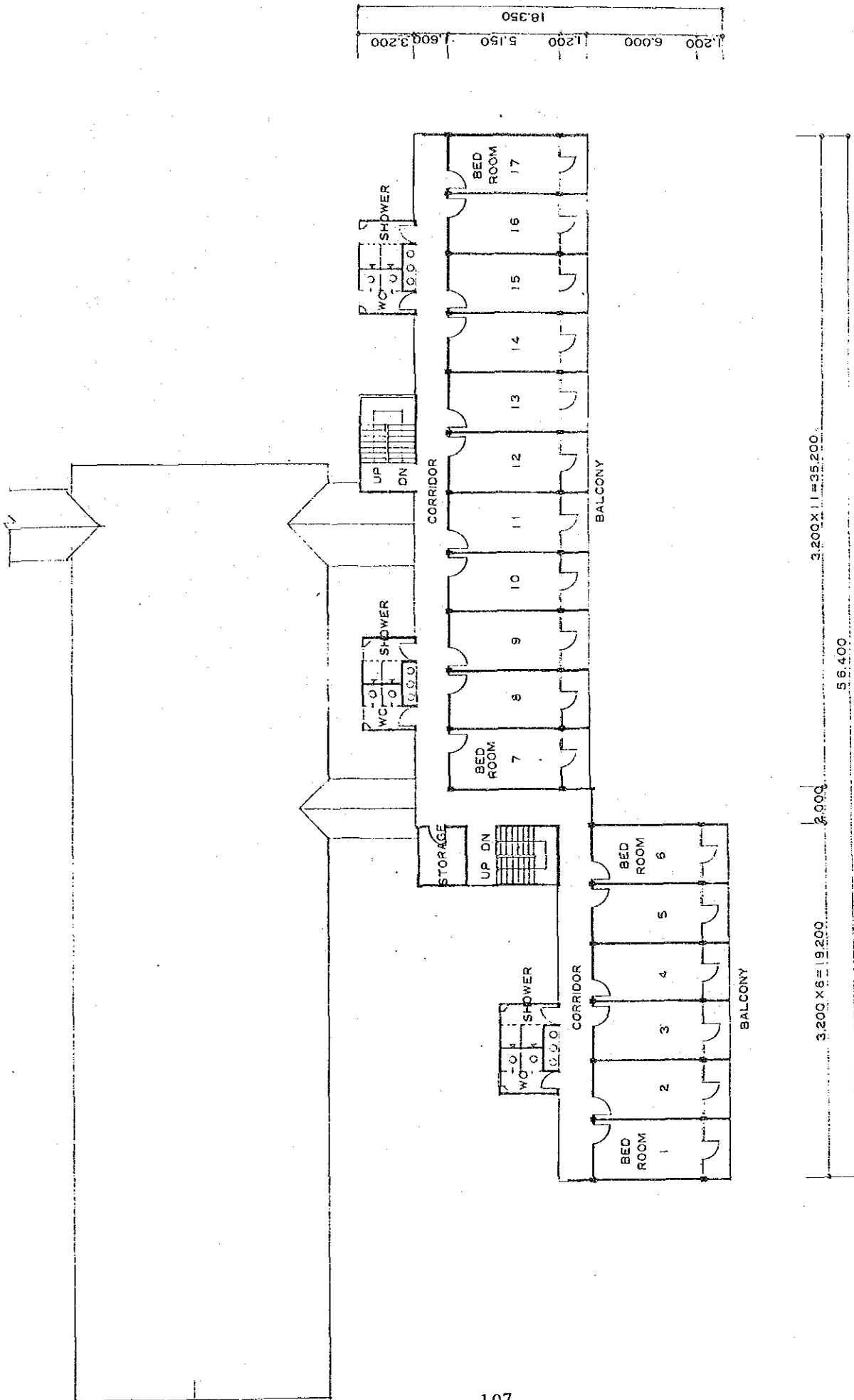


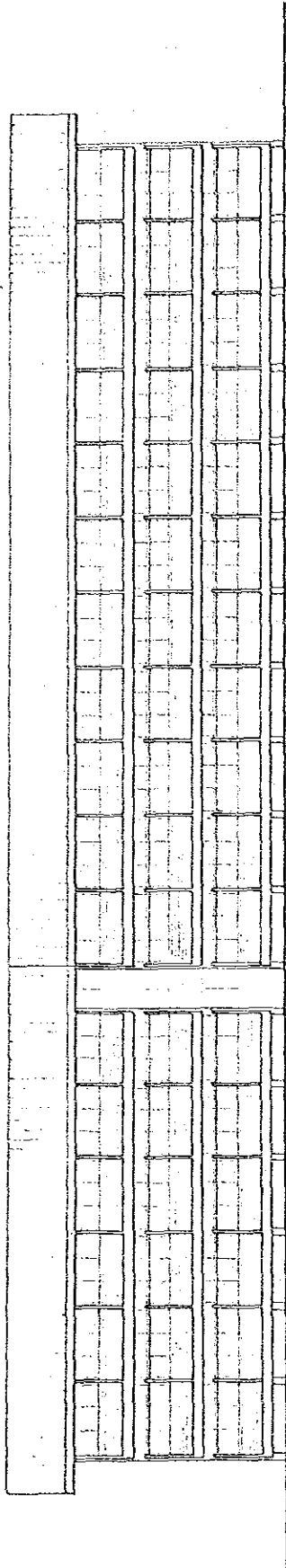
ATC/PHC AUDITORIUM ELEVATION



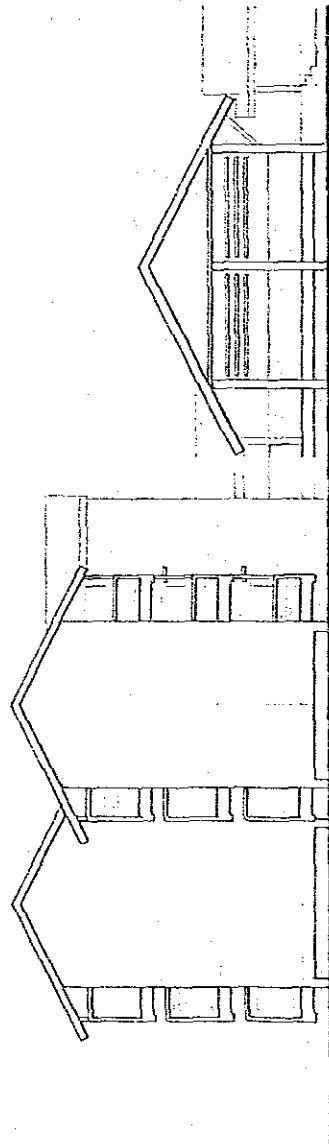


ATC/PHC DORMITORY 1ST FLOOR PLAN 15

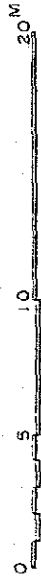




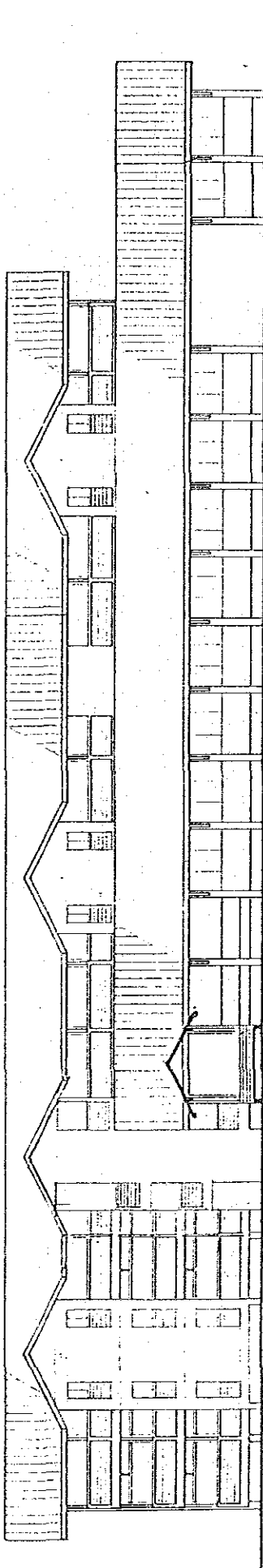
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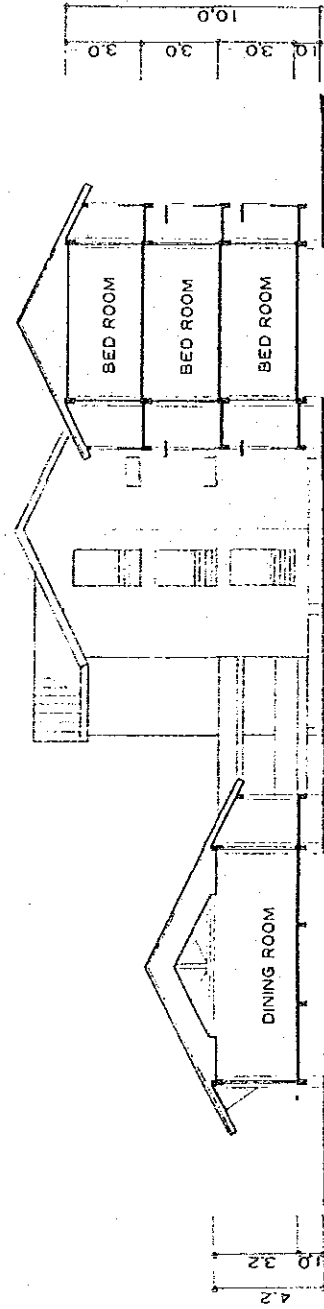
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ATC/PHC DORMITORY ELEVATION

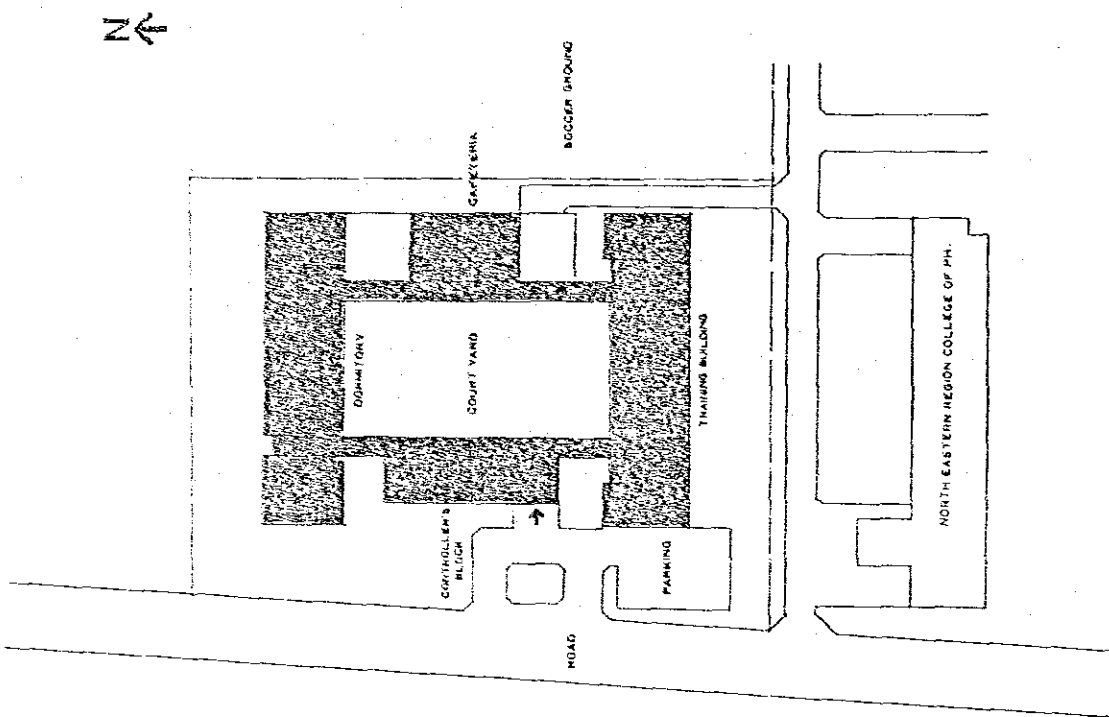


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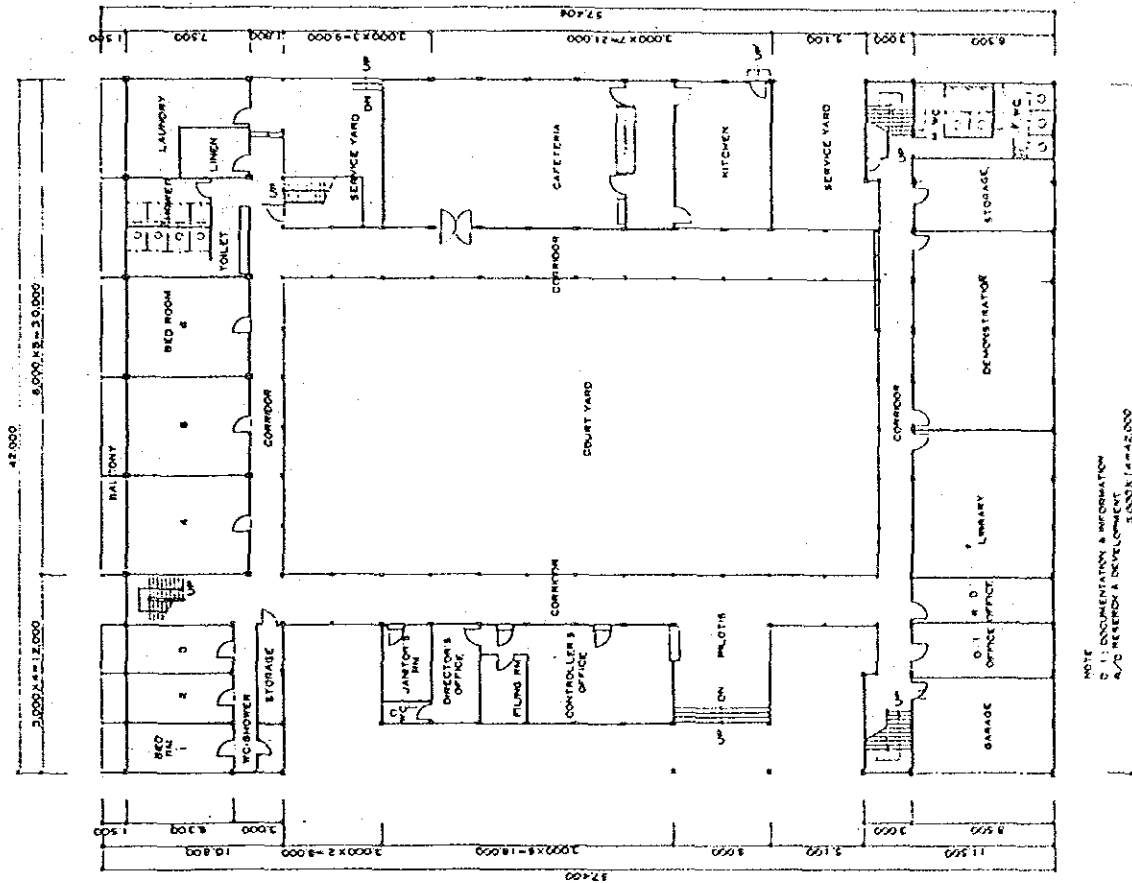


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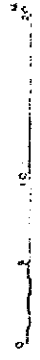




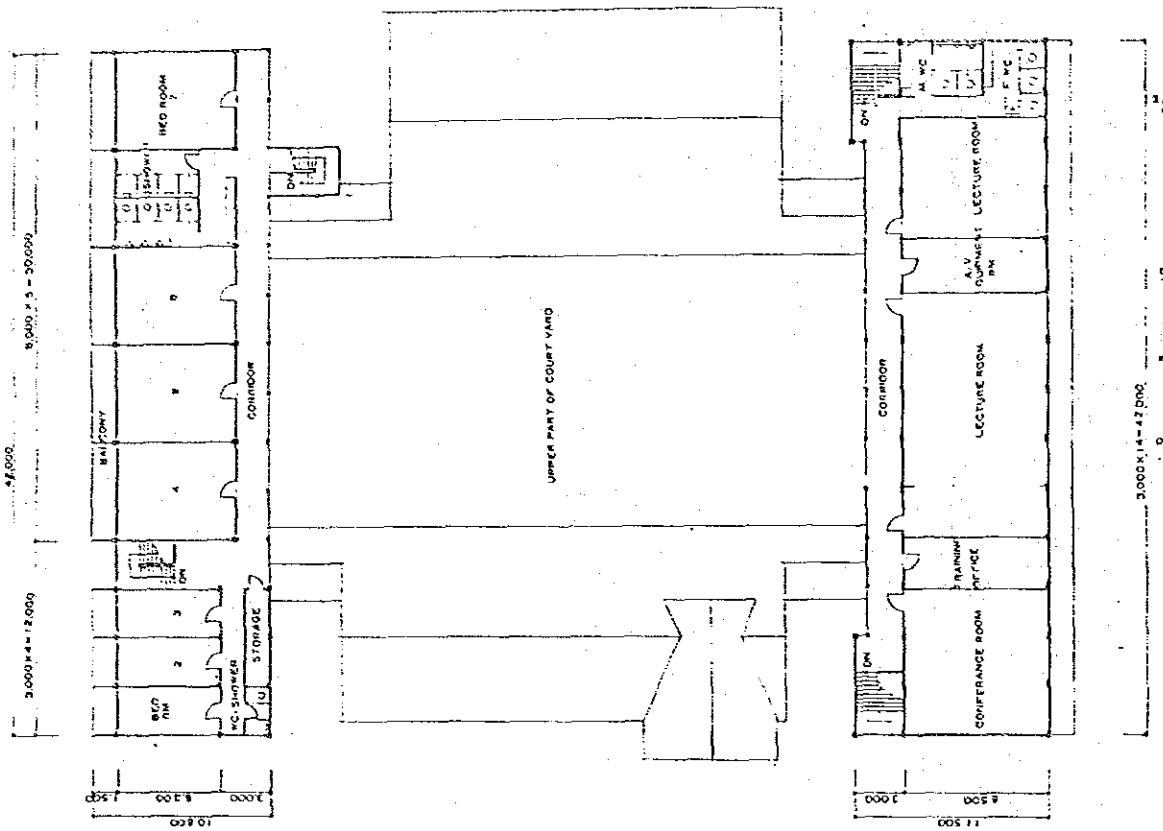
NORTH EAST RTC/PHC PLOT PLAN

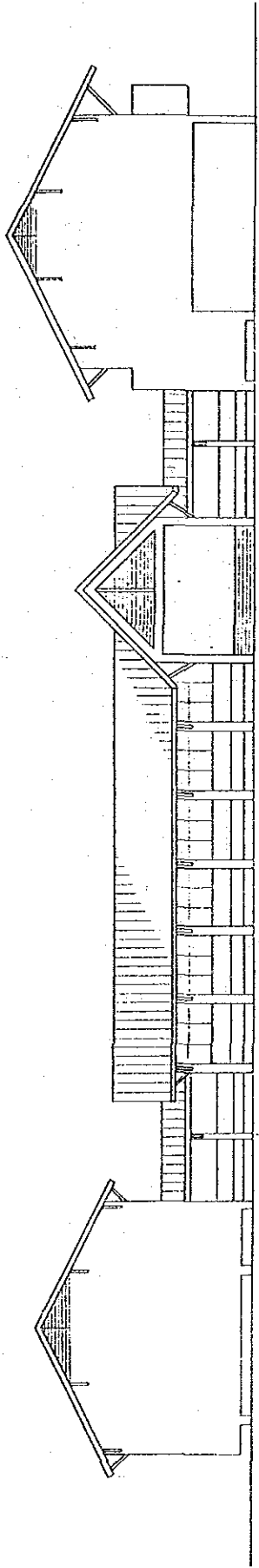


NOTE
 0 11: DOCUMENTATION & INFORMATION
 0 12: RESEARCH & DEVELOPMENT
 0 13: GENERAL SERVICES

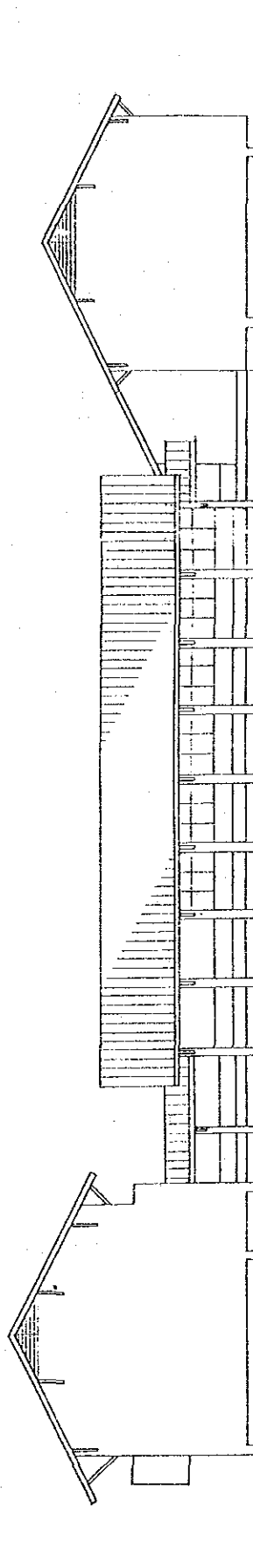


NORTHEAST RTC/PHC 1ST FLOOR PLAN 20

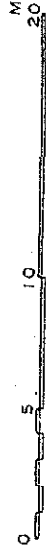


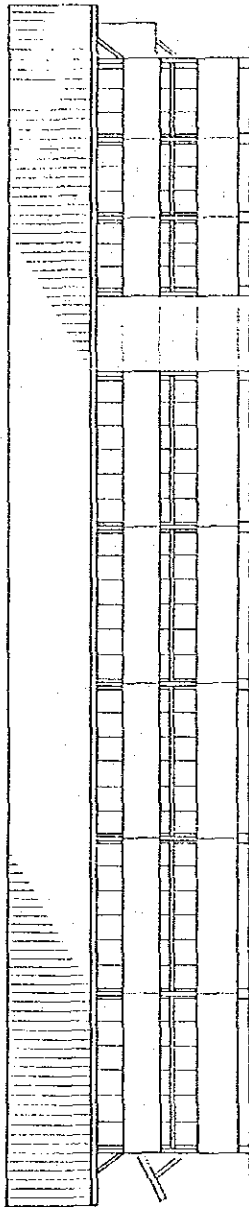


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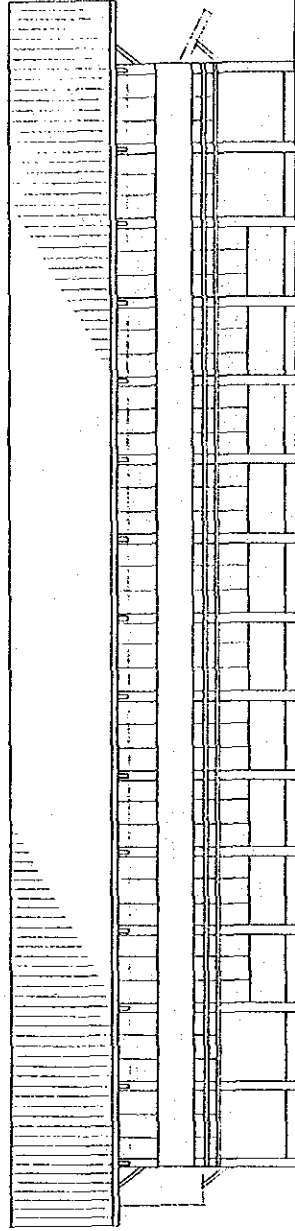


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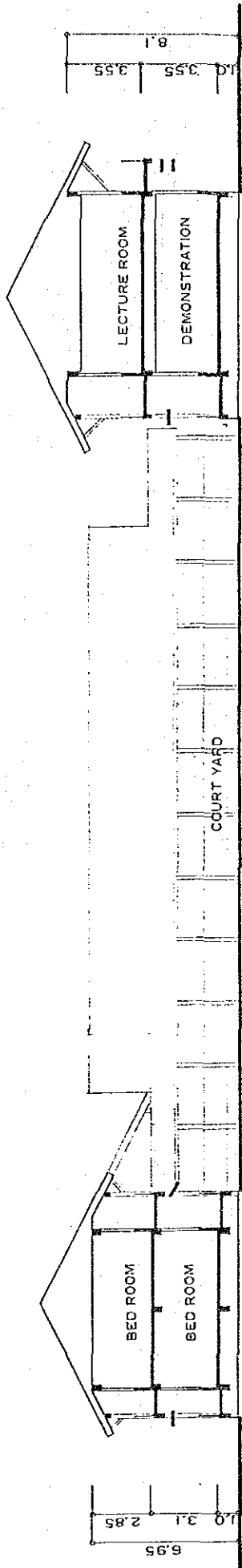


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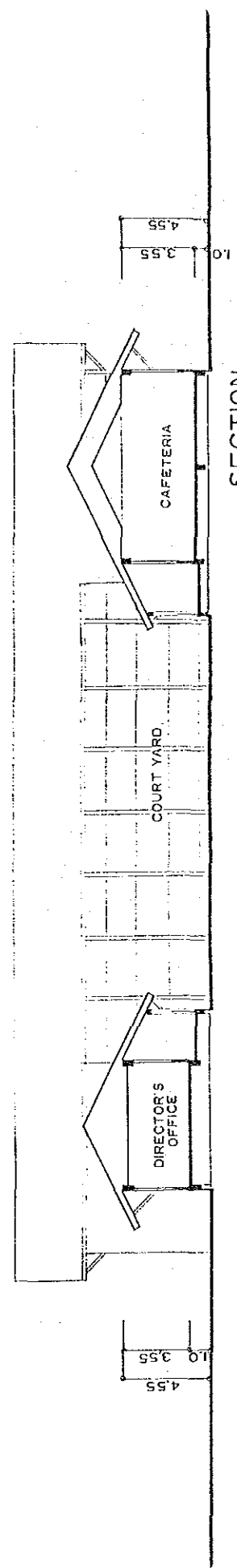


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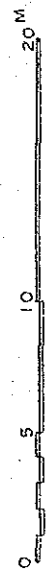


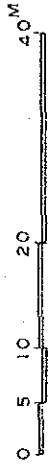
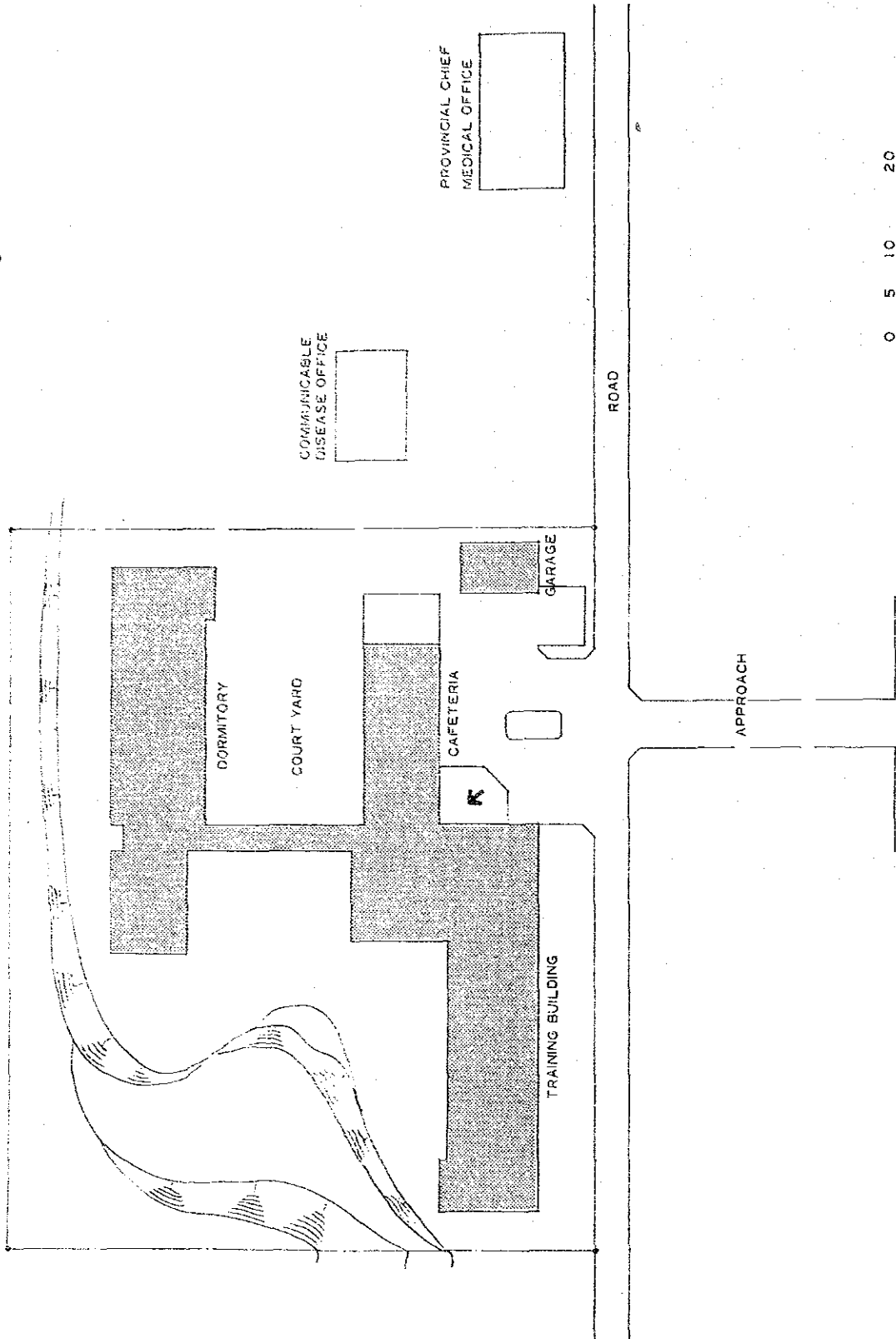


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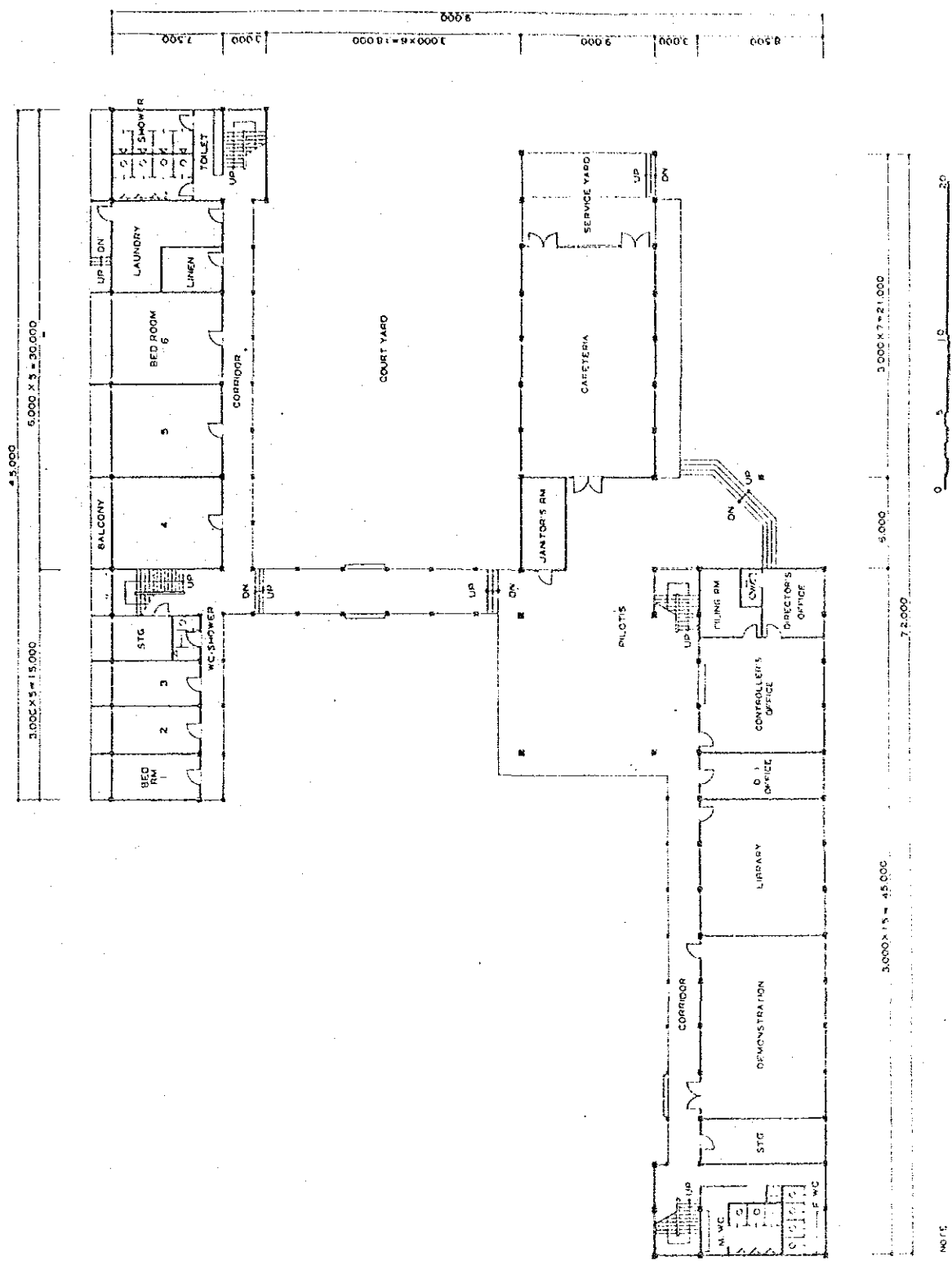


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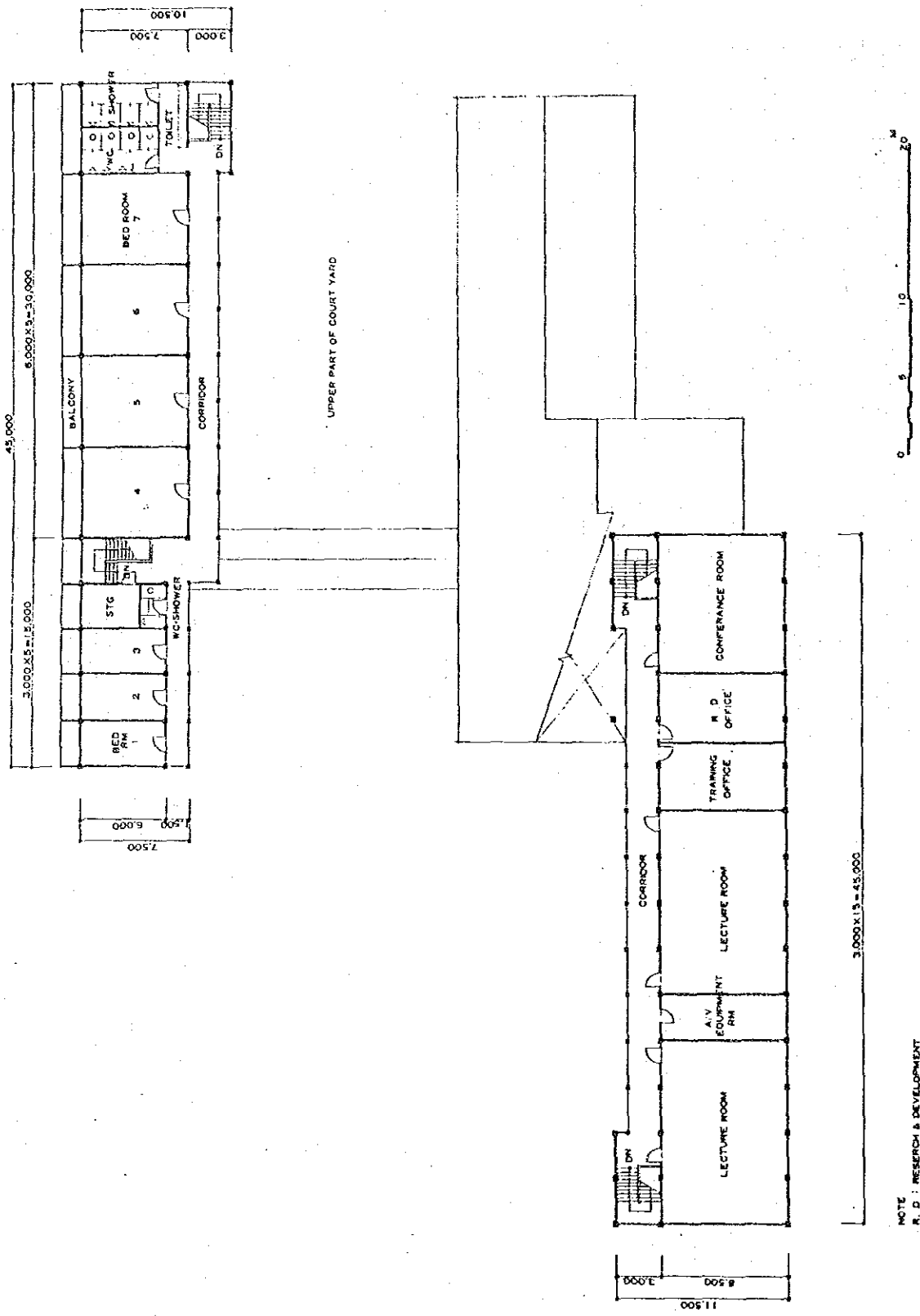


NORTH RTC/PHC PLOT PLAN 25

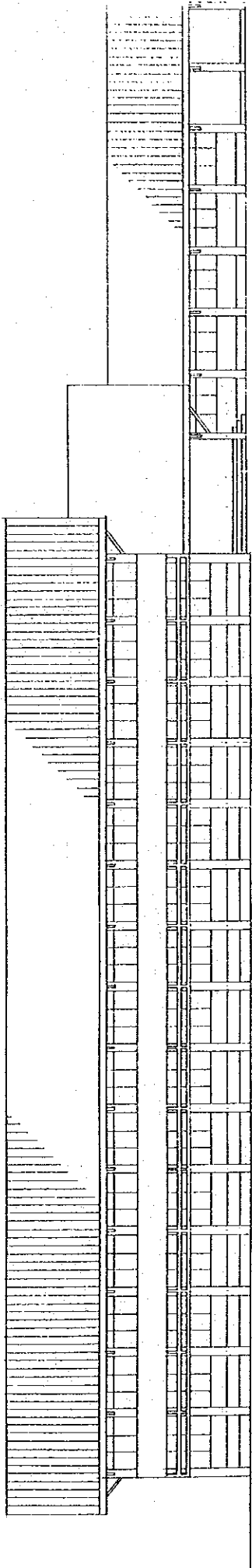


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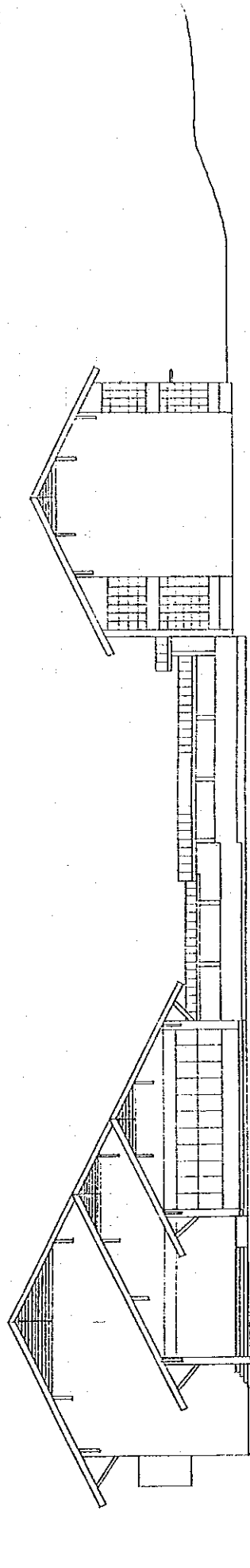
NORTH RTC/PHC 1st FLOOR PLAN 26



NORTH RTC/PHC 2ND FLOOR PLAN 27



SOUTH ELEVATION

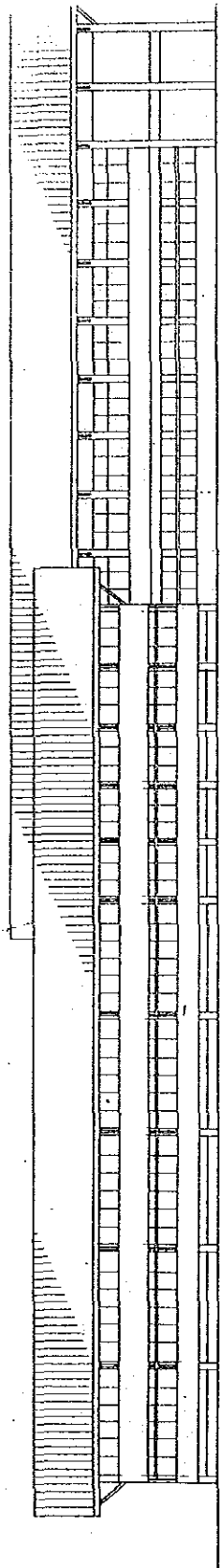


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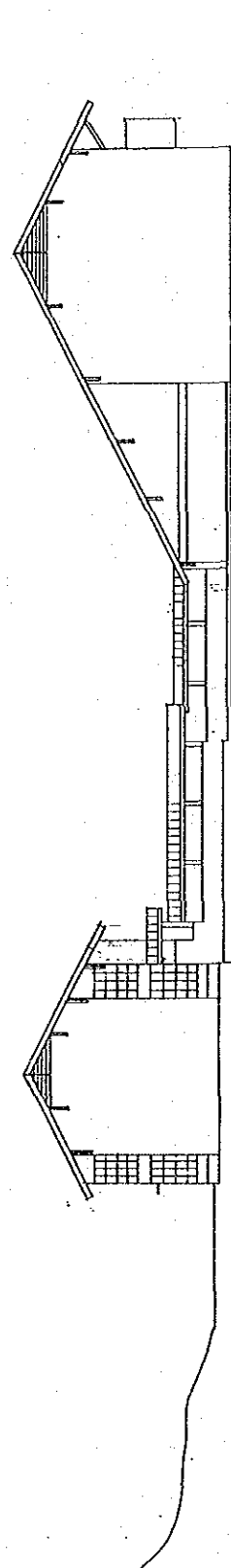


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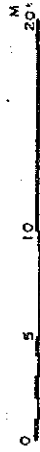
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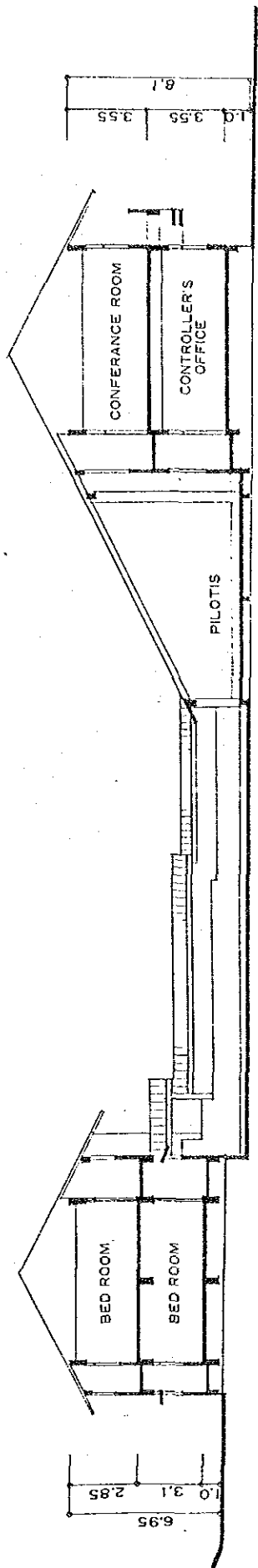
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WEST ELEVATION



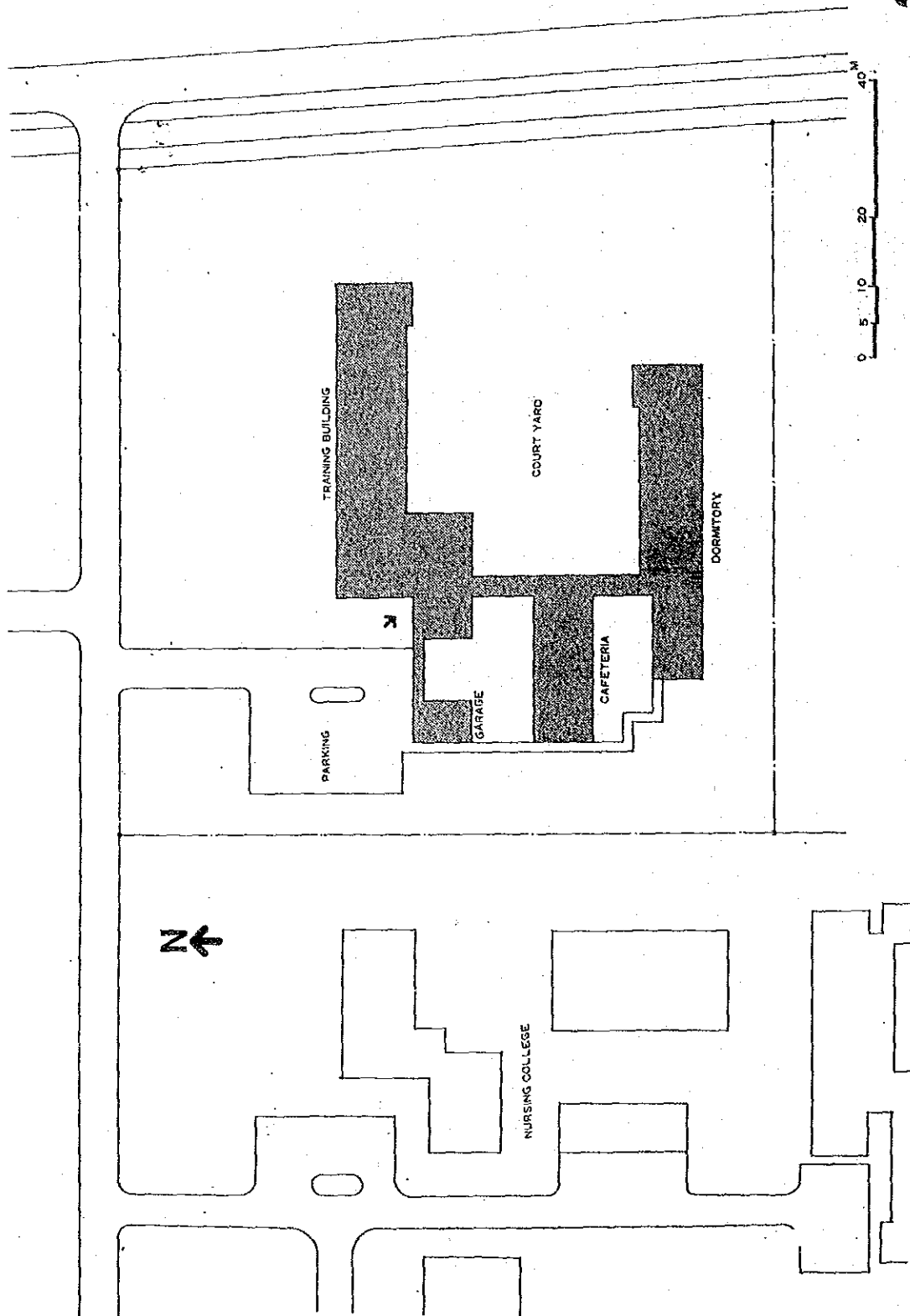
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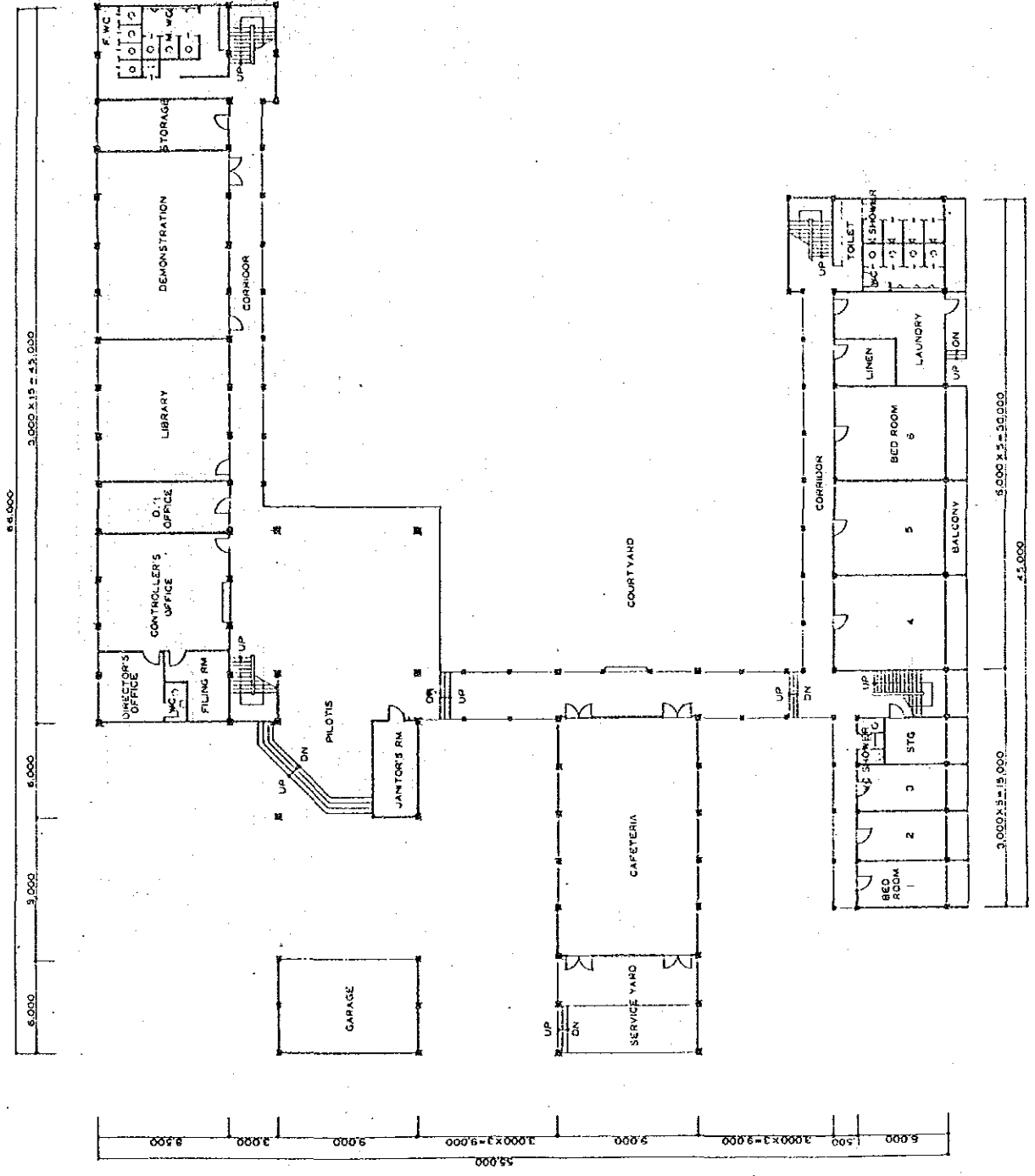
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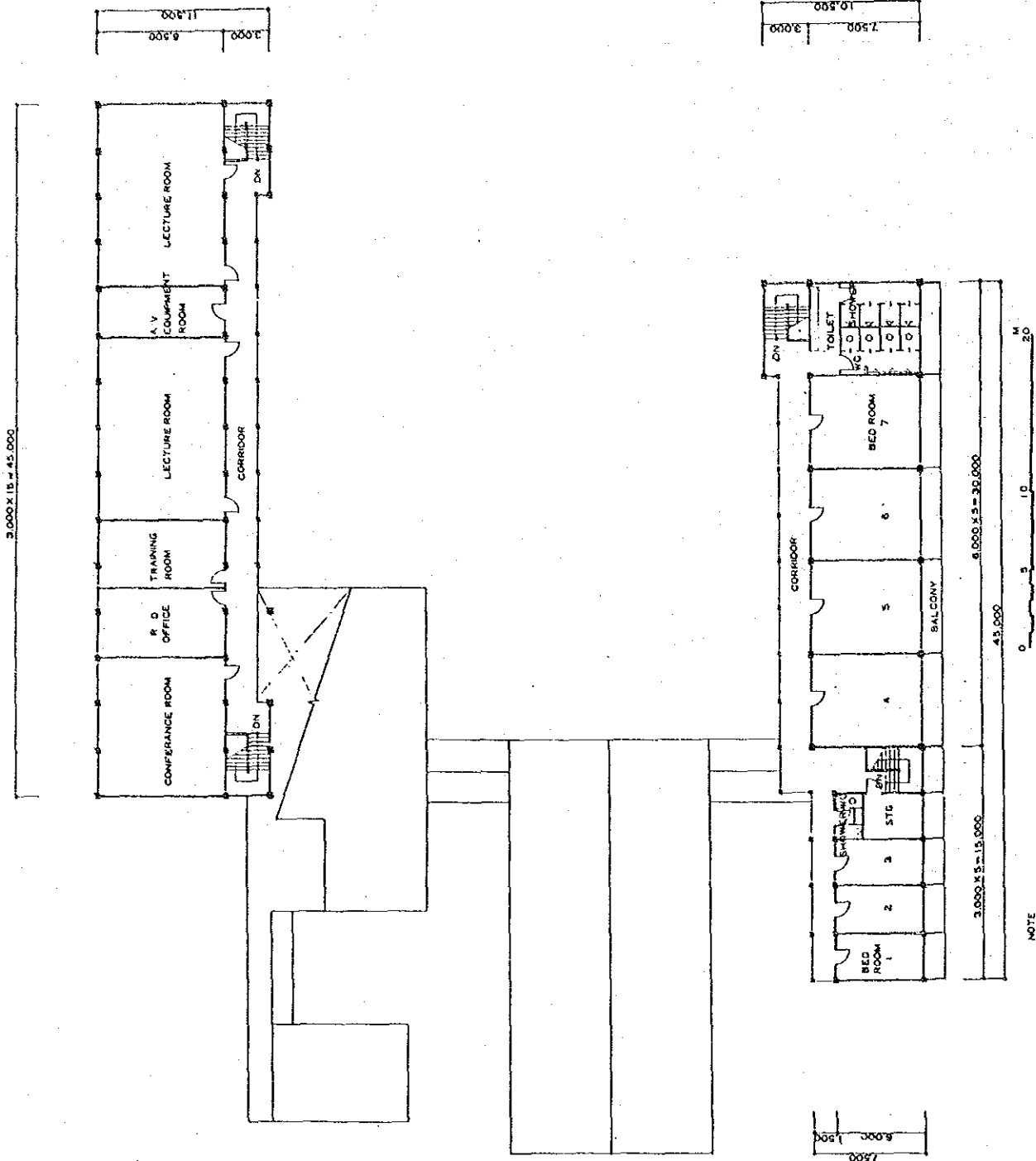
NORTH RTC/PHC SECTION 30



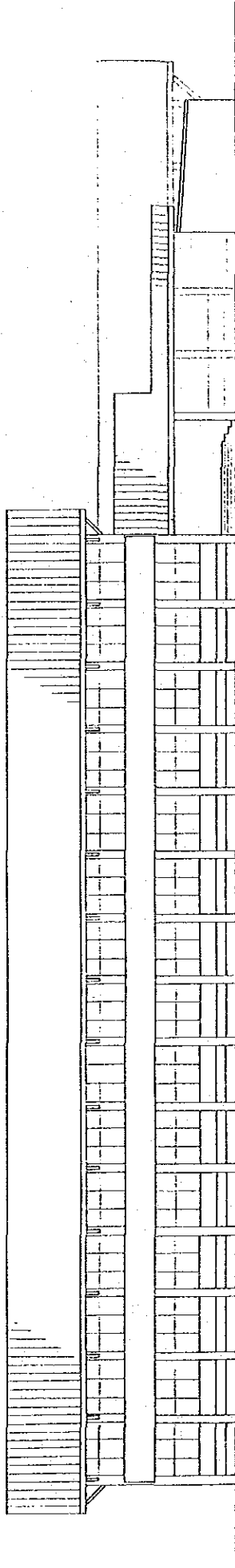
SOUTH RTC/PHC PLOT PLAN **31**



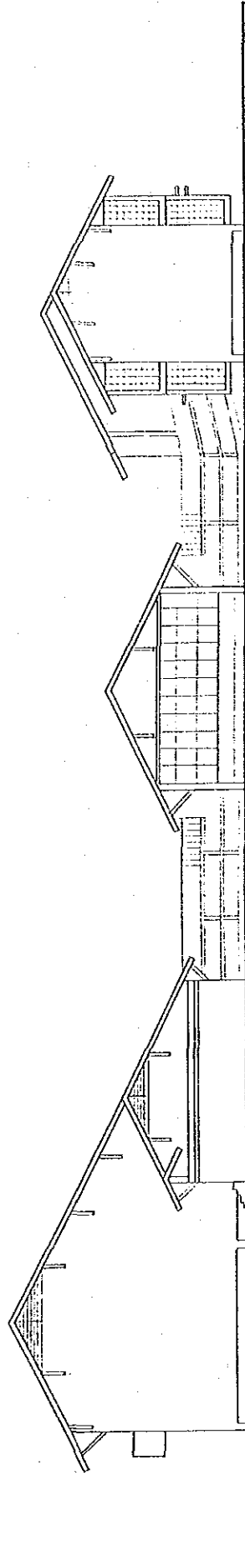
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SOUTH RTC/PHC 2ND FLOOR PLAN 33

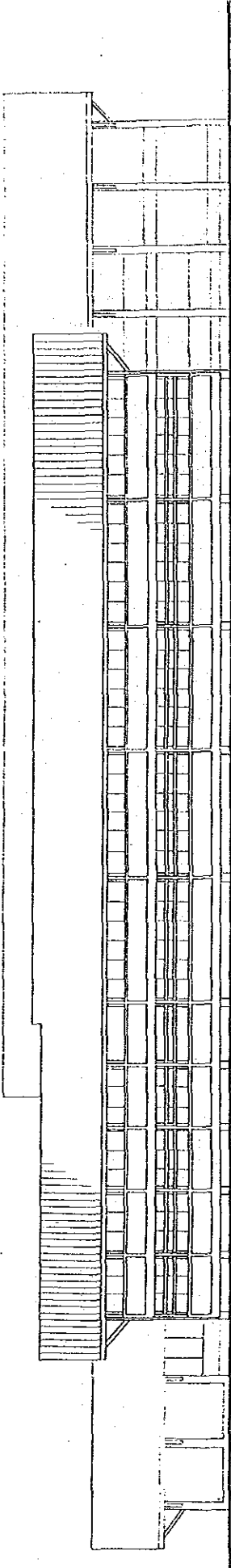


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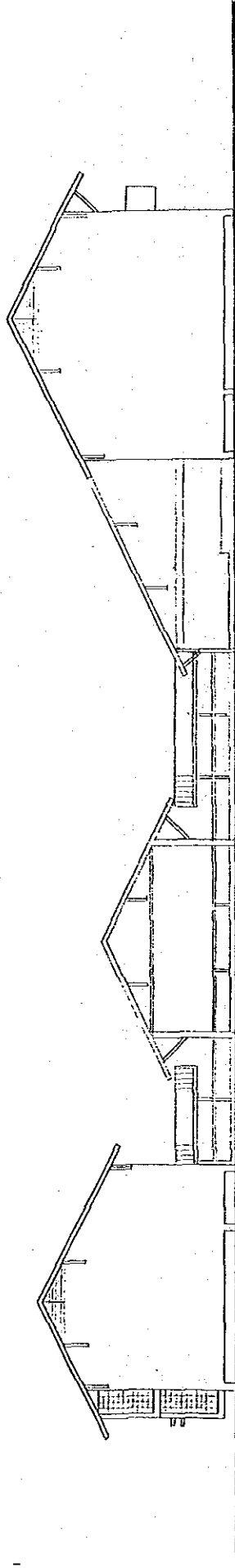


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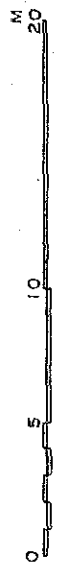




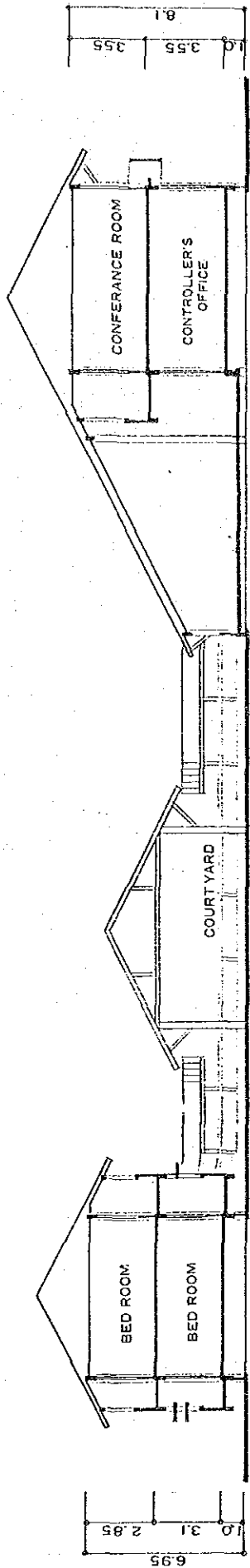
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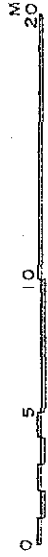
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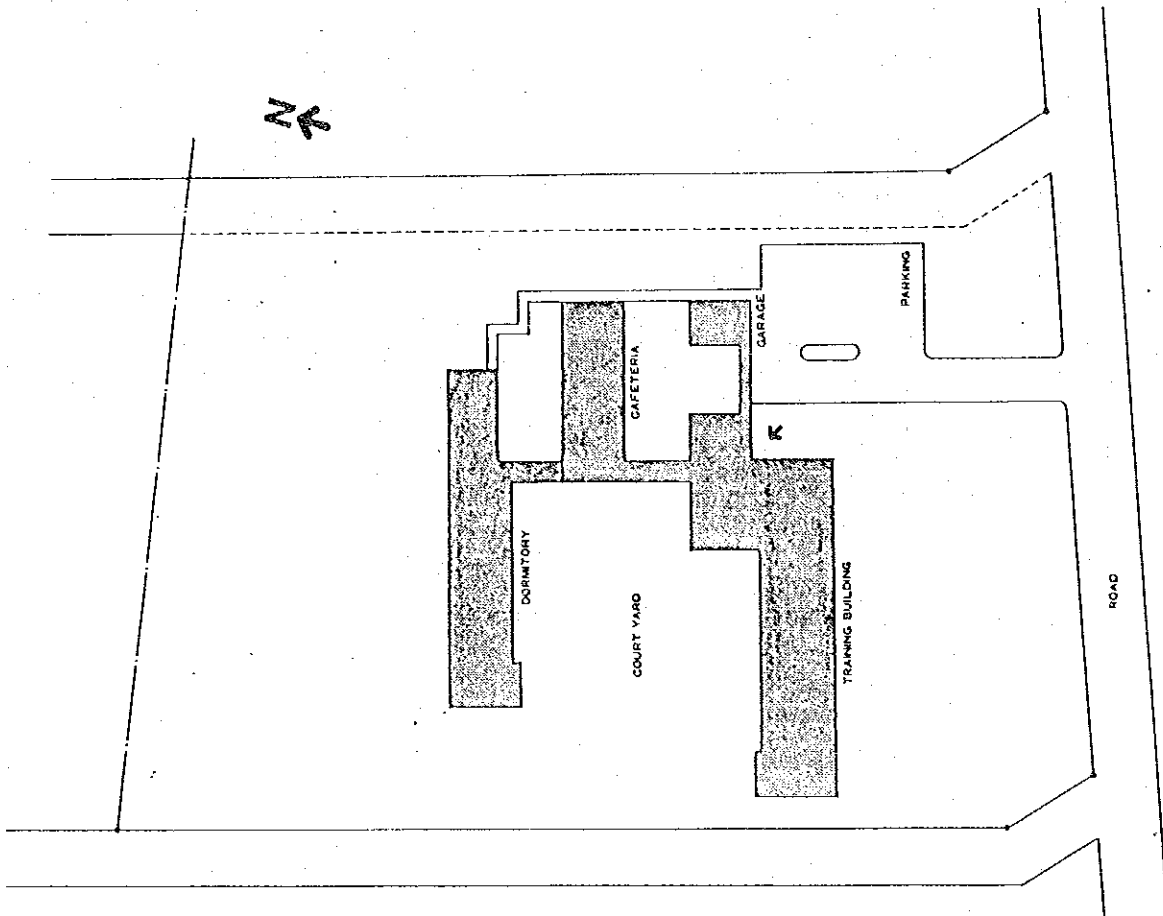
SOUTH RTC/PHC ELEVATION **35**



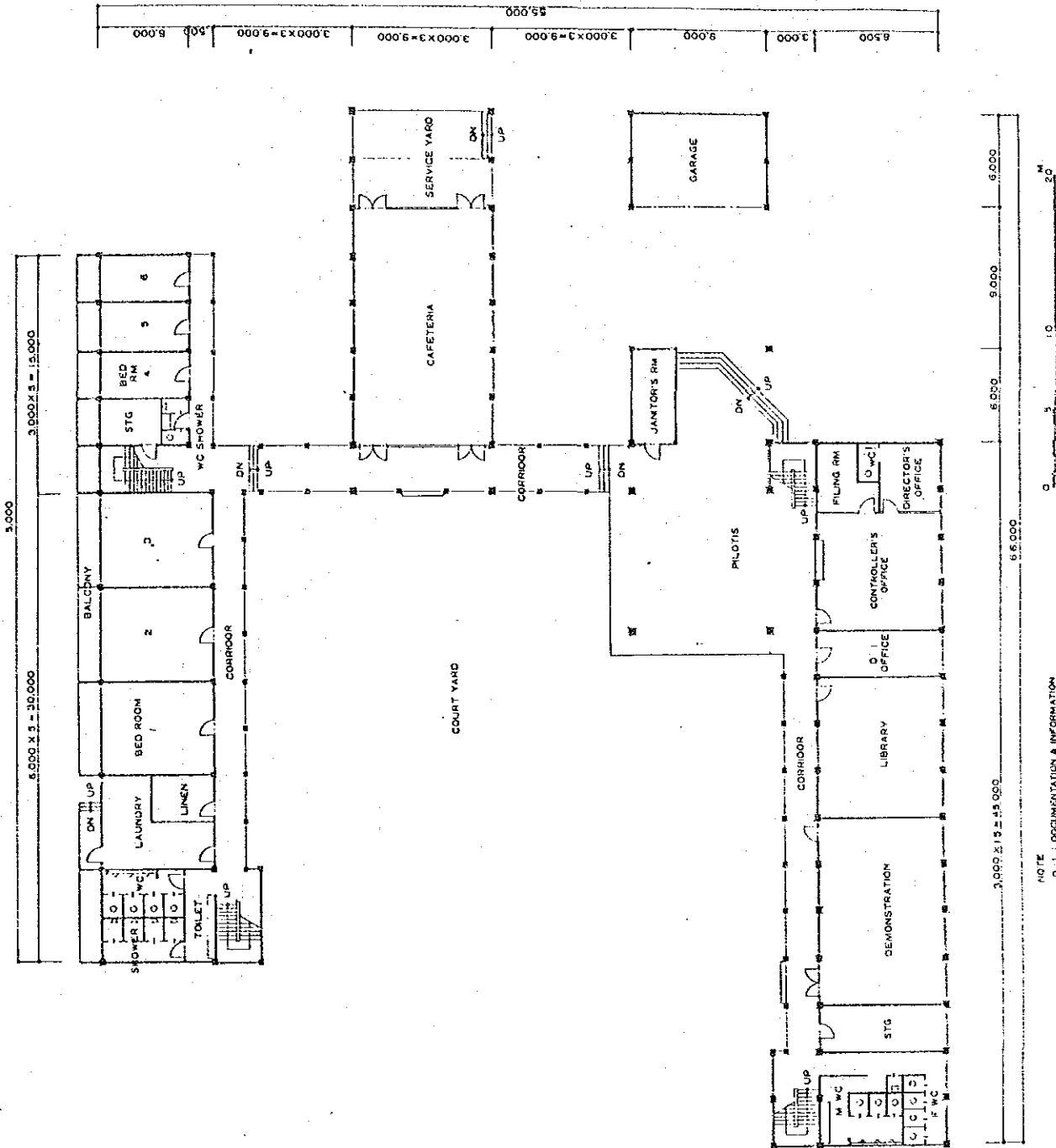
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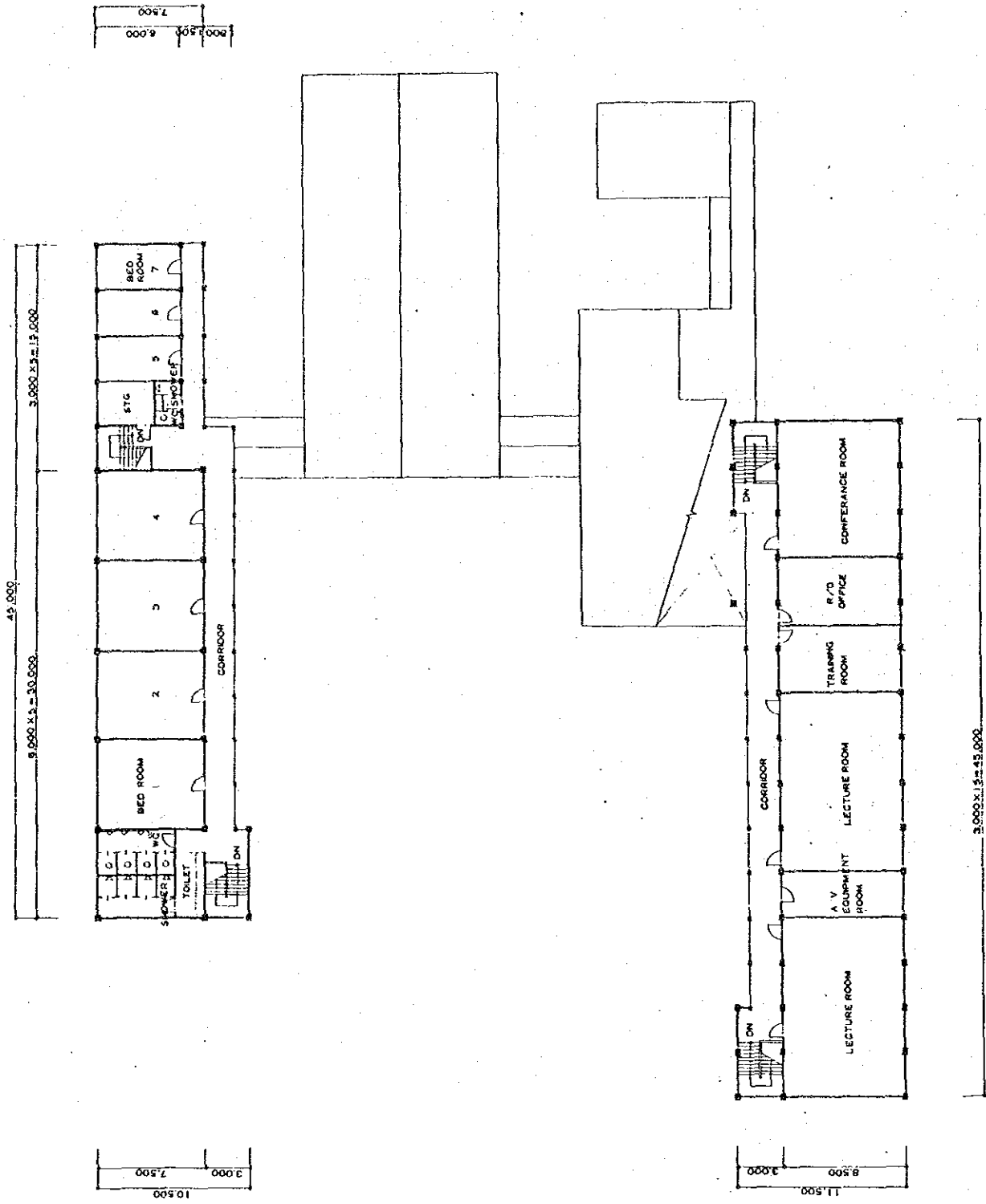


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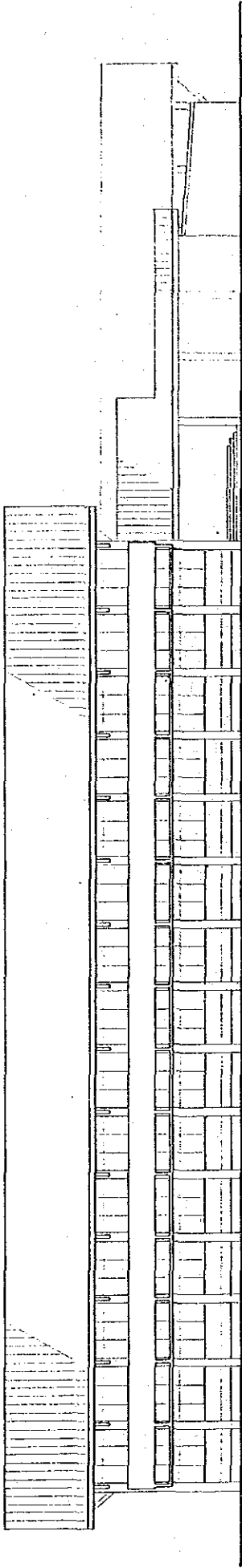


CENTRAL RTC/PHC PLOT PLAN 37

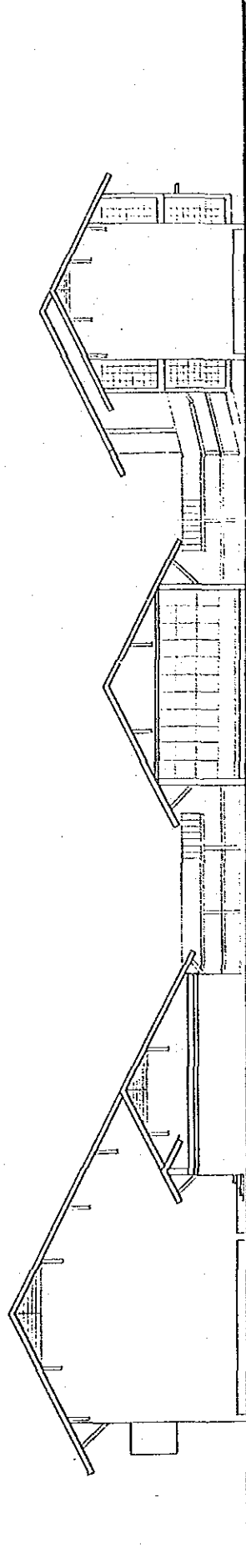




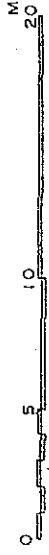
CENTRAL RTC/PHC 2ND FLOOR PLAN 39

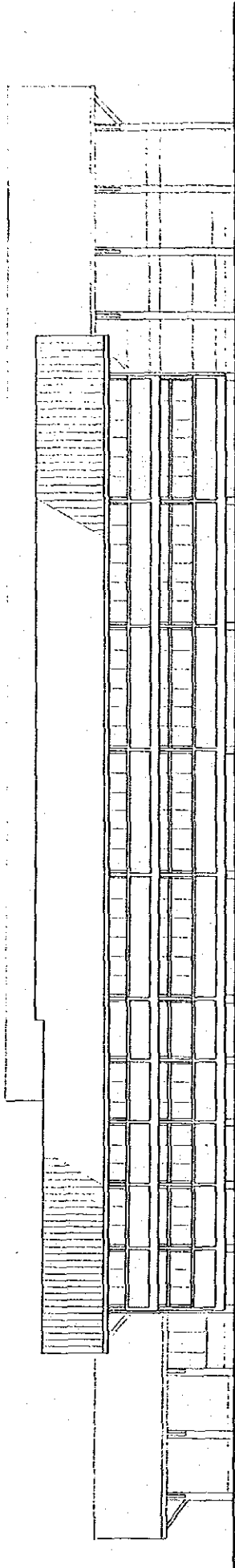


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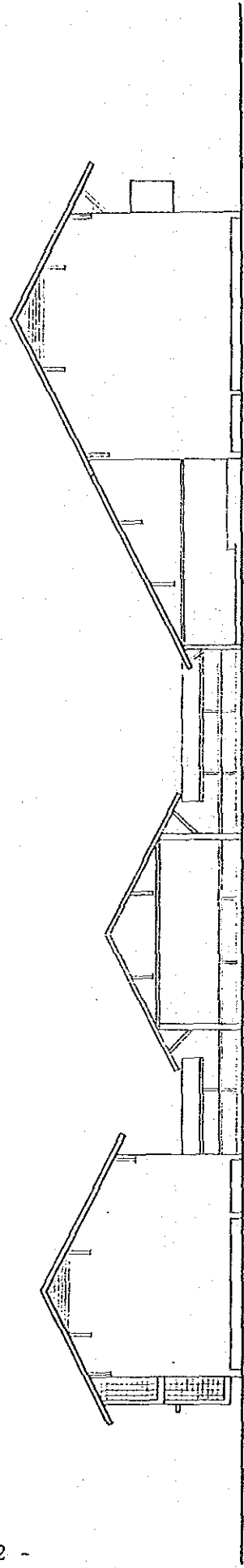


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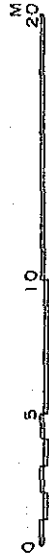


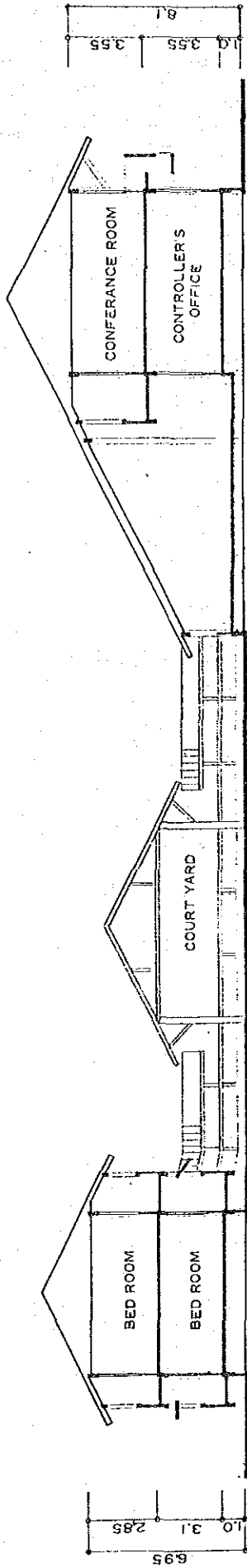


NORTH ELEVATION

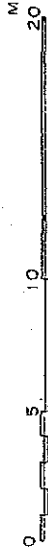


WEST ELEVATION





SECTION



CENTRAL RTC/PHC SECTION 42

Chapter 6 SETUP FOR PROJECT EXECUTION

Chapter 6 SETUP FOR PROJECT EXECUTION

6-1 Execution Bodies

For the implementation of the project, the government of Thailand will establish a Board of Executives for this project as well as ATC/PHC and 4 RTC/PHCs as a governmental body.

Mahidol University and the Ministry of Public Health (hereinafter referred to as MPH) will fully Support the body and the Rector of Mahidol University and the Deputy Under-secretary of MPH will be the core member of the Board, the former as the chairman and the latter as the Co-chairman. The Board will include as its member other Ministries which will have close relation to the project operation, and will decide polices and plans on training, research/development and other activities as well as administrative matters of ATC/PHC and RTC/PHCs.

Under the Board, a Project Director will be installed and the Chairman of the Board will sit on the position as a organizational rule. The Project Director will execute the decisions made by the Board giving directions to ATC/PHC and RTC/PHCs on their operation and administration. Thus, The Project Director, one and the same with the chairman of Board, will have full responsibility for the whole operation of the project.

Mahidol University will bear budgetary responsibility of ATC/PHC, and MPH will of 4 RTC/PHCs. Technically, ATC/PHC will be supported by Mahidol University as well as MPH, and RTC/PHCs will be supported by ATC/PHC as well as MPH.

The whole organization of the body is shown, including related bodies, in the Fig. 6-1-1 in the next page.

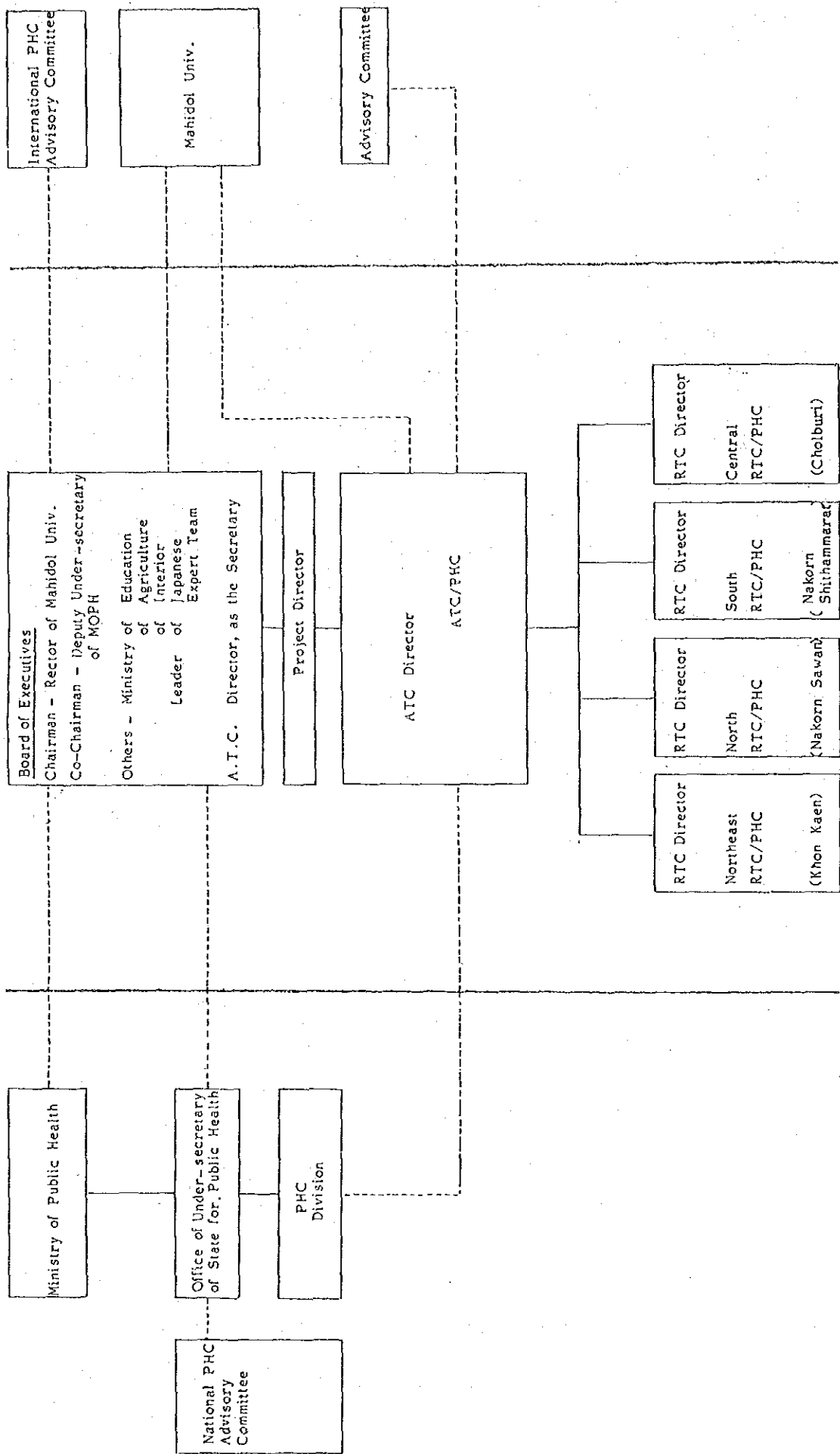
6-2 Construction Project

6-2-1 Execution Body

The Project Director will have the responsibility for the construction project. Under the command of Project Director, the project will be executed.

Mahidol University and MPH will work to maintain harmony among all the persons involved.

Fig. 5-1-1 Organization Chart of ATC/PHC & RTC/PHCs



6-2-2 Scope of Works

- (1) The costs of the construction works and the equipment procurement, including the services of a consultant, of the following items which are specified in Chapter 5 are born by the Government of Japan.

1) ATC/PHC

(a) Buildings and its incidental facilities

- a) Main building
- b) Training block including museum
- c) Auditorium
- d) Dormitory block
- e) Garage
- f) Connecting corridors

(b) Equipment

- a) Equipment for training
- b) Equipment for teaching materials production
- c) Data processing equipment

(c) Vehicles

2) RTC/PHCs

(a) Building and its incidental facilities

- a) Training and controller's block including a garage
- b) Dormitory and a dining room block
- c) Connecting corridors

(b) Equipment

- a) Equipment for training

(c) Vehicles

RTC/PHCs are as follows. The number indicates the priority order.

- | | |
|--------------|---------|
| 1. Northeast | RTC/PHC |
| 2. North | RTC/PHC |
| 3. South | RTC/PHC |
| 4. Central | RTC/PHC |

(2) Items whose costs are born by the Government of the Kingdom of Thailand:

- 1) Securing the plots of land
- 2) Site survey
- 3) Filling and levelling of the sites
- 4) Water supply mains to the sites
- 5) Drainage from the buildings
- 6) Power main lines to the sites
- 7) Telephone lines to the sites
- 8) Exterior facilities and landscaping
- 9) Provision of spaces necessary for temporary offices, working area, stock yards, etc.
- 10) Furniture, carpet and curtains
- 11) Maintenance and operation costs and expenses.

6-2-3 Design and Supervision

After a Exchange of Note (hereinafter referred to as E/N) on the Project between the Government of Japan and the Government of the Kingdom of Thailand, the latter will proceed to a step to make a agreement with a consultant. The consultant, based on the agreement, will provide professional services concerning the construction works and the equipment procurement whose costs are born by the Government of Japan. The services consist of the items as follows.

(1) Preparation of tender documents

- 1) Working drawings.
- 2) Specifications.
- 3) Draft of the construction contract.
- 4) Preparation of the interpretation of the documents

(2) Procedure for the selection of a contractor

- 1) To check the qualification of tenderers and to make recommendations to the Government of Thailand on participants in tender.
- 2) to place tender on behalf of the Government.
- 3) To act as a negotiator on behalf of the Government in case the tenders are not successful.
- 4) To estimated necessary costs in order to carry out the above services satisfactly.

- 5) To be a witness to the contract.
- (3) Administration of the construction contract
- 1) To keep eyes on the process and the progress of the construction works as to be done in accordance with the contract and confirm the completion.
 - 2) To dispatch to the sites supervisors necessary for the above services.

In the above-mentioned process, the persons concerned in the Project both of the government and of the consultant shall take close contacts all the time, and upon mutual consents, shall exert their maximum efforts to the success of the Project.

6-2-4 Construction Works

Based on the E/N, the Government of Thailand will select a contractor and enter into a contract for the works and the procurement of the equipment whose costs will be born by the Government of Japan.

Under the supervision of the consultant, the contractor will complete the buildings and deliver the equipment.

It is supposed that in connection with the budgetary allocation the works will be divided to two phases. The overall construction project schedule based on the assumption is shown in 6-2-6. The first phase must be completed at least by the middle of March, 1984 taking into account the Japanese budgetary system. However, since this will limit the construction period too short, some measures have to be taken in the design stage and in the construction stage as well.

Construction work schedules will be planned by the contractors on their own responsibility in accordance with the contracts. Then the consultant will check and approve the schedules. Fig. 6-2-1 and 6-2-2 are tentative work schedules.

The relevant works done by the expenses of the Government of Thailand are essential to be executed in harmony with the works done by the grant aid. So, the consultant have to give necessary technical support concerning these works to the Government of Thailand.

Fig. 6 - 2 - 1

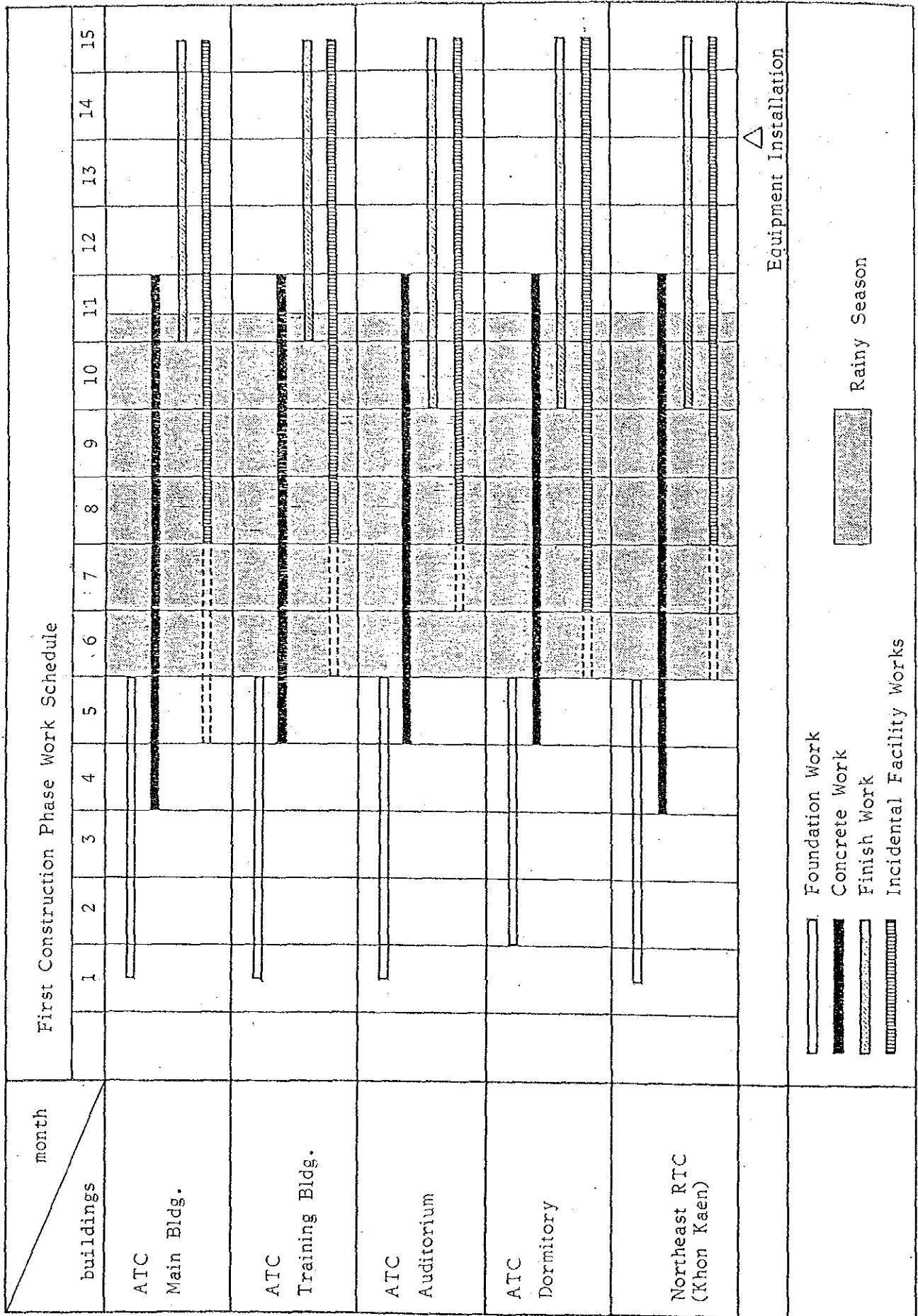
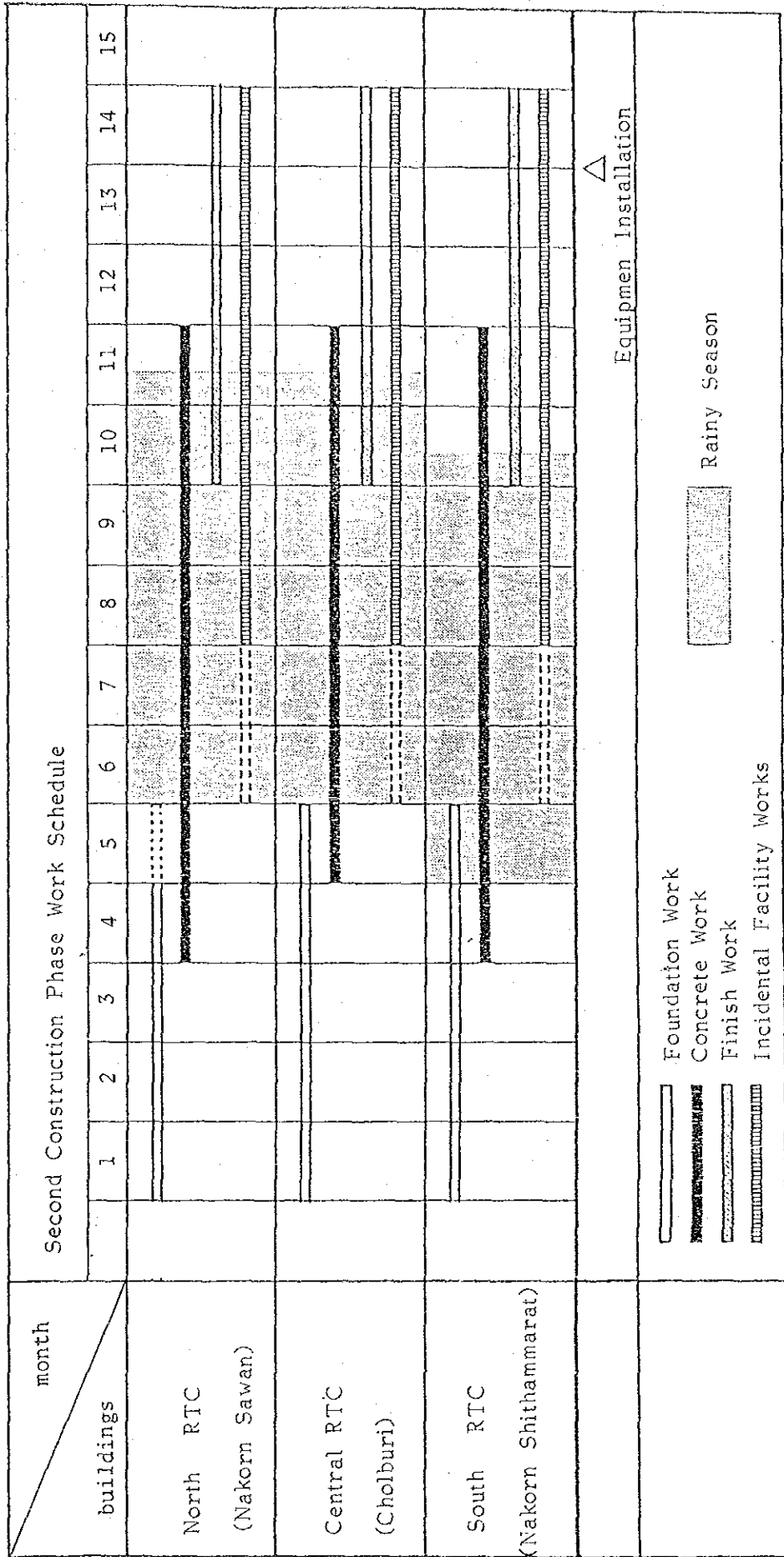


Fig. 6 - 2 - 2



6-2-5 Materials and Equipment Procurement

Most of the construction materials needed can be procured in Thailand except special ones.

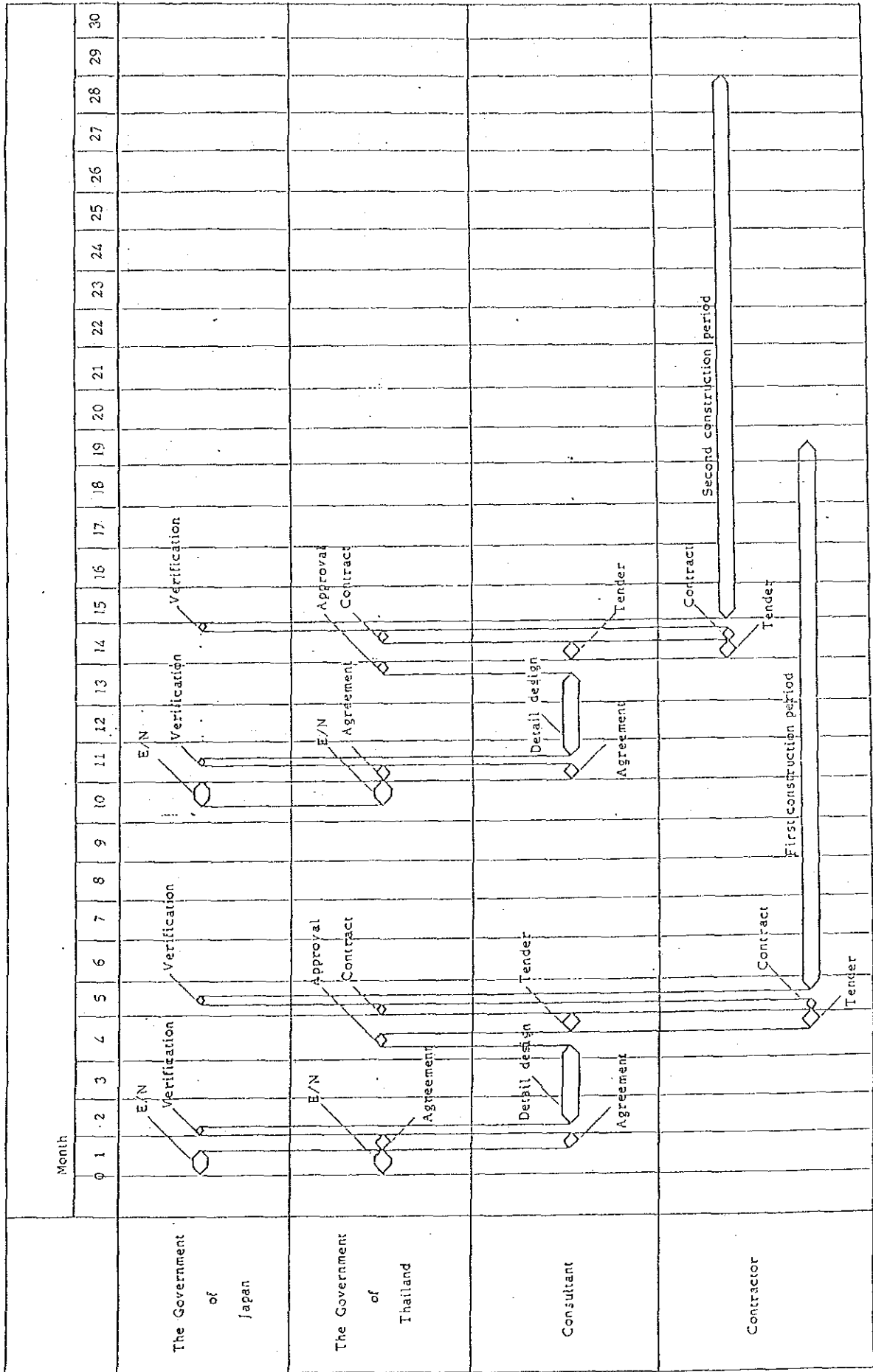
However, following circumstances should be born in mind. In is hard to get the materials of same shape, size and quality due to less strict standard and quality control on products. Market prices may vary greatly and delivery dates may delay because of shortage of materials, that may affect the work schedules. Natural disaster due to flood and paralyze of transportation often causes the delay of arrival of materials. In south part of the country, some security problems may interrupt material transportation.

Most of machines for temporary work are imported ones. So, it is hard to maintain, repair and adjust them because of lack of parts and technicians.

6-2-6 Total Schedule of the Construction Project

Refer to Fig. 6-2-3 in the next page for the entire schedule from the first phase E/N till completion of the construction project of the second phase. In the Fig., (0) point is supposed to be September 1, 1982, 19th month to be March, 1984 and 31th month to be March, 1985.

Fig. 6-2-3 Overall Construction Schedule



6-3 Estimation of Operation and Administrations Costs

Annual Operation cost and administration cost for the year 1984 are roughly estimated as follows. In the administration cost, the allowance for inflation has been calculated assuming the annual rate of 12%.

6-3-1 ATC/PHC

(Unit = 1,000 Bahts)

(1) Administration cost

1) Personnel expenses	4,944
(No. of staff = 51.)	(4,100)
(No. of misc. workers = 23.)	(844)
2) Transportation exps.	205
3) Communications exps.	123
4) Supply goods exps.	82
5) Conference/meeting exps.	41
6) Facility maintenance exps.	(after 2 yrs 100)
7) Equipment and vehicle maintenance exps.	(after 2 yrs 340)
8) Power, heat and water exps.	950
9) Vehicle fuel exps.	350
10) Miscellaneous	105

Sub-total 6,800

(2) Operation cost

1) Training expenses	7,000
(Domestic training)	(4,000)
(ASEAN training)	(1,800)
(ASEAN seminars)	(1,200)
2) Researchs (60 items)	3,000
3) Developments of am model tambol (5 tambol)	3,500
4) Central level conference (once a year)	1,100

Sub-total 14,600

TOTAL 21,400

6-3-2 RTC/PHC

(1) Administration of cost

1) Personnel expenses	1,083
(No. of staff = 13)	(854)
(No. of misc. workers = 10)	(229)
2) Transportation exps.	43
3) Communications exps.	26
4) Supply goods exps.	17
5) Conference/meeting exps.	8
6) Facility maintenance exps.	(26,000 bahts/yr after the 2'nd yr.)
7) Equipment and vehicle maintenance exps.	(33,000 bahts/yr after the 2'nd yr.)
8) Power, heat and water exps.	140
9) Vehicle fuel exps. (3 units)	170
10) Miscellaneous	13
	<hr/>
Sub-total	1,500

(2) Operation cost

1) Training expenses	4,800 (see note)
2) Research expenses	(included in ATC)
3) Development expenses	(included in ATC)
4) Regional conference expenses (3 times a year)	450
	<hr/>
Sub-total	5,250
	<hr/>
TOTAL	6,750

Note: expenses for fieldwork training of ATC courses are not included, these are included in ATC training expenses.

Chapter 7 PROJECT EVALUATION

Chapter 7 PROJECT EVALUATION

7-1 Soundness of the Project

It is difficult to promote PHC depending only on existing organizations in the public health and medical field. PHC should be promoted by involving wider fields which are not currently participating in public health activities.

The first stage of the PHC training programme now being conducted by the Ministry of Public Health is scheduled to be finished by the end of Fifth Five-year National Health Development Plan training and organizing VHV and VHC throughout the country. The concept of this ATC and ATC project have to be planned so that the facilities bear fruit in the development of PHC from that moment on.

The questions to be solved in the development are roughly grouped into the following four items.

- (1) Improving theoretical foundations for the PHC through research and development.
- (2) How to promote enlarged scale training and retraining of PHC participants and other personnels concerned.
- (3) How to get cooperation from other sectors such as the Ministries of Interior, Education and Agriculture.
- (4) Developing techniques for direct dissemination of PHC information among the people through mass media and other ways.

The facility plan mainly focuses on the training related to the target of the item (2). As for the other three targets, considerations are being made in the plan to cover immediate needs. Particularly, the third target is a major concern of ATC/PHC because the success of PHC will greatly depend on cooperation among many sectors.

At the early stage of the planning of this project, there were two plans, one was to establish only ATC/PHC, and the other was to establish RTC/PHCs as well as ATC/PHC.

However, after several discussions among the people concerned it was decided to establish four RTC/PHCs in each region and to divide roles among RTCs and ATC from the points as follows.

- (1) It costs too much to gather all the trainees from tambols to ATC.
- (2) Each region has its own cultural, social and economic environments which are different from each other.
- (3) Well-organized technical supports by the central level to the provincial peripheral level are supposed to be difficult, resulting in the need of regional level centers.
- (4) The gaps between the central and tambol level are so much in many aspects that the trainees from tambol levels has better to be trained in their own regions. And so doing also improves efficiency in the utilization of facilities.

Although the first plan with only ATC/PHC has several merits, another four RTC/PHCs were decided from these points. And the project could keep continuity and conformity with the VHV and VHC training programme having been promoted by the Ministry of Public Health.

It is reasonable that researches and developments are practiced on consignment basis, taking the actual contents of researches and developments and the effective use of the existing organizations and personnels into consideration.

7-2 Outputs and Significance

7-2-1 ATC/PHC

The training courses to be held at ATC are expected to get great results. Twelve courses are planned as periodical trainings. The courses are for PHC specialists, medical doctors, administrators and those in education and agriculture who will be instructors of the provincial level. 360 persons are trained per year. Therefore, in five years, 25 instructors will be provided in each of 71 provinces. Also ATC will effectively enhance PHC trainings to students, and the improvement of both quantity and quality of PHC personnel can be expected in the future.

It is significant for Japan to participate in project to transfer the achievements of Thailand PHC to the other ASEAN countries by means of international training courses and seminars.

National conferences for PHC promotion will be actively held getting facilities for their own purpose.

Teaching material production will serve not only for trainings but also for conferences, researches and developments especially because of their efficient A/V aids and printing ability.

It is a minor topic in the early stage of the project to develop techniques for publicizing PHC through mass media. However, publicity plays such an important role in PHC activities that developing the techniques should be emphasized.

7-2-2 RTC/PHC

According to the first-year training program after the completion of the facilities, major RTC trainings are summarized as following two items.

(1) For District and Tambol Level Government Officers:

100 trainees x 4 sessions = 400 trainees per year

(2) For Village Council Members and PHC Committee Members:

100 trainees x 8 sessions = 800 trainees per year

The above trainee total up to 1,200. The trainees in four RTCs altogether total up to 1,600 under item (1) and up to 3,200 under item (2), making a grand total of annual trainees up to 4,800. According to Table 3-3-2 in Chapter 3, the number of the targets to be trained in the whole nation under item (1) is 37,200, while those under item (2) is 72,000.

Therefore, the program will take about twenty three years to complete training covering whole the targets, if they are trained only in RTCs. However, this calculation is based on the pace of the first-year training program, which is subject to budgetary limitation in training expenses for that period. While, budgetary allocations are expected to be increased for the years ahead. In those cases, the number of training sessions can be increased by nearly 50% more. On the other hand, about a half of the targets under item (1) and (2) is planned to receive training on the provincial level.

Considering these circumstances, the training which should be done by RTCs is expected to be completed in a ten year period. Thus the

training program of RTCs will be incorporated into the National Five-year Health Development Plan in the future.

The foregoing is major objectives of RTC training. RTCs are also planned to serve as front-line bases for field-work training and research and development activity of ATC, as well as information centres for individual regions, and also providing places for PHC conference on regional level.

7-3 Fitness and Efficiency of the Basic Design

After several discussions, the spaces was revised and approved as:

ATC	6,976 m ²
RTCs 2,004 m ² x 4 RTCs =	8,016 m ²
Total	15,992 m ²

Subjects which PHC deal with range over various fields, and this project is applied to the entire Thailand. Therefore, even being limited to training, it is hard to estimate how much space is necessary in the facilities. Prior to the discussion, Thai side had prepare a facility plan which was reasonable as an ideal plan considering the future development and its necessity. However, it was needed to make the facility size smaller than that for the following two practical reasons.

- (1) After due consideration of the current financial situation in Thailand, as the hardship is also the same in Japan, a difficulty is prospected to make a full use of all the facilities in the proposed plan. And shortage of manpower are feared in connection with the situation.
- (2) The Japan's foreign aid system is premised on the self-reliance of the recipient country, so that this project is not able to cover all the plan including the future developments.

The revisions were made by enhancing multi-purpose utilization of each room in the facilities.

Although expansion of the facilities are expected according to the development of the future training programs and research and development

programs, the revised plan of the facilities is sufficient and fit to handle the operations and activities in the early stage of the project.

A medium size computer system was asked to be introduced to ATC for the purpose of processing the statistical data of one-tenth of the national tambols. However, the introduction of the computer system is considered not to be urgently required because the plan for the data collection system have not been realized yet. However a computer for research/developments is needed, so a system fit for that purposes is planned to be introduced.

In addition, some equipment were deleted from the list, because of their possibility of under-utilization.

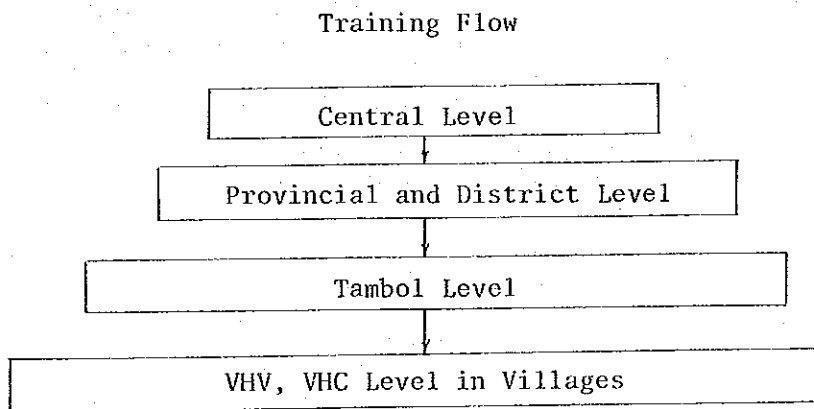
Chapter 8 CONCLUSION AND RECOMMENDATION

Chapter 8 CONCLUSION AND RECOMMENDATION

When the numbers per capita of facilities and manpower as doctor and nurse etc. of Thailand are compared to those of Japan, they are both about one tenth. In the rural area, the situation becomes worse than this, because of the fact that most of facilities and manpower are concentrated in the Metropolitan area. It is said that 70 to 75 per cent of the rural population are not able to receive medical treatment other than buying medicines.

Of course, not only from the budgetary restrictions but also physically it is not possible to solve such conditions in the near future. This is why the Government of Thailand formed the PHC scheme as their fundamental policy, which becomes a worldwide movement under the guidance of WHO. And, establishing PHC as a strategy, the Government of Thailand has been extending their efforts in the organization of the medical system based on the community participation.

Following the Fourth National Health Development Plan, the Fifth Plan is now underway. And here consecutively, VHV and VHC training is being carried out expanding training manpower in such a flow as follows.



In the final stage of the training, the organization will have about 50,000 VHVs, and about 460,000 VHCs.

The project this time intends to establish facilities used exclusively for training, the training of Tambol level trainers and above. Although this training is temporarily being given at the Provincial Chief Medical Office, its limit will come sooner or later. Therefore, when

the training plans increase in number and advance in quality, along with further promotion of PHC, it will become extremely important to establish the facilities proposed in this project.

Thus, this project will contribute to the development of PHC in Thailand and to the betterment of the medical conditions. The significance it gives to the welfare improvement of Thailand people is said to be great.

Further, although the project is planned to be operated with a full support by Mahidol University and Ministry of Public Health. The implementation of this project depends on securing staff in ATC and RTC, as are described in Chapter 3, and also securing budgetary allocation for operation cost and administration expenses which are described in Chapter 6. Efforts by the government of Thailand in this direction is therefore essential.

In origin, the concept of PHC is extremely wide and extensive with many differing opinions concerning the methodology and practise of its accomplishments and this indicates the many facets of PHC and the diversity of its necessary functions. This project is a joint project made by Mahidol University and the Ministry of Public Health. The former excels in theory and methodology while the latter displays organizing ability especially in the rural area. We sincerely hope that by putting together the strong points of both, they will work hand in hand for the development of PHC in Thailand and will achieve its final goals.

APPENDICES

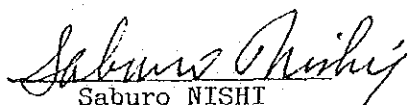
Minutes of Discussion on the Establishment
Project of Primary Health Care Training
Centers in the Kingdom of Thailand

In response to the request of the Government of the Kingdom of Thailand, the Government of Japan has sent, through the Japan International Cooperation Agency which is an official agency implementing the technical cooperation of the Government of Japan, a team headed by Dr. Saburo NISHI, Department of Public Health, The Institute of Public Health, to conduct a basic design survey on the Establishment Project of Primary Health Care Training Centers (hereinafter referred to as the "Project") for 28 days from May 23rd, 1982.

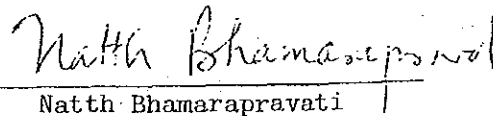
The team had a series of discussions and exchanged views with the Thai counterpart's party headed by Prof. Natth Bhamarapavati, Rector of Mahidol University.

Both parties have agreed to recommend their respective Governments and the authorities concerned to examine the result of the survey attached herewith toward the realization of the Project.

June 4th, 1982


Saburo NISHI

Team Leader,
Japanese Survey Team


Natth Bhamarapavati

Rector,
Mahidol University

Attachment:

1. The objective of the Project is to provide necessary buildings, facilities and equipment for the Primary Health Care Training Programme in the Kingdom of Thailand.
2. Both parties understood the necessity of establishing ASEAN Training Center (hereinafter referred to as ATC/PHC) at Salaya Campus of Mahidol University and four Regional Training Centers (hereinafter referred to as RTC/PHC) in Khon Kaen, Nakhon Sawan, Cholburi, Nakhon Srithammarat Provinces for implementation of the PHC training programme.
3. The proposed sites of each centers are as follows:
 1. ATC/PHC: in Salaya Campus of Mahidol University, Nakorn Pathom Province
 2. Northeast RTC/PHC: in the site of Northeastern Regional College of Public Health, Khon Kaen Province
 3. North RTC/PHC: in the site of Provincial Public Health Office, Nakhon Sawan Province
 4. South RTC/PHC: in the site of Maharaj Hospital, Nakhon Srithammarat Province
 5. Central RTC/PHC: in the new development area near the Communicable Disease Control Unit, Cholburi Province
4. The Japanese Survey Team will convey the desire of the Government of the Kingdom of Thailand to the Government of Japan that Japanese Government will take necessary measures to cooperate in implementation the Project and will provide the training facilities as listed in Annex 1 within the scope of Japanese economic cooperation in grant form.
5. The Government of the Kingdom of Thailand will take necessary measures listed in Annex II on conditions that the grant assistance by the Government of Japan is extended to the Project.

S. Nishij

T. S.

Annex I

Items requested by the Government of the Kingdom of Thailand whose costs will be borne by the Government of Japan and the priority orders are shown as follows:

1. ATC/PHC

(1) Building and Facilities

- 1) Offices and others
- 2) Training and lecture rooms
- 3) Research and development rooms
- 4) Training material production rooms (including audio visual rooms)
- 5) Library
- 6) Auditorium
- 7) Museum
- 8) Dormitory and cafeteria for trainees
- 9) Conference rooms
- 10) Working spaces and storerooms

(2) Equipment

- 1) Training equipment
- 2) Audio visual equipment
- 3) Data processing equipment
- 4) Printing and Photocopy machines

(3) Vehicles

2. RTC/PHC

(1) Building and facilities

- 1) Offices and others
- 2) Training and lecture rooms
- 3) Audio visual room
- 4) Dormitory and cafeteria for trainees
- 5) Library

S. Pichay

726

- 6) Training material production room
- 7) Research and development room

(2) Equipment

- 1) Training equipment
- 2) Audio visual equipment
- 3) Printing and Photocopy machines

(3) Vehicles

* The priority order of each RTC/PHC is as follows:

- 1. Northeast RTC/PHC
- 2. North RTC/PHC
- 3. South RTC/PHC
- 4. Central RTC/PHC

S. Mishra

7/15

Annex II

Following measures are required to be taken by the Government of the Kingdom of Thailand:

1. To provide data and information necessary for the design and the construction
2. To secure lots of land necessary for the construction of facilities and to clear, fill and level the site as needed before the start of the construction
3. To provide facilities for distribution of electricity, telephone, water supply and drainage and other incidental facilities outside the Buildings at each proposed sites
4. To ensure prompt unloading, tax exemption, customs clearance at ports of disembarkation in Thailand, and prompt internal transportation therein of the products purchased under the grant
5. To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in Thailand with respect to the supply of the products and the services under the verified contracts
6. To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into Thailand and stay wherein for the performance of their work
7. To maintain and use properly and effectively the facilities constructed and equipment purchased under the grant
8. To provide and accord necessary permissions licences and other authorization required for carrying out the Project
9. To provide other Items listed in Annex III

S. Nishij

M.B.

Annex III

Items whose costs will be borne by the Government of the Kingdom of Thailand:

1. Water supply mains to the project sites
2. External drainage from the buildings and sewage treatment facilities
3. Electrical power main line to the project sites
4. Telephone lines to the project sites
5. Exterior facilities and landscaping
6. Provision of space necessary for such construction as temporary office, working area, stock yards and others
7. Furniture, carpet, curtains and other furnishings
8. Maintenance and operation cost and expenses

Kidij

W.B.

Appendix II Organization of Study Team

Leader	Dr. Saburo Nishi	Chief, Division of Health Administration Dept. of Public Health National Institute of Public Health
Member (PHC)	Prof. Shunichi Yamamoto	Dept. of Hygiene & Preventive Medicine Faculty of Medicine The University of Tokyo
Member (Coordination)	Mr. Takeshi Imazu	Deputy Head Basic Design Div. Grant Aid Dept. Japan International Cooperation Agency
Member (Architectural Planning)	Mr. Eiichi Yabumae	Chief Architect Ishimoto Architectural & Engineering Firm, Inc.
Member (Building Design)	Mr. Shozo Ibe	Architect Ishimoto Architectural & Engineering Firm, Inc.
Member (Incidental Facilities)	Mr. Yoshihisa Omura	Mechanical Engineer Ishimoto Architectural & Engineering Firm, Inc.
Member (Equipment)	Mr. Seiichi Nishikubo	Electrical Engineer Ishimoto Architectural & Engineering Firm, Inc.

Appendix III List of Counterparts

Mahidol University

1. Prof. Dr. Natth Bhamarapavati, Rector
2. Prof. Dr. Prawase Wasi, Deputy Rector
3. Prof. Dr. Debhanom Muanyman, Dean, Faculty of Public Health
4. Dr. Krasae Chanawongse, F of P.H.
5. Dr. Mali Thainua, Visiting Professor
6. Assoc. Prof. Dr. Dusanee Suthapreyasri, F of P.H.
7. Assoc. Prof. Dr. Kraissid Tanfisinin, Faculty of Medicine
8. Dr. Anong Mondasuta, Asist. Dean, F of Medicine
9. Dr. Orapin Singhadej Dept. of Maternal & Child Health
10. Dr. Soowapat Pongroch, Dept. of P.H. Administration
11. Prof. Chote Buranakari, Dept. of San. Engineering, F of P.H.
12. Asist. Prof. Romsai Klinsoonforn, Dept. of San. Engineering, F of P.H.
13. Mr. Anucha Mookhavesa, Chief of Planning Division
14. Miss. Sasithorn Santiwongsakul, F of P.H.
15. Miss. Chawewan Fnnivechayunt, F of P.H.

The Ministry of Public Health

1. Dr. Pricha Deesawati, Director
2. Dr. Chawalit Suntikitrungruang, Nutrian Division
3. Miss. Pisamai Chandavimol, Policy & Planning Analyst 6
4. Mr. Matee Chanjaruporn, Chief, Planning & Evaluation
5. Mr. Chatchai Traurattanapiron, Policy & Planning Analyst 3

KHON KAEN

1. Dr. Prakas Chavapricha, Chief Medical Officer
2. Dr. Vanit Lovahapun, Director

NAKHON SI THAMMARAT

1. Dr. Yutthana Sinlaparatsamee, Director of Health Promotion & Service
2. Dr. Uraphong Veskiikul, Chief of Surgical Dept.
3. Dentist, Vipas Leelaprute, Chief of Dental Dept.

NAKHON SAWAN

1. Dr. Sunthorn Thongkong, Chief Medical Officer
2. Dr. Chaiwat Siripong, Director

CHOLBURI

1. Mr. Sompong, Head of Administration Section Cholburi Province
2. Mr. Sornsakd

A/V Engineer

1. Mr. Choosak Pongsawat, Engineering Division Radio Thailand
2. Mr. Nopadol Klaikeow, Public Relations Dept.
3. Mr. Karnjanapot Sonsilpong, Health Education Division M. of P.H.

Computer Engineer

1. Dr. Supchai Tangwongsan, Director, M.U.C.C.F. of Science

Appendix IV Minutes on the Draft Final Report

MINUTES OF DISCUSSIONS
ON
THE DRAFT FINAL REPORT OF THE BASIC DESIGN STUDY
ON
THE ESTABLISHMENT PROJECT OF
PRIMARY HEALTH CARE TRAINING CENTERS IN THE KINGDOM OF THAILAND

The Government of Japan has sent, through Japan International cooperation Agency (JICA), a Basic Design Survey Team to The Kingdom of Thailand from September 26th to October 2nd, 1982 for the purpose of presenting and explaining the Draft Final Report of the Basic Design Study (The Report) on the Establishment Project of Primary Health Care Training Centers in the Kingdom of Thailand (The Project).

The team held meetings with the Thai counterpart's party headed by Prof. Dr. Natth Bhamarapravati, Rector of Mahidol University to explain and to discuss on the Report.

The main items which were discussed and understood by both parties at the meetings are as follows :

1. The Thai side principally approved the Report and appropriate alternations in design agreed during the discussions will be incorporated in the Final Report.
2. The Final Report (10 copies in English) on the Project will be submitted to the Government of Thailand by the end of November, 1982.
3. Both side confirmed that the Thai side understood the system of Grant Aid Programme to be extended by the Government of Japan, especially the arrangements to be taken by the Government of Thailand (as agreed in the Minutes for the Project dated on June 4th, 1982)

September 29, 1982

Bangkok, Thailand

Masami Hashimoto
Leader,
Japanese Survey Team

Natth Bhamarapravati
Natth Bhamarapravati
Rector,
Mahidol University

Pirote Ningsanonda
for Pirote Ningsanonda
Deputy Under-Secretary of
State for Public Health

Masami Hashimoto

JICA