

(2) Design of Routing Switcher

Optional connection between inputs and outputs will be made by means of the matrix switcher having the inputs and outputs as shown in Table 4-2. In order to avoid increase of number of crosspoints, it will be appropriate to adopt two-stage matrix switchers composed of in-switcher and out-switcher, which will connect the two with about eight channels.

These switchers should be made to connect an intercom and tally signal at the same time in addition to the audio trunk line.

Provision of display equipment to indicate the connection between the switchers is desirable.

Table 4-3 shows application examples of the routing switcher.

4-3-2 Continuity Studio

Eight continuity studios will be built for the transmission and monitoring of broadcast programmes for four channels each for home and external services. Among them, one is to be for stereo programmes.

It will be desirable to consider using the S-1 studio as a backup in case a continuity studio fails.

Continuity studios will serve the following functions:

- (1) Aside from news, information and other straight-talk programmes, the continuity studios can deal with taped programmes, disc music, etc.

Input		Output	
Source	No. of Ch.	Destination	No. of Ch.
Studio	18	Studio	18
Continuity Studio	8	Continuity Studio	2 x 8
OB	4	Audition Room	1
Test	1	On-air Switcher	4
Auxiliary	5	Dubbing Room	1
		Test	1
		Auxiliary	7
Total	36	Total	48

Table 4-2 Inputs and Outputs of Routing Switcher

Purpose of Usage	Connection of Facility
<p>1 Transmission of Studio Live Programme (1)</p> <p>ditto (2)</p>	<pre> graph LR subgraph (1) S1[Studio] --> RS1[Routing Switcher] RS1 --> CS[Continuity Studio] CS --> OAS1[On-air Switcher] end subgraph (2) S2[Studio] --> RS2[Routing Switcher] RS2 --> OAS2[On-air Switcher] end </pre>
<p>2 Multi-studio Production</p>	<pre> graph LR SA["Studio (A) (Sound Effect)"] --> RS[Routing Switcher] RS --> SB["Studio (B) (Drama)"] </pre>
<p>3 Network Show</p>	<pre> graph LR OB1[OB(1)] --> RS[Routing Switcher] OB2[OB(2)] --> RS RS --> CS[Continuity Studio] CS --> OAS[On-air Switcher] </pre>
<p>4 Audition</p>	<pre> graph LR S[Studio] --> RS[Routing Switcher] RS --> AR[Audition Room] </pre>
<p>5 Examination of System</p>	<pre> graph LR TI1[Test Instrument] --> RS1[Routing Switcher] RS1 --> S[Studio] S --> RS2[Routing Switcher] RS2 --> TI2[Test Instrument] </pre>

Table 4-3 Examples of Usage of Routing Switcher

(2) All the programmes produced in the studios and OB are connected to continuity studios through the routing switcher. Then, the continuity studios can make supplementary announcements as required.

(3) Continuity studios can be used for recording as ordinary production studios separated from the transmission system when the particular programme channel is not on-air, when operating simultaneous transmission with other programme channel, or when transmitting completed programmes from other studio or OB.

(4) The audio mixing console to be installed in a continuity studio will require about ten channels as input.

(5) When almost all programmes can be recorded on tapes completed in advance, the function of programme switching in the continuity studio can be transferred to the on-air switcher. Then, less continuity studios may be shared for common use by eight programme channels. The remaining studios can be allocated for producing ordinary programmes.

4-3-3 On-air Switcher

This is a matrix switcher to send programmes from continuity studios, or from the routing switcher, to STL for sending to transmitting stations. Simultaneous transmission among each programme channels can be easily selected by a simple operation, so that flexible programme schedules are made according to necessity.

The on-air switcher should have the following functions:

(1) The number of input and output channels for the on-air switcher shown in Table 4-4 must be appropriate. Each input should be able to be supplied to the multiple output channels so that the simultaneous transmission of programmes can be made. Considering the importance of broadcast transmission, it is desirable to have a redundancy system.

(2) The monitor circuit will be connected to all inputs and outputs of the on-air switcher and off-air monitor receivers, too.

(3) It is desirable to insert a suitable limiter amplifier in each output system to prevent such a degradation of sound quality by excessive level.

(4) It will be effective to have the on-air switcher permitting it to be automatically switched by a pinboard memory. Desirably, this system should be compatible even when automatic transmission by a computer would be introduced in the future.

Manual switching control should be made possible so that troubleshooting will be easy even when a failure occurs in automatic control, or when a urgent change of program schedule arises.

(5) A display unit will be installed so that transmission state can be easily grasped.

4-3-4 Intercom and Tally Equipment

For smooth production and transmission of programmes, an intercom and tally equipment will be installed.

Fig. 4-6 shows a system diagram of them.

Input		Output	
Source	No. of Ch.	Destination	No. of Ch.
Continuity Studio	8	Home Service	4
S-1 Studio	1	External Service	4
Routing Switcher	4	Backup	1
Auxiliary	2	Monitor	1
Total	15	Total	10

Table 4-4 Inputs and Outputs of On-air Switcher

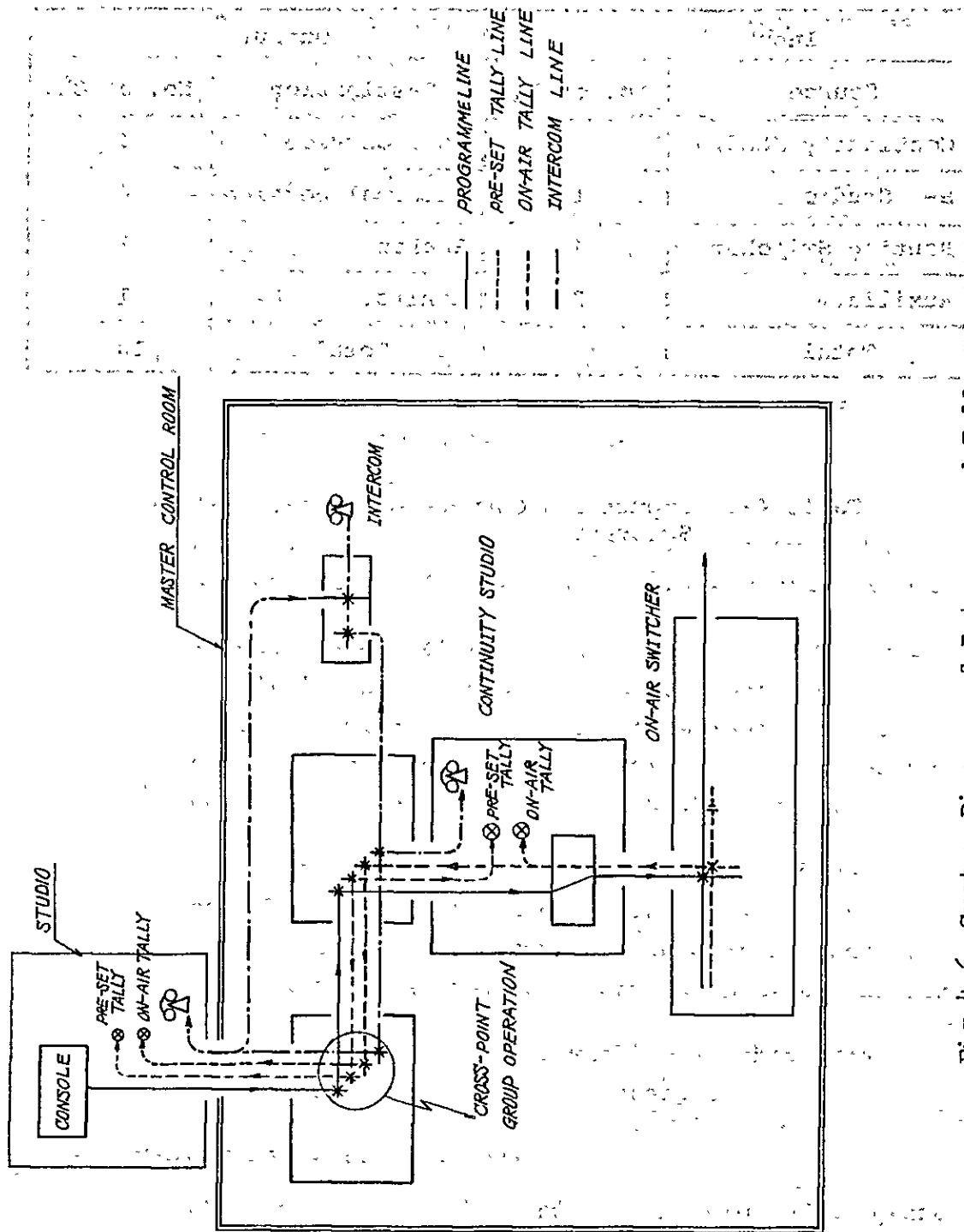


Fig 4-6 System Diagram of Intercom and Tally

(1) Intercom

Aside from the ordinary PABX, two systems of intercom will be installed for broadcasting purpose.

One system is to connect MCR and various facilities in the House mainly for technical ordering. The other system is to be for ordering between facilities connected through the routing switcher mainly for programme production purpose.

In either system, a calling system with loud speaker will be appropriate.

(2) Tally Equipment

Present tally equipment to show the connecting state of the routing switcher and on-air tally to show that of the on-air switcher will be provided.

4-3-5 Other Equipment in MCR

(1) Clock and Timepips Generator

A Master clock unit including a timepips generator will be installed in MCR.

Slave clocks of one-second step will be installed at studios, studio control rooms, and at necessary locations in MCR. The slave clocks are to be operated by clock pulses sent by the master clock unit. Slave clocks operating in 30-second steps will be installed at locations in the Broadcasting House considered necessary.

(2) House Monitor in the Broadcasting House

Programmes on the air are to be sent to locate in the Broadcasting House considered necessary

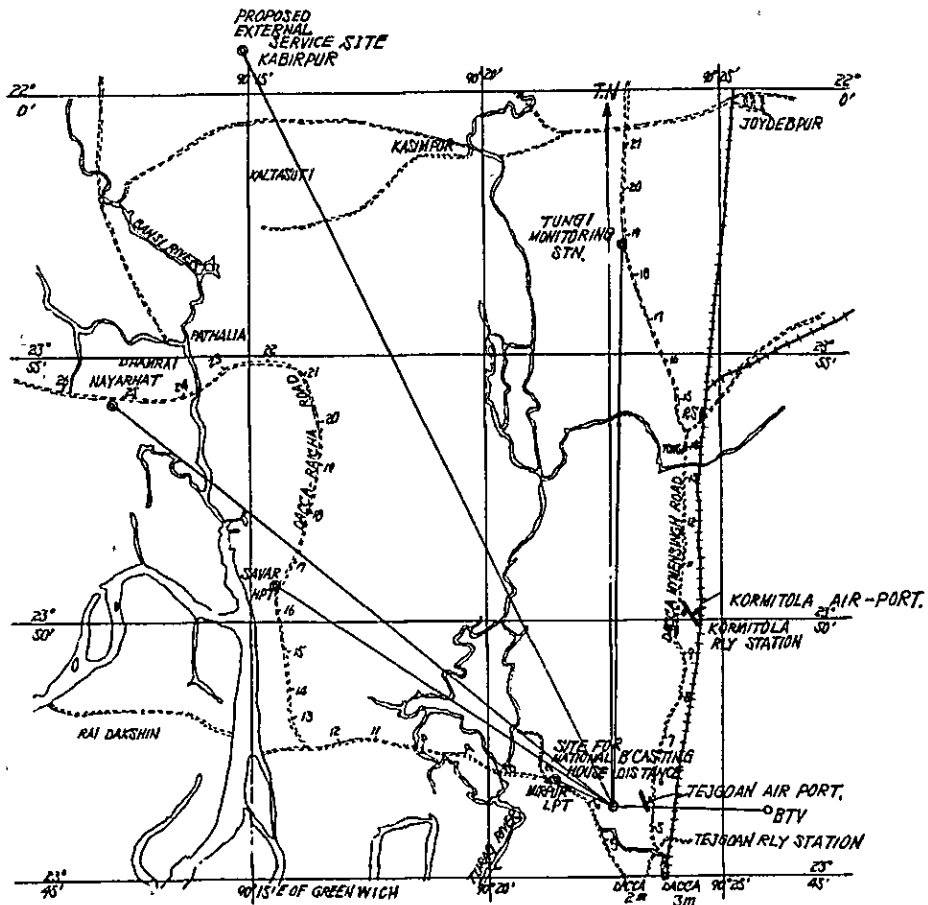
for monitoring. Installation locations will be kept to a necessary minimum limit.

4-3-6 STL

Programmes are to be sent from the existing Broadcasting House to various transmitting stations by physical lines and links utilizing VHF and UHF. High-quality, stable transmission will not be expected from physical lines. Links from the new Broadcasting House to each transmitting station should be preferably of wireless radio. To supply each transmitter in respective stations with different programmes together with an associated telephone channel, it will be effective to adopt a similar type of multiplex STL as is now used in Nayarhat transmitting station. The relationship between each transmitter and broadcasting programme channels is not known at the moment. In order to meet future expansion plans, STL should be planned as follows:

- (1) LPT (Mirpur), HPT (Savar) and SPT (Nayarhat) transmitting stations are located in almost same direction from the new Broadcasting House as shown in Fig. 4-7. Possibly, one STL transmitter having proper outputpower may be used by feeding one or two transmitting antennas of appropriate directivity and gain. Programmes for six channels will be multiplexed, and each transmitting station will have its own receiver.

The order telephone channel between the Broadcasting House and transmitting stations will be provided with one channel for each station, which is multiplexed on programmes channels. For the up link, a transmitter for telephone



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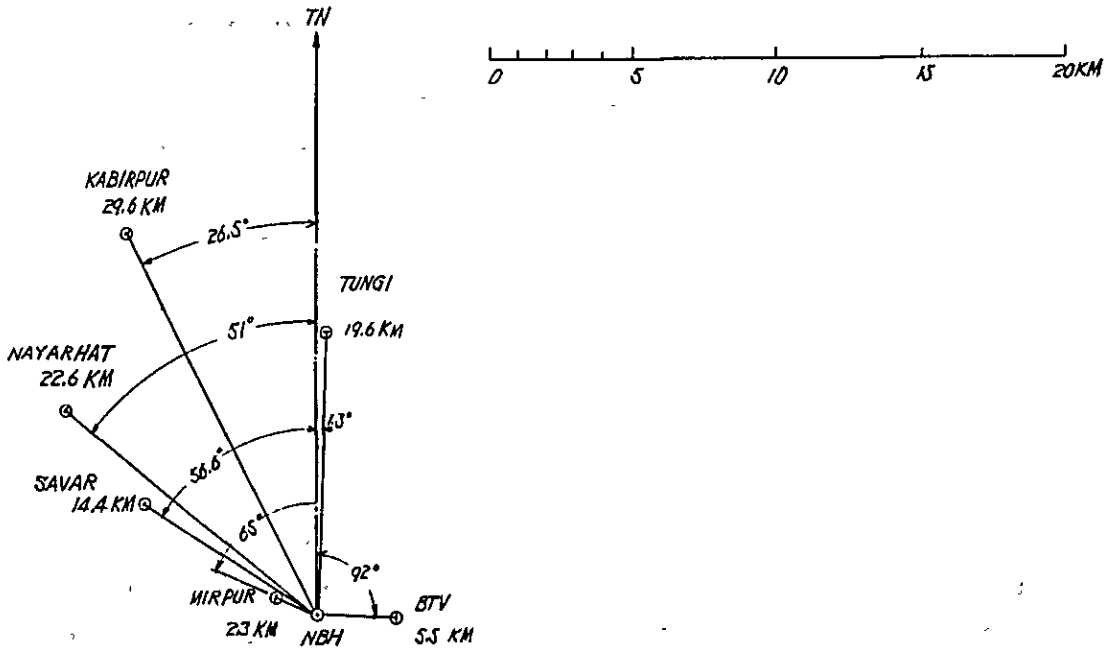


Fig. 4-7 Map for Studio Transmitter Links Radio Bangladesh

channel with a different transmitting frequency will be installed in each station.

- (2) A number of transmitters are expected to be installed in the HF transmitting station planned to be built in Kabirpur, and equivalent UHF multiplex STL will be desirable.
- (3) For VHF FM broadcasting, an STL capable of transmitting stereo composite signals from the new Broadcasting House to a proposed transmitting station is to be built.
- (4) Transmission of overseas news sources from the monitoring station now under construction in Tungi is expected to use multiplex STL.

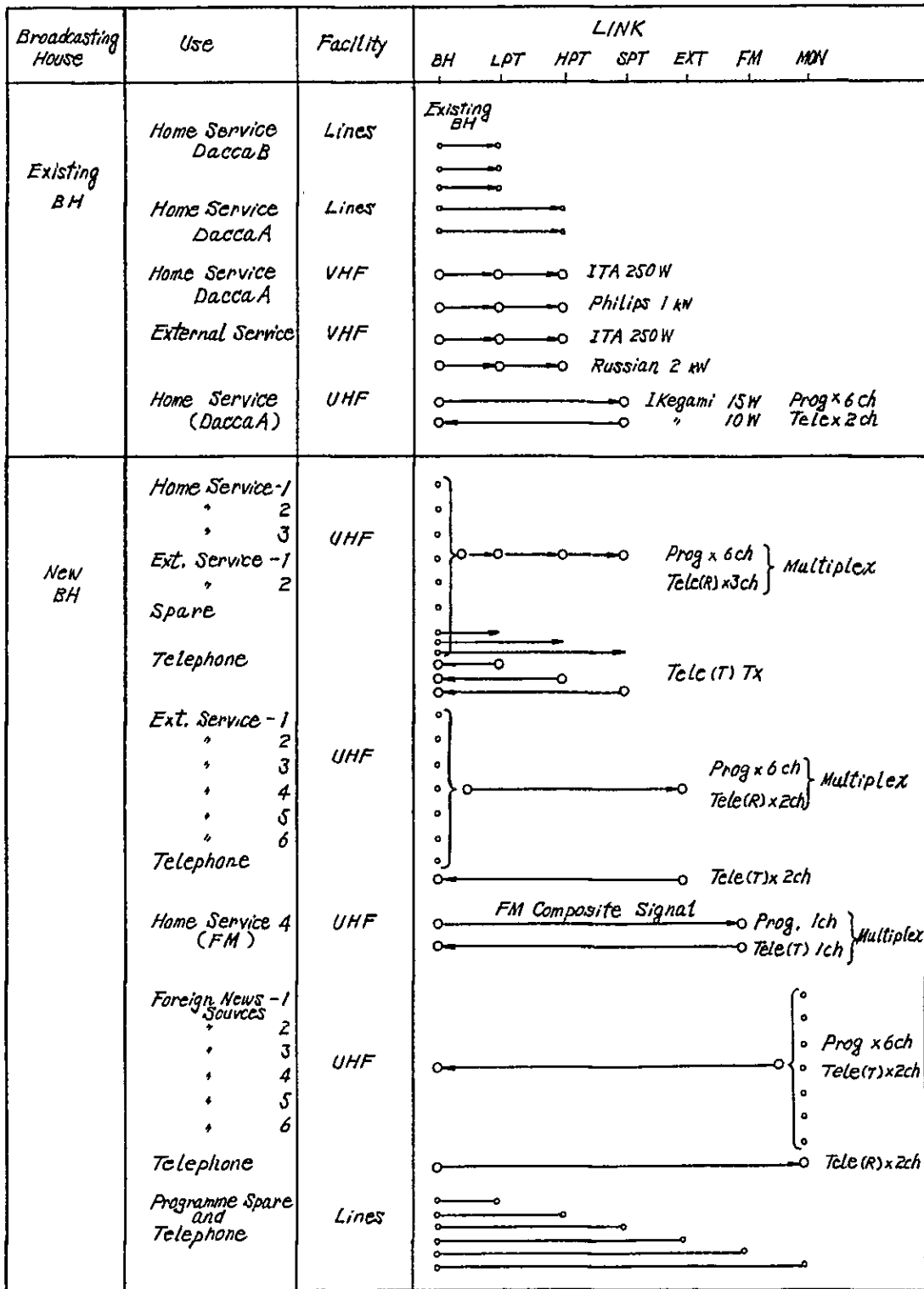
As stated, all the programme and order telephone lines will be mainly UHF radio channels. However, it will be expected to be more effective to provide with standby channels of both physical lines and existing VHF and UHF radio equipment, which can be moved to the new Broadcasting House.

Fig. 4-8 summarizes the preceding studies. As for (2), (3) and (4), proposals should be executed within the scope of their respective projects. In this design the plan for the new Broadcasting House will not include them.

Technical specifications of radio links should be studied in detail when making a detail design.

4-4 Common Equipment

Aside from the standard equipment for programme production and MCR as described above, it is desirable to maintain several of the following commonly-used units for



Note: BH : Broadcasting House
LPT : Mirpur Transmitting Station
HPT : Savar Transmitting Station
SPT : Nayarhat Transmitting Station
Ext : Proposed Kabirpur Transmitting Station
FM : VHF FM Transmitting Station (proposed)
MON : Tunji Monitoring Station (under construction)

Fig 4-8 Proposed Studio Transmitter Links

producing specially large programmes and for maintenance:

- Tape recorders
- Disc reproducers
- Cartridge tape recorders
- Audio mixers
- Microphones
- Microphone stands
- Test equipment
- Tool kits

4-5 List of Necessary Equipment

All equipment necessary for the foregoing systems and facilities are shown in Table 4-5.

Table 4-5 Proposed Schedule of Broadcasting Equipment for National Broadcasting House

Item	Total Quantity	Use or Installation	Brief Specification
Routing Switcher	1 set	MCR	.Composed of two matrix switchers, In and Out. .No. of Inputs/Outputs; 36 x 48
On-air Switcher	1 set	MCR	.Matrix switcher of 15 inputs x 8 outputs
Pin-board Control	1 set	MCR	.Automatic programme switching control for On-air Switcher
Central Clock System	1 set	MCR	.Master clock system with timepip gen. .Slave clocks of "Second" and "30-second"
Display System	1 set	MCR	.Displaying system indicating operation of On-air Switcher.
House Monitor System	1 set	MCR	.Distribution Panels of air-monitor .Audio-monitors
STL	1 set	MCR	.UHF 1 transmitter and 3 receiver sets multiplex of 6 programme and 3 telephone channels
Audio Mixing Console	26	Studios	.No. of Inputs; 8 - 16 chs according to scale of studio
Portable Audio Mixer	7	OB, Audition Room	.No. of Inputs; 4 channels or more
Tape Recorder	90	MCR Studios and Others	.Console type
Portable Tape Recorder	17	OB, Audition Room	.10 compact type included
Portable Tape Recorder	5	Listening Room	.Low-cost type
Cartridge Tape Reproducer	4	Studios	.NAB type A .5 channels of reproducing with recording function
Reverberation Equipment	4	Studios OB	.Portable type utilizing spring reverberation
Disc Reproducer	45	Studios	.Console type with three speeds
Microphone	130	Studios, OB and Others	.Condenser, ribbon, moving coil type according to necessity
Mic Stand	120	Studios, OB and Others	.Desk, floor, boom type according to necessity
Wide Band Radio Receiver (Main station)	1 set	MCR and OB	.VHF wide band receiver equipment for programme sound with directional antenna system

Continued

Item	Total Quantity	Use or Installation	Brief Specification
Narrow band Radio Communication Trans/Rec	1 set	MCR and OB	.VHF narrow band trans/rec set with non-directional antenna system .Output power 25~50W
Portable Walkie-Talkie	5	OB	.VHF narrow band trans/rec set .Output power 1W
All Wave Receiver	2	Monitoring	.Professional all wave receiver for MF and HF with umbrella-type doublet antenna system
Audio Monitor	78	MCR, Studios and Others	.Audio monitor speaker with amplifier
OB Van	1 set	OB	.Wagon or micro-bus type .Installed by audio-mixer, portable tape recorder, Wide band radio transmitter, Narrow band radio Communication trans/rec set, power supply and others
Vehicle	4	OB	.Wagon or micro-bus type
Test Equipment	1 set	Common use	.Oscillator, multimeter, oscilloscope, distortion meter and other according to necessity
Blank Tape	1 set		.1/4" tape of open reel type, 1200' and 600' .Cartridge tape of NAB type A (Maximum 10 minutes)
Tool Kit			.According to necessity

Chapter 5 Phased Schedule

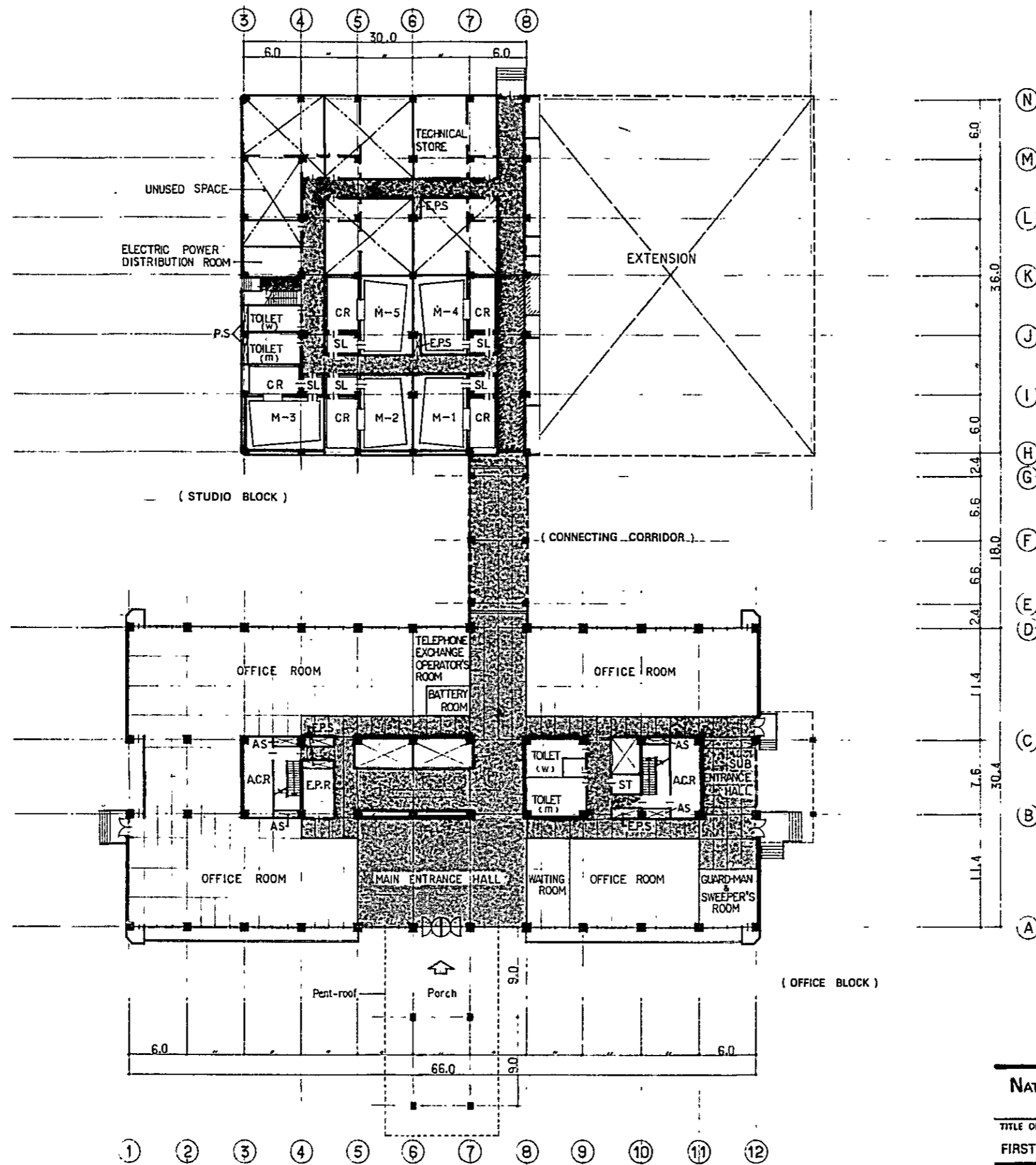
5-1 Buildings

5-1-1 Conditions of the phased schedule

- (1) The first phase includes thirteen studios, a half of the total schedule.
- (2) Consideration must be given to achieve the maximum effect on the minimum scale.
- (3) Phase design must be considered so that the expansion of the building can be made easily in view of its broadcasting operation and structure and construction work of buildings. Alternation to the buildings must be minimized in view of expenses.

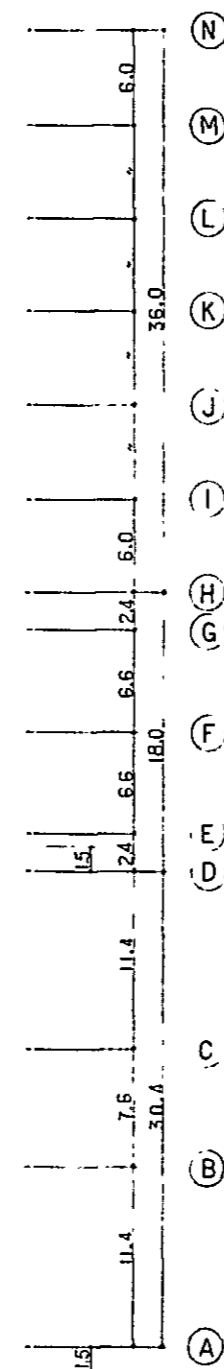
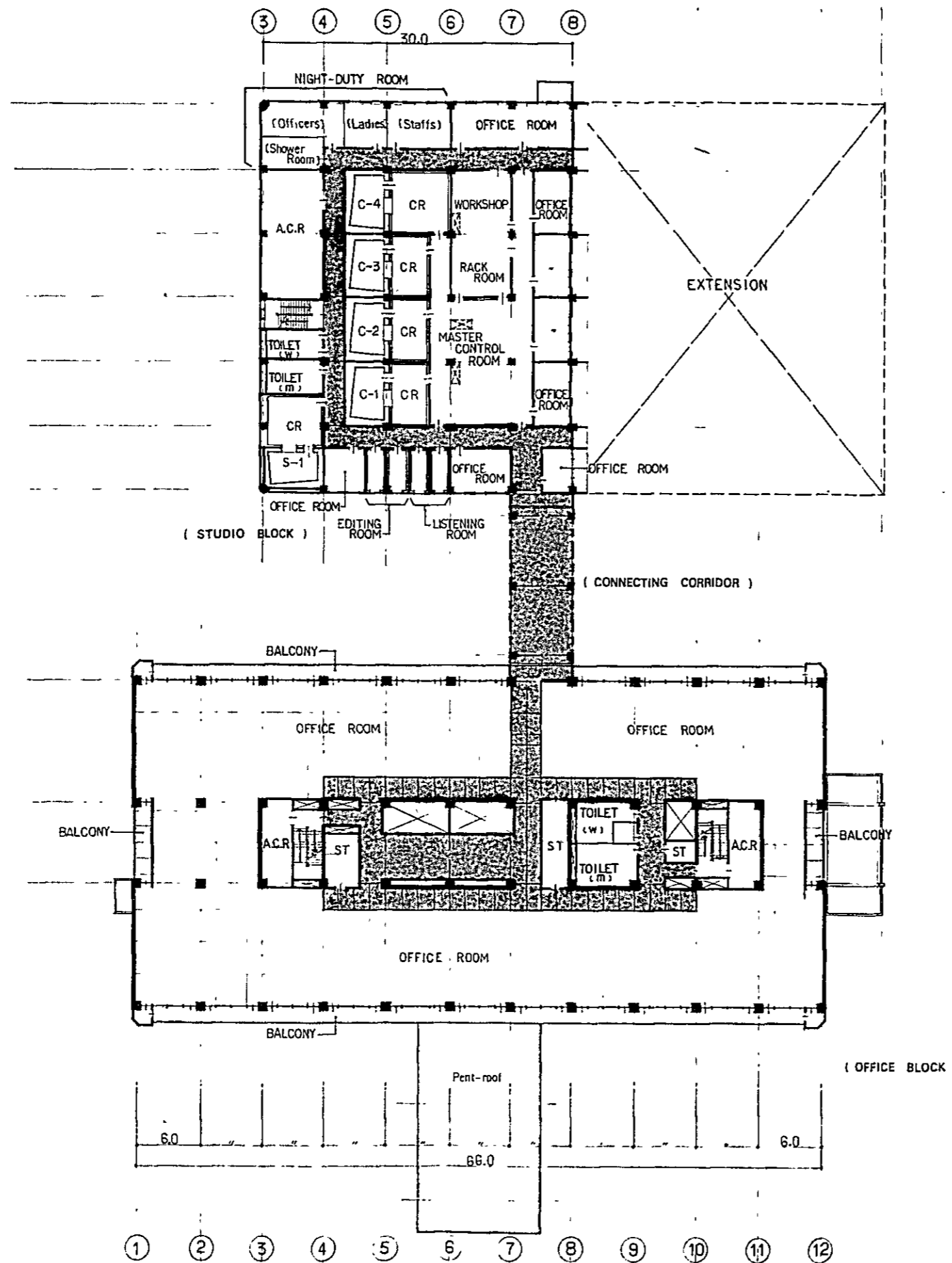
5-1-2 Scale of the first phase

- (1) The first phase includes west side half of the studio block, from the first floor to the third floor of the office block, and the whole part of the connecting corridor, the building equipment house, the reception house and the security staff house, and the rest will be included in the second phase. (Fig. 5-1 ~ Fig. 5-4) The scale of the buildings, the outside work, and antenna supporting structure are shown in Table 5-1.
- (2) The floor space of each room of the first phase is shown in Table 5-2. Some explanation as to the phased schedule will be made in each paragraph as follows.



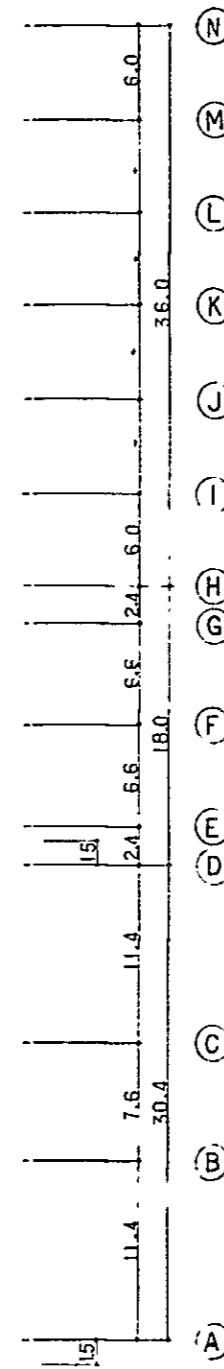
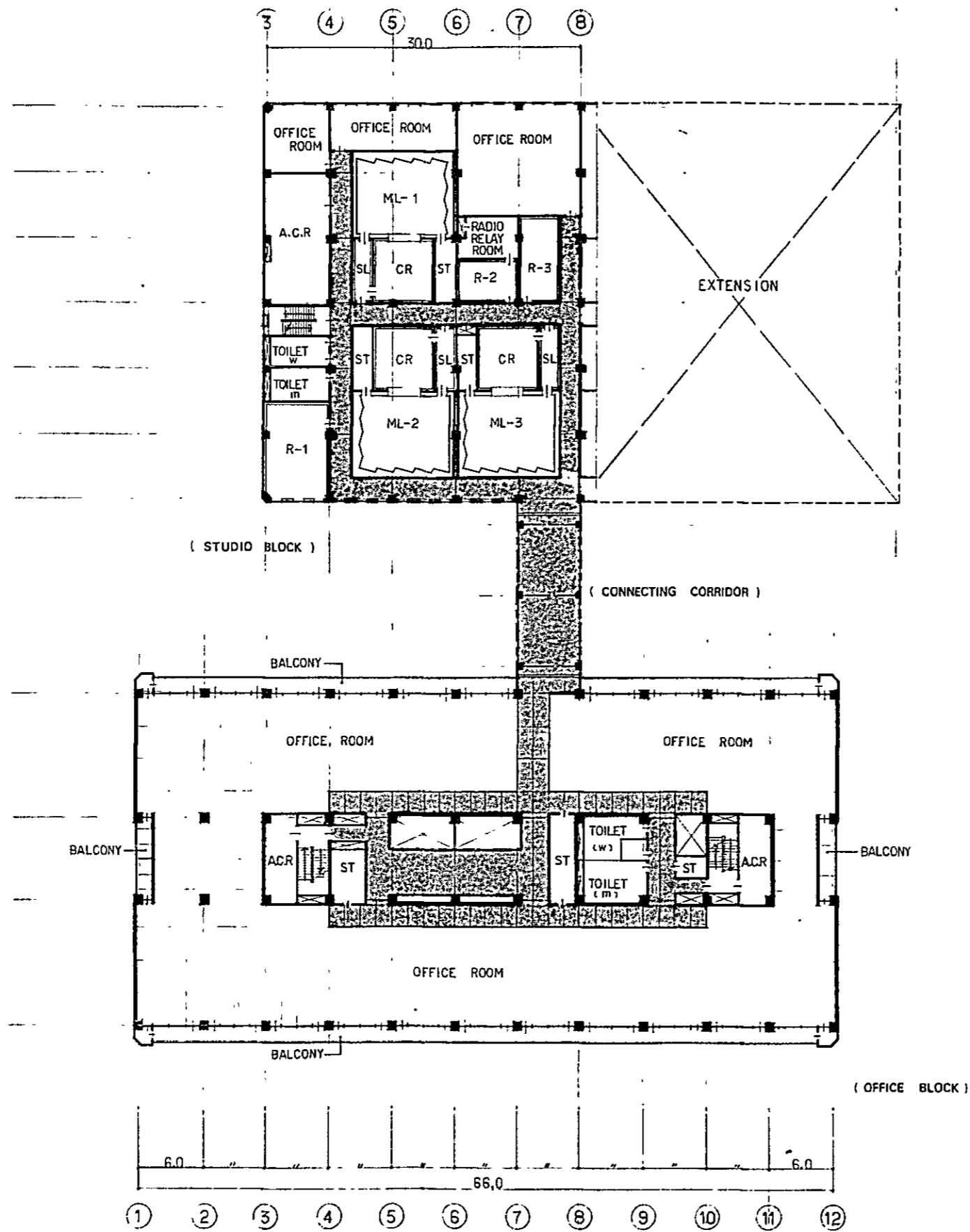
- NOTES -
- : CORRIDOR
 - : DOUBLE SLAB
(over THE CEILING)
 - M- : MEDIUM STUDIO
 - CR : CONTROL ROOM
 - SL : SOUND LOCK
 - ACR : AIR CONDITIONING
EQUIPMENT ROOM
 - ST : STORE
 - E.P.R. : ELECTRIC POWER
DISTRIBUTION ROOM
 - A S : AIR SHAFT
 - EPS : ELECTRIC PIPING SHAFT

[PHASE - 1]	
NATIONAL BROADCASTING HOUSE RADIO BANGLADESH Dacca	ORG. NO. Fig. 5-1
TITLE OF DRAWING FIRST FLOOR PLAN of STUDIO & OFFICE BLOCK	SCALE 1: 300 ^m



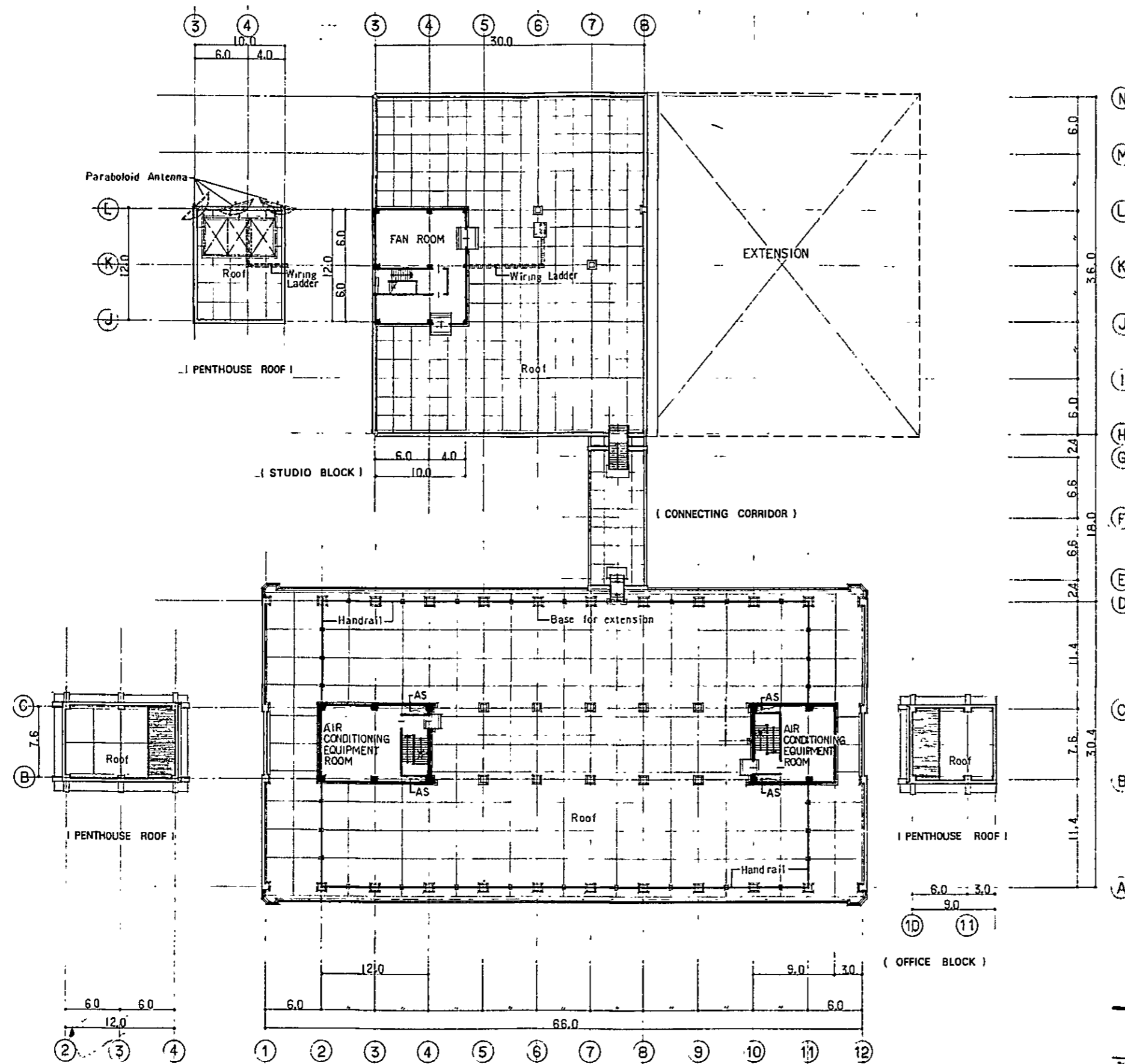
- NOTES-
- : CORRIDOR
 - C- : CONTINUITY STUDIO
 - S-1 : SMALL STUDIO (for VIP)
 - CR : CONTROL ROOM
 - A.C.R. : AIR CONDITIONING EQUIPMENT ROOM
 - ST : STORE

[PHASE - 1]	
NATIONAL BROADCASTING HOUSE RADIO BANGLADESH Dacca	DRG. NO. Fig. 5-2
TITLE OF DRAWING SECOND FLOOR PLAN of STUDIO & OFFICE BLOCK	SCALE 1:300m



- NOTES -
- : CORRIDOR
 - ML- : MEDIUM-LARGE STUDIO
 - CR : CONTROL ROOM
 - SL : SOUND LOCK
 - ST : STORE
 - R- : REHEARSAL ROOM
 - ACR : AIR CONDITIONING EQUIPMENT ROOM

[PHASE - 1]	
NATIONAL BROADCASTING HOUSE RADIO BANGLADESH Dacca	DRG. NO. Fig. 5-3
TITLE OF DRAWING THIRD FLOOR PLAN of STUDIO & OFFICE BLOCK	SCALE 1:300^m



- NOTE -
A S : AIR SHAFT

[PHASE - 1]	
NATIONAL BROADCASTING HOUSE RADIO BANGLADESH DACCA	DRG. NO. Fig. 5-4
TITLE OF DRAWING ROOF & PENTHOUSE FLOOR PLAN of STUDIO & OFFICE BLOCK	SCALE 1:300 ^m

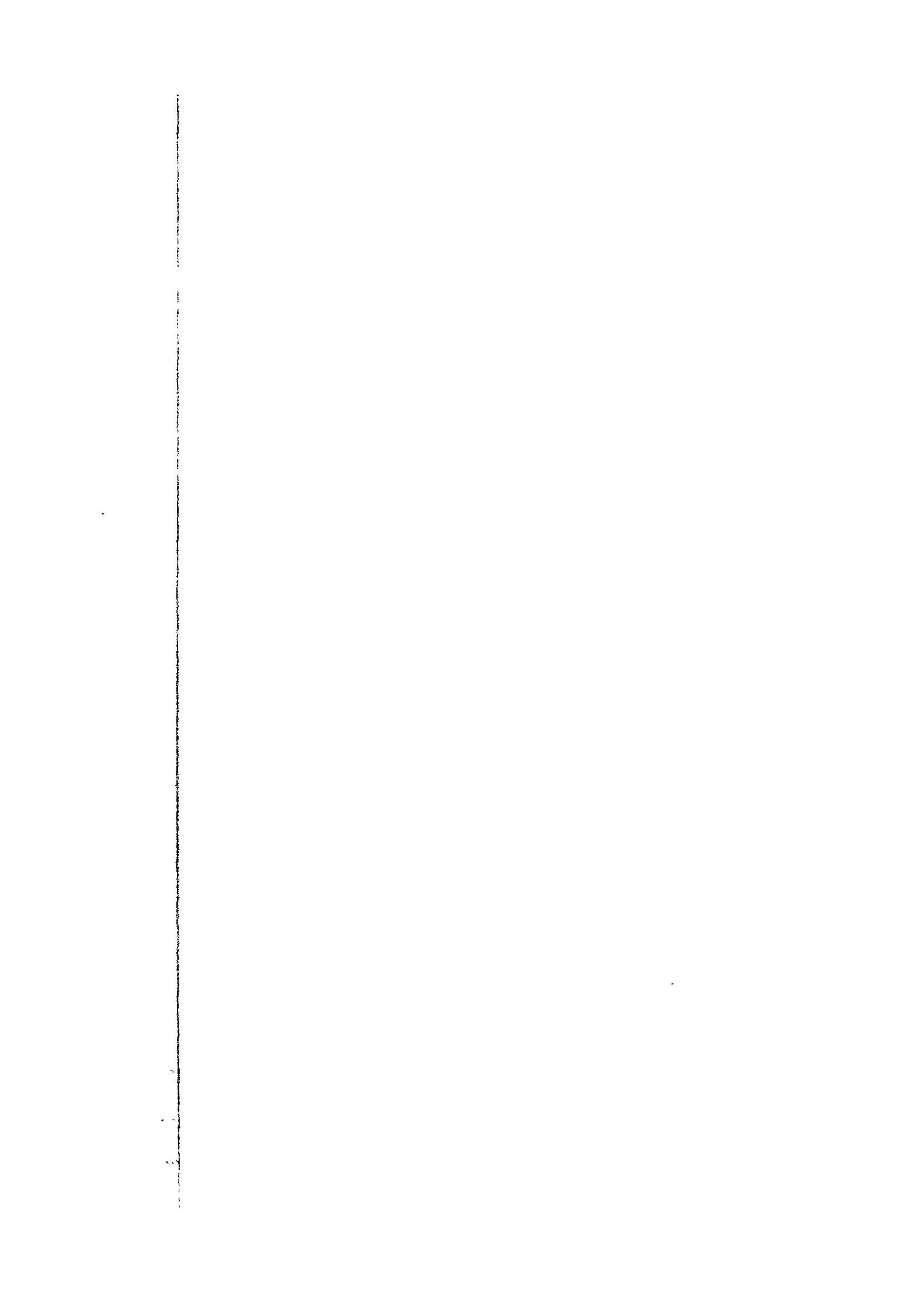


Table 5-1 General Plan of Phased Schedule

1. Buildings

Name of building	1st phase(m ²)	2nd phase(m ²)	Total(m ²)
Studio block	3,360.0	2,367.6	5,727.6
Office block	6,121.8	10,624.8	16,746.6
Connecting corridor	324.0	—	324.0
Building equipment house	540.0	—	540.0
Garage	—	1,120.0	1,120.0
Reception house	70.0	—	70.0
Security staff house	144.0	—	144.0
Total	10,559.8	14,112.4	24,672.2

2. Antenna Supporting Structure and Outside Work

Item	1st phase	2nd phase
Antenna supporting steel frame	On the penthouse of studio block	at the side of pent- house of office block
Antenna pole	—	On the roof of studio block
Site pavement	1/2	1/2
Site drainage	1/2	1/2
Wall, gate, gate doors	Total	—
Watch house	Total	—
Tree planting, grass growing	—	Total
Cycle shed	—	Total

Table 5-2 Floor Area of General Planning, PHASE - 1

	Function	Floor Area (m ²)	Remarks
I	Studio Block	3.360.0	3 + 1 Stories
II	Office Block	6.121.8	" "
III	Connecting Corridor	324.0	3 Stories
IV	Building Equipment House	540.0	One-Storeyed House
V	Reception House	70.0	" "
VI	Security Staff House	144.0	" "
	Grand Total	10.559.8	

(Continued)

(Continued)

I. Studio Block

No.	Room Name	Floor Area (m ²)	Remarks
1	Studio C - 1	48.0	Including C.R.
2	" " - 2	48.0	" "
3	" " - 3	48.0	" "
4	" " - 4	60.0	" "
5	" S - 1	54.0	" "
6	" M - 1	72.0	" " , S.L.
7	" " - 2	80.0	" " "
8	" " - 3	70.0	" " "
9	" " - 4	72.0	" " "
10	" " - 5	80.0	" " "
11	" ML - 1	140.0	" " " , S.T.
12	" " - 2	140.0	" " " "
13	" " - 3	140.0	" " " "
14	Master Control Room	156.0	" Circulation Space
15	Rack Room	72.0	Including Workshop
16	Listening Room	16.0	2 Booths
17	Editing Room	16.0	" "
18	Rehearsal Room R - 1	54.0	
19	" " - 2	24.0	
20	" " - 3	32.0	
21	Night-Duty Room	84.0	Including Shower Room
22	Technical Store	72.0	Temporary Use
23	Office Room	400.0	Including Temporary Use Space
24	Radio Relay Room	24.0	Temporary Use
25	Electric Power Dist. Room	18.0	
26	Air Cond. Equip. Rm.	240.0	Including Fan Room
27	Unused Space	338.0	Studio's (M-6~10) Space of Phase - 2
	(Sub Total of 14-27)	(2,598.0)	
28	Common Part	762.0	Including Corridor, Stair, Toilet, etc.
	Total	3,360.0	

(Continued)

(Continued)

II. Office Block

No.	Room Name	Floor Area (m ²)	Remarks
1	Office Room	3.909.3	Including Conference Room, Store, etc.
2	Waiting Room	40.5	Including Men's & Women's
3	Guard-Man's Room	36.0	Including Sweeper's Room
4	Telephone Exchange Operator's Room	54.0	Including PABX & Battery Space
5	Electric Power Dist. Room	18.0	
6	Air Cond. Equip. Rm.	262.8	Including Fan Room & Temporary Use Space
	(Sub-Total)	(4.320.6)	
7	Common Part	1.801.2	Including Entrance Hall, Corridor, Stair, Toilet, Future E.V. Shaft, etc.
	Total	6.121.8	

III. Connecting Corridor

No.	Room Name	Floor Area (m ²)	Remarks
1	Connecting Corridor	324.0	Connecting for Studio & Office Block
	Total	324.0	

(Continued)

(Continued)

IV. Building Equipment House

No.	Room Name	Floor Area (m ²)	Remarks
1	H.T. Room	90.0	
2	Engine Generator Rm.	144.0	
3	Battery Room	30.0	
4	Equipment Room for Air Cond. & Cooling	204.0	Including Water Receive Tank Space
5	Staff Room	48.0	Chilled Water-Tanks are Provided Underground
6	Night-Duty Room	24.0	Including Toilet & Shower
	Total	540.0	

V. Reception House

No.	Room Name	Floor Area (m ²)	Remarks
1	Office Room	12.0	Including Men's & Women's
2	Visitor's Room	50.0	Including Men's & Women's
3	Toilet	8.0	Including Men's & Women's
	Total	70.0	

VI. Security Staff House

No.	Room Name	Floor Area (m ²)	Remarks
1	Office Room	18.0	Including Store
2	Resting Room	65.2	" Kitchen
3	Toilet & Shower Booth	24.8	" Circulation Space
4	Night-Duty Room	36.0	
	Total	144.0	

5-1-3 Floor Plan

- (1) Common space of the first floor of the office block is to be diverted to as many office rooms as possible. The office block will have the capacity to accommodate 650 persons with a space of 6 m²/head.

Also, additional seating capacity of approximately 65 persons can be created by diverting windowed rooms of the studio block to the office rooms.

- (2) As for the studio area on the first floor of the studio block, five studios, a half of the scheduled M studios, will be left unfinished. Some of them will be diverted to a technical store until the second phase will be completed.

- (3) Piping of circulating cooling water, water supply and electric power line, etc. from the building equipment house gets into the studio block at the north side of the corridor on the first floor. In the second phase, the above piping arrangement gets into the studio block from the technical store and connected with the already arranged pipes at a proper point respectively, with some possible route alteration brought to the previously established piping.

- (4) The parabola antenna will be installed on the roof of the penthouse on the studio block. In the second phase, this will be moved to the wall of penthouse on the office block.

5-1-4 Air-Conditioning Equipment

- (1) Cooling Source Equipment

A natural gas burning chilling unit in common use for both the studio block and the office block will be installed in the building equipment house. Chilled water is stored in the underfloor heat storage tank, which is supplied to each air conditioner and fan coil unit of the respective systems by means of 3~4 chilled water supply pumps. Also cooling water for the chilling unit will be cooled by a cooling tower.

(2) Air Conditioner Equipment

Air conditioning systems will be as follows:

1) Studio Block

- a) System for M-1 through M-5, and control rooms.
- b) System for C-1 through C-4, S-1, control rooms and MCR, etc.
- c) System for ML-1 through ML-3, control rooms and R-1 ~ R-3.
- d) System for editing rooms, etc.
- e) System for night duty rooms.
- f) System for power distribution room.

2) Office block

- a) North-east system for each floor (1-3F)
3 Systems
- b) South-east system for each floor (1-3F)
3 Systems
- c) North-west system for each floor (1-3F)
3 Systems

d) South-west system for each floor (1-3F)

3. Systems

Two floor-type fan-coil-units will be provided for each span in perimeter zones as in the case of one-phase schedule.

(3) Ventilating Equipment

In principle, fresh air intake will be $20 \text{ m}^3/\text{hour}/\text{head}$ as in the case of one-phase schedule.

1) Studio Block

Exhaust air of each system will be collected on the roof and it will be discharged outside after exchanging heat with fresh air by an air-to-air heat exchanger. Exhaust air from toilets, etc. is discharged separately, not through said air-to-air heat exchanger.

2) Office Block

With the perfectly same system of the one-phase schedule, two air-to-air heat exchangers will be provided in the penthouse to reduce the heat load of fresh air.

(4) Automatic Control Equipment

The fundamental system is the same as in the case of the one-phase schedule except for the number of the water chilling units, air conditioners, pumps, etc.

5-1-5 Plumbing

(1) Water Supply Facilities

The process up to the water receiving tank

is perfectly the same as that of the one-phase schedule and a pressure tank system is applied for the water supply system.

- (2) Hot-water Supply, Fire Extinguishing, Drainage, Sewage, Vent Pipe, Kitchen Facilities and Gas Supply

These are the same as in the case of the one-phase schedule in view of the fundamental idea and system, except for its scale.

Incidentally, the septic tank and the seepage pit have the same capacity, as in the case of the one-phase schedule.

5-1-6 Electrical Equipment and Facilities

- (1) Incoming and Distribution Equipment and Engine Generator

One incoming transformer, with the capacity of 1,000 KVA, will be provided in the building equipment house. At the time of expanding the building, another transformer with the same capacity will be provided.

One engine generator, with the capacity of 150 KVA, will be provided, and when the building is expanded, another one with the same capacity will be provided.

- (2) Battery Facilities

Four battery units will be provided excluding those for another generator expected to be installed in the second phase.

- (3) Electric Power Trunk Line Equipment

Low voltage panels required only for the time

being will be provided, and those required at the time of enlargement of the building will be provided additionally. The route of the power main line from the building equipment house to the studio block and the office block may be changed when the building is enlarged.

(4) Power Facilities

The pushbuttons for starting and stopping the operation of each equipment is operated on the control panel in each separate machine room, and not collectively in the building equipment house. Such collective control system will be established when the building is enlarged.

(5) Telephone Equipment

The telephone exchange will have the capacity and the actual mounting of 100 extension lines, which will be increased when the building is enlarged.

(6) Others

With regard to other facilities, those necessary for the time being are to be provided, and the rest will be provided as required at the time of the enlargement of the building. Care must be exercised so that those which are provided for the time being will also be utilized when the building is enlarged.

5-2 Broadcasting System

5-2-1 Conditions of Phased Schedule

- (1) In the first phase, the broadcasting system should be provided with minimum required functions for programme production and transmission for five programme channels which Radio Bangladesh is planning in about five years' time.

- (2) Care must be taken to minimize waste of broadcasting facilities and equipment in each phase.

5-2-2 Phased Schedule of Production Facilities

(1) Studios

Nine out of the total eighteen studios will be built in the first phase. Particulars of those studios are: one S studio, five M studios and three ML studios. Among them, S studio located near MCR on the second floor, as mentioned later, will be used as a continuity studio of the fifth channel for the time being. Studios for stereo purpose will be included in the second phase schedule.

(2) Supporting Facilities for Programme Production

In the first phase, two editing rooms, two listening rooms and three rehearsal rooms will be constructed. In the second phase, the remaining two editing rooms, two listening rooms, one dubbing room, one audition room and two rehearsal rooms will be constructed. News monitoring facilities to be equipped in the new Broadcasting House will be installed in the second phase.

(3) OB

An OB van and associated radio equipment will be provided in the second phase. As for other OB equipment, approximately half of the total, will be provided in the first phase.

5-2-3 MCR Phased Schedule

(1) MCR Facilities

A routing switcher and an on-air switcher are provided. Other pin-board, display system,

central clock system and house monitor system are also provided.

But minimum required units and panels in the MCR equipment are to be installed to meet prepared production facilities in this first phase. The rest will be completed in the second phase.

As for the continuity studios, S studio will be diverted to that purpose in addition to four continuity studios built in the first phase. From this reason, the audio mixing console in the S studio will be provided with 10 input channels like other continuity studios.

The continuity studio for FM stereo programmes will be provided in the second phase.

(2) STL

An STL transmitter for Mirpur, Savar, and Nayarhat transmitting stations, and one for Kabirpur transmitting station and an STL receiver from Tungi monitoring station are considered to be necessary in the first stage. To house these equipment, a temporary radio equipment room will be provided on the third floor of the studio block. Parabola antennas will be installed on a simple supporting structure on the roof of the studio block.

In this condition, average height of the parabola antennas is estimated to be about 20 meters high above ground. This is considered to be sufficient enough to obtain an adequate propagation path.

However, careful survey must be performed to have clear propagation paths between the new National Broadcasting House and each station when a detailed design is made.

Upon completion of the final construction, they will be moved to the roof of the office block.

(3) Common Equipment

Approximately half of the equipment for common use will be provided in the first phase.

5-2-4 List of the Broadcasting Equipment

Summarized list of equipment to be provided in each phase will be shown in Table 5-3.

Item	Total Quantity	1st phase	2nd phase	Remarks
Rounting Switcher	1 set	1 set		Some of the units and panels necessary for the 2nd phase will be installed in the 2nd phase.
On-air Switcher	1 set	1 set		
Pin-board Control	1 set	1 set		
Central Clock System	1 set	1 set		
Display System	1 set	1 set		
House Monitor System	1 set	1 set		
S T L	1 set	1 set		
Audio Mixing Console	26	13	13	
Portable Audio Mixer	7	4	3	
Tape Recorder	90	38	52	
Portable Tape Recorder	17	8	9	
low-cost Portable Tape Recorder	5	3	2	
Cartridge Tape Reproducer	4	4	-	
Reverberation Equipment	4	2	2	
Disc Reproducer	45	20	25	
Microphone	130	60	70	
Mic Stand	120	55	65	
Wide Band Radio Receiver	1 set	-	1 set	
Narrow Band Radio Communication Trans/Rec.	1 set	-	1 set	
Portable Walkie-talkie	5	-	5	
All Wave Receiver	2	-	2	
Audio Monitor	78	33	45	
OB Van	1 set	-	1 set	
Vehicle	4	2	2	
Test Equipment	1 set	1 set	-	
Blank Tape	1 set	1/2 set	1/2 set	
Tool Kit	1 set	1/2 set	1/2 set	

Table 5 - 3 Phased Schedule of Broadcasting Equipment

Chapter 6 Plans of Work

This Chapter describes the construction schedule, budget plans and various problems anticipated in performing the construction work.

6-1 Scheduling

About 3 years and 7 months is estimated as the time required between the start and completion of construction, should the National Broadcasting House be built in its entirety in one step.

If the National Broadcasting House is built in the two phases as described earlier, it is estimated that the first phase will require 2 years and 7 months, and the second phase 2 years and 2 months.

A preparatory period for detailed designs, bids, etc. will be required before the construction work can be started. At least two years will be required for this period. The Phase-Two works should be started as soon as circumstances permit if the construction is to be undertaken in two phases. This plan estimates that it will be six years before the Phase-Two construction works can be started. In this instance, the entire project will take about eight years or more.

In preparing a progress schedule, the following points have been taken into consideration:

- (1) Time required for the design, manufacture and transportation of imported machinery

Table 6-1 shows typical items.

Six months has been reserved as the period for preparation. The time to start the pile driving will be determined by whether or not construction machinery

Table 6-1. Time Required for Importing
Materials and Machinery

(Month)

Item	Designing/ Manufacturing	Transportation	Total
Construction Machines	3	3	6
Fabricated Steel Frame	5	3	8
Soundproofing Doors and Windows	4	3	7
Air-Conditioning Equipment	4	3	7
Electrical Equipment	8	3	11
Broadcasting Equipment	10	3	13

such as track cranes, earth augers and others can be imported smoothly.

(2) Piling work

Piles are necessary for the foundation of each building. A large number of earth augers will be required if all the buildings are to be built at the same time, but it is not necessary to start all the buildings at the same time. It will be wise to start driving piles from the building which will require the longest time to build, moving on to the other buildings in succession, so that the number of machines may be minimized. The duration of the work will not change even if a progress schedule is made on such a basis.

(3) Earthwork

The rainy season has to be avoided for earthwork. The entire progress schedule will change depending on when the earthwork starts.

(4) Reinforced concrete work

Two months is estimated as the time required to cast concrete for each floor.

(5) Installation of broadcasting equipment

Broadcasting equipment will be installed in parallel when the interior and exterior finish work of the studio block has progressed to a certain extent. It is estimated that six months will be required. Four months will be needed if phased construction plans are executed.

(6) Training and handover

Training will be given to the staff of Radio Bangladesh successively after the broadcasting equipment has been installed. Utilized in the recording studios, etc. in part, the facilities will be transferred gradually. The final handover is estimated to take about six months.

In the case of phased construction, the training and handover of the facilities are expected to be shortened to about four months.

Table 6-2 and Table 6-3 show the proposed construction schedule.

6-2 Construction Expenses

If the National Broadcasting House is built in one phase, the required cost will be:

796.9 million Taka (10,360 million yen)

In this estimate, the time to commence the construction has been set as two years from now.

If the House is built in two phases, the estimated cost will be:

First phase 387.0 million Taka (5,031 million yen)

Second phase 518.2 million Taka (6,737 million yen)

In this estimate, the time when the first phase work will start has been set at two years from now and that for the second phase work, six years later from now.

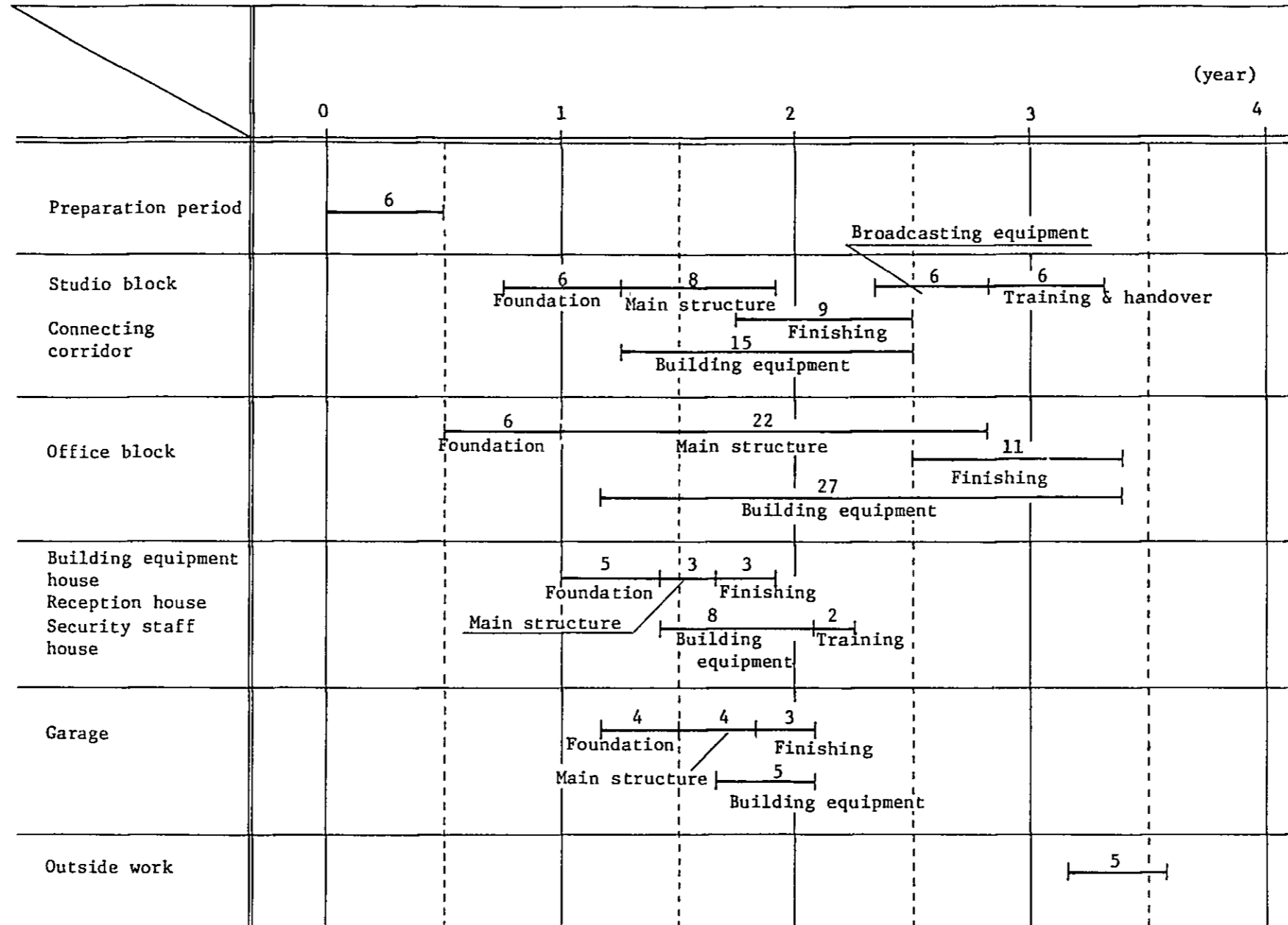
Table 6-4 lists the estimated cost of each section.

Of the total building cost, the local fund is estimated to be about 18%. For the broadcasting equipment and consultant fee, the foreign fund will be required. Base on these factors, the respective figures in foreign and local currencies are shown in Table 6-5.

The calculation is based on the following conditions:

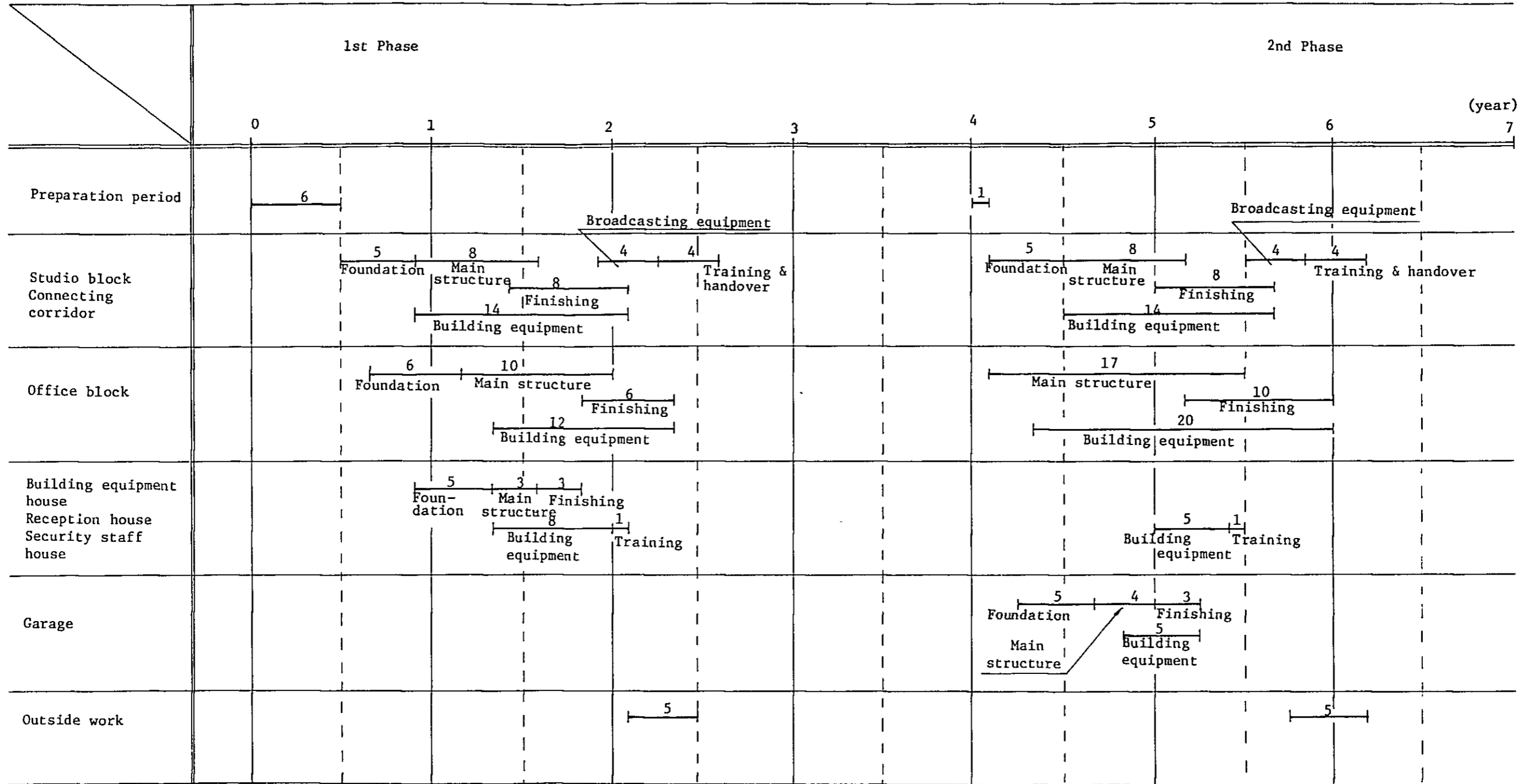


Table 6-2 Construction Schedule in One Phase



Note: Figures on the respective item lines indicate required months

Table 6-3 Construction Schedule in Two Phases



Note: Figures on the respective item lines indicate required months.

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1

1

2

2

1

1

1

1

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1

1

1

1

1

1

1

1

1

1

1

Upper: million Taka

Lower: million Yen

		When constructed in one phase	When divided into two phases		
			1st phase	2nd phase	Total
Grand Total M.Tk.		796.9	387.0	518.2	905.2
(1)+(2)+(3)+(4) M.¥		(10,360)	(5,031)	(6,737)	(11,768)
(1) Buildings	Studio Block including Corridor	175.5 (2,282)	102.0 (1,326)	91.2 (1,185)	193.2 (2,511)
	Office Block	348.8 (4,534)	128.0 (1,664)	271.7 (3,532)	399.7 (5,196)
	Building Equipment House	33.8 (439)	22.4 (291)	14.0 (182)	36.4 (473)
	Garage, Reception House, Security Staff House	15.2 (198)	3.8 (50)	14.0 (182)	17.8 (232)
	Outside Work	6.2 (80)	2.2 (29)	4.9 (64)	7.1 (93)
	Total	579.5 (7,533)	258.4 (3,360)	395.8 (5,145)	654.2 (8,505)
(2) Broadcasting Equipment		63.8 (829)	36.8 (478)	34.1 (444)	70.9 (922)
(3) Consultant Fee	Detailed Design	24.2 (315)	24.2 (315)	-	24.2 (315)
	Supervision	25.5 (332)	17.1 (222)	20.7 (269)	37.8 (491)
(4) Contingency {(1)+(2)+(3)} x 0.15		103.9 (1,351)	50.5 (656)	67.6 (879)	118.1 (1,535)

Table 6 - 4 Estimated Construction Expenses for the National Broadcasting House

		When Constructed in Two Phases											
		When Constructed in One Phase		1st Phase				2nd Phase				Total	
		Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local		
Total	M.Tk.	677.0	119.9	333.5	53.5	436.2	82.0	769.7	135.5				
	M.₹	(8,801)	(1,559)	(4,335)	(696)	(5,672)	(1,065)	(10,007)	(1,761)				
(1) Building	M.Tk.	475.2	104.3	211.9	46.5	324.5	71.3	536.4	117.8				
	M.₹	(6,177)	(1,356)	(2,755)	(605)	(4,219)	(926)	(6,974)	(1,531)				
(2) Broadcast- ing Equipment	M.Tk.	63.8	-	36.8	-	34.1	-	70.9	-				
	M.₹	(829)	-	(478)	-	(444)	-	(922)	-				
(3) Consultant Fee	M.Tk.	49.7	-	41.3	-	20.7	-	62.0	-				
	M.₹	(647)	-	(537)	-	(269)	-	(806)	-				
(4) Contingency {(1)+(2)+(3)} x 0.15	M.Tk.	88.3	15.5	43.5	7.0	56.9	10.7	100.4	17.7				
	M.₹	(1,148)	(203)	(565)	(91)	(740)	(139)	(1,305)	(230)				

Table 6 - 5 Estimated Construction Expense in Foreign and Local Currency

(1) Items not included:

The estimated cost does not include the following items:

- 1) Site preparation work
- 2) Connection of city services, such as electricity, natural gas and telephone, on the site.
- 3) Customs duties on imported goods; warehousing charges; inland transportation cost and commodity taxes.
- 4) Moving expenses from the present National Broadcasting House when the new House is completed. Expense of training the Radio Bangladesh staff.

(2) Currency conversion rates

The following rates are used:

Tk.1	¥13
US\$1	¥200

(3) Escalation clause

The rate of price escalation in construction costs has been estimated as 6% a year, and the cost for the start-up years was calculated on that basis.

(4) Consultant fees

Consultant fees necessary for detailed design and supervision in this project have been estimated respectively.

(5) Contingencies

Contingencies equivalent to 15% of the total amount have been included in the estimate in order to cover unexpected inflation, design changes, etc. during the construction.

(6) Others

In compiling the budget, the following points have been taken into consideration for the buildings and broadcasting systems:

- 1) It is assumed that the construction work is performed by a Japanese contractor who has enough experience in performing this kind of project abroad.
- 2) Equipment and materials considered difficult to procure in Bangladesh, such as truck cranes, earth augers, temporary frames, etc. will be obtained by importing them.
- 3) Building materials produced in Bangladesh will be used whenever possible. In this plan, aggregate, bricks, marble, carpets, etc. will be procured locally. Other materials will be imported.
- 4) Cost estimation of the office block will be made on the basis of reinforced concrete structure.
- 5) Local technicians will be employed as craftsmen. Field supervisors and instructors for special work requiring special skills will be sent to Bangladesh from overseas by contractors.
- 6) Radio Bangladesh's engineering staff will install the broadcasting equipment under the guidance of installation engineers and engineers in special fields sent to Bangladesh by the manufacturers of the broadcasting equipment who have been awarded contracts.

6-3 Execution of Construction Plans

The new National Broadcasting House for Radio Bangladesh is very large in scale. It will require a large sum of money and a long period of time before completion. In order to implement this construction plan smoothly, the following will be required.

6-3-1 Establishment of a Construction Committee

An organization carrying out radio broadcasting requires the formation of services in various areas other than programme production and engineering. Services in such a structure usually have a complicated

relationship. Needless to say, personnel in each service area should cooperate with a spirit of teamwork in order to ensure the smooth construction of the National Broadcasting House.

For this reason, it will be essential to organize a construction committee composed of representatives from each department. These people will have the responsibility and authority to handle various problems from the time the new National Broadcasting House is designed until it starts functioning.

The chief engineer should be appointed as chairman of the committee, and the secretariat should consist of a full-time project manager and committee members serving concurrently and representing each organizational wing.

6-3-2 Detailed Design

Based on this preliminary design, a detailed design is to be made in the next stage.

The designers of the detailed design should give thorough consideration to the present situation in Bangladesh and take local wishes into consideration whenever possible. Full consideration should be given particularly in terms of maintenance and operation.

6-3-3 Use of Consultants

The completion of this National Broadcasting House will require the harmonious integration of various complicated works and special techniques on a high level. The use of consultants during the entire period from the prior preparations for construction including detailed design until the completion of moving is desirable.

In cooperation with Radio Bangladesh, the consultants shall prepare detailed design, prepare tender documents, evaluate proposals for the tender, supervise the work, participate in the acceptance tests, make and implement a moving plan and other items Radio Bangladesh may require.

The consultants should have sufficient experience and capability in business of this type.

6-3-4 Overseas Study Tours by Project Leaders

In implementing this construction plan, it is recommended that the project manager, as well as senior engineers and architects involved in making the plan, make study tours to inspect broadcasting houses in advanced broadcast countries overseas during the planning preparation period.

6-3-5 Training

Radio Bangladesh has sufficient experience in radio broadcasting. However, both the production and technical staff should be given an opportunity to acquire knowledge about new and complicated equipment over an adequate period of time.

It will be desirable to give training to a limited number of backbone engineers and producers at the advanced broadcasting organizations abroad. All production and technical staff should be given sufficient training on the site.

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