

THE PEOPLE'S REPUBLIC OF BANGLADESH

DETAILED DESIGN REPORT

OF

NATIONAL BROADCASTING HOUSE

FEBRUARY, 1981

Japan International Cooperation Agency

7
S
RY

S.D.S.
81-03

JICA LIBRARY



1011915[4]

THE PEOPLE'S REPUBLIC OF BANGLADESH

DETAILED DESIGN REPORT
OF
NATIONAL BROADCASTING HOUSE

FEBRUARY, 1981

Japan International Cooperation Agency

INTERNATIONAL COOPERATION CENTER
TOKYO UNIVERSITY OF COMMERCE
1966
RESEARCH REPORT NO. 100

国際協力事業団		
受入 用印	36.52207	7091
登録No.	06038	64.475
	0442	S.D.S.

INTERNATIONAL COOPERATION CENTER

PREFACE

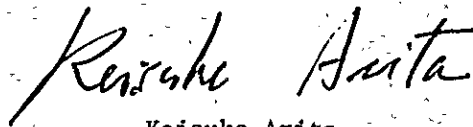
In response to the request of the Government of the People's Republic of Bangladesh, the Japanese Government decided to conduct a survey on detailed design of National Broadcasting House Project and entrusted the survey to the Japan International Cooperation Agency (JICA). The JICA sent to Bangladesh a survey team headed by Mr. Kiichi Kobayashi from August 28 to September 27, 1980.

The team had discussions with the officials concerned of the Government of the People's Republic of Bangladesh and conducted a field survey in Dacca. After the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

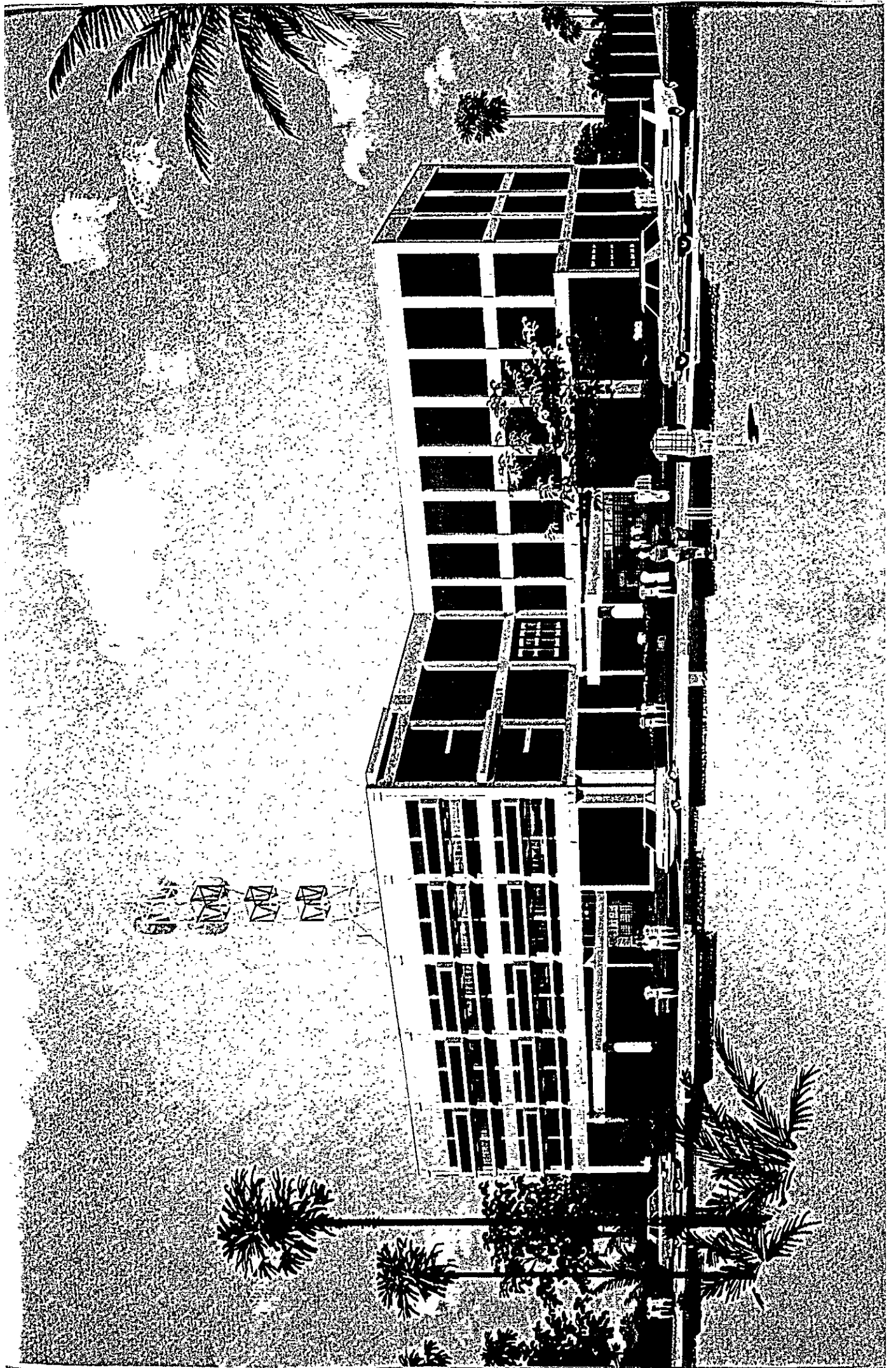
I wish to express my deep appreciation to the officials concerned of the Government of the People's Republic of Bangladesh for their close cooperation extended to the team.

February, 1981

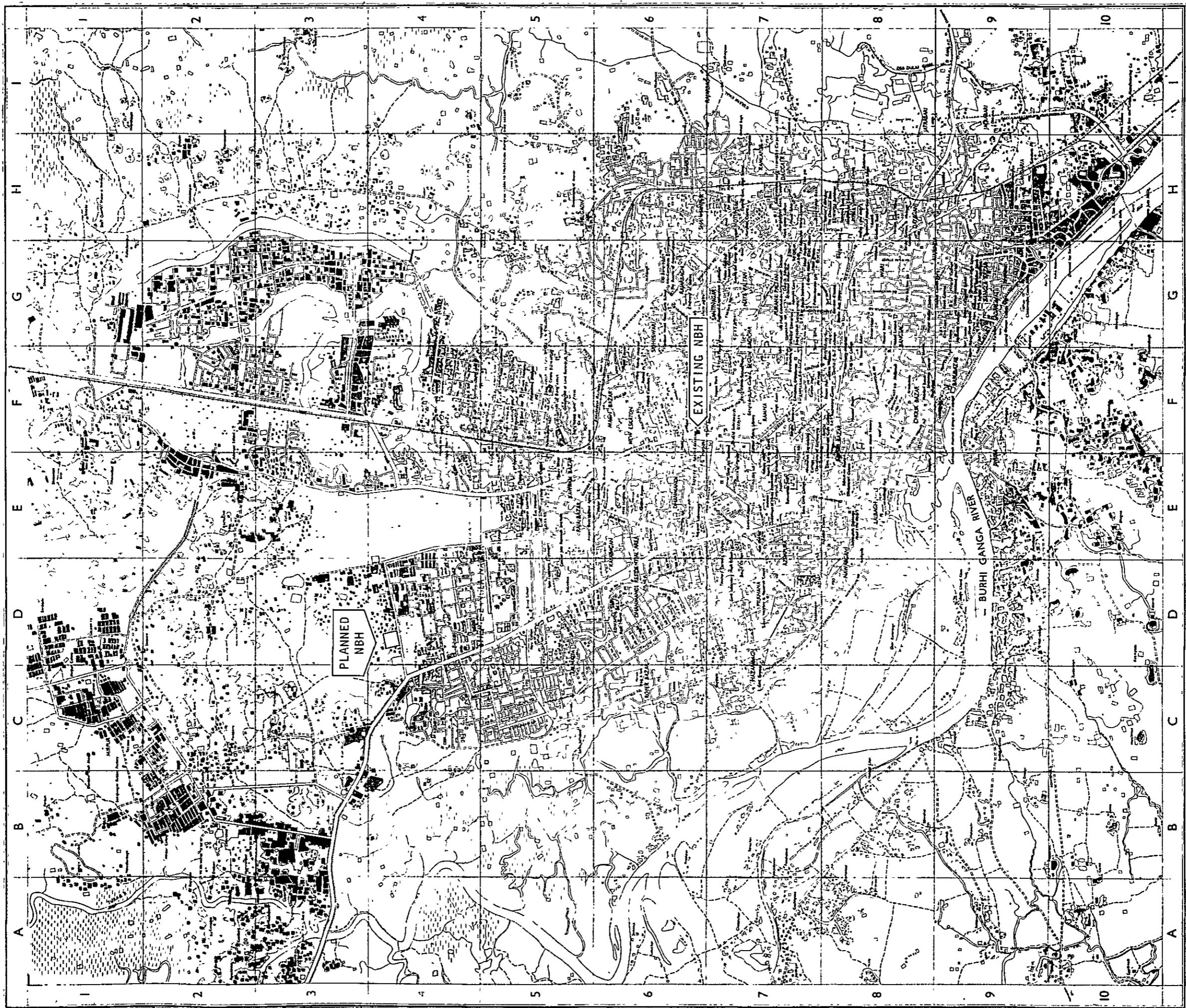


Keisuke Arita
President

Japan International Cooperation Agency



DACCA GUIDE MAP



Published under the direction of the Survey General of Bangladesh, 1977.

Scale: 1:50,000 or 1:75,000 as shown.

FOR SYMBOLS AND REFERENCES ETC. SEE REVERSE.

Refer to this map as - 1:20,000
DACCA GUIDE MAP FIRST EDITION

GOVERNMENT OF BANGLADESH
COPYRIGHT RESERVED
It is an offence under the Copyright Act to make and issue any copy
in whole or in part of this map, with or without alteration
and additions, without the written permission of the Survey General
of Bangladesh.

SUMMARY

1. The Government of the People's Republic of Bangladesh requested the Government of Japan, in view of the importance to improve the mass-media network, for technical cooperation in the preliminary design related to the proposed plan for construction of the National Broadcasting House. In response to this request, the Government of Japan dispatched to Bangladesh a preliminary design survey team in October 1978. The team members entered into consultation with the officials concerned of the Government of Bangladesh and prepared a preliminary design report therefrom in February 1979.

In order to implement the plan worked out by due reference to the report, the Government of Bangladesh made further request for grant of financial aid from the Government of Japan in 1980. In response to this further request, the Government of Japan again despatched an 'Aftercare' survey team in May 1980 for reviewing the preliminary design. After discussion with the officials concerned of the Government of Bangladesh it was mutually agreed that the project size of minimum requirement for broadcasting facilities should include construction of a studio house (10 studio rooms including an Audience Participation Studio) and an annex building only. Afterwards, a detailed design survey team was dispatched for a month in August 1980. The survey team that conducted its site survey in cooperation with the Radio Bangladesh and other governmental agencies concerned commenced the detailed design work and prepared a draft detailed design report after returning to Japan. In December 1980, the draft report was reviewed for confirmation jointly with the officials concerned of the Government of Bangladesh. Upon return to Japan, the survey team revised the draft report for preparation of a final report.

2. Whilst the Government of Bangladesh puts special stress upon improvement and expansion of the mass-media network in implementing the construction project of the National Broadcasting House, it aims at

reducing the construction cost to the possible minimum by taking into due consideration its financial limitation for spending. This point was, therefore, taken into special consideration prior to preparation of the detailed design report. The detailed design work was executed not only on the basis of the preliminary design report but also in pursuance of the site survey results and the discussed matters thereupon. Consideration was given to possible curtailment of the construction costs by maximum use of construction materials and local construction methods on the condition that the functional requirement as the broadcasting station can be fully satisfied.

(1) Overall Plan:

Studio House	3-storied building of reinforced concrete construction with brick walls, with erection of a 20 m high antenna tower and the total floor area of 4,800 m ² , being provided with air-conditioning, water supply, sewerage, sanitation, electrical and broadcasting systems.
Annex	One storied building of brick fabricated construction, partially mixed with RC construction, with the total floor area of 540 m ² , being provided with air-conditioning, water supply, sewerage and electrical equipment.

(2) Construction Programme:

Construction materials and labor of local availability will be utilized to the possible maximum. Total construction period will be divided into the 1st Phase and the 2nd Phase with the duration of 21 months including two dry seasons.

(3) Construction Cost: Total construction cost is estimated at about 2,179 million yen for building construction and broadcasting system installation on the basis of 21-month construction period for completion.

Execution of the construction project for the National Broadcasting House should require necessary preparations on the part of the Government of Bangladesh including the site preparation work for the building lot, the installation work of power distribution line and gas and water supply pipelines into the site, the budget making for payment of customs duties

imposed on imported construction materials and equipment and for inland transportation to the site, and all other preparations required for smooth execution of this construction project.

3. We are fully confident that this Report will lead to the successful completion of the construction project for the National Broadcasting House, which is required as the most urgent national project for the People's Republic of Bangladesh, thus contributing greatly toward improvement and expansion of the existing mass-media network and, in turn, toward improvement of the nation's education and culture in the future.

THE PEOPLE'S REPUBLIC OF BANGLADESH

NATIONAL BROADCASTING HOUSE

DETAILED DESIGN REPORT

CONTENTS

- (1) DETAILED DESIGN REPORT OF NATIONAL BROADCASTING HOUSE
(JAPANESE COPY)

- (2) DETAILED DESIGN REPORT OF NATIONAL BROADCASTING HOUSE
(ENGLISH COPY)

- (3) TECHNICAL SPECIFICATION OF NATIONAL BROADCASTING HOUSE
VOLUME - I

SPECIFICATION OF BUILDING AND BUILDING EQUIPMENT (ENGLISH COPY)

- (4) TECHNICAL SPECIFICATION OF NATIONAL BROADCASTING HOUSE
VOLUME - II

SPECIFICATION OF BROADCAST EQUIPMENT (ENGLISH COPY)

- (5) TECHNICAL SPECIFICATION OF NATIONAL BROADCASTING HOUSE
VOLUME - III

DRAWINGS FOR BUILDING (ENGLISH COPY)

- (6) TECHNICAL SPECIFICATION OF NATIONAL BROADCASTING HOUSE
VOLUME - IV

DRAWINGS FOR BUILDING EQUIPMENT (ENGLISH COPY)

- (7) TECHNICAL SPECIFICATION OF NATIONAL BROADCASTING HOUSE
VOLUME - V

DRAWINGS FOR BROADCAST EQUIPMENT (ENGLISH COPY)

CONTENTS

page

PREFACE		
MAP		
SUMMARY		
CHAPTER 1	SURVEY FOR DETAILED DESIGN	1
1.1	BACKGROUND	1
1.2	PURPOSE OF SURVEY	2
1.3	TEAM MEMBERS	2
1.4	SURVEY BACKGROUND	4
1.4.1	Period of survey	4
1.4.2	Contents of survey	4
CHAPTER 2	DETAILED DESIGN	7
2.1	BUILDING AND EQUIPMENT	7
2.1.1	Site	7
2.1.2	Plan	7
2.1.3	Architectural design	14
2.1.4	Structural design	14
2.1.5	Acoustic design	15
2.1.6	Electrical installation	19
2.1.7	Air conditioning and ventilation systems	21
2.1.8	Plumbing and sanitary system	24
2.2	BROADCAST EQUIPMENT	27
2.2.1	System standard	27
2.2.2	Studio and control booth	28
2.2.3	Associated rooms	31
2.2.4	Master control system	32

	<u>page</u>
2.2.5 Wireless link system	34
2.2.6 Clock system	35
2.2.7 House monitor system	35
2.2.8 Room-to-room intercom system	36
2.2.9 Non-break power supply	36
2.2.10 Common use equipment	36
CHAPTER 3 CONSTRUCTION SCHEDULE	39
CHAPTER 4 CONSTRUCTION COST	45
4.1 SCOPE OF CONSTRUCTION	45
4.1.1 Scope of construction	45
4.1.2 Work to be done at the expense of owner	47
4.2 CONSTRUCTION COST	48
CHAPTER 5 APPENDIX	51
5.1 DRAWINGS	51
5.2 INFORMATION FOR TENDER	67
5.2.1 General	67
5.2.2 Appointment of a consultant as supervisor of project	67
5.2.3 Approval of tender documents	68
5.2.4 Nomination of contractors for invitation to tender	69
5.2.5 Authorized officials or organization for tender	69
5.2.6 Place for execution of works for tender	69
5.2.7 Designation of a signer and a place for signature of contract	69

CHAPTER 1

SURVEY FOR DETAILED DESIGN

1.1 BACKGROUND

In recent years, the importance of radio broadcasting as a means of mass-media in Bangladesh has been recognized. While there has been a sharp increase in the demand for production of various domestic programmes, the existing broadcasting facilities can no longer handle the increasing demand.

Under these circumstances, the Bangladesh Government has designated the construction plan of a new National Broadcasting House as one of its top-priority national projects under the 2nd 5-year Plan (1980 - 1985) and has already proceeded with the necessary preparations for construction by securing the project site within the governmental office building complex in Dacca.

In 1977, a UNDP team was delegated to Bangladesh at the request of the Ministry of Information and Broadcasting and, after site survey on the proposed project for the broadcasting house construction, presented a survey report on the building construction and broadcasting facilities.

In 1978, as per the request from the Bangladesh Government for designing the new broadcasting house, the Japanese Government dispatched its survey team to conduct the preliminary design of the project and submitted the preliminary design report.

After review and evaluation of the report, the Bangladesh Government decided to request the construction of the new broadcasting house on a reduced scale of the original project plan using the grant

made available by the Japanese Government. In 1980 (May 27 - June 6), in order to extend the grant aid as requested, the Japanese Government again dispatched the survey team commissioned to define the planned project scale and draft the guidelines for detailed design. The survey team exchanged views and comments with the governmental officials concerned of Bangladesh and the result was reported in a form of a memorandum (on June 5, 1980).

And finally from August to September, 1980, the Japanese Government dispatched the survey team for a detailed design of a new national broadcasting house at the request of the Bangladesh Government, and, as a result, the detailed design report is presented.

1.2 PURPOSE OF SURVEY

The purpose of the survey is to conduct all necessary site surveys, to consult with the governmental officials of Bangladesh and to collect information and data as may be required for execution of the detailed design service on the construction project of the broadcasting house in accordance with the preliminary design report (dated June 5, 1980).

1.3 TEAM MEMBERS

The survey team for detailed design of the broadcasting house construction project consisted of 9 members as shown in Table 1-1.

Table 1-1. Members of Detailed Design Survey Team

Name	Work	Status
Hideki TERANISHI	Supervision of Work	Special Advisor to Director, General Coordination Division, Minister's Secretariat, Ministry of Posts and Telecommunications
Hiroo SUZUKI	Supervision of Work	Manager, Overseas Technical Cooperation, Technical Coordination & Information Group, Headquarters of Technical Administration & Construction, NHK
Akio ITOH	Coordinator	Special Assistant to Director, Social Development Cooperation Department, Japan International Cooperation Agency (JICA)
Kiichi KOBAYASHI	Architect (General)	Manager, Architectural Department, Japan Engineering Consultants Co., Ltd.
Takashi AKITA	Structural Engineer	Technical Adviser, Architectural Department, Japan Engineering Consultants Co., Ltd.
Katsuhiko NAKAMURA	Plumbing & Air-conditioning Engineer	Assistant to Manager, Architectural Department, Japan Engineering Consultants Co., Ltd.
Keiji KOBAYASHI	Cost Estimator	Deputy Manager, Architectural Department, Japan Engineering Consultants Co., Ltd.
Yasumasa KOKUBU	Broadcasting Equipment Engineer	Acting Director, Consulting Division, All Japan Television Services Co., Ltd.
Fumio NISHIMURA	Broadcasting Equipments Cost Estimator	Chief Engineer, Consulting Division, All Japan Television Services Co., Ltd.

1.4 SURVEY BACKGROUND

1.4.1 Period of survey

The survey team stayed in Bangladesh for the period of one month starting from August 28, 1980. Discussions were made with the governmental officials and other people concerned during their stay. The representatives concerned in the Bangladesh Government are shown in Table 1-2.

1.4.2 Contents of survey

The contents of the survey conducted include all the necessary investigations for preparation of the detailed design report pursuant to, as aforesaid, the preliminary design report (June, 1980) for construction of the New National Broadcasting House, discussions to a depth of details with the Bangladesh governmental officials with regard to architectural design, structure, mechanical (air-conditioning) and electrical installations and broadcasting facilities and collection of the necessary data.

Discussions with those governmental officials resulted in this report involving drawings and specifications.

Table 1-2 Representative Concerned in the Bangladesh Government

1. Ministry of Planning:	
Member	Dr. Eusufzai
Chief, Communication Sector	Mr. M. I. Hossain
2. Ministry of Finance:	
Joint Secretary (ERD)	Mr. Mohammad Ali
Deputy Chief (ERD)	Mr. Saiful Haque
3. Ministry of Information and Broadcasting:	
Hon'ble Minister	Mr. Shamsul Huda Chowdhury
Secretary	Mr. Khorshed Alam
Joint Secretary	Mr. N. A. Al-Masood
Radio Bangladesh:	
Director General	Mr. Amiruzzaman Khan
Chief Engineer	Mr. M. Habibullah
Additional Chief Engineer	Mr. A. M. M. Aabad
Dy. Chief Engineer (Development)	Mr. Asaduzzaman
Dy. Chief Engineer (Planning)	Mr. Abul Hossain
Dy. Chief Engineer (M & S)	Mr. S. U. Mallik
Research Engineer	Mr. Md. Khalilur Rahman
Installation Engineer, Incharge of the Project of N.B.H.	Mr. S. B. Doza
Planning Engineer	Mr. Mirza Nasiruddin
Director External Services	Mr. Mobarak Hossain Khan
News Editor	Mr. Nazrul Islam
Dy. Research Engineer	Mr. Abdur Rashid
Regional Engineer (B.H.)	Mr. Delwar Hossain

- | | |
|---|--------------------------|
| Dy. Resident Engineer | Mr. Golam Mostafa |
| Radio Engineer
(Transcription Service) | Mr. Nazimuddin Chowdhury |
| Radio Engineer (ICD) | Mr. Mowla Nawaz |
4. Ministry of Public Works and Urban Development:
- Department of Architects:
- | | |
|---------------------|--------------------|
| Chief Architect | Mr. A. Bashar |
| Dy. Chief Architect | Mr. Golam Mohammad |
| Junior Architect | Mr. Hazrat Ali |
- Public Works Department
- | | |
|-------------------------|--------------|
| Superintending Engineer | Mr. A. Hye |
| Executive Engineer | Mr. Abu Bakr |
- National Library:
- | | |
|------------|-----------------------|
| Supervisor | Mr. K. M. Jamshed Ali |
|------------|-----------------------|
5. Power Development Board:
- | | |
|---------------------------------|-------------------|
| Director of System
Planning: | Mr. Ahmed Murtafa |
|---------------------------------|-------------------|
6. Titas Gas:
- | | |
|--------------------------|--------------------------|
| Manager Sales Department | Mr. A. B. M. Fazle Elahi |
|--------------------------|--------------------------|
7. Bangladesh Telephone Department:
- | | |
|-----------------------------------|-------------------|
| Director Planning | Mr. N. A. Khan |
| Divisional Engineer
(Planning) | Mr. M. A. Hossain |
8. Dacca Electric Supply:
- | | |
|----------------|--------------------|
| Chief Engineer | Mr. Obaidul Bashar |
|----------------|--------------------|
9. Water and Sewerage Authority:
- | | |
|----------------|--------------------|
| Chief Engineer | Mr. A. N. M. Wahid |
|----------------|--------------------|

CHAPTER 2

DETAILED DESIGN

2.1 BUILDING AND EQUIPMENT

2.1.1 Site

For construction of the New Broadcasting House, the Bangladesh Government has already provided a site area of about 31,400 m² (7.8 acres) in Sher-E-Bangla Nagar of Dacca City.

The site is approximately 171 m x 182 - 185 m (560 ft. x 598 - 607 ft.), in a trapezoid formation closely resembling a regular square. The site is fenced with brick walls all the way around except for some portions. Land formation, which is not yet completed, will be levelled at 24.55 ft. above sea level (See Appendix Drawings).

The site forms a corner lot with its connected access roads; the existing Agargaon Road to be connected on the south side after expansion of its width to 150 ft. and new roads of 150 ft. and 100 ft. width to be constructed respectively on the west and north sides.

2.1.2 Plan

The plan of buildings will be as shown in Appendix Drawings.

Table 2-1-1 includes the design outline for each building.

The layout plan considers accessibility of vehicles from the center of Dacca City and envisages the location of gates on the south

side against the road since the north side of the site is planned separately for future utilization. Gates will be erected at two points for guard security, so that studio A-1, to be opened to the public, will be segregated completely from the access to the studio house. The west side area of the site will remain as it is for future construction of an office building block.

In the space between the pedestrian way of the south-side road and the brick wall, there will be a 30 ft. wide parking lot for visitors. The plan, elevation and section at each floor of the studio building are shown respectively in Appendix Drawings. The floor area breakdown is shown in Table 2-1-2.

The Layout for the studio house is divided largely into the studio to be opened to the public and the production studio, each having its own separate entrance from outside. In case of emergency, each studio will be provided with exits on both the north and south sides of the building, so that attendees will be able to seek two escape routes. The fire alarm system will be installed and the fire extinguishers will be provided. The layout for each floor is based upon the result of full discussion with those locally involved in this project at the time of survey for detailed design which was conducted by due reference to the Survey Report on Preliminary Plan (May 27 - June 7, 1980).

The plan, elevation and section of the annex are shown in Appendix Drawings. The floor area breakdown is shown in Table 2-1-3.

The main piping for water circulation for cooling the rooms and the main line for power supply will be connected to the studio house, passing beneath the roof slab of the liaison corridor with the annex.

As a common design requirement for each building the typical floor level will be set at 2 feet high (M.S.L. + 26.55 ft.) above the planned ground level allowing for high water level during floods.

Table 2-1-1 Outline of buildings

Building	Structure	Width(m) Length(m)	Plinth area (m ²)	Total floor area (m ²)
Studio house	3-stories, and penthouse on roof Steel tower for antenna, 20m high on penthouse Reinforced concrete structure Brick wall	30 x 36 24 x 24	1,656	4,800 (3,936)
Annex	Single-story, brick structure partially reinforced concrete	18 x 30	540	540
		Total area	2,196	5,340 (4,476)

() shows the area except open space on the floors.

Table 2-1-2 Schedule of Rooms and Area of Studio House

Floor- Room No.	Name of Room	Floor Area(m ²)	Remarks
Ground Floor			
G - 1	Audience Participating Studio (184 seats)	517	including Announce Booth, Control Room, Sound Lock, Store, Waiting Room, Make-up Room, etc.
G - 2	Entrance Hall to Audience Participating Studio	167	including Toilet
G - 3	Entrance Hall to Studio House	247	
G - 4	Rehearsal Room (1)	54	
G - 5	Rehearsal Room (2)	30	
G - 6	Musicians Room	72	including P/I Store and Locker Room
G - 7	Artist Room	47	
G - 8	Waiting Room (Men)	57	
G - 9	Waiting Room (Women)	73	including Powder Room and W.C.
G - 10	Musical Instrument Store	36	
G - 11	Staff Room	69	
Sub Total		1,369	(G-1 ~ G-11)
G - 12	Common Space	287	Corridor, Stairs, W.C., etc.
Ground Floor Total		1,656	(G-1~G-12)

1st Floor			
1 - 1	Studio C-1	55	including Control Room
1 - 2	Studio C-2	45	do
1 - 3	Studio C-3	45	do
1 - 4	Studio C-4	46	do
1 - 5	Studio News	59	do (2 Rooms)
1 - 6	Main Control Room	91	including Rack Room
1 - 7	Tape Library	43	
1 - 8	Listening Room	20	2 Rooms
1 - 9	Editing Room	21	2 Rooms
1 - 10	Telephone Exchange Room	21	
1 - 11	Store	28	
1 - 12	Staff Room	185	5 Rooms
1 - 13	Air-conditioning Room	73	
Sub Total		732	(1-1~1-13)
1 - 14	Common Space	348	Corridor, Stairs, W.C., etc.
1st Floor Total		1,080	(1-1~1-14)

2nd Floor			
2 - 1	Studio M-1	82	including Control Room and Sound Lock
2 - 2	Studio ML-1	116	including Control Room, Sound Lock and Store
2 - 3	Studio ML-2	116	do
2 - 4	Repair Workshop	55	including Store
2 - 5	Radio Relay Room	33	
2 - 6	Night Duty Room	68	including Shower Room
2 - 7	Staff Room	200	8 Rooms
2 - 8	Air-conditioning Room	111	
Sub Total		781	(2-1 ~ 2-8)
2 - 9	Common Space	299	Corridor, Stairs, W.C., etc.
2nd Floor Total		1,080	(2-1 ~ 2-9)
Penthouse			
P - 1	Fan Room	54	
P - 2	Store	42	
Sub Total		96	(P-1 ~ P-2)
P - 3	Common Space	24	Stairs
Penthouse Total		120	(P-1 ~ P-3)
Total Floor Area		3,936	Studio House

Table 2-1-3 Schedule of Rooms and Area of Annex

Room No.	Name of Room	Floor Area(m ²)	Remarks
E - 1	High Tension Room	108	
E - 2	Engine Generator Room	36	
E - 3	Machine Room	96	
E - 4	Staff Room	126	
E - 5	Store	105	
E - 6	Common Space	69	W.C., Kitchenette, etc.
Total Floor Area		540	(E-1 ~ E-6)

2.1.3 Architectural design

Architectural design has been elaborated on with special consideration to ensure compatibility with the local peculiarity of architectural style and the climatic conditions. Especially, aesthetic consideration was given to the appearance of buildings to be well-harmonized with other public buildings existing in the vicinity. The studio house was designed for plentiful use of brick for its external walls and for protection against the burning sun with sunshade benthouses and by use of ornamental brick, though its structural framework had inevitably to be designed for reinforced concrete because of the layout requirement.

Internal and external finishes are as shown in Appendix Drawings. Such finishes were made definite as a result of full discussions with the Bangladesh representatives during the survey. The studio interior design complied strictly with the acoustic design in an attempt to try to use as much material of local availability as possible.

2.1.4 Structural design

- (1) The studio house will be of reinforced concrete frame construction and the foundation will depend heavily upon the bearing capacity of the soil. Brick will be used as much as possible for the partition wall.
- (2) The annex will be a brick structure with the combined use of reinforced concrete posts and slabs.
- (3) The structural design will adopt the Architectural Institute of Japan Standard(s) and the local design practice as recommended by the Bangladesh experts.

- (4) The wind velocity of cyclones in Dacca is recorded at 120 m.p.h. (60 m/sec.).
- (5) The horizontal force coefficient of earthquake intensity is estimated at 5 percent of the vertical load.
- (6) The level of 6 feet below the surface level of the road existing in the front is designed as the bottom of footing with 11 tons per square meter net bearing capacity of soil.
- (7) Local made M/S bars will be used as reinforcement material.
- (8) The antenna tower will be fabricated with steel material made in Japan.
- (9) The live load will be designed by due reference to the Standard of N.H.K. (Japanese Broadcasting Corporation)

2.1.5 Acoustic design

- (1) General noise at the proposed site

The general noise level at the proposed site is relatively small given the lack of a heavy traffic load and its resultant noise pollution around the site. The area has been assessed as a relatively calm environment and the normal noise level, with site monitoring, was 50 dB (A). However, in the future when this project will be completed, the site will be surrounded, except on one side, by roads of broad width with resultant gradual increases of car traffic. From the result of monitoring at the site boundary it was noted that the noise level was increased by 10 dB (A) or so over the level previously monitored when heavy traffic was on the roads.

Noise disturbance from aircraft may be reduced with the opening of the new international airport in September 1980. The following are the data obtained from monitoring of the aircraft noise level.

Helicopter (at the point 100 m off from the site)

66 - 72 dB (A) (76 - 82 dB (C))

Engine test (at the point 1,600 m off from the site)

64 - 84 dB (A) (72 - 92 dB (C))

(2) Measures against noise nuisance

- 1) Use of sound insulating walls, wherever deemed necessary, has been taken into consideration.
- 2) The studio has a floating structure to shut out solid borne sound. (Except Studio A-1)
- 3) The studio will be provided with acoustic doors and windows and, if necessary, with a sound lock.
- 4) The designed target for air conditioning noise levels is set as follows:

Studio C, A.B, M, N.S. and M.L.	NC-15
Studio A	NC-20
Control room	NC-25
Master control room	NC-30
Rehearsal room	NC-30

(3) Indoor acoustic design

- 1) Dimensions for each studio have been determined with due consideration to the preferable proportion ratio between length, depth and height.

- 2) The acoustic design target for each studio has been set as follows:

For a group of studios except Studio A-1, the average sound absorption target has been determined as 0.35 - 0.40 at 500 Hz. In Studio A-1, the reverberation time at full occupancy is set as 1.0 to 1.2 seconds as the target with design consideration to restrain any change of the reverberation time to a minimum even in case of vacancy.

- 3) Materials are arranged for Studio A-1 by application of the live end - dead end system
- 4) For studios ML and A-1, wall and ceiling surfaces are concave and convex in full consideration of sound diffusion.
- 5) Design factors for each studio are specified in Table 2-1-4.
- 6) For a control room, a listening room and rehearsal room, design consideration has been given to indoor acoustic conditions as well as other conditions.
- 7) The ceiling surface design of the office room has incorporated the need for sound absorption
- 8) The air conditioning room is also designed to absorb sound in its wall surface so as to maintain the internal noise level at a minimum.

Table 2-1-4 Design Factor for Studio

No.	Symbol	Purpose	Dimension of Studio			Reverberation Time of 500 Hz (sec)	Floor Area of Attached Room (m ²)			Remarks	
			Length (m)	Width (m)	Height (m)		Floor Area (m ²)	Volume (m ³)	Control Room		Announce Booth
1	C - 1	Speech	4.78	2.64	3.0	12.62	37.86	33.0	-	-	Continuity Studio
2	- 2	do	do	do	do	do	do	24.0	-	-	do
3	- 3	do	do	do	do	do	do	do	-	-	do
4	- 4	do	do	do	do	do	do	do	-	-	do
5	N - 1	Speech	2.79	2.0	2.4	5.58	13.39	36.0	-	-	News Studio
6	- 2	do	do	do	do	do	do	-	-	-	do
7	M - 1	Speech/Music	7.51	4.54	3.0	34.10	102.3	21.0	-	8.75	Curtain Box
8	ML - 1	Music/Drama	8.48	6.5	3.56	55.12	196.23	24.0	-	8.0	Curtain Box
9	- 2	do	do	do	do	do	do	do	-	do	do
10	A - 1	Music	19.83	15.8	9.50	289.16	2,333.88	48.0	7.51	24.0	184 Seats, Makeup Room, Waiting Room, Curtain Box

() shows the figure for full occupancy

2.1.6 Electrical installation

(1) Design Conditions

The electrical installation in the facilities is based on such conditions as follows.

- 1) Incoming electric system
3 phase 3 wire 11 KV 50 Hz
- 2) Distribution system
3 phase 4 wire 415V-240V 50Hz
- 3) Rating of electric equipment
for 3 phase, 400V class 50Hz
for single phase, 230V 50Hz
- 4) Specifications and Standards
Specifications and Standards of Japan or equivalent
- 5) Equipment and materials (to be used)
Japanese products or equivalent
- 6) Separate work to be provided by the client
 - a) Electric power supply work to the site from outside the site
3 phase 3 wire 11 KV 50Hz, over-head line
 - b) Telephone trunk work to the studio-house on the site from outside the site
 - c) Supply and installation of private automatic branch exchange of telephone and its materials on the site

(2) Design Outline

The design outline of electrical installation in the site is shown as follows.

1) Sub-station equipment

The sub-station equipment will be provided on the site for receiving the electric power to be supplied from outside the site by the client and for transforming it to what is required for distribution within the facility, and provided with generator and battery for emergency. The fuel for the engine generator will be natural gas according to the request of the Bangladesh government.

A voltage regulator will be provided for voltage fluctuation max. 20%, and for important load.

The power source of the broadcasting equipment will be supplied from a CVCF set for non-break power supply, to be provided by the broadcasting equipment installation.

2) Main line, power control system

This is the system to supply the power to the required load on the site, and the power control for water supply, water discharge, air conditioning equipment, etc.

An alarm system will be provided with an alarm button at each floor and receiving panels for this system will be installed at the security check place and night guard room.

3) Lighting fixtures and socket-outlet system

Lighting fixtures and socket-outlet system will be provided in the required rooms. Lighting and incandescent lamps in the studio will be selected for preventing noise.

The base of the fluorescent tube and incandescent lamps were designed for both in Japanese and Bangladesh products.

4) Telephone, clock and broadcasting system

This includes the supply and fixing of piping and boxes required for the telephone, clock and broadcasting systems.

The supply and installation of private automatic branch exchange of telephone and the materials will be provided by the client.

The supply, fixing and wiring for the clock and broadcasting systems will be provided in the broadcasting equipment installation work.

5) Lightning conductor and earthing

These systems respectively are for the protection of the building from lightning, and the required system of earthing for sub-station equipment, broadcasting equipment, telephone equipment and lightning system.

2.1.7 Air conditioning and ventilation systems

(1) Design conditions

1) Cooling thermal source

Combined use of a gas burning absorption type refrigerator and well-water cooling system

2) Air conditioning system

To be designed for ductwork by operation of the air conditioner.

3) Ventilation

To induce air into the air conditioner for any cooling space and to adopt a mechanical exhaust system for the toilet and machine room

4) Equipment power supply rating

3-phase, 400 volts and 50 Hz

1-phase, 230 volts and 50 Hz

5) Criteria and standards

To comply with Japanese technical criteria and standards

6) Equipment and material

To use, in principle, equipment and material made in Japan

7) Separate work

a) Electrical installation work

b) Water supply, drainage and sanitary work

c) Exterior and door louver work

(2) Design outline

1) Cooling thermal source

Chilled water will be produced by a refrigerator of a natural-gas burning absorption type and fed into each piece of cooling equipment. Well water will be used for cooling purposes with the provision of deep tube wells, pumps and a water tank (architectural work) but without the installation of a cooling

tower. These refrigerators and pumps will be provided respectively with each standby unit, in order to avoid the suspension of the cooling service in case of equipment failure.

2) Air conditioning equipment

The whole building will be divided into four (4) blocks, each being equipped with an air conditioning unit. Cooling water from the refrigerator will be introduced into each air conditioner by way of the connected piping. Air in each room to be air-conditioned will be collected through the duct and will be cooled by the air conditioner, through which cooled air will be returned to each room through the duct.

The air-conditioning equipment, piping and duct will be fully provided with necessary measures for vibration proof, sound insulation and noise absorption.

3) Ventilation equipment

Air to be induced into the air conditioner will be heat-exchanged with the exhaust of surplus air. A heat exchanger will be installed for this purpose inside the roof fan room in order to reduce the cooling load. Mechanical ventilation will be applied to the toilet, shower room and the annex by use of ventilation fans.

4) Automatic control equipment

The room temperature for air conditioning will be controlled by an increase or decrease of cooling water induced into the air conditioner after the detection of the return air temperature to set an average room temperature for each air-conditioned block.

The refrigerator will be controlled automatically by regulating its refrigerating capacity, through the automatic controller inside the refrigerator, after the detection of the return cooling water temperature.

2.1.8 Plumbing and sanitary system

(1) Design conditions

1) Work items

Installation of facilities for water supply, drainage, gas supply, sanitary utensils and purification tank

2) Separate work

a) Water supply pipeline installation work outside the boundary of the project site

b) Gas pipeline installation work outside the boundary of the project site

c) Drainage work inside and outside the project site

3) Equipment power supply rating

3-phase 400 volts and 50 Hz

1-phase 230 volts and 50 Hz

4) Criteria and standards

To comply, in principle, with Japanese technical criteria and standards

5) Equipment and material

To use, in principle, equipment and material made in Japan

(2) Design outline

1) Water supply system

Water supply will be available from the city water supply system through distribution pipelines to each receiving terminal by the installation of receiving and elevated tanks together with pumps.

2) Drainage system

The drainage system will be designed for natural drainage and divided into two separate systems for sewage and normal drain water. The former will be discharged into the side channel after processing in the purification tank while the latter will be purged into the channel without treatment.

3) Gas supply system

Gas supply will be available from the city gas service system through distribution pipelines connected to each receiving terminal by the installation of a pressure regulator.

4) Sanitary utensils

This includes the installation of closet bowls, urinals, lavatory sinks, shower set and faucets for toilet, shower room and lavatory.

5) Purification tanks

Purification tanks will be provided for sewage disposal from the building. The continuous air rationing system will be adopted for purification.

2.2 BROADCAST EQUIPMENT

This chapter describes the outline of the detailed design of broadcast equipment of National Broadcasting House.

Programmes to be produced at Studios and associated Control Booths will be fed into the Master Control Room. Each Studio and Booth will be equipped with programme producing equipment such as a mixing console, tape-recorders, turn-tables, microphones, monitor speakers and others.

In the Master Control Room, the programmes will be switched to the outgoing channels according to the prepared time schedule by means of the operation of the Master Control Console.

The necessary wireless link system for the programme transmission to the existing transmitting stations has been designed.

Details are described in the following clauses. For more details, please refer to the attached Technical Specifications, Volume-II Technical Specifications of Broadcast Equipment and Volume-V Drawings for Broadcast Equipment.

2.2.1 System standard

The system and equipment are designed in accordance with the latest CCIR recommendations and Japanese Industrial Standards. Equipment having the same performance has been designed to be of the same model which consists of the same standard modules in order to keep easy operation and maintenance.

The output levels are designed as follows:

Outgoing channels	+ 4 dBm
Mixing console	0 dBm
Tape-recorder and turn-bable	0 dBm

The input levels are designed as follows:

Mixing Console	Microphone	-70/-60/-50/-40/-30 dBm
	Line	0 dBm
Tape-recorder		0 dBm

2.2.2 Studio and control booth

Equipment for undermentioned 10 Studios and 9 Control Booths has been designed.

<u>Symbol of Studios</u>	<u>Symbol of Booths</u>	<u>Floor.</u>	<u>Performance</u>
C-1	C-1	1st	Continuity and commercial
C-2	C-2	1st	Continuity
C-3	C-3	1st	Continuity
C-4	C-4	1st	Continuity
N-1	N	1st	News casting
N-2		1st	News casting
M-1	M-1	2nd	Music, drama and general
ML-1	ML-1	2nd	Music, drama and general (for stereophonic recording)
ML-2	ML-2	2nd	Music, drama and general
A-1	A-1	Ground	Audience participation

(1) Mixing console and monitor speaker

Each Booth has been designed to be equipped with the following:

<u>Symbol of Booths</u>	<u>Numbers of Mic/Line Fader</u>	<u>Numbers of Output Circuit</u>	<u>Numbers of Monitor Speaker</u>		
			<u>Booth</u>	<u>Studio</u>	<u>Announce Room</u>
C-1	10	2	2	1	
C-2	10	2	2	1	
C-3	10	2	2	1	
C-4	10	2	2	1	
N	10	2	2	2	
M-1	12	2	2	1	
ML-1	16	2	2	2	
ML-2	12	2	2	1	
A-1	16	2	2	4	1

(2) Speaker system for studio A-1

Two speakers on the ceiling and two speakers at both sides are designed to cover the audience seats.

The required input wattage level of the ceiling speakers is calculated as follows:

$$P = L_r + 20 \log D - L_o + P'$$

where P : input wattage level of speaker in dB

L_r: required sound level at the centre seat : 90 dB

D : distance from speaker to center seat : 10 m

L_o: sound level at 1m from speaker at 1w input : 100 dB

P' : margin : 10 dB

$$\text{Then } P = 90 + 20 \log 10 - 100 + 10 = 20 \text{ dB} - 100 \text{ Watt(s)}.$$

In accordance with the above calculation, two 50 Watt speakers will be set at the ceiling center above the front edge of the stage to the direction of the centre seat.

Two additional speakers will be set at both sides in order to serve the forward seats. These side speakers are designed to have the same sound quality as the ceiling speakers.

(3) Tape-recorders and turn-tables

<u>Symbol of Booths</u>	<u>Tape-recorder</u>			<u>Turn-table</u>	
	<u>Open Leel</u>	<u>Cassette</u>	<u>Cartridge Recorder</u>		<u>Cartridge Reproducer</u>
C-1	1		2	3	2
C-2	2	2			2
C-3	2				2
C-4	2				2
N	1	2			1
M-1	2				2
ML-1	2				2
ML-2	2				2
A-1	3				2

(4) Microphone and others

	<u>Microphone</u>			<u>Desk</u>	<u>Stand</u>		<u>Announce Fader</u>
	<u>Ribbon</u>	<u>Condenser</u>	<u>Dynamic</u>		<u>Floor</u>	<u>Boom</u>	
C-1	1			1			
C-2	1			1			
C-3	1			1			
C-4	1			1			
N-1	1			1			1
N-2	1			1			1
M-1	1	2	2		2	2	
ML-1	2	4	2		4	4	
ML-2	1	2	2		2	2	
A-1	2	3	5	1	5	1	

(5) Stage lighting equipment

The following lighting equipment is designed for Studio A-1:

Footlight 60W x 12 lamps	...	5 sets
Fresnel Spotlight 1 kW	...	2 sets
Convex Spotlight 1 kW	...	2 sets
Follow Spotlight 1 kW	...	2 sets

2.2.3 Associated rooms

The undermentioned equipment is designed for the Editing Rooms, Listening Rooms and News Staff Room.

	<u>Tape-recorder</u>		<u>Monitor Speaker</u>	<u>Allwave Receiver</u>
	<u>Console Type</u>	<u>Cassette</u>		
Editing Room 1	2	1	2	
Editing Room 2	2	1	2	
Listening Room 1	1		1	
Listening Room 2	1		1	
News Staff Room			1	2

2.2.4 Master control system

(1) On-Air switcher

An 18 input and 6 output electro-magnetic switcher is designed. Anyone of the 18 input audio signals can be switched to 6 outgoing channels with pre-set operation.

(2) Master control console

A console for the following control operations are designed as follows;

- a) Pre-set of input signals
- b) On-air switching (can operate all outgoing channels simultaneously or each outgoing channel individually)
- c) Monitoring of level and sound of each outgoing channel
- d) Monitoring of level and sound of signal being pre-set
- e) Monitoring of sound of signal at the input circuit
- f) Display of operating status of Booths and outgoing channels.

(3) Distributing network

All incoming and outgoing audio signals to and from the on-air switcher pass through amplifiers, equalizers, transformers, pads and jacks. Studio-to-studio and OB-to-studio connections are available by means of patching at jackfields. The jackfields are designed to have graphical indications in order to avoid the output-to-input connection of the same Booth.

(4) Tally circuit

Tally circuit is designed as follows:

- a) Pre-set tally: A green lamp will be lighted on the mixing console at each booth when the booth will be being pre-set by the master control console
- b) On-air tally: A red lamp will be lighted on the mixing console at each booth when the booth will be on-air by the master control console
- c) On-air signbox: An on-air sign box will be set at each studio entrance and at suitable places inside each studio respectively. The on-air sign box will be lighted by a switch on the mixing console.

(5) Provision for automatic operation

The on-air switcher is designed to be convertible into automatic operation by attaching automatic control equipment.

(6) Equipment accommodation

All of the equipment except the control console is designed to be set in 5 cabinet racks in the Master Control Room.

2.2.5 Wireless link system

(1) Studio-Transmitter-Link (STL)

In order to perform STL for SPT at Nayarhat, HPT1 and HPT2 at Savar and LPT at Mirpur, the following equipment has been designed:

1) NBH side:

1 set of STL transmitter (473 MHz)

2 sets of 3m parabolla for transmission to SPT and HPT

1 set of Yagi antenna for transmission to LPT

2) SPT side

Existing STL receiver and parabolla will be used for receiving.

The direction of the parabolla will be adjusted.

3) HPT side

1 set of STL receiver (473 MHz)

1 set of Yagi antenna for reception from NBH

These are designed to be set at HPT1. The received audio signals will be branched at HPT1 and sent to HPT2 by an underground cable.

4) LPT side

1 set of STL receiver (473 MHz)

1 set of Yagi antenna for reception from NBH

(2) News transmission link

In order to perform a link for news transmission from the existing BH to NBH, the following equipment has been designed:

1) NBH side

1 set of FPU receiver (150 MHz band)

1 set of Yagi antenna

2) Existing BH side

1 set of FPU transmitter (150 MHz Band)

1 set of Yagi antenna

(3) Wireless intercom

1 set of 172.45 MHz transceiver is designed to be set in the Master Control Room in order to communicate with the existing transceivers at other Radio Bangladesh sites.

2.2.6 Clock system

The master clock will generate the driving signals for slave clocks in NBH and the time-pip signal. The time-pip signal will be distributed in order to insert the programme line at the master control console or the mixing consoles at Booths.

The master clock consists of two master clock units with an automatic changeover circuit.

Numbers of slave clocks are as follows:

30 cm Clock, 1 second step ...	28 sets (including spare 6 sets)
30 cm Clock, 30 second step ...	11 sets (including spare 3 sets)
45 cm Clock, 30 second step ...	1 set
Digital Clock, 1 minute step ...	1 set

2.2.7 House monitor system

Six outgoing signals will be distributed to the house monitor circuit in NBH at the level of -20 dBm. Each house monitor is designed to be able to select one of the six distributed signals. The number of house monitors are 20 sets. (including spare 3 sets)

2.2.8 Room-to-room intercom system

Direct two-way communication will be available between two of the following rooms:

Master Control, Each Booths, Engineering Duty Room, Shift I/C Room, Duty Officer's Room and Radio Relay Room.

Besides, the following communication will be also available:

Between the Master Control and Equipment House Staff Room,
Between Booth A-1 and Back Stage.

2.2.9 Non-break power supply

Considering the conditions of city power supply, it is designed to feed electricity to all broadcasting equipment through "non-break power supply". It is composed of a battery charger, floating batteries and a thyristor controlled DC to AC converter. The rated capacity is 20 kVA and 20 minutes operation without input AC power.

2.2.10 Common use equipment

Besides the equipment for each sub-system mentioned in foregoing Clauses, the undermentioned equipment is scheduled to be provided:

1) Portable Audio Mixer	...	2 sets
2) Tape-recorder, open-reel, console type	...	2 sets
3) Tape-recorder, open-reel, portable type	...	2 sets
4) Cassette Tape-recorder, portable type	...	2 sets
5) Cartridge Tape-recorder, 1ch	...	1 set
6) Turn-table	...	1 set
7) Reverberation Unit	...	2 sets
8) Microphone, Ribbon type	...	3 sets
Condenser type	...	3 sets
Dynamic type	...	3 sets

9) Microphone Stand, Desk type	...	4 sets
Stand, Floor type	...	2 sets
Stand, Boom type	...	2 sets
10) Audio Monitor	...	4 sets
11) Wireless Microphone for Cassette Tape-recorder	...	2 sets
12) Walky Talky (172.45 MHz)	...	2 sets
13) Magnetic Telephone	...	1 set
14) Measuring Equipment		
Distortion Meter/Osc	...	2 sets
Audio Attenuater	...	2 sets
Electronic Voltmeter	...	2 sets
Frequency Counter	...	2 sets
Oscilloscope	...	2 sets
Wow Flutter Meter	...	2 sets
Spectrum Analizer	...	1 set
Signal Generator	...	1 set
FM Linear Detector	...	1 set
Field Strength Meter	...	1 set
Mobile Trolley for Measuring Equipment	...	2 sets
RF Attenuater	...	1 set
Multimeter	...	5 sets
Megger	...	1 set
15) Tool Kit	...	5 sets
16) Blank Tape, Reel/Cartridge/Cassette	...	1 lot
17) Tape Recorder Accessories	...	1 set
18) Spare Parts	...	1 lot

CHAPTER 3

CONSTRUCTION SCHEDULE

The time schedule for the construction project will be divided, as shown in Table 3-1, into a first phase and a second phase and the work will thereby be executed toward its target completion of construction not later than 21 months counting from the date of commencement.

The period of consultant services will continue from two months before the commencement of construction to one month after the completion of construction; namely 24 months.

The scope and content of the work respectively for the first phase and the second phase are as specified in Table 3-2.

Table 3-1 Construction Schedule

Period (Month)		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Remarks	
1st Phase	Building Studio House Annex			[Solid bar]																							
				[Solid bar]																							
	Electric Installation			[Solid bar]																							
	Air-conditioning & Plumbing			[Solid bar]																							
	Broadcasting Equipment			[Solid bar]																							
(Consultation)			[Solid bar]																								
2nd Phase	Building Studio House Antenna Tower Exterior Work																										
	Electric Installation																										
	Air-conditioning & Plumbing																										
	Broadcasting Equipment																										
(Consultation)																											

Table 3-2 Construction Items of 1st and 2nd Phase

	1st Phase	2nd Phase	Total
Building	1,190,000,000	300,000,000	1,490,000,000
Broadcasting Equipment	150,000,000	400,000,000	550,000,000
Supervisor of Project	100,000,000	40,000,000	140,000,000
Total	1,440,000,000	740,000,000	2,180,000,000

	1st Phase	2nd Phase
Purpose of Function	Programme production and recording in 6 studios	Programme production, Recording and relay in 4 studios Relay facility to transmitting station
1) Building Construction		
. Studio House	All parts of Studio House except A-1 Studio (except interior construction of M and ML)	Building of A-1 Studio and interior construction of M and ML
. Annex	All parts of equipment house and part of electric and air-conditioning equipment (except generator and part of air-conditioning equipment)	Generator and rest of air-conditioning equipment
. Miscellaneous	Roof of entrance porch	Antenna tower, roof of entrance porch (A-1 Studio)
2) Broadcasting Equipment	Equipment in Studios (C-1 4, N.S.), and equipment for listening, editing and non-breaking and related facilities (mainly in 1st floor)	Equipment in Studio (A-1, M and ML) and equipment for M.C.R. and STL and related facilities
3) Supervision of Project	Cost for consultant of and expense for supervisors of project	Cost for consultant of and expense for supervisors of project

CHAPTER 4

CONSTRUCTION COST

4.1 SCOPE OF CONSTRUCTION

4.1.1 Scope of construction

(1) Construction work

- (a) Procurement of necessary material and equipment (except items in 4.1.2,(3)) and transportation from Japan to Bangladesh if they will be Japanese products.
- (b) Procurement of necessary labours and work of construction by labours
- (c) Expense for management of project

The general outline of construction is specified in Table 4-1.

(2) Consultant services

A consultant will supervise the project and assist the owner in effectively executing the project. The consultant services are specified as follows;

- (a) Supervision of construction work at the site
- (b) Assistance in discussion and adjustment with the officials and organizations concerned
- (c) Inspection on the materials and equipment to be procured

Table 4-1 General Outline of Construction

	Outline	Floor area (m ²)	Remarks
1. Studio House	Structure (column, beam, slab, etc.); reinforced concrete Wall; brick Antenna Tower; steel (20 m high)	Ground Floor 1,656 1st Floor 1,080 2nd Floor 1,080 Penthouse 120 Total 3,936	Exterior work; entrance porch, berm, drainage ditch and Trench Air-conditioning and plumbing equipment Electric equipment
2. Annex	Structure; brick and reinforced concrete	Ground floor 540	
3. Broadcasting Equipment	Supply and installation of broadcasting equipment shown in 2-2		

4.1.2 Work to be done at the expense of owner

- (1) Site preparation and ground formation.
- (2) Extension to the site of utility services such as electric power, gas, water, telecommunications and other incidental facilities.
- (3) Prompt unloading, custody, customs clearance at ports of disembarkation and inland transportation from ports to the site of material and equipment to be imported, and customs duties, internal taxes and other fiscal levies to be imposed on the material and equipment.
- (4) Removal of the existing broadcasting facilities to the new house and installation of the equipment after such transfer.
- (5) Exterior construction work except the construction work of drainage ditch and trench.
- (6) Preparation of necessary documents, maps, drawings and other informations.
- (7) Adjustment with the officials and organizations concerned.
- (8) Necessary facilities for entry, stay and performance of services of Japanese nationals and customs duties, internal taxes and fiscal levies to be imposed on the material, equipment and the services of Japanese nationals.
- (9) All other work as may be deemed necessary for the execution of the work without difficulty.

4.2 CONSTRUCTION COST

Construction costs are as broken down in Table 4-2, provided that such costs are estimated on the following conditions:

- (1) The cost estimate covers the scope of construction in the preceding item 4.1.
- (2) The work to be executed by eligible Japanese consultants and contractors.
- (3) Material and equipment to be procured in Japan and Bangladesh as specified in Table 4-3.
- (4) Labour to be procured locally in Bangladesh.

Table 4-2 Break-down of Construction Cost

Item		Cost (Unit; Japanese Yen)
(1) Building Construction	Studio House	732,780,000
	Annex	96,250,000
	Electric Installation	227,673,000
	Air-conditioning	336,991,000
	Plumbing	76,846,000
	Antenna Tower	18,630,000
	Sub-Total	1,489,170,000
(2) Broadcast Equipment/		550,000,000
Sub-Total ((1) + (2))		2,039,170,000
(3) Consultant Fee		140,000,000
Grand Total ((1) + (2) + (3))		2,179,170,000

Table 4-3 Material List

Purpose		Imported	Local
Skelton		Antenna mast Deformed bar	Aggregate Brick(machine and hand made) M/S bar Cement
Finishing	General	Vinyl tile Vinyl skirtings Plaster board Timber (soft wood) Steel door and window Finish hardware (lock, hinde, door-check, lever handle, etc.) Caulking material Paint (special quality) Plate glass (large)	Terrazzo block Asbestos cement board Wood door and window Paint (oil and vinyl) Plate glass
	Acoustic	Glass wool felt Plywood Rock wool board Sound proof door and window Gum gasket Vibration proof rubber	Jute carpet Jute cloth Partex (Jute chip board)
Equipment		Air-conditioning equipment Electric equipment Lighting fittings Electric outlet Sanitary equipment Broadcasting system	

.CHAPTER 5

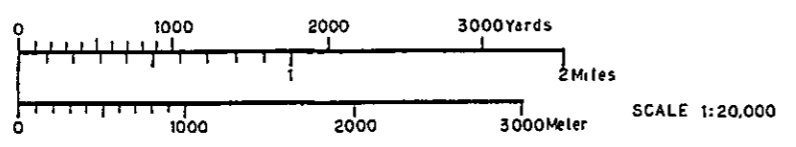
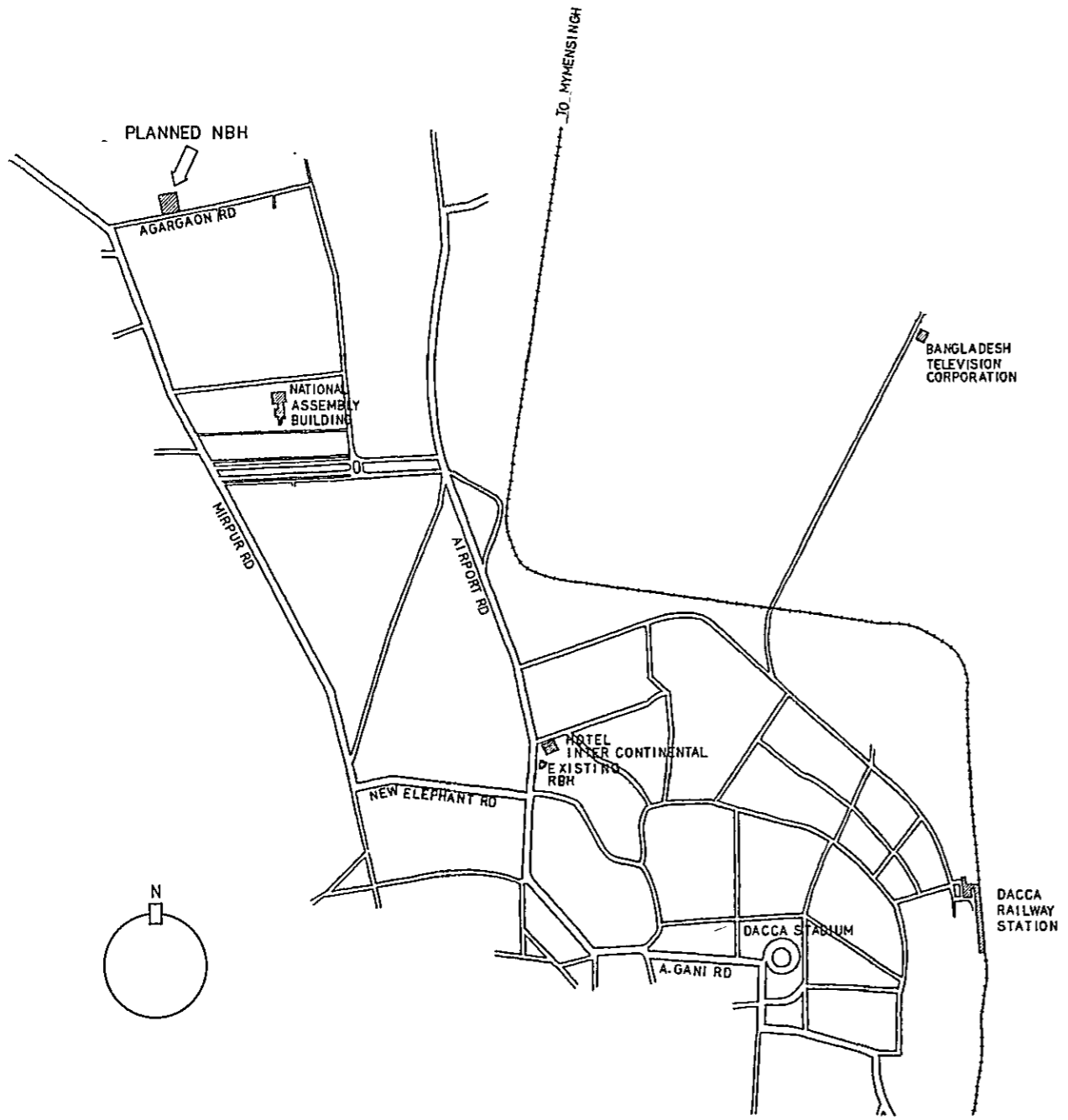
APPENDIX

5.1 DRAWINGS

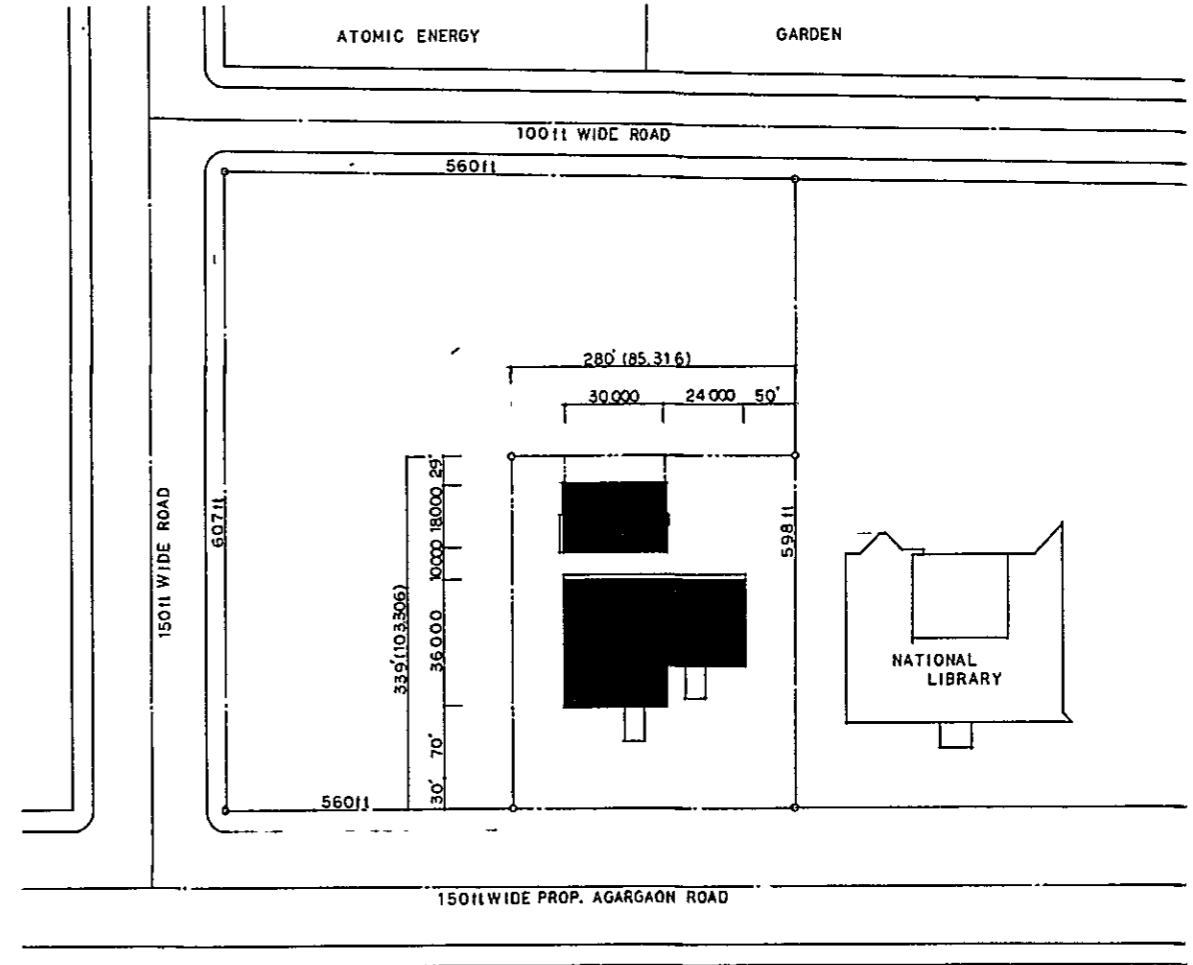
Drawings are as follows.

(List of Drawings)

- . Location Map
Site Plan
- . Exterior Finish Schedule
Floor Area Key Plan
- . Interior Finish Schedule (1)
- . Interior Finish Schedule (2)
- . Ground Floor Plan
- . 1st Floor Plan
- . 2nd Floor Plan
- . Roof Floor Plan
Penthouse Roof Floor Plan
- . South Elevation
East Elevation
- . North Elevation
West Elevation
- . Section (1)
- . Section (2)
- . Annex Plan
- . Annex - Section and Elevation



LOCATION MAP



SITE PLAN SCALE 1:1000

OUTLINE OF BUILDING	
SITE AREA	88135.55 M ²
BUILDING COVERAGE AREA	2196.000 M ²
TOTAL FLOOR AREA	4,476.000 M ²

No. 1

Project	NATIONAL BROADCASTING HOUSE OF RADIO BANGLADESH	No.	A-01-01
Scale	1:20,000	Scale	1:1,000
LOCATION MAP	SITE PLAN	Approved by	Designed by
		Drawn by	Date
			FEB 1981

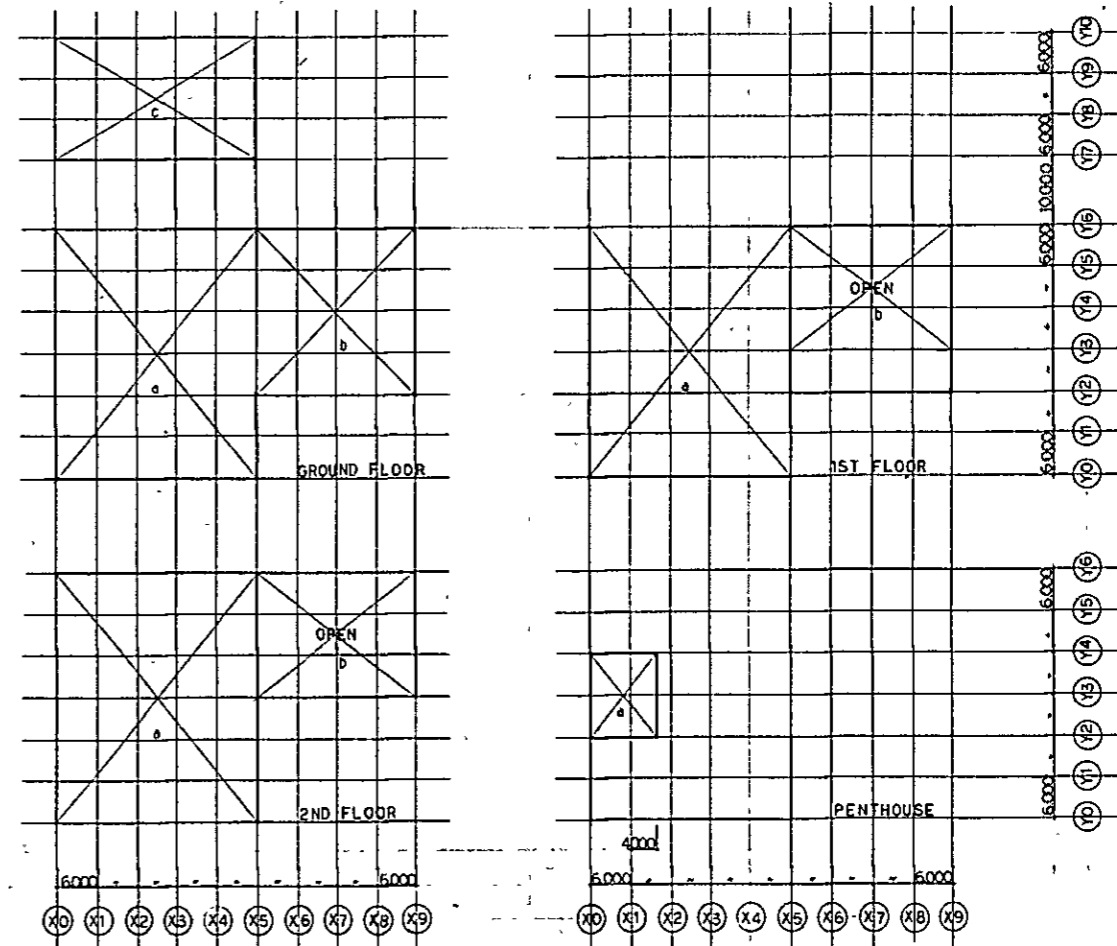
JECR JAPAN ENGINEERING CONSULTANTS CO., LTD.

EXTERIOR FINISH SCHEDULE.

	FLOOR	SKIRTING	WALL	CEILING	OTHER
BERM	GRAVEL				
MAIN ENTRANCE PORCH	TERRAZZO			EXPOSED CONCRETE	
CORRIDOR	EXPOSED CONCRETE			DO	
SUB ENTRANCE PORCH	DO			DO	
EXTERIOR WALL			EXPOSED BRICK, ORNAMENTAL BRICK, EXPOSED CONCRETE		
WINDOW AND DOOR FRAME			WOOD, STEEL		IRON GRILL
EAVES	TROWELLED MORTAR			EXPOSED CONCRETE	
PARAPET			EXPOSED CONCRETE		STAINLESS STEEL RING
ROOF	LIME TERRACING				STEEL GAS PIPE 100 ^R O.P.
GUTTER					EXPOSED CONCRETE

REMARKS

SYMBOL	EXPLANATIONS	ABBREVIATION	EXPLANATION
	REINFORCED CONCRETE	VEP	SYNTHETIC RESIN TYPE VINYL EMULSION PAINT
	BRICK	EP	SYNTHETIC RESIN TYPE EMULSION PAINT
	DO	QP	OIL PAINT
	ORNAMENTAL BRICK	OS	OIL STAIN
	INSULATION	RW	ROCK WOOL
	GLASS WOOL BOARD		
	TIMBER		
	DO (FINISH WOOD)		
	LIGHTWEIGHT CONCRETE		
	FIRE EXTINGUISHER 18L ACID TYPE		
		PS	PIPE SPACE
		DS	DUCT SPACE



FLOOR AREA KEY PLAN s 1:500

GROUND FLOOR AREA	$a. 30.000 \times 36.000 + b. 24.000 \times 24.000 + c. 30.000 \times 18.000 = 2,196.000 M^2$
1ST FLOOR AREA	$a. 30.000 \times 36.000 = 1,080.000 M^2$
2ND FLOOR AREA	$a. 30.000 \times 36.000 = 1,080.000 M^2$
PENTHOUSE AREA	$a. 10.000 \times 12.000 = 120.000 M^2$
TOTAL FLOOR AREA	4,476.000 M ²
(ANNEX	540.000 M ²)

No. 2

Project	NATIONAL BROADCASTING HOUSE OF RADIO BANGLADESH	No.	A-01-02
Scale	1:500	Date	FEB 1981
Approved by		Designed by	
JEC JAPAN ENGINEERING CONSULTANTS CO., LTD.			

INTERIOR FINISH SCHEDULE < STUDIO HOUSE > (1)

	ROOM NAMES	FLOORS	F.H.	SKIRTINGS	H	WALLS	CEILINGS	H	C	W	REMARKS
G.F	AUDIENCE PARTICIPATING STUDIO	TERRAZZO BLOCK JUTE CARPET (CORRIDOR)	9 1,225	WOOD OS.	150	A	A	9495	○		AUDIENCE SEATS 184 PERSONS, CURTAIN
	STAGE	STRIP FLOORING OS.	500	DO	150	A	A	4,700 9,495	○		
	WAITING	TERRAZZO BLOCK	500	TERRAZZO BLOCK	60	TROWELLED MORTAR FINISH VEP.	PARTEX T18	—			
	MAKEUP ROOM	DO	500	DO	60	DO	DO	—			
	STORE	DO	500	DO	100	DO	DO	—			
	ANNOUNCE BOOTH	JUTE CARPET	1,600	WOOD OS	150	B	B	2,400			
	CONTROL ROOM	VINYL-ASBESTOS TILE	1,500	DO	150	C	D	2,600 2,100			
	SOUND LOCK	JUTE CARPET	1,225	DO	60	C	D	2,400			
	REHERSAL ROOM	DO		DO	60	TROWELLED MORTAR FINISH VEP	RW SOUND ABSORBING BOARD T12	2,900	○		
	MUSICIAN ROOM	DO		DO	60	DO	DO	2,900			
	P/I STORE	TERRAZZO BLOCK		TERRAZZO BLOCK	60	DO	PLYWOOD EP T4	2,900			
	LOCKER ROOM	DO		DO	60	DO	DO	2,900			
	MUSICAL INSTRUMENT STORE	DO		DO	60	DO	DO	2,900	○		
	ARTIST ROOM	DO		DO	60	DO	RW SOUND ABSORBING BOARD T12	2,900			
	PROGRAM STAFF ROOM	DO		DO	60	DO	DO	2,900	○		
	WAITING ROOM	DO		DO	60	DO	DO	2,900	○		
	POWDER ROOM	DO	-40	DO	60	DO	DO	2,940	○		
	DUTY OFFICER ROOM	DO		DO	60	DO	DO	2,900			
	ENTRANCE HALL (1)	DO		DO	60	EXPOSED BRICK	WOOD LOUVER OP	4,200			STYLO FORM T100 EP
	ENTRANCE HALL (2)	DO		DO	60	DO	DO	4,200			DO
	W.C	TERRAZZO CAST IN PLACE	-40 460	CERAMIC TILE	—	CERAMIC TILE	FLEXIBLE BOARD V.E.P. T4	2,940			
	CORRIDOOR	TERRAZZO BLOCK		TERRAZZO BLOCK	60	TROWELLED MORTAR FINISH VEP.	RW SOUND ABSORBING BOARD T12	2,400			
	STAIRS	TERRAZZO CAST IN PLACE		DO	—	EXPOSED BRICK	TROWELLED MORTAR FINISH VEP	—			
	O/B EQUIPMENT ROOM	TERRAZZO BLOCK		DO	60	TROWELLED MORTAR FINISH VEP	RW SOUND ABSORBING BOARD T12	2,900			
1st F.	CONTINUITY STUDIO	JUTE CARPET	250	WOOD OS	150	B	B	3,000			
	NEWS STUDIO	DO	250	DO	150	B	B	2,400			
	CONTROL ROOM	VINYL-ASBESTOS TILE	150	DO	150	C	D	2,700	○		
	MASTER CONTROL ROOM	DO	150	DO	150	C	D	2,900	○		
	ELECTRONIC WORKSHOP	TERRAZZO BLOCK	150	TERRAZZO BLOCK	60	TROWELLED MORTAR FINISH VEP	PLYWOOD EP T4	2,900	○		
	EQUIPMENT STORE	DO	150	DO	60	DO	DO	2,900			
	STORE	DO	150	DO	100	DO	DO	2,900			
	SHIFT I/C	DO	150	DO	60	DO	DO	2,900	○		
	NEWS STAFF ROOM	DO		DO	60	DO	RW SOUND ABSORBING BOARD T12	2,900	○		
	NEWS EDITOR & READER WAITING ROOM	DO		DO	60	DO	DO	2,900	○		
	TELEX PRINTER ROOM	DO		DO	60	DO	DO	2,900	○		
	ENGINEER ROOM	DO		DO	60	DO	DO	2,900	○		
	PROGRAM I/C	DO		DO	60	DO	DO	2,900	○		
	TELEPHONE EXCHANGE ROOM.	DO	150	DO	60	DO	DO	2,900	○	○	
	TAPE LIBRARY	VINYL TILES		WOOD OS.	60	DO	PLYWOOD EP T4	2,900	○		
	LISTENING ROOM	JUTE CARPET		DO	60	C	D	2,900	○		
	EDITING ROOM	TERRAZZO BLOCK		TERRAZZO BLOCK	60	TROWELLED MORTAR FINISH VEP.	RW SOUND ABSORBING BOARD T12	2,900	○		
	DUTY OFFICER ROOM	DO		DO	60	DO	DO	2,900	○		
	WAITING ROOM	DO		DO	60	DO	DO	2,900	○		
	AIR CONDITIONING EQUIPMENT ROOM	TROWELLED MORTAR FINISH		TROWELLED MORTAR FINISH	100	GLASS WOOL BOARD T 25, CRIMP WIRE NET	CEMENT CHIP BOARD T 25	—			
	WC	TERRAZZO CAST IN PLACE	-40	CERAMIC TILE	—	CERAMIC TILE	FLEXIBLE BOARD VEP T4	2,940			BITUMINOUS MEMBRANE WATER PROOFING

NOTES

A 1) VENEERED CHIP BOARD T20

2) PERFORATED PLYWOOD T6 6^o-150, GLASS WOOL BOARD T50

3) PERFORATED PLYWOOD T6 9^o-50, GLASS WOOL BOARD T50

4) PERFORATED PLYWOOD T6 9^o-20, GLASS WOOL BOARD T50

B 1) PERFORATED PLYWOOD T6 6^o-150, GLASS WOOL BOARD T50

2) PERFORATED PLYWOOD T6 9^o-20, GLASS WOOL BOARD T50

3) PERFORATED PLYWOOD T6 6^o-150, GLASS WOOL BOARD T50

2) PERFORATED PLYWOOD T6 9^o-20, GLASS WOOL BOARD T50

D 1) RW. SOUND ABSORBING BOARD T12

2) PLASTER BOARD T9

REMARKS

1) B : AIR SPACE T40

2) C : AIR SPACE T5

RW : ROCK WOOL

C : CURTAIN BOX (WOOD)

FH : SL+




W : WIRING PIT

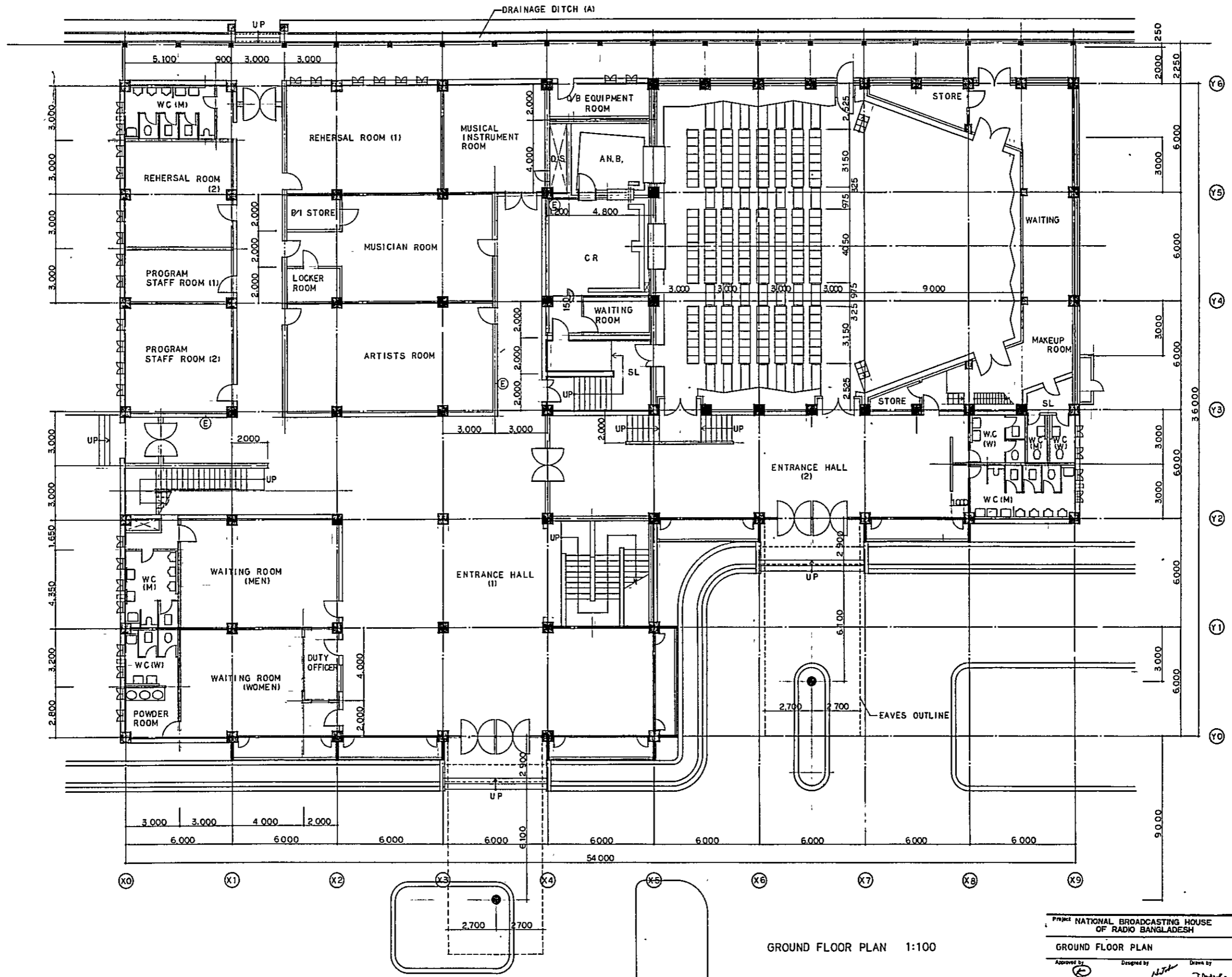
Project	NATIONAL BROADCASTING HOUSE OF RADIO BANGLADESH	No.	No 3
Scale			A-01-03
INTERIOR FINISH SCHEDULE (1)			
Approved by	Designed by	Drawn by	Date
			FEB 1981
JEC JAPAN ENGINEERING CONSULTANTS CO., LTD.			

INTERIOR FINISH SCHEDULE <STUDIO HOUSE> (2)

	ROOM NAMES	FLOORS	F.H.	SKIRTINGS	H	WALLS	CEILINGS	H	C	W	REMARKS	
1st F.	CORRIDOR	TERRAZZO BLOCK		TERRAZZO BLOCK	60	TROWELLED MORTAR FINISH V.E.P.	RW SOUND ABSORBING BOARD T12	2.400				
	STAIRS	TERRAZZO CAST IN PLACE		DO	—	EXPOSED BRICK	TROWELLED MORTAR FINISH V.E.P.	—				
2nd F.	MEDIUM STUDIO	VINYL FLOORING SHEET	250	WOOD OS	150	B	B	3.000			STYLO FORM T100	
	MEDIUM LARGE STUDIO	DO	250	DO	150	B	B	3.550			DO	
	CONTROL ROOM	VINYL-ASBESTOS TILE	150	DO	150	C	D	2.700	○		DO	
	SOUND LOCK	JUTE CARPET	150	DO	150	C	D	2.400			DO	
	STORE	TERRAZZO BLOCK	250	TERRAZZO BLOCK	100	TROWELLED MORTAR FINISH V.E.P.	PLYWOOD E.P. T4	2.900			DO	
	REPAIR WORKSHOP	DO	150	DO	60	DO	DO	2.900	○		DO	
	STORE	DO	150	DO	100	DO	DO	2.900	○		DO	
	RADIO RELAY ROOM	DO	150	DO	60	DO	RW SOUND ABSORBING BOARD T12	2.900	○		DO	
	MAINTENANCE ENGINEER ROOM	DO	150	DO	60	DO	DO	2.900			DO	
	MECHANICAL MAINTENANCE & PROGRAMING STAFF ROOM	DO	150	DO	60	DO	DO	2.900	○		DO	
	NIGHT DUTY ROOM	DO		DO	60	DO	DO	2.900	○		DO	
	BED ROOM	DO		DO	60	DO	DO	2.900	○		DO	
	SHOWER ROOM & WC	TERRAZZO CAST IN PLACE	-40	CERAMIC TILE	—	CERAMIC TILE	FLEXIBLE BOARD V.E.P. T4	2.940	○		DO	
	PROGRAM OFFICER ROOM	TERRAZZO BLOCK		TERRAZZO BLOCK	60	TROWELLED MORTAR FINISH V.E.P.	RW SOUND ABSORBING BOARD T12	2.900	○		DO	
	TECHNICIAN ROOM	DO		DO	60	DO	DO	2.900	○		DO	
	ENGINEERING DUTY ROOM	DO		DO	60	DO	DO	2.900	○		DO	
	WAITING ROOM	DO		DO	60	DO	DO	2.900	○		DO	
	DUTY OFFICER ROOM	DO		DO	60	DO	DO	2.900	○		DO	
	AIR CONDITIONING EQUIPMENT ROOM	TROWELLED MORTAR		DO	60	GLASS WOOL BOARD T25, CLIMP WIRE NET	—	—				DO
	WC.	TERRAZZO CAST IN PLACE	-40	CERAMIC TILE	—	CERAMIC TILE	FLEXIBLE BOARD V.E.P. T4	2.940				DO BITUMINOUS MEMBRANE WATER PROOFING
	CORRIDOR	TERRAZZO BLOCK		TERRAZZO BLOCK	60	TROWELLED MORTAR FINISH V.E.P.	RW SOUND ABSORBING BOARD T12	2.400				DO
	STAIRS	TERRAZZO CAST IN PLACE		DO	—	EXPOSED BRICK	TROWELLED MORTAR FINISH V.E.P.	—				DO
	P.H.	FAN ROOM	TROWELLED MORTAR	360	TROWELLED MORTAR FINISH	100	GLASS WOOL BOARD T25, CLIMP WIRE NET	—	—			STYLO FORM T100
STORE		TERRAZZO BLOCK	360	TERRAZZO BLOCK	100	TROWELLED MORTAR FINISH V.E.P.	RW SOUND ABSORBING BOARD T12	2.700			DO	
STAIRS		TERRAZZO CAST IN PLACE		DO	—	DO	TROWELLED MORTAR FINISH V.E.P.	—			DO	
E.H.	MACHINE ROOM	TROWELLED MORTAR		TROWELLED MORTAR FINISH	100	EXPOSED BLICK	—	—			STYLO FORM T100	
	H.T. ROOM	DO	200	DO	100	DO	—	—	○		DO	
	ENGINE GENERATOR ROOM	DO	200	DO	100	DO	—	—	○		DO	
	NIGHT GUARD	TERRAZZO BLOCK		TERRAZZO BLOCK	60	TROWELLED MORTAR FINISH V.E.P.	PLYWOOD E.P. T4	2.900			DO	
	KITCHENETTE	DO		DO	60	DO	FLEXIBLE BOARD V.E.P. T4	2.900			DO	
	STAFF ROOM	DO		DO	60	DO	PLYWOOD E.P. T4	2.900			DO	
	HOUSE KEEPER	DO		DO	60	DO	DO	2.900			DO	
	OFFICE	DO		DO	60	DO	DO	2.900			DO	
	STORE	DO		DO	100	DO	—	—			DO	
	STORE I/C	DO		DO	100	DO	—	—			DO	
	WC	TERRAZZO CAST IN PLACE	-40	CERAMIC TILE	—	CERAMIC TILE	FLEXIBLE BOARD V.E.P. T4	2.900				DO

No. 4

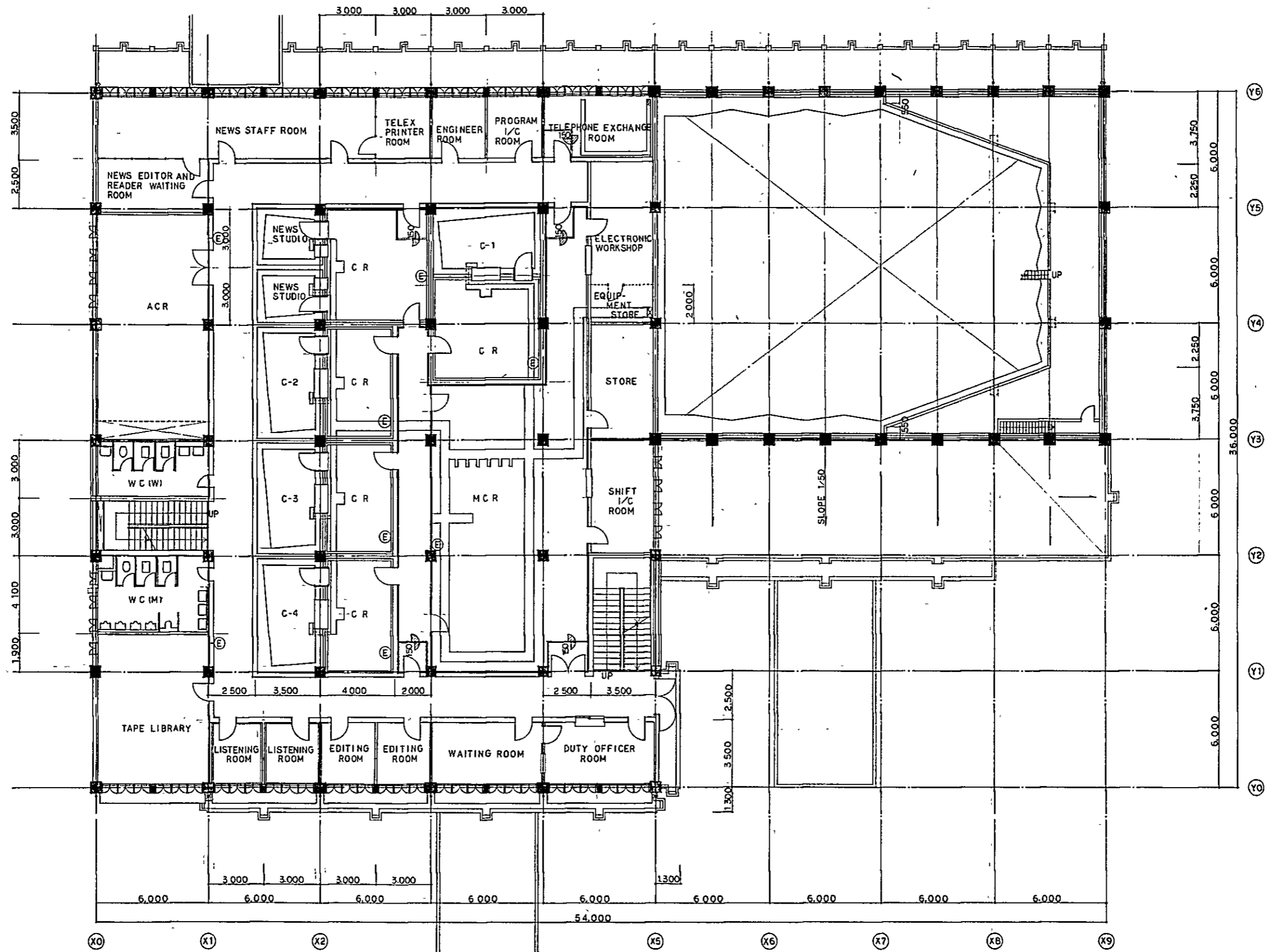
Project NATIONAL BROADCASTING HOUSE OF RADIO BANGLADESH	No. A-01-04
Interior Finish Schedule (2)	Scale
Approved by 	Designed by 
	Date FEB 1981
JEC JAPAN ENGINEERING CONSULTANTS CO., LTD.	



GROUND FLOOR PLAN 1:100

No. 5

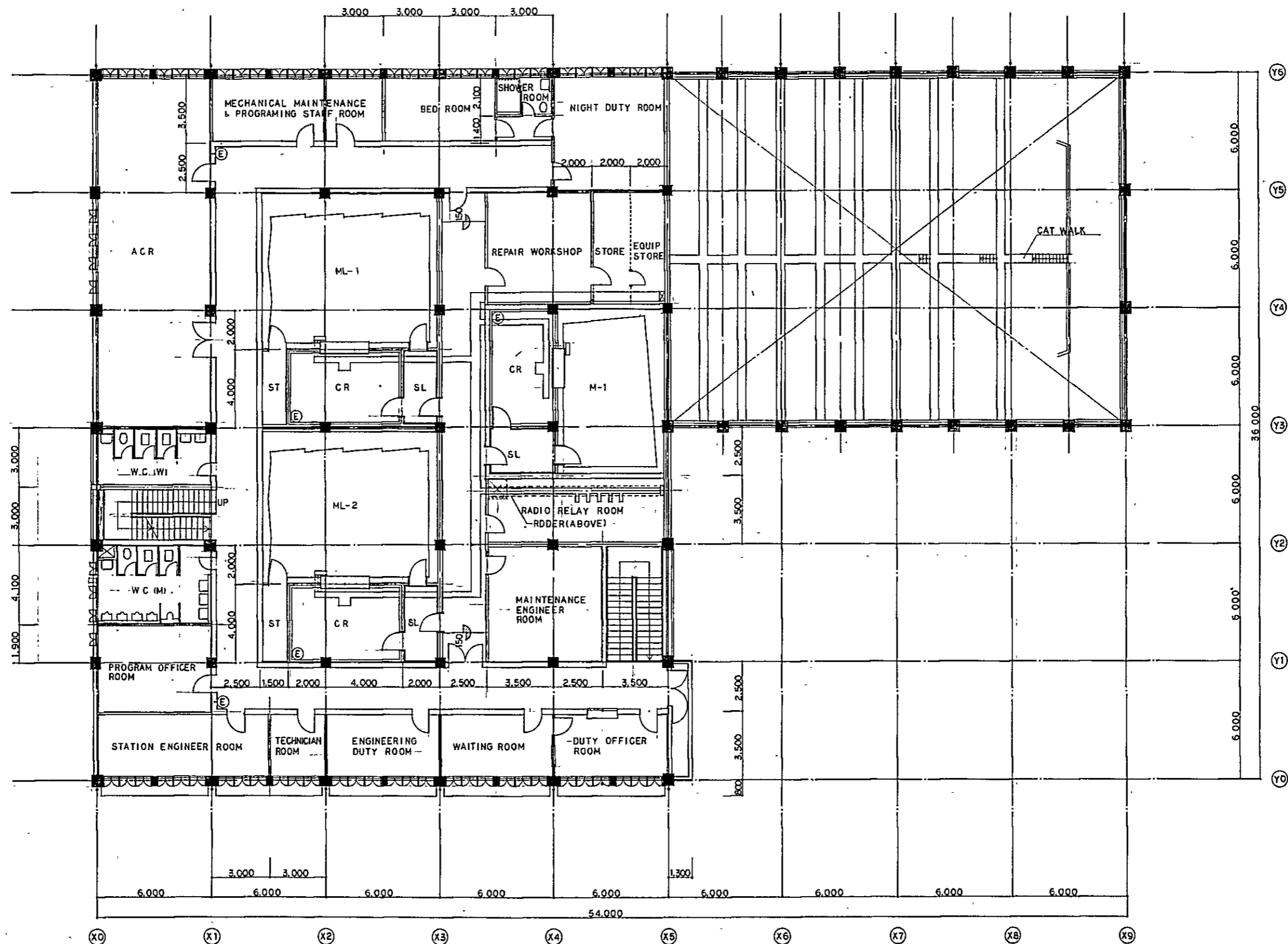
Project NATIONAL BROADCASTING HOUSE OF RADIO BANGLADESH		No. A-01-05
GROUND FLOOR PLAN		Scale 1:100
Approved by	Designed by	Drawn by
		Date FEB 1981
JEC - JAPAN ENGINEERING CONSULTANTS CO., LTD.		



1ST FLOOR PLAN 1:100

No. 6

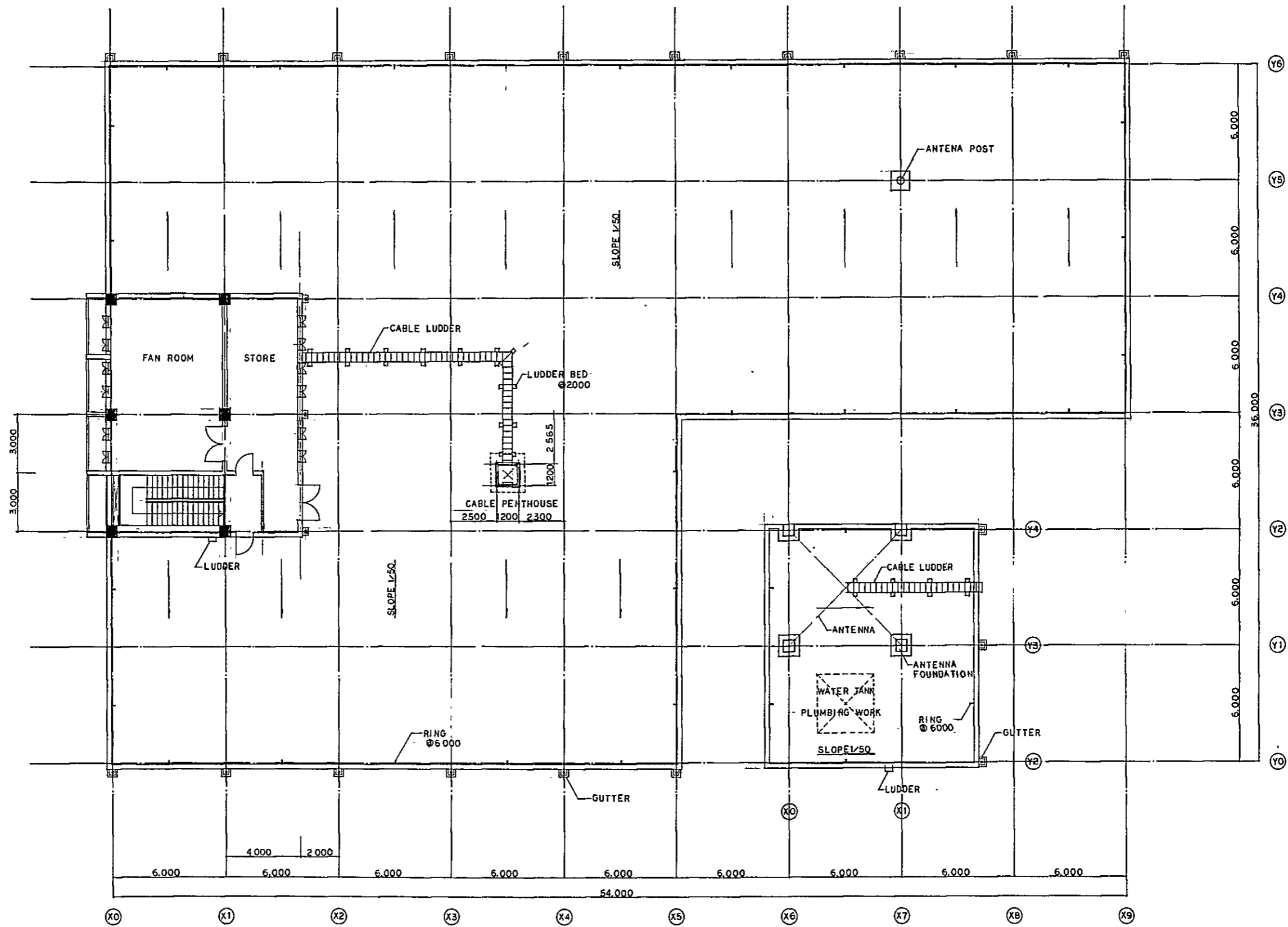
Project NATIONAL BROADCASTING HOUSE OF RADIO BANGLADESH		No. A-01-06
1ST FLOOR PLAN		Scale 1:100
Approved by	Designed by	Date FEB 1981
JECR JAPAN ENGINEERING CONSULTANTS CO., LTD.		



2ND FLOOR PLAN 1:100

No. 7

Project	NATIONAL BROADCASTING HOUSE OF RADIO BANGLADESH	No.	A-01-07
		Scale	1:100
Approved by	Designed by	Drawn by	Date
			FEB 1981
JAPAN ENGINEERING CONSULTANTS CO., LTD.			

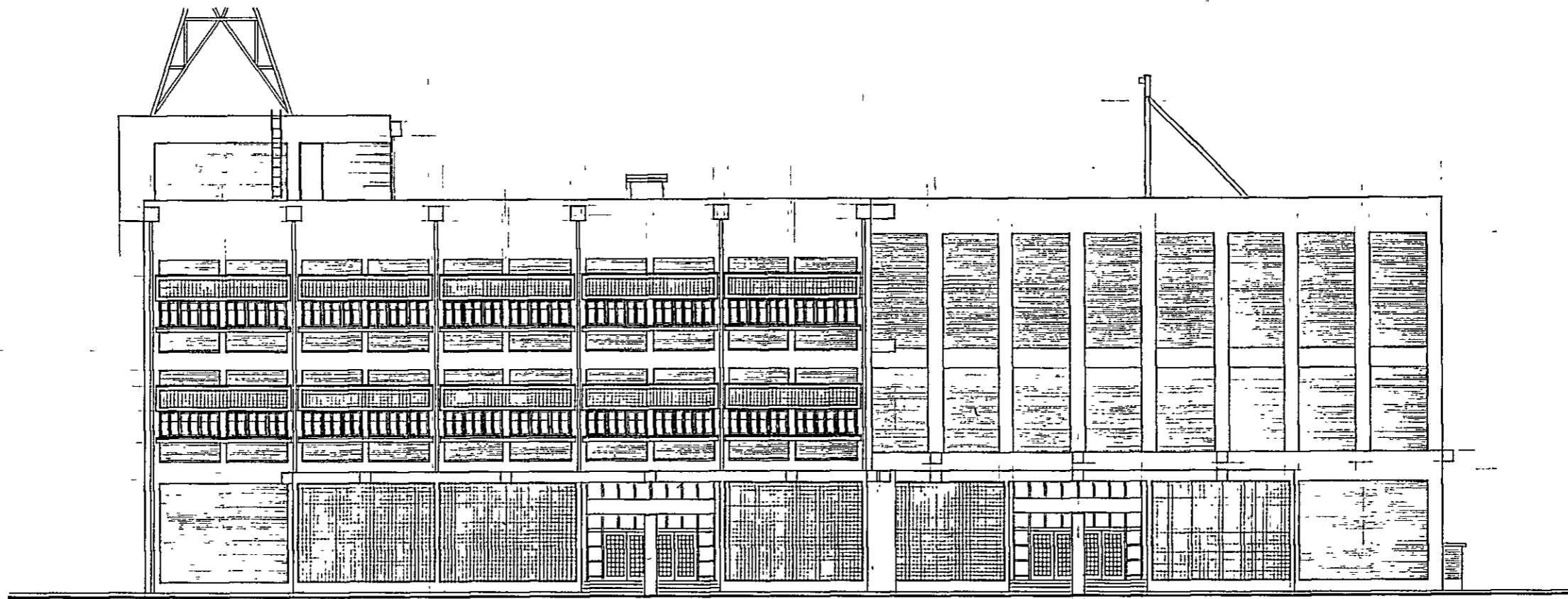


ROOF FLOOR PLAN 1:100

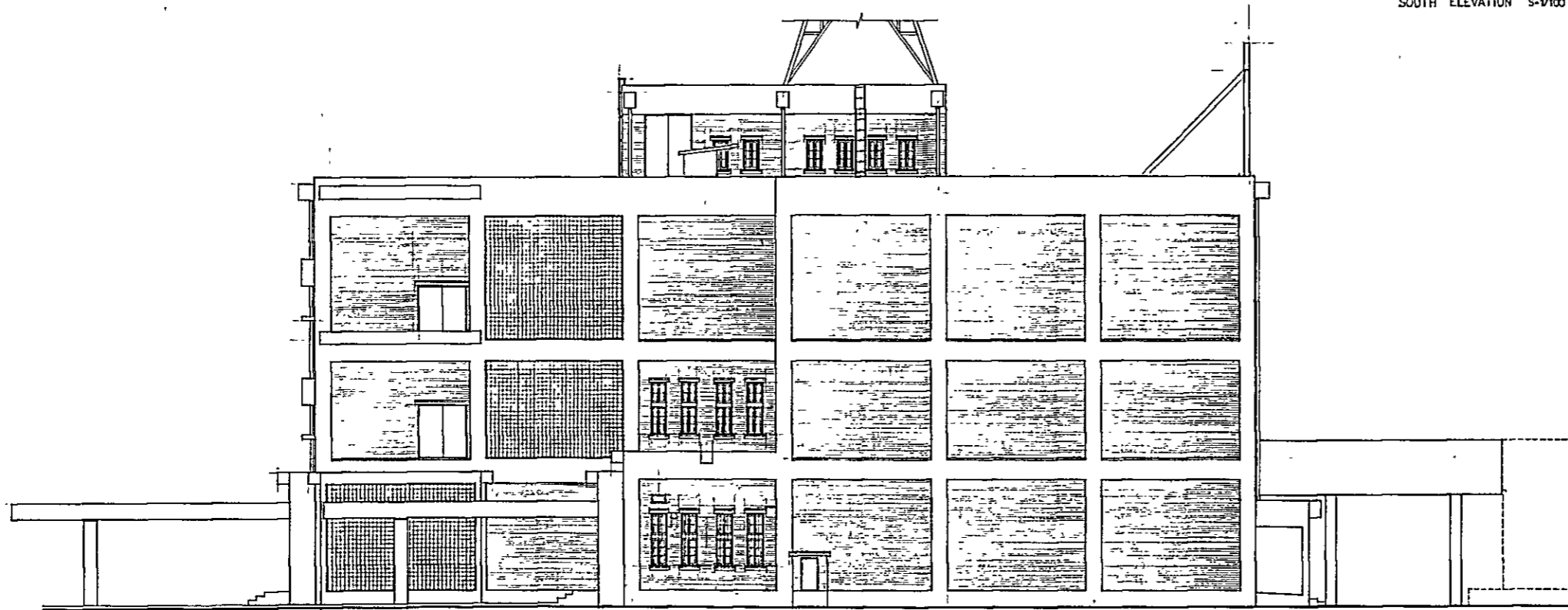
PENTHOUSE ROOF FLOOR PLAN 1:100

No. 8

Project	NATIONAL BROADCASTING HOUSE OF RADIO BANGLADESH	No.	A-01-08
Scale	1:100	Date	FEB 1981
Approved by	Designed by	Drawn by	
JEC JAPAN ENGINEERING CONSULTANTS CO., LTD.			



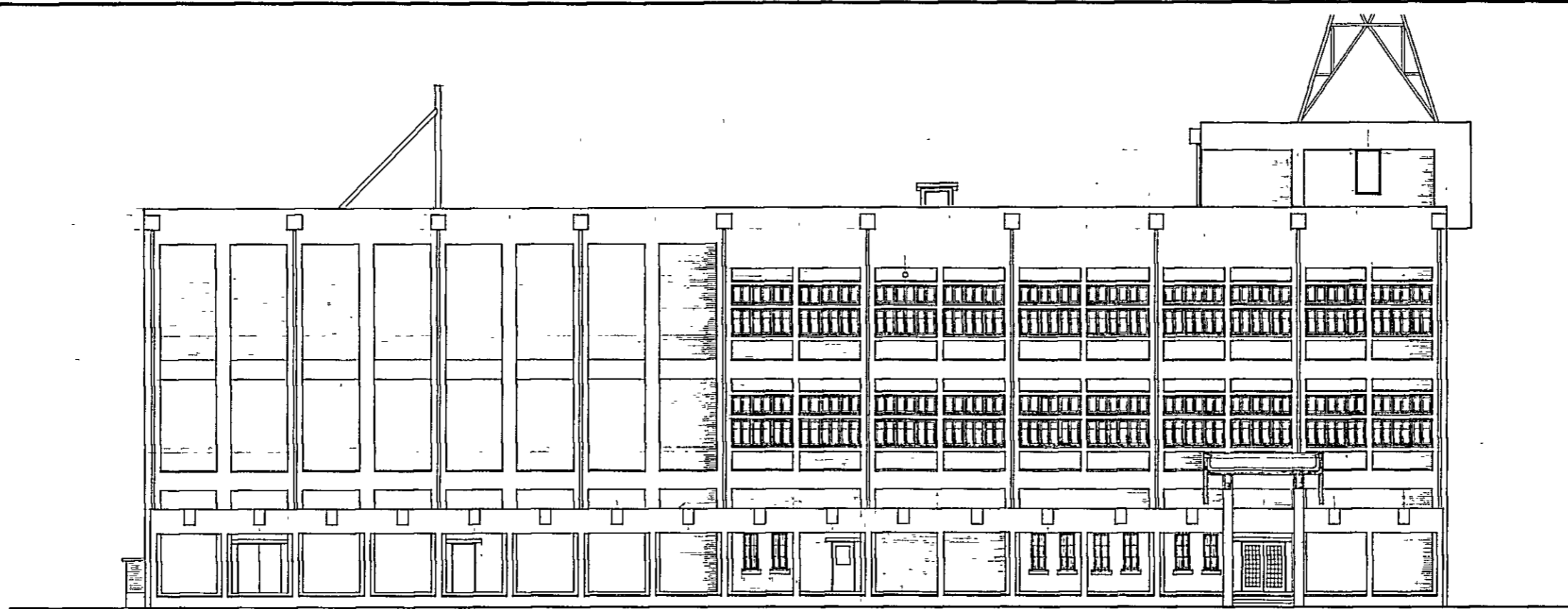
SOUTH ELEVATION S-1/100



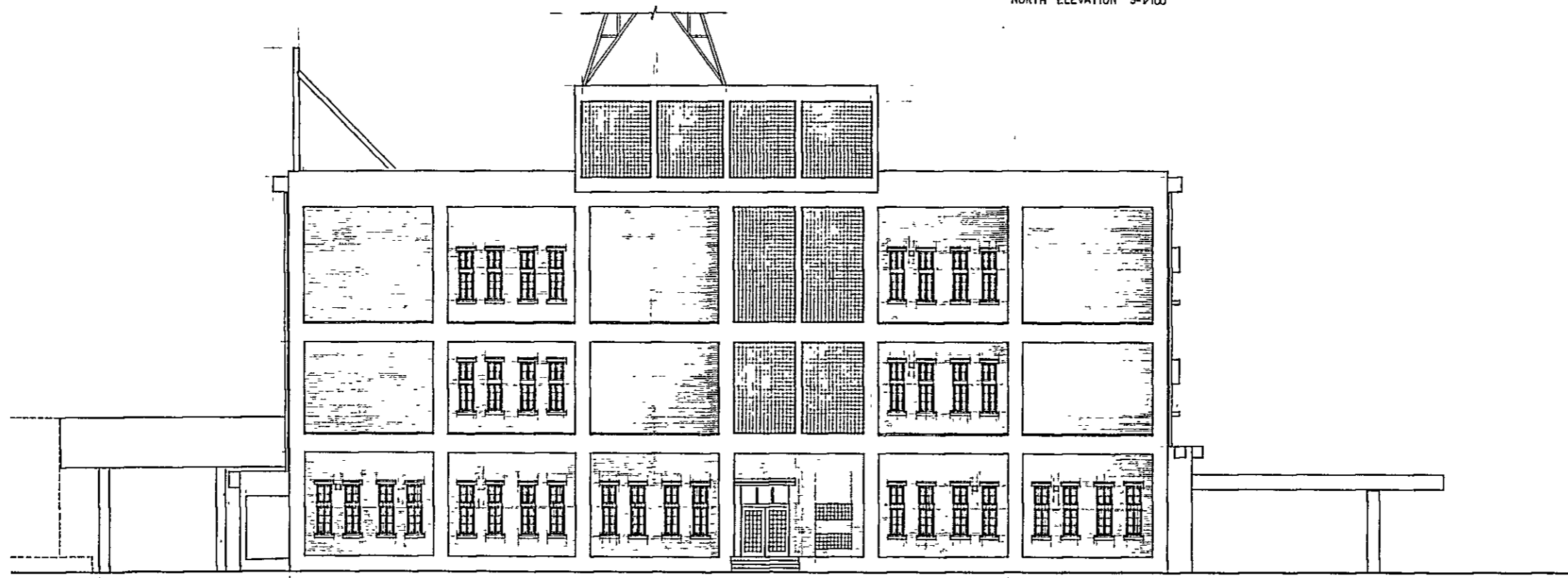
EAST ELEVATION S-1/100

No. 9

Project	NATIONAL BROADCASTING HOUSE OF RADIO BANGLADESH	No.	A-01-09
	SOUTH ELEVATION EAST ELEVATION	Scale	1 100
Approved by	Designed by	Drawn by	Date
		K.S.	FEB 1981
J.E.C.C. JAPAN ENGINEERING CONSULTANTS CO., LTD			



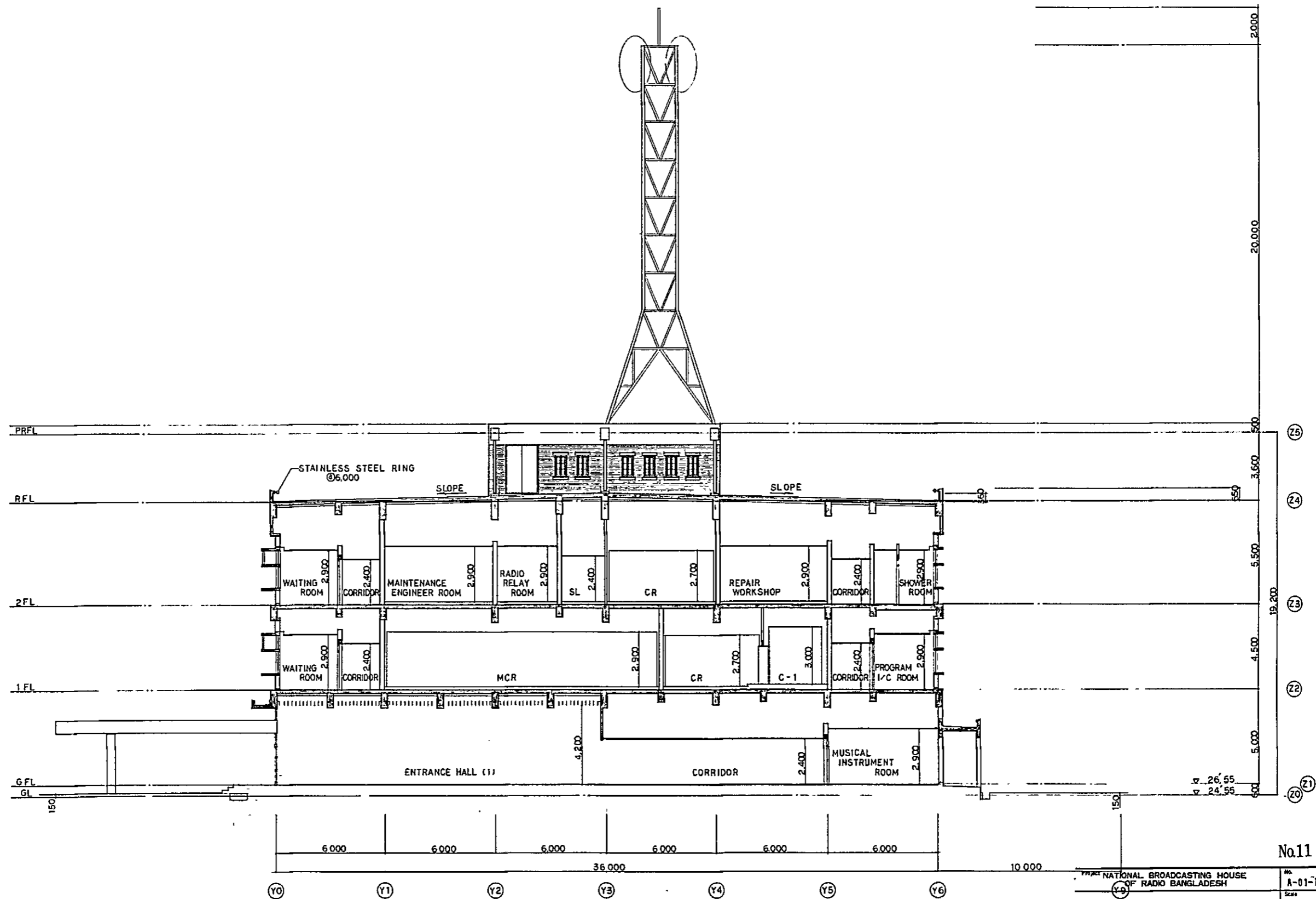
NORTH ELEVATION S-1/100



WEST ELEVATION S-1/100

No.10

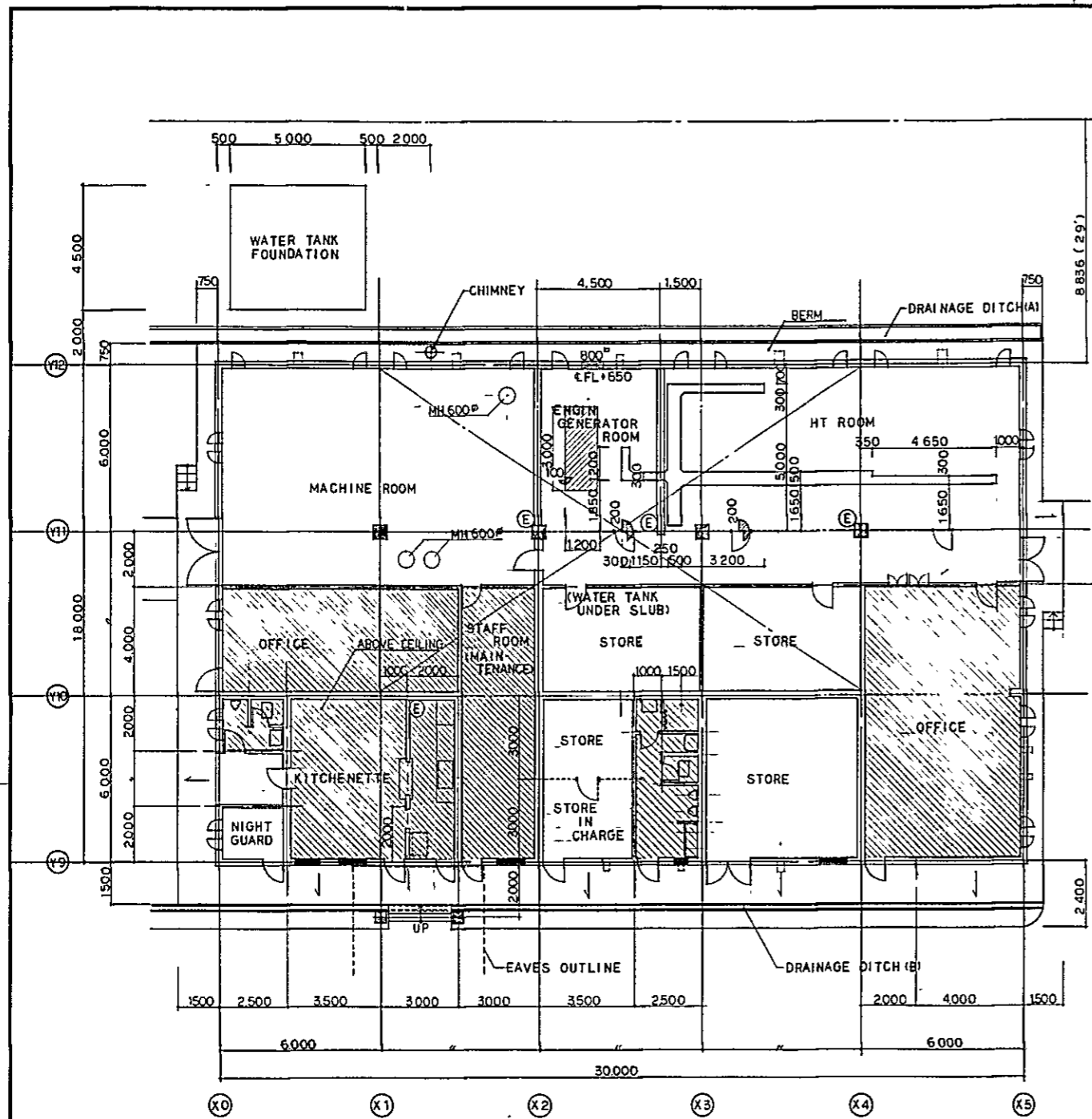
Project	NATIONAL BROADCASTING HOUSE OF RADIO BANGLADESH	No.	A-01-10
		Scale	1/100
	NORTH ELEVATION		
	WEST ELEVATION		
Approved by	Designed by	Drawn by	Date
			FEB 1981
JEC JAPAN ENGINEERING CONSULTANTS CO., LTD.			



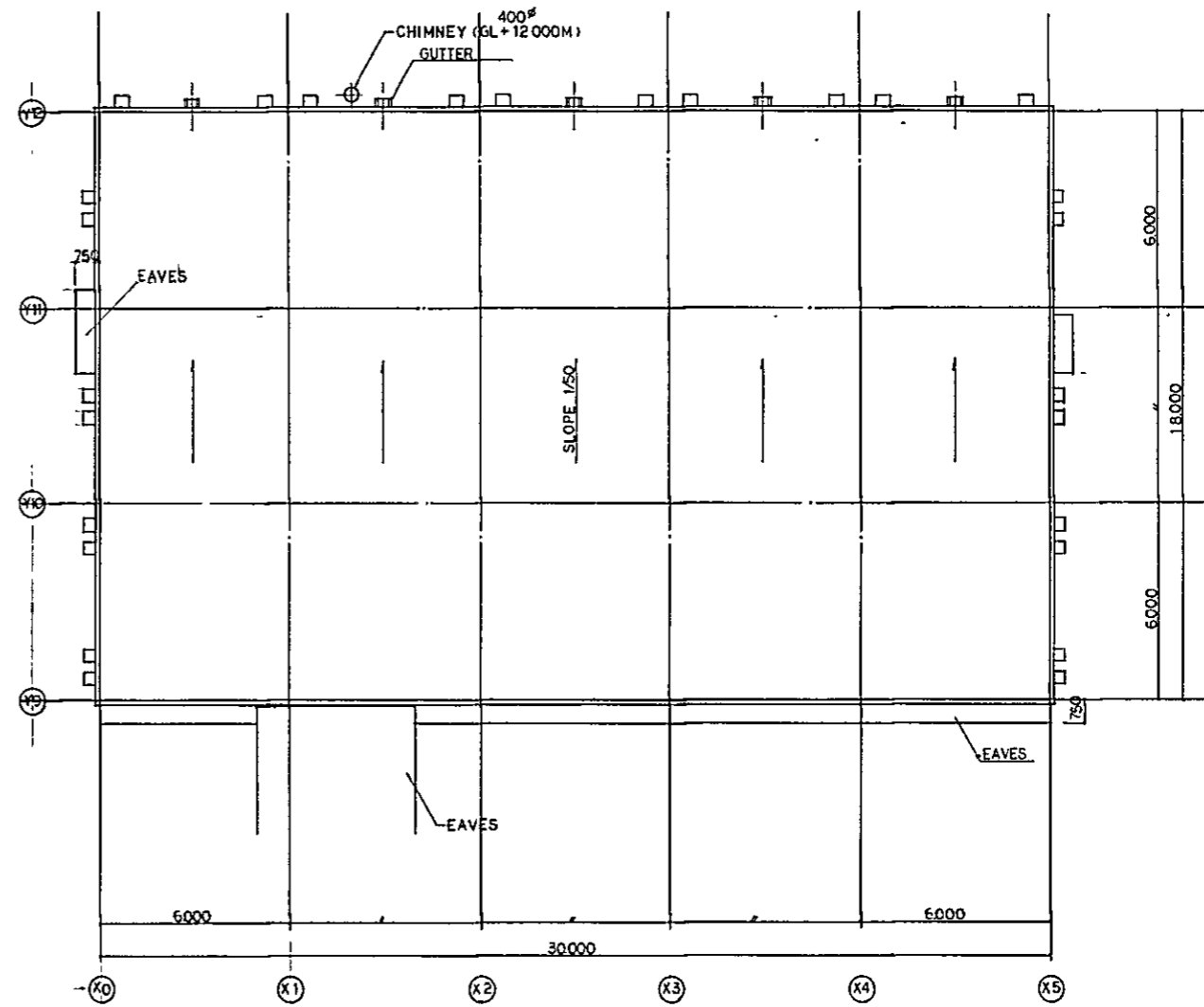
X-X SECTION 1:100

No.11

PROJECT NATIONAL BROADCASTING HOUSE OF RADIO BANGLADESH		No. A-01-11
SECTION (11)		Scale 1:100
Approved by	Designed by	Drawn by
		Date FEB 1981
JEC JAPAN ENGINEERING CONSULTANTS CO., LTD.		



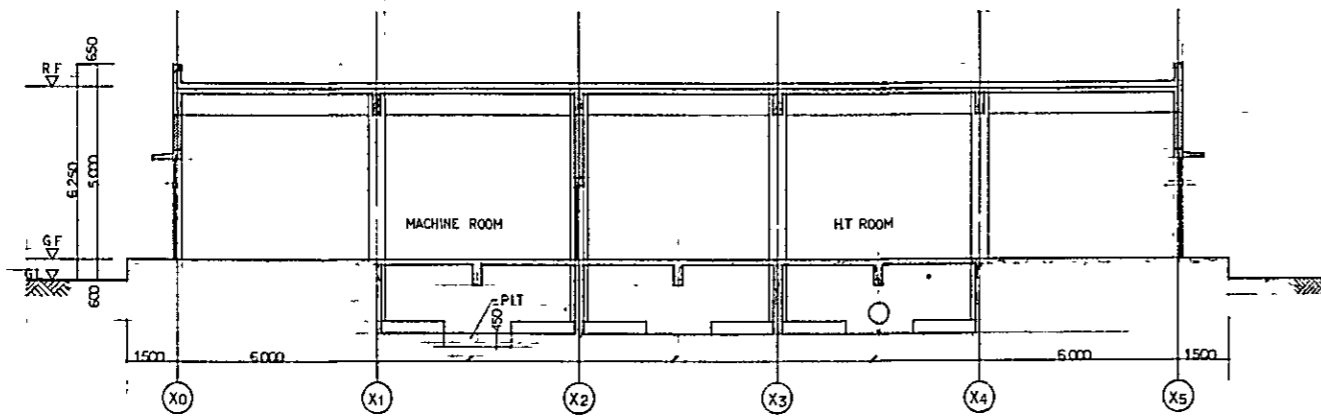
GROUND FLOOR PLAN 1:100



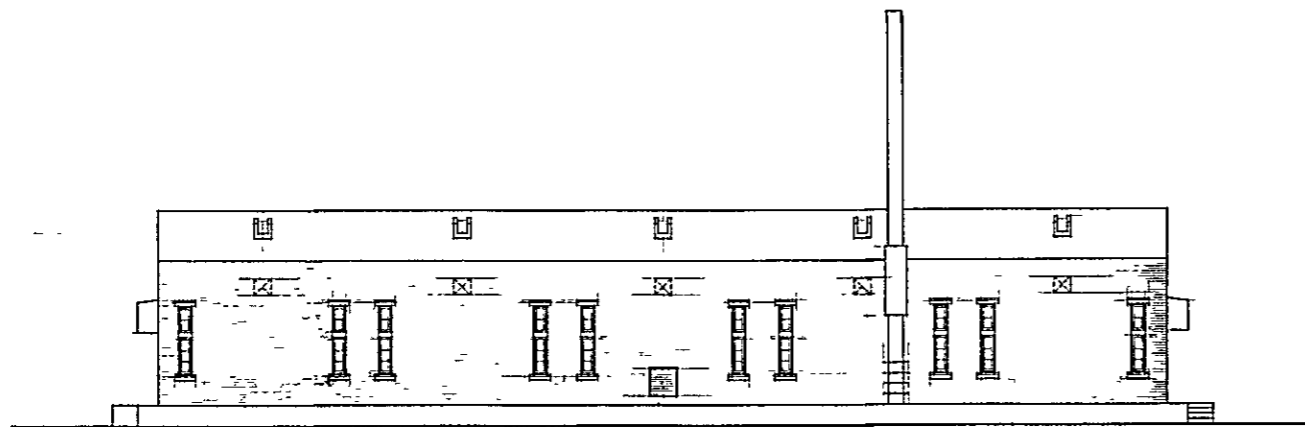
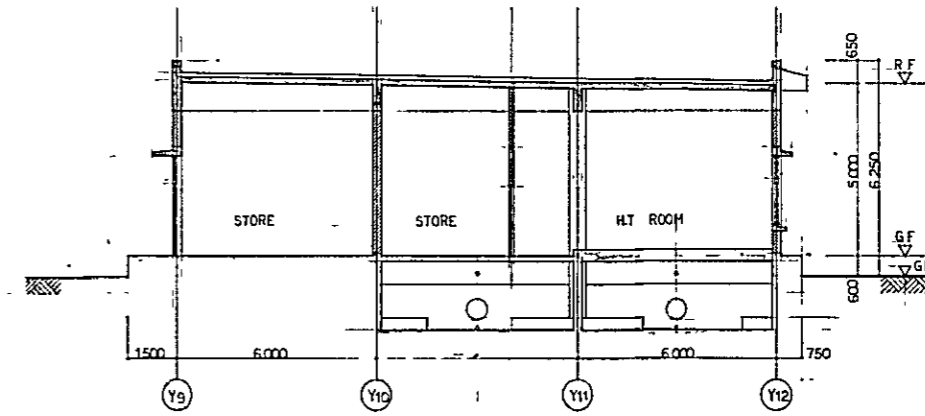
ROOF FLOOR PLAN 1:100

No.13

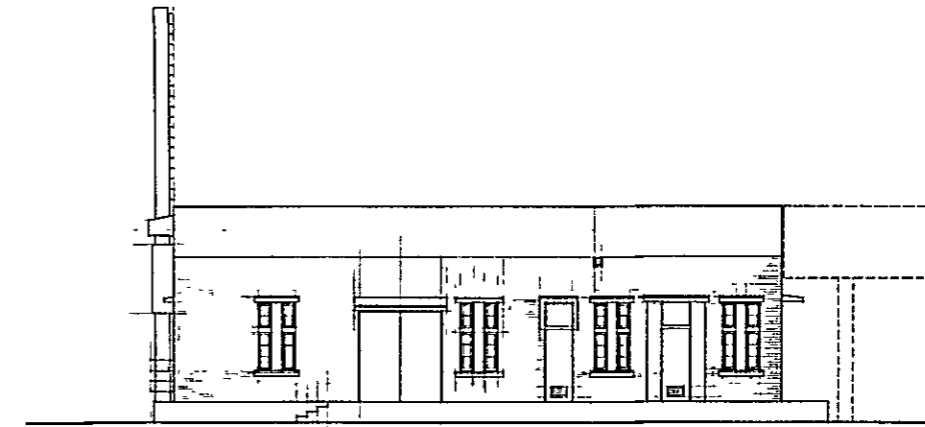
Project NATIONAL BROADCASTING HOUSE OF RADIO BANGLADESH		No. A-02-01
ANNEX PLAN		Scale 1:100
Approved by	Designed by	Drawn by H.R.
		Date FEB 1981



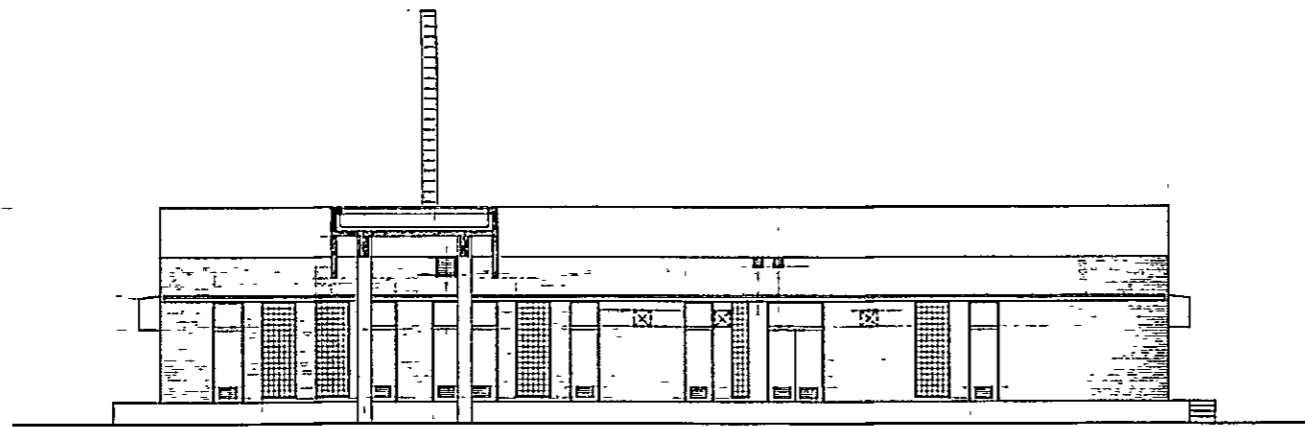
SECTION S-V/100



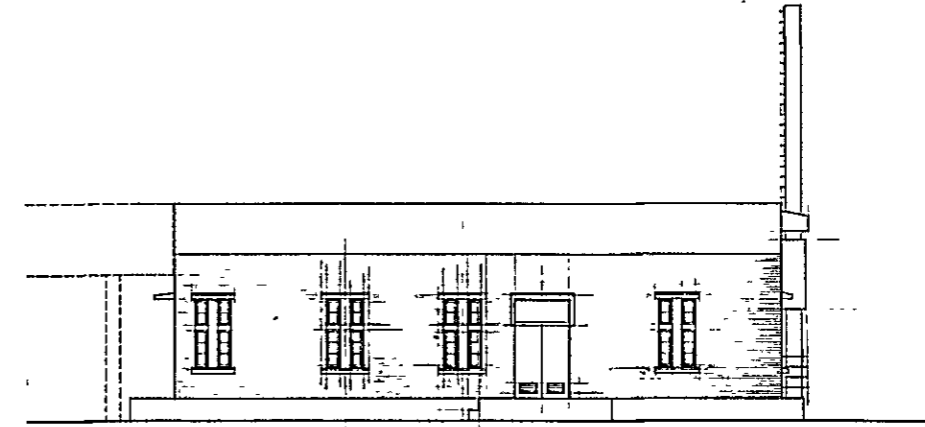
NORTH ELEVATION S-V/100



WEST ELEVATION S-V/100



SOUTH ELEVATION S-V/100



EAST ELEVATION S-V/100

No.14

Project	NATIONAL BROADCASTING HOUSE, OF RADIO BANGLADESH	No.	A-02-02
	ANNEX	Scale	1/100
	SECTION ELEVATION	Date	FEB 1981
Approved by	Designed by	Drawn by	K.S
JECI JAPAN ENGINEERING CONSULTANTS CO., LTD.			

5.2 INFORMATION FOR TENDER

5.2.1 General

The tender for selecting contractors is the most important procedure for the execution of the project, and, therefore, will have to be authorized and be finalized promptly.

The following discussion for finalizing the selection of the contractor by the owner is necessary;

- 1) Appointment of a consultant as supervisor for the project
- 2) Approval of tender documents to be prepared by an appointed consultant
- 3) Nomination of contractors for invitation to the tender
- 4) Appointment of the officials or organization to be authorized for tender
- 5) Approval of place for works for tender
- 6) Designation of a signer and a place for contract

5.2.2 Appointment of a consultant as supervisor of project

First, a consultant has to be appointed as a supervisor of the project. The project will actually start from the appointment of a consultant, which for the prompt execution of project, will have to have sufficient experience and understanding of the project.

The consultant services for the selection of contractors are expected to be as follows;

- 1) Preparation of tender documents
- 2) Assistance to the owner in tender, and nomination of contractors to execute the construction work
- 3) Checking the conditions of construction contract and presence at signing of the construction contract

5.2.3 Approval of tender documents

All the tender documents prepared by a consultant will need the approval of owner.

The necessary documents for tender are as follows;

- 1) Information for tender, which involves the schedule of tender, the outline of project, the explanation of tender documents, etc.
- 2) Form of proposal, which will be used for the presentation of proposed cost by tenderers in tender
- 3) Form of questions and answers to be used pertaining to the tender documents
- 4) Contract (draft)
- 5) General conditions of construction contract (draft)
- 6) Amendment and additional explanation of tender documents, if necessary

Other than the above, drawings and specifications are necessary and will need the approval of owner.

5.2.4 Nomination of contractors for invitation to tender

The results of the project may depend on the contractors to execute the construction work. Tender will be made within a limited number of contractors. Therefore, a consultant will nominate more than three and less than fifteen eligible contractors for invitation to tender through discussion with the owner, that have sufficient experience overseas as well as in Japan. The tenderers will be limited to the applicants to the authority of tender within the nominated contractors.

5.2.5 Authorized officials or organization for tender

The owner will designate officials or an organization for tender who will finalize a tender with the assistance of a consultant.

A work for tender will be done at the Embassy of Bangladesh in Tokyo, to be authorized by the owner and in the presence of a representative of owner with the assistance of a consultant.

5.2.6 Place for execution of works for tender

It may be suggested that the owner should decide a place for the execution of works so that all the nominated contractors will be able to apply and act for tender without difficulty.

5.2.7 Designation of a signer and a place for signature of contract

The owner will have to designate a signer for the contract, before tender, the finally awarded contractor will sign after tender. The place for signing the contract may be reasonably selected in the place where the owner exists.

JICA