THE PEOPLE'S REPUBLIC OF BANGLADESH

DETAILS DESIGN REPORT

ON

THE TELEVISION STUDIO CONSTRUCTION PROJECT

VOLUME I

MARCH 1978

JAPAN INTERNATIONAL COOPERATION AGENCY

THE PEOPLE'S REPUBLIC OF BANGLADESH

DETAILS DESIGN REPORT

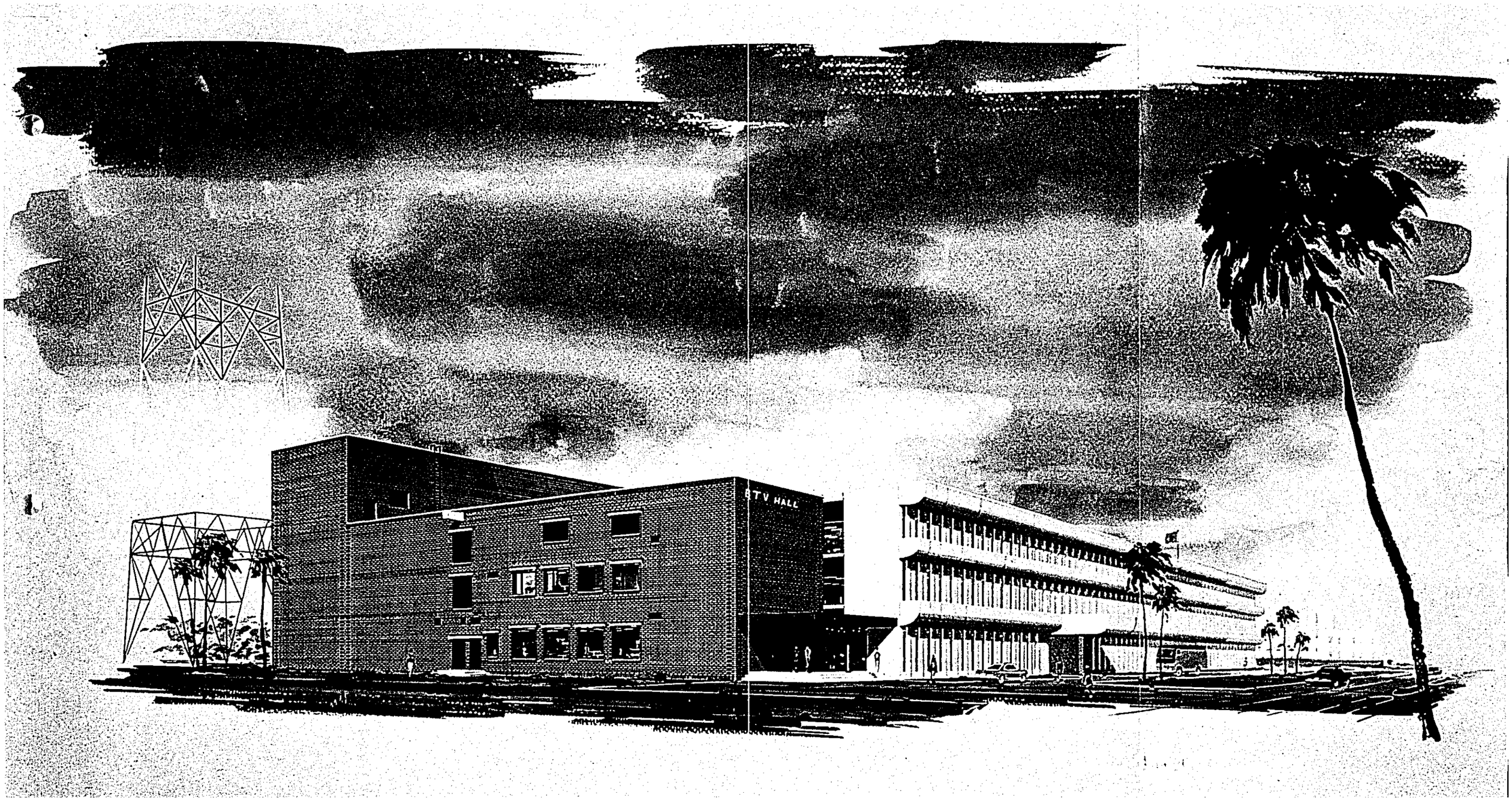
ON

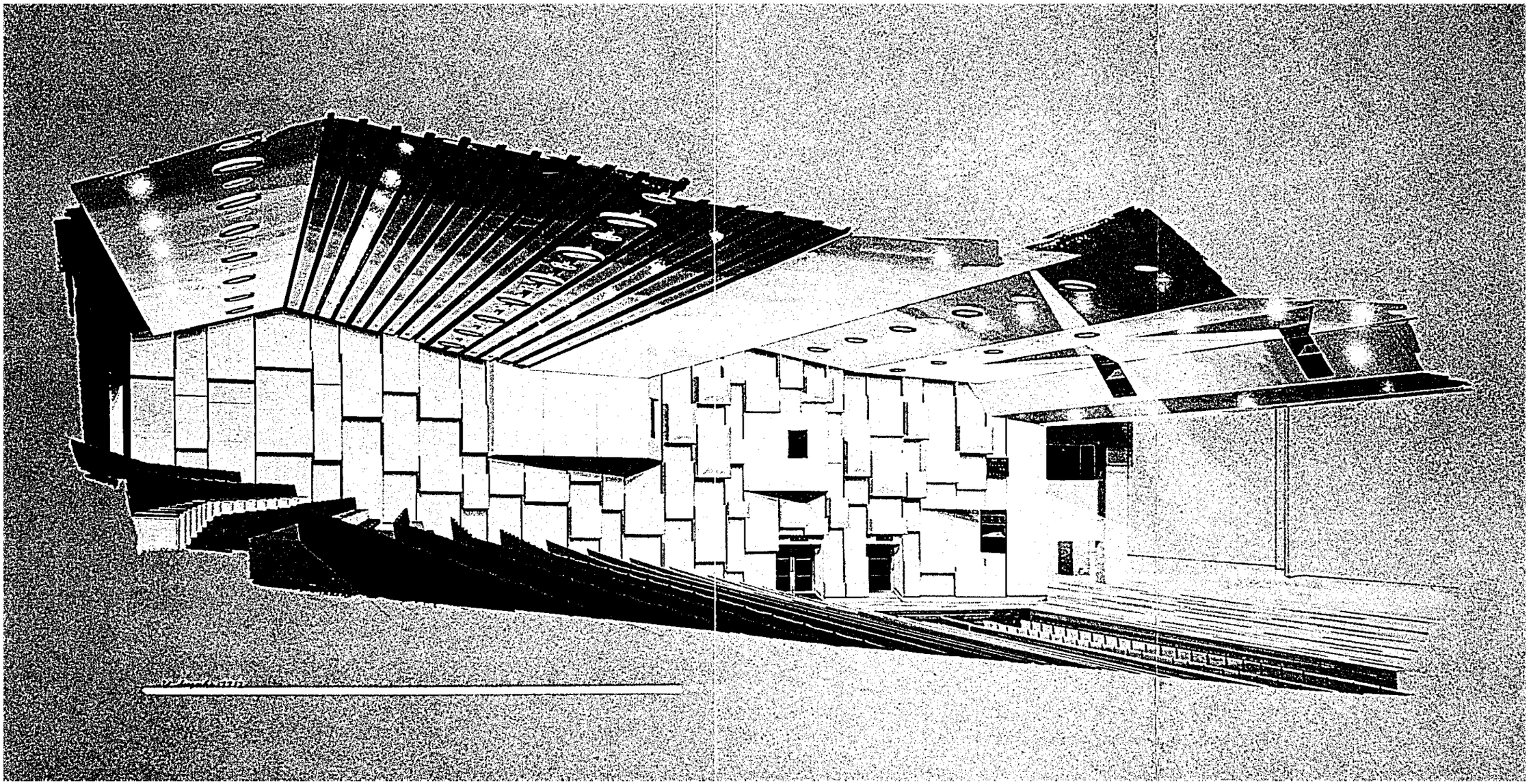
THE TELEVISION STUDIO CONSTRUCTION PROJECT

VOLUME I

MARCH 1978

JAPAN INTERNATIONAL COOPERATION AGENCY


BTV HALL



P R E F A C E

In compliance with the request of the Government of the People's Republic of Bangladesh, the Government of Japan decided to carry out a study on the construction of Television Studio as part of its overseas technical cooperation programms and this study was executed by Japan International Cooperation Agency (JICA).

JICA organized and dispatched a survey team of 7 experts, headed by Mr. Heiji KAGECHIKA of the Radio Regulatory Bureau of the Ministry of Posts and Telecommunications to Bangladesh from July 22 to August 9, 1977, and made a necessary survey on detailed design of the project.

The survey in Bangladesh was carried out smoothly with the extensive cooperation of the Government of Bangladesh.

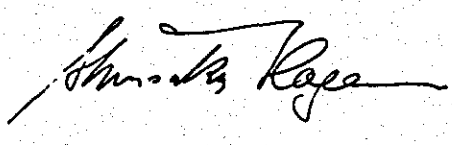
After the study team returned to Japan, JICA has prepared this report based on the data collected by the study team and discussions made in Bangladesh with officials of the Government of Bangladesh.

I hereby submit a Detailed Design Report on the Television Studio Construction Project sincerely hoping that this report will contribute to the progress of the project in future and to the promotion of friendly relations between Bangladesh and Japan.

Finally, I would like to express my heartfelt gratitude to all those who participated in conducting the survey and to the Government of Bangladesh for into helpful cooperation extended to the team.

March, 1978

Shinsaku HOGEN



President
Japan International Cooperation Agency

CONTENTS

CHAPTER 1

INTRODUCTION

CHAPTER 1
INTRODUCTION

The auditorium involved was designed, in the beginning, TV studio for audience participation programs. The structure of the auditorium and the slab for the audience seats were completed about nine years ago. After this, on October 30, 1974, Yukio Watanabe of NHK was dispatched to Bangladesh as a specialist representing the Japan International Cooperation Agency, where he remained until January 28, 1975. During this period, he made a basic survey for the subject project, details of which are given in his report.

Later, however, the purpose of the auditorium application was changed, and subsequently, survey team was dispatched to that country to proceed again with the basic design. The task of this team was to make a basic design for the auditorium on the basis of the Watanabe's report and the request from BTV, and also to collect as much data as possible which would be necessary for the details design. The survey team conducted an investigation into the matter during the three weeks from March 24 to April 13, 1977.

Organization of the survey team was as follows:

Chief:	Heiji Kagechika	Deputy Director, Broadcast Engineering Division, Radio Regulatory Bureau, Ministry of Posts & Telecommunications (summary of all surveys)
Team members:		
	Akihisa Asano	Senior Engineer, NHK Technical Headquarters (for construction)

Koshiro Hibino	Senior Engineer, Studio Facilities Group NHK Technical Headquarters (for stage decoration)
Teruji Yamamoto	Senior Research Engineer, NHK Technical Research Laboratories (for sound)
Yoshihisa Kondo	Social Development Cooperation Department, Japan International Cooperation Agency (business coordination)

The survey team and BTV together discussed the basic design, and the results of this discussion were arranged into a memorandum, which was later exchanged between the two parties. In addition, in response to the request from BTV, the survey team prepared a list of TV broadcasting equipment after their return to Japan. In May, the list was submitted to BTV, and a report was prepared from the results of the investigation.

Successive to this survey for the basic design, second survey team was dispatched to Bangladesh. This team explained the basic design report to BTV for approval. Simultaneously, the details design also was discussed. The results of the discussion were arranged into an agreed minute book which was then exchanged between the two parties.

Thereafter, with the aim of smoothly carrying out this project, two members of the staff (Mustafa Monwar and S. M. Nousher Ali) of BTV were invited to visit Japan for their individual training and education, From August 29 to September 7, 1977. During this time also, consultations regarding the details design were held between the two parties involved. In order to make preparations for the start as early as possible, the design data regarding the piling work was submitted to BTV at the end of October. The data of the piling work and that

contained in the TV broadcasting equipment list were to be incorporated, as a matter of course, into the details design. These data are to be confirmed on the occasion of the final consultation between the two parties, which is slated to be held in December this year.

CHAPTER 2

OUTLINE OF THE SURVEY FOR THE DETAILS DESIGN

CHAPTER 2

OUTLINE OF THE SURVEY FOR THE DETAILS DESIGN

2.1 PURPOSE OF THE SURVEY

The aim of the survey was to collect as much data as would be required for elaborating the details design while referring to the survey report for the basic design.

2.2 ORGANIZATION OF THE SURVEY TEAM AND BTV STAFFS

2.2.1 Organization of the survey team

Chief:	Heiji Kagechika	Deputy Director Broadcast Engineering Division, Radio Regulatory Bureau, Ministry of Posts & Telecommunications (summary of all surveys)
Team members:		
	Hiroshi Uzawa	Legal Division Radio Regulatory Bureau, Ministry of Posts & Telecommunications (business coordination)
	Hogara Chiba	Senior Engineer, NHK Technical Headquarters (for architecture)
	Chikara Kanazashi	Engineer NHK Technical Headquarters (for building equipment)
	Toshihiko Kuma	Engineer NHK Technical Headquarters (for broadcasting system)
	Takashi Akita	Technical Adviser Japan Engineering Consultants Co., Ltd. (for structure)
	Yoshinao Kuribayashi	Engineer Japan Engineering Consultants Co., Ltd. (for air conditioning equipment)

2.2.2 BTV staffs

(1) BTV

Amir-uz-Zarman Khan	(Director General)
A. M. M. Aabad	(Chief Engineer)
Salimuddin Ahmed	(Director Programmes)
S. D. Khan	(Installation Manager)
S. M. Nousher Ali	(Engineering Manager)
M. A. Wahed	(Engineering Manager)

(2) Consultant

Nazrul Islam	(The Consociates Limited, Consulting Engineer)
Omar G. Rabbany	(The Consociates Limited, Consulting Engineer)
Muneer Ahmed	(The Consociates Limited, Architect)
Manzur Husain	(The Engineers Limited, Director)
S. A. Kurim	(The Engineers Limited, Constructor, Project Manager)

(3) Others

Qasim Abul	(The Service Training School, Instructor)
MD. Maswood	(The Service Training School, Instructor)

2.3 SURVEY SCHEDULE

July	21	Departure from Tokyo International Airport
	22	Arrival at Dacca, and consultation with the Embassy of Japan and JICA
	23	
	〃	Explanation of the basic design
	26	
	27	Data collection for the details design and consultation
	〃	with BTV
August	5	Courtesy call to the Information and Broadcasting Ministry on August 1
	5	Preparation of an agreed minute book, and explanation
	〃	about the book to the Japanese Embassy staff
	8	
	9	Exchange of the agreed minute book between the two
	〃	parties involved and departure from Dacca for Japan
	10	Arrival at Tokyo International Airport

2.4 DETAILS OF THE SURVEY

In this survey, consultations were held between the two parties involved on the architectural design, the structural design, the building equipment (such as the electric equipment, air conditioning equipment and others) and TV broadcasting equipment. The necessary data was collected during this survey.

The outline of the consultations with BTV is as given in the agreed minute book. As a result of the efforts exerted by maintaining a wide contact with the staffs of BTV, consultants, and other authorities concerned, almost all of the necessary data could be obtained. At the time of the survey for the basic design the survey team had already collected a considerable amount of data relating to the acoustics, lighting and stage facilities and others, and so successfully completed due preparations to proceed with elaborating the details design, as well as collection of necessary data through the survey.

The problems taken up in this survey are as follows.

(1) In this project, a structural extension was planned for the stage and some accessory rooms. But some details of the structure of the existing building are unclear, as it was constructed several years ago, and the necessary data on this are few. Accordingly, a confirmation was made of the footing structure of the building partly through excavation and partly through reference to the drawings of the existing building.

(2) At this stage, about the location of the sub control room and the installation layout of the TV broadcasting equipment many discussion were held. The adjustment of the lighting system and the microphone system, etc., must be made in step with the progress of the performance on the stage. For keeping optical observation of the stage and audience hall, the location of the sub control room and the layout of the TV broadcasting equipment to be installed in the room must be such as

will allow the persons in charge of controlling the system to be able to clearly observe the stage and audience hall. Therefore, to select such a sub control room location and to determine such a installation layout of the equipment are very important. The problem was how to coordinate the location selected for the sub control room and TV broadcasting equipment installation layout with the overall TV broadcasting system layout.

(3) How to do with the air conditioning equipment furnished for the existing building was one of problems. The climate in Bangladesh is one of high temperature and humidity. In this regard, air conditioning is considered to be essential. Due consideration will therefore be taken into account in designing the air conditioning equipment to be installed for the auditorium, and for the existing building, it will be necessary to make considerable improvements to the air conditioning equipment currently in use. The improvement of the existing air conditioning system, though, is only indirectly connected with the new air conditioning system to be installed for the auditorium, we will accordingly provide appropriate advice in this regard.

(4) The next problem is how to match this TV broadcasting equipment design to the color TV broadcasting system in the future. Precisely speaking to what extent and what kinds of equipment shall required to be set in selecting the color TV broadcasting equipment. This problem is also related to the financial situation of Bangladesh TV. Therefore, we have tentatively planed the system at such a minimum as will enable Bangladesh TV to proceed with test color telecasting.

(5) The next is to decide the scale of the TV broadcasting system. Namely, Bangladesh TV is planning to present a second program next year for TV viewers in the Dacca area only. There are at present two studios, but more three studios are planned to be added to in the future, including an auditorium involved.

Up to this date, Bangladesh TV has completed the construction of the fourth local relay station. Considring the possibility of relay telecasting from these local stations, a study of the overall telecasting system as well as of a program shift system will be required. Regarding this, we have advised that modifications and alterations shall be made step by step to the TV broadcasting equipment to be selected for this project in conformance with the future plan.

The major items of understanding reached, between the parties involved, in this survey are as follows:

(1) The extent of details design for the building construction shall be as shown in Fig. 2.1, 2.2. But as for the air conditioning and electrical facilities, etc., the limitation above may be exceeded so that they may have smooth connection with the existing facilities.

(2) MKSA units shall be used in the details design.
However, feet unit will also be simultaneously written for showing the dimension of important portions.

(3) The existing surface and underground piping, etc., which may be obstacle for the expansion work of the auditorium shall be removed before starting the construction.

(4) The design of external facilities of the auditorium and garden shall be excluded from the details design.

(5) The Japanese standard shall be taken as the basis for structural design. But, seismic force coefficient for earthquake proofing will be designed to be 0.05.

(6) The cable laid between the transformer station and the rack room shall be excluded from the scope of the details design. However, wiring piping fitted between the rack room and the outdoor inlet will be included in the detials design.

(7) The design condition for temperature & humidity will be as follows:

	Temp. (°F)	Humidity (%)
outside	95 (D.B.)	90
Technical Area	72 ± 2	50 ∿ 60
Non-technical Area	76 ± 2	50 ∿ 60

(8) The TV broadcasting equipment, and related facilities will be designed to meet the color TV broadcasting requirement in future.

2.5 LIST OF DATA COLLECTED IN DACCA

(1) Television Centre "Site Plan"

(2) Television Centre "Proposed Waiting Lounge"

(3) Schedule of Rate (Public Works Department)

(4) Schedule of Rate (Consultant)

(5) Data on earthquake proofing structure (N value of soil, ground-water level, bearing capacity of soil at depths, depth of bearing piles)

(6) Arrangement of steel bar, bearing capacity, method of loading test and unit cost on foundation piles

(7) Specifications of structural materials, steel bar for reinforcement, steel, and concrete, etc.

(8) Commendable values of lateral seismic force and maximum wind load

(9) Drawings of existing outdoor sewage equipment and the septic tank

(10) Drawings of existing duct work and piping

(11) Specifications of pumps

(12) Meteorological data in Dacca(Temperature, humidity, wind-direction and precipitation)

CHAPTER 3

OUTLINE OF DETAILS DESIGN

CHAPTER 3
OUTLINE OF DETAILS DESIGN

The details design for the BTV auditorium is based on results of a study made of the basic design and the subsequent survey conducted during the course of elaborating the details design. The items of understanding which were reached with the BTV were also taken into consideration for this details design.
A comment will be made here concerning the outline of the details design.

3.1 PLANNING

Fig. 3.1 shows the overall plot plan of the auditorium, Fig. 3.2 ∿ 6, a plan of each floor, Fig. 3.7, 8 a section, and Fig. 3.9 an elevation.

The total floor area of the part for which an extension is currently being planned is approximately 3,900m^2, including the part of the existing building which is to be reconstructed. The area of each floor is given in the table below.

	Extension area(m^2)	Reconstruction area (m^2)	Sub total (m^2)
Under ground floor	201.45	-	201.45
Ground floor	799.08	666.92	1,466.00
1st floor	337.31	668.72	1,006.03
2nd floor	514.53	230.26	744.79
3rd floor	170.30	-	170.30
4th floor	337.37	-	337.37
Total	2,360.04	1,565.90	3,925.94

Enumerated below are items to be noted in connection with the planning.

(1) In designing the auditorium, a study was made of ways to increase the number of seats to as many as possible. As a

result of this study, it was clarified that the maximum number of seats would be 577.

Seats in the fourth and fifth rows, behind the first three rows, will be so designed that they can be removed. Therefore, as occasion demands, one or two rows of seats can be removed to provide a space in a direction parallel to the stage so that the TV camera may be moved back and forth freely.

Along the entire center aisle leading to the stage, two seats on either side may also be removed.

Therefore, whenever the need arises, they can be dismounted to provide more space down the aisle enabling the stage effects to be enhanced.

When the orchestra pit is not being used, it will be covered so that more space will be available for the audience.

As touched upon above, the seats in the auditorium are classified into fixed or removable types, and the number of each type is given below

Fixed type			443 seats
Removable type	Aisle area	88 seats	134 seats
	Orchestra pit area	46 seats	

The width of the 81 seats in the three rows in front of the aisle is 500mm. The remaining seat width is 480mm.

(2) Taking into consideration the travelling of the TV camera, the stage floor level can be adjusted according to the floor level of side aisle. Accordingly, the stage floor level will be 125mm above the ground floor level of the existing building. The problem of offsetting this difference will be resolved by providing a slope for part of the passageway to the artist's waiting room and the passageway (sound lock-2) between the auditorium and the foyer.

(3) A pit to improve the effectiveness of the stage will be provided at center of stage and a passageway will be provided under the stage to facilitate communication to this pit. This pit will be linked to the orchestra pit. Taking into

account the possibility of water flowing underground into this pit at the time of a flood, a drain pit will be provided under stairway-1. The depth of the orchestra pit will be set 880mm (under ground) from the floor level, over which the foremost rows of fixed seats, considering the acoustical effects, its functionalism, etc..

(4) The cover for the orchestra pit will be a panel arrangement type permitting ease in assembling and disassembling, as opposed to a cover without complex mechanism.

(5) In order to maintain the hurdle floor over the main stage more easily, the floor height of the 4th floor will be 12'-6" which is two feet higher than the basic design.
The result is that the dimension under the beam will be approximately 1.9m.

(6) Air conditioning will be provided for storage-5, for it is planned that the removable-type seats will be kept in this storage under the audience hall floor.

(7) The entrance door(both the single open and double open-types) which is to be mounted at the stage right side, is scheduled to be installed closer than originally planned in the basic design. This is due to the existing structural restrictions (the height up to the beam is only about 2m from the level of the floor where the 4th row of seats are to be mounted).

(8) Stairway-3 (on the right side of the stage) was slated to be of the spiral steel frame type in the beginning, but reflecting upon the noises likely to occur while walking up and down this stairway, it was decided that this stairway shall be manufactured of RC.
A wall partition and a door will be provided between the stairway and the space on the right side of the stage.

(9) An overhang for observing the audience hall and stage, and a window to view the audience will be provided in the space

beside the sub control room. But owing to an existing beam, a portion of the ceiling in this overhang will not have adequate height but will be merely 1.45m, thus requiring the TV broadcasting staff to stoop under this part.

(10) Entry into the side spot room on the left side of the audience hall will be made from the 2nd floor (air conditioner room) and not from the 1st floor, because of the existing structural restrictions (the height available between the under side of the beam and the level of floor in the side spot room is only about 700mm).

(11) Taking into consideration the possibility of applying the projection room as a simultaneous translation room in the future, the window to be furnished for the projection room will be one that is sound proof as well as large. For this reason also, spare wiring conduits will be installed in this room.

(12) A door equipped screen will be provided between the lobby on the first floor and the existing corridor taking into consideration for the air conditioning.

3.2 INTERIOR AND EXTERIOR DESIGNS

The following are to be noted with regard to the interior and exterior designs.

(1) For waterproofing, as given in the specifications, lime concrete will be used which has thus far been resultful in Bangladesh.

(2) For maintaining harmony with the existing building, brick facing will be used for the exterior of the auditorium.

(3) For facilitating maintenance, such interior finish incombustible materials as will not be stained readily and as will allow the ease of cleaning are selected.

(4) The decorative design will be taken into consideration for the surface of the wide wall (as specified in C) facing the foyer, in addition to the above.

(5) Taking comfort into account, the window of the canteen, etc. that is to be constructed on the north side of exterior must provide a large opening.

(6) Full-length mirror
A full-length mirror will be provided at seven different locations.

3 mirrors for performers	Right and left sides of the stage, and artist's waiting room.
3 mirrors for audience	Lavatory-1 (one each for men and women) and powder room
1 mirror for special guests (VIP)	VIP waiting room

(7) The ceiling boards of the lobby on the first floor will be replaced with new ones, in view of the possibility of conduit wiring and air conditioning installation in the future, as well as maintaining uniformity and harmony with the interior finish materials of the extension and reconstruction building.

(8) The special finish materials, such as perforated boards used for the auditorium and its belonging rooms, spares will be considered for future needs.

3.3 STRUCTURE

3.3.1 Overall structural design

Expansion joints will be provided for the connecting sections between the building to be extended and the existing building so there will be no adverse effects to each of these structures, making their design independent in the structural aspect. therefore, the footing for the existing building will not be applied for the extension building and we proceeded with the planning under the restriction to construct the columns for the part to be extended.

The structural design was made for earthquakes proofness and wind load, and in this design, the design lateral seismic force coeffeicient as much as 0.05 was adopted. In addition, a study was made also of the structural strength of the portion of the existing audience space with a lateral seimsic force coefficient of 0.05. As a result of the study, it is found that the existing building is earthquake-resistant.

In the structural design against wind load, a maximum wind velocity of 120 miles per hour was adopted.

Both the structural analysis and the structural design were conducted in accordance with Building Standard Law of Japan and various structural design standards established by the Architectural Institute of Japan.

The live load, which will be applied to the special-purpose room or other rooms (such as the video control room, rack room, the hurdle floor and so forth) was determined, with reference made to the standard value which NHK applies, upon calculating the weight of the equipment and the facilities involved which are to be installed in these rooms.

3.3.2 Foundation structure

All foundations will be reinforced concrete structure. To make the structure rigid, foundation beams will be used.

The foundation piles will be the cast-in-place type reinforced concrete piles. The length of these piles will be approximately 60' measured from the ground level. The bottom of piles will be made to penetrate the sand layer (with N value of about 50). The design bearing capacity of the piles is 50 tons per one pile.

3.3.3 Structure of stage portion

A steel framed reinforced concrete structure will be adopted for the major frame (20.765m x 9.734m) including the proscenium arch. Meanwhile, the left and right portions of the stage will be made of a reinforced concrete structure.

Steel beams will be provided for the hurdle floor at an interval of 1.5m in the longitudinal direction (stage-left to the stage-right) so that flying scenery (flying lights) may be added in the future.

The reinforced concrete floor slab at the stage will be made of the on-ground-placed type, allowing the stage load to be applied directly to the ground. The orchestra pit floor slab, as well as of the passageway under the stage will be of the same structure as the above.

3.3.4 Structure of the portions other than the stage

The structure of these portions will be made of reinforced concrete, and the height of story will be the same as that of the existing building.

3.3.5 Structural plan for the alteration and extension of a part of the existing building

(1) Thorough studies have been taken so that the strength of the existing structure of the present building may not be impaired by an alteration, in designing the audience space, the power room, the projection room and others.

(2) A steel frame will be applied in the extension so that the live load may not exceed the design live load (500kg/m^2) to the light room, side spot, speaker room, proscenium arch, and so forth, respectively.

3.3.6 Materials to be used for the structural parts

(1) Steel materials

The steel materials to be used for the upper structure excluding the reinforcement of the cast-in-place type reinforced concrete piles, which comply with JIS Standards (Japanese Indutrial Standards), and those locally available which are equivalent to the JIS Standard products, are entered in parallel with one another, in the design drawing during the designing.

Mild steel bars shall be used for the reinforcement of the cast-in-place type reinforced concrete piles.

(2) Concrete

Stone concrete shall be used for the cast-in-place type reinforced concrete piles, while brick concrete shall be used for the upper structure.

3.4 ACOUSTIC DESIGN

3.4.1 Overall design

Noise control design and room acoustic design are made for auditorium, stage, sub control room, projection room, air conditioner room, and so on. Results of these basic designs are combined into the details design.

The environment of the site selected for BTV HALL is relatively quiet at present, but considering the air route scheduled over the site in the future, it is necessary to take into account the treatment for sound insulation against aircraft noises.

In addition, it is also necessary to keep in mind the noises and vibrations coming from the air conditioner room. It is inevitable that the air conditioner room be located adjacent to the auditorium, and it is therefore essential to proceed carefully with a noise insulation design for walls and a noise control design for air ducts.

Moreover, a proper reverberation design is required to provide the auditorium with acoustic characteristics suitable for multiple purposes.

The noise control design and room acoustic design are expected to produce favorable results if they are carried out on the basis of the design principle given in the previous basic design report.

3.4.2 Noise control design

(1) Permissible noise level

The designed air conditioning noise levels are established as follows:

Auditorium and stage	NC-25
Sub control room	NC-25

Lobby and foyer	NC-30
Other clerical work rooms	NC-35

Noises other than air conditioning noise, will be limited to unpretentious levels, taking into consideration masking effect, and assuming that there will be the amount of noise mentioned above.

(2) Auditorium and stage

1) To improve the noise insulation characteristics of the auditorium roof against aircraft noises, a dry type noise insulation layer will be provided under the existing roof. The construction similar to the above will be applied to the roof of the stage to be newly constructed in the extension part.

2) The outdoor walls and the wall adjacent to the air conditioner room will be double construction by brick and concrete.

3) Considering the noise insulation of the entrance for stage settings, a sound lock will be provided to be installed with coupled sound insulation doors. The door structure will be of the air-tight steel flush design (with sound absorbing materials contained inside).

4) A sound lock mounted with sound insulation doors will also be provided between the auditorium and lobby, and between the auditorium and foyer.

5) In order that any air conditioning noise level will be maintained at less than NC-25, the necessary amount of sound absorbent chambers or elbows are provided in the air conditioner room and in the space above the ceiling of the auditorium.

6) The window to be installed between the sub control room and the stage, and between the projection room

and the auditorium will be of excellent sound insulation characteristics.

7) The attic space over the auditorium ceiling will be utilized as an air exhaust chamber. Therefore, considering the sound absorption treatment in the chamber, and also the noise insulation of the auditorium ceiling, adepuate sound absorbing materials will be laid over the entire rear of the ceiling.

(3) Sub control room

1) As to sound insulation between the air conditioner room on the 2nd floor and the sub control room on the 1st floor, the sound insulation treatment will be given to the ceiling of the sub control room, in addition to the sound absorption treatment to the space over the ceiling.

2) Fan coil units will be installed inside the finishing wall, and air supply and exhaust chambers of them will be given proper sound absorption treatment.

3) A great amount of noise will be generated in the rack room, therefore the partition wall between the sub control room and the rack room, will consequently be of superior sound insulation quality.

4) In order that the air conditioning noise level may be maintained at less than NC-25, appropriate sound absorbent chambers and elbows will be furnished inside the air conditioner room and in the space above the ceiling of the sub control room.

5) Considering the sound insulation between the air conditioner room and the sub control room, the wall between these two rooms will be a double construction by brick and concrete.

6) The entrance door will be of the air-tight steel flush design (with sound absorbing materials contained inside).

(4) Air conditioning room

1) The air handling units will be furnished with vibration insulation materials, and the air ducts will be suspended by vibration insulation fittings.

2) Adequate sound absorption treatment will be given to the interior finishing to minimize the noise radiated from the air handling units and other blowers.

3) Considering the sound insulation for the auditorium and sub control room, both of which are adjacent to the air conditioner room, the walls here will be of the double construction type.

4) The entrance door of this room will be of the air-tight steel flush design (with sound absorbing materials contained inside).

(5) Others

1) Considering the abatement of impact noises from walking, a carpet will be laid on the lobby floor.

2) Considering sound insulation from the air conditioner room on the above floor, the ceiling of the special guest room will be given special sound insulation.

3.4.3 Room acoustic design

(1) Auditorium and stage

The data of the cross sectional shape of the auditorium ceiling will be applied to the details design, referring to the results of the study made in the previous basic design report.

This auditorium is to be the multipurpose type and will be used for performing various programs. Due consideration will thus be taken into account in the reverberation design for the auditorium. The reverberation time of this auditorium will be determined so that it will provide (1) adequate live sound in the case of a recital with the use of stage sound reflectors, which will be furnished in the future; (2) adequately moderate sound for dramatic performances and such programs as feature the use of electric sound reinforcement system.

1) In the calculation of reverberation time in the auditorium, an assumption will be made as the installation condition of stage sound reflectors that a rear sound reflector 26' wide and approximately 15' high will be set at a point about 27' away from the stage front end, and also that two side reflectors and ceiling reflector will be furnished to enclose the opening of the proscenium arch.

2) The reverberation time in the auditorium when it is full will be designed to be approximately 1.1 second (500Hz) under the condition that the sound reflectors are furnished on the stage.

3) Under the condition that the sound reflectors are not used on the stage, the reverberation time will be designed to be about 0.9 second (500Hz) for full occupancy by making absorptive the wall and ceiling surfaces of the stage flies.

4) To obtain the adequate sound diffusion in the auditorium, necessary quantity of sound diffusers will be installed to the side walls at the fore of the auditorium. In addition, diffusing walls with rugged surface will be employed at other side walls of the auditorium.

5) On the other hand, the rear wall of the auditorium, which faces the stage, will be of an extensive frequency range absorbing structure.

6) To compensate for sound absorption power in the low frequency range, necessary sound absorbing material will be furnished at the border of the ceiling, and at part of the rear ceiling.

7) In audience hall, sound absorptive upholstered seats will be provided.

8) Giving preference to the acoustic effects inside the orchestra pit, the orchestra pit wall on the stage side will be of the reflective design, and the pit wall on the audience side will be of the sound absorbing design. In addition, a short partition between the auditorium and the orchestra pit will be of the louver type so that the sounds of music from the orchestra pit may be transmitted through this partition toward the audience area.

9) To prevent deterioration to the acoustic effects of the auditorium by sounds in the passageway under the stage and in the chair storage under the auditorium floor, the interior of the passageway and the chair storage will be furnished with appropriate sound absorbing materials.

(2) Sub control room

This room will also serve as the monitoring room, and therefore, due consideration will be given to the selection of favorable acoustic characteristics.

(3) Sound lock

Thorough consideration will be taken into account of its sound absorbing properties.

(4) Projection room

This room has sources of noises, and therefore due consideration will be given to the sound absorbing characteristics.

(5) Air conditioner room

These rooms have sources of noises similarly to (4) above, and therefore consideration will be taken into account of the sound absorbing characteristics.

3.5 BUILDING EQUIPMENT

3.5.1 Ventilation and air conditioning equipment

(1) Outline

The air conditioning system for this project is designed exclusively for cooling each room and will be supplied with cooling water from the existing refrigerating machine.

A new water chilling unit, exclusively for cooling at night, will be installed. This unit is designed to allow a shift to the existing refrigerating machine.

(2) Design conditions

a. Outdoor temperature and humidity requirements for designing

Dry bulb temperature 35°C Relative humidity 90%

b. Temperature and humidity requirements of the rooms to be cooled

Dry bulb temperature 26°C Relative humidity 55%

(Sub control room 24°C)

(3) Air conditioning system

The air conditioning units to be installed are mainly of the air handling units and will be allocated to the following systems:

No.1 Stage
No.2 Audience seat
No.3 Entrance and Foyer
No.4 Lighting room
No.5 Sub control room
No.6 VIP room
No.7 Canteen
No.8 Projection room
No.9 Orchestra pit

A fan coil unit for generated sensible heat processing will also be installed in the sub control room,rack room, and

projection room.
The air-to-air heat exchanger will be installed for the audience seat system, of which outside load is large, with the aim of decreasing the cooling load.
The kitchen, water closet, stage, etc. will be ventilated according to the mechanical ventilation system.

3.5.2 Plumbing equipment

(1) Water supply facilities
Water will be supplied to each section of the auditorium from two existing water supply pipings with a pipe size of 50m/mϕ.

(2) Hot water supply facilities
Hot water supply system for kitchen will be planned to be installed.

(3) Fire fighting facilities
The hydrant pump will be installed in order to derive water from the existing water tank. A hydrant box will also be installed on the left side of the stage. The hydrant pump will be started with a switch to be mounted inside the hydrant box.

(4) Sanitary fixtures
Sanitary fixtures will be mounted in each water closet, make-up room, and other rooms requiring the sanitary fixtures. The closet bowl and urinals will be of the flush valve type operated by handle and push button.
An air towel will be provided in each water closet.

(5) Kitchen facilities
A gas range, sink, ice making machine, kitchen table, coffee maker, juice dispenser, cold table and so forth will be furnished in the kitchen. A water cooler for drinking and bottle coolers will be installed in the canteen.

(6) Drainage facilities
With the exception of the water drainage system for the passageway to the orchestra pit, the water drainage system for the entire auditorium will be designed to

be of the natural gravity flow type.
the sewage piping and miscellaneous use drain piping, both of which are to be installed within the respective building will be independent from one another, and these piping will be connected to the outdoor drainage basin which will be installed by the separate work.

3.5.3 Electrical facilities

(1) Leading-in for power supply

The power supply to be applied will be the 380/220v, 3-phase, 4-wire system, and the power will be supplied from the transformer station in a separate building.
The power receiving point on the audience hall side will be located in the rack room on the 1st floor.
The wiring conduits which are to be installed inside the auditorium building while being extended from the 1st manhole (for the outdoor leading in), which is adjacent to the audience hall, are included in the details design, but the outdoor wiring conduit installation and the wiring work are not included in the details design.
The number of feeders and the wire size will be based on those shown in the design drawing.

(2) Power supply system

The power will be led from the rack room on the 1st floor to the power control panel, each distribution board, broadcasting equipment distribution board, stage batten power control panel, and main lighting panel.

(3) Lighting fixtures and plug sockets (excluding stage lighting and broadcast lighting systems)

A distribution board will be installed at two different locations on the ground floor, and one unit of distribution board will also be installed on the 1st floor,

and the power is distributed to each of the rooms from these boards.

The lighting fixtures to be mounted inside the audience seat will be incandescent fixtures. Another lighting fixtures consist mainly of fluorescent fixtures.

The illumination for each room is as specified below:

Audience seat	150 lx
Stage (general lighting)	150 lx
Foyer	300 lx
Water closet	200 lx
Office room	400 lx
Store	100 lx
Sub control room	400 lx

The design of the incandescent lamps to be mounted in the audience seats will be the dimmable type, with the dimmer included on the stage lighting control panel.

When these lamps are applied for general lighting, they will be installed in such a manner that they can be flashed from the stage.

The exits in the audience seats and on the stage will be furnished with an emergency lamp, and furthermore, in preparation for an emergency, each of rooms will also have emergency lamp which will operate on power from a battery or a generator, (between which a shift is made automatically.)

The battery and the rectifier will be included in the broadcasting equipment, and they will be installed in under the stairs (3) and rack room.

Plug sockets will be installed for each of the rooms.

(4) Power facilities

A power control panel will be installed for power supply to the air conditioning system, ventilation system, and fire hydrant pump system. Each of the power control panels will be mounted respectively on the ground floor, 1st floor,and 2nd floor.

The air handling units, ventilation fans, and hydrant pump will be started and stopped manually.
Ventilation fan will be interlocked with the air handling unit so that they may be operated synchronously for air volume balance.

(5) Earthing equipment
One earthing system will be provided for the sub control room of the audience hall.

(6) Telephone equipment
A terminal board will be installed between the entire length of the telephone cable at the left stage so that the wiring and the conduit may be installed together in each room.
The telephone sets will be mounted separately from this work.

(7) Clock equipment
The clock system to be applied will be extended from the master clock in the existing main control room.
The clock to be mounted in the sub control room will be made of the 1-second type and that to be provided in the office room, the foyer, VIP room will be made of 30-second type. The clock to be mounted in the canteen and audience seats will be made of the digital type.
Both the 1-second type and the 30-second type clocks form part of the broadcasting equipment, but supply and installation of the digital type clocks will be included in this work.
The clocks to be provided in the audience seats will be of the special digital type.

(8) Buzzer equipment (for the indication of stage opening)
A buzzer push button will be mounted on the control rack in the sub control room, and a buzzer will be provided for the foyer, canteen, water closet, stage,

artist's waiting room, make-up room, audience seat, and projection room.

(9) Alarm equipment

As many automatic fire alarms as required will be furnished for the audience hall while a fire alarm indicator panels will be provided in the sub control room of the audience hall, existing main control room, and the front entrance of the existing building.

The fire alarm indicator panel to be provided at the front entrance of the existing building will be made of a type that is furnished with five alarm indicator lamps, bell, bell stop key, relay, and control key. Another two panels will have five alarm indicator lamps, bell, and bell stop key. Five alarm indicator lamps will be installed for the ground floor, 1st floor, 2nd floor, stage, and audience seats.

A fire alarm push button will be mounted in the sub control room, as well as at the left and right stages.

(10) Wiring conduit system for broadcasting equipment

The wiring conduits extending respectively from the stage lighting system and the broadcasting equipment will be installed to make a connection to the existing main control room.

The wiring in this case will be included in the broadcasting equipment.

The connection boxes for the TV camera, microphones, speakers, inter-coms, monitor, and so forth will be included in this work, but the box cover plates will be included in the broadcasting equipment.

The wiring conduits to be installed on the grid, for the stage battens and the lighting equipment will be included in the broadcasting facilities installation work.

(11) Wiring conduits for the simultaneous interpretation system

To provide for a simultaneous interpretation system for international conventions in the future, spare wiring conduits will be installed in the audience seats which will extend from the projection room.

3.6 BROADCASTING FACILITIES

The conceptional diagram of the broadcasting facilities to be installed in the auditorium is shown in Fig. 3-10. The installation layout of the TV broadcasting equipment and the room space have been determined on the bases of the following.

(1) Fewer crossing between traffic lines.

(2) Closer functional proximity of TV broadcasting equipment in layout, as well as the isolation of every part of the equipment which is considered to interfere with each other in their performance.

(3) Close association between sub control room and other places in a auditorium, among the staff, such as lighting, audio and video group members.

The perspective of the sub control room is given in Fig. 3-11.

3.6.1 Program production system

(1) Video facilities

1) Video system

The video facilities to be installed are designed to meet the requirement for color TV broadcasting in the future. Namely, in TV broadcasting, if it is colorized, the contents of programs can no doubt be enriched remarkably, and color TV programs will appeal so much more to the viewers. On the otherhand, as compared with the monochromatic TV broadcasting facilities, the color TV telecasting facilities and equipment are more complex, thus requiring highly complicated operation and maintenance techeniques. Moreover, in TV program production, a high level technique is also needed for the stage set, costumes and lighting for color TV. It is, accordingly, essential to study its stage set, costumes and so on. The video

control system is designed so as not to require much modification in the main facilities such as the video switcher, video mixing facility, special effect units, even at the time of color TV telecasting in the future. For that reason a burst-killer will be incorporated in this TV broadcasting system.
Consequently, it is simply possible for the TV broadcasting facilities to make a shift to color TV telecasting.

2) TV camera

A 5-camera system is introduced, and one of the cameras in this system is a color camera for the purpose of levelling up the whole TV broadcasting techniques so that a smooth shift is possible for the color TV broadcasting in the future.
The telechine camera is designed as a color TV camera in order to broadcast complete color TV programs by film.

(2) Audio facilities

The 12-channel audio mixing console, two disc players, two tape recorders, many types of microphones such as wireless, dynamic and condenser, are provided to meet the requirements for such programs as dramas, lectures, music shows, chorus, etc.

The antenna used for the wireless microphones should be that of the suspension type and it should be mounted at four different locations over the stage to cope with the programs full of dynamic action. A horizontal type antenna should be fixed under the ceiling spot room in the audience space.
In addition, a stand type antenna are installed so that the antennas can be optionally relocated wherever required.

3.6.2 Stage and lighting facilities

(1) Lighting facilities

The same footlights, base lights, suspension lights and horizontal lights, are installed as used for standard theatrical lighting systems. And a ceiling light room and two side spot rooms are also furnished, together with the spot lights. The capacity and functions of these lighting facilities are designed to fully meet the requirements for color TV broadcasting. Considering the reliability and maintenance of lighting system, a direct patching method is applied to make a connection between the light control facilities and the lighting equipment. For reference, the specifications of the electronic cross connection type are also added in this details design report. The pipe battens employed to suspend the lighting equipments are that of the motor-driven type, providing superior maneuverability.

(2) Other stage-related facilities

1) Curtain

To separate the stage from the audience space, a fly curtain consisted of a draw curtain, a drop curtain and a counter curtain, which are arranged in this order when viewed from the audience-hall side, is installed.
The draw curtain, drop curtain and counter courtain are of the motor-driven type. Fig. 3-12 shows the fly curtain referred to as above.

2) Other flying scenery

The flying set battens to suspend the stage scenery are relatively light in weight, and the batten operating speed must be carefully controlled with the change of scene. Therefore, they are the manually-driven type.

3.6.3 Public address system and others

(1) Public address system

1) Loudspeaker layout

In consideration of ample volume of sounds, less acoustic feedback, quality of tone and natural directivity of the loudspeakers, they are laid out to fit the scale of the audience hall. Namely, two 100W type loudspeakers are mounted on the ceiling, two 100W type loudspeakers on bothside of the hall, and three 15W type loudspeakers under the fore-stage.

Taking the fold-back for the performers and the sounds from the motion picture projector system into the consideration, the audience hall has been designed to be able to mount with loud-speakers at twenty-two different locations such as those over the stage, grid, etc.

2) Public address mixing console

Considering the maintenance, the public address mixing console uses the same types of units as employed by the audio mixing console and is designed for 12 channels as input and 8 channels as output. The sub control room does not allow the staff to directly view the performers from inside. Therefore, two CCTV (closed circuit TV) cameras are applied in combination with the TV camera system.

Moreover, a portable PA console with 4-channel is installed inside the audience seats.

(2) Inter-communication system

1) Inter-communication facilities

For TV program production, inter-communication facilities are installed for the purpose of inter-communication among the camera men, audio and video operators, producers and other engineers to keep with the flow of

program production; the inter-communication system is designed to allocate itself to each working group.

2) Inter-phone system

The sub control room and other rooms are lined to one another by means of inter-phone system for general communication in stage setting or in the case of emergency.

3) Indications and signals

The indications of intermission time as well as the no-smoking signs are controlled from the sub control room.

In order to give audience audio signals such as *starting signal of performance by chime tone*, an announcing machine including 5-channel endless cartridges, is mounted in the sub control room.

CHAPTER 4

CONSTRUCTION COSTS & SCHEDULE

CHAPTER 4

CONSTRUCTION COSTS & SCHEDULE

4.1 CONSTRUCTION COSTS

4.1.1 Construction Work and Building Equipment Work

Unit: (US$)

(1)	Construction Work		2,031,392
	a. Temporary Work	254,166	
	b. Skeleton Work	949,902	
	c. Interior Finishing Work	739,781	
	d. Exterior Finishing Work	87,543	
(2)	Building Equipment Work		753,238
	a. Electrical Installation Work	255,562	
	b. Plumbing	48,640	
	c. Ventilation and Air Conditioning	449,036	
(3)	Several Expenses		1,528,685
	a. Field Expenses	334,151	
	b. Transportation Expenses	249,500	
	c. Escalation	437,875	
	d. General Caretaking Expenses	456,742	
	c. Expenses of Advisors in each Work	50,417	
	Sub Total (1)+(2)+(3)		4,313,315

4.1.2 Additional Broadcasting Facilities

(1)	Program Production Facilities	175,687
(2)	Stage & Lighting Facilities	7,048
(3)	Public Addressing Facilities & Others	128,562
(4)	Installation & Several Expenses	76,828
	Sub Total (1) + (2) + (3) + (4)	388,125

4.1.3 Grand Total of Construction Costs

4,701,440

4.1.4 Integration Conditions

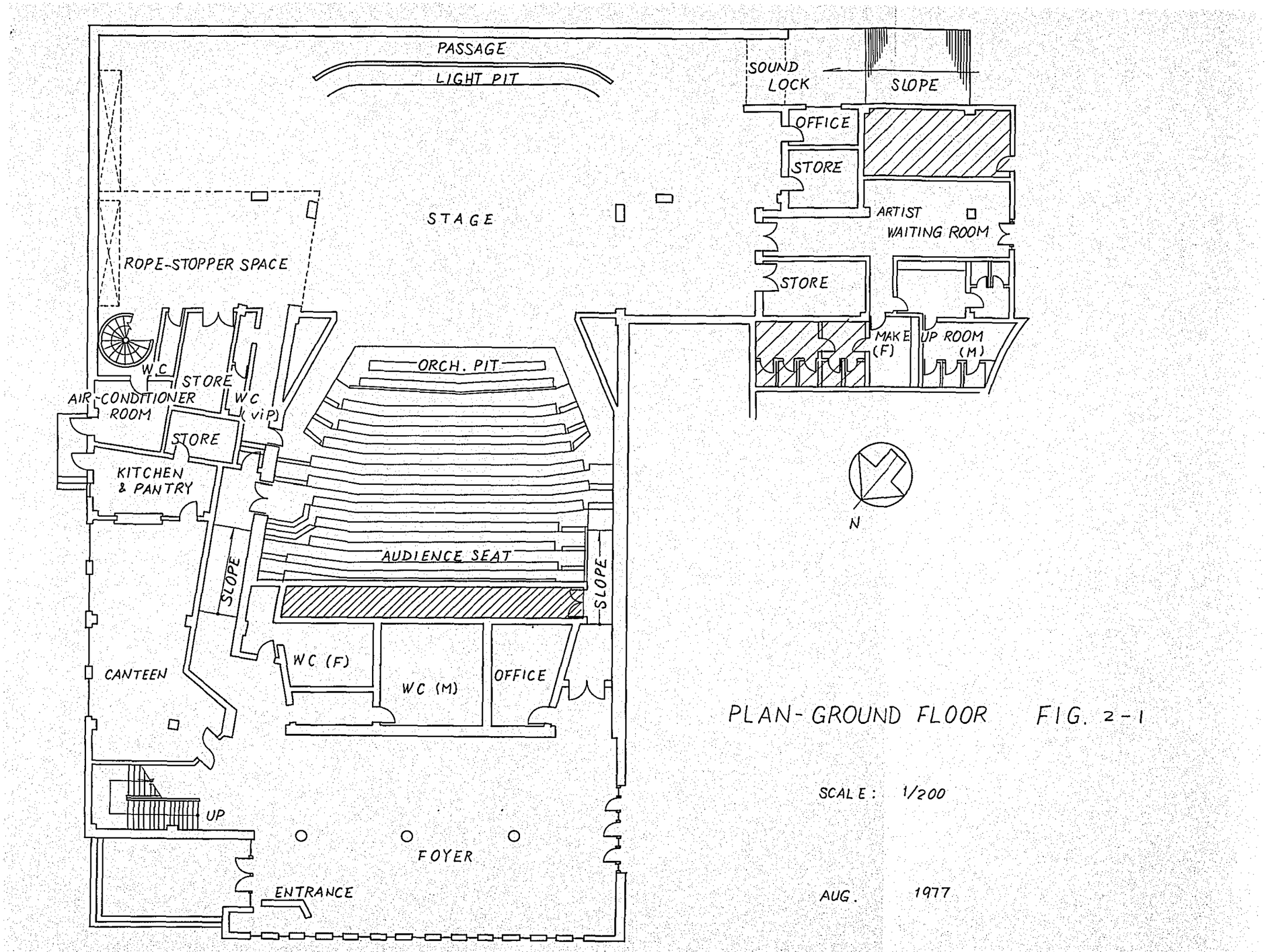
The set integration was made for the construction of the auditorium in accordance with the design drawings and the following terms.

Rate	: Unit of money shall be calculated at US$1.00=¥240 rate, and shall be revised in tender. (US$1.00= TK15.00, TK1.00=¥16)
Construction	: Construction shall be done by Japane contractor.
Materials	: Aggregates, bricks, and carpet shall be supplied in Bangladesh; and most of others shall be imported from Japan
Labour Expenses	: Engineers in each work shall be Japanese, and workmen shall be Bengali.
Cost	: Reference to Schedule of Rates multiplied by 1.3 in "Public Works Department" issued in 1975.
Temporary Work	: Machines and tools shall be integrated including generator, weld machine, unit steel scaffold, truck crane.
Customs	: Details of customs are uncertain, customs shall be as except. But customs duty for Broadcasting facilities shall be included.

The integration shall be valid until December 31, 1978.

4.2 CONSTRUCTION SCHEDULE

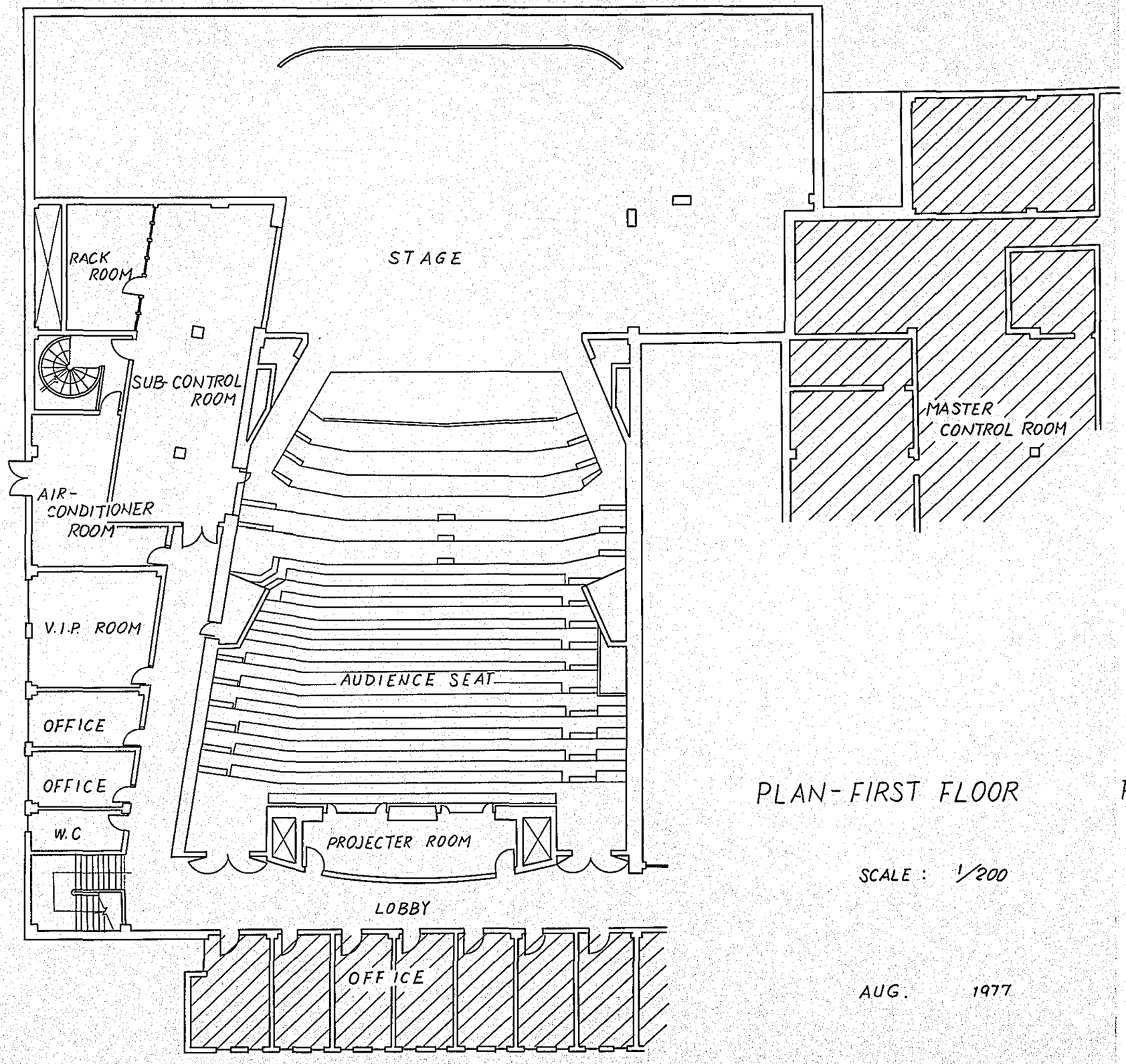
This construction schedule which Bangladesh TV has elaborated, is shown in Tables 4.1 through 4.5.



PLAN - GROUND FLOOR FIG. 2-1

SCALE : 1/200

AUG. 1977

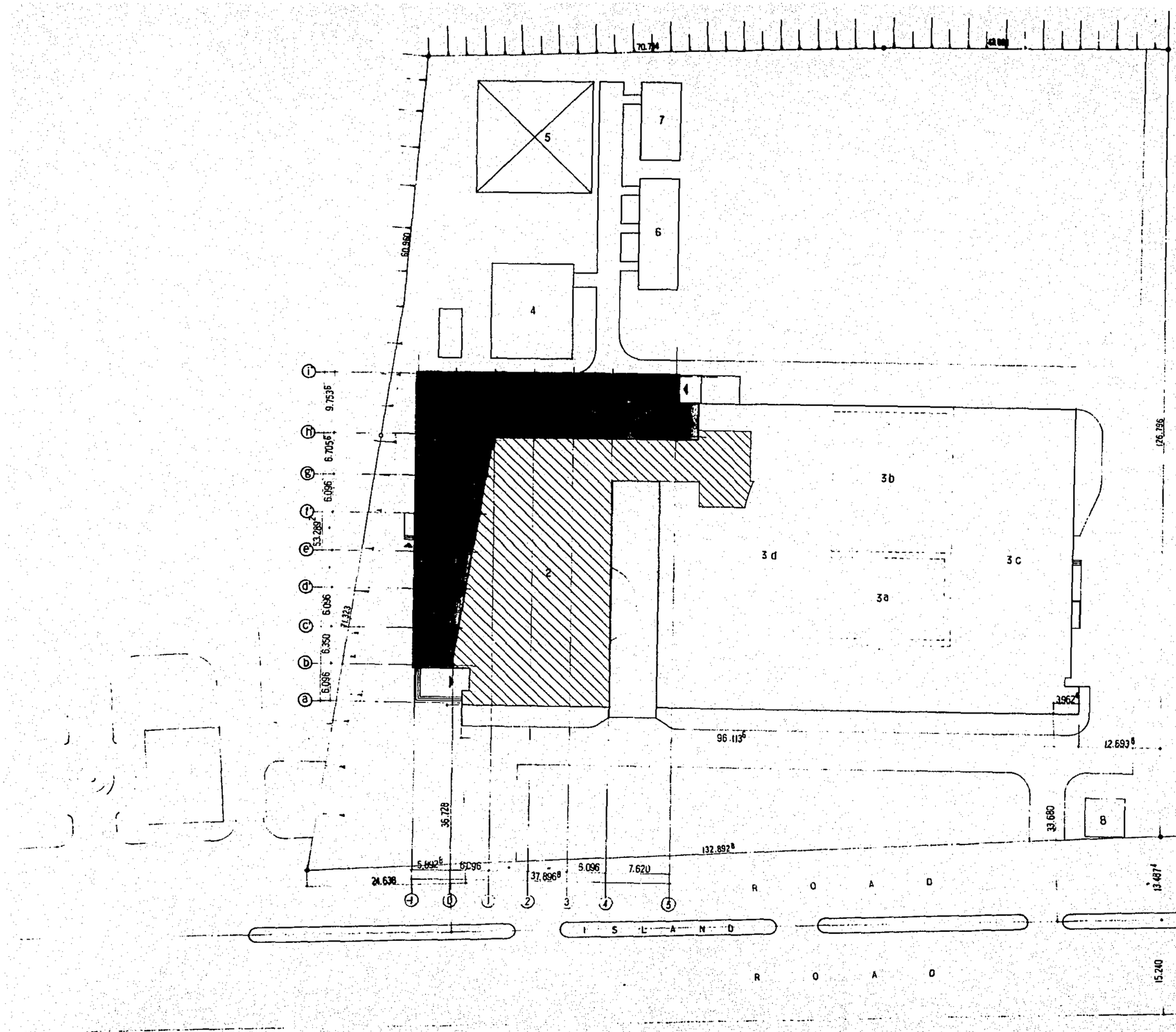


Dashed line area excluded

PLAN-FIRST FLOOR FIG. 2-2

SCALE : 1/200

AUG. 1977



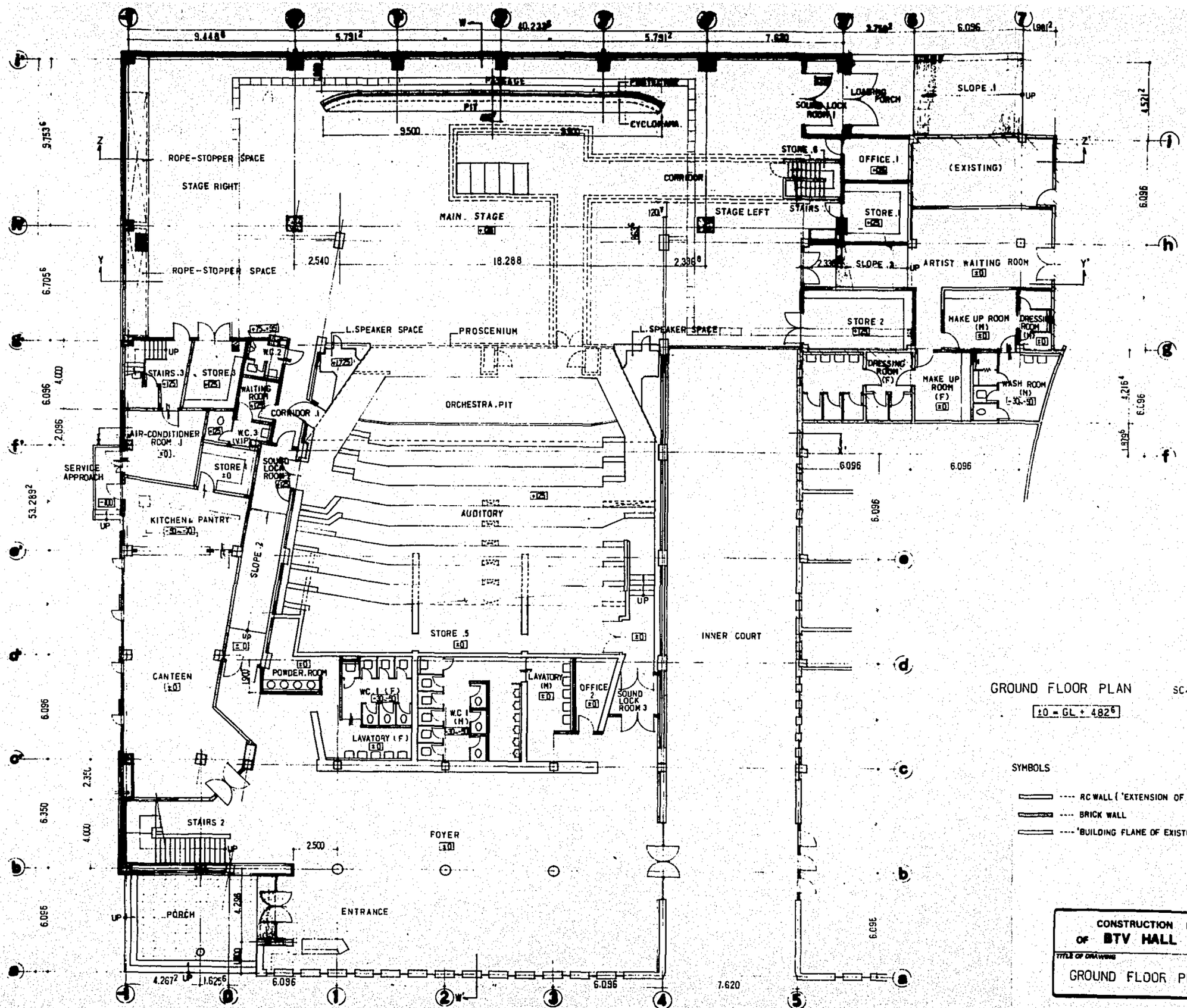
1 'EXTENTION OF BUILDING' PART
2 RECONSTRUCTION PART
3 a STUDIO A
b STUDIO B
c MOCK-UP AREA STUDIO A & b
d TECHNICAL AREA STUDIO A & b
4 SERVICE BUILDING
5 TRANSMITTING TOWER
6 ELECTRICITY SUB-STATION
7 POLICE BARRACK
8 GATE HOUSE

SYMBOLS
'EXTENSION OF BUILDING' PART
RECONSTRUCTION PART
EXISTING PART

PLOT PLAN SCALE 1:600

CONSTRUCTION PROJECT OF **BTV HALL** IN DACCA

DATE 12/'77
SCALE 1:600
TITLE OF DRAWING PLOT PLAN
DRG. NO. A-3-1



GROUND FLOOR PLAN SCALE : 1/200

±0 = GL + 48.26

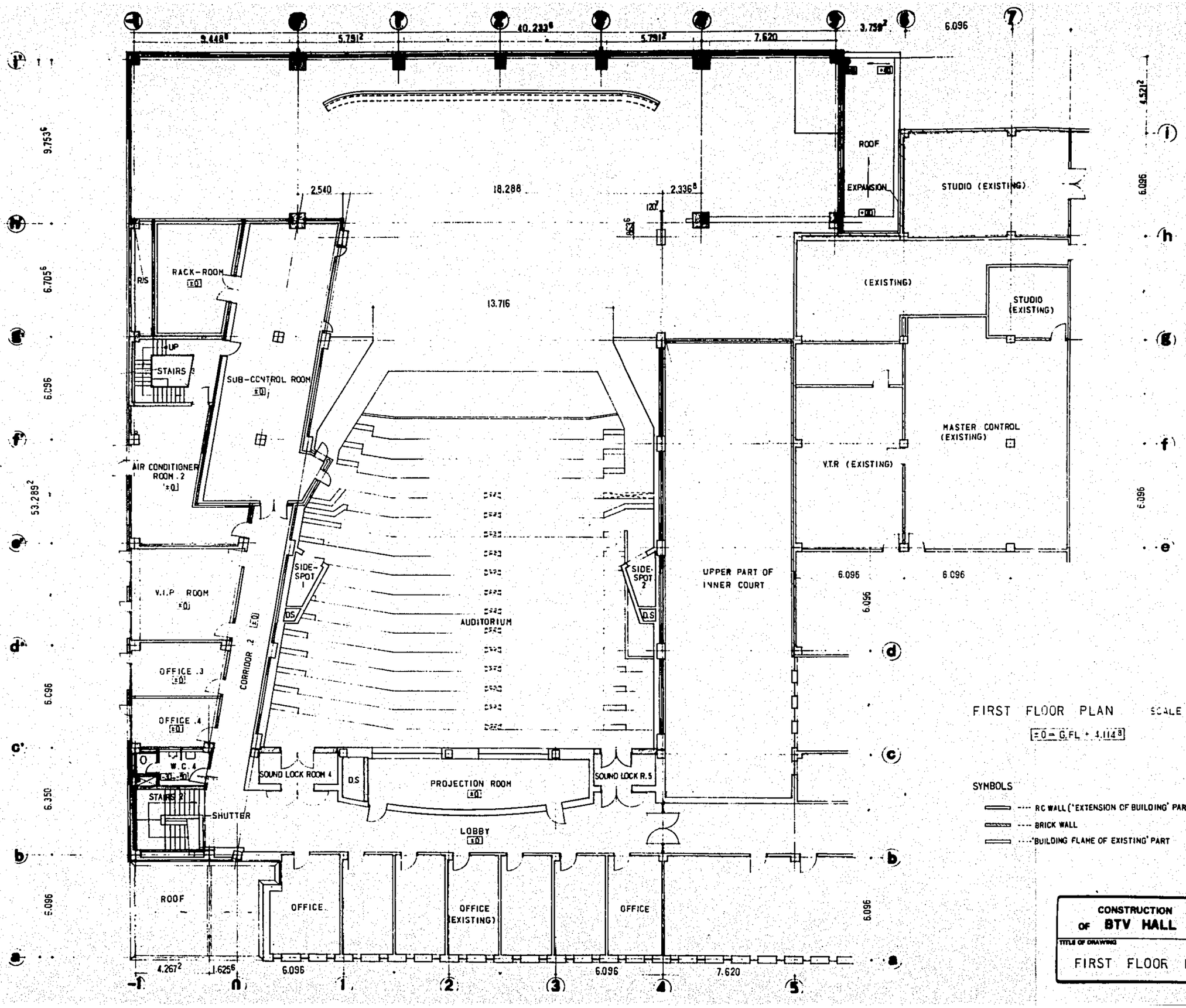
SYMBOLS

---- RC WALL ('EXTENSION OF BUILDING' PART)

---- BRICK WALL

---- 'BUILDING FLANE OF EXISTING' PART

CONSTRUCTION PROJECT OF **BTV HALL** IN DACCA	DATE 12 '77
	SCALE 1:200
TITLE OF DRAWING: GROUND FLOOR PLAN	DRG. NO. A-3-2



FIRST FLOOR PLAN SCALE : 1/200

±0 = G.FL + 3.114

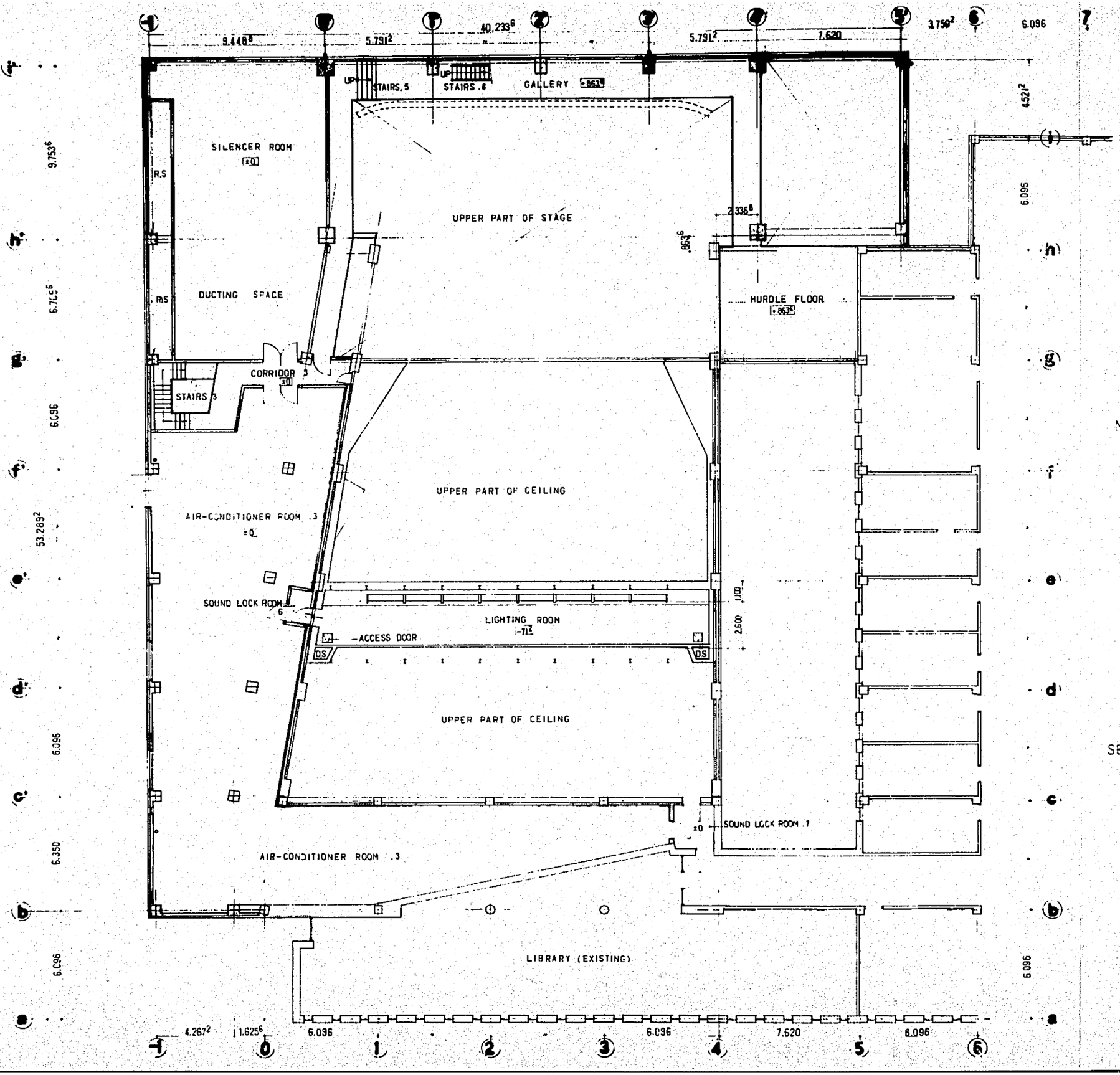
SYMBOLS

---- RC WALL ('EXTENSION OF BUILDING' PART)

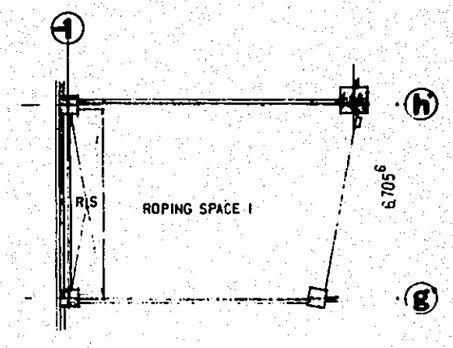
---- BRICK WALL

----'BUILDING FLAME OF EXISTING' PART

CONSTRUCTION PROJECT OF **BTV HALL** IN DACCA	DATE 12/'77
	SCALE 1:200
TITLE OF DRAWING: FIRST FLOOR PLAN	DRG. NO. A-3-3



MIDDLE THIRD FLOOR PLAN SCALE 1/200



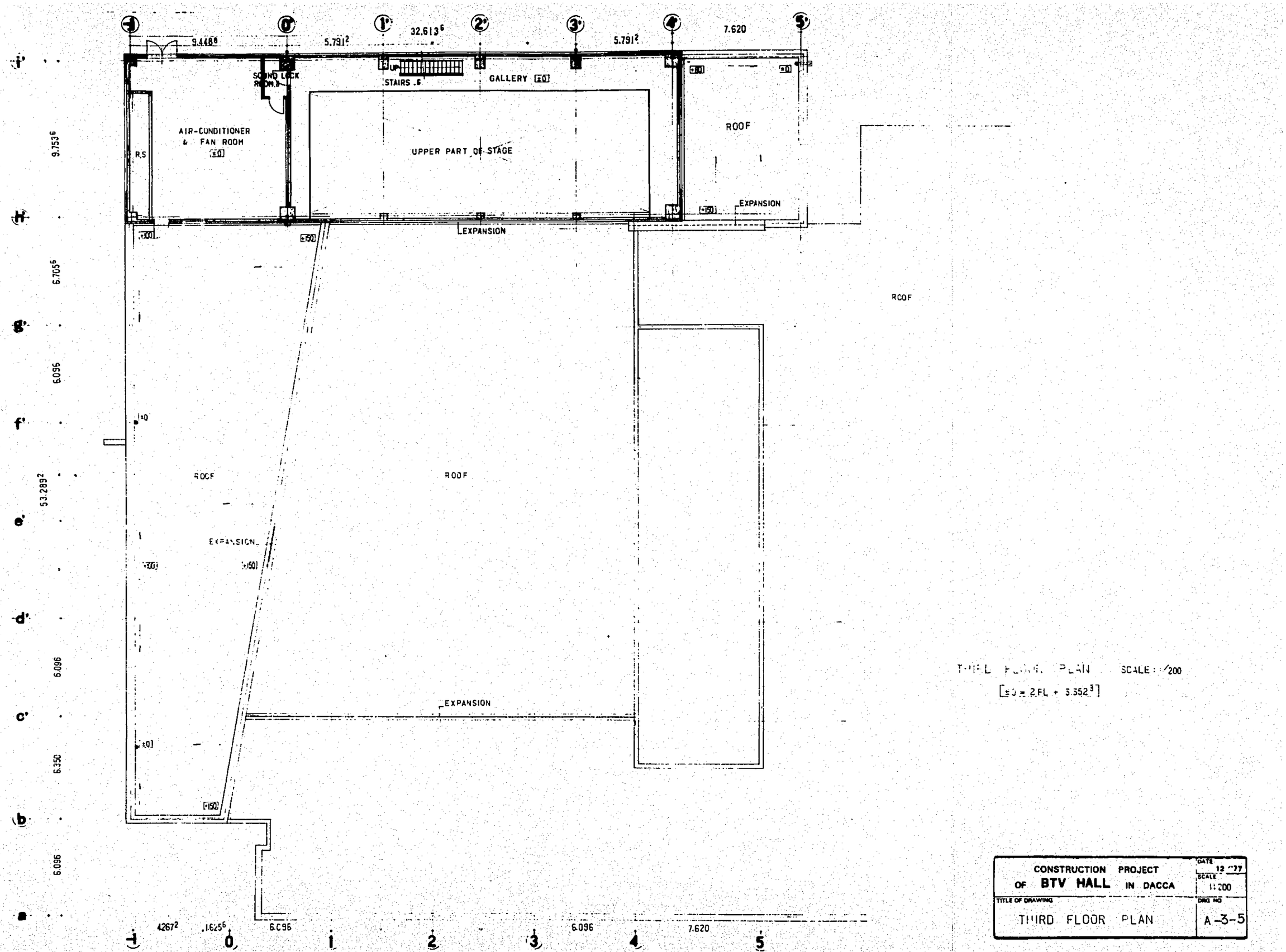
SECOND FLOOR PLAN SCALE : 1/200

±0 = TFL + 3.200⁴

SYMBOLS

- ···· RC WALL ('EXTENSION OF BUILDING' PART)
- ···· BRICK WALL
- ···· 'BUILDING FLAME OF EXISTING' PART

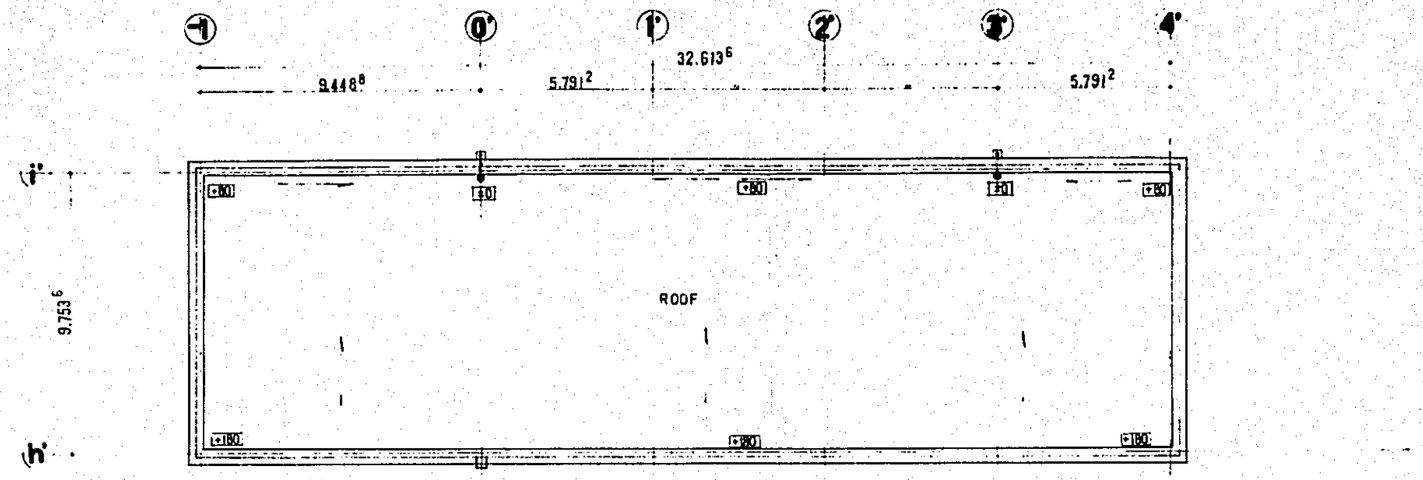
CONSTRUCTION PROJECT OF **BTV HALL** IN DACCA	DATE 12/'77
	SCALE 1:200
TITLE OF DRAWING: SECOND, MIDDLE THIRD FLOOR PLAN	DRG. NO. A-3-4



THIRD FLOOR PLAN SCALE : 1/200

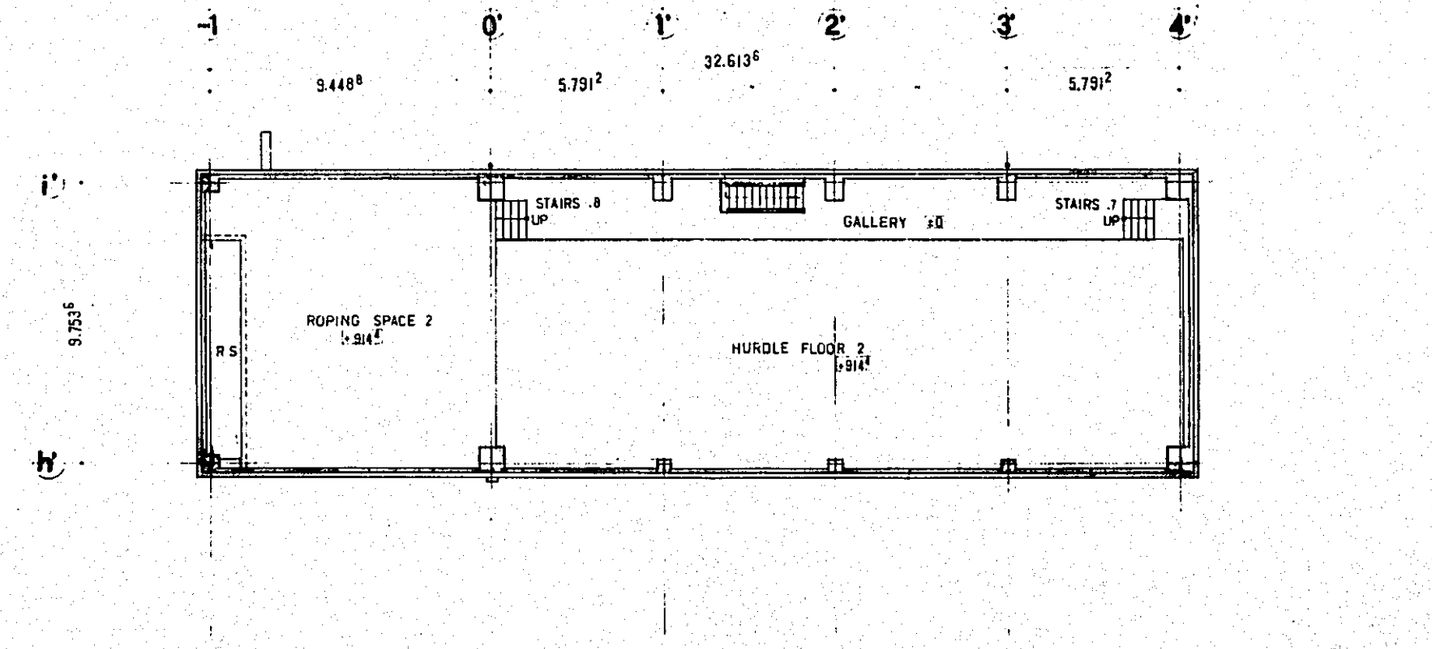
[±0 = 2FL + 5.352³]

CONSTRUCTION PROJECT OF BTV HALL IN DACCA	DATE 12 '77
	SCALE 1:200
TITLE OF DRAWING: THIRD FLOOR PLAN	DRG NO A-3-5



ROOF FLOOR PLAN SCALE : 1/200

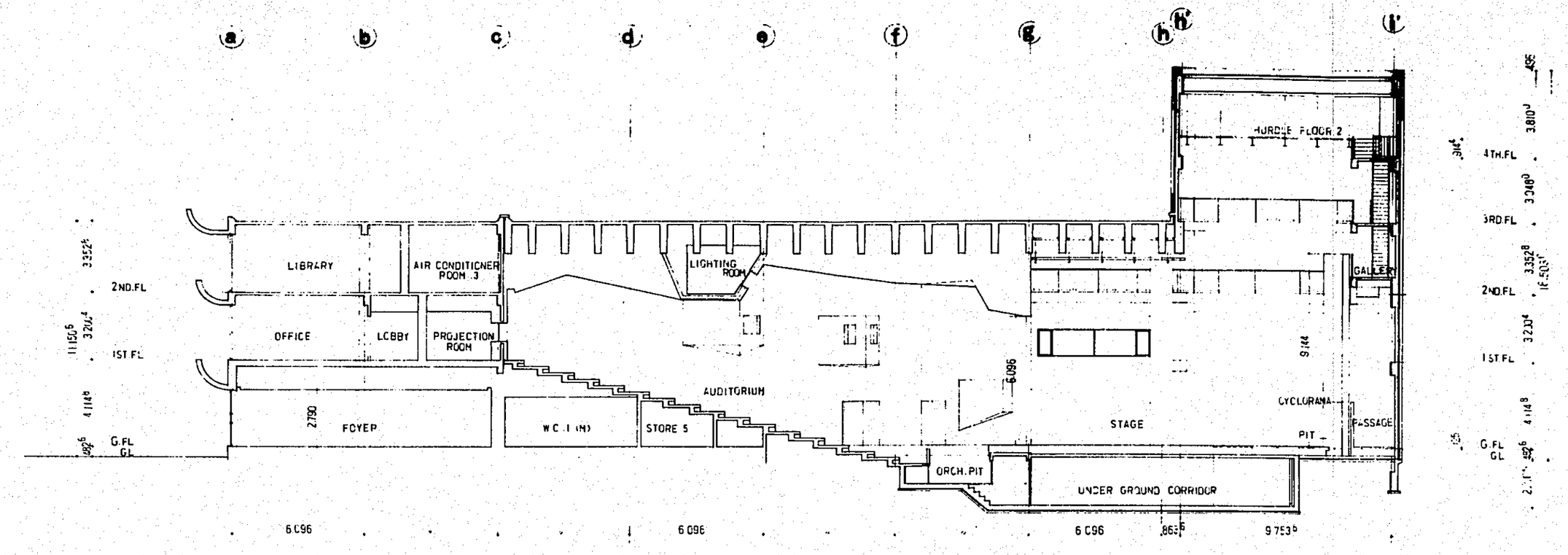
±0 = 4FL + 3.810⁰



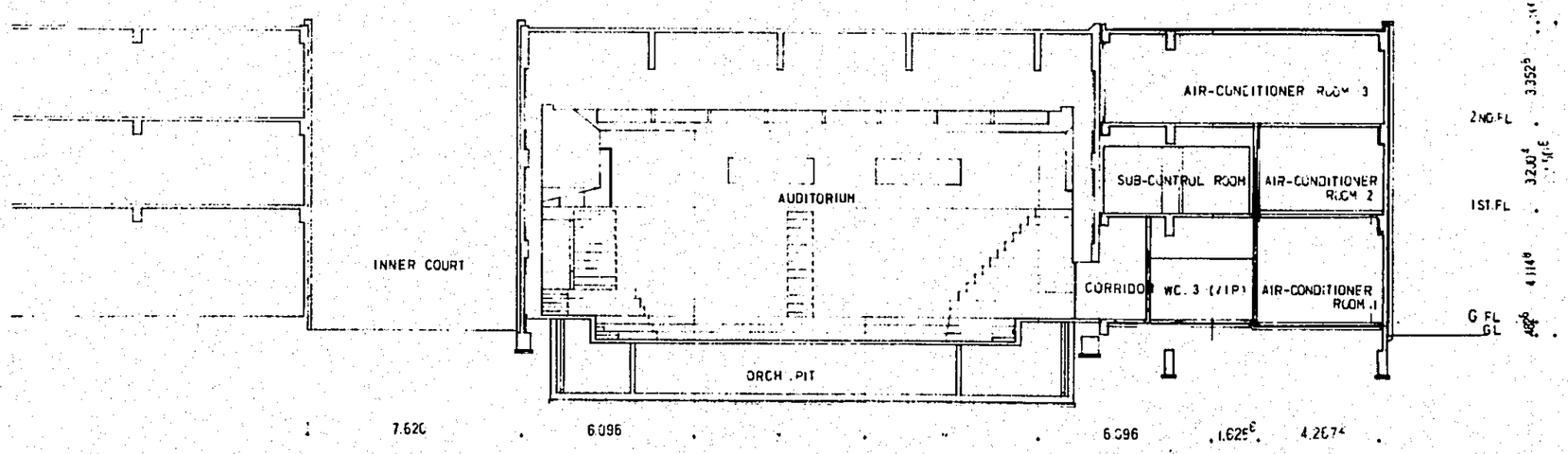
FOURTH FLOOR PLAN SCALE : 1/200

±0 = 3FL + 3.048⁰

CONSTRUCTION PROJECT OF **BTV HALL** IN DACCA	DATE 12.'77
	SCALE 1:200
TITLE OF DRAWING: FOURTH. ROOF FLOOR PLAN	DRG. NO. A-3-6



W–W' SECTION



X–X' SECTION

CONSTRUCTION PROJECT OF **BTV HALL** IN DACCA

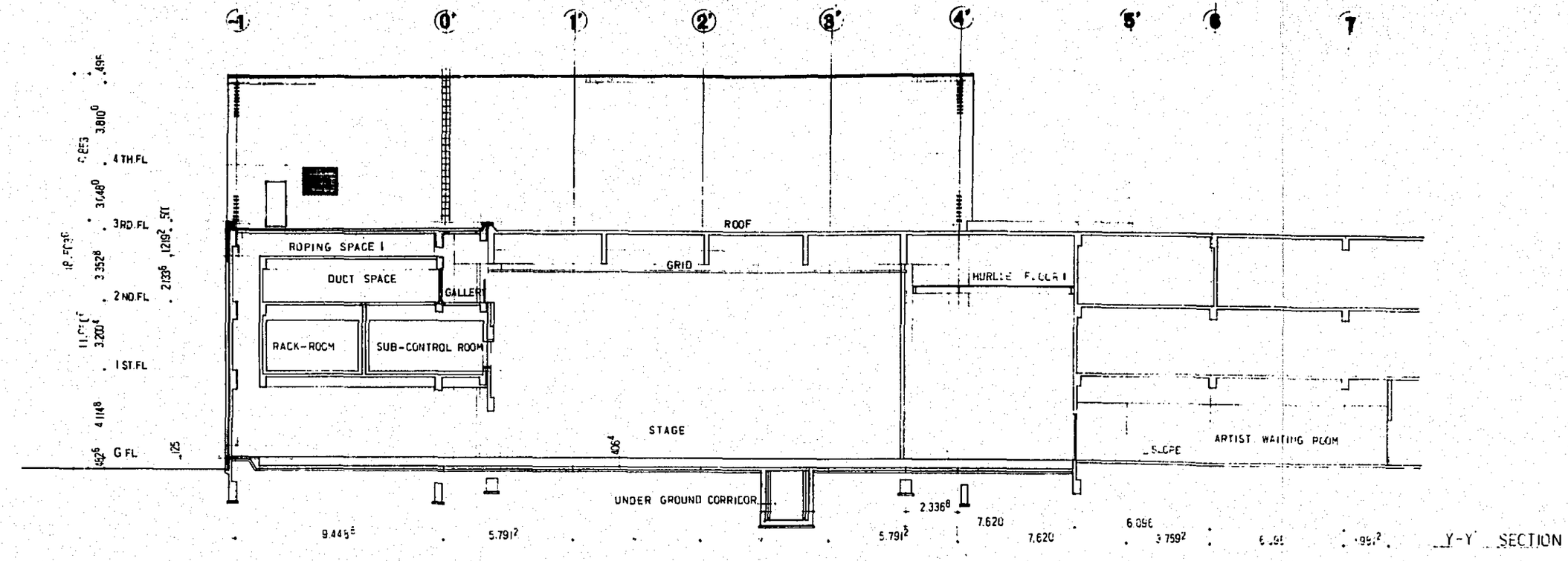
DATE 12 77

SCALE 1:200

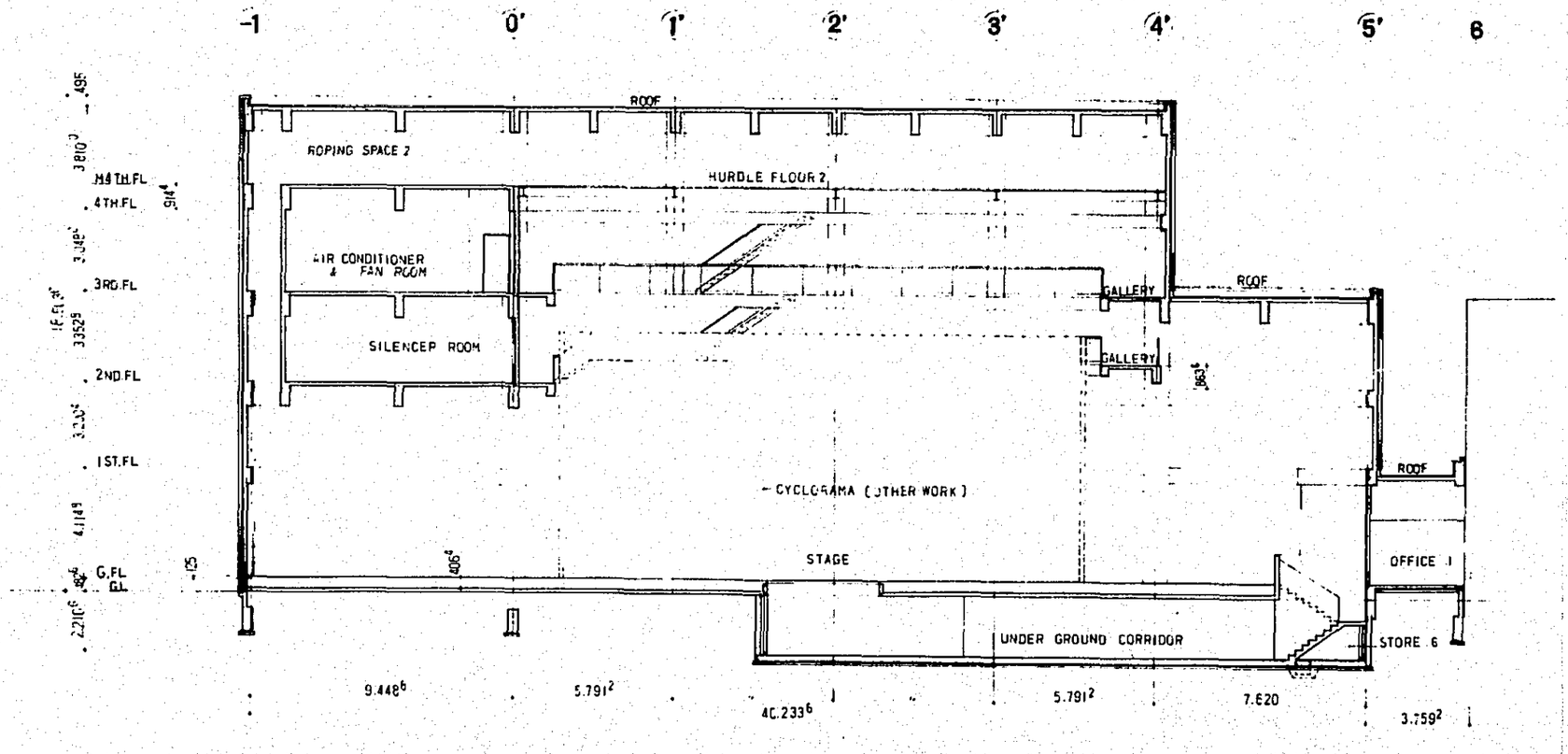
TITLE OF DRAWING

SECTIONS N:1

DRG NO A-3-7

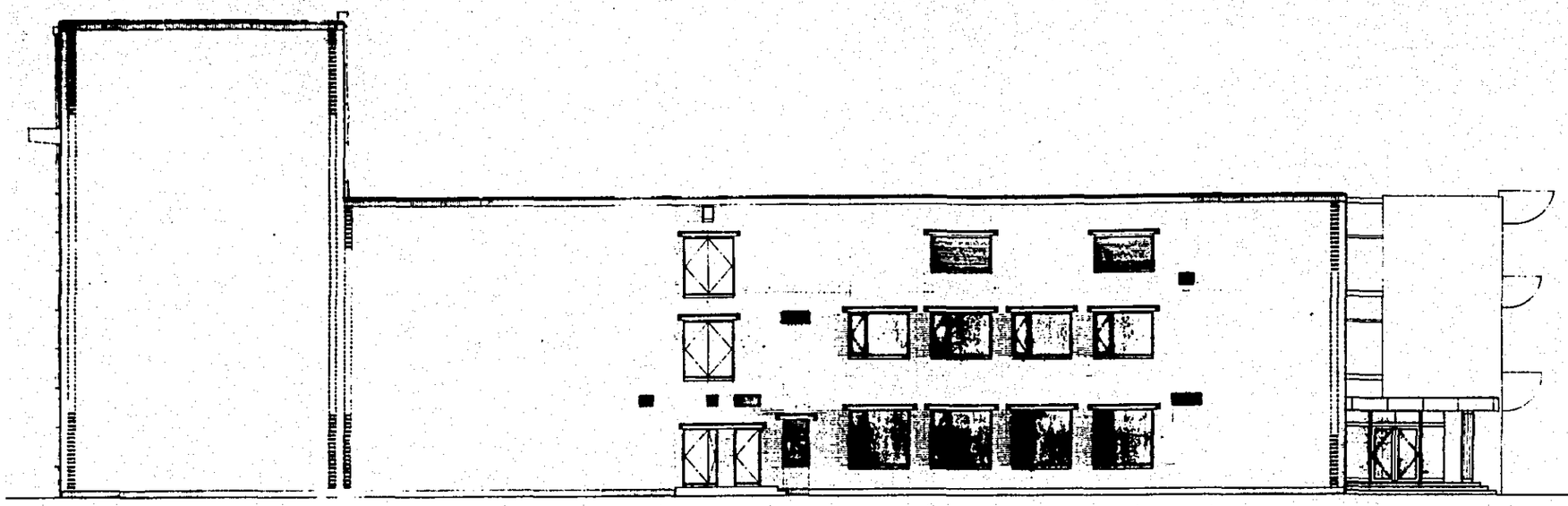


Y-Y SECTION

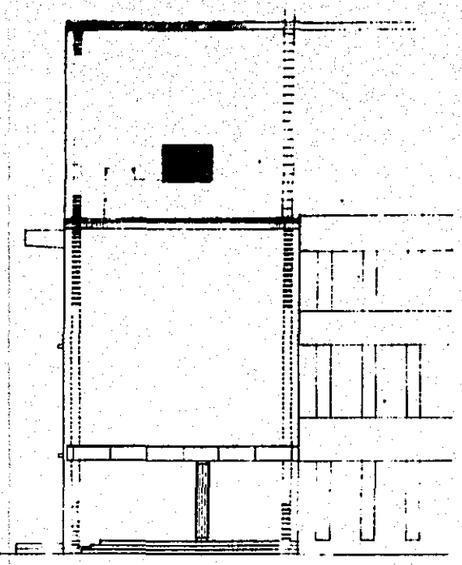


Z-Z SECTION

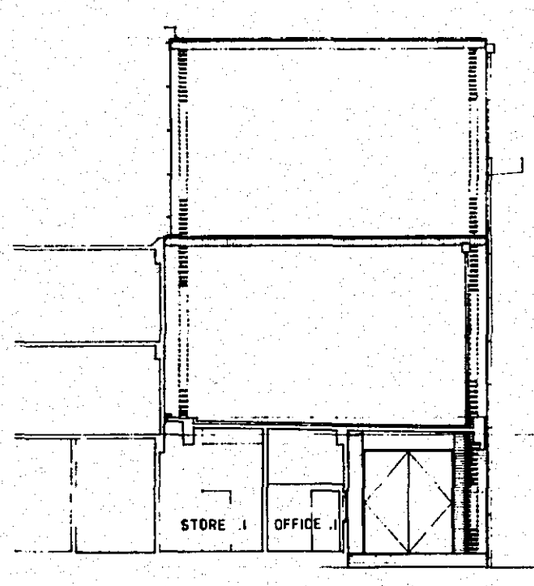
CONSTRUCTION PROJECT OF **BTV HALL** IN DACCA	DATE 12 77
TITLE OF DRAWING: SECTIONS	SCALE 1:200
	DRG NO A-3-8



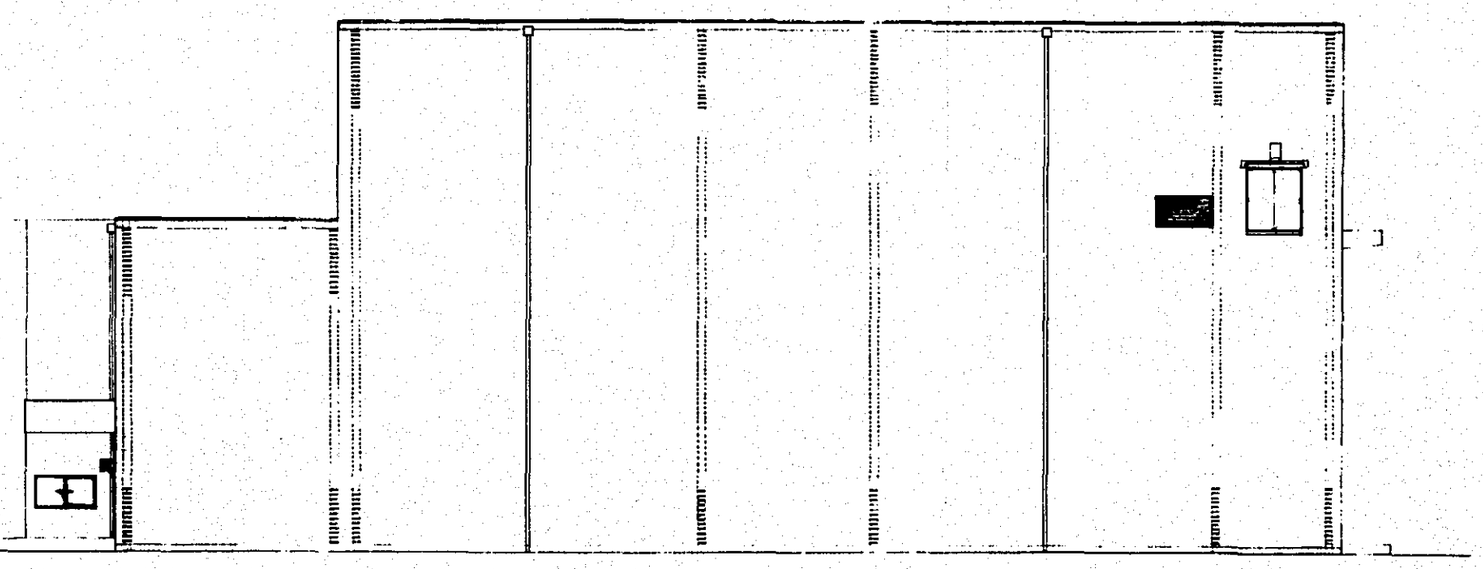
NORTH ELEVATION



WEST ELEVATION



SOUTH ELEVATION



EAST ELEVATION

CONSTRUCTION PROJECT OF **BTV HALL** IN DACCA	DATE 12 '77
	SCALE 1 20
TITLE OF DRAWING ELEVATIONS (NORTH WEST) (SOUTH EAST)	DRG. NO A-3-9

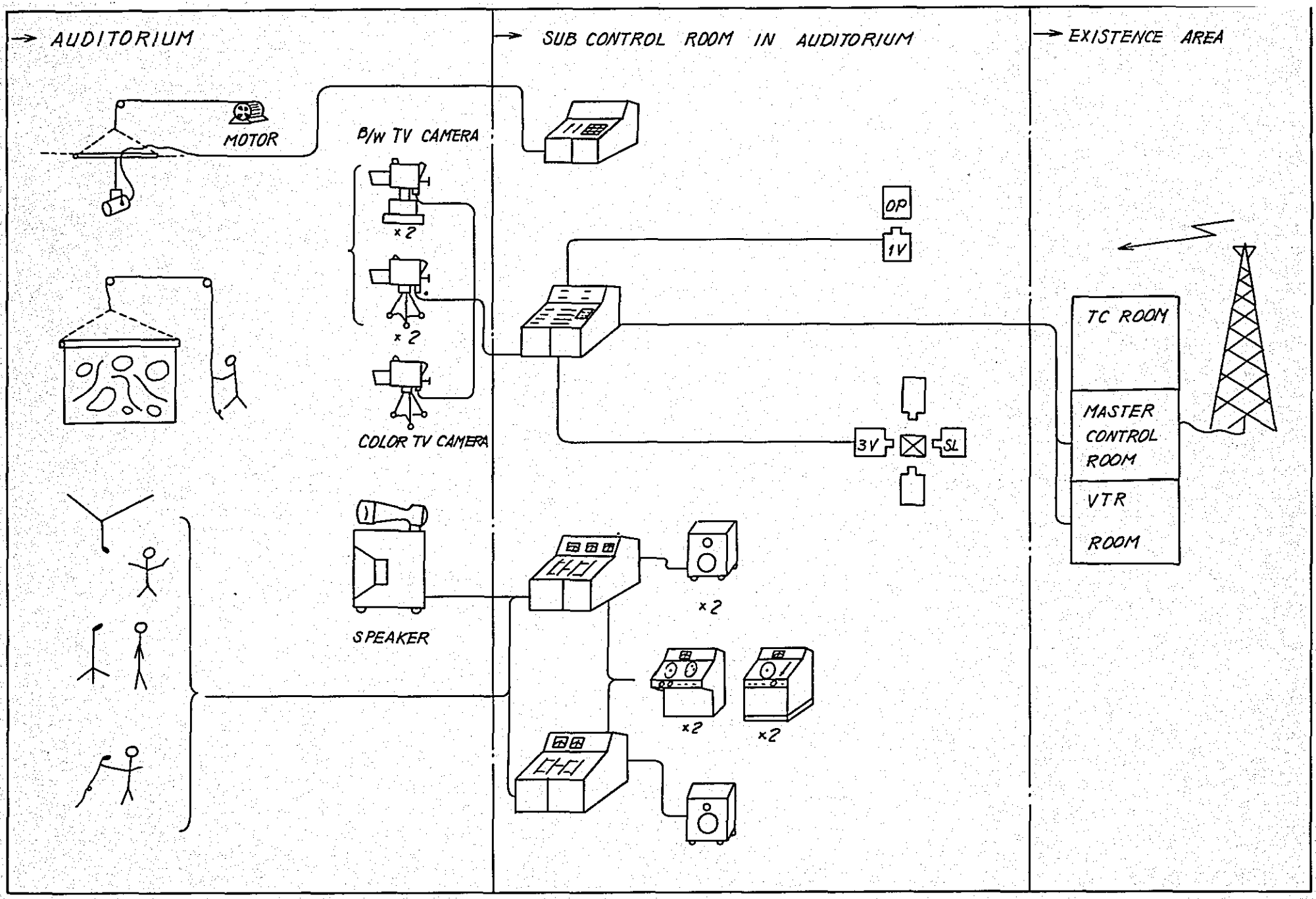

AUDITORIUM
SUB CONTROL ROOM IN AUDITORIUM
EXISTENCE AREA
MOTOR
B/W TV CAMERA
×2
×2
COLOR TV CAMERA
OP
1V
3V
SL
TC ROOM
MASTER CONTROL ROOM
VTR ROOM
SPEAKER
×2
×2
×2

FIG. 3-10

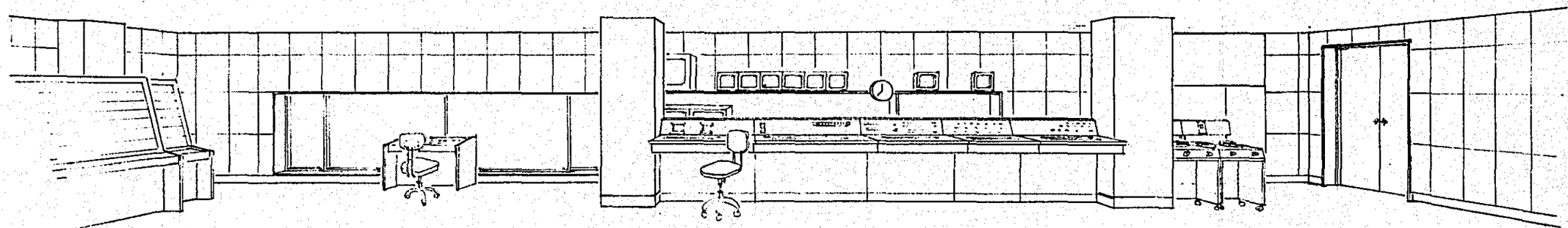


FIG. 3 - 11 SUB-CONTROL ROOM

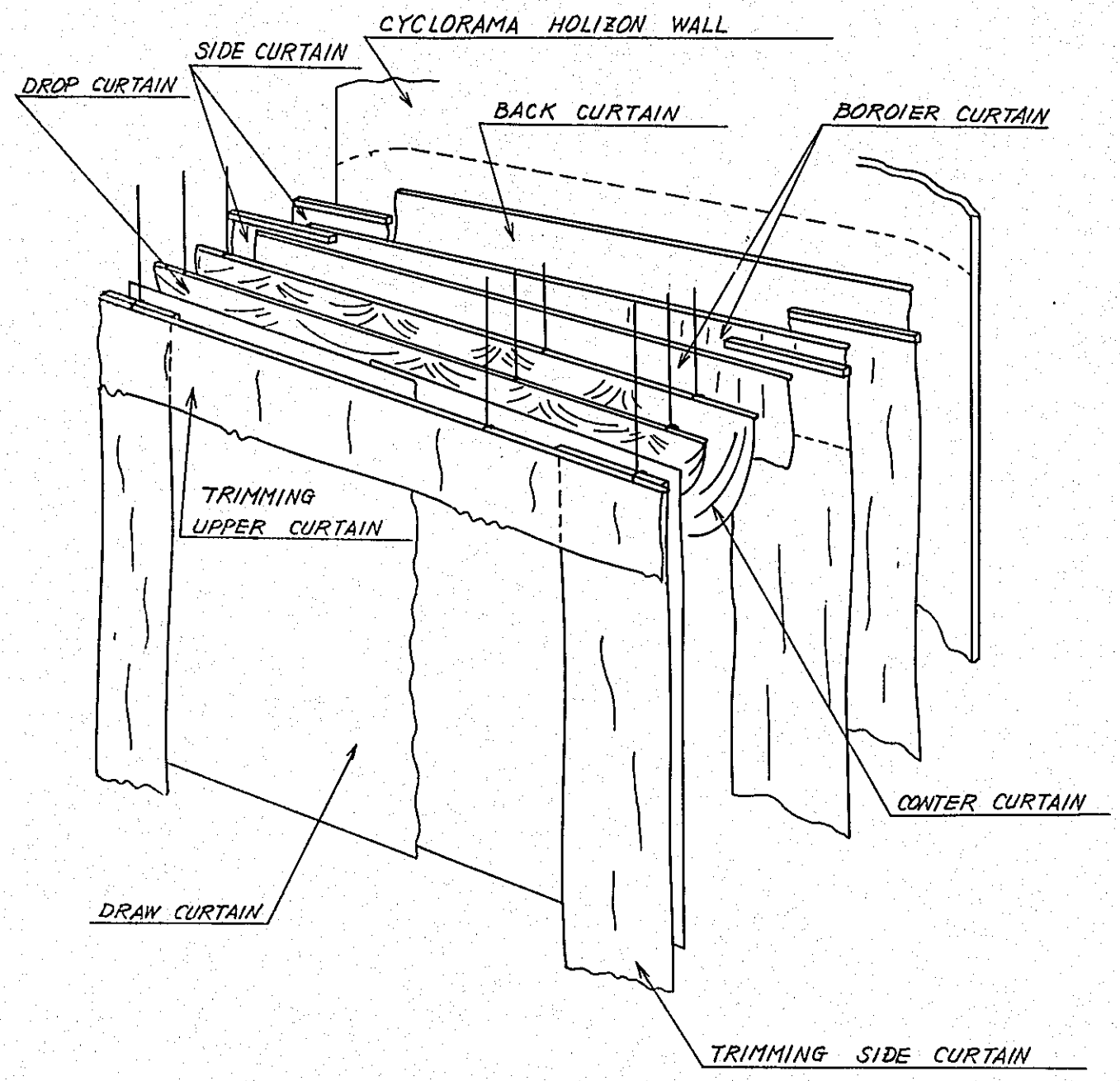

CYCLORAMA HOLIZON WALL
SIDE CURTAIN
DROP CURTAIN
BACK CURTAIN
BOROIER CURTAIN
TRIMMING
UPPER CURTAIN
CONTER CURTAIN
DRAW CURTAIN
TRIMMING SIDE CURTAIN

FIG. 3-12

Table 4-1 Bangladesh Television
Rampura, Dacca

Work Schedule of Piling & Foundation of Auditorium

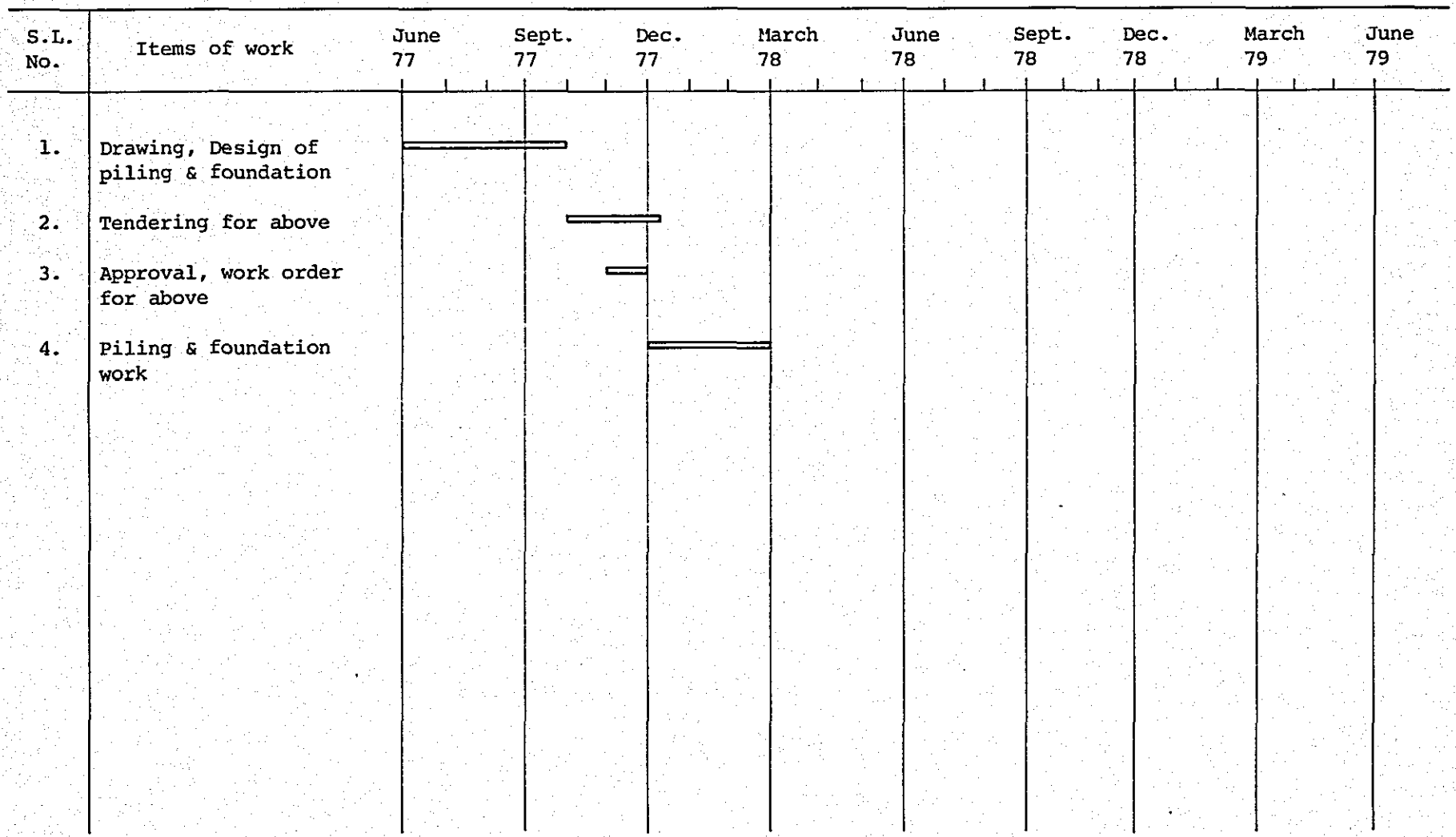
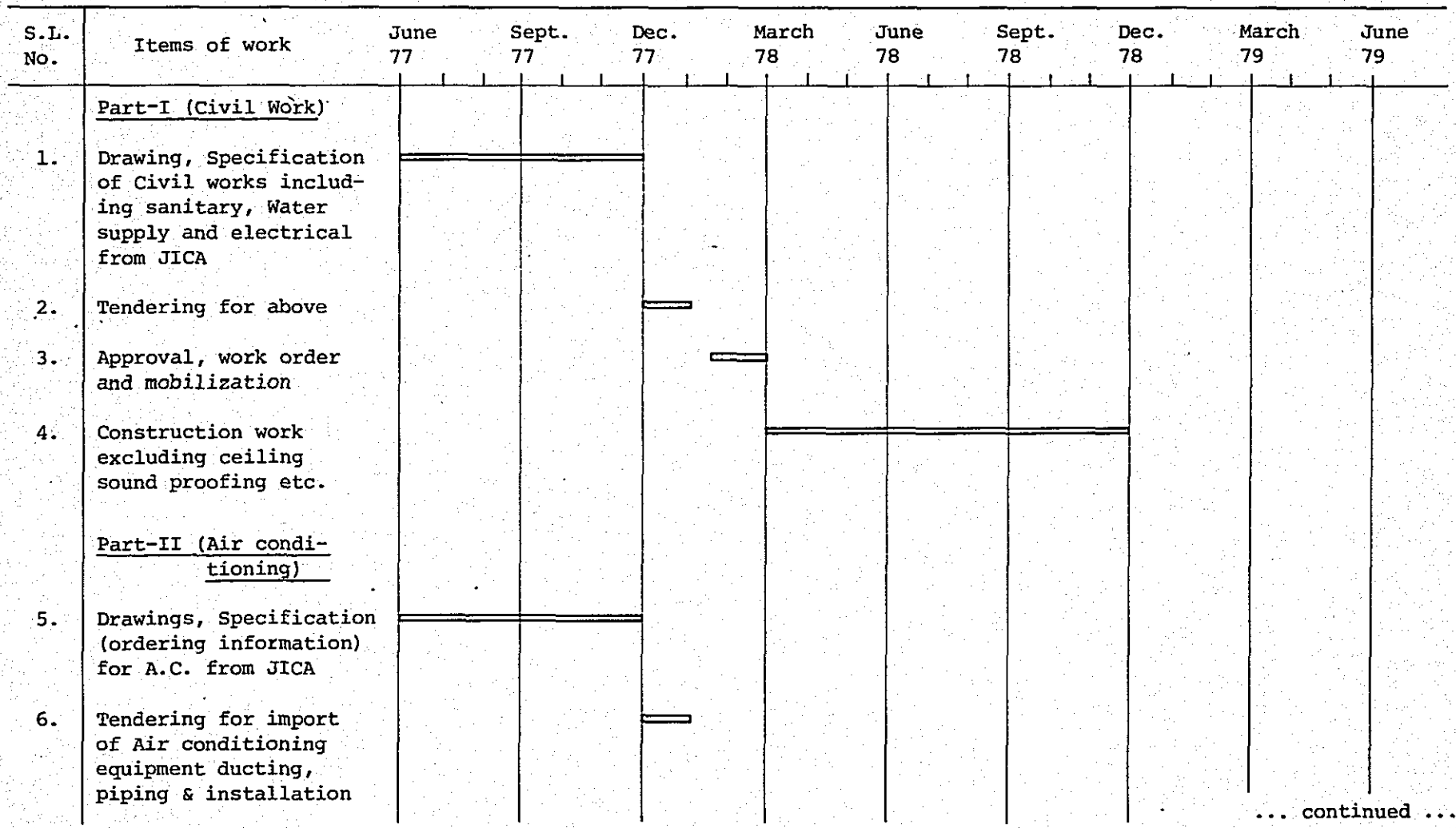


Table 4-2 Bangladesh Television
Rampura, Dacca

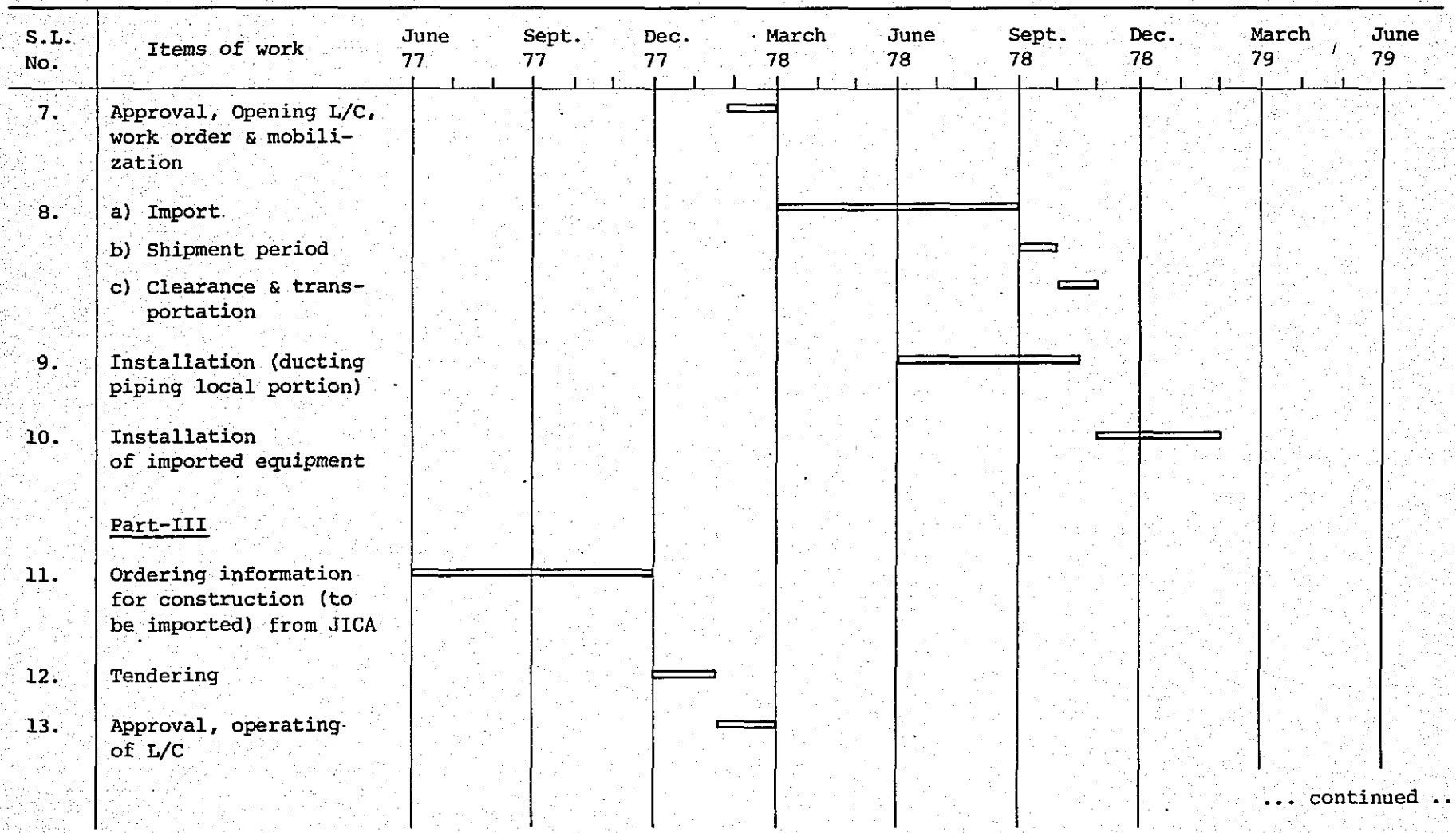
Work Schedule of Piling & Construction of Auditorium - 1 -



... continued ...

Table 4-3 Bangladesh Television
Rampura, Dacca

Work Schedule of Piling & Construction of Auditorium - 2 -

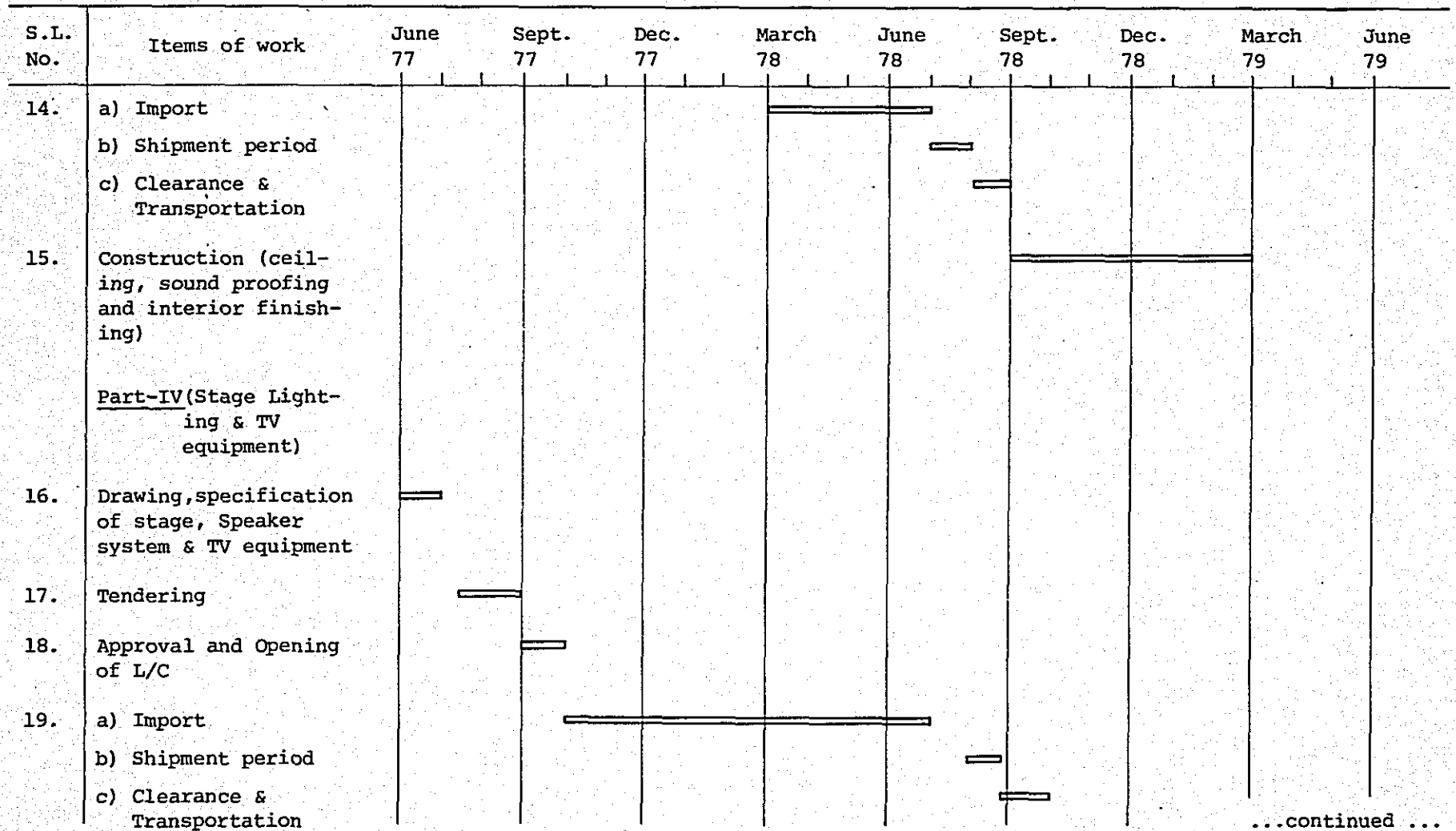


... continued ...

Table 4-4 Bangladesh Television

Rampura, Dacca

Work Schedule of Piling & Construction of Auditorium - 3 -



...continued ...

Table 4-5 Bangladesh Television
Rampura, Dacca

Work Schedule of Piling & Construction of Auditorium - 4 -