5-3 Basic Plan

5-3-1 Site and Layout Plan

(1) Site Plan

Since the Project is an extension of the operation theater, its linkage with the existing operating rooms is important. It is desirable to unify the existing section and the extended section functionally. For this reason, it is the best to construct a new building next to the existing operation theater on the north side in view of its size and the functional linkage. A sufficient space is available at this location because the extension of the operation theater, the radiology department and the pathology department was considered in the previous project by the Japan's Grant Aid.

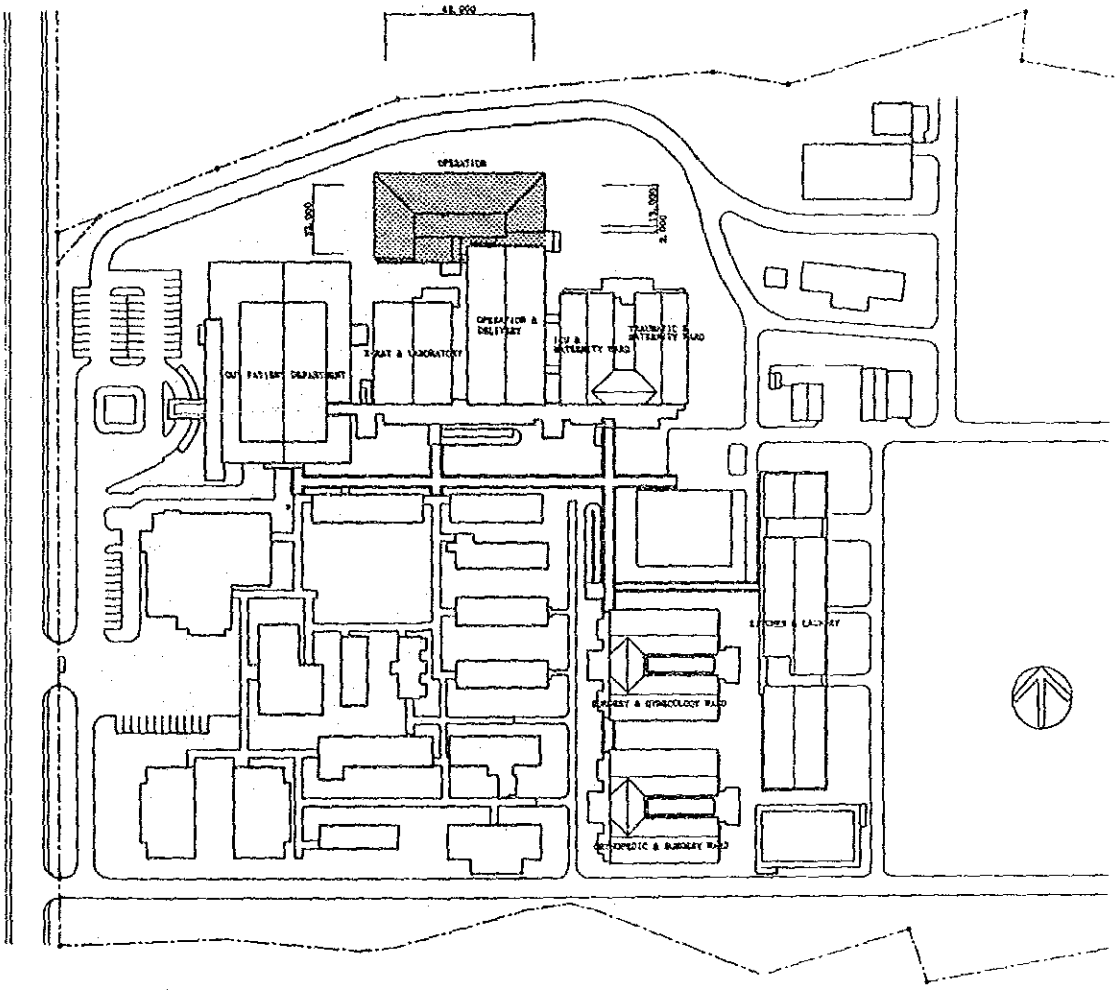


Figure 5-3-1 Site Plan

(2) Facility Layout Plan

1) The building for the Project will be constructed next to the existing operation theater because the linkage between the two is important as stated above.
2) There is a road which surrounds the hospital facilities. It can be used for the transportation of materials and it is used as the route for connecting the east and west sides of the extensive hospital ground. Since it is undesirable to intercept the road, the new building will be constructed off the road.
3) The central medical facilities, consisting of the operating theater, the radiology department and the pathological department, will be structurally unified. However, some extension space will be left between the existing radiology department and the pathological department and the building for the Project to allow the possibility of some extension by the Government of Thailand.

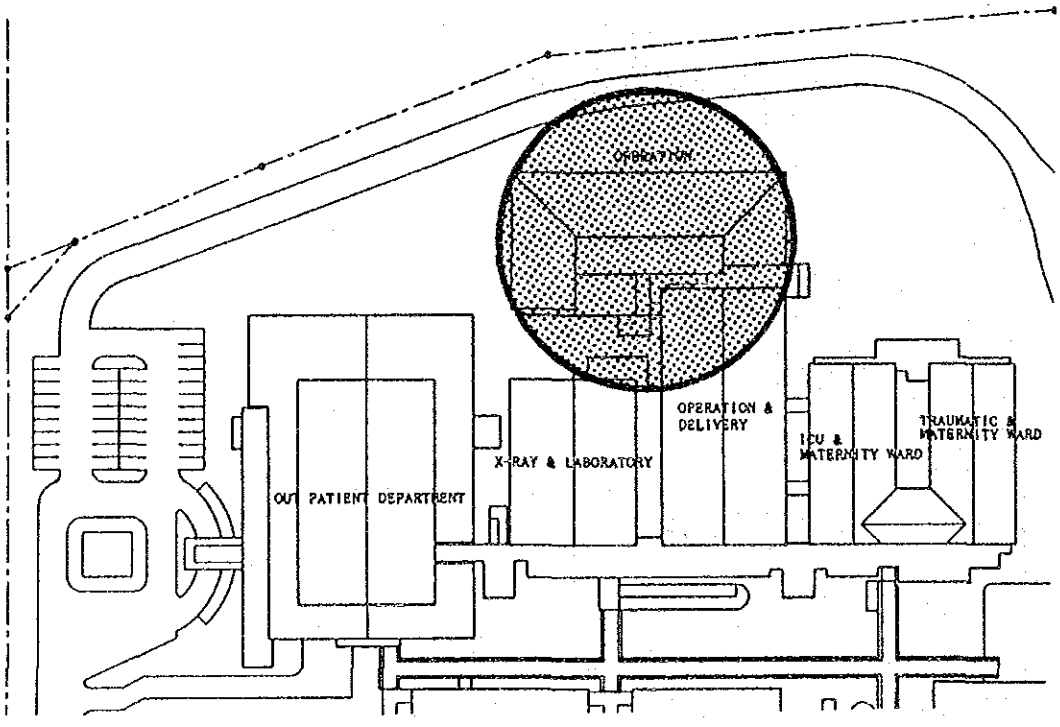


Figure 5-3-2 Facility Layout

5-3-2 Architectural Plan

(1) Zoning Plan

An operating hall and 6 operating rooms will be planned on the 1st floor to facilitate the unified utilization of the existing and the new operation theaters. A sterilizing room will also be planned on the 1st floor to facilitate the supply of medical equipment, etc. to the operating rooms. The rooms for the staff will be planned on the 2nd floor above the new operation theater partly because of the site conditions.

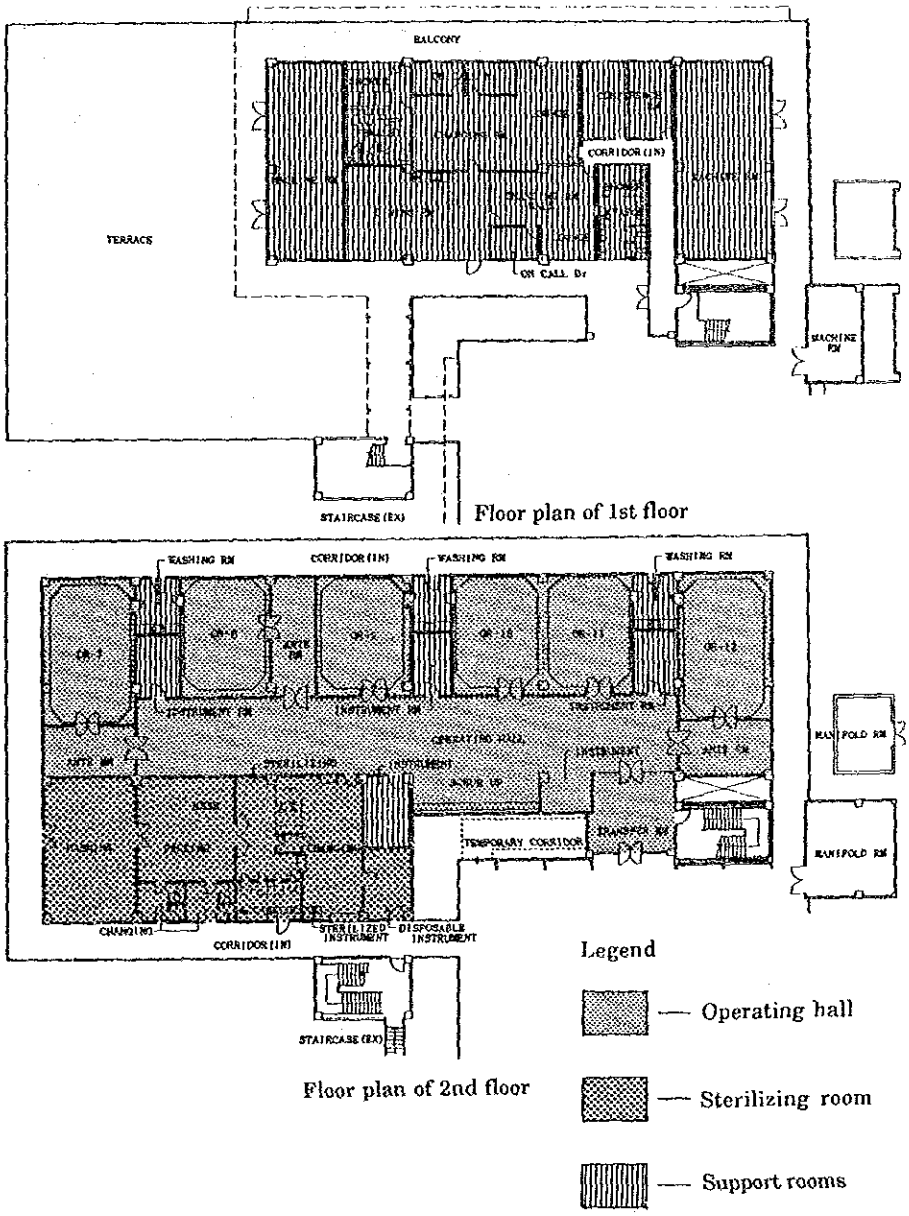


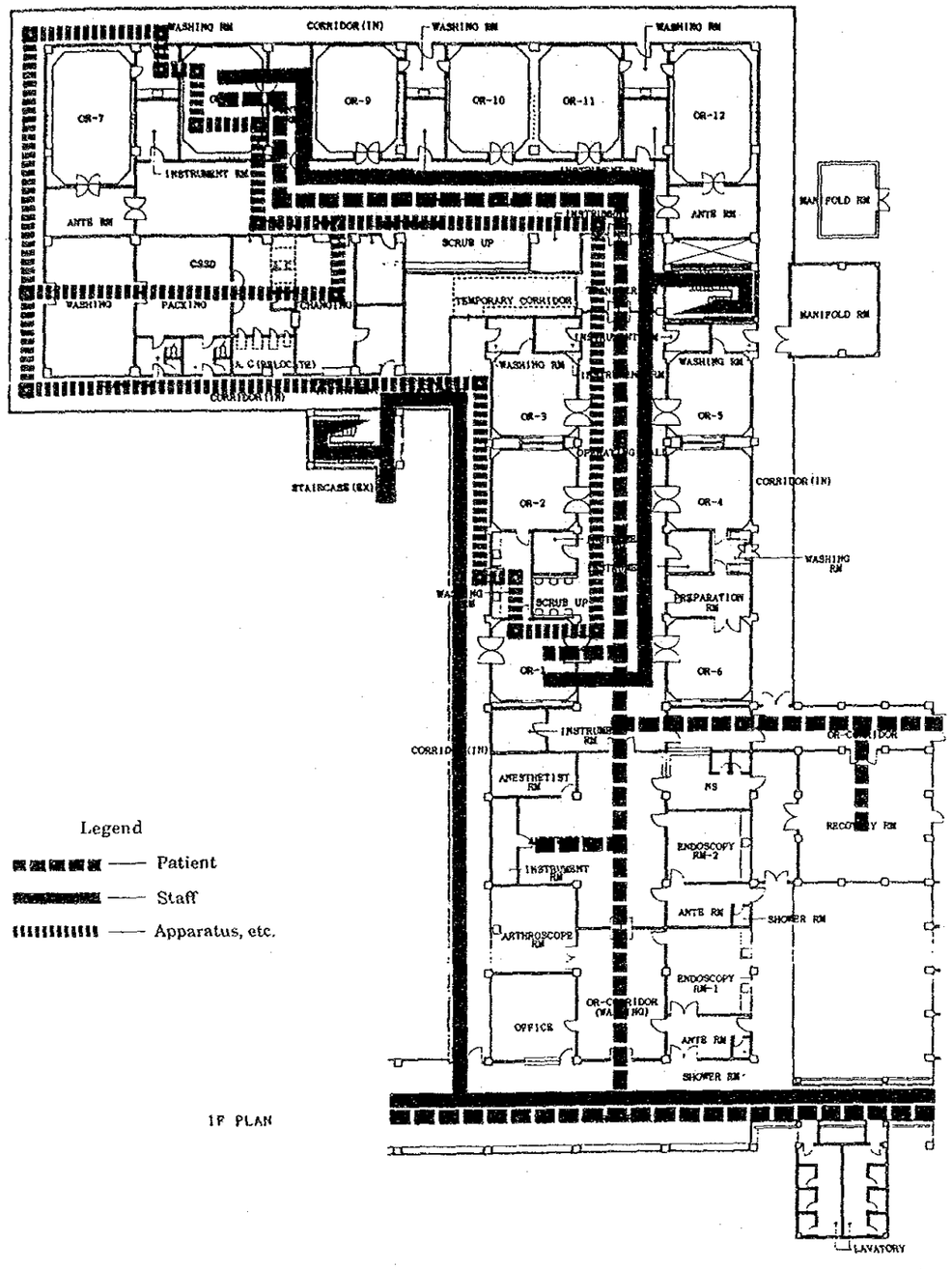
Figure 5-3-3 Zoning Plan

(2) Flow Plan

The patient flow is nearly the same as that of the existing operation theater. The patient enters the operating theater, goes through the operating hall and into an operating room. After the operation, the patient goes through the operating hall and enters the recovery room and ICU.

The basic flow of sterilized equipment is the same as that of the existing operation theater, though the location of the sterilizing room has been changed. They are supplied to operating rooms by way of the operating hall. They are returned to the sterilizing room by way of the corridor which surrounds the operating rooms.

The staff come from the dressing rooms on the 2nd floor, go down the stairs, enter the operating hall and the operating rooms.



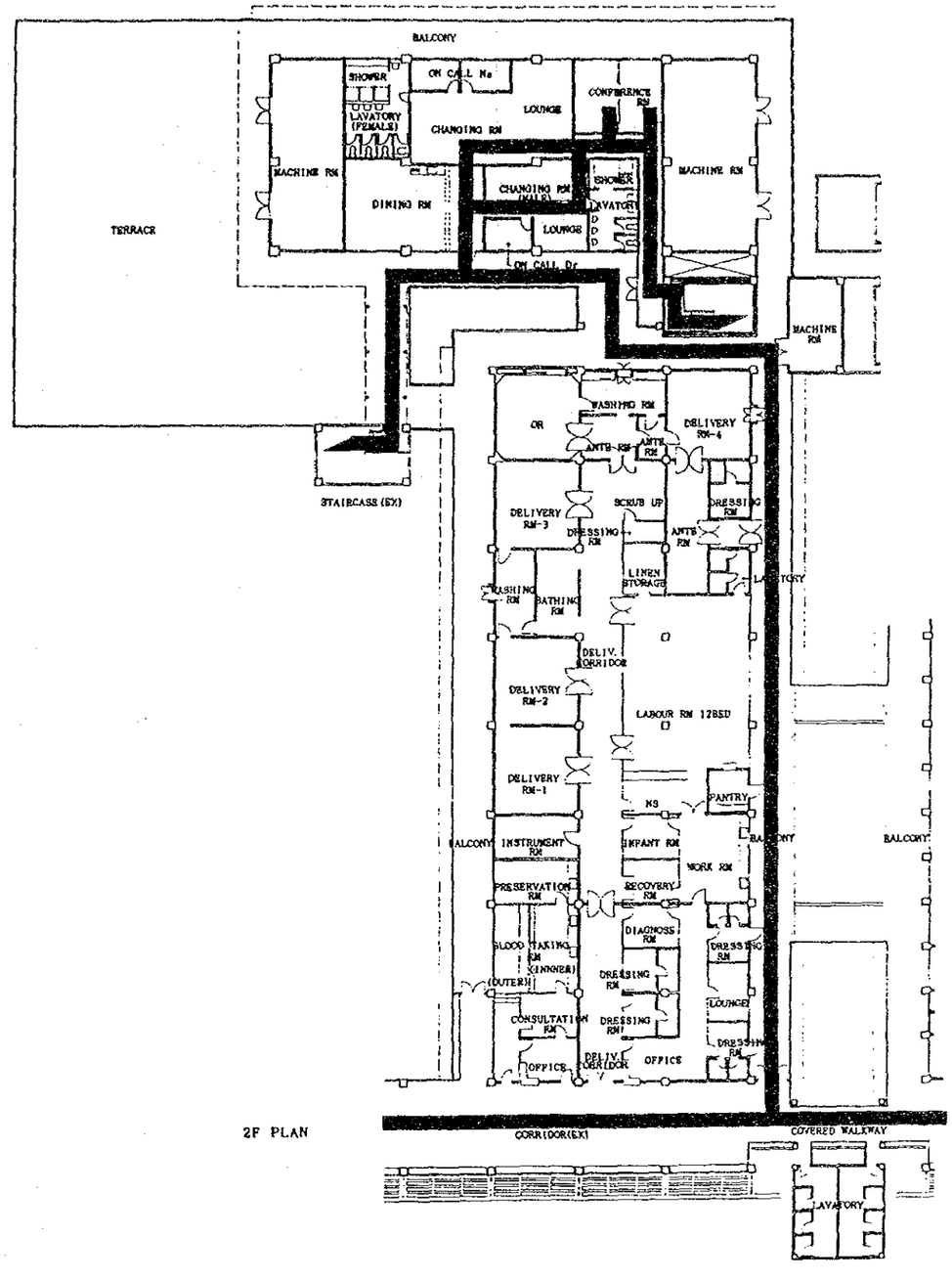
Legend

Patient

Staff

Apparatus, etc.

1F PLAN



2F PLAN

Figure 5-3-4 Flow Plan

(3) Zoning for Clean Zones in Floor Plan

The concept of cleanliness is especially important for the facilities being planned. They are classified by the degree of cleanliness in the following drawing.

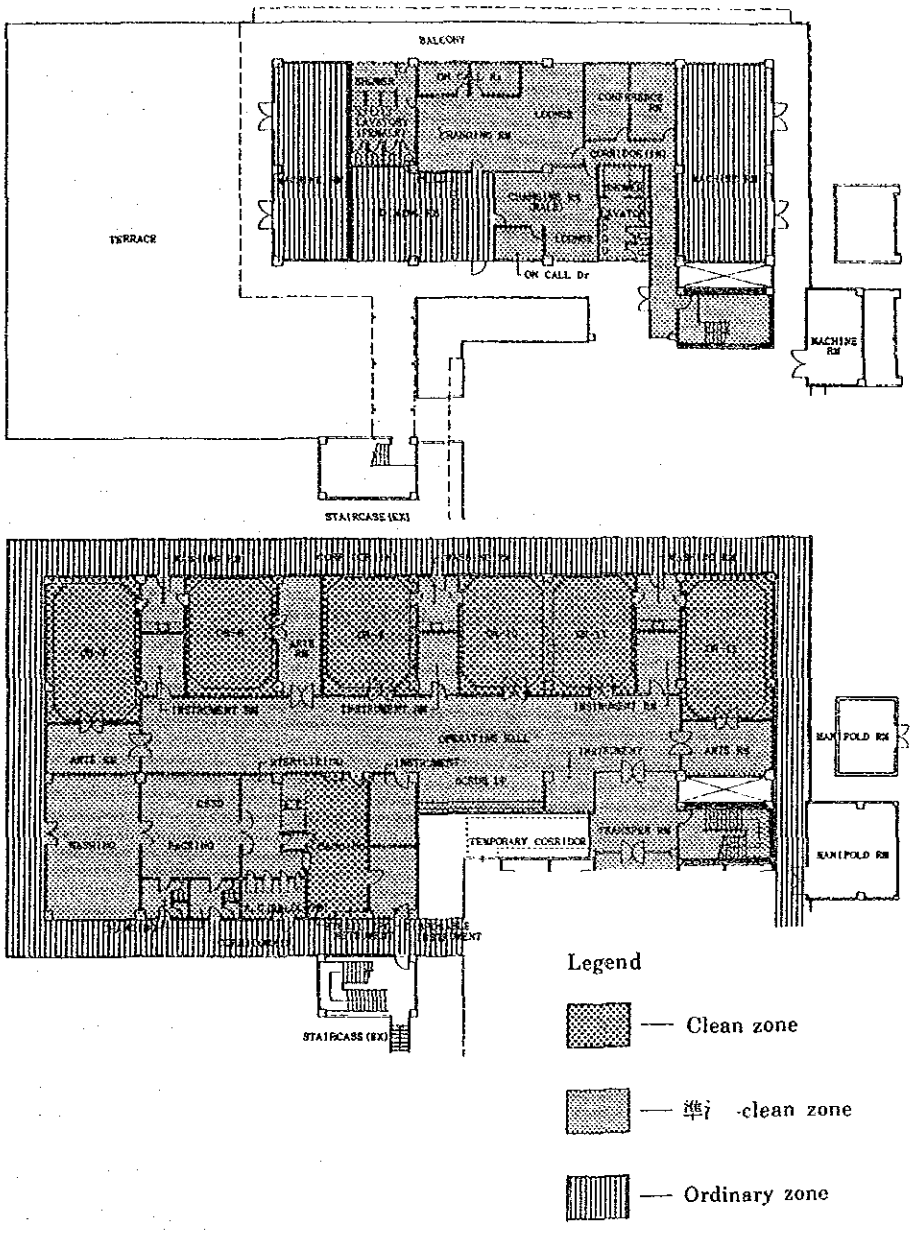


Figure 5-3-5 Zoning for Cleanliness

The floor plan of each operating room is the same as that of the existing operating rooms. However, the corridor which surrounds the existing operating rooms is an outdoor corridor, but that of the new operating rooms will be an indoor corridor. Therefore, the equipment which was used for operations can be taken out to the corridor through doors.

This can be done when hatches are used for taking out equipment to the corridor from the existing operating rooms. After this project, the Government of Thailand must remodel the surrounding corridor (outdoor corridor) to an indoor corridor so that the operating rooms may not directly face the outside. The cleanliness of the operating rooms can be improved, even though slightly, by this method.

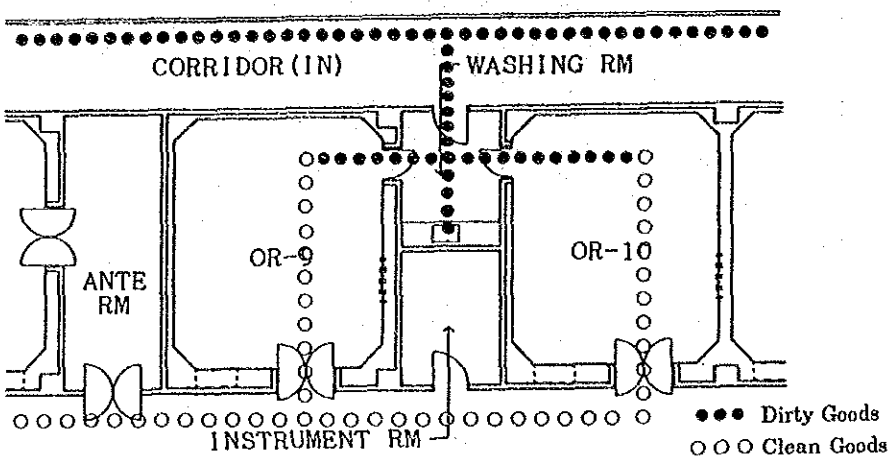


Figure 5-3-6 Flow for Clean and Dirty

The support rooms on the 2nd floor for male and female staff will be completely separated. However, the dining room will be shared by all staff.

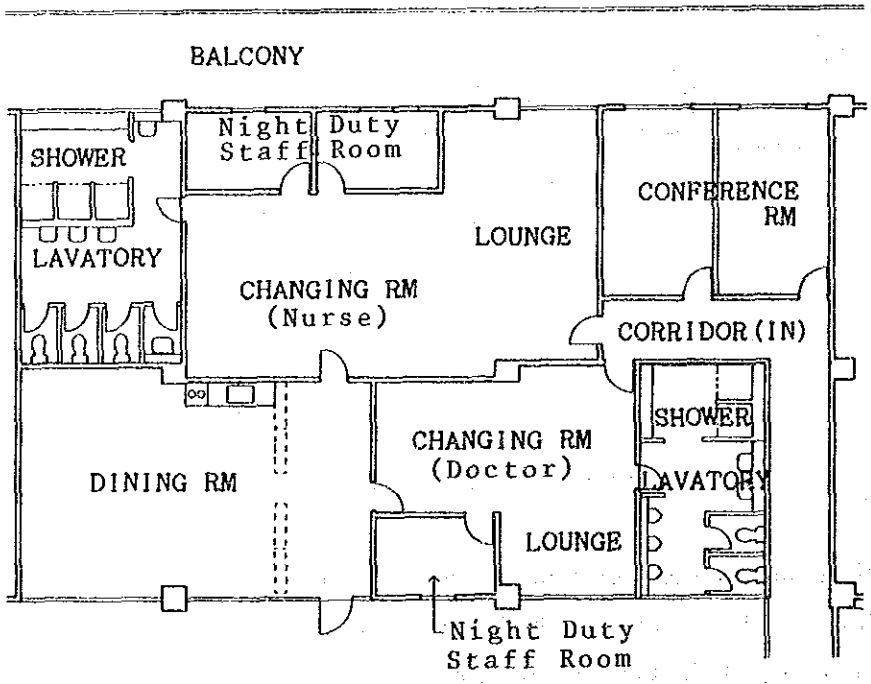


Figure 5-3-7 Layout for Support Rooms

(4) Sectional Plan

The new and the existing buildings are to have the same floor height in consideration of their smooth linkage.

It is also desirable to adopt a same roof shape (ridge, inclination) for the unification with the existing building.

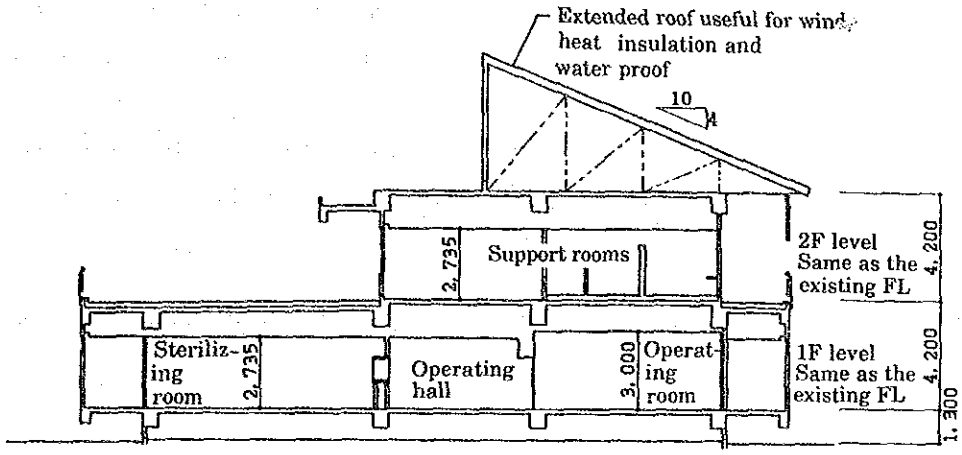


Figure 5-3-8 Sectional Plan

5-3-3 Structural Plan

(1) Structural Plan

In Thailand earthquakes cannot be ignored completely because many earthquakes occur in the west part of the Malay Peninsula. Winds are not very strong because the maximum wind speed in Nakorn Sri Thammaraj province is 28.3 m/sec. Therefore, the wind load is assumed to be 100 kg/m^2 at the eaves height below 15 m, which is stipulated in the Control of the Construction of Building Act. Reinforced concrete bearing walls can be considered for bearing horizontal forces. However, this method is not generally used in Thailand. Since this is a 2-story building, locally produced bricks or blocks will be used for both the inner and outer walls. The vertical and horizontal forces are to be born by the pure rigid frame structure consisting of columns and beams only.

In Thailand, the reinforced concrete structure has been spread considerably and this structure seems to be the best for this building. However, a steel truss structure will be adopted for the roof.

(2) Structural Design

The structure of this building is to be designed by the following policy.

1) Determine the external forces and the assume loads applied to the building on the basis of the meteorological, geographical and ground conditions of the field and the purpose of the building.
2) In principle, adopt materials of the allowable stress intensity and that comply with the related Thai standards. However, make decisions in consideration of the quality.
3) Consider the related ACI code and standards of the Architectural Institute of Japan for the stress computing of the framework and the determination of the sections.

Determine the external forces and the loads applied to the building by the following method.

1) Dead weight

Compute the dead weight of each of the materials and obtain its fixed load.

2) Live load

Determine live loads in consideration of the Bye-Laws of the Bangkok Metropolis, the Building Standards Law of Japan and ASA (American Standard Association) of U.S.A., etc. Concerning the rooms which are used for special purposes, adopt values on the basis of their actual conditions.

Table 5-3-1 Live Loads List

Usage	Load (kg/m^2)
Operating room	290
Common area	300
Office	300
Storage	500
Roof	50

3) Wind pressure

Assume 100 kg/m^2 as the wind pressure because the eave height of the building is not over 15 m.

4) Seismic force

Seismic loads are hardly considered in Thailand. However, adopt 1/5 of the seismic load which is obtained by the Building Standards Law of Japan.

(3) Design Strength of Concrete

The standard design strength of concrete is to be Fc = 210 kg/cm^2 and the allowable deviation is to be 50 kg/cm^2. Therefore, the proportioning strength is to be Fc = 240 – 260 kg/cm^2.

5-3-4 Building Facility Plan

(1) Electrical Plan

The following highlighted points shall be considered in the design to maintain cleanliness of the operation theater.

1) Installation of Automatic Voltage Regulator (AVR)

AVR is to be provided for the medical equipment which will be used for the 6 operating rooms in order to prevent the damage to equipment and the malfunction of measuring instruments due to voltage fluctuations. Centralized AVR capacity is to be introduced to cover the 6 operation rooms to consider maintenance and the use of the operating rooms instead of providing indivisual AVR unit.

2) Countermeasure for Power Failures

In order to maintain cleanliness, operating rooms are recommended not to introduce natural ventilation system during a power failure. The air-conditioning system introduced to the operating theater shall be fully backed up by the generator circuit, so that a sufficiently high level of cleanliness will be maintained even during a power failure. The generator will also serve as a back up power source for the water supply, sewage treatment facilities and medical equipment which are necessary for maintaining the operating theater.

3) Interior of Operating Rooms

- Lighting method

  In order to prevent dust adhesion to the covers of ceiling lights, grid earthing will be provided to the cover of fixture to maintain cleanliness. The ballast of a lighting fixture shall be installed separately from a lighting fixture at one place, not to be installed at the operation room.

- Walls and floors of operating rooms

  All the power supply and grounding terminals (for medical equipment) are to be placed in walls. They should be easy to maintain and inspect.

  Since the floors will be washed with water, the operating tables are controlled not electrically, but hydraulically in order to eliminate the need to install power supply floor boxes. All the metallic joints of the floor finish are to be grounded to prevent electrostatic charging.

- Isolation transformer

  Power for medical equipment in the operating rooms will be supplied through an isolation transformer in order to prevent micro shocks to patients.

The outline of the basic plan based on the above highlighted points are presented in the following table.

Table 5-3-2 Electrical System Design Description

Items	Design Description	Related with Existing Facility
Power Distribution System	– High tension of Tr shall be installed. (3 phase 4 wire 33 kV 500 kVA × 1)	– Bus-Tie interlocking to ACB shall be conducted.
	– Statics condensor to be added complete with reactor. SC: 3 phase 50 kVA × 4 SR: 3 phase 3 kVA × 4	– Under voltage relay for Generator operation shall be added. – Monitoring point for Sub-station protection shall be added.
	– Bus-Tie ACB to be added.	

Items	Design Description	Related with Existing Facility
	– Distribution panel shall be added.	– Demand controller to be added to execute transformer's mutual back-up. – Statics condensor to be added and its control device shall be added. - Sub-station space shall be re-considered.
Generator	– 500 kVA Generator shall be provided. – Syncronizing operation or load sharing device shall be introduced between existing 500 kVA and new 500 kVA Generator. Loading for Generator shall be as follows: • Medical Equipment • AC System to the Operation Room • Lighting for Operation Room •CSD Equipment • ICU Equipment • Medical Gas System • Pumps for Water • Water Treatment Plant • Sewage Treatment Plant	– Air intake and exhaust volume shall be re-considered. – Installation space shall be re-considered. – Monitoring points to protect and maintain Generator system shall be added. – Demand controller shall be introduced to assign suitable number of Generator.
Battery System	– Additional battery system shall be installed for control power source.	– Installation space shall be required.
Earthing	– Medical earthing to operating theater shall be provided.	– For new Sub-station and Generator equipment, existing earthing wire shall be extended.

Items	Design Description	Related with Existing Facility
Main Power Feeders	– Power feeders shall be fed to operating theater. – AVR (Automatic Voltage Regulator) Provided to compensate voltage fluctuation against medical equipment. – Cable ladder for new operating theater shall be provided. – Power supply to the operating room shall be protected by introducing isolation transformer to prevent micro surgery.	– Power feeder in the existing wiring duct installed shall be supplied to operating theater.
Power Distribution for Medical Equipment and AC Systems	– Motor control panel for operating theatre' AC system shall be installed. – Medical power distribution panel shall be provided at somewhere in preparation room.	– Monitoring points shall be added.
	– Power circuit for medical equipment shall be consisting of the followings: • Generator power for lighting & receptacles. • Medical AC circuit.	
	• Medical AC circuit backed-up by Generator. – ELCB (Electrical Leakage Current Circuit Breaker) shall be provided at main circuit for medical distribution panel.	

Items	Design Description	Related with Existing Facility
Control Monitoring and Alarm System	– The following monitoring points shall be announciated on new panel. • Sub-station system alarm. • Generator system alarm. • Battery distribution MCB trip. • Alarm for medical power distribution panel. • Alarm for medical GAS.	– Alarm panel shall be installed at to existing OPD.
Lighting System	– DC lighting fixture (built in type) shall be provided at operating theater. – The following specific lighting fixture shall be provided at operation room. • Fixture's structure should be enclosed tightly.	
	• Covers should be made of glass to prevent dust adhesion due to electrostatic phenomena. • Alminium or stainless steel frame shall be adopted to prevent chemical corrosion. • Conducting grid mesh shall be provided at the surface of glass cover to prevent effect of noise to medical equipment. – Operating indication lamp (DC source built-in-type) shall be installed at operating room. – Power supply to shadowless operation light shall be connected to Generator circuits. – Ballast for lighting fixtures provided at operating theater shall be installed at operating hall separately.	

Items	Design Description	Related with Existing Facility
Service Receptacles	– Power supply to the respective medical service outlets shall be connected to Generator circuits. – Service receptacle provided at operating rooms shall be dust protective type and earthing terminal shall be completed. – Identification for service receptacle shall be required to identify circuit variation.	
Public Address	– Public address speaker complete with volume controller shall be added to operating theater. – Speakers provided at operating room shall be executed dust proof treatment.	– Existing main amplifier shall be utilized for added speakers.
Master TV	– TV outlets shall be provided at respective areas	– Branch distribution shall be added to the existing head end.
Telephone	– The system shall be used for medical lecture through existing VTR system. – Telephone extension line shall be distributed from existing PBX. – Wiring work shall not be included in this scope. – Telephone terminal board shall be provided.	– Telephone line through PBX shall be conducted by Thai side.
Fire Alarm	– Alarm indication for new operating theater shall be added on the existing main alarm panel.	– Spare alarm indication shall be applied for new operating theater.
	– Local combination alarm panel shall be installed at the operating theater.	
Intercom	– Intercom system shall be introduced to the mechanical and electrical RMS.	
Nurse Call	– Nurse call system shall be introduced at the recovery room	

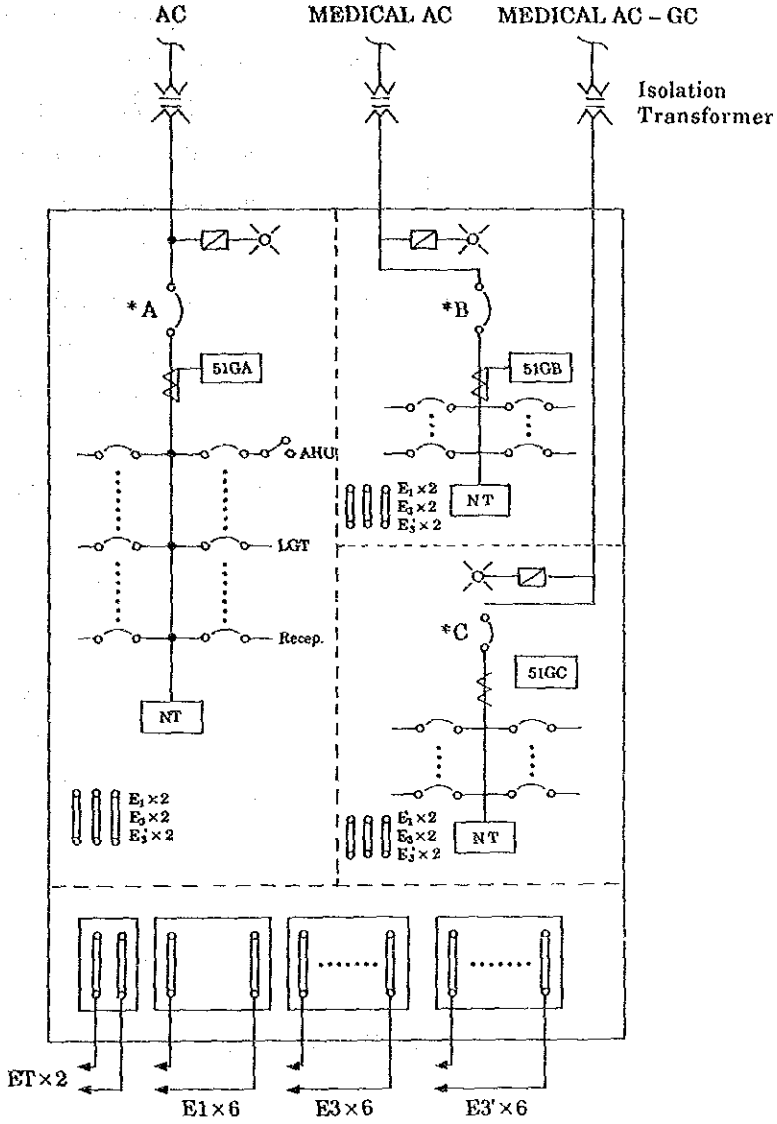


Figure 5-3-9 **Distribution Panel for Medical Equipment, Lighting & Receptancles**

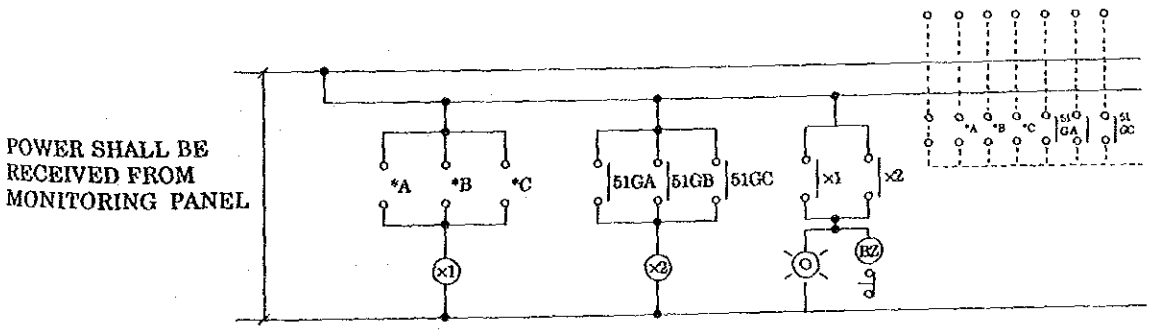


Figure 5-3-10 Distribution Panel Sequencial

Earthing Facilities for Medical Instruments

It is one of the most important items connected with power supply to protect patients from small leaked current attributable to medical instruments.

These leaked currents can be classified into the following two types in the medical field. (One of micro shock 100 × in and the other is micro shock 10 × 10 A and over.)

Leaked current is caused by a potential difference in both of the cases. Therefore, a patient's heart and the operating room itself must have equal electric potential in order to prevent these phenomena. The medical instruments and other articles made of steel plate (within 2.5 m from a patient) must be connected to the earth center terminal which is installed in each room. In addition, an insulated transformer should be installed for the current which flows from the transformer side.

Leaked current would circulate through a heart due to a earthing potential voltage differences.

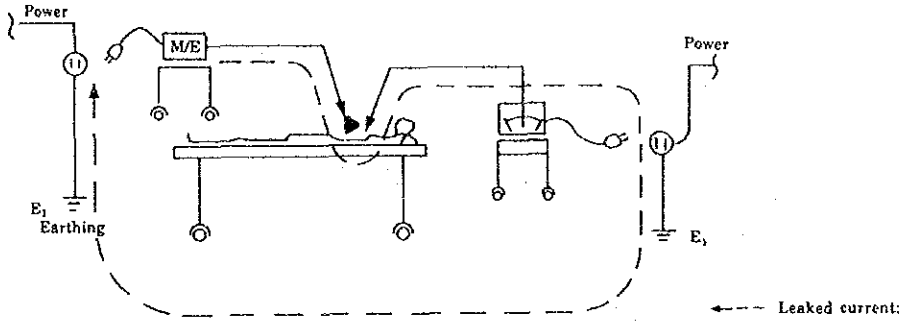


Figure 5-3-11 Micro Shock System

To prevent the above case, the following earthing system should be undertaken.

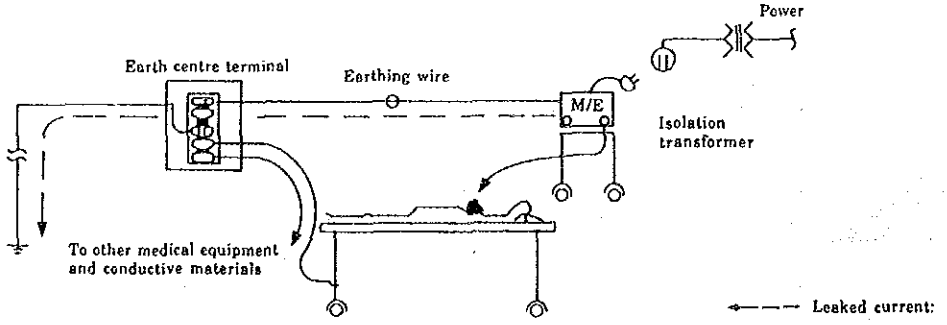


Figure 5-3-12 Proposed Earthing System

FIXTURE: FL40W × 3

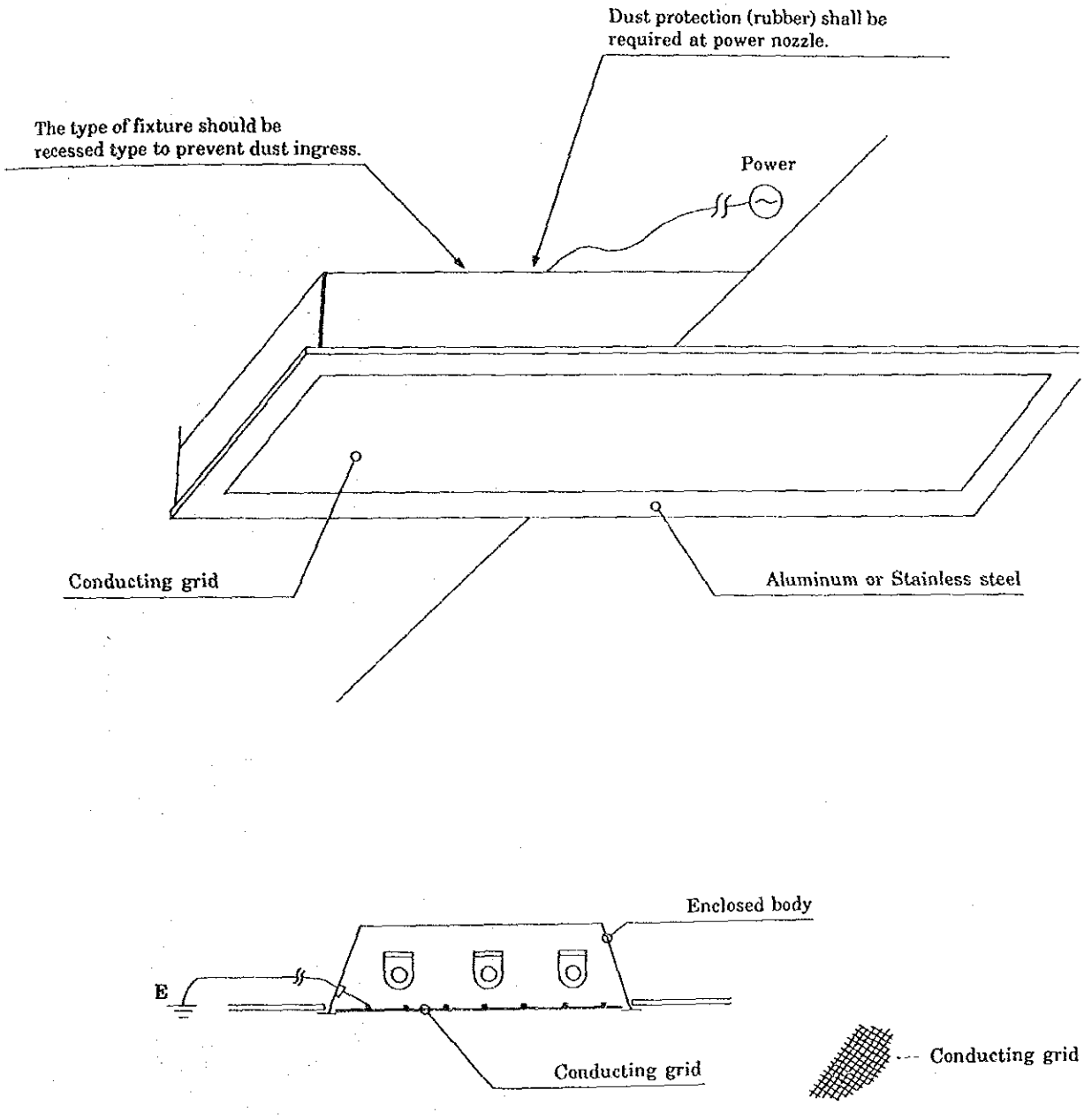
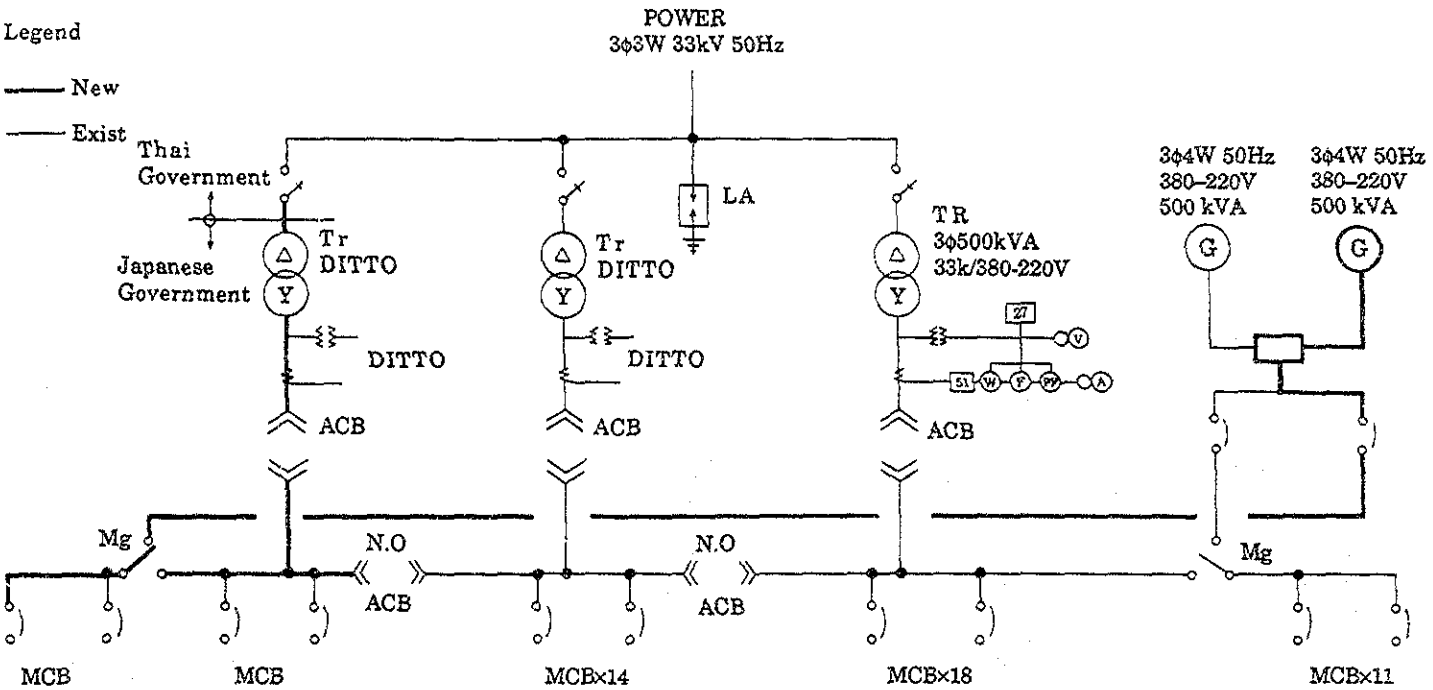


Figure 5-3-13 Lighting Fixture at Operation Theater



A. Tr Capacity

1.	Lighting & Receptacles	60 VA/m²
2.	AC	150 VA/m²
3.	Medical	30 VA/m²
	Total	240 VA/m²

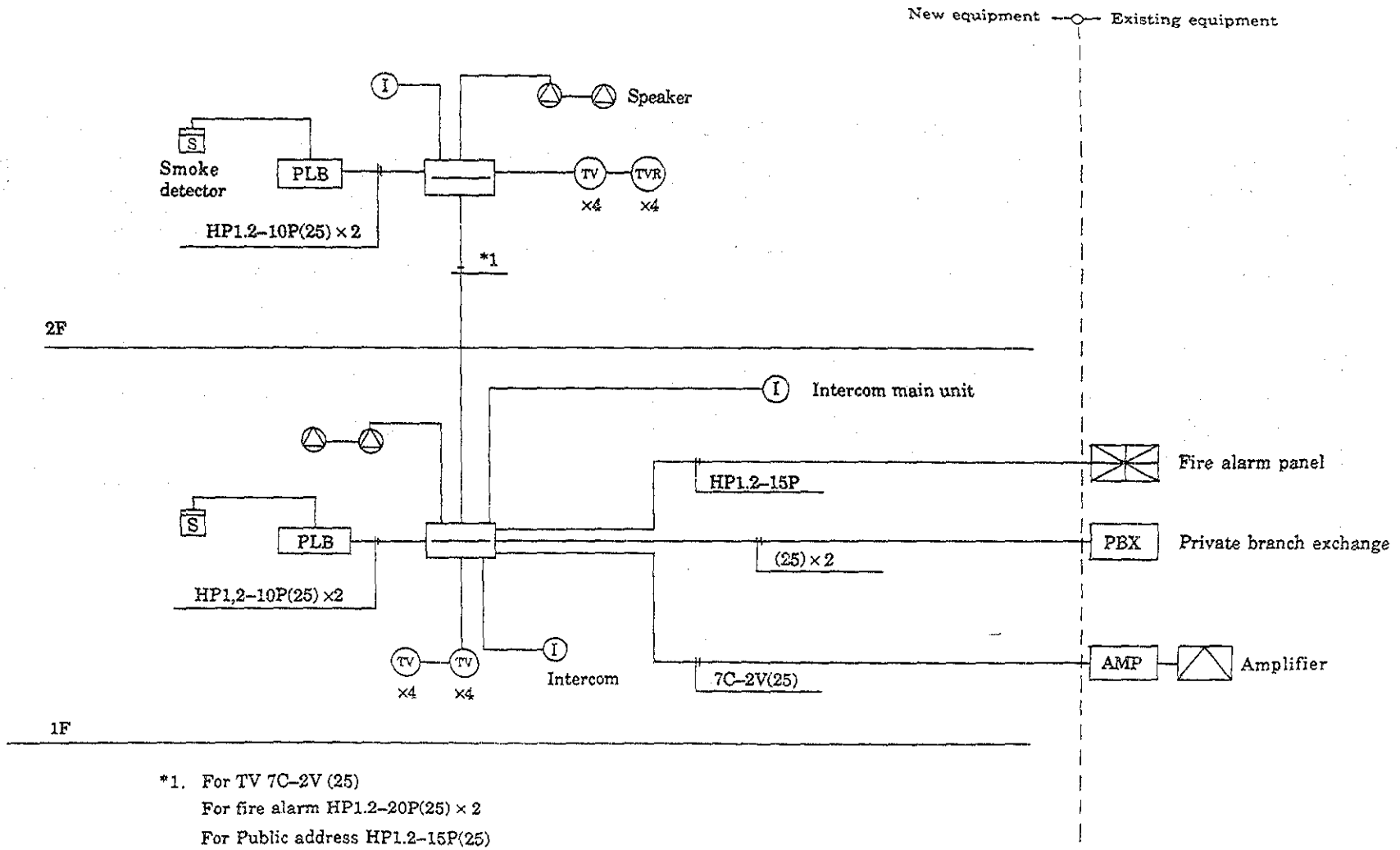
240 VA/m² ×2,000 m² = 480 kVA ⇒ 500 kVA

B. Generator Estimated Capacity

1.	Electrical & Mechanical	20 VA/m²
2.	Medical	10 VA/m²
	Total	30 VA/m²

30 VA/m² × 2,000 = 60 kVA/m² ⇒ 100 kVA/m²

Figure 5-3-14 Power Distribution System



*1. For TV 7C–2V (25)
For fire alarm HP1.2–20P(25) × 2
For Public address HP1.2–15P(25)
For Intercom AE
For Telephone
For Spare

Figure 5-3-15 TV, Fire Alarm, Public Address, Intercom, Telephone System Diagram

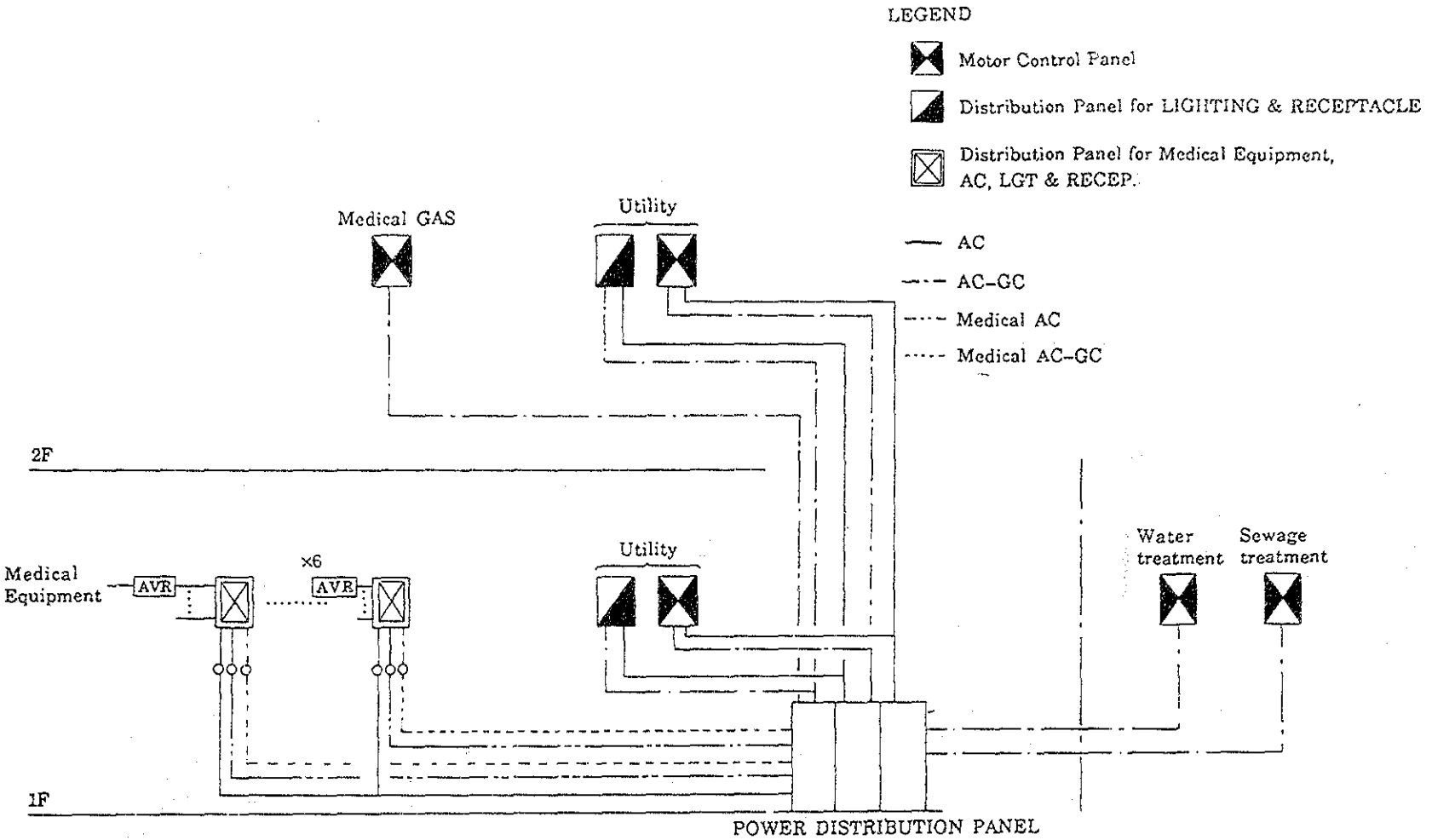


Figure 5-3-16 Main Power Feeders

(2) Mechanical Plan

1) Air-conditioning and ventilating facilities

An air-conditioning system using air-cooled packages and high-performance filters will be adopted for the operating rooms and preparation rooms in order to maintain cleanliness. Room air-conditioners and air-cooled packages will be used for the sterilizing room, the lounges, the dressing room, the dining room, etc.

2) Water supply facilities

The water supply facilities should be installed exclusively for the new operating rooms. The supply capacity should be 125 m^3/day. According to certain literature ("Collection of Materials on Construction Facilities: Medical and Welfare Facilities," The Society of Heating, Air-Conditioning and Sanitary Engineers of Japan), the main hospital section uses 37% of all the water used by the hospital. If the new operating rooms are to perform about 50% of the functions of the main section they will use about 20% of all the water used by the hospital. Since the present supply volume is around 500 m^3/day. The 625 m^3/day (=500m^3/day + 80%) will be necessary for the whole Hospital, when the new operating theater is completed. The volume used by the new operating rooms will be 125 m^3/day (=625 m^3/day × 20%). Since the water is for supply to operating rooms it should be filtered and sterilized at the processing facilities. A well is to be dug on hospital grounds by the Hospital as the water source, and well water is to be supplied to the new water supply facilities by the Hospital.

Water is to be supplied to the new operating theater from an elevated tank by the gravity method. The same method has been adopted for the existing building.

The water pipes will be planned to give the highest priority to the supply to the operating theater. A sterilizing hand washer shall be provided at the area of scrub to excuse hand sterilizing before operation.

3) Sewage treatment facilities

The system which is used for the existing buildings is to be adopted for the new extension building. Sewage is to be combined and to be discharged together in the building. A floor drainage is to be provided where water is supplied according to the Thai custom.

Since the capacity of the current treatment system is 1,000 m^3/day, it will be sufficient even after the extension. Therefore, the existing sewage treatment

system is to be used after repairing and improvement. A underground drainpipe is now running through the area where the new operating rooms will be constructed. This pipe will have to be moved elsewhere.

4) Fire extinguishing facilities

As in the existing buildings, indoor hydrants and faucets for fire fighting are to be installed where they seem necessary for self-protection.

5) Medical gas supply facilities

Oxygen is to be supplied from the existing facility. Nitrogen and nitrous oxide are to be supplied both by the cylinders needed for the new operating rooms and by branching from the existing equipment. The air-compressor, vacuum pump, and equipment for discharging nitrous oxide are to be installed for new operating rooms.

6) Others

Other facilities which also need to be improved are water supply facilities, the medical gas facility's suction pipe, which clogs, the compressed-air drier, the timer of the laundry sterilizer and washer, and the kitchen ice-maker. An agreement has been reached with the Hospital for it to carry out all works using its own budget through consultation with the Japanese side.

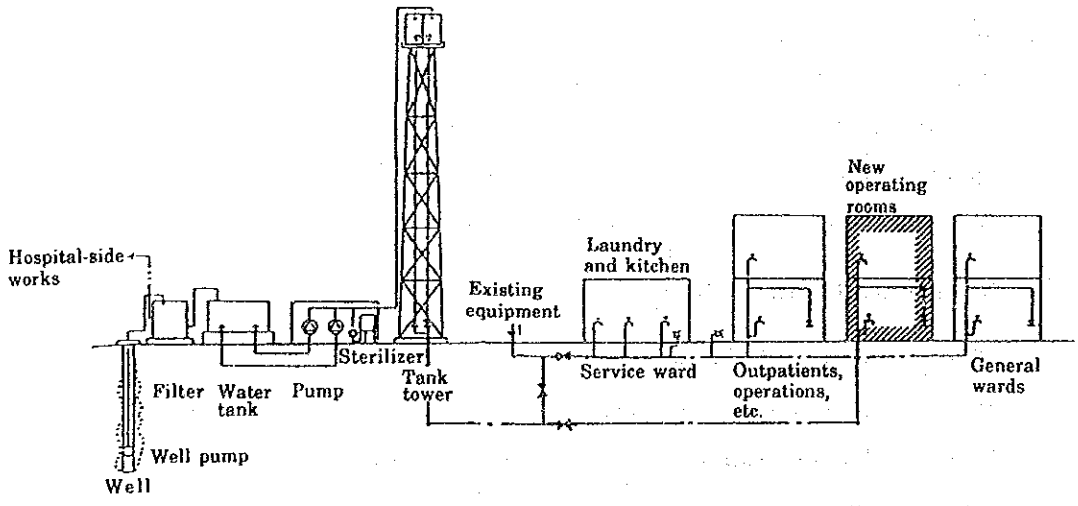


Figure 5-3-17 System of Water Supply Facilities

The existing operating rooms use the general air-conditioning system using an air-cooled package. Not much consideration was given to the purity of the air inside the rooms. In recent years however great emphasis has been placed on improving the purity of the air inside operating rooms in preventing infection. Ensuring such purity is also contributing toward improving the operation's success rate.

Therefore the new operating rooms should have the minimum grade of air-conditioning equipment prescribed by the upper view points.

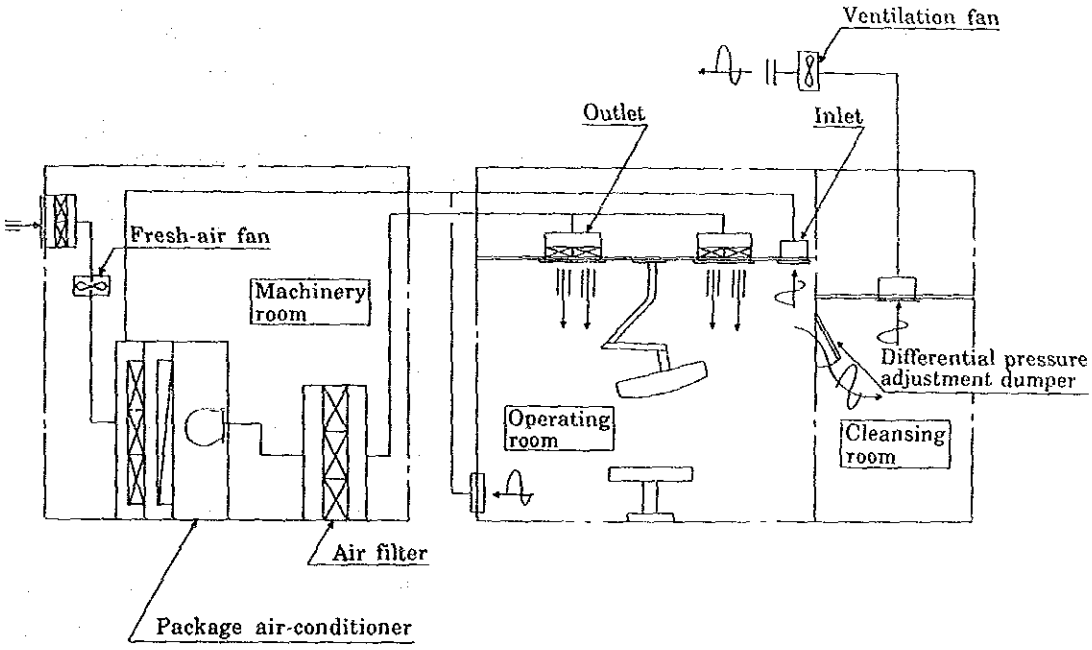


Figure 5-3-18 System of Operating Room Air-conditioner

5-3-5 Construction Material Plan

Most of the construction materials can be obtained within Thailand. They can be classified into local materials and imported materials. Since the import tax and agent expenses are added to imported materials, the cost can sometimes be saved by direct importation in case of grants.

The following materials are to be obtained in Thailand.

- Concrete stakes, reinforcing rods, concrete, molds, steel frames, concrete blocks, bricks, water proof asphalt, terazzo, tiles, roofing tiles, eave troughs, handrails, ironware, fittings (aluminum, steel, wood), glass, paint, woodwork

- Pipes, wires, wiring equipment, boards, general lighting equipment, generator, electric equipment (some communication equipment)
- Tank, tank tower, piping material, insulation materials, sanitation ceramics, fire hydrants, square ducts

The following materials are to be imported from Japan.

	Material Name	Remark
1	Finish hardware	Low quality
2	Ceilings and wall panels of operating rooms	No Thai products are available.
3	Equipment to be installed in walls (Film viewer, Pass box)	No Thai products are available.
4	Water supply and sewage treatment facilities	No Thai products are available.
5	Medical gas equipment • Hand washer of scrub	No Thai products are available.
6	Air-cooled package (include pipes) • fans	No Thai products are available.
7	Air supply-return nozzle • spiral ducts	No Thai products are available.
8	Fittings for sanitary fixture	No Thai products are available.

5-3-6 *Medical Equipment Plan*

(1) Equipment Plan for Major Room

1) General surgical operating room

Type of operation: General surgical operations

Main equipment: Operating table, operating light, anesthetic apparatus, patient monitor, endoscope, electric surgical unit, suction unit, ultrasonic apparatus, defibrillator.

The equipment installed in these rooms is the type which is necessary for operations due to rapidly increasing traffic accidents and for operations from the internal medicine department. In particular, an ultrasonic sonogram is suitable for examining deep parts of a body which cannot been seen by the naked eye as it enables a quick and accurate diagnosis. An endoscope enables the doctor to see various parts of a body by eyes and to cut a part of tissue, etc.

2) Orthopedic surgical operating room

Type of operations: Compound fracture, skin transplantation, spinal correction, orthopedic surgery.

Main equipment: Operating table, operating light, patient monitor, electro surgical unit, anesthetic apparatus, X-ray apparatus, suction unit.

Relatively complicated operations are performed in the orthopedic operating room. An operating table for orthopedics enables a patient's body position to be changed when required. It facilitates the performance of an operation even if it is in a place that is not easily accessable. An X-ray apparatus shows a patient's fractured part and the picture is displayed on a screen. Therefore, doctors are able to give adequate treatment quickly. The other equipment are important for maintaining a patient's life during an operation.

3) Neurosurgical operating room

Type of operation: Neurosurgical operation
Main equipment: Operating table, operating light, anesthetic apparatus, patient monitor, electric surgical unit, suction unit.

The operations in this room differ from those in the other rooms. Since many of them are very fine operations, an operating table, operating light and other equipment designed specially for neurosurgery are necessary.

Emergency operations for traffic accidents and various other operations (mainly general surgical operations) are performed in the existing operating rooms. However, necessary procedures cannot be performed quickly because there is a shortage of medical equipment which is necessary for quick and accurate diagnosis. Therefore by providing the requested equipment quick and accurate operations can be performed on serious patients and the medical services to local people will be greatly improved.

4) Sterilizing room

Purpose: Washing and sterilizing equipment used in operating rooms
Main equipment: Steam sterilizers, EOG sterilizers

The machines which are necessary for sterilizing equipment used for operations are installed here. They must be clean and efficient. A sterilizing room is ordinarily located next to an operating room. The equipment layout should be planned to make sure to avoid internal contamination due to the intersection of used instruments with sterilized instruments during their transportation.

5) ICU (Intensive Care Unit)

Purpose: Intensive care for serious patients
Main equipment: Ventilator, patient monitor

These equipment are essential for maintaining a patients life after an operation. A ventilator feeds an adequate amount of oxygen to those patients who are unable to

breath by themselves. Accurate patient data can be obtained by monitoring their pulses and heart condition.

(2) List of Major Medical Equipment

1) Equipment for operating theater

1. Operating tables

(Specifications for General Operating Table)

Hydraulic System

Table top dimensions	:	(W)45 cm × (L)190 cm
Height adjustment	:	75 cm to 100 cm
Lateral tilt (right & left)	:	20° maximum
Back section	:	90° up, 30° down
With X-ray cassette		

2. Operating light

(Specifications for general operations)

Lump	:	Two head type 12 pcs + 5 pcs bulbs
Fixing place	:	Ceiling, Elevetor Type
Source of light	:	Halogen bulbs

3. Anesthetic apparatus

(Specifications)

Gas	:	O_2, N_2O
Flow rate	:	O_2, 0.1 to 10*l*/m
		N_2O, 0.5 to 8*l*/m
Vaporizor	:	Harothan

4. Anesthetic ventilator

(Specifications)

Type	:	Volume present, time cycling system
Flow	:	100~1200 m*l*/min
Breating frequency	:	5 to 40 times/min

5. ECG monitor with blood pressure monitor

(Specifications)

Measuring method	:	Photo-electric plethysmogram
Measuring parameter	:	ECG, HR, RR
Measuring modes	:	Oscillometric measurement
Recorder	:	Thermal recorder

6. Defibrillator

(Specifications)

Setting energy level : 3, 5, 10, 20, 30, 50, 70, 100, 150, 300, 360 J

Monitor : 5.5 inch

Paper speed : 25 mm/second

7. Pulse oxymeter

(Specifications)

Measuring method : Pulse oxymetry

Data display : LED

8. Electric surgical unit

(Specifications)

Bipolar type

Output circuit : Floating system

Output power : Cutting 290W

Blend 120W

Coagulation 120W

9. Electric suction

(Specifications)

Vacuum range : 750 mm Hg

Bottle capacity : 3000 m*l*

10. Sterilizer

(Specifications)

Capacity : (W)660 × (H)1000 × (d)1200 mm

Control : Computer control

Display : LED

Chamber : Double wall

11. Endoscope

(Specifications for Gastrointestival Fiber Scope)

Field of view : 100°

Outer diameter : 9.8 mm

Working length : 1025 mm

12. Ultrasonic apparatus

(Specifications)

Scanning methods : Electric convex

Electric linear

Electric sector

Display modes	:	B-mode, M-mode, B/M mode, D-mode
Sweep speed	:	4 selections
Monitor	:	12 inch screen

13. Surgical TV X-ray apparatus

(Specifications)

Radiographic rating	:	40 to 100 kV
Fluoroscopic rating	:	100 kV, 20 mA
Fluoroscopic time	:	5 minutes
Resolution	:	525 lines

2) Equipment for ICU

1. Ventilator

(Specifications)

Mode	:	CMV, SIMV, CPAP
Ventilation time	:	1 to 60 LPM
Tidal volume	:	0.1 to 2.0*l*
PEEP/CPAP	:	0 to 30 cm H20

2. ECG monitor

(Specifications)

Display	:	CRT screen
Measuring method	:	Hard wire
Measuring parameters	:	ECG, HR, RR, BP, BT

3) Other equipment

1. ECG monitor

(Specifications)

Display	:	LED (151 × 70 mm)
Measuring parameters	:	ECG, BP

2. Operating light

Lamp	:	5 pcs bulbs
Bulb	:	Halogen

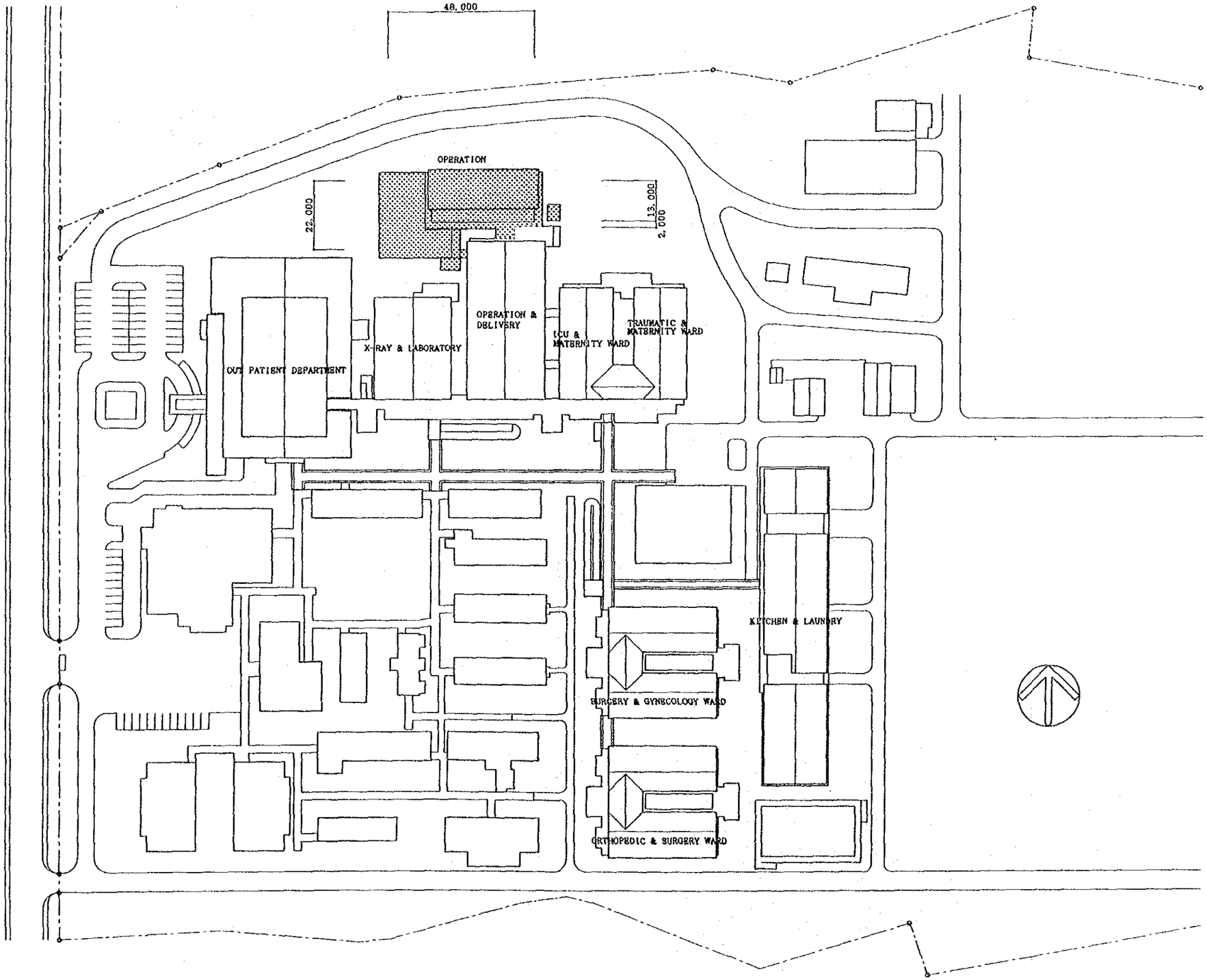
Stand type

5-3-7 Basic Design Drawings

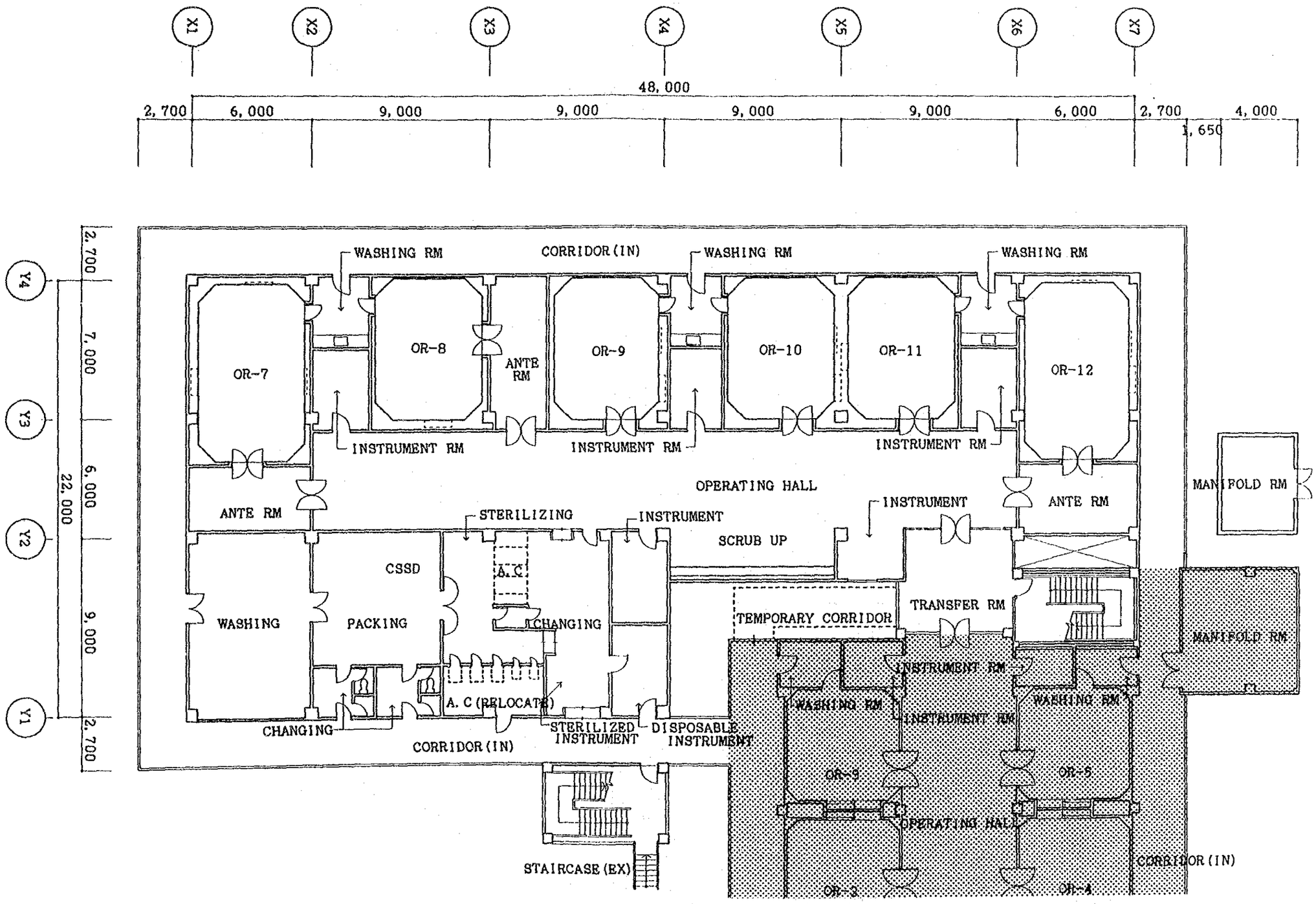
Site Plan	1/1,200
1FL Plan	1/200
2FL Plan	1/200
Roof Plan	1/200
South Elevation	1/200
North Elevation	1/200
West Elevation	1/200
East Elevation	1/200
Section	1/200

Floor Area Tabulation

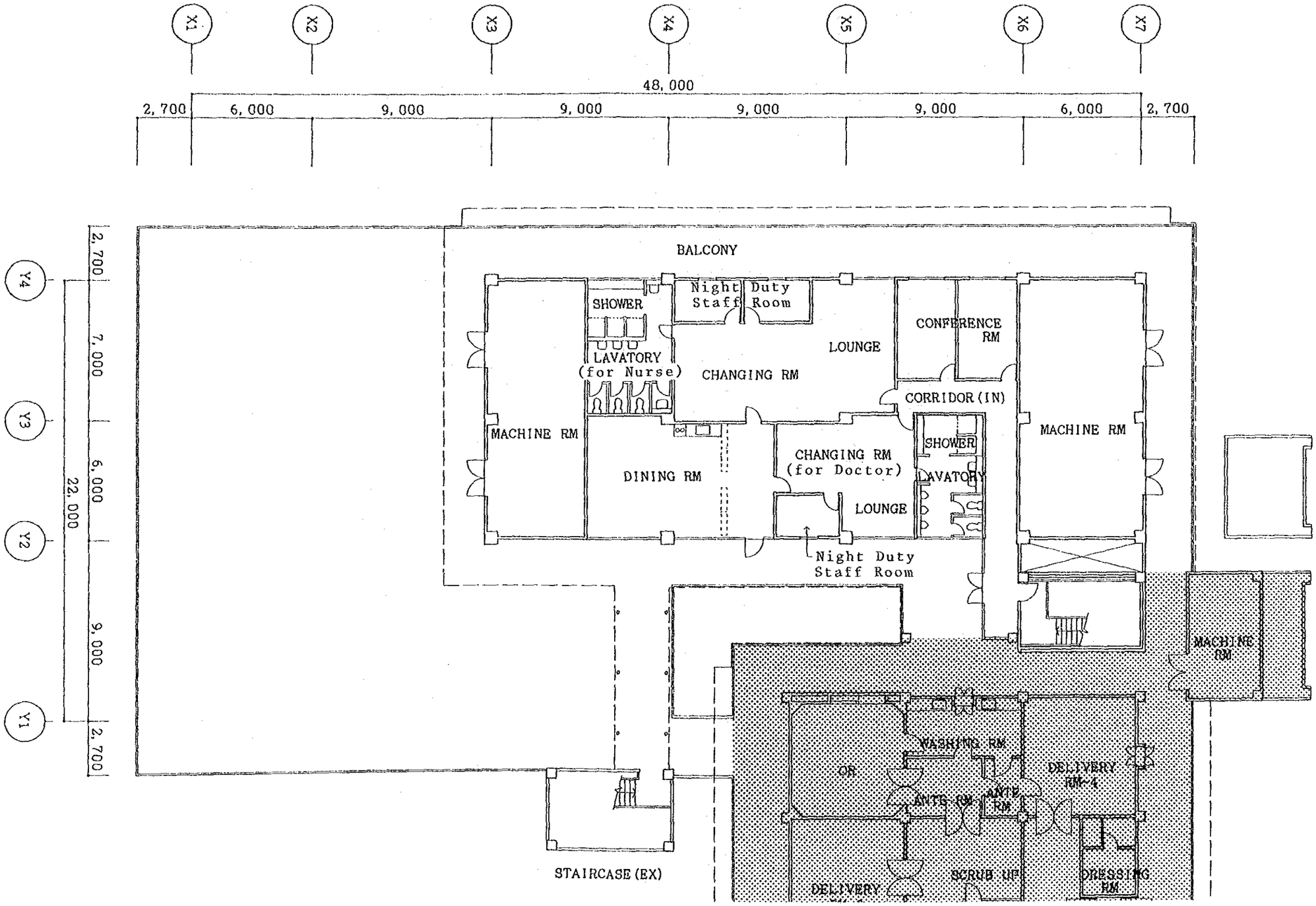
	1FL (m^2)	2FL (m^2)	Total (m^2)
Total Floor Area	1,231.92	466.64	1,698.56
Balcony, Terrace Floor Area	—	757.30	757.30



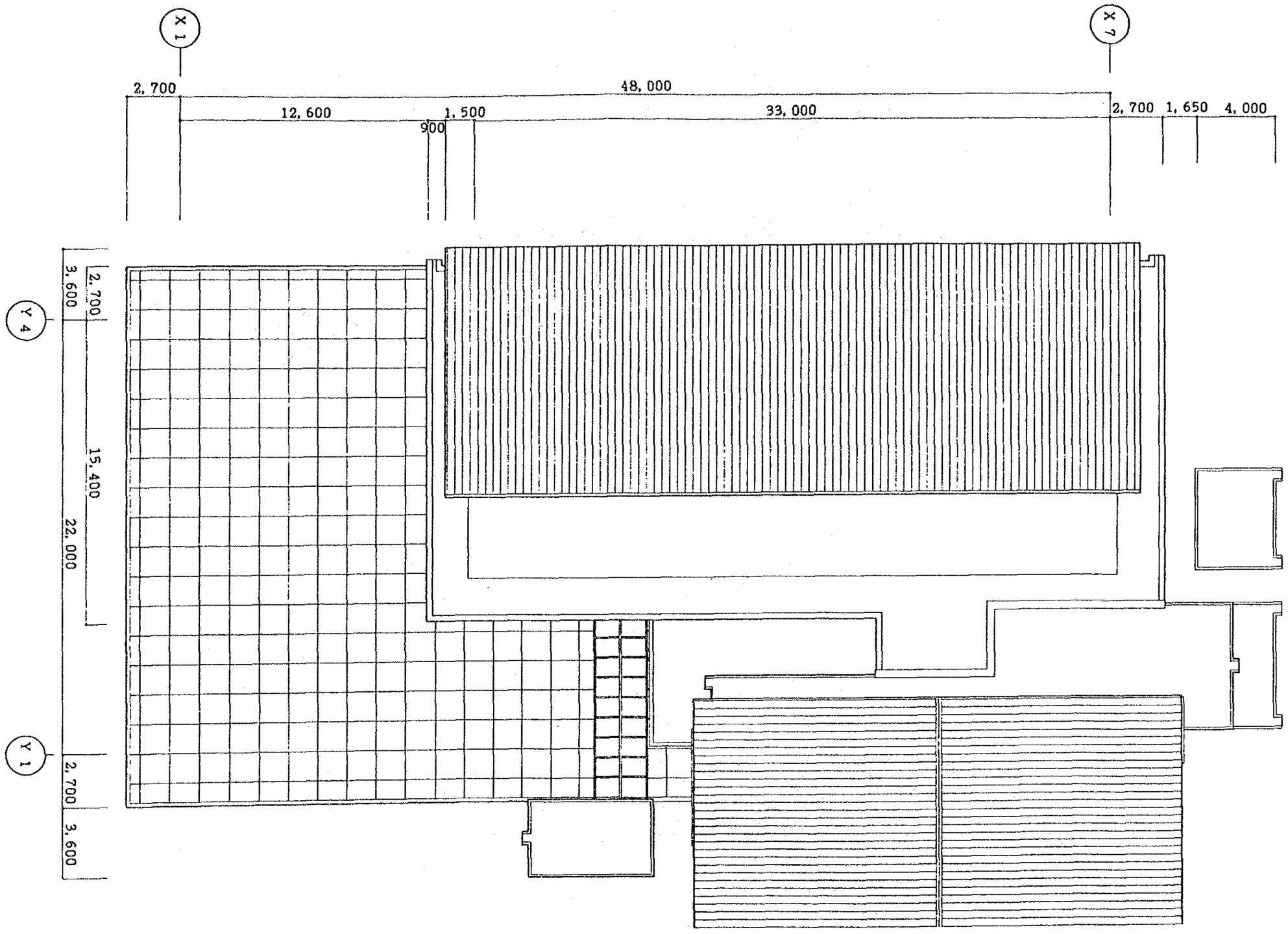
Site Plan **Scale 1/1200**



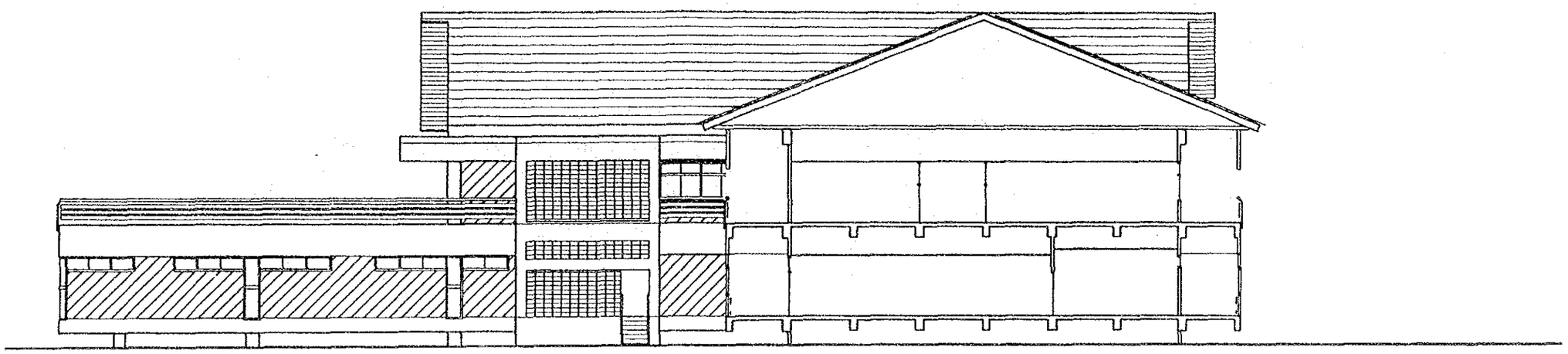
1FL Plan **Scale 1/200**



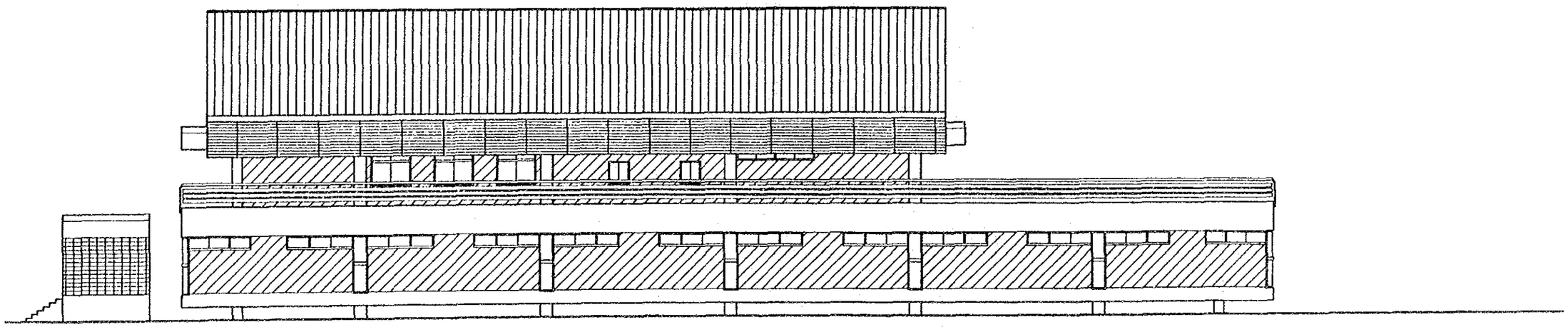
2FL Plan **Scale 1/200**



Roof Plan **Scale 1/200**

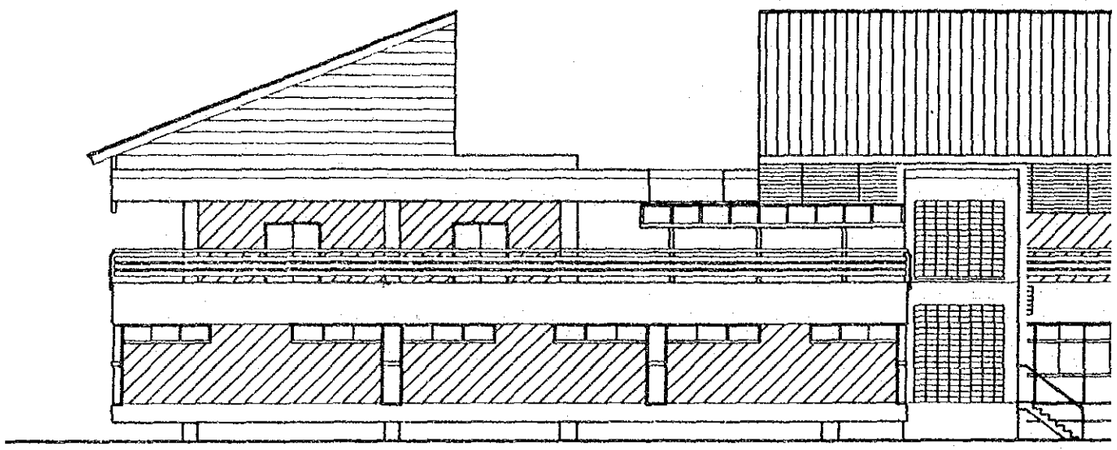


S ELEVATION

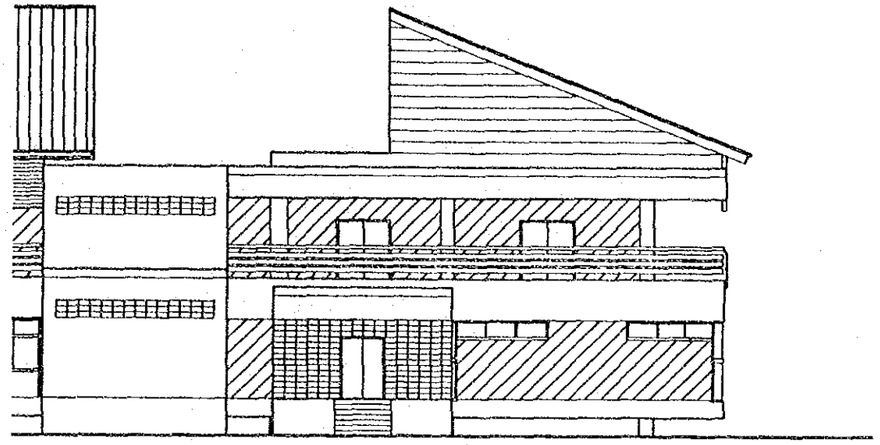


N ELEVATION

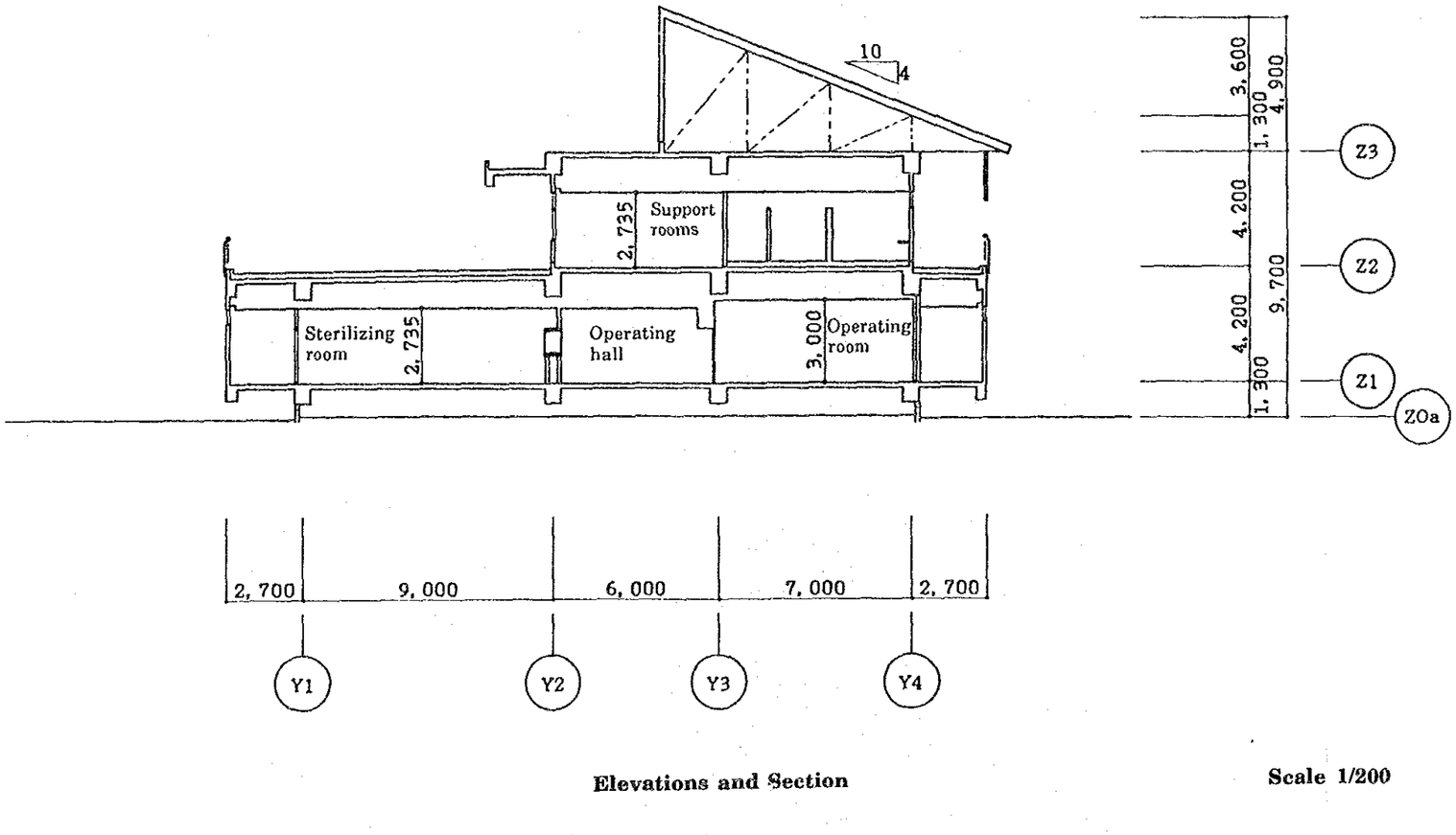
Elevations **Scale 1/200**



W ELEVATION



E ELEVATION



Elevations and Section **Scale 1/200**

5-4 Construction Plan

5-4-1 Construction Policy

The Project is executed by the Provincial Hospital Division, office of the permanent secretary, MPH, in Thailand. The facilities which are to be constructed under the Project will be operated by the Maharaj Hospital. Director of Division of Design and Construction, MPH, Director and Deputy Director of Maharaj Hospital will take care of the official contacts and communications with consultants, in addition to several contractors and others who will be assigned for the Project. Since the Project is an extension of an existing hospital, the people mentioned above represented the Government of Thailand from the beginning of the basic design study.

As soon as the Exchange of Notes takes place between both governments, the consultant, which will be a Japanese juridical person, is to conclude a consultant contract immediately with the MPH in compliance with the procedure of the Japan's Grant Aid.

The consultant is to prepare the blue prints, construction specifications and medical equipment specifications which are necessary for the Project and the documents which are necessary for contract according to the basic design report. When the consultant completes the preparation of all of these documents, Japanese contractors are to invite tenderers for the Project after obtaining an approval from the Government of Thailand.

After the successful tenderer and the Government of Thailand sign a contract, the construction work is to be started upon the verification of the contract by the Government of Japan. A Japanese juridical person is to be the general contractor. The cooperation with the local contractors is the key for the successful construction work. Therefore, the division of roles between the general contractor and subcontractors and the personnel assignments should be planned with careful consideration. The organization for the Project should be formulated to ensure smooth management. Since uninterrupted work is essential for connecting new facilities to existing facilities, skilled Japanese engineers should always be on call at the construction site.

The Japanese consultant will make preliminary discussions and coordinations with the local authorities for the Project as a consultant for MPH and Maharaj Hospital from the designing stage. The consultant will deal with quality control and process control throughout the construction work. Necessary specialists and engineers will be sent from Japan periodically in order to provide sufficient support.

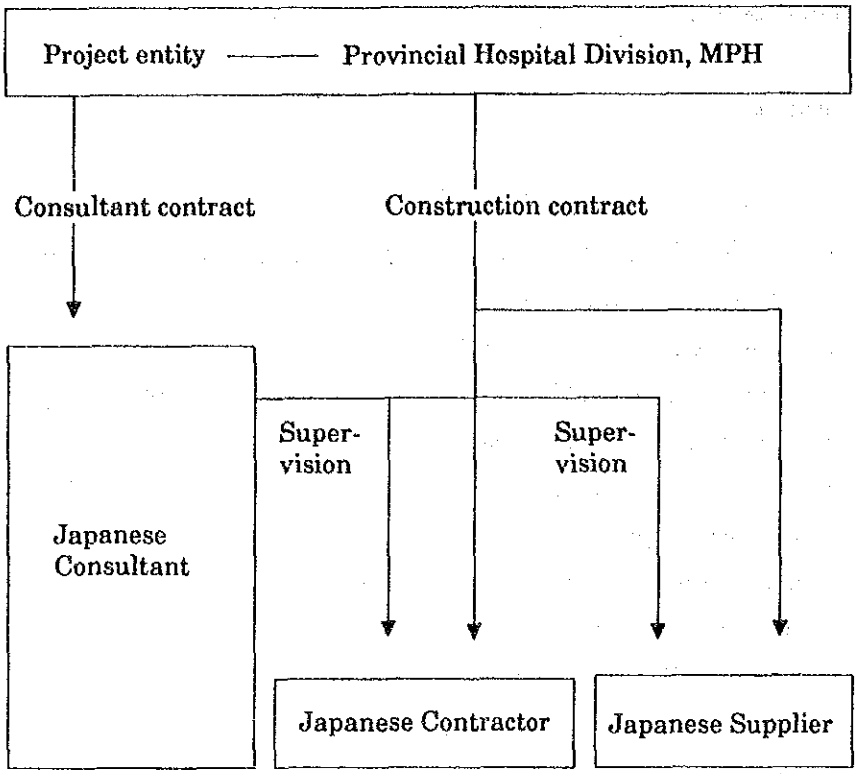


Figure 5-4-1 Organization for Project Execution

5-4-2 Situation and Remarks about Construction

Generally, different works of construction work are often ordered separately in Thailand. This makes it difficult to coordinate different works and to manage the construction processes. Since Thailand is currently in a construction boom, there is a shortage of construction materials, especially cement. This is causing a constant delay in construction work. Generally, contractors in Bangkok seem to be technologically rather behind compared with Japanese constructors. For example, they do not make a temporary construction plan. They are not highly mechanized. The quality of their work is unpredictable because they do not have a habit of making shop drawings. They regard the building equipment not as a component of a total construction work, but as a independent machine. The contractors in Nakorn Sri Thammaraj operate their enterprises by an extremely personal method. Each enterprise has about 10 to 20 management staff, but no engineer. When they receive an order, they make a necessary personnel plan and employ workers.

The construction work is to be managed by a Japanese contractor and the labor is to be supplied by local contractors. However, specialists must be sent from Japan to provide technological guidance and management for some special jobs (equipment for operating rooms, medical gas equipment, water supply and discharge facilities and other equipment installation work).

5-4-3 Construction and Supervision Plan

Periodical supervision is to be adopted in consideration of the scale of the Project. However, the works in Japan which are necessary for promoting the Project smoothly, the frequency of engineer dispatching and the period of their stay will be sufficiently studied in the supervision stage as well.

The major works in Japan at the supervision stage include periodical meetings (once a week), the examination of shop drawings, process management and witnessing inspections at factories.

5-4-4 Procurement Plan

(1) Construction Materials and Machines

In principle, materials and labor are to be obtained within Thailand. Most of the construction materials are available in Thailand. However, finished hardware and materials and equipment related to operating rooms will be obtained from Japan because

finished hardware which is available in Thailand is of low quality. Similarly, high quality materials are required for operating rooms in order to attain a high degree of cleanliness. Since the equipment and machinery which are available in Thailand are limited both in variety and quantity, those which cannot be obtained in Thailand will be acquired from Japan. Equipment and machinery will be selected in consideration of the availability of maintenance service and after-sales service in Thailand so that they can be maintained, inspected and repaired without any problem after the completion of the Project.

Regular monthly transportation service is available from Japan to Port Bangkok.

Transportation period :16 days
Transportation frequency :3 times/month

The period of transportation from the delivery to a packaging plant to the arrival at the construction site is planned to be about 50 days.

The distance of domestic transportation, from Port Bangkok to Nakorn Sri Thammaraj (construction site), is about 830 km. Railway transportation or truck transportation is available for the inland transportation. Truck transportation is to be adopted for the entire inland transportation considering reloading, etc.

(2) Medical Equipment

1) Since their functions must be constantly maintained, those which can be maintained and serviced in the field after installation are to be selected. In other words, a service organization or agency must be available in Thailand.
2) Japanese engineers will be sent for the installation and adjustment of medical equipment. However, the other work is to be carried out by Thai workers.
3) It takes 16 days for marine transportation, 5 – 10 days for customs clearance and about 10 days for inland transportation to import medical equipment from Japan.
4) The availability of spare parts and consumable supplies is to be given a high priority in the selection of medical equipment.
5) The procurement from a third country is not applicable to the Project, because all equipment can be procured in both Thailand and Japan.

5-4-5 Implementation Schedule

The construction work will be divided into the 1st phase and the 2nd phase. About 12 months are required for the construction work of the phase I and about 8 months are required for the supply and installation work for medical equipment of the phase II. If the civil engineering work, foundation and concrete work, and external work must be

carried out during the rainy seasons (from August through November) in Nakorn Sri Thammaraj, the attention may have to be paid for deciding the construction schedule. The building and necessary facilities to maintain the building will be constructed during the 1st phase. The medical equipment will be supplied and installed during 2nd phase.

The implementation schedule is given in Figure 5-4-2. The works which are carried out by the Government of Thailand should be carried out prior to or in parallel with the Project.

The Government of Thailand is in charge of the following works:

1) Before the commencement of the construction work
   - Subsoil exploration
   - Felling trees and extracting roots in the site
   - Well excavation and water quality investigation

2) During the construction work of phase I and II
   - Renovation of the existing facilities (engine room, operating rooms, ICU, recovery room)
   - To complete the connection corridor leading to the new operation theater

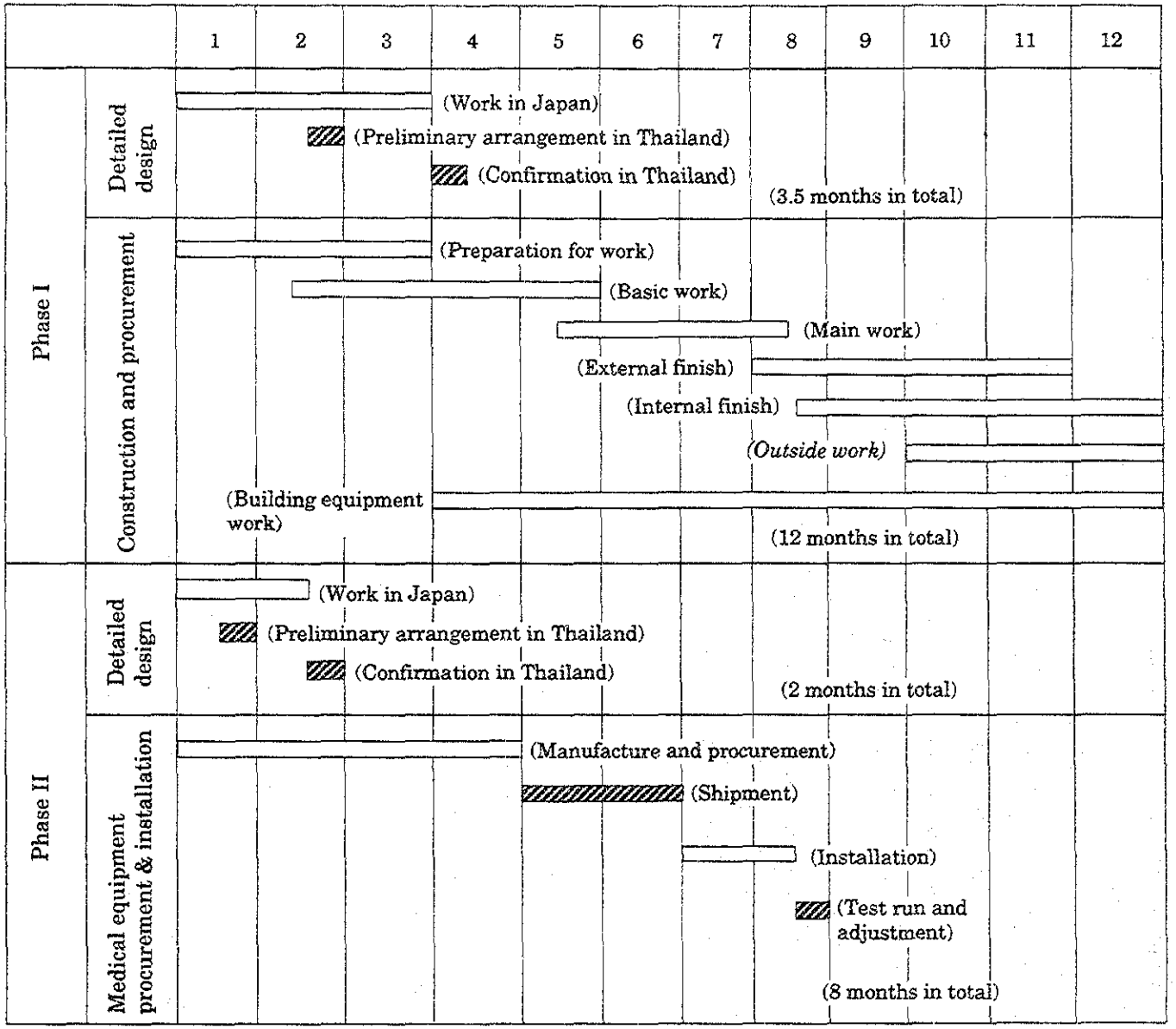


Figure 5-4-2 Implementation Schedule

5-4-6 Estimated Project Cost

The Thai share of the Project cost is estimated below based on the following estimation conditions.

(1) Thai Share of the Project Cost

- Cost of renovating existing facilities: 22,220,000 baht
- Cost of developing electric and water supply facilities: 1,700,000 baht
- Others: 150,000 baht

Total: 24,070,000 baht

(Approximately Japanese yen 130 million)

(2) Estimation Conditions

1) Time of estimation: June 1991

2) Exchange rate: 1US$ = ¥134.53
1BT = ¥5.42

3) Execution period: The work is divided into two phases. The period of detailed design and construction work is as shown in Figure 5-4-2 Implementation Schedule.

4) Others: The Project shall be implemented according to the system of the Japan's Grant Aid.

CHAPTER 6 PROJECT EFFECTIVENESS AND CONCLUSION

CHAPTER 6 PROJECT EFFECTIVENESS AND CONCLUSION

6-1 Effectiveness

Over the last few years, the rapid spread of motorized vehicles in the Southern Thailand area has caused hospitals to handle an increasing number of traffic accident related operations. Traffic accident injuries used to account for a much smaller percentage of operations at Maharaj Hospital, but with the recent increase in motor vehicles, (and subsequently traffic accidents), the Hospital is currently facing a serious situation in which there is not only a shortage of operating rooms, but the doctors, nurses, and support staff are constantly working overtime.

Upon the completion of the Project doubling the number of operating rooms, the schedule of operating performance can be restored to a normal standard. In addition, the quality of surgery can be raised through a higher level of cleanliness, due to the extended operating theater and by the increased reliability of new medical equipment. According to the Government of Thailand's medical manpower reinforcement plan, the support facilities, such as conference rooms, dinning room, changing rooms, night duty rooms, etc. will be connected directly to the Surgery Department so that the preparation work for surgery will be done smoothly and without delay. The newly extended operating theater not only raises the level of cleanliness in the washing rooms, sterilizing rooms and clean zone of surgery department, but it also allows the medical staff to spend more time on the research and study of advanced medical technology.

Since two of the new operating rooms will be utilized as special operating rooms (one for neurosurgery and the other for orthopedic surgery), they will be well equipped to accept serious injury patients from traffic accidents. Further, it will be possible to raise the qualitative technology of neurosurgical operations which are frequently required for victims of traffic accidents.

The existing operating rooms must be renovated in order to assure a linkage with the new facilities. The cleanliness of the existing facilities can be raised by linking them functionally with the new operating rooms. The new support facilities will double the efficiency of the entire surgery department. As a result, large qualitative and technological improvements in operations can be expected. The Government of Thailand is in charge of renovation of the existing facilities. In view of their previous accomplishments with the Maharaj Hospital, they have sufficient ability to handle the remodeling without Japan's Grant Aid.

It can be expected that the medical staff's plan to increase the management/operation fund after the completion of the Project will be studied fully. It can also be anticipated that the Hospital will make its own efforts to improve facilities and medical equipment as well as to manage and operate them adequately.

Table 6-1-1 Problem, Policy and Effect

Current State and Problems	Policy Plan	Effects of Plan and Degree of Improvement
The Hospital became a large hospital by Japan's Grant Aid in 1982. The Hospital has functioned as a regional hospital for the last 10 years and its facilities are fully utilized. The number of operations has doubled despite the fact that their manpower quantity is less than the standard scale of regional hospitals.	The Hospital has been operated appropriately and adequately in accordance with the original plan of 1982. With this new extension project, activities and the functions of the Surgery Department can be improved and, at the same time, the medical activities in the other sections can also be improved qualitatively by giving the minimum necessary extension.	In view of the current administration and the management of the existing facilities, the extension of the Surgery Department will also strengthen the function of the entire hospital upon the completion of the Project. The Hospital will moreover promote its role as the core hospital in the region.
The functional linkage with existing facilities is important for the extension work. The Government of Thailand is responsible for the improvement, repair and modification of existing facilities.	The Hospital has made its own funds for modifications and improvements. For example, the modification and the expansion of clinical booths, the extension of the treatment room of the dentistry department and the installation of CT scanner in the Radiology Department have been done during the last 10 years. The Project should be realized totally by making up a plan of both extension project and the remodeling of existing facilities functioning as a cohesive unit.	The Hospital has sufficient ability to implement the improvement works of existing facilities related with the Project. The scale of extension is not so large, but effectiveness in medical function and activity can be obtained on a large scale.

(Continue)

Current State and Problems	Policy of Plan	Effects of Plan and Degree of Improvement
The Hospital is so congested that it has about 1,000 out-patients a day and the occupancy rate of beds is over 100%. Moreover about 10,000 major operations (17,000 operations including minor operations) are performed in only 6 operating rooms. In addition, most hospitals in the neighborhood have not been extended. All the serious patients are sent to the Hospital and it results in such delay in processing time that some of these patents are left on a waiting list or sent to hospitals in Bangkok.	By constructing 6 new operating rooms, the frequency of operating room usage can be decreased to less than 1/2, which is the normal usage rate. The cleanliness can be raised, the overload of staff (doctors, paramedical staff, nurses) can be decreased and the quality, accuracy and the efficiency of operations can be raised by setting up the supporting facilities (sterilizing room, scrubs, dressing rooms, lounges, conference room) in the same building.	Upon the completion of 6 new operating rooms, the Hospital will be able to accept not only the traffic accidents' emergency operations, but also other many cases of serious operations as well as normal, nonemergency operations. They will provide the potential for cardiac surgery and other surgical operations requiring high technology in the future. MPH plans to increase doctors and nurses for the extension of the operating theater. The Hospital has a program to send doctors to higher level hospitals in Bangkok for training. Therefore, it can be expected that medical techniques and service levels will be raised in the Hospital because of expansion and improvement of the operating facilities.

6-2 Conclusion

Due to its physical location and capabilities, Maharaj Hospital is currently one of the leading Regional Hospitals in Southern Thailand. When the extension project of the operating theater is completed, the Maharaj Hospital will not only be able to take care of more emergency traffic accidents patients; but it will also become able to treat major surgery patients whom other hospitals in the region cannot.

The implementation of the Project will not only solve the problem of the current operating congestion, but it will also raise the quality of operations and medical services. Additionally, these improvements will cause the surgery department to become a major force in the medical activities of the Hospital. Finally Maharaj Hospital will make a large contribution to the medical services and the welfare of the region.

Therefore, it is considered as reasonable to implement the Project by Japan's Grant Aid.

6-3 Recommendation

The Project is expected to bring about large changes as explained above. It will contribute to the quality of medical services for the residents in a wide area. Therefore, it can be judged that the Project has great significance.

The Government of Thailand is in charge of the renovation work of existing operating rooms and related facilities. However, this work is to be done in conjunction with the Project. The renovation work should be planned and carried out along with the progress of the Project without delay, and should be finished as soon as possible after the completion of the Extension Project.

The facility maintenance/management and the reinforcement of personnel related to the Project must be planned and carried out adequately without delay. For this purpose, systematic staff assignment must be made for the maintenance and management of the new facilities and equipment. Effective contracts for machinery and equipment maintenance must be concluded with specialized agents. The new facilities and equipment must be operated smoothly through this method.

The medical equipment which will be provided under the Project must be maintained steadily and be always ready for effective utilization.

1) Consumable supplies and spare parts

A stable supply of consumable supplies and spare parts is essential in order to maintain the medical equipment in good condition.
Generally, technological innovation is taking place rapidly in the medical equipment industry. Today's latest technological equipment will be replaced by new equipment in several years.
This makes it difficult to obtain spare parts for old models.
Therefore, it is absolutely recommended that the manufacturers of the equipment which will be selected for the Project should be able to supply spare parts under the condition of the contract inspite of simple model change.

2) Periodical service calls

When the suppliers of medical equipment are selected, it should be requested that the suppliers submit an organization table (specialist staff for equipment) for service calls to the Hospital. It should be considered that the possibility of service calls is one of the conditions for the selection.

In principle, service calls are to be made when it is requested by the Hospital. It is desirable for the Hospital to plan both the diagnosis and the acquisition of necessary spare parts at the time of the service call.

APPENDIX

1. Member List of Survey Team
2. Survey Schedule
3. List of People Interviewed
4. Minutes of Discussions
5. List of Hospitals Observed
6. List of Materials Collected
7. Data for Soil Test

1. Member List of Survey Team

(List of Basic Design Study Team)

Name	Organization
Dr. Akira Suto (Team Leader)	Anesthesia Department of International Cooperation National Medical Center Hospital
Mr. Katsuji Onoda (Project Coordinator)	Deputy Director General Affairs Division Kyushu International Center Japan International Cooperation Agency
Mr. Kazuo Nagata (Architectural Planning)	Nihon Sekkei, Inc.
Mr. Hitoshi Ito (Architectural Designing)	Nihon Sekkei, Inc.
Mr. Shigeo Nagase (Electrical Engineering)	Nihon Sekkei, Inc.
Mr. Ichiro Kasai (Mechanical Engineering)	Nihon Sekkei, Inc.
Mr. Noriyuki Suzuki (Medical Equipment Engineering)	Nihon Sekkei, Inc.

(List of Draft Report Explanation Team)

Name	Organization
Dr. Akira Suto (Team Leader)	Anesthesia Department of International Cooperation National Medical Center Hospital
Mr. Katsuji Onoda (Project Coordinator)	Deputy Director General Affairs Division Kyushu International Center Japan International Cooperation Agency
Mr. Kazuo Nagata (Architectural Planning)	Nihon Sekkei, Inc.
Mr. Noriyuki Suzuki (Medical Equipment Engineering)	Nihon Sekkei, Inc.

2. Survey Schedule

(Schedule for Basic Design Study Team)

1991

April 8 (Mon.)	• Arrived at Bangkok. • Arranged the schedule.
April 9 (Tue.)	• Made a courtesy call to the Japanese Embassy and JICA. • Made discussion at MPH.
April 10 (Wed.)	• Made a survey of Rajaviti Hospital. • Moved to Nakorn Sri Thammaraj. • Made a courtesy call to Maharaj Hospital.
April 11 (Thu.)	• Held the first preliminary meeting with Maharaj Hospital. Presented an Inception Report and explained the content and the schedule of the survey. Asked to prepare information and documents according to the questionnaire. • Inspected and investigated the hospital ground (piping location, ground boundary, etc.)
April 12 (Fri.)	• Made a survey of Surat-Thani Hospital. • Surveyed the inside of Maharaj Hospital.
April 13 (Sat.)	• Held a team meeting and studied the items of hearings. • Mr. Nagata moved to Bangkok.
April 14 (Sun.)	• Held a team meeting and analized the collected information and documents. • Dr. Suto and Mr. Onoda arrived at Bangkok.
April 15 (Mon.)	• Dr. Suto and Mr. Onoda made a courtesy call to the Japanese Embassy and JICA. • Mr. Nagase made a survey of Songkhla Hospital. Surveyed the medical facilities. Surveyed the medical equipment.
April 16 (Tue.)	• Dr. Suto and Mr. Onoda made a courtesy call to MPH, and DTEC. Made discussion. • Surveyed Ramativoti Hospital. • Held the second preliminary meeting with Maharaj Hospital. Studied the facility planning. • Inspected the inside of Maharaj Hospital. • Inspected the existing medical equipment.
April 17 (Wed.)	• Discussed the facility planning. • Inspected the inside of Maharaj Hospital.

	• Dr. Suto and Mr Onoda made a survey of Paya Thai Hospital and arrived at Nakorn Sri Thammaraj. • Made a courtesy call to Maharaj Hospital. • Mr. Kasai arrived at Bangkok. • Mr. Nagase moved to Bangkok.
April 18 (Thu.)	• Inspected the inside of Maharaj Hospital. • Made the third preliminary meeting with Maharaj Hospital and reported the outline of the survey. • Mr. Kasai arrived at Nakorn Sri Thammaraj.
April 19 (Fri.)	• Made a survey of Songkhla Hospital, Hat Yai Regional Hospital and Hat Yai University Hospital. • Discussed the facility planning. • Analized the collected information of medical equipment. • Made a hearing survey on machines and equipment. • Made a survey of the situation of building materials.
April 20 (Sat.)	• Held the fourth preliminary meeting with Maharaj Hospital and reported the present investigation. • Prepared the Minutes of Discussions (draft).
April 21 (Sun.)	• Moved to Bangkok.
April 22 (Mon.)	• Made a preliminary meeting at MPH, reported the present investigation, discussed the Minutes of Discussion and confirmed the requested information and documents.
April 23 (Tue.)	• Made a preliminary meeting at MPH. • Investigated the situation of construction field. • Collected information and documents.
April 24 (Wed.)	• Signed and exchanged the Minutes of Discussion.
April 25 (Thu.)	• Dr. Suto and Mr. Onoda returned to Japan. • Investigated the situation of construction field. • Investigated the situation of building equipment. • Investigated the situation of medical equipment.
April 26 (Fri.)	• Made an survey of construction site of a public hospital (Samut Sakorn Hospital).
April 27 (Sat.)	• Analized the information and documents.
April 28 (Sun.)	• Held a team meeting.
April 29 (Mon.)	• Reported to JICA. • Visited DTEC.
April 30 (Tue.)	• Messers Nagata, Suzuki and Ito returned to Japan.

(Schedule of Draft Report Explanation Team)

1991

Sept. 2 (Mon.)	• Arrived at Bangkok. • Arranged the schedule
Sept. 3 (Tue.)	• Made a courtesy call to the Japanese Embassy and JICA. • Made a courtesy call to the UPH and the DTEC.
Sept. 4 (Wed.)	• Made explanation and confirmation of the Report in general.
Sept. 5 (Thu.)	• Made explanation and confirmation of the mechanical equipment in detail in the Report at MPH.
Sept. 6 (Fri.)	• Made explanation and confirmation of the architectural planning in detail in the Report at MPH. • Prepared the Minutes (draft) of Discussion.
Sept. 7 (Sat.)	• Team meeting.
Sept 8 (Sun.)	• Team meeting.
Sept. 9 (Mon.)	• Made discussion at MPH. • Signed and exchanged the Minutes of Discussion.
Sept. 10 (Tue.)	• Reported to JICA.
Sept. 11 (Wed.)	• Returned to Japan.

3. List of People Interviewed

(1) Persons connected with MPH

Dr. Uthai Sudsukh	Permanent Secretary
Dr. Pramukh Chandavimol	Deputy Permanent Secretary
Dr. Prasert Krajangwongse	Director, Provincial Hospital Division
Ms. Pisamai Chandavimol	Director, International Health Division
Dr. Sathaporn Wongjarern	Head of Sub-Division
Ms. Udomsiri Parnrat	General Administration

<Design & Const Division>

Mr. Kriang Ekksuwan	Division Director
Mr. Paitoon Turanuparp	Architect
Mr. Santi Chayasombat	Architect
Mr. Sittipon Dhanuggamin	Architect

(2) Persons connected with Maharaj Hospital

Dr. Sanan Prasertsilpa	Director
Dr. Kamol Veerapradist	Deputy Director
Dr. Pravich Tanyasittisuntorn	Doctor
Dr. Prachayaran Petchnay	Doctor

(3) Songkla Hospital

Dr. Uraphong Veskijkul	Director

(4) Surattani Hospital

Dr. Weena Kwaowangkul	Deputy Director

(5) Japanese Embassy

Toshiaki Nagato	Second Secretary

(6) Japan International Cooperation Agency

Shinji Abe	Manager of Thai Office
Hideo Miyamoto	Member

(7) DTEC

Tomikazu Inagaki	Technical Cooperation Coordinator, Department of Technical and Economic Cooperation, Thailand

4. Minutes of Discussions

(For Basic Design Study)

MINUTES OF DISCUSSIONS

BASIC DESIGN STUDY ON THE PROJECT FOR

THE EXTENSION OF THE MAHARAJ NAKORN SRI THAMMARAJ HOSPITAL

IN THE KINGDOM OF THAILAND

In response to a request from the Government of the Kingdom of Thailand, the Government of Japan decided to conduct a Basic Design Study on the Project for the Extension of the Maharaj Nakorn Sri Thammaraj Hospital (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Thailand a study team, which is headed by Dr. Akira Suto, Anesthesia, Department of International Cooperation, National Medical Center Hospital, and is scheduled to stay in the country from April 8 to 30, 1991.

The team held discussions with the officials concerned of the Government of Thailand and conducted a field survey at the study area.

In the course of discussions and field survey, both sides have confirmed the main items described on the attached sheets. The team will proceed to further works and prepare the Basic Design Study Report.

Bangkok, April 24, 1991

A. Suto

Dr. Akira Suto
Leader
Basic Design Study Team
JICA

U. Sudsukh

Dr. Uthai Sudsukh
Permanent Secretary
Ministry of Public Health
The Government of
the Kingdom of Thailand

ATTACHMENT

1. Objective

The Objective of the Project is to improve regional health services in the southern region by extending the operation theatre and other facilities of the Maharaj Nakorn Sri Thammaraj Hospital (hereinafter referred to as "the Hospital").

2. Project Site

The Maharaj Nakorn Sri Thammaraj Hospital in Nakorn Sri Thammaraj to be attached with Annex Ⅰ.

3. Executing agency

Ministry of Public Health, Thailand is responsible for the administration and execution of the Project.

4. Items requested by the Government of Thailand

After discussions with the Basic Design Study Team, the following items were finally requested by the Thai side.

1) Construction of two-story building for six operating rooms and supporting facilities which are described in Annex Ⅱ.

2) Provision of medical equipment related to the Project which are described in Annex Ⅱ.

However, the final components of the Project may differ from the above items, if it is judged necessary after further study.

5. Japan's Grant Aid System

1) Thai side has understood the system of Japan's Grant Aid explained by the team.

2) Thai side will take necessary measures, described in Annex Ⅲ for smooth implementation of the Project, on the condition that the Grant Aid Assistance by the Government of Japan is extended to the Project.

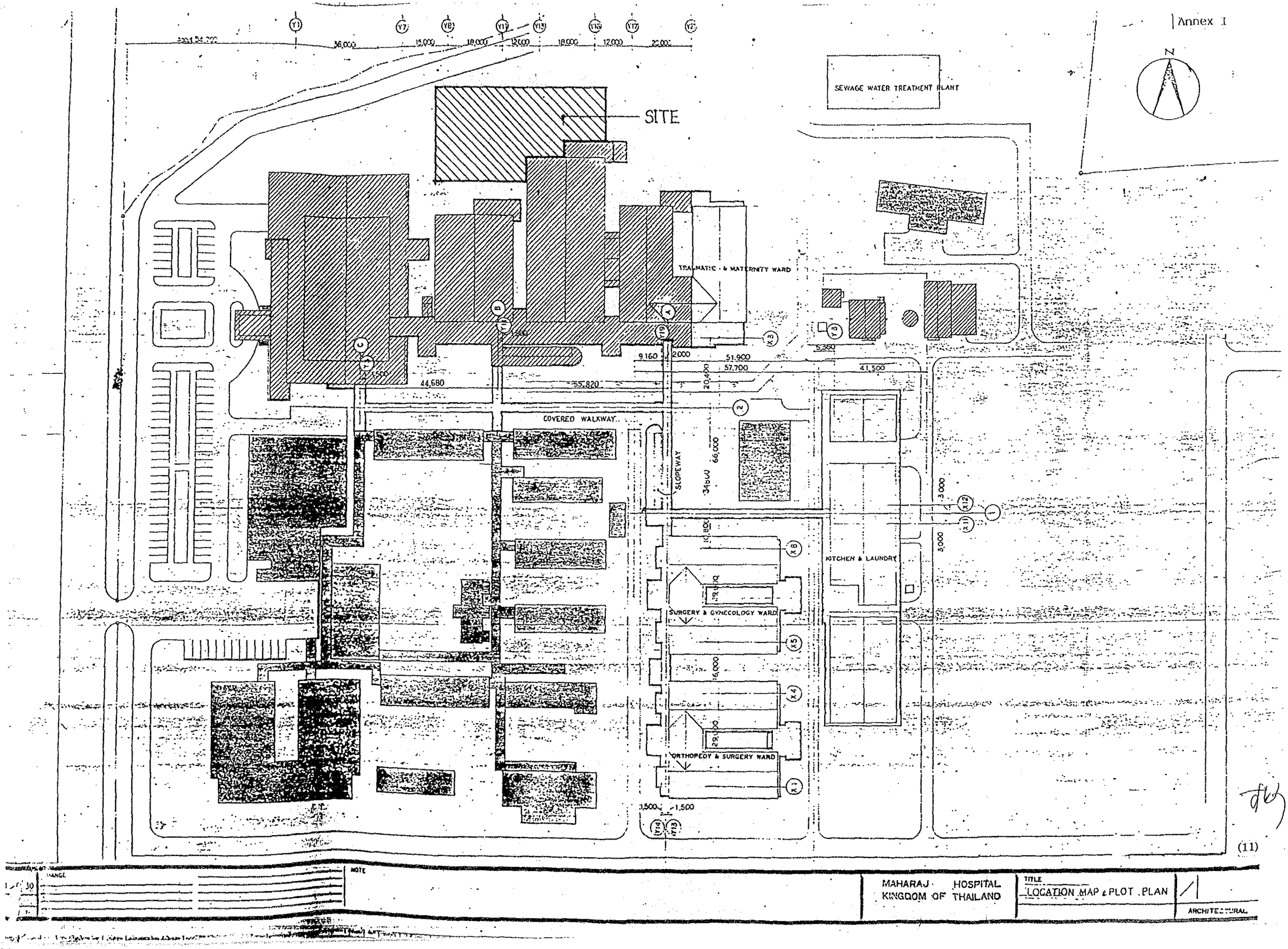
6. Schedule of the Study

1) Based on the Minutes of Discussions and technical examination of the study results, JICA will compile the draft final report and dispatch a mission in order to explain its contents at the end of July, 1991.

2) After the contents of the report are accepted in principle by the Thai side, JICA will complete the final report and send it to the Government of Thailand in October, 1991.

U. Sucksuth

Annex I



(11)

CHANGE	NOTE	MAHARAJ HOSPITAL KINGDOM OF THAILAND	TITLE: LOCATION MAP & PLOT PLAN / 1 — ARCHITECTURAL

Annex II

1. Building related to the Project

   1) Six (6) Operating Rooms

      ① Orthopedic operating room

      ② Neurosurgical operating room

      ③ Cardiac and general surgical operating room

      ④ Three (3) general surgical operating rooms

   2) Supporting facilities

      ① Sterilizing room

      ② Washing room

      ③ Dressing room (male, female)

      ④ Conference Room

      ⑤ Dinning Room

      ⑥ Night duty staff's room

      ⑦ Medical Gas facilities

      ⑧ Others

2. Medical equipment related to the Project

① Operating table
② Operation light for major operation
③ Anesthetic apparatus
④ Anesthetic ventilator
⑤ Blood pressure monitor + ECG monitor
⑥ Defibrillator
⑦ Pulse oxymeter
⑧ Electro surgical unit
⑨ Wall suction unit
⑩ Electric suction
⑪ Film viewer for x-ray photo
⑫ Instruments cabinet
⑬ Sterilizer
⑭ Endoscope
⑮ Ultrasonic sonograms
⑯ Laser apparatus for opthalmic
⑰ Electric ultrasonic scan
⑱ X-ray apparatus
⑲ Respirator
⑳ Infant Ventilator
㉑ Bed side monitor
㉒ Others

Annex III

Necessary measures to be taken by the Government of Thailand in case Japan's Grant Aid Assistance is executed.

1. To secure the site for the Project.

2. To clear, level and reclaim the site prior to commencement of the construction.

3. To undertake incidential outdoor works such as gardening, fencing, gates and exterior lighting in and around the site.

4. To construct the access road to the site prior to commencement of the construction.

5. To provide facilities for distribution of electricity, water supply, telephone, drainage, sewage and other incidental facilities to the Project site.
   1) Electricity distributing line to the site
   2) City water distribution main to the site
   3) Drainage city main to the site
   4) Telephone trunk line to the main distribution panel of building
   5) General furniture such as carpets, curtains, tables, chairs and others

6. To bear commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement.

7. To exempt taxes and to take necessary measures for customs clearance of the materials and equipment brought for the Project at the port of disembarkation.

8. To accord Japanese Nationals whose services may be required in connection with the supply of products and the services under the verified contract such facilities as may be necessary for their entry into Thailand and stay therein for the performance of their work.

9. To maintain and use properly and effectively that the facilities constructed and equipment purchased under the Grant.

10. To bear all the expenses other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and the installation of the equipment.

(For Draft Report Explanation)

MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY ON THE PROJECT FOR THE EXTENSION OF THE MAHARAJ NAKORN SRI THAMMARAJ HOSPITAL IN THE KINGDOM OF THAILAND
(CONSULTATION ON DRAFT REPORT)

In April 1991, the Japan International Cooperation Agency (JICA) dispatched a Basic Design Study team on the Project for the Extension of the Maharaj Nakorn Sri Thammaraj Hospital (hereinafter referred to as "the Project") to the Kingdom of Thailand, and through discussions, field survey, and technical examination of the results in Japan, has prepared the draft report of the study.

In order to explain and to consult the Thai side on the components of the draft report, JICA sent to Thailand a study team, which is headed by Dr. Akira Suto, Department of International Cooperation, National Medical Center Hospital, and is scheduled to stay in the country from September 2 to 11, 1991.

As a result of discussions, both parties confirmed the main items described on the attached sheets.

Bangkok, September 9, 1991

A. Suto

Dr. Akira Suto
Leader
Draft Report Explanation Team
JICA

U. Sudsukh.

Dr. Uthai Sudsukh
Permanent Secretary
Ministry of Public Health
The Kingdom of Thailand

ATTACHMENT

1. Components of Draft Report

   The Government of Thailand has agreed and accepted in principle the components of the Draft Report proposed by the team.

2. Japan's Grant Aid system

   (1) The Government of Thailand has understood the system of Japan's Grant Aid explained by the team.

   (2) The Government of Thailand will take the necessary measures, described in Annex I, for smooth implementation of the Project on condition that the Grant Aid assistance by the Government of Japan is executed to the Project.

3. Further schedule

   The team will make the Final Report in accordance with the confirmed items, and send it to the Government of Thailand by the end of October 1991.

U. Sucharitkul

Annex I : Necessary measures to be taken by the Government of Thailand in case Japan's Grant Aid is excuted.

1. To secure the site for the Project.
2. To clear, level and reclaim the site prior to commencement of the construction.
3. To undertake incidental outdoor works such as gardening, fencing, gates and exterior lighting in and around the site.
4. To construct the access road to the site prior to commencement of the construction.
5. To ensure budget and to provide facilities for distribution of electricity, water supply, telephone and other incidental facilities to the Project site.
   1) Electricity distributing line to the site.
   2) Water distribution main to the site.
   3) Telephone trunk line to the main distribution panel of the new building.
   4) General furniture such as carpets, curtains, tables, chairs and others.
   5) To ensure necessary budget to maintain the new operation theatre stipulated in this report on page 71.
   6) Necessary budget shall be ensured to excuted renovation works stipulated on pate 127. Schedule of the above construction shall be matched with discussed schedule. Renovation works shall be started after completion of phase I construction and be expected to complete within one year.
6. To bear commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Agreement.
7. To exempt taxes and to take necessary measures for customes clearance of the materials and equipment brought for the project at the port of disembarkation.
8. To accord Japanese Nationals whose services may be required in connection with the supply of products and the services under the verified contract such facilities as may be necessary for their into Thailand and stay therein for the performance of their work.
9. To maintain and use properly and effectively that the facilities constructed and equipment purchased under the Grant.
10. To bear all the expenses that those to be borned by the Grant, necessary for construction of the facilities as well as for the transportation and the installation of the equipment.

M. Sudsuq

5. List of Hospitals Observed

Rajavithi Hospital	(Bangkok, National Hospital)
Suratthani Hospital	(Suratthani, Public Hospital)
Songkhla Hospital	(Bangkok, National Hospital)
Ramativoti Hospital	(Bangkok, National Hospital)
Rayathai Hospital	(Bangkok, Private Hospital)
Hat Yai Hospital	(Songkhla, Public Hospital)
Songkhla Univ. Hospital	(Songkhla, Medical University Hospital)
Samut Sakorn Hospital	(Samut Sakorn, Public Hospital)

6. List of Materials Collected

<General Information, Public Health and Medical Services of Kingdom of Thailand>

- Thailand in Figures 1990
- Thailand Map
- Vital Statistics
- Targets of the Sixth-Five Year Health Development Plan
- Regional Hospital List

<General Information, Public Health and Medical Services of Maharaj Nakorn Sri Thammaraj Hospital>

- Maharaj Nakorn Sri Thammaraj Hospital Statistical Report
- Answer for Questionnaire (3 copies)
- Nakorn Sri Thammaraj Province Map & Location of Hospital List
- Southern Provinces Map & Location of Hospital List
- Chart of Administration of Maharaj Nakorn Sri Thammaraj Hospital
- Nakorn Sri Thammaraj Map (2 copies)
- Maharaj Nakorn Sri Thammaraj Hospital Site

<Situation of Construction and Prices of Commodities>

- Various Pamphlets of Construction
- Catalogs and Price Lists of Construction, Equipment, Materials, Book II, Book III
- Construction Unit Cost Survey
- Specifications of Reference Orders of MPH, Thailand (Material on unit prices)

<Others>

- Japanese–Thai dictionary
- Thai–Japanese Dictionary
- Building Code 1979
- Surattani Hospital Annual Report
- Song Khla Hospital Annual Report
- Samut Sakorn Hospital Annual Report

7. Data for Soil Test

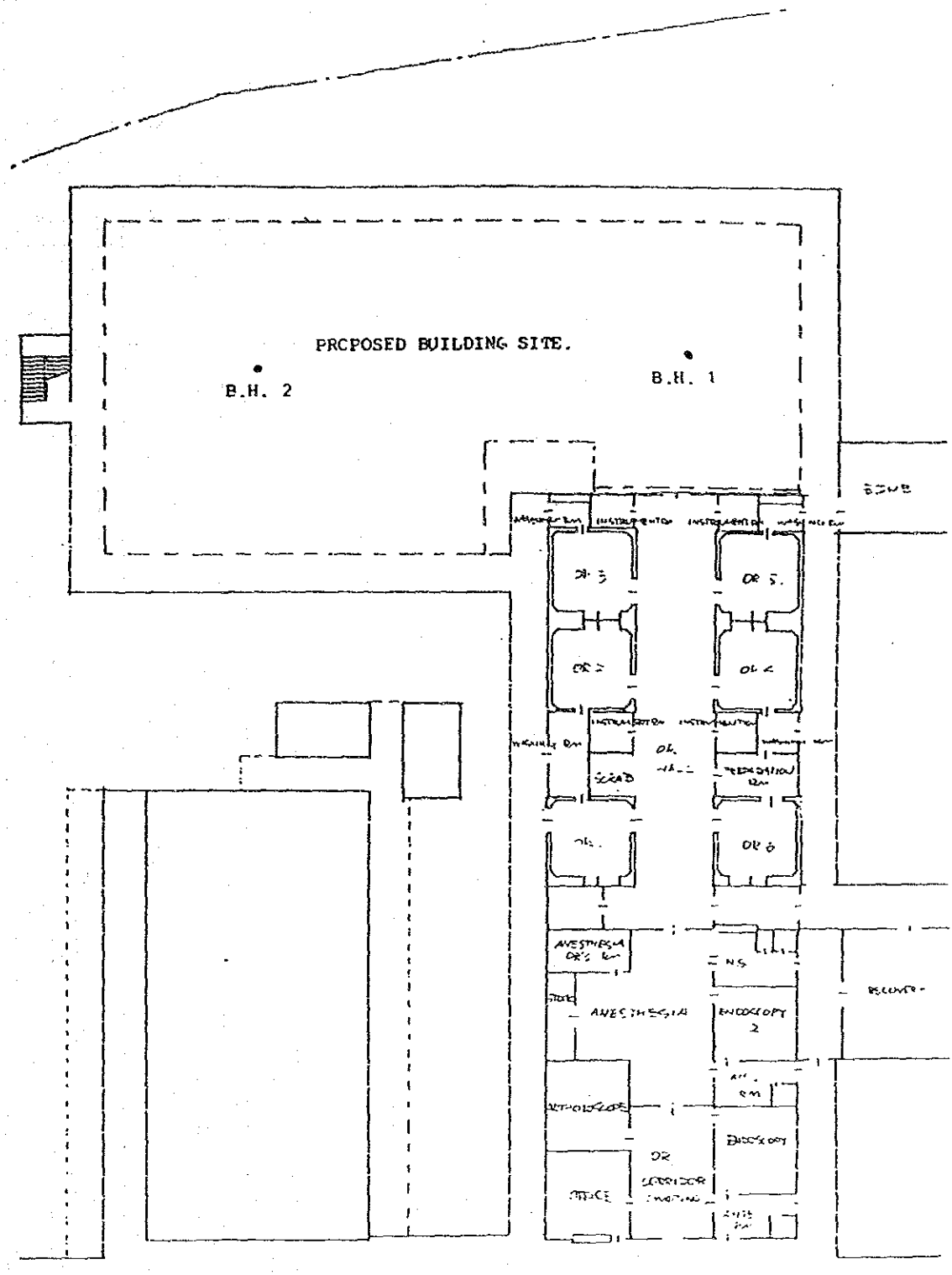


Figure 7-1 Test Points for Soil Survey

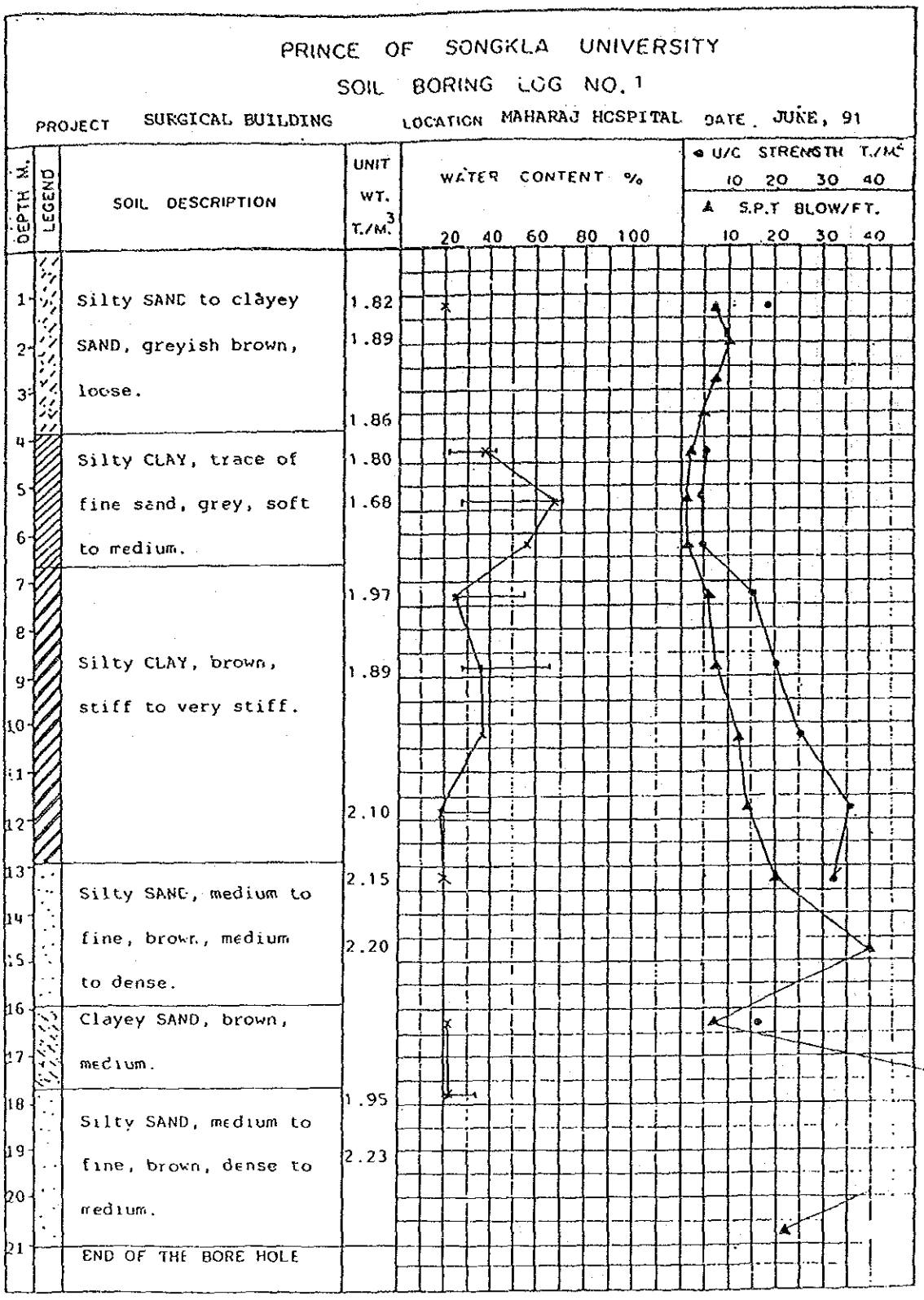


Figure 7-2 Soil Boring Log No. 1

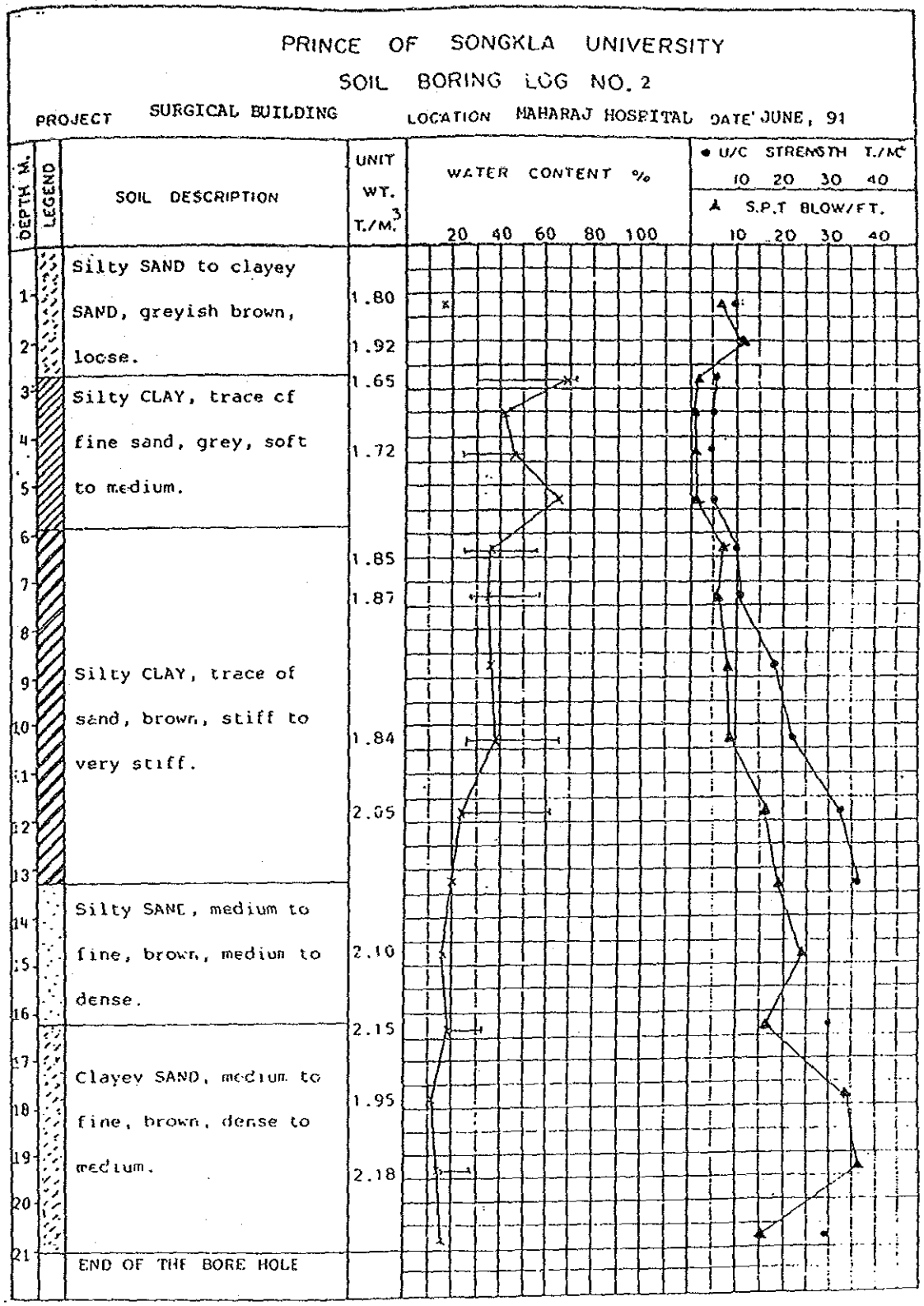
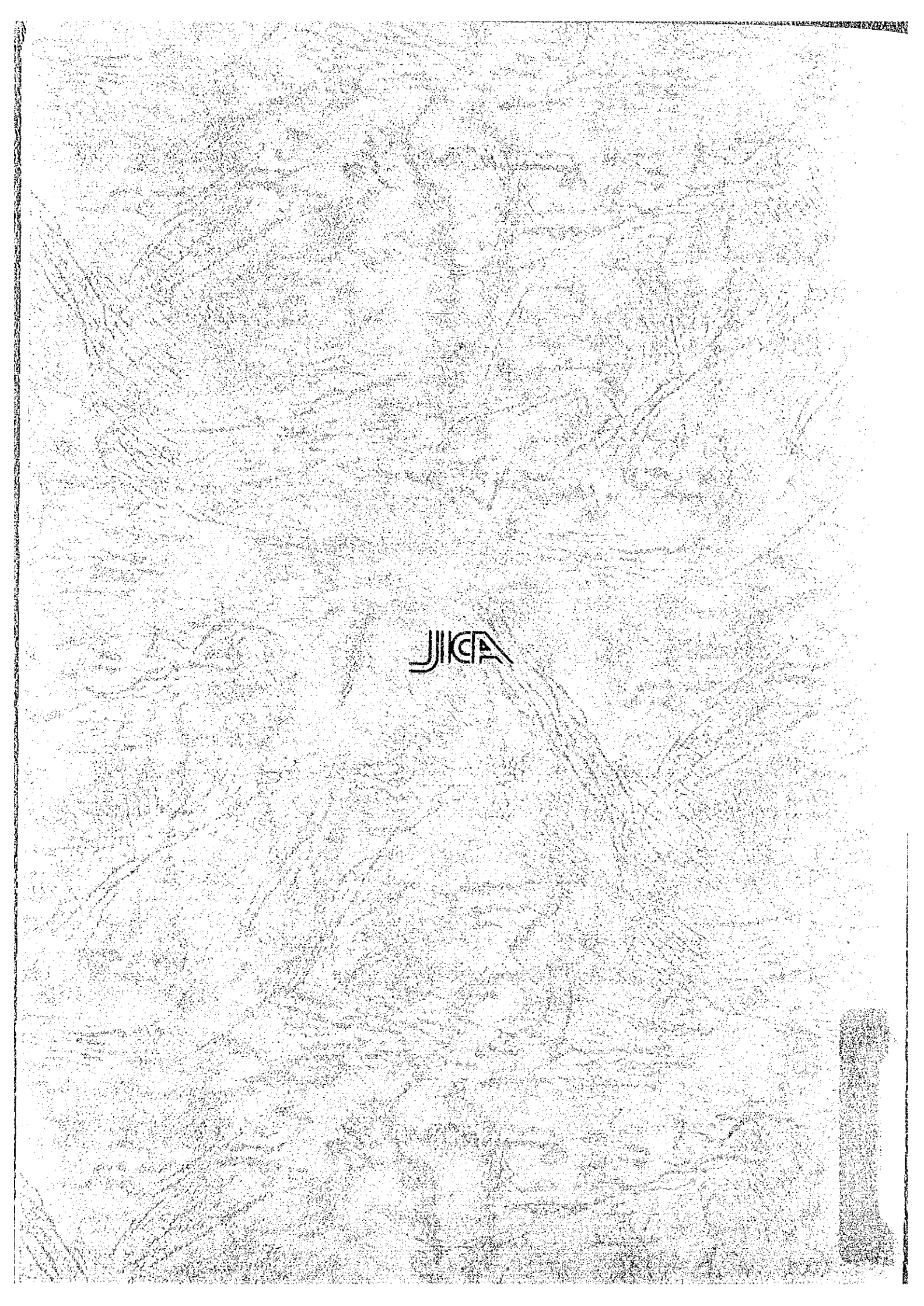


Figure 7-3 Soil Boring Log No. 2


JICA