

## 2-3 Basic Design

### 2-3-1 Basic Concept

#### (1) Facilities

##### 1) Basic Concept of Facility Design

Given below is the outline of the basic concept of facility design.

- ① Facility design focusing on the present state and the future direction of the hospital.

A facility design consistent with the technical level of the medical professionals and the administrative staff is to be developed by resolving problems on the basis of a clear grasp of the present scale of the hospital and details of operations performed at the existing facilities.

- ② Facility design aiming at the durability and ease of maintenance and management of facilities

In selecting and designing building materials, priority should be given to those which are durable and which can be procured in the country to make it easy for the hospital staff in charge to maintain the facilities.

- ③ Utilization of local construction methods and materials

The construction cost should be cut down as much as possible by adopting the traditional Lao architectural style and construction methods using building materials in widespread use in the country.

- ④ Building security consistent with the public security in the neighborhood

Entry of people, goods and materials should be restricted so that the entire hospital be guarded effectively.

##### 2) Guideline Concerning Natural Conditions

- ① Project site

The project site is located in a plateau in a suburb of the city of Vientiane. Two sides of the project side border on roads. The ground level of the construction site should be raised to cope with localized torrential downpours during the rainy season, and a rainwater drainage system should be produced. There are spots heavily planted in the project site. The trees in the woods should be preserved as much as possible.

② Wind

In the city of Vientiane, the prevailing wind blows from south or north throughout the year. During the rainy season, strong rain storms come from south. The proposed facilities should be designed to take in as much air flow as possible by means of natural ventilation taking advantage of the prevailing wind.

③ Rain

In the city of Vientiane the rainy season lasts from May to September. The average annual rainfall is about 2,109 mm. The total rainfall during the rainy season is about 1,600 mm. For these reasons, the openings of the rooms and corridors should be protected against rainwater with louvers and/or awnings. The drainage system for the roofs and the ground should have a sufficient capacity.

④ Solar radiation

As the city of Vientiane is situated at lat. 17.5° N, solar radiation comes mainly from south. The sun being strong in summer, the roofs should be insulated sufficiently and the openings of the rooms and corridors should be protected against solar radiation with louvers and/or awnings.

⑤ Climate

In Vientiane the monthly average temperature is 26.5°C. The lowest temperature of the day is 21.8°C on the average. In order to secure a comfortable indoor environment not necessarily dependent on mechanical ventilation system, it is necessary to design a floor plan and a sectional plan, both of which ensure sufficient ventilation.

3) Guideline Concerning Social Conditions

Since the hospital has a teaching and training function in addition to its functions as the key hospital in the city of Vientiane, the basic design for this project should enable the hospital to give full play to these functions. As seen typically in this country patients usually attended by a bunch of family members, the waiting rooms in the hospital should be designed large enough. The examination and treatment zone should be restricted to let in patients only. The entry of other visitors including patients' family to this area controlled effectively.

4) Guideline Concerning the Local Construction Situation

The building codes and regulations of Laos stipulate the setback line of buildings. As there is the aesthetic control on the major buildings in the city of Vientiane, the roofs of the proposed buildings are required to have inclinations. The Japanese building codes and regulations can be referenced to whatever relevant local codes are not be found. An application for building certification is filed first with the village office, and forwarded to the construction department of municipal office via the district office for the final approval. It takes an hour to file an application with a village office, and two to three days to file an application with a district office. It takes about 45 days to file an application with the municipal building authorities (the period of time can be reduced to two weeks). At village and district offices, they only receive the application and drawings, sending them to the municipal office for the review and approval.

5) Guideline Concerning Local Suppliers and Utilization of Locally Available Construction Materials and Medial Equipment

In consideration of facility operation and maintenance after completion of the proposed facilities, local construction methods and locally available should be used wherever appropriate materials are found. However, materials which cannot be procured in the country should be procured in Japan or otherwise in Thailand. Most items of medical equipment are to be procured in Japan because it is hard to procure locally. In the selection of construction materials and medical equipment, priority should be given to products of manufacturers who have distributors in the country or Thailand and such manufacturers who have well-established maintenance and management systems in the country.

6) Guideline Concerning the Project Implementing Organization's Operation, Maintenance and Management Capability

From the standpoint of reduction of the operation and maintenance cost, it is desirable to utilize natural ventilation rather than rely on mechanical ventilation in light of the present conditions in the country. Under this project the operation and delivery rooms, the medical laboratory, the ward rooms (for ICUs, PICUs, NICUs, postoperative observation rooms and private rooms as well as the lecture hall (seating capacity is about 100) and the conference rooms are to be air-conditioned. However, common areas like corridors are to be ventilated by means of natural ventilation in order to minimize the maintenance cost, including electricity charges. Durable and weather materials for interior and exterior finish should be selected to minimize the maintenance cost in the long run.

(2) Medical Equipment

1) Formulating Medical Equipment Plan Consistent with the New Organizational Structure of the Hospital

Within the framework of the hospital's present organizational structure, it is observed that the outpatient and inpatient departments have a strong tendency to operate separately and independently of each other. As a consequence, the hospital's organizational system has many inefficient elements. It is therefore necessary to formulate an equipment plan on the basis of the proposed organization chart of the new hospital which is agreed upon during the basic design survey.

The proposed organization chart of the new hospital is not aimed at making a drastic change from the present organizational system. It will bring modifications to only the system's inefficient elements without causing an increase of the personnel or budgetary appropriations. In other words, the new organizational system is made similar to those of other general hospitals of the same size, so it will promise the higher feasibility. For this reason, the equipment plan is to cover only the departments included in the new organization chart. These departments are:

a. Outpatient Department

Each consultation room of each section of this department is to be equipped with minimum necessary items of equipment, such as a consultation desk, a chair (for the medical doctor), an X-ray film illuminator and a medical examination table. A treatment room for common use is to be equipped with a medical examination table (to serve also as a treatment table), an instrument cabinet and an instrument table.

The gynecology section is to be provided with a consultation room (to serve both for an internal examination and for a treatment). MCH section should be equipped with an IUD room and a treatment room. Under this project, however, an IUD room is also served as a treatment room. The room is to be equipped with an internal examination table, an instrument cabinet and an instrument table. The MCH consultation room is to be equipped with an ultrasound so that its use may be shared with the gynecology section.

The dental, ophthalmology and ENT sections require equipment for exclusive use. The dental section is to be provided with a dental unit, the ophthalmology section with the existing slit lamp, the ENT section with an

ENT examination unit, and the respiratory section with a spirometer.

Two emergency treatment rooms (both are to serve also as consultation rooms) are to be installed for the examination and treatment of emergency cases. A stretcher is to be installed in each emergency treatment room instead of a treatment table. Here also a small surgical room is prepared for use in emergency operations. This room is to be equipped with an operation table, an operation lamp, and an anesthesia apparatus. The emergency cases' room is to be equipped with a total of seven beds.

b. Central Diagnostic and Treatment Department

Two operation theaters are to be installed. Each of these rooms is to be equipped with an operating table, an operating light, an electro-surgical unit and an anesthesia apparatus. The postoperative observation room is to serve also as a recuperation room. It is to be equipped with a total of eight beds.

The ICU for adults is to be equipped with a total of 14 ICU beds, as well as bedside monitors and ventilators. The ICU for children, namely "PICU" (Pediatric Intensive Care Unit) is to be equipped with ICU beds and bedside monitors.

The NICU (ICU for newborns) is to be equipped with incubators, beam treatment units and ventilators. Only one nurse station is installed to cover the ICU for adults, the PICU and the NICU so as to centralize functions for sharing them.

This department is to be provided with two delivery rooms. One for normal deliveries is to be equipped with a delivery table, an astral lamp (stand type) and an instrument table, and the other for abnormal deliveries with an astral lamp (suspension type), an anesthesia apparatus and an electro-surgical unit.

c. Central Clinical Examination Department

In the radiology section as the existing X-ray unit remains serviceable, this instrument is to be moved from existing Sethathirath Hospital to New Sethathirath Hospital. The type of examination and part of the body is very limited if it is used as it is, a fluoroscope is to be procured under this project. From the standpoint of easy maintenance, a proximity fluoroscope,

not a remote-controlled one, is to be procured.

The radiology section currently has an ultrasound diagnostic apparatus. As it will be very difficult to install this instrument in the same section of the new hospital, it is to be installed in the newly built physiological laboratory. The new clinical laboratories include a blood test room, a biochemical test room, microbial test room and a pathological test room. Each of these rooms is to be equipped with necessary items of equipment. Of the existing items of equipment, those which remain serviceable, such as microscopes and centrifuge, are to be moved to the new facilities.

For the purpose of improving the hospital's diagnosing function, however, the existing fluorescent microscope and blood counter are to be replaced. As there are local distributors of manufacturers of these items of equipment, there will be no problem with their periodical maintenance and procurement of reagents and expendables.

At the existing hospital, the function of a physiological test room has been included in the functions of the radiology and internal medicine sections. Since this arrangement has proved inefficient, the new Sethathirath Hospital is to have an independent physiological test room. The radiology section's existing ultrasound is to be moved to the physiological test laboratory. An electrocardiograph is also to be procured for this laboratory room. The pharmaceutical rooms are currently located in a number of places within the hospital. Since this arrangement has proved inefficient, the new Sethathirath Hospital is to have a centralized pharmacy. The new pharmacy is to be equipped with an electronic balance, a refrigerator and a drug cabinet.

d. Inpatient Ward

The Inpatient Ward consists of Wards for internal medicine, surgery, obstetrics/gynecology and pediatrics. Each of these wards is to be provided with beds and bedside cabinets. The specifications for the beds are to be basically one crank type beds. Those for the ICUs and the private rooms are to be double crank type beds.

e. Administration Department

The administration department's responsibilities include management of the mortuary. The dissecting table and related items of equipment will often

cause problems in operation and maintenance, so these items of equipment should be excluded from the equipment plan. Considering the high temperature and high humidity in this area and the fact that in the country the remains of the deceased are usually stored in refrigerators for four to five days, a refrigerator capable of storing four dead bodies at a time is to be procured under this project. Audio-visual devices and maintenance tools can be procured in the country, and therefore these items of equipment should be excluded from the equipment plan.

2) Formulating an Equipment Plan to Ensure Technical and Financial Sustainability and Self-Reliant Growth of the Hospital

The medical equipment plan for this project must be one that ensures and promote the technical, financial independence and growth of the hospital. More specifically, the scope of the equipment plan is limited to the extent that only the existing items of equipment are to be replaced or the supply of these items of equipment are to be replenished. Consequently that will lessen the technical and financial burdens on the equipment operation, maintenance and management system incurring a great share of hospital and budget at this moment.

In this connection, an equipment procurement plan must give priority to manufacturers who have distributors in the city of Vientiane, Thailand or Vietnam. For such items of equipment as used in clinical laboratories, which require day to day service and inspection, their procurement in third countries should be considered.

3) Formulating an Equipment Plan to Help Sethathirath Hospital to Restore Its Original Functions

So far, there has been no clear demarcation in functional roles set between Sethathirath Hospital, Mahosot Hospital and Friendship Hospital. The field survey team has found that there are differences in terms of equipment operation, maintenance and management system and budgetary appropriations between Sethathirath Hospital and the two other hospitals. The hospital is also finding it very difficult to fulfill its original functions due to the obsolescence of its facilities and medical equipment.

In establishing the equipment plan for this project, therefore, utmost emphasis should be placed on the hospital's need to restore its original functions as a general hospital operating at the secondary health care level rather than on the hospital's functions as a general hospital operating at the tertiary health care level

or on the sharing of some particular functions with other major general hospitals by defining its specialities.



## 2-3-2 Design Conditions

### (1) Facility Composition

In light of the climatic conditions in and around the project site and the shape of the ground in the project site, this project is to consist of two buildings, namely, a north building and a south building arranged in parallel with an east-to-west axis in between. For patients' convenience and operational efficiency, both buildings are to be two-storied ones, with individual rooms arranged functionally. A machine room is to be built on the rear end of the area between the two main buildings for efficient service to both buildings. The respective facilities and functions on each floor of the two buildings are as shown in Table 2-11.

**Table 2-11 Composition of the Facility**

Location	Major Function
1 <sup>st</sup> Floor North Wing	Out-patient, Diagnostic/Treatment Center for Examinations (Reception, Examination room, Treatment room, Emergency room, Emergency bed, Laboratory, X-ray, etc.)
2 <sup>nd</sup> Floor North Wing	Administration (Lecture room, Office, Director's room, etc.)
1 <sup>st</sup> Floor South Wing	In-patient (Wards) Diagnostic/Treatment Center for Operation and Delivery (Pharmacy, CSSD, Operation room., Delivery room., Ward, etc.)
2 <sup>nd</sup> Floor South Wing	In-patient (Wards)
Annex	Building Service (Machine room, Kitchen, Dining, Mortuary, etc.)

### (2) Data Used Determining the Size of Each Facility

In determining the size of each of the proposed facilities the hospital's present functions were examined fully with reference to the Japanese standard values. The layout of necessary items of equipment was also be taken into consideration. Table 2-12 shows the size of each facility determined in this way.

Fig. 2-12 Room List

First floor room list (1)

NO.	Room	Number	Floor area m <sup>2</sup>	Criteria & remarks
	[North Wing]			
	Medical Office	1	21.00	Includes reception counter, tel.operator's corner
	Medical Records	1	21.00	
	Security	1	15.00	Includes resting space
	Emergency Reception	1	9.00	
	Preparation rm. (1)	1	27.00	
	Emergency Treatment rm.	1	22.20	2 treatment tables
	Storage (Medical Records)	1	14.40	
	Minor Surgery	1	26.00	4.0m × 6.5m=24.0m <sup>2</sup>
	Emergency Bed	1	43.20	7 beds
	Darkroom(1)	1	7.80	
	Lab.(1)	1	35.40	Hematological, Bio Chemical Exam.
	Lab.(2)	1	21.60	Microbiological, Pathology Exam.
	Washing(1)	1	12.32	
	Storage (1)	1	12.32	
	Physiology Exam.	1	23.70	Electrocardiograph exam., Ultrasound diagnosis
	Storage (2)	1	23.40	
	Control rm.	1	28.40	Includes reception counter
	X-ray	1	25.85	2 X-ray Machines
	Toilet (1)	1	2.50	Toilet for X-ray Operation rm.
	Darkroom (2)	1	6.25	
	Rehabilitation rm.	1	39.60	5.5m × 7.2m=36m <sup>2</sup>
	Workshop (M/E)	1	24.64	Combines the service staff locker room and stores
	Dermatology Exam.	1	12.48	2.4m × 5.2m=12.48m <sup>2</sup>
	Pneumology Exam.	1	12.48	2.4m × 5.2m=12.48m <sup>2</sup>
	Waiting room	1	9.60	for Dermatology, Pneumology Exam.
	Ophthalmology Treat.	1	13.20	2.4m × 5.5m=13.2m <sup>2</sup>
	Ophthalmology Exam.	1	16.56	2.4m × 5.2m=12.48m <sup>2</sup>
	Surgery Exam.	1	12.48	2.4m × 5.2m=12.48m <sup>2</sup>
	Dental Laboratory	1	5.76	
	Dental Exam. & Treat.	1	18.24	2 treatment tables
	E.N.T. Exam.& Treat.	1	12.48	2.4m × 5.2m=12.48m <sup>2</sup>
	Int. Medicine Exam.(1)~(5)	5	12.48	2.4m × 5.2m=12.48m <sup>2</sup>
	Pediatrics Exam.(1),(2)	2	12.48	2.4m × 5.2m=12.48m <sup>2</sup>
	MCH Exam.(1)~(3)	3	12.48	2.4m × 5.2m=12.48m <sup>2</sup>
	MCH Internal Exam.	1	12.48	2.4m × 5.2m=12.48m <sup>2</sup>
	Gynecology Exam.	1	12.48	2.4m × 5.2m=12.48m <sup>2</sup> (Includes Internal Exam.)
	Waiting Corridor	1	81.60	Includes reception counter
	Medical Counsel	1	16.80	3m × 5.6m=16.8m <sup>2</sup>
	Plaster Room	1	16.80	3m × 5.6m=16.8m <sup>2</sup>
	Treatment rm. (1),(2)	2	16.80	3m × 5.6m=16.8m <sup>2</sup> 2 treatment tables
	Toilet (2),(3)	2	33.60	M:2toilet stalls,3urinals,3sinks W:3toilet stalls,4sinks
	EPS(1)	1	1.50	
	Entrance Hall	1	230.40	General waiting hall
	Waiting Hall	1	194.40	Consulting waiting hall
	Corridor (1)~(4)	4	43.48	2.4m in width to accommdate stretchers
	Stairs(1)	1	9.00	
	Stairs(2)	1	9.60	
	Ramp(1)	1	162.00	Carrying stretchers
	1F North Wing Total		1722.44	

Fig. 2-12 Room List

First floor room list (2)

NO.	Room	Number	Floor area m <sup>2</sup>	Criteria & remarks
	[South Wing]			
	Pharmacy	1	21.00	Includes preparation of small doses, counter
	Drug Storage	1	15.00	
	Storage (3)	1	8.75	Pass room
	Storage (4)	1	18.00	
	C.S.S.D.	1	29.10	
	Washing(2)	1	16.20	
	Nurse station (1)	1	7.20	
	Ante. Rm	1	7.80	
	Preparation rm. (2)	1	31.20	
	Operation rm.(1)	1	33.60	1 operation table
	Operation rm. (2)	1	33.60	1 operation table
	Supply Corridor	1	9.60	
	AC	1	4.00	
	POST OP.	1	43.20	8 beds
	I.C.U.	1	86.40	14 beds
	P.I.C.U.	1	43.20	6m × 7.2m=43.2m <sup>2</sup> 8 beds
	N.I.C.U.	1	21.60	3m × 7.2m=21.6m <sup>2</sup> 6 beds
	Preparation rm. (3)	1	16.20	
	Delivery rm. (1)	1	13.50	1 delivery table
	Delivery rm. (2)	1	13.50	1 delivery table
	Labor rm.	1	25.20	3.5m × 7.2m=25.2m <sup>2</sup> 4 beds
	Nursery	1	18.00	
	Nurse station (2)	1	48.00	
	Staff rm.(1)	1	8.40	
	Conference rm. (1)	1	8.40	
	Toilet (4),(5)	2	2.30	for Patients(ICU,etc)
	Disposal (1)	1	1.00	
	Equipment Storage (2)	1	5.60	
	Changing rm. (1),(2)	2	12.60	Includes toilet, shower
	Ward(1)	1	19.05	1 bed (Includes sink, toilet, shower)
	Ward(2)	1	19.80	1 bed (Includes sink, toilet, shower)
	Ward (3),(4)	2	43.20	6m × 7.2m=43.2m <sup>2</sup> Pediatrics 8 beds
	Ward (5),(6)	2	19.80	1 bed (Includes sink, toilet, shower)
	Ward (7),(8)	2	43.20	6m × 7.2m=43.2m <sup>2</sup> 8 beds
	Ward (9)~(11)	3	19.80	1 bed (Includes sink, toilet, shower)
	Ward(12)	1	21.60	Isolated ward (Includes sink, toilet, shower)
	Nurse station (3)	1	33.60	
	Treatment rm. (3)	1	8.40	
	Staff rm.(2)	1	8.40	
	Toilet (6)	2	3.15	Staff
	Disposal (2)	1	2.10	
	Shower rm. (1),(2)	2	4.20	
	Toilet (7)	2	12.60	M:2toilet stalls,3urinals,2sinks W:3toilet stalls,3sinks
	EPS(2)	1	1.50	
	Storage (5)	1	3.00	Linen storage
	Storage (6),(7)	2	1.80	Linen storage
	Storage (8),(9)	2	3.60	Linen storage
	Hall	1	135.84	
	Corridor (5)	1	47.96	2.4m in width to accommdate stretchers
	Corridor (6),(7)	2	43.48	2.4m in width to accommdate stretchers
	Stairs (3)	1	9.00	
	Stairs (4)	1	9.60	
	1F South Wing Total		1346.36	

Fig. 2-12 Room List

Second floor room list				
NO.	Room	Number	Floor area m <sup>2</sup>	Criteria & remarks
	[North Wing]			
	Office (1)	1	64.80	
	Office (2)	1	43.20	
	Day Nursery	1	43.20	
	Night Duty (1)~(6)	6	5.40	
	Doctor's rm.	1	108.00	3m <sup>2</sup> /pers. × 35pers. = 105m <sup>2</sup> Capacity for 35 pers.
	Meeting rm. (1)	1	43.20	Capacity for 20pers.
	Library	1	37.20	6m × 7.2m=43.2m <sup>2</sup>
	Office (3),(4)	2	31.20	6m × 5.2m=31.2m <sup>2</sup>
	Storage (1)	1	15.60	6m × 5.2m=31.2m <sup>2</sup>
	Director's rm.	1	15.60	6m × 5.2m=31.2m <sup>2</sup>
	Office (5)	1	15.60	3m × 5.2m=15.6m <sup>2</sup>
	Vice-Director's rm. (1),(2)	2	15.60	3m × 5.2m=15.6m <sup>2</sup>
	Meeting rm. (2)	1	15.60	3m × 5.2m=15.6m <sup>2</sup>
	Med. Records Administration	1	37.20	6m × 7.2m=43.2m <sup>2</sup>
	Lecture rm.	1	129.60	0.9m <sup>2</sup> /pers. × 100pers. = 90m <sup>2</sup> Capacity for 100pers.
	Storage (2),(3)	2	9.72	
	Pantry	1	8.40	
	Toilet (1)	2	12.00	M:2toilet stalls,3urinals,2sinks W:2toilet stalls,3sinks
	Locker's rm. (1),(2)	2	27.16	
	Shower rm. (1),(2)	2	4.20	
	Toilet (2)	2	14.56	M:2toilet stalls,3urinals,2sinks W:2toilet stalls,3sinks
	Lounge	1	151.20	
	Lobby (1)	1	43.20	Staff lobby
	EPS(1)	1	1.50	
	Corridor (1),(2)	2	36.48	
	Corridor (3),(4)	2	109.72	
	Stairs (1)	1	10.80	
	Stairs (2)	1	9.60	
	Ramp	1	162.00	Carrying stretchers
	<b>2F South Wing Total</b>		<b>1509.18</b>	
	[South Wing]			
	Ward (1), (22)	2	18.90	1 bed (Includes sink, toilet, shower)
	Ward (2), (21)	2	19.80	1 bed (Includes sink, toilet, shower)
	Ward (3),(4),(19),(20)	4	43.20	6m × 7.2m=43.2m <sup>2</sup> 8 beds
	Ward (5),(6),(17),(18)	4	19.80	1 bed (Includes sink, toilet, shower)
	Ward (7),(8),(15),(16)	4	43.20	6m × 7.2m=43.2m <sup>2</sup> 8 beds
	Ward (9)~(14)	6	19.80	1 bed (Includes sink, toilet, shower)
	Nurse station (1),(2)	2	33.60	
	Treatment rm. (1),(2)	2	8.40	
	Staff rm (1),(2)	2	8.40	
	Toilet (4),(5)	2	3.15	For Staff
	Disposal (1),(2)	2	2.10	
	Shower (3)~(6)	4	4.20	
	Toilet (3),(6)	2	12.60	M:2toilet stalls,3urinals,2sinks W:3toilet stalls,3sinks
	Storage (2)	1	3.00	Linenn storage
	Storage (3),(4)	2	1.80	Linenn storage
	Storage (5)~(7)	3	3.60	Linenn storage
	Storage (8),(9)	2	1.80	Linenn storage
	Storage (10)	1	3.00	Linenn storage
	EPS(2)	1	1.50	
	Lobby (2)	1	43.20	Patients, Patient's family
	Corridor (5)~(8)	4	73.60	2.4m in width to accommdate stretchers
	Stairs (3)	1	10.80	
	Stairs (4)	1	9.60	
	<b>2F South Wing Total</b>		<b>1157.80</b>	

Fig. 2-12 Room List

Annex room list

NO.	Room	Number	Floor area m <sup>2</sup>	Criteria & remarks
	Laundry	1	28.38	
	Staff rm (3)	1	10.50	
	Storage (12)	1	25.92	3.6m × 7.2m=25.92m <sup>2</sup>
	Dining	1	69.12	1 m <sup>2</sup> /pers. × 60pers.=60m <sup>2</sup> Capacity for 50 pers.
	Kitchen	1	36.00	Capacity for 300pers.
	Food Storage	1	8.80	
	Staff rm (4)	1	3.60	
	Toilet (8)	1	2.16	
	LPG st.	1	1.28	
	Generator	1	43.20	Capacity for 200kva
	Workshop (Maintenance)	1	14.40	Combines the service staff locker room and stores
	Toilet (9)	1	2.88	
	Sub Station	1	60.48	
	Pump Rm.	1	25.92	
	Medical Gas rm.	1	19.44	
	Mortuary	1	19.44	
	<b>Annex Total</b>		<b>371.52</b>	
	[Elevated Water Tank] PH1F		24.00	
	PH2F		24.00	
	1F North Wing Total		1722.44	
	1F South Wing Total		1346.36	
	Annex Total		371.52	
	Corridors, etc.		776.31	
	<b>1F Total</b>		<b>4216.63</b>	
	2F South Wing Total		1509.18	
	2F North Wing Total		1157.80	
	Corridors, etc		511.78	
	<b>2F Total</b>		<b>3178.76</b>	
	PH1F		24.00	
	PH2F		24.00	
	<b>Main Building Total</b>		<b>7443.39</b>	

### 2-3-3 Site Plan

#### (1) Site Conditions

The project site is located about 6 km south of the center of the city of Vientiane. It borders on Prefectural Road No. 5, an arterial road running from north to south, on the west, and a rural road on the north. The project site is on a hill gently-sloping down to the Prefectural Road. So the drainage of the site does not matter very much. There are many trees in the project site.

#### (2) Site Plan

- ① The project site (of a shape as shown in an attachment to the Lao side written request) was enlarged to have an area of 12 ha. Of the total area, about 9 ha is for the proposed facilities, the rest being for relocation of current dwellers in the project site and also for relocation of the village school nearby. In the center of the project site the main buildings are to be built facing the road running in front and circular roads are to be built around these buildings. The space surrounded by such roads plus adjacent area is the construction area under this project.
- ② The two buildings are to be built in parallel with an east-to-west axis in between in order to protect against direct sunlight in the mornings and evenings when the sun shines at very low angles. This arrangement will also make it easy to let the prevailing wind (blowing from south or north) into the rooms.
- ③ The two main buildings are to be connected by means of a connecting passageway built in the center of the space between the two buildings.
- ④ In consideration of the local security conditions, it is desirable to install a minimum number of entrances. The entrance to the facilities of the emergency department should be located on the same side as the main entrance and the number of entrances to the facilities of the service department should be minimized for easy security management.
- ⑤ The location of the two main buildings in the center of the project site will secure a space for future extensions. This arrangement is also consistent with the director of the hospital's request that amenities such as lodging houses and sports grounds be constructed in the future.
- ⑥ Sufficient setback of wall surface line will make it possible to secure spaces for bus, Jumbo and Tuktuk stops.

## 2-3-4 Architectural Plan

### (1) Floor Plan

#### 1) Examination of the Form of the New Hospital

Generally, a hospital's functions are complex and therefore it is important to design the facilities of a hospital in a manner that ensures orderly performance of these functions. In the floor plan for this project, for efficient interdepartmental functional coordination, the proposed facilities are divided into three groups, the first group consisting of the medical examination and treatment department, the administration/training department, the second group of the wards and the inpatient treatment department and the third group the service and energy department. This arrangement will make it easy to use each of the proposed facilities. In consideration of the need to fully utilize natural ventilation taking advantage of the tropical monsoon climate and the relatively large area of the project site, the main buildings are to form a low-rise, atrium-type hospital.

#### 2) Examination of the Story Composition

One of the two main buildings (north building) is to consist of the facilities of the medical examination and treatment and administration/training departments, namely, the facilities of the outpatient section, the emergency section, the radiology section and the clinical laboratory on the first floor and the facilities of the administration section, the medical office and the training rooms on the second floor.

The other main building (south building) is to consist of the facilities of the ward and inpatient treatment departments, namely, an inpatient treatment ward and related facilities on the first floor and the general ward on the second floor.

The third building, a one-storied building to be built in a place with easy access to the two main buildings, is to consist of the facilities of the service and energy departments.

#### 3) Examination of Building Plans

The main entrance is to be placed in the center of the building so that visitors to the hospital may easily identify it. The medical office, accounting and dispensing counters are to be placed facing the entrance hall. On the northern side of the entrance hall are the facilities of the medical examination and treatment and administration/training departments (the north building) and on the southern side are the facilities of the inpatient treatment department and the

wards (the south building). In the city of Vientiane the south wind or the north wind is prevalent, and therefore all the main rooms are open to south and north so that they may fully utilize natural ventilation and natural lighting from south and north.

#### **First floor:**

The emergency rooms are to be located close to the entrance in the north building so that emergency cases may be let directly into these rooms. The northern half of the north building is to consist of the facilities for the treatment of outpatients. These rooms will let in ample sunlight and also will benefit from sufficient natural ventilation. The southern half of the building is to consist of the sample test laboratories on the eastern side and the radiology and rehabilitation rooms on the western side. This arrangement will make it easy for outpatients to identify individual rooms.

The eastern side of the south building is to consist of the operation theaters, the delivery rooms and the rooms for serious cases. The concentration of these rooms, all of which must be required highly sanitized, in one block of the building will ensure functional efficiency. The western side of the south building is to consist of the facilities of the obstetrics/gynecology and pediatrics sections so that they may provide easy access to the delivery rooms.

#### **Second floor:**

Administration facilities are to be concentrated in the northern half of the second floor for easy interdepartmental coordination. The training rooms are to be arranged facing the atrium so that they may provide a comfortable indoor environment with ample sunlight. The southern half of the second floor is to consist of the wards of two nursing units, one each on the eastern and western sides. This arrangement will afford the nurses' station an unobstructed view of both nursing units.

#### **(2) Sectional Plan**

The wards and the rooms for the examination and treatment of outpatients are to be ventilated by means of natural ventilation. It is important to secure sufficient air volume by means of adequate story and ceiling heights to create a fine indoor environment.

Two atria are to be placed in the center of each of the north and south buildings for efficient ventilation.



There will be many medical equipments on the first floor because the operating, diagnosing and testing rooms are to be placed there, and those rooms should be air-conditioned. This requires higher story height, which is ended in 3.9 m also in consideration of the sizes of these items of medical equipment to be brought in on this floor. The story height of the second floor, where the wards and administration rooms are located, should be 3.45 m.

In view of the fact that both of the main buildings are two-storied and the fledgling equipment maintenance conditions in the county, no elevators are to be installed and instead slopes for use in transportation of beds are to be installed. Patients and the hospital staff are to use two sets of staircases to be installed on the side of the entrance hall.

### 2-3-5 Structural Plan

#### (1) Basic Concept of the Structural Plan

The basic concept of the structural plan for this project is as follows.

- 1) As there are no official standards applicable to architectural structures in Laos, the structural plan for this project is to be worked out in accordance with Japanese Building Standards Code and the standard set by Architectural Institute of Japan. As to the seismic force, however, past records in the country show that earthquakes occurring in and around the city of Vientiane are mostly unfelt earthquakes. In this structural plan, therefore, the value of seismic force is set at one-fourth (1/4) of the one applicable in Japan. The values of other external forces and assumed load are to be determined according to the local climatic conditions, the local geographical conditions, the ground of the project site and the uses of the proposed buildings.
- 2) In consideration of the capability of local construction industry, the building structure should be a simple and clear one. From the standpoint of economy, locally available building materials should be used as much as possible.

#### (2) Structural Plan

The structure of proposed buildings are to be of reinforced concrete, which are common in Laos. As the proposed buildings have a relatively even spanning and the applicable value of seismic force is low, a framed structure is to be employed as the structural form. All the walls, except for those which require measures to protect against X-rays, are to be brick or block walls (bricks and blocks can be procured in the country).

The roofs of all the proposed buildings are required to be similar to traditional Lao roofs. The roofs are, in principle, to be reinforced concrete roofs.

#### (3) Foundation Plan

In principle, the foundations are to be pile foundations. Pile length should be examined carefully taking into consideration the balance between cost and performance. In the case of a relatively light building, the use of spread foundation should be considered. PC (Precast Concrete) piles, which are in widespread use in the country, are to be used.

(4) Design Load

Typical live load values are as shown in Table 2-13. Other live load values are to be determined according to the uses of portions of the building.

**Table 2-13 Live Load for Floor Slab**

(kgf/m<sup>2</sup>)

Room name	for Slab	for Structure	for Seismic
Ward	180	130	60
Examination rm., Operation rm.	300	180	80
Hall, Corridor	300	270	160
Nurse St., Office	300	180	80
Lecture room	360	330	210
Storage	500	400	300
Flat roof	100	80	60

(5) Materials

Main structural materials to be used for this project are as shown in Table 2-14.

**Table 2-14 Materials for Structural Members**

Concrete	Design strength $F_c = 24 \text{ N/mm}^2$
Reinforcing-Bar	Deformed Bar JIS G 3112 SD295A ( $\leq D16$ ) SD345 ( $\geq D19$ ) or equivalent.
Pile	Pre-stressed concrete pile (driven pile)

## 2-3-6 Mechanical and Electrical Systems

### (1) Electrical System

#### 1) Power Supply System

Electric power (3-phase, 3-wire 22 kV, one circuit) is to be supplied to the electric room within the project site from the nearby substation of Electricite Du Laos via an overhead power cable installed on Prefectural Road No. 5. Since it is assumed that load capacity with 330 kW will be required for the proposed facilities, a substation system, a switchboard and other related devices are to be procured for the supply of electric power to the proposed facilities.

The distribution voltage of the electric power to be supplied to the proposed facilities is standard 3-phase, 4-wire 380/220 V. As it is expected that the voltage fluctuation rate will range from -10 percent to +10 percent according to the season and the time zone, automatic voltage regulators (AVRs) are to be procured for the protection of medical equipment and other precision instruments on an as required basis. It is also assumed that there will be one or two power stoppages a month on the average, a power stoppage lasting up to one hour, a diesel generator is to be installed as the emergency power supply. Both the generator and the generator room should be sound insulated, soundproofed and vibration isolated.

#### 2) Lighting/Socket Outlet System

In principle, the design illuminance may be determined with reference to the Japanese Industrial Standards (JIS). In consideration of the present circumstances in Laos, however, the design illuminance values should be 50 to 70 percent of the JIS values.

The light sources should be mostly fluorescent lamps, which are very efficient. A wide range of switches are to be installed to minimize the operation cost.

Sockets outlet that can be used with standard 2-pin outlets with an earth terminal are to be installed. Places of their installation and specifications for them are to be determined according to the type of medical equipment, electrical equipment or communications equipment.

#### 3) Lightning Protection/Earthing System

A conventional type lightning rods and conductors are to be installed on top of each of the proposed buildings. Medical equipment, electrical equipment and

communications equipment are to be earthed as required.

4) Telephone System

The overhead telephone line of Laos Telecom, which is to be installed on Prefectural Road No. 5 running on the eastern side of the project site, is to be connected to the lead-in wire from the MDF. In consideration of future extensions, the circuit capacity of the lead-in wire should be 30 lines or more.

Since the minimum circuit capacity necessary for the proposed facilities will be 10 external lines and 150 extension lines, a PABX (telephone exchange) is to be installed for efficient telephone communications. The Lao side is to be responsible for the work to install the lead-in wire and the payment of circuit connection charges.

5) Public Address System

The main components of the public address system are to be installed in the security room. The public address system will be instrumental in paging medical doctors and instructing patients and staff members to evacuate efficiently when a fire breaks out. A simple audio-visual system is to be installed in the lecture/seminar room. Installation of additional public address systems for use at the reception counter and the pharmacy window is to be considered.

6) Master TV Antenna System

A master TV antenna system is to be provided to the proposed facilities, and TV outlets are to be installed in the administration and education/training rooms. The antennas should be VHF/UHF antennas.

7) Intercom System

A simple nurse call system for the communications between the nurses' station and the wards is to be installed. Extension telephones are to be installed for the communications with the generator and machine rooms.

8) Clock with Battery System

A simple clock with battery is to be installed in each of the administration rooms and the clinical laboratories.

9) Fire Alarm System

A push-button fire alarm system is to be installed for early warning of a fire and

prevention of spread of damage. In principle, the instructions of Vientiane Municipality's Fire Department should be followed in installing the fire alarm system. Details of the system to which no local official standards are applicable are to be examined and determined with reference to Japan's Fire Services Law and the local fire fighting conditions.

(2) Mechanical System

1) Water Supply System

The daily quantity of water required for the proposed facilities is estimated at about 175 m<sup>3</sup>. It is expected that city water will be supplied to the project site by the end of 1998. In case of a delay in the supply of city water, a well is to be newly dug as a backup.

A water tank on the ground is to be installed to protect against city water contamination by ground water. In case of suspension of city water supply, the water tank should always store one day's city water supply.

2) Drainage System

As there are no infrastructures for waste water treatment, waste water from the proposed facilities is to be treated within the project site. General waste water is to be discharged into the existing canal located nearby together with rainwater after being treated in septic tanks.

3) Hot Water Supply System

A system for supplying hot water to the operating rooms and the delivery rooms is usually examined taking into account economy and ease of maintenance. Judging from the required quantity of hot water and the nature of the facilities to be supplied with hot water, a system of supplying hot water from an electrical water heater should be installed.

4) Sanitary Fixtures

As this project is going to be implemented for a Lao hospital, Asian type water closets are to be used together with Western type ones. It is customary in Laos to wash hands directly after defecating, and therefore each water closet is to be provided with a faucet and a paper holder.

5) Medical Gas Supply System

From the standpoint of safety, ease of operation and maintenance and protection against hospital infection, oxygen gas and suction outlets are to be supplied from

a centralized supply system. Oxygen gas and suction outlets are to be supplied to the following rooms.

Operating rooms

Delivery rooms

ICUs

Wards, etc.

Compressed air is to be supplied to operating room by central system.

6) Fire Fighting System

In principle, the Lao fire services laws and regulations are to be followed in installing the fire fighting system for the proposed facilities. As there are no systematized laws and regulations applicable to fire fighting in the country, Japan's Fire Services Law will be referred to on an as needed basis. Indoor hose reels, outdoor fire hydrants and fire extinguishers are to be provided for the proposed facilities.

7) Sewage System

General waste water is to be treated in septic tanks. In light of the present sewage disposal conditions in the country, a simple sewage disposal system which is easy to maintain and manage and which requires minimum running cost is to be introduced. Infectious waste water (from clinical facilities) and laboratory waste water are to be treated in septic tanks together with general waste water after undergoing proper chemical treatment (sterilization and/or neutralization).

8) Kitchen System

As the project site is located far away from the center of the city, it is imperative to supply meals not only to patients but also to their families and relatives, as well as the hospital's staff members.

9) Laundry System

A laundry system to wash linen is to be installed. The system will include washing machines, dehydrators, dryers and irons.

10) Incinerator

An incinerator to dispose of medical waste is to be installed.

11) **Air-conditioning System**

Only the operating rooms, the delivery rooms, the ICUs, the pharmacy and the seminar rooms, all of which must be kept clean, are to be air-conditioned. From the standpoint of economy and ease of maintenance, a separate type air-conditioning system is to be introduced.

In principle a natural ventilation system is to be adopted. However, rooms where smells, vapor or heat will likely be generated, are to be mechanically ventilated.



## 2-3-7 Construction Material Plan

### (1) Exterior Finishing Materials

#### 1) Roofs

From the standpoint of future maintenance, the roofs should be waterproofed with urethane resin. The sloped roofs above the atria and common areas are to be finished with roof tiles. A part of such sloped roofs is mounted with a toplights which will provide supplementary lighting to the area below.

#### 2) Exterior Walls

Those portions of exterior walls which are within reach of human hands are to be finished with highly water-resistant paint for ease of maintenance, and the other portions are to be finished with washed-out mortar.

### (2) Interior Finishing Materials

#### 1) Floors

Floors of the consultation room, the treatment rooms, the wards and the corridor, all of which are likely to be contaminated, should be covered with ceramic tiles for purpose of easy cleaning and sanitation.

#### 2) Walls

The lower parts of the walls of water lavatories and closets, to which contaminated materials are likely to be attached, and those of other facilities which can easily be stained should be covered with ceramic tiles for easy cleaning. The upper parts of the interior walls are to be finished with paint.

#### 3) Ceilings

Ceilings should be installed in rooms where pipes and/or ducts are running and needed to cover them up. For most of areas in the proposed facilities, ceiling will be finished with paint on concrete in order to prevent propagation of bacteria.

The construction materials that can be procured in the country include sand, gravel, bricks, forms, carpentry materials and plastering materials. Other construction materials are to be imported from neighboring countries.

### (3) Doors and Windows

In consideration of the local climatic conditions, exterior windows are to be aluminum. Durable stainless steel fittings should be employed for entrances doors where there

will be a lot of people coming and going.

As for the interior, doors at operation theaters and the rooms which are likely to come into contact with stretchers must be strong enough. For this reason, these doors should be made of steel, light steel or stainless steel. Other interior doors should be made of wood.

### **2-3-8 Medical Equipment Plan**

The medical equipment plan is worked out on the basis of the current status of the items of equipment in the Sethathirath Hospital, the results of the study of the request and the criteria for the selection of items of medical equipment. The list is established as shown in "Table 2-15 List of Main Items of Equipment."

Table 2-15 (1) List of Main Items of Equipments

Ref. No.	Item No.	Code No.	DEPARTMENT	EQUIPMENT	Q'ty
1	IC-A-1	2	ICU	ICU Bed	14
2	IC-A-2	51		Continuous Suction Unit	1
3	IC-A-3	82		Defibrillator	1
4	IC-A-4	85		Syring Pump	1
5	IC-A-5	86		Ventilator	2
6	IC-A-6	93		Patient Monitor	7
7	IC-A-7	110		Nebulizer	2
8	IC-A-8	162		Infusion Pump	4
9	NI-A-1	11	NICU	Infant Warmer	2
10	NI-A-2	67		Phototherapy Unit	2
11	NI-A-3	79		Film Illuminator Large Type	1
12	NI-A-4	85		Syring Pump	1
13	NI-A-5	87		Ventilator for Infant	1
14	NI-A-6	93		Patient Monitor	2
15	NI-A-7	102		Resuscitation Set	1
16	NI-A-8	145		Infant Incubator	3
17	NI-A-9	162		Infusion Pump	1
18	NP-A-1	27	NICU/PICU	Instrument Cabinet	1
19	NP-A-2	74		Continuous Suction Unit	1
20	PI-A-1	2	PICU	ICU Bed	8
21	PI-A-2	85		Syring Pump	1
22	PI-A-3	87		Ventilator for Infant	1
23	PI-A-4	93		Patient Monitor	2
24	PI-A-5	162		Infusion Pump	4
25	OB-A-1	7	Delivery Room	Stool for Operation	2
26	OB-A-2	51		Suction Unit for Operation	1
27	OB-A-3	52		Vacuum Extractor	1
28	OB-A-4	95		Stretcher	4
29	OB-A-5	104		Weighing Scale for Infant	2
30	OB-A-6	114		Ultra-Violet Water Sterilizer	1
31	OB-A-7	117		Diathermy Unit	1
32	OB-A-8	130		Foot Steel Two-step Type	2
33	OB-A-9	135		Delivery Table	2
34	OB-A-10	143		Infant Bassinet Stand	6
35	OB-A-11	152		Anesthesia Apparatus	1
36	OB-A-12	155		Operating Light Stand Type	1
37	OB-A-13	156		Operating Light	1
38	OB-A-14	162		Infusion Pump	2
39	EM-A-1	6	Emergency	Stool for Patient	4
40	EM-A-2	7		Stool for Operation	1
41	EM-A-3	24		Instrument Table	2
42	EM-A-4	27		Instrument Cabinet	2
43	EM-A-5	51		Suction Unit for Operation	1
44	EM-A-6	78		Film Illuminator Small Type	2
45	EM-A-7	80		Operating Table Universal Type	1
46	EM-A-8	82		Defibrillator	1
47	EM-A-9	93		Patient Monitor	1
48	EM-A-10	95		Stretcher	2
49	EM-A-11	96		Examining Light	2
50	EM-A-12	113		Basin Stand	2
51	EM-A-12	114		Ultra-Violet Water Sterilizer	1
52	EM-A-13	117		Diathermy Unit	1
53	EM-A-14	138		Bed Gatch Type	7
54	EM-A-15	152		Anesthesia Apparatus	1
55	EM-A-16	156		Operating Light	1
56	EM-A-17	162		Infusion Pump	2
57	OT-A-1	7	Operation Theater	Stool for Operation	2
58	OT-A-2	24		Instrument Table	2
59	OT-A-3	51		Suction Unit for Operation	2
60	OT-A-4	63		High Pressure Steam Sterilizer	2
61	OT-A-5	80		Operating Table Universal Type	2
62	OT-A-6	82		Defibrillator	1
63	OT-A-7	93		Patient Monitor	2

Table 2-15 (2) List of Main Items of Equipments

Ref. No.	Item No.	Code No.	DEPARTMENT	EQUIPMENT	Q'ty
64	OT-A-8	95		Stretcher	2
65	OT-A-9	115		Scrub Station	1
66	OT-A-10	117		Diathermy Unit	2
67	OT-A-11	138		Bed Gatch Type	8
68	OT-A-12	152		Anesthesia Apparatus	1
69	OT-A-13	162		Infusion Pump	4
70	PH-A-1	6	Pharmacy	Stool for Patient	2
71	PH-A-2	118		Electronic Balance	1
72	PH-A-3	149		Refrigerator	1
73	PH-A-4	160		Medicine Cabinet	2
74	IN-A-1	4	Internal Medicine	Chair for Doctor	5
75	IN-A-2	6		Stool for Patient	5
76	IN-A-3	78		Film Illuminator Small Type	5
77	IN-A-4	88		Examination Table	5
78	IN-A-5	112		Desk for Doctor Consulting	5
79	SG-A-1	4	Surgical Clinic	Chair for Doctor	1
80	SG-A-2	6		Stool for Patient	1
81	SG-A-3	34		Instrument Set for Plaster	1
82	SG-A-4	49		Plaster Bandage Table	1
83	SG-A-5	78		Film Illuminator Small Type	1
84	SG-A-6	88		Examination Table	1
85	SG-A-7	112		Desk for Doctor Consulting	1
86	SG-A-8	131		Foot Steel One-step Type	1
87	DM-A-1	4	Dermatology	Chair for Doctor	1
88	DM-A-2	6		Stool for Patient	1
89	DM-A-3	78		Film Illuminator Small Type	1
90	DM-A-4	88		Examination Table	1
91	DM-A-5	112		Desk for Doctor Consulting	1
92	PN-A-1	4	Pneumology	Chair for Doctor	1
93	PN-A-2	6		Stool for Patient	1
94	PN-A-3	62		Spirometer	1
95	PN-A-4	78		Film Illuminator Small Type	1
96	PN-A-5	88		Examination Table	1
97	PN-A-6	112		Desk for Doctor Consulting	1
98	EY-A-1	4	Ophthalmology	Chair for Doctor	1
99	EY-A-2	6		Stool for Patient	1
100	EY-A-3	112		Desk for Doctor Consulting	1
101	DN-A-1	4	Dental Clinic	Chair for Doctor	1
102	DN-A-2	12		X-ray Apparatus for Dental	1
103	DN-A-3	16		Casting Machine Centrifugal	1
104	DN-A-4	73		Dental Unit	2
105	DN-A-5	112		Desk for Doctor Consulting	1
106	DN-A-6	132		Flask Press	1
107	DN-A-7	159		Model Trimmer	1
108	DN-A-8	165		Micro Motor for Dental Laboratory	1
109	DN-A-9	165		Laboratory Lathe	1
110	EN-A-1	4	ENT	Chair for Doctor	1
111	EN-A-2	77		ENT Treatment Unit with Chair	1
112	EN-A-3	112		Desk for Doctor Consulting	1
113	PD-A-1	4	Pediatric Dept.	Chair for Doctor	2
114	PD-A-2	6		Stool for Patient	2
115	PD-A-3	78		Film Illuminator Small Type	2
116	PD-A-4	88		Examination Table	2
117	PD-A-5	105		Weighing Scale for Pediatric	1
118	PD-A-6	112		Desk for Doctor Consulting	2
119	GY-A-1	4	Gynecology Dept	Chair for Doctor	1
120	GY-A-2	6		Stool for Patient	1
121	GY-A-3	24		Instrument Table	1
122	GY-A-4	27		Instrument Cabinet	1
123	GY-A-5	78		Film Illuminator Small Type	1
124	GY-A-6	88		Examination Table	1
125	GY-A-7	89		Examination Unit for Gynecology	1
126	GY-A-8	112		Desk for Doctor Consulting	1

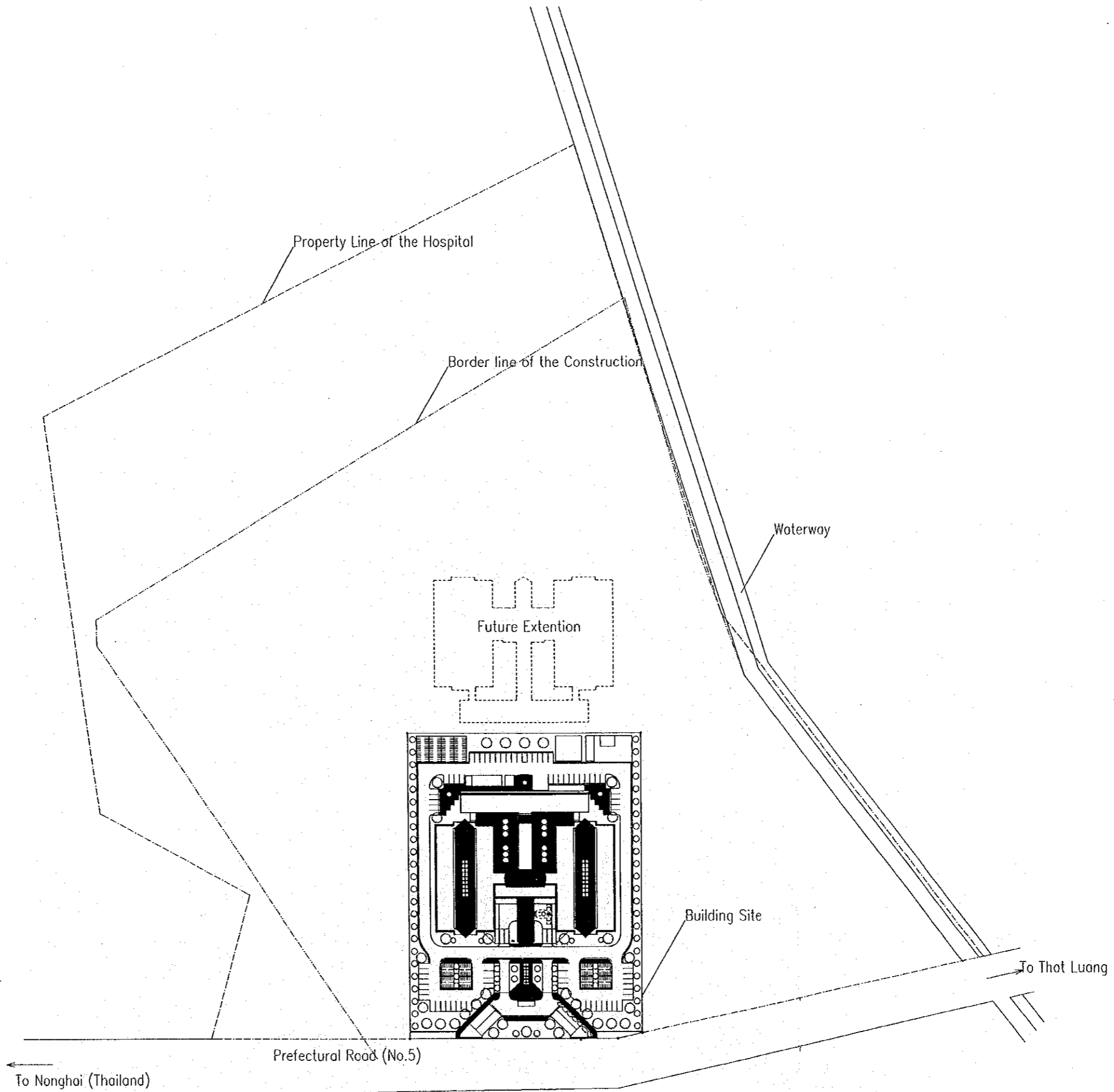
Table 2-15 (3) List of Main Items of Equipments

Ref. No.	Item No.	Code No.	DEPARTMENT	EQUIPMENT	Q'ty
127	GY-A-9	124		Examination Table for Gynecology	1
128	GY-A-10	130		Foot Steel Two-step Type	1
129	MC-A-1	4	MCH	Chair for Doctor	3
130	MC-A-2	6		Stool for Patient	3
131	MC-A-3	24		Instrument Table	1
132	MC-A-4	27		Instrument Cabinet	1
133	MC-A-5	78		Film Illuminator Small Type	3
134	MC-A-6	88		Examination Table	3
135	MC-A-7	89		Examination Unit for Gynecology	1
136	MC-A-8	109		Ultrasound Linear Scanner	1
137	MC-A-9	112		Desk for Doctor Consulting	3
138	MC-A-10	124		Examination Table for Gynecology	1
139	MC-A-11	130		Foot Steel Two-step Type	1
140	CO-A-1	6	Treatment	Stool for Patient	14
141	CO-A-2	24		Instrument Table	5
142	CO-A-3	27		Instrument Cabinet	5
143	CO-A-4	88		Examination Table	7
144	RE-A-1	4	Radiology	Chair for Doctor	1
145	RE-A-2	13		X-ray Fluoroscopy Table	1
146	RE-A-3	30		Instrument Set for X-ray	1
147	RE-A-4	31		Instrument Set for Darkroom	1
148	RE-A-5	78		Film Illuminator Small Type	2
149	RE-A-6	112		Desk for Doctor Consulting	1
150	GY-A-1	4	Rehabilitation	Chair for Doctor	1
151	GY-A-2	19		Overhaed Flame	1
152	GY-A-3	57		Wheel Chair	1
153	GY-A-4	112		Desk for Doctor Consulting	1
154	GY-A-5	136		Parallel Bar	1
155	PY-A-1	4	Physiological Exam.	Chair for Doctor	1
156	PY-A-2	6		Stool for Patient	1
157	PY-A-3	88		Examination Table	2
158	PY-A-4	92		EKG	1
159	PY-A-5	112		Desk for Doctor Consulting	1
160	LB-A-1	3	Laboratory	pH Meter	1
161	LB-A-2	6		Stool for Patient	5
162	LB-A-3	15		Flame Photometer	1
163	LB-A-4	17		Centrifuge	1
164	LB-A-5	55		Clean Bench	1
165	LB-A-6	58		Fluorescent Microscope	1
166	LB-A-7	64		Auto Clave Stand Type	1
167	LB-A-8	65		Drying Oven	1
168	LB-A-9	66		Water Bath	1
169	LB-A-10	76		Blood Cell Counter	1
170	LB-A-11	81		Distilling Water Machine	1
171	LB-A-12	100		Binocular Microscope	2
172	LB-A-13	118		Electronic Balance	1
173	LB-A-14	133		Incubator	1
174	LB-A-15	134		Spectrophotometer	1
175	LB-A-16	144		Hematocrit Centrifuge	1
176	LB-A-17	149		Refrigerator	1
177	LB-A-18	147		Refrigerator for Blood Bank	1
178	LB-A-19	169		Deep Freezer	1
179	WD-A-1	18	Ward	Overbed Table	22
180	WD-A-2	137		Bed Standard Type	80
181	WD-A-3	137b		Bed for Pediatric	20
182	WD-A-4	138		Bed Gatch Type	22
183	WD-A-5	141		Bedside Cabinet	122
184	WS-A-1	10	Workshop	Mortuary Refrigerator	1

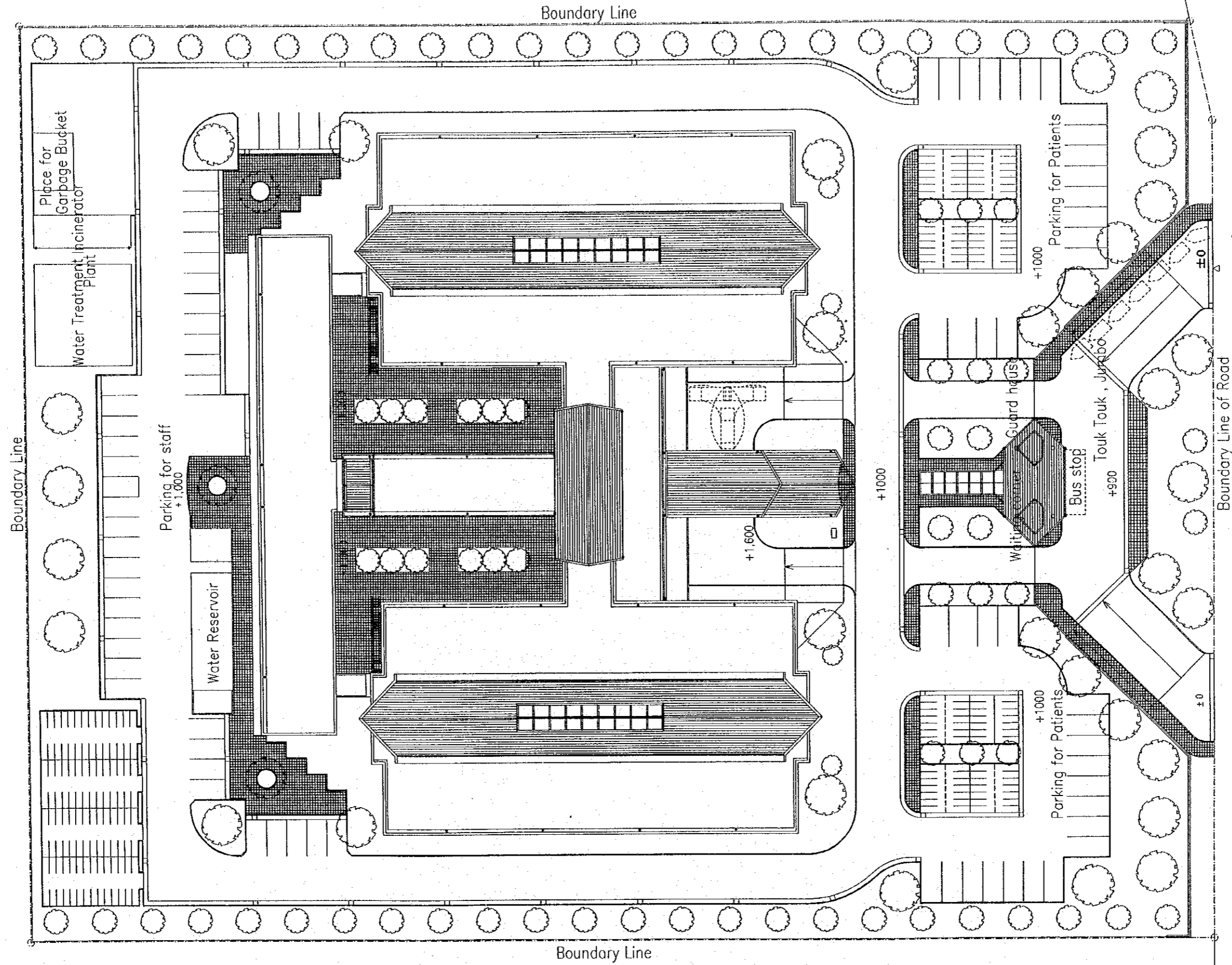
**2-3-9 Basic Design Drawings**

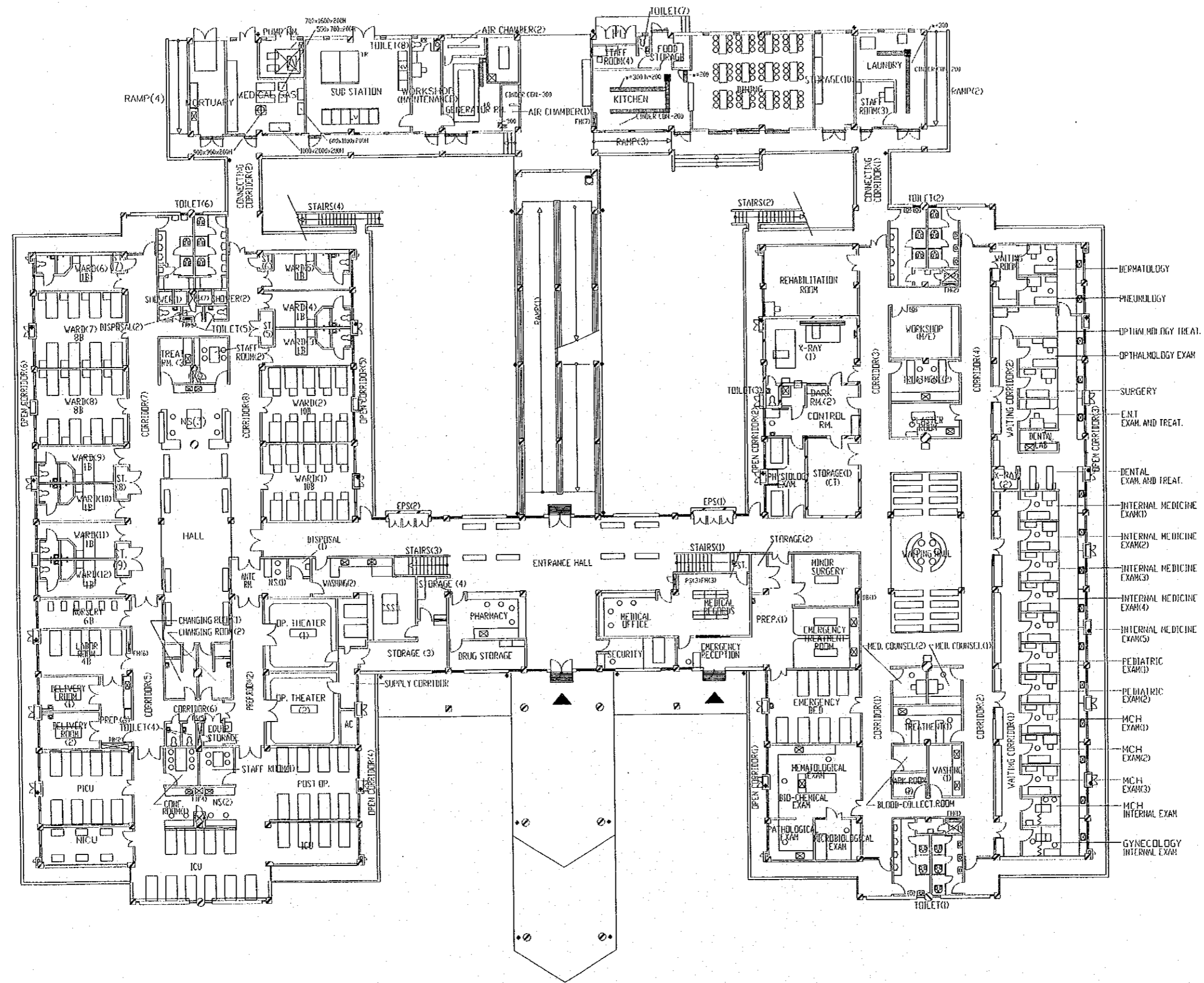
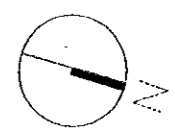
**Table 2-16 Drawing List**

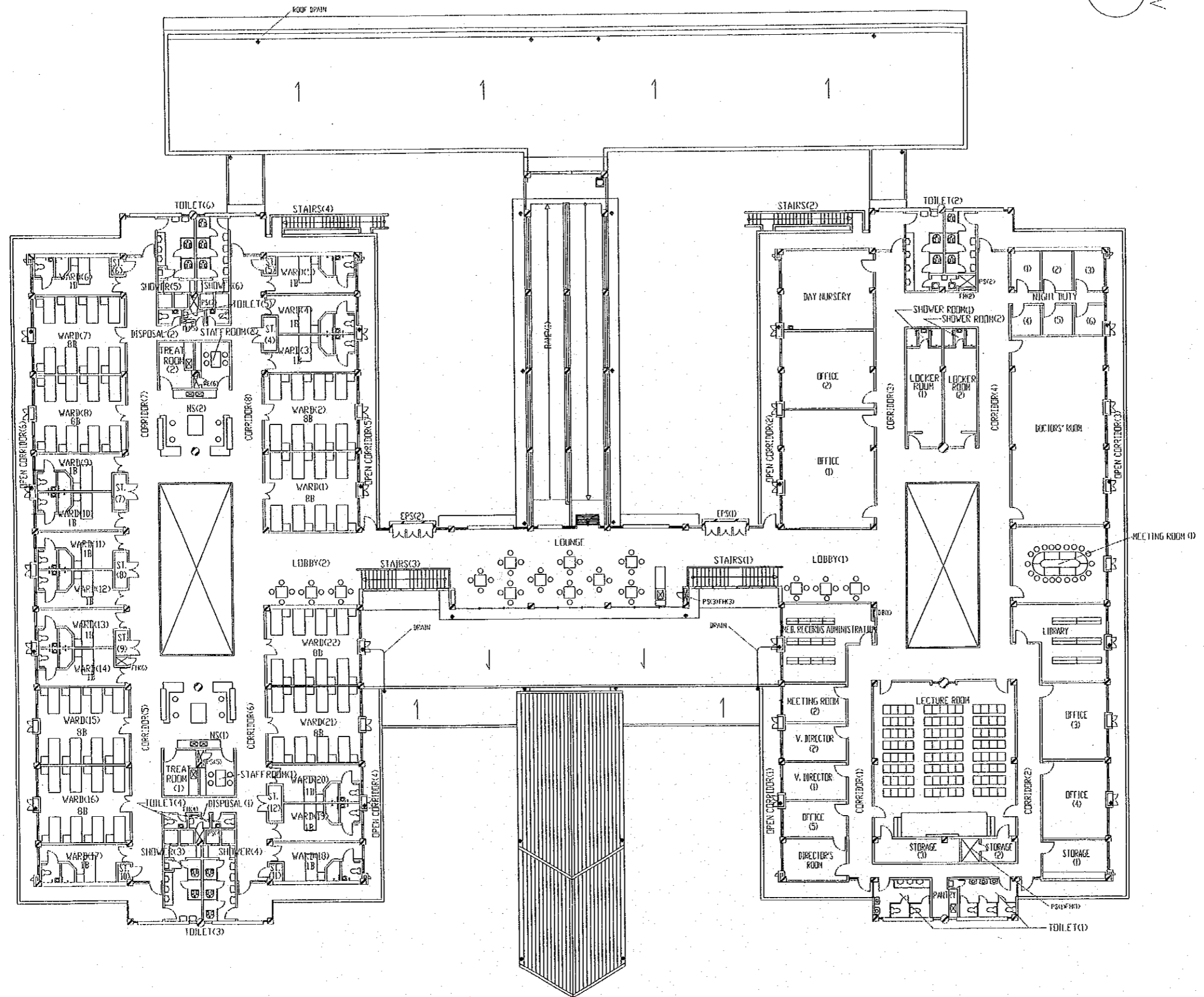
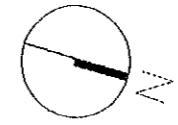
No.	Name	Scale
1	Site Plan 1	1/2,000
2	Site Plan 2	1/500
3	1 <sup>st</sup> Floor Plan	1/300
4	2 <sup>nd</sup> Floor Plan	1/300
5	Elevation	1/400
6	Section	1/400

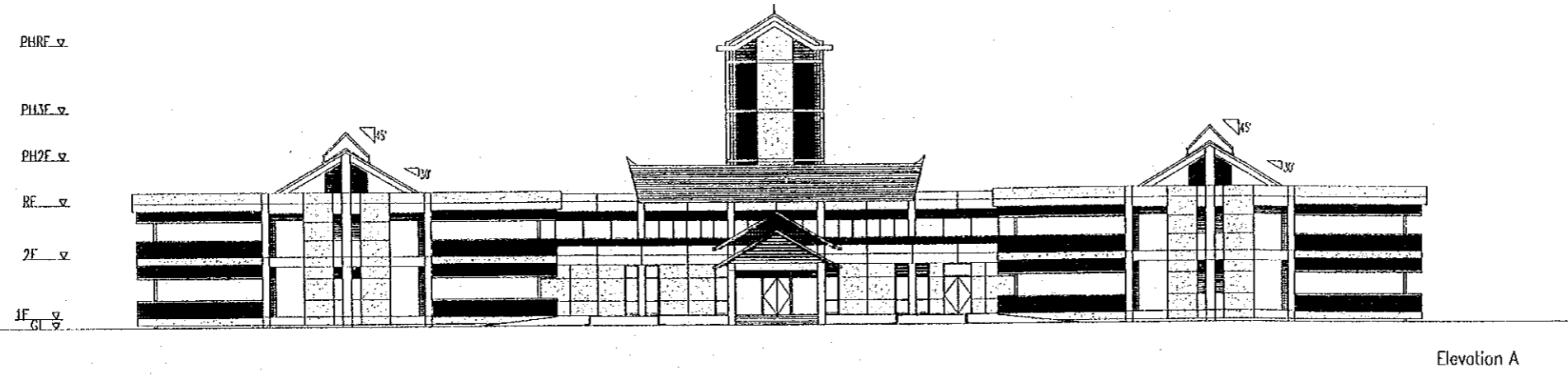




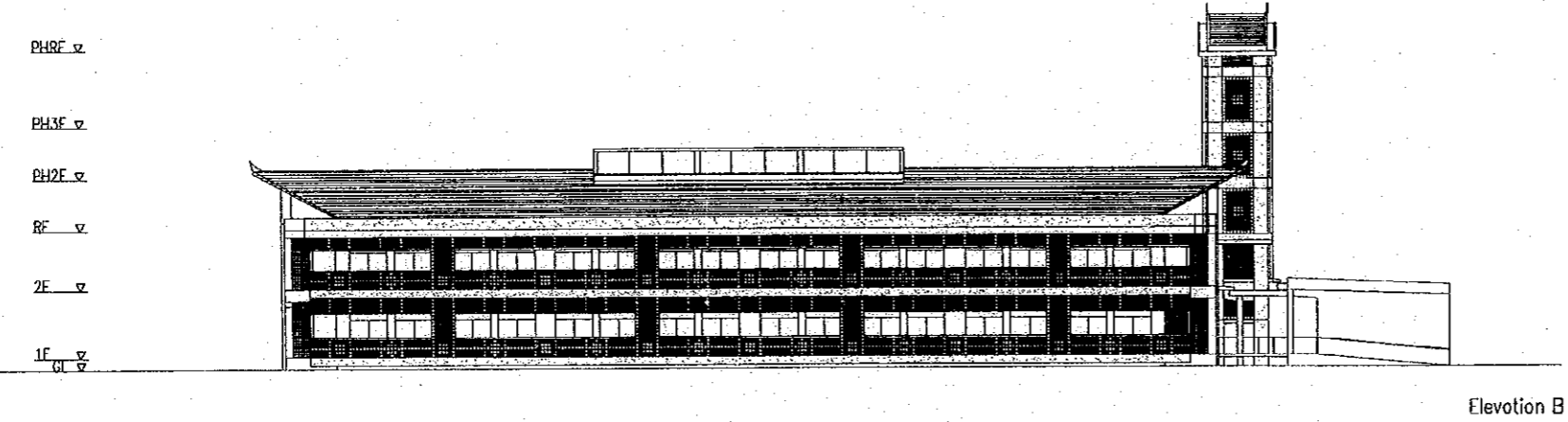




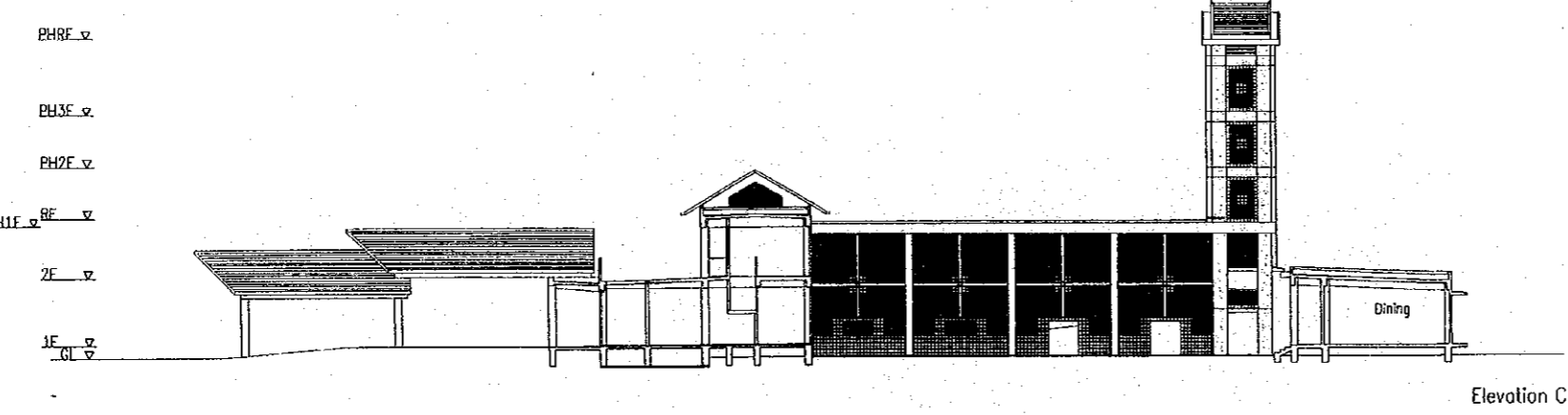
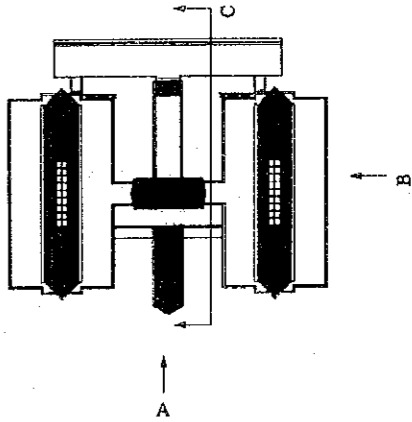




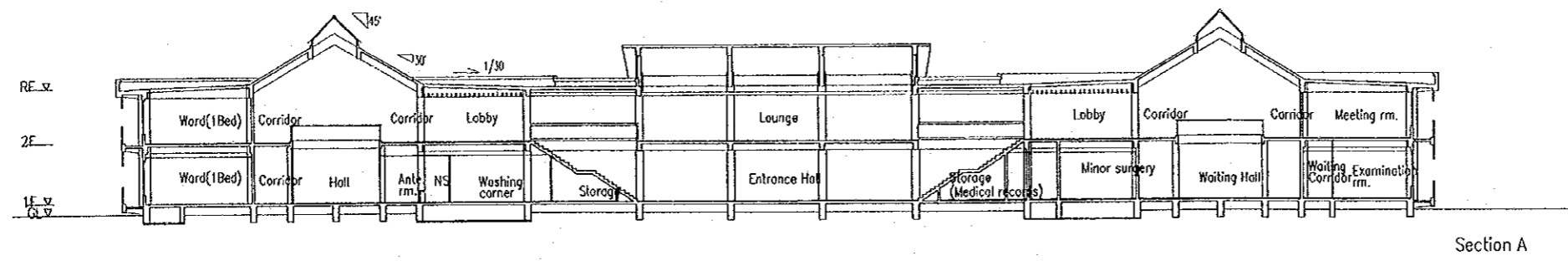
Elevation A



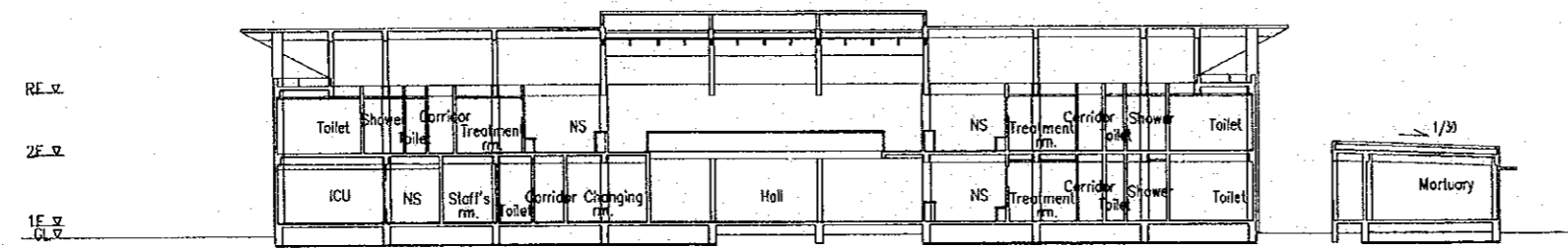
Elevation B



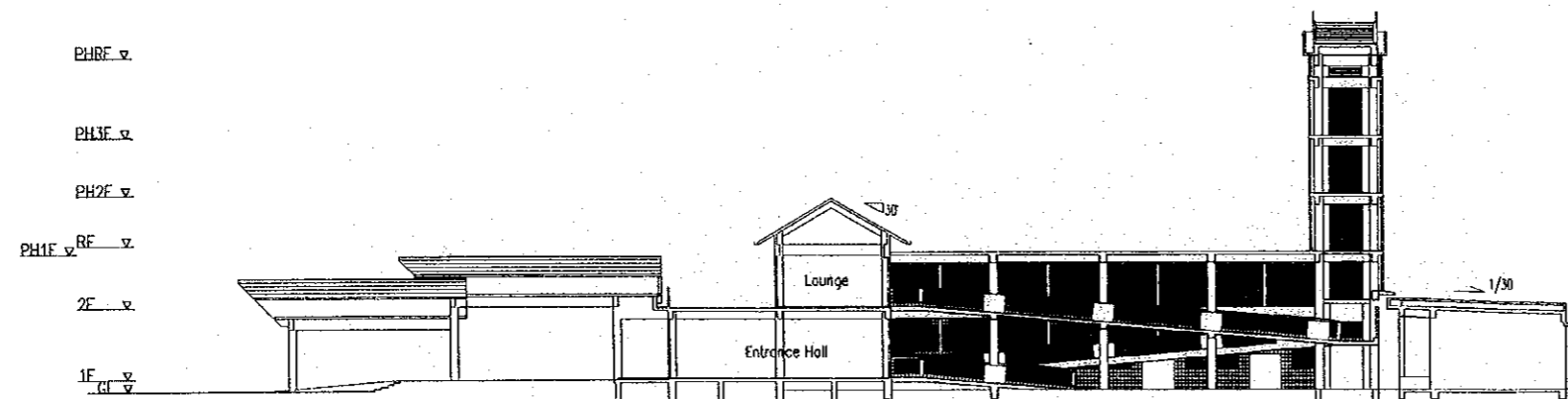
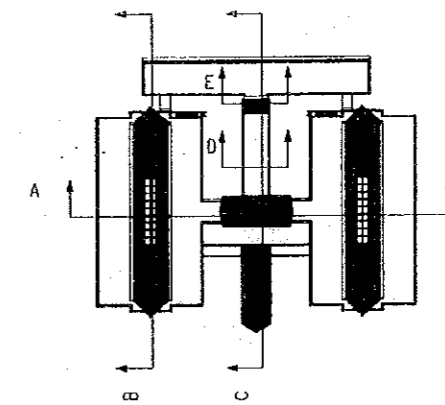
Elevation C



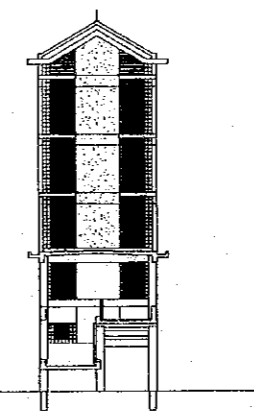
Section A



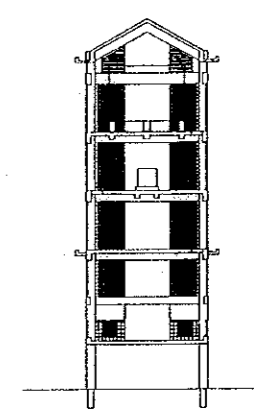
Section B



Section C



Section D



Section E

## **Chapter 3 Implementation Plan**

## CHAPTER 3 IMPLEMENTATION PLAN

### 3-1 Implementation Plan

#### 3-1-1 Implementation Concept

(1) System for the Implementation of the Project

This project is to be implemented within the framework of the Government of Japan's grant aid cooperation after the signing of the Exchange of Notes (E/N) between the Government of Japan and the Government of Laos, subject to the Government of Japan's approval for it in a Cabinet meeting. The system for the implementation of this project is as shown in Fig. 3-1 Implementation Structure.

The supervising agency on Lao side for all aspects of this project is the Ministry of Health of Lao PDR.

The Health Department of Vientiane Municipality is to be the implementing agency to conclude a construction/equipment contract and carry out the works within the scope of works agreed upon in above Exchange of Notes.

(2) Consultant

After the signing of the above-mentioned Exchange of Notes, the Health Department of Vientiane Municipality is to conclude a consultant agreement with the Japanese consultant firm which was concerned with the basic design study for this project for Detail Design and Construction Administration and then have the consultant agreement certified by the Government of Japan. For the smooth implementation of this project, it is important that the consultant agreement be concluded immediately after the signing of the Exchange of Notes. After the conclusion of the consultant agreement, the consultant firm is to prepare detail design drawings and specifications based on the contents of this basic design study report, in consultation with the representatives of Sethathirath Hospital and obtain the approval of the head of the Health Department of Vientiane Municipality for them. Then the consultant firm is to start carrying out tender procedure to select the Contractors and Construction Administration on the basis of the contents of the detail design drawings and specifications.

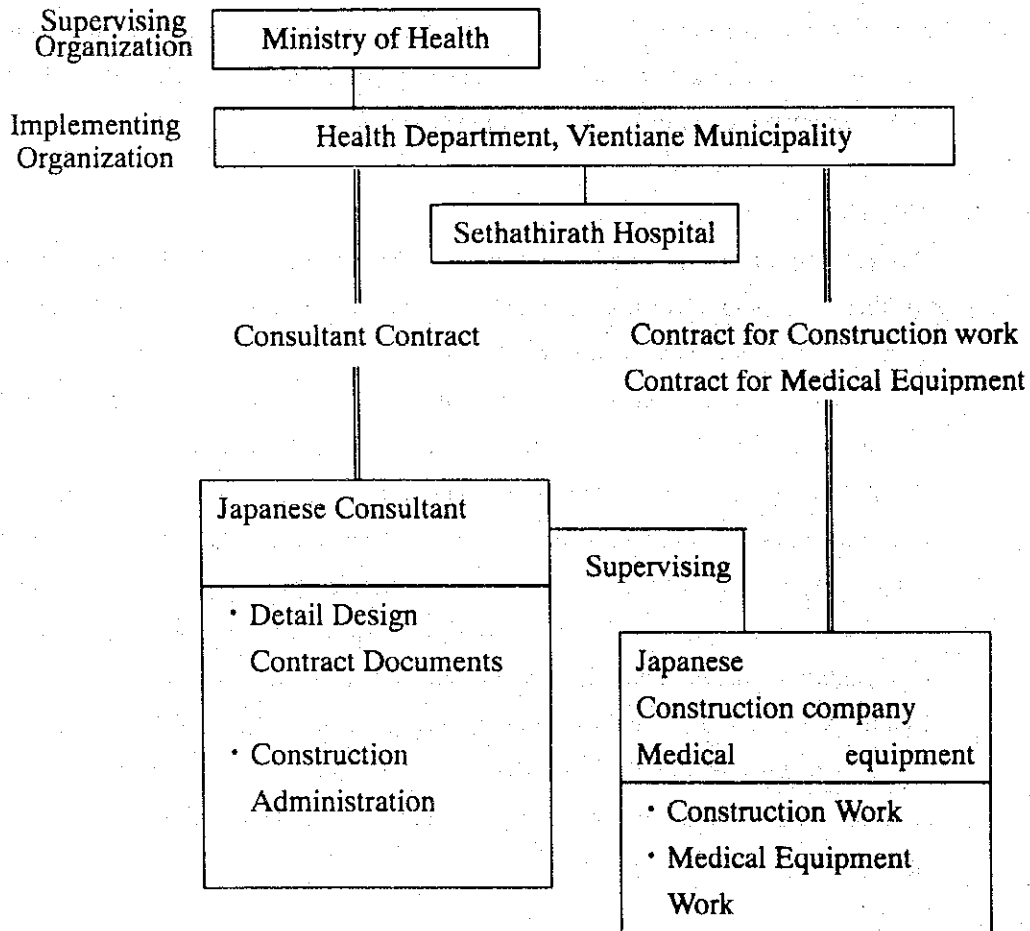
(3) Contractors

This works executed to implement the project comprises the work to construct the proposed building facilities and the work to procure and install medical equipment. The contractors to be responsible for these works is to be selected from qualified Japanese business corporations by open tender with restrictions on qualifications.

The Health Department of Vientiane Municipality is to conclude contracts for the building construction and equipment procurement/installation with the contractors selected by tender and then have the contracts certified by the Government of Japan.

Immediately after that, the contractors are to start carrying out the works in accordance with the provisions of the contract.

Fig. 3-1 Implementation Structure





### 3-1-2 Implementation Conditions

#### (1) Local Construction Situations

In Laos many civil engineering works, mainly road/bridge construction works and irrigation works, have been implemented. In the city of Vientiane, a road pavement project is scheduled to be started. A large scale project to construct Highways No. 8 and 9, both of which will lead to Vietnam, is at the planning stage. In the area of building construction, an airport terminal construction project, a project started with the financial assistance by the Government of Japan, has just been completed. The construction of the Parliament building has also been completed, and many buildings of government agencies' are under construction one after another. A part of the building of the Ministry of Health is also under construction. A new four-storied building with a total floor space of 3,500 m<sup>2</sup> is being constructed adjacent to the ministry's existing building.

In the area of hospital construction, a project to construct the building of Vientiane Prefectural Hospital was launched in November 1997 with the cooperation from the government of Luxembourg, and the project is now under way. The building's total floor space is about 6,000 m<sup>2</sup>. The construction period is 20 months. A Thai contractor was selected as the contractor to build this project by international tender. Large-scale hotel construction projects are being implemented in association with Thailand's big businesses. Thailand's contractors, including building material suppliers, is exerting great influence on the Laotian construction industry.

In implementing this project the Japanese contractor is to use the services of local subcontractors. There would be no problem with this arrangement so far as the Japanese contractor administers and manages the local subcontractors very carefully. On the other hand, those portions of the proposed facilities and items of equipment which must be of high quality and those which require high precision in engineering will require technical guidance and construction supervision by experts from Japan or Thailand.

Of the construction materials, only such basic items as sand, gravel, forms, reinforcement bars of small gauge, concrete blocks, bricks and lumber can be procured in the country. Reinforcement bars, steel products, ceramic tiles, doors and windows, all of which must be up to standards equivalent to JIS, are to be imported from neighboring countries. It will be necessary, therefore, to arrange for the procurement of these construction materials well in advance to prevent adverse effects of the delay in the procurement of these materials on the construction period.

In the city of Vientiane there are two factories supplying ready-mixed concrete, but the quality of their products is uneven. Moreover, the two factories' combined total daily production is only about 100 m<sup>3</sup>. That quantity will be insufficient for the skeleton work for this project.

Such construction machines as bulldozers, backhoes, dump trucks, cranes and concrete mixers can be procured in the country. These machines can also be brought into the country from Thailand. Thus there will be no problem with the procurement of construction machines.

Since most of the construction machines and materials for use in this project are to be procured in third countries, it is necessary that the procedures for their procurement, including import and tax exemption procedures, be followed well in advance for the smooth progress of the construction work.

(2) Points to Note in Carrying Out the Construction Work

The project site is located in a suburb of the city of Vientiane, about 6 km south of the center of the city. The total area of the formal project site is about 9 ha, and about 2 ha of the site is to be used for this project. As for the temporary works for the project, city water is not yet supplied to the project site, and therefore well water is to be used for the construction work, drinking water being purchased on an as needed basis.

In view of the fact that the project site is situated fairly remote from the center of the city of Vientiane and that there are no means of public transport between the project site and the center of the city, it is necessary to secure means of transport of the staff members at work at the project site and accommodations for the construction workers. The project site has a relative large space to spare and therefore it will be possible to provide construction workers' lodging houses. Farm houses are scattered around the surrounding areas. It is likely that cows and buffaloes will trespass on the project site. So it will be necessary to install fences to prevent their trespass as well as thefts.

In Laos the rainy season lasts from May to September. It will be necessary, therefore, to avoid carrying out the earth work, such as excavation and filling, during this season. It will also necessary to pay special attention to the quality of the concrete work during this season and the drying period in the plastering work.

As this is a project for the construction of facilities of a hospital, including the procurement of medical equipment, it will be necessary to verify the capacity, size and location of each item of electric and drainage equipment, to which medical equipment is to be connected. That requires the good coordination with reference to the shop drawings prior to the start of the construction work.

### 3-1-3 Scope of Works

For the smooth progress of this project, it is necessary to clearly distinguish between the works to be carried out by the Japanese side and those to be carried out by the Lao side. The distinction is as shown in Table 3-2.

**Table 3-2 Scope of Works**

Works to be borne by Japanese side	Works to be borne by Lao side
1. Building construction work (including standard fixed furniture and fixtures, curtain inside the ward).	1. Preparation of construction site Demolition of existing structure and substructure, Filling.
2. Electrical work Substation system, Power and main wiring system, Lighting and socket outlet system, Telephone and Communication systems, Lightning protection system, and Fire alarm system.	2. Move of existing primary school building, residence.
3. Mechanical work Water supply system, Drainage system, Hot water supply system, Sanitary fixtures, Gas supply system, Fire fighting system, Air conditioning and Ventilation systems.	3. Landscape work Landscaping and planting (except courtyard), Gate, Fence, Road, Parking.
4. Special work Generator system, Nurse call system, Medical gas supply system, Sewage treatment plant, Kitchen, Laundry, Incinerator.	4. Connection works utilities Each infrastructure such as electricity, water supply, telephone, drainage.
5. Landscape work Planting in courtyard, Grading, Roads, Lighting in the area defined as the construction site in this report.	5. Furniture and fixture Curtain for windows (Curtain rail work will be done by Japanese side), Blind, Ordinary furniture.
6. Medical equipment work Procurement and installation of medical equipment.	6. Transportation and installation of existing medical equipment.

### 3-1-4 Construction Administration

Vientiane Municipality's Health Department and the Japanese consultant firm are to conclude a consultant agreement for detail design and construction administration for this project.

The objectives of construction administration are to ensure that the construction work is conducted in accordance with the drawings and specifications and to provide guidance, advice and coordination to attain the highest possible quality of the construction work from a fair point of view. Construction administration comprises the following activities.

1) Cooperation in Tender and Conclusion of the Contracts for the Building Construction and the Procurement/Installation of Medical Equipment Works

The consultant firm is to prepare tender documents necessary for selecting a contractor to take charge of the building construction works and medical equipment procurement, make a tender announcement, accept applications, review applicants' qualifications, hold a briefing, distribute tender documents, accept tenders and evaluate the results of tender, and also give advice about the building construction works and medical equipment procurement works contract to both Health Department Vientiane Municipality and the contractors selected.

2) Guidance, Advice and Coordination to the Contractor

The consultant firm is to examine the implementation schedule, the implementation plan, the construction machine/material procurement plan and the medical equipment procurement/installation plan, and give guidance, advice and coordination to the contractor.

3) Examination and Approval of the Shop Drawings and the Manufacturing Drawings

The consultant firm is to examine the shop drawings, the manufacturing drawings and other documents submitted by the contractor, give necessary instructions to the contractor, and after that approve them.

4) Approval of the Construction Method, Materials and Medical Equipment

The consultant firm is to confirm the consistency of the construction materials and medical equipment with the Contract Documents.

5) Work Inspection

The consultant firm is to be present at inspections of the construction

machines/materials and medical equipment to be procured as well as the working tests to ensure that their quality and performance are consistent with the specifications.

6) **Reporting on the Progress of the Construction/Equipment Works**

The consultant firm is to get a clear grasp of the implementation schedule and the conditions of the construction site and report the progress of the works to the organizations concerned of both countries.

7) **Inspection of the Completed Facilities/Installed Equipment and Trial Operation of the Installed Equipment**

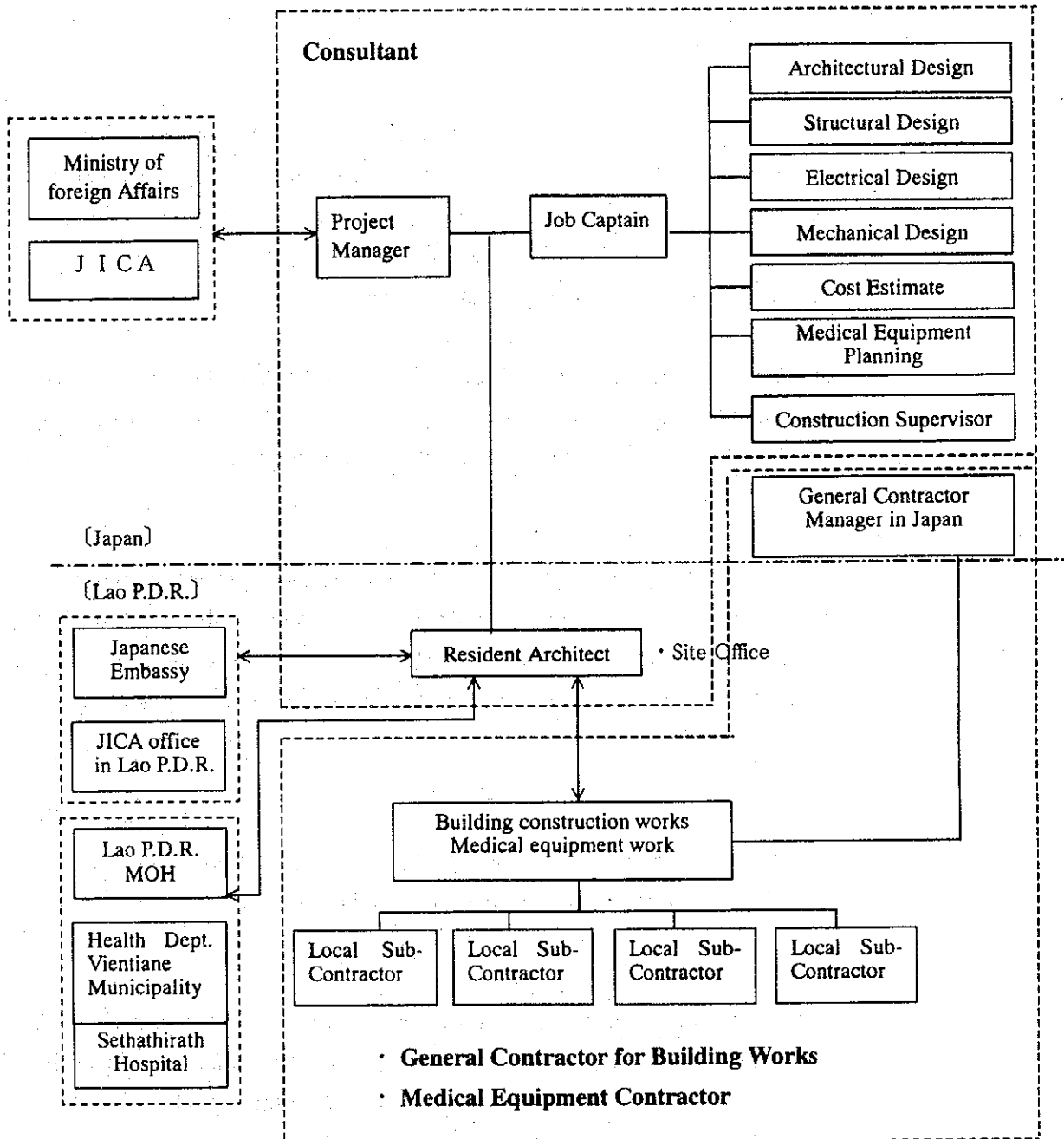
The consultant firm is to inspect the completed facilities and conduct trial operation of the installed medical equipment to ensure that the performance of each item of equipment is consistent with the provisions of the contract, and after that submit a certificate of completion of the works to the Lao side.

8) **Method and System for Consultant's Construction Administration**

In light of the scale of this project, the consultant firm is to send its experts to the construction site for discussions, inspections, guidance and coordination as the works progress, in addition to its staff member stationed at the construction site. During the foundation and skeleton works, the consultant firm is to dispatch architects and a structural engineer is to administer the works, and during the finish work architects, mechanical, and electrical engineers and medical equipment engineers are to inspect and administer the work. The consultant firm is also to establish a backup system within it by appointing qualified engineers to approve the shop drawings and the manufacturing drawings and keep in contact with the staff member stationed at the construction site. Furthermore, the consultant firm is to report the progress of this project, the payment procedures and the completion and delivery of the proposed facilities and equipment to the Japanese government agencies concerned.

Consultant supervision is to be carried out within the framework of an organizational system as shown in Fig. 3-3.

Fig. 3-3 Construction Administration System



### 3-1-5 Procurement Plan

#### (1) Procurement Concept

As this is a project for the construction of facilities of a hospital, it is essential to procure items of equipment which are easy to keep clean, easy to clean and sturdy. The important points to note in procuring these items of equipment are as follows.

##### 1) Local Procurement

For the ease of repair, operation and maintenance of the proposed items of equipment after the completion of this project, these items of equipments should be procured in the country wherever appropriate. In this connection, it is necessary to verify the quality and the supply of each of these items of equipment to ensure the smooth progress of the works.

Imported products which can be easily procured in the domestic market of Laos without following the import procedures, are regarded as domestic products, and therefore their procurement is regarded as local procurement.

##### 2) Import

Those which are hard to procure in the country, fail to meet the prescribed quality requirements or are in short supply are to be procured in Japan or third countries. In this case, the contractor will have to contact Vientiane Municipality's Health Department to ensure that all the necessary procedures are followed smoothly.

When the cost of import from Japan or third countries (purchase price plus packing/transportation cost) is lower than the purchase price of domestic products, such import is regarded as local procurement.

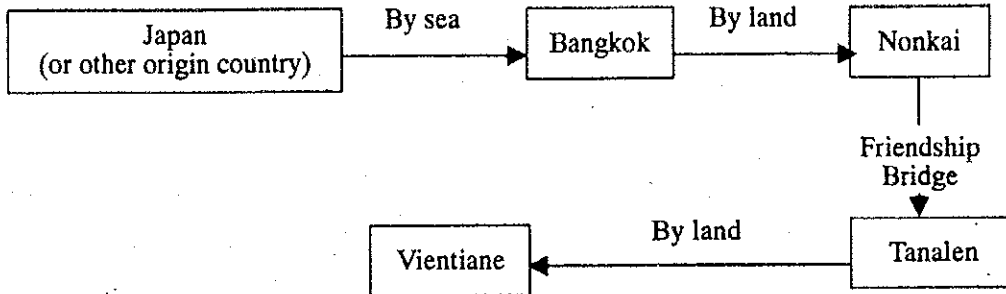
##### 3) Transportation Plan

Products imported from Japan or third countries are to be first transported by sea to Bangkok, where they are to be transshipped for land transportation to the construction site in the city of Vientiane. As some of these products are likely to be badly affected by shocks, humidity and high temperature, special attention should be paid to their packing.

The most common route of transportation of products imported from Japan or



third countries is as shown below.



This is the shortest route between Vientiane and Bangkok, and is therefore the most common route of trade between Laos and Thailand. It will take about one week to transport by land products procured in Thailand to Vientiane, and one week to clear these products through the customs. Products procured in Japan are to be first transported by sea. It will take about two months for shipment from Japan to the Construction site.

A Thai carrier to transport goods to Laos must receive an export license. The Thai carrier stores the goods in bond in Thanaleug and a Laotian carrier clears them through the customs and then transports them to the construction site. The road between Thanaleug and the construction site is paved. The road's length is about 23 km.

The tax exemption procedures must be followed in advance in Laos.

## (2) Construction Machines/Materials Procurement Plan

The construction machines and materials to be procured in accordance with the above-mentioned "Procurement Concept" can be divided into those to be procured in Laos, those to be procured in third countries and those to be procured in Japan, as shown in Table 3-4. The rationales for the decisions to procure certain items either in Japan or in the third countries are indicated in this table.

**Table 3-4 (1) Procurement Plan for Major Construction Materials**

Works	Material	Laos	Third Country	Japan	Comments
Concrete work	Cement		○		
	Sand	○			
	Gravel	○			
	Deformed Bar		○		
	Form		○		
Steel work	Section steel		○		No local product
	Steel plate		○		"
Masonry work	Concrete block	○			
	Brick	○			
Water proofing work	Asphalt water proof		○		No local product
	Coating		○		"
	Sealing		○		"
Plastering work	Terrazzo		○		No local product
Tile work	Ceramic tile		○		No local product
	Porcelain tile		○		"
Carpentry work	Timber	○			
	Laminated wood		○		No local product
	Plywood		○		"
Roofing	Roofing material	○			
Metal work	Light gage steel stud		○		No local product
	Aluminum louver		○		"
	Finish hardware		○		"
	Roof drain		○		"
Plastering	Cement mortar	○			
	Plaster	○			
Wood fittings work	Swing door		○		Produced locally, but Flush doors to be imported
	Double sliding door	○	○		
	Wood door frame	○	○		
Metal fittings work	Aluminum window		○		No local product
	Louvered glass windows		○		"
	Steel door		○	○	Special doors from Japan
	Stainless steel fittings			○	For use in operating theaters & other rooms requiring high performance fittings
Fitting hardware	Door check			○	No local product
Glass work	Plate glass		○		No local product
	Heat reflective glass		○		
	Glass block		○	○	
Painting work	Interior paint		○		Japanese paint used where durability required
	Exterior paint		○	○	

Table 3-4 (2) Procurement Plan for Major Construction Materials

Works	Material	Laos	Third Country	Japan	Comments
Interior work	Glazing board			○	Used where sterility , ease of maintenance, and resistance
	Plaster board		○		No local product
	Rock wool sound absorption board		○		"
	Glass wool		○		"
	Form polystyrene		○		"
Furniture	Chairs and tables	○	○		Produced locally (only wood, not steel)
	Beds and lockers	○	○		"
Miscellaneous	Laboratory sink/table			○	Tub sinks
Exterior work	Paving material		○		
Electrical work	Electrical, wiring equipment		○		
	Lighting fixture		○	○	Special fixtures for operation theaters, etc., to be Japanese
	Switch board		○		No local product
	Generator		○		Made by Japanese maker in 3 <sup>rd</sup> country
	Dry-type transformer		○		No local product
	Electric wire and cable		○		"
	PABX			○	Use Japanese products considered cost and maintenance
	Public address system			○	"
Mechanical work	Package air conditioner		○	○	Japanese: duct type, recessed type 3 <sup>rd</sup> country: wall type, hang type
	Blower and exhaust fan		○		
	Outlet and inlet		○	○	Special Equipment for operation theaters, etc., will be Japanese
	Sanitary ceramic		○	○	Special fixtures to be Japanese
	Ducting material		○		
	Piping(PVC)		○		
	Piping(steel pipe)		○	○	Medical gas pipes from Japan
	Insulation material		○		No local product
	High performance filter			○	"
	Kitchen equipment		○		"
	Laundry equipment		○		"
	Incinerator		○		"
	Sewage treatment plant		○		"

(3) Medical Equipment Procurement Plan

In Laos no medical equipment is manufactured and therefore all items of medical equipment in use at the hospital are imports from other countries. The important points to note in procuring medical equipment under this project are as follows.

- In the city of Vientiane there are only three local distributors of medical equipment manufacturers. The hospital is dependent on Thailand, a neighboring country, for the maintenance of the existing items of medical equipment and the procurement of expendables and spare parts. On the other hand, there are a number of local distributors of Japanese medical equipment manufacturers in Thailand. It is therefore desirable to procure most items of medical equipment in Japan.

- Those to be procured for the clinical laboratory, the gas blood analyzer, the electrolyte analyzer and the like, which must be inspected and maintained frequently and which require an ample supply of reagents and consumables, must be the products of manufacturers who have local distributors in the city of Vientiane.

### 3-1-6 Implementation Schedule

#### (1) Implementation Schedule

- 1) This project is to be implemented within the framework of Bond A as a part of the Government of Japan's grant aid. The implementation schedule after the signing of the Exchange of Notes by the governments of Japan and Laos is as shown in Table 3-5 below. The implementation schedule covers detail design by the consultant firm, tender business, the construction work by the contractor and construction supervision by the consultant firm. It will be about seven months before the construction work is started. It is necessary to implement this project properly taking this into consideration.
- 2) After the conclusion of the construction/equipment contract, the construction work is to be started subject to the Government of Japan's approval for the contract. In examining the construction period it is necessary to give due consideration to the following factors in addition to the scale of this project and the local construction conditions.
  - In the city of Vientiane the rainy season lasts from May to September. It will therefore be necessary to pay careful attention to the timing of excavation and the drying period in the skeleton work and the plastering work.
  - It will be necessary to take minute care in working out the plan for the packing and transporting of products to be imported.

It will be necessary to complete the works within the set period of time giving due consideration to these factors.

- 3) Since this project is to be implemented within the framework of grant aid cooperation of the Government of Japan, it is required to be completed within the set period of time. In this context, the Lao side's cooperation is of very important. It is desirable that the works by the Lao side before the works by the Japanese side. The scope of works by the Lao side include securing project site, obtaining building certification and other necessary procedures, and development of part of necessary infrastructures.

**Table 3-5 Implementation Schedule**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Detailed Design	■	Field Survey			■	Confirmation									
		Work in Japan											(Total 7 months)		
Construction and Procurement	■	Preparation													
		Foundation													
			Structural Work												
				Building Equipment & Interior Work											
					Exterior Work										
			[Equipment Work]	Manufacture & Procurement											
											Transportation				
													Install. & Adjust.		

### **3-1-7 Obligations of the Recipient Country**

The obligations on the Lao side are as itemized below.

- 1) Exemption from all applicable taxes.
- 2) Following the procedures for obtaining building permission and other necessary permits.
- 3) Issuance of the bank arrangement (B/A) and the authorization of payment (A/P) and defrayment of charges for the issuance of these documents.
- 4) Prompt unloading of imported products at the port of unloading, guaranteeing the tax exemption and customs clearance procedures, and ensuring prompt domestic transportation.
- 5) Providing every facility to Japanese nationals to enter and stay in Laos to engage in the supply of the items of equipment and materials under the contract certified and other related activities.
- 6) Exempting Japanese nationals to enter and stay in Laos to engage in the supply of the equipment and materials under the certified contract and other related activities from customs and all other taxes.
- 7) Effective operation of the facilities constructed, and the equipment procured, with the grant aid cooperation of the Government of Japan and making budgetary appropriations for their maintenance and management.
- 8) Removal of the existing facilities in the project site and site preparation.
- 9) Supply of electric power, city water, sewers and telephone line to the project site.
- 10) Relocation of the specified items of equipment in the existing facilities to the proposed facilities and their installation in the proposed facilities.
- 11) Procurement and installation of general furniture.
- 12) Defrayment of the costs of products other than those procured under this grant aid cooperation project.