CHAPTER 3 BASIC DESIGN

CHAPTER 3 BASIC DESIGN

1. Basic Design Policies

The Project aims to strengthen the primary and secondary medical functions of Kalawati Saran Children's Hospital located on the premises of Lady Hardinge Medical College, improve the quality of regional health activities conducted at the three Health Centres working closely with the Medical College, promote the health of local community residents, including infants, and thereby improve the country's health indicators such as the infant mortality rate. The facility and equipment plan for the Project is therefore to be worked out paying close attention to the functionality, economy and safety of each item in accordance with the following basic design policies.

(1) Basic Design Policy in Relation to the Natural Conditions

As stated in Chapter 2, the National Capital Territory of Delhi (hereinafter referred to as Delhi) belongs to a semiarid climate which consists of the rainy season and the dry season. There is a considerable difference in temperature between the May to June period, when the average temperature exceeds 30°C and the maximum temperature reaches 45°C and the December to February period, when the average monthly temperature is about 15°C and the lowest temperature reaches 4°C. The July to August period is the very sultry rainy season when average monthly rainfall exceeds 200m/m. In light of such natural conditions, the following basic design policy was worked out.

- Since the operation theatre, ICUs and laboratories to be constructed under the Project require air conditioning, their walls and roofs should be insulated sufficiently and the amount of

sunlight coming though the window glass should be minimized so that maintenance and management costs, including air conditioning expenses, may be minimized.

- To protect the medical equipment to be procured under the Project against dust during the dry season, window frames which are highly resistant to dust should be used.

- Measures should be taken to protect against unclean condition especially during the rainy season.

(2) Basic Design Policy in Relation to the Social Conditions

The Project site is located in the New Delhi District in the centre of the National Capital Territory of Delhi. New Delhi Municipal Committee attaches importance to the maintenance of the beauty of the streets and environmental protection. Applications for the building permit are screened by Delhi Urban Arts Commission. As regards environmental protection, it is difficult to obtain permission to cut down existing trees. Since the Project is going to be implemented as one aimed at expanding and improving the existing facilities of Kalawati Saran Children's Hospital on the premises of Lady Hardinge Medical College, the following basic design policy was worked out.

- The design of the outer appearance of the planned facilities should be in harmony with that of the existing facilities.

- As many of the existing trees on the Project site should be preserved as possible considering the surrounding natural environment.

(3) Basic Design Policy in Relation to the Local Construction Situation

India has detailed building laws and regulations, which require that architectural plans shall be subject to screening of their contents. In working out the architectural plan for the Project it is essential to comply with the local building laws and regulations so that the building permit may be obtained smoothly.

(4) Basic Design Policy in Relation to Utilization of Local Contractors and Locally Available Building Equipment and Materials

In India, the import of foreign-made goods which are the same as domestic goods is restricted. Activities of foreign companies in the country are also limited. Since the country has a viable construction industrial base, there will be no problem with the procurement of domestically produced building equipment and materials. In implementing the Project, therefore, the qualified Japanese contractor should give technical advice to its Indian subcontractor to make full use of domestically produced building equipment and materials.

(5) Basic Design Policy in Relation to the Project Implementing Organization's Maintenance and Management Capability

The building maintenance and management cost is included in the annual budget of Kalawati Saran Children's Hospital. As the Project is aimed at expanding and improving the facilities of the existing hospital, it is expected that the building maintenance and management cost will increase as the total floor space of its facilities increases. It is important to minimize the hospital's building maintenance and management cost for the Project so that too heavy a financial burden may not be imposed on the hospital. To reduce the maintenance and management cost, natural ventilation and lighting should be utilized as much as possible, planned

buildings should be sufficiently insulated, and highly durable building equipment and materials should be used.

(6) Basic Design Policy in Relation to the Scope and Level of the Facilities and Equipment to be Procured under the Project

After considering all the above basic design policies, the following basic design policy was worked out for the facilities and equipment to be procured under the Project.

- The facility plan should be consistent with the functions of Kalawati Saran Children's Hospital and the three Health Centres (in Kalyanpuri, Najafgarh and Palam).
- The facility/equipment maintenance and management cost should be minimized.
- The planned facilities should match the characteristics of the Project site.

(7) Basic Design Policy in Relation to the Period of the Implementation of the Project.

In determining the period of the implementation of the Project, care should be taken to minimize the period of suspension of operations at the hospital while the planned facilities are connected to the existing facilities. In India, the July to August period is the rainy season when temperatures often exceed 35°C. It will therefore be difficult to carry out the earth and foundation work during this season. This should also be taken into account in determining the period of Project implementation. Considering the above conditions, it is difficult to complete construction and equipment supply within 12 months. Therefore, the Project should be divided and work carried out in 2 phases.

2. Study and Examination of the Design Criteria

(1) Facility Composition

The facilities to be constructed under the Project are as follows.

1) Kalawati Saran Children's Hospital

① Central Building

- Outpatient Department:

  Examination Rooms (Paediatric Internal Medicine, Paediatric Surgery, Paediatric Orthopedics, Ophthalmology, E.N.T., Dermatology), Treatment Room (Paediatric Orthopedics), Plaster Room, Treatment Room for common use, Central Injection Room, Specimen Collection Room, Add. Medical Superintendent Office, Doctor's Office, Dpty. Nurse Supt. Room, Stretcher Stockroom, Pharmacy/Dispensary, Drug Storage, General-purpose Storage, etc.

- Radiology Department:

  Reception, X-ray Room, Control Room, Darkroom, Technician's Room, Ultrasound Room, Waiting Room, etc.

- Laboratory Department:

  Chemical Biochemistry Laboratory Room, Autoanalyzer Room, Common Laboratory (Bacteriology & Parasitology, Hematology & Histopathology), Immuno Hematology Laboratory, ECG room, EMG Room, EEG Room, Doctor's Room, Officer's Room, Technicians' Room, Storage, etc.

- Operation Department:

  Reception, Major Operation Theatre, Minor Operation Theatre, Changing Room, Surgical ICU, Recovery Room, Doctor's room, Surgical Nurse Station, Preoperative/Postoperative Room, Central Supply & Sterilization Room, Store, etc.

- Emergency Department:

  Reception, Examination Room, Treatment Room, Doctors' room, Nurse Station, Police Post Room, etc.

- ICU Department:

  Treatment Room, Examination Room, Nurse Station, Isolation Room, ICU, Laboratory, Doctor's room, Store, etc.

- Preventive Social Medicine Department:

  Reception, Immunization Room, Nutrition Counseling & Growth Monitoring Room, Child Guidance Clinic, High Risk Clinic, Malaria Clinic, Family Welfare Clinic, Doctor's Room, Store, etc.

- Diarrhea Training & Treatment Unit:

  Doctor's Office, Treatment Room, Waiting Room, Health Education Room, etc.

- Physical Medicine & Rehabilitation Department:

  Reception, Medical Record Room, Examination Room, Doctor's Office, Physiotherapy Treatment Room, Occupational Therapy Room, Language Therapy Room, Physiotherapist's Room, Occupational Therapist's Room, etc.

② Workshop·Substation Building

Generator Room, High-tension Panel Room, Low-tension Panel Room, Transformer Room, Metal Processing Workshop, Wood Workshop, Electrical Workshop, Electronic Workshop, Parts Store, Engineer's Room, Technician's Room, etc.

③ Laundry Building

Washing/Extract Room, Drying Room, Press Room, Reception Counter/Distribution Room, Rest Room, Store, etc.

④ Incinerator Building

Incinerator Room, etc.

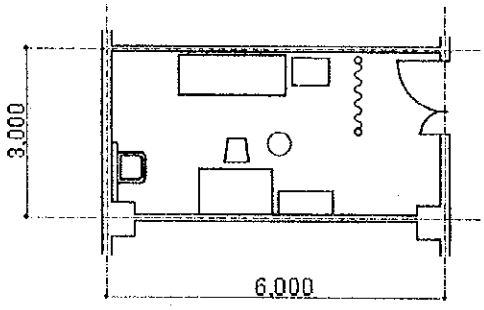
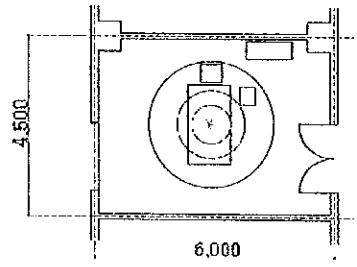
2) Kalyanpuri Urban Health Centre

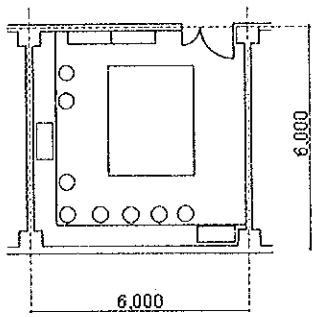
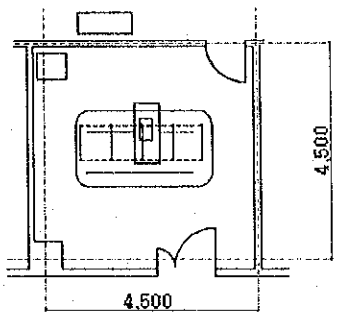
Reception, Examination Room, Minor OT (Treatment Room), Injection Room, Pharmacy, Store, Observation Room, Dressing Room, Laboratory, Seminar Room, Medical Social Worker's Room, Doctor's Room, etc.

(2) Scale of the Planned Facility

The scale of the facilities to be contracted under the Project is determined on the basis of the contents of the Indian request, staffing of each room, contents of activities, standard floor spaces required in Japan, the equipment arrangement plan and other data and information collected in India. The scale of each room is determined based on the contents of the following table.

Table 3-1 Rationale for Determination of the Scale of the Planned Facilities

	Rationale / function	Applicable standard
Examination room for each dept.	The number of rooms is determined on the basis of the number of doctors and the number of cases. The floor space of each room is determined on the basis of the proposed equipment / furniture arrangement.  	
Operation theatre	The number of operation theatres is determined on the basis of the proposed scale of major and minor operations, as well as the scale of surgical, orthopedic and ophthalmological operations. At the hospital, the annual number of major surgical operations is 591, and that of minor surgical operations is 1,919. The result of the calculation of the number of operation theatres based the above data rooms is as shown below. Major surgical operation theatre ..... 1 Minor surgical operation theatre ..... 1 Orthopedic / ophthalmological operation theatre ..... 1  	No. of room = average daily No. of patients) × (average consultation time / patient) / average daily consultation time = patients/day × min./patient / min.

	Rationale / function	Applicable standard
Laboratory	The scale of laboratory is determined on the basis of the number of technicians that use laboratory rooms and the proposed laboratory equipment arrangement.  	Proposed equipment arrangement
X-ray room	The annual number of patients undergoing general X-ray examination is 32,191, and that of patients undergoing special X-ray examination 5,112. Thus, the average daily number of patients undergoing general X-ray examination is 102, and that of patients undergoing special X-ray examination is 17. If the average daily working time is 5 hours, the average examination time/patient is 3 minutes for general X-ray examination, and that for special X-ray examination is 30 minutes, The number of general X-ray examination rooms $= \frac{102/\text{day} \times 3 \text{ min./patients}}{300 \text{ min.}} = 1.0$ The number of general X-ray examination rooms $= \frac{17/\text{day} \times 30 \text{ min./patients}}{300 \text{ min.}} = 1.7 \rightarrow 2.0$  	Proposed equipment arrangement

3. Basic Plan

3-1 Facility Plan

1. Kalawati Saran Children's Hospital

(1) Site and Layout Plan

The Project site is located on the premises of Lady Hardinge Medical College. The following figure shows the locational relationship between the planned facilities and the existing facilities.

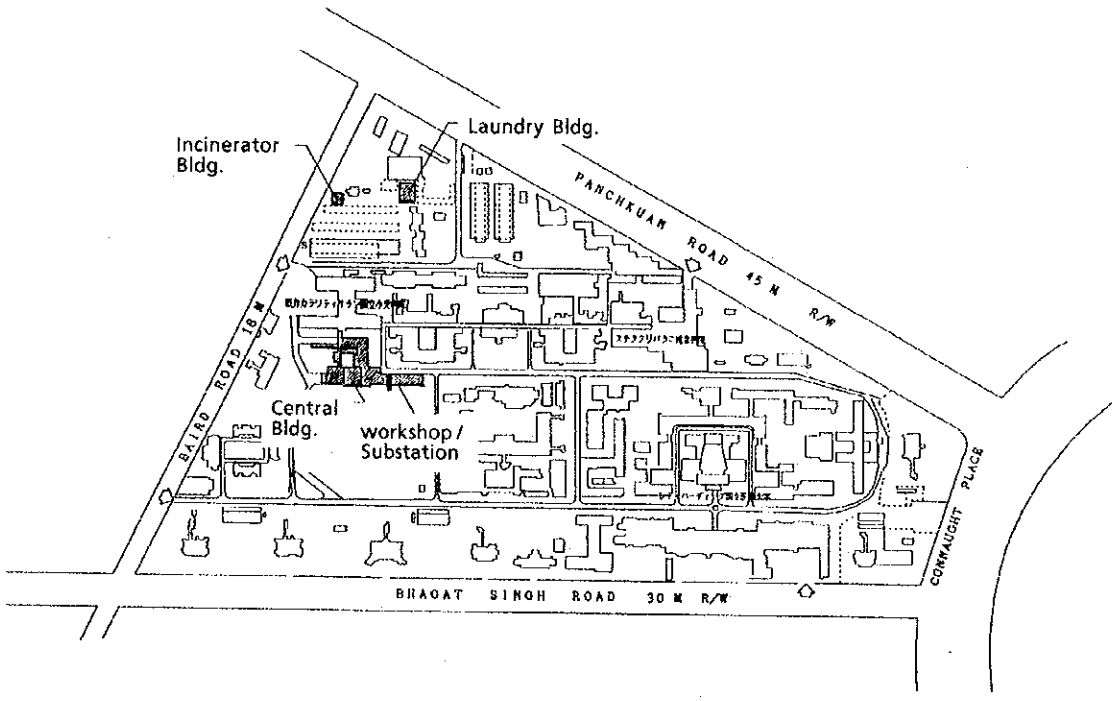


Fig. 3-1 Locational Relationship between the Planned Facilities and the Existing Facilities

The planned facilities are considered to be an extension of the existing facilities of Kalawati Saran Children's Hospital. In other words, the planned facilities and the existing facilities combine to constitute a single children's hospital. It is therefore necessary to design the planned facilities in a manner that makes connection of the two functional and easy. The traffic flow of the service approach should be completely separated from those for outpatients, their attendants and other visitors. As many of the existing trees in the Project site should be preserved as possible and included in the site plan so that the building arrangement plan may make full use of the natural environment.

(2) Facility/Architectural Plan

1) Building Control

The Indian building standards require that the building coverage ratio to the site for hospital buildings shall be 25 percent or less. The planned buildings are to be constructed on the premises of Lady Hardinge Medical College. Therefore the building coverage ratio should be calculated using the entire area of premises and building. At present, the building coverage ratio for the campus is 24.93 percent, which is very close to the allowable maximum. In implementing the Project, therefore, the Indian side will relocate the existing boarding house with a floor space of 1,800m^2 and remove unnecessary existing facilities so that the problem of the building coverage ratio may be overcome. The building area and the building coverage ratio for the existing facilities is as shown in the following table.

Table 3-2 Site and Building Area

	Area (m^2)	Building coverage ratio (%)
1. Site Area	1,94,916.17	
2. Allowable maximum building area	48,729.04	25.0
3. Total building area for the existing facilities confirmed in the 1994 basic design study	48,590.59	24.93
4. Building area under the project	2,680.14	1.37
5. (3+4)	51,270.73	26.3
6. Building area of existing facilities to be removed (5-2)	2,541.69	1.3

2) Facility Composition for Each Floor

Since the allowable maximum building coverage ratio of 25 percent is applicable to the planned facilities, planned building should have four stories so that necessary conditions for each room may be met. The facility composition for each floor in terms of functions of hospital facilities and the planned facilities' relationships with the existing ones is as shown below.

Ground floor : Reception, Emergency, ICU, Diarrhea Training & Treatment Unit, Radiology, Pharmacy, Substation, etc.

1st floor : Outpatient (internal medicine), Physical Medicine & Rehabilitation, etc.

2nd floor : Outpatient (surgical), Laboratory, Preventive & Social Medicine, etc.

3rd floor : Operation Theatre, Central Supply & Sterilization, Doctor's Rooms, etc.

3) Floor Plan

The arrangement of main rooms is determined on the basis of activities to be carried out in these rooms and functions required of them. The optimal scale of required rooms is determined after examining the equipment arrangement plan for these rooms and functions required of

these rooms. The rationale for the determination of the functions and floor space of each of these rooms is as shown in the following table.

Table 3-3 Determination of the Scale of Each of the Main Rooms

① Central Building

Room	No. of room	Floor Area / Rm (m^2)	Rationale / functions
Ground Floor			
Outpatient Reception	1	18.0	A total of 6 reception counters for an average 261 outpatients/day.
Central Specimen Collection Rm	2	6.0	
• Emergency Department			
Emergency Reception	1	18.0	Emergency care to be received at the counter.
Examination Rm	1	18.0	An average emergency outpatients/day are to be screened (24 hours./day).
Treatment Rm	1	36.0	Emergency treatment and minor operations.
Nurse Station	1	18.0	To operate 24 hours./day. A napping space included.
Doctor's Rm	2	18.0	For an LHMC professor and the senior doctor to be in charge of emergency care.
Police Post Rm	1	10.0	Legal treatment of emergency cases.
• Pharmacy Department			
Pharmacy / Dispensary	1	18.0	
Store	1	27.0	One for storing drugs and the other for storing documents.
• Diarrhea Training & Treatment Unit			
Doctor's Rm	1	18.0	To serve also as the reception counter.
Treatment Rm	1	18.0	With toilet
Children Sitting Corner	1	14.0	
Health Education Rm	1	18.0	
Nurse Station	1	18.0	
• ICU Department			
ICU	2	72.0	Each provided with 15 beds.
Isolation Rm	1	18.0	For cases of infectious diseases.
Treatment Rm	1	18.0	
Examination Rm	1	18.0	
Laboratory	1	18.0	To be provided with the existing equipment (autoalyzer).
Nurse Station	1	18.0	To be used to monitor two ICUs.
Store	1	18.0	
• Radiology Department			
Reception	1	9.0	To be used to receive patients.
X-ray Rm A	1	36.0	To be provided with general-purpose (two-bulb) X-ray equipment.
X-ray Rm B	2	22.0	One to be provided with general-purpose X-ray equipment and the other with special X-ray unit.

Room Name	No. of Room	Floor Area / Rm (m^2)	Rationale / functions
Control Rm	1	8.0	To serve also as X-ray room B
Darkroom	1	9.0	To serve also as a drying room.
Ultrasound Rm	1	14.0	To be provided with two units of ultrasonic diagnosis equipment.
Radiologist's Rm	1	18.0	One for a middle-ranking radiologist and for a radiologist.
Technicians' Rm	1	12.0	A large room for the use of 8 technicians.
First Floor			
• Outpatient Department (Internal Medicine)			
Examination Rm	8	18.0	Examination rooms for Paediatric Internal Medicine
Central Injection Rm	1	18.0	
Store	1	18.0	To be used to store documents.
Stretcher Rm	1	9.0	To store stretchers.
Telephone Exchange Rm	1	18.0	Telephone Exchange to be installed (to be operated around the clock).
• Physical Medicine & Rehabilitation			
Reception	1	36.0	To receive patients and store case records.
Examination Rm	4	18.0	Designed to examine 249 patients a day on average.
Doctor's Rm	3	18.0	One office for two doctors (two senior doctor's offices and a senior resident's office.)
Physiotherapist's Rm	2	18.0	A single room for a senior physiotherapist and other for physiotherapists.
Physiotherapy Treatment Rm	2	27.0	To be provided wit two units of microwave treatment equipment, one unit of whirlpool treatment equipment, one unit of low-frequency treatment equipment, etc.
Electro Therapy Treatment Rm	1	36.0	
Occupational Therapy Rm	2	27.0	To be provided with equipment for use in occupational therapy of infant and adult patients.
Occupational Therapists Rm	1	18.0	A room for two occupational therapists.
Language Therapy Rm	1	18.0	
Store	2	18.0	
Second floor			
• Laboratory			
Chemical Biochemistry Laboratory	1	36.0	To be provided with laboratory equipment.
Autoanalyzer Rm	1	18.0	Existing equipment will be transferred.
Bacteriology / Parasitology Laboratory	1	36.0	To be provided with laboratory equipment.
Hematology/ Histopathology Laboratory	1	36.0	To be provided with laboratory equipment.
Immuno Hematology Laboratory	1	36.0	To be provided with laboratory equipment.
ECG Room	1	15.0	Two kinds of electrocardiographs (3 units in total).
EMG Room	1	15.0	To be equipped with one of the existing electromyographs and a new one.

Room Name	No. of Room	Floor Area /Rm (m^2)	Rationale / functions
EEG Room	1	15.0	To be equipped with one of the existing.
Officer's Rm	2	18.0	One for a senior parasitologist and the other for a senior biochemist.
Technicians' Rm	1	18.0	To be used as technicians' resting room.
Office Rm	1	18.0	To serve also as a reception counter.
• Outpatient Department (Surgical)			
Paediatric Orthopedic Treatment Rm	1	18.0	To be used for Paediatric orthopedic treatment.
Plaster Rm	1	18.0	To be used for plaster cast treatment.
Examination Rm	6	18.0	2 for Surgery, 1 for Orthopedic, 1 for ENT, 1 for Dermatology, 1 for Opthalmology
Assit. Nurse Supt. Rm	1	18.0	A single room.
Depty. Nurse Supt. Rm	1	18.0	A single room.
• Preventive & Social Medicine Department			
Reception	1	18.0	To be used to receive patients.
Child Health Promotion Clinic's Immunization Rm	1	36.0	DPT, polio, BCG, diphtheria, measles, tetanus
Nutrition Counseling / Growth Monitoring Rm	1	18.0	Designed to provide follow-up clinic services to 3,109 patients a year.
Child Guidance Clinic	1	36.0	To be used to give child guidance.
Psychological Testing Room	1	18.0	To be used to give psychological tests (in a soundproof booth set up at a corner of the room.)
High Risk Clinic	1	18.0	A soundproof room to be used to examine those patients who have difficulty in speaking.
Malaria Clinic	1	18.0	To be used to give guidance on malaria. The guidance is to be given by a technician dispatched from NDMC.
Family Welfare Clinic	1	18.0	To treat 9,576 patients a year.
Doctor's Rm	1	18.0	A single room for the senior doctor to be in charge of Child Health Promotion Clinic.
Medical Social Services	2	9.0	To give guidance to an average of 15-20 patient per day.
Store	1	18.0	
Third Floor			
• Operation Theatre			
Reception	1	12.0	To receive patients to undergo operations.
Major Operation Theatre	1	36.0	To be equipped with two operating tables. It is estimated that 591 major operations will be performed a year in the major operation theatre.
Minor Operation Theatre	2	27.0	It is estimated that 19,169 minor operations (hernia, aritifical anus, lithectomy, circumcision) will be performed a year at the two minor operation theatres.
Surgical ICU	1	18.0	An ICU provided with 3 beds.
Recovery Rm	1	18.0	
Doctor's Rm	1	13.0	A single room.
Surgical Nurse Station	2	18.0	
Preoperation / Postoperation Rm	2	36.0	Each room is to be provided with 6 beds.
Changing Rm	2	11.0	One for males and the other for females.

Room Name	No. of Room	Floor Area /Rm (m^2)	Rationale / functions
Scrubbing Corner	1		2 scrubber unit will be installed.
Store	1	18.0	2 scrubber unit will be installed.
• Central supply & Sterilization Department			
Reception	1	16.0	To receive washing.
Washing Rm	1	33.0	To be provided with cleaning equipment and working space.
Autoclave Rm	1	17.0	To be provided with 3 high-pressure sterilizers (a large-size one and two medium-size ones).
Assembly Rm	1	30.0	To be used to assemble cleaned devices.
Clean Store	1	24.0	To be used to store cleaned devices.
Distribution Rm	1	15.0	To be used to deliver sterilized devices.
Staff Rm	1	18.0	
Store	1	54.0	
• Others			
Doctor's Rm	14	18.0	14 single rooms for 14 doctors.

② Workshop / Substation Building

Room Name	No. of Room	Floor Area /Rm (m^2)	Rationale / functions
Generator Rm	1	68.0	No. of rooms determined according to the equipment arrangement plan.
High-tension Panel Rm	1	68.0	Ditto
Low-tension Panel Rm	1	68.0	Ditto
Transformer Rm	2	34.0	Ditto
Metal Processing Workshop	1	34.0	Ditto
Wood Workshop	1	34.0	Ditto
Electrical Workshop	1	34.0	Ditto
Electronic Workshop	1	34.0	Ditto
Parts Store	4	11.0	One each for 4 workshops.
Engineers' Rm	4	11.0	
Technician's Rm	1	18.0	
Store	1	23.0	

③ Laundry Building

Room Name	No. of Room	Floor Area /Rm (m^2)	
Washing/Extract Room	1	60.0	No. of rooms determined according to the equipment arrangement plan. To be provided with two 50kg washing machines 25kg washing machine and two 35kg extractors.
Drying Rm	1	20.0	No. of rooms deter mined according to the equipment arrangement plan. To be provided with two 50kg dryers and a 25kg drier.
Press Rm	1	40.0	No. of rooms determined according to the equipment arrangement plan. To be equipped with two presses.
Reception /Distribution Rm	1	40.0	To receive washing and distribute washed articles.
Resting Rm	1	16.0	
Store	1	16.0	

④ Incinerator Building

Room Name	No. of Room	Floor Area /Rm (m^2)	
Incinerator Rm	1	100.0	No. of rooms determined according to the equipment arrangement plan. To be equipped with 3 medium size incinerator and two small-size incinerators.

4) Section Plan

In working out the section plan, natural ventilation and lighting will be secured for general rooms giving due consideration to protection against direct sunlight and rainwater. The height of each story will be determined taking into account connection of planned facilities with existing facilities (where story height is 3.5m). To prevent sharp rises in room temperature, the allowable maximum ceiling height should be employed. Also, in consideration of the possibility of floods as a result of heavy rainfalls and Indian building standards, the height of the ground floor (from the ground) should be the same as that for existing facilities (0.65m).

5) Structural Plan

■ Outline of the Structure

The planned facilities are considered to be an extension of the existing facilities of Kalawati Saran Children's Hospital. The central building consists of the Outpatient Department, Emergency Department, Operation Theatre, Radiology Department, Central Laboratory Department, Preventive Social Medicine Department and Physical Medicine & Rehabilitation Department facilities. It is a reinforced concrete building with four stories and a basic span of 6.0m×6.0m. Each story's height is 3.5m.

■ Foundation System

According to the soil investigation conducted at the time of the field survey, the Project site has uniform geological features. Up to a depth of 3.0m, there is back filling soil with N values ranging from 0 to 5, a sandy silt layer with N value of about 10 at a depth of 3.0 to 6.0m, and a clayey silt layer with trace of gravel with N values ranging from 15 to 20 following the sandy silt layer. The foundation base depth will be about 3.0m below ground. Since judging from the scale of the planned building, it is possible to use this portion of the layer as the supporting layer for the planned building, spread foundation is employed as the foundation system. It is possible to secure bearing capacity of $12t/m^2$. At the time of investigation during the dry season, groundwater level of 4.5m was confirmed. It is likely that the groundwater level will rise to 2.0m below ground during the rainy season. This should be taken into consideration in working out the structural design of the planned building. It should be noted that

the ground water contains 300 to 350 mg/ℓ of sulfate. Therefore, the quantity of cement used in production of the foundation concrete should be more than 330kg/m3 and the water/cement ratio should be less than 55 percent. The geological survey data are included in the Appendix to this report.

■ Superstructure System

In light of the degree of ease of the construction work, cost factors, natural conditions and the scale of the planned building, it is appropriate to employ reinforced concrete rigid frame structure as the superstructure system for the planned building. The external walls should be of brick or sand stone common in the country, in consideration of local construction conditions and cost factors.

■ Applicable Structural Standards

The Indian Building Standards (1993) Chapter 6 (Structural Design) and the Indian Concrete and Reinforced Concrete Standard should be applied as structural standards.

■ Load and External Force

- Live Load

  The live load of each room is determined in accordance with Table 1 in Article 1.3 of Chapter 6 of the Indian Building Standards (1993). The live load of each of the main rooms is as shown in the table.

Table 3-4 Live Load for Main Rooms

Room	Live Load (kg/m²)
Laboratory	300
Operation theatre	300
X-ray room	300
Office	250
Toilet	200
Corridor/hall	400
Machine room	500

- Earthquake Load

As the northern part of India belongs to the Eurasian Seismic Zone, earthquakes occur in Delhi area. For this reason, buildings must feature earthquake-resistant construction. The calculation of the earthquake load should be conducted in accordance with Article 1.5 of Chapter 6 of the Indian Building Standards (1983).

○ Calculation of Base Shear Coefficient (V)

$V = K \cdot C \cdot \alpha h \cdot W$

K : structural form coefficient (1.0)
C : building cycle coefficient (1.0)
αh : design seismic coefficient (0.075)
W : building's seismic weight

$\alpha h = \beta \cdot I \cdot \alpha o$

β : foundation form coefficient (1.0)
I : coefficient of degree of importance (1.5)
αo : basic seismic coefficient (0.05)

$\alpha h = 1.0 \times 1.5 \times 0.05 = 0.075$

Therefore,

$V = 1.0 \times 1.0 \times 0.075 \times W = 0.075W$

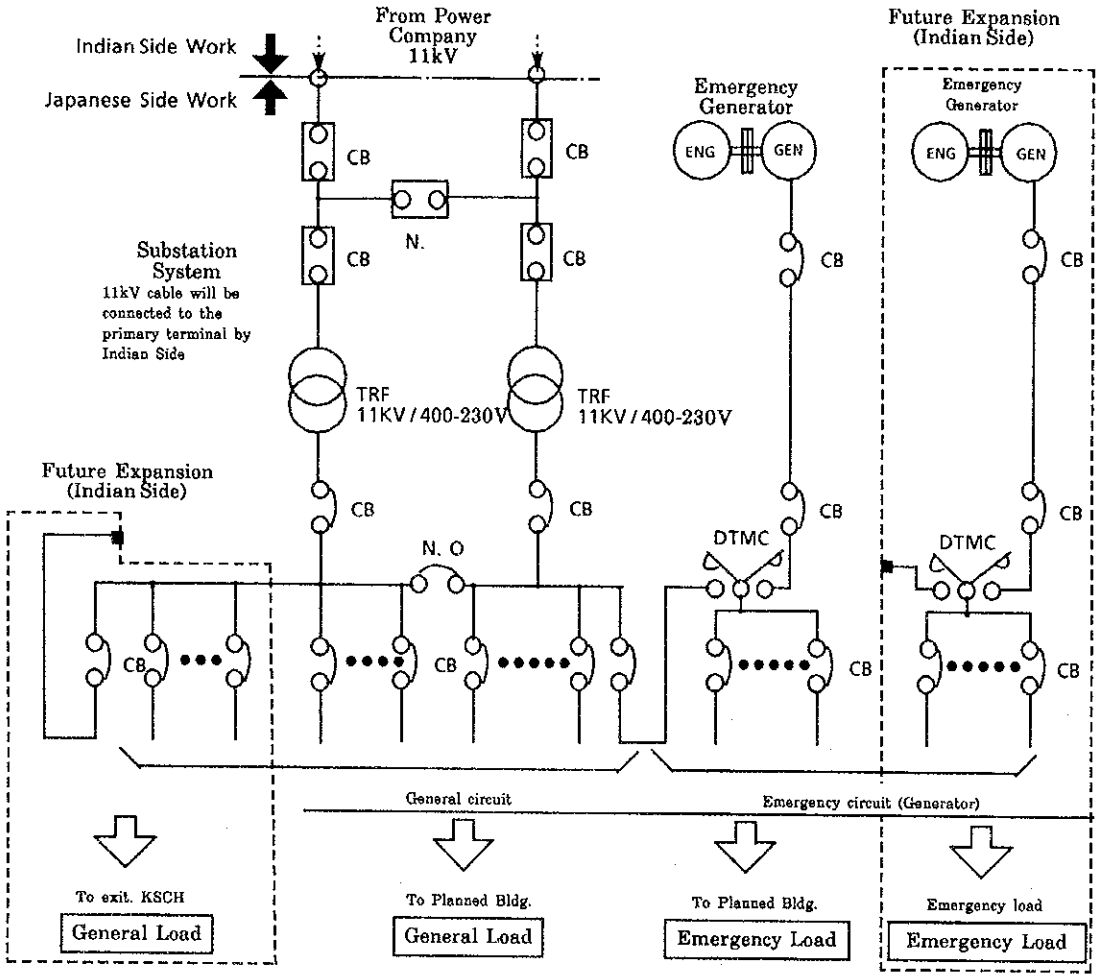
6) Electrical Plan

Only the electric equipment plan for the planned buildings (Central Building, Workshop/Substation Building, Laundry Building, Incinerator Building) will be included in the scope of the Project (that for the existing buildings of Kalawati Saran Children's Hospital will not be included in the scope of the Project). However, consider the possibility of future unification of electrical facilities of those two buildings. The electric plan for the Project should be efficient to make it easy to maintain and manage the facilities.

■ Power Receiving and Substation Facilities

A substation will be built on the southern side of the planned building. 11kV 50Hz high-tension power shall be led in to the substation from the cable installed along Baird Road running along the western side of the Project site. The high-tension electric power will be stepped down to 400V/230V low-tension electric power via the substation and will be distributed to each load in the planned building. Each of two transformers (each with a capacity of about 1,250kVA), able to meet the total load requirements of the hospital will be installed in the room so that the spare transformer may be used when the other breaks down. According to the records of the existing substation of Lady Hardinge Medical College, power supply to the Medical College is relatively stable, the voltage fluctuation rate ranging from -5 percent to +5 percent. There will be no need to install an automatic voltage regulator (AVR). However, an AVR should be attached to each unit of medical equipment requiring electricity with a very low voltage fluctuation rate. The Indian side should be responsible for applying for

approval of high-tension power receiving, power lead-in up to the substation, and relocation of the existing power cable.



Note : CB : Circuit Breaker N.O : Normal Open ENG : Engine
TRF: Transformer DTMC : Double Throw Magnetic Conductor GEN : Generator

Fig. 3-2 Power Supply System Diagram

■ Generator

A diesel engine generator will be installed for the emergency power supply at the time of power failure. It should have a capacity large enough to cover the facilities of Operation Theatre, Emergency Department, ICU, etc. (about 250kVA). Electric power by the generator will not be supplied to the existing facilities of the hospital. No spare generator will be procured under the Project.

■ Lighting Fixtures and Wall Sockets

Lamps will be mainly fluorescent lamps. Lighting fixtures will be directly mounted onto the ceiling or suspended from the ceiling. Embedded lighting fixtures will be installed in clean zones such as operation theatres. The following table shows the target illuminance for each main room.

Table 3-5 Target Illuminance of Each Main Room

Room	Target illuminance (lux)
Operation Theatre	1000~750
Examination Rm, Treatment Rm, Nurse Station, Pharmacy, Laboratory Rm, Central Injection Rm	500~300
Dpty. Nurse Supt. Rm, Doctor's Rm, Isolation Rm, Health Education Rm, Plaster Rm, Specimen Collection Rm, Exercise Therapy Rm, Language Therapy Rm, X-ray Rm, Control Rm, Technician's Rm	350~250
Entrance Hall, Reception, Drug Store, Waiting Rm, Laundry, Stretcher Rm	250~100
Corridor, Machine Rm, Store	150~50

Wall sockets that comply with the applicable Indian standard will be procured. General-purpose wall sockets and emergency generator-powered wall sockets will be installed in each room.

■ Telephone Equipment

The planned building will have a telephone exchange room, in which a switchboard and a telephone wiring system will be installed. The switchboard should have a capacity large enough to meet the circuit requirements of the existing facilities of the hospital. The required number of lead-in wire circuits will be 6 to 10, and it will be necessary to install about 250 extension lines including lines for existing Kalawati Saran Children's Hospital. The following table shows the main rooms which require installation of extension telephones.

Table 3-6 Main Rooms to Be Equipped with Telephones

Floor	Room
Ground floor	Reception, Pharmacy, Health Education Rm, Treatment Rm, Technicians' Rm, X-ray Control Rm, Examination Rm, Doctor's Rm, Nurse Station, Police Post Rm, etc.
Second floor	Reception, Examination Rm, Dpty. Nurse Supt. Rm, Asst. Nurse Supt. Rm, Treatment Rm, Injection Rm, etc.
Third floor	Reception, Examination Rm, Treatment Rm, Doctor's Rm, Nurse Station, Distribution Rm, Laboratory, etc.
Fourth floor	Reception, Examination Rm, Doctor's Rm, Technicians' Rm, etc.

The telephone exchange must have a capacity large enough to handle 10 circuits and about 150 extension circuits. The work to repair the telephone equipment installed in the existing facilities of Kalawati Saran Children's Hospital is not included in the Project. However, there exist the future possibility of the existing facilities extension circuits being connected to the newly installed telephone exchange. The Indian side should be responsible for applying for approval of the lead-in wire installation work, and the work to connect the extension circuits of the existing facilities.

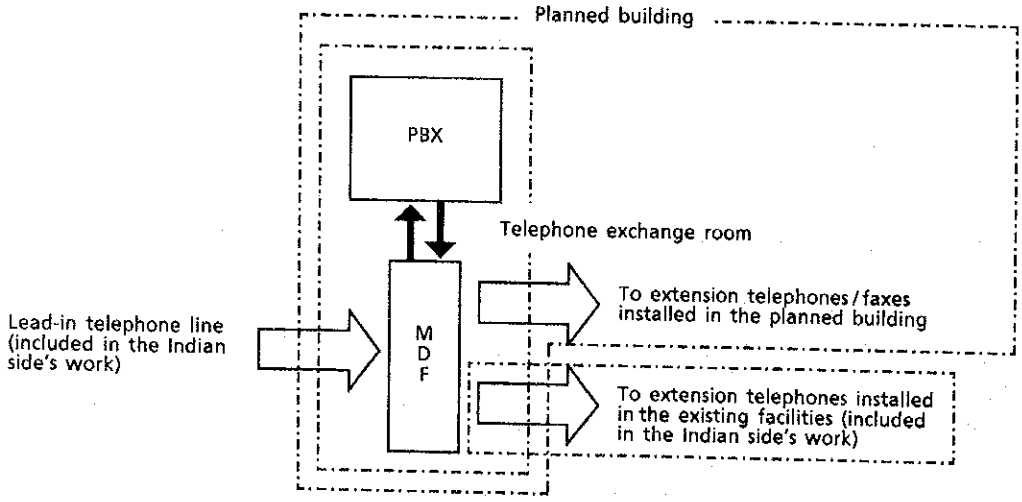


Fig. 3-3 Telephone System Diagram

■ Intercommunication System

An intercommunication system to connect operation-related rooms will be installed. An intercom will be installed in each of the following rooms.

Major operation theatre, minor operation theatre, Paediatric surgery, reception.

■ Fire Alarm System

An automatic fire alarm system will be installed in the planned building in accordance with the Indian Building Standards (1983) and the Indian Fire Prevention Manual.

■ Lightning Arresting System

A lightning arresting system will be installed in accordance with applicable Indian standards. It will include lighting arresters to protect hospital equipment against lightning.

■ Lift

Two sets of hospital lift will be installed. The specifications are as follows.

Load	: 1,768 kg (26 persons)	Speed	: 33m/min.
Stops	: 4 stops	Car Size	: 1,600mm×2,400mm

7) Air Conditioning Plan

The air conditioning to be planned under the Project should be determined with due consideration to usage, location of installation, the ease of operation and maintenance, and running cost and safety.

■ Design Conditions

- Design Outdoor Temperature and Humidity

Summer	Dry bulb temp.	39.3°CDB	Winter	Dry bulb temp.	10.0°CDB
	Wet bulb temp.	22.0°CWB		Wet bulb temp.	7.6°CWB

(Source: National Buildings Organization Ministry of W.H. & R.)

- Design Indoor Temperature and Humidity

(Operation theatre)

Summer	Dry bulb temp.	26°C ±2	Winter	Dry bulb temp.	22°C ±2
	Relative humidity	45% ±5		Relative humidity	45% ±5

(Other rooms)

Summer	Dry bulb temp.	26°C ±2	Winter	Dry bulb temp.	22°C ±2

Note: Indoor temperature and humidity in the case of heating may be dependent on the type of the heater used.

■ Air Conditioning System Plan

The separate air conditioning system using air-cooled air conditioners is to be procured under the Project in consideration of ease of maintenance and management, running cost, safety and steps to be taken at the time of equipment breakdown. As for heating, electric heaters are to be procured for partial heating of rooms. The single duct air conditioning system using air-cooled package-type air conditioners is to be procured for operation theatres and related rooms which require clean air. The degree of cleanliness of the air in the room should be of Class 10,000.

(Note) Class 10,000: Number of particles above 0.5μ and under 5μ should not exceed 10,000/ft3 and number of particles over 5μ should not exceed 65/ft3.

Table 3-7 Air Conditioning System -1

Clean Rooms

Type of air conditioning	Rm
Air-cooled package-type air conditioning system and duct system	Major Operation Theatre, Preoperative / Postoperative Rm, Central Supply & Sterilization, Assembly Rm, Clean Store, Distribution Rm
Air-cooled split suspension type package unit + filter unit	Minor Operation Theatre, ICU, Recovery Rm, Emergency Treatment Rm, ICU Isolation Rm, Surgical ICU

Table 3-6 Air Conditioning System -2

Other Rm

Type of air conditioning	Rm
Air-cooled split suspension-type package unit and ceiling fan	• Emergency Reception, Examination Rm, Treatment Rm, Nurse Station, Doctor's Rm • Diarrhea Training & Treatment Unit Doctor's Rm, Treatment Rm, Waiting Rm, Health Education Rm • ICU Treatment Rm, Examination Rm, Nurse Station • Outpatient Reception, Examination Rm, Orthopedic Treatment Rm, Plaster Rm, Central Injection Rm, Specimen Collection Rm, Dpty. Nurse Supt. Rm, Assit. Nurse Supt. Rm, Telephone Exchange Rm, Doctor's Rm • Physical Medicine & Rehabilitation Reception, Examination Rm, Doctor's Rm, Physiotherapist's Rm • Radiology Reception, X-ray Rm, Control Rm, Darkroom, Radiologist's Rm, Technicians' Rm • Operation Theatre Reception, Doctor's Rm, Nurse Station, Central Supply & Steri. Reception, Cleaning Rm • Preventive & Social Medicine Reception, Immunization Rm, Nutrition Counseling / Growth Monitoring Rm, Child Guidance Clinic, Psychological Test Rm, High Risk Rm, Malaria Clinic, Family Welfare Clinic, Doctor's Rm • Laboratory Chemical Biochemistry Lab., Autoanalyzer, Bacteriology / Parasitology Lab., Hematology / Histopathology Lab., Immune Hematology Lab., ECG Rm, EMG Rm, EEG Rm, Technician's Rm, Officer's Rm, Office Rm

■ Ventilating Equipment Plan

In principle, a ceiling fan will be installed in each of the rooms which do not require air conditioning. Ventilators will be used to discharge odor, heat and dust. The method of ventilation will be Class 1 (intake/exhaust) or Class 3 (exhaust) depending on the use of the room.

8) Plumbing System Plan

■ Water Supply System

The gravity type water supply system will be introduced so that the two existing elevated water tanks may be utilized. The two existing elevated water tanks ensure stable water supply because they are used jointly. Basically, water will be supplied to the planned building directly from the existing elevated water tanks. Facilities which require soft water will be supplied with water from the water tank to be installed on the roof of the planned building. The hospital's existing facilities will not be supplied with water from the water supply system to be procured under the project since the existing water pipes are so superannuated that supply of water to the existing facilities from the planned water supply system cause leaks when water pressure fluctuates widely.

As an existing tube well is located at the newly planned building, it is necessary to relocate the tube well. Relocation work shall be done by Indian side.

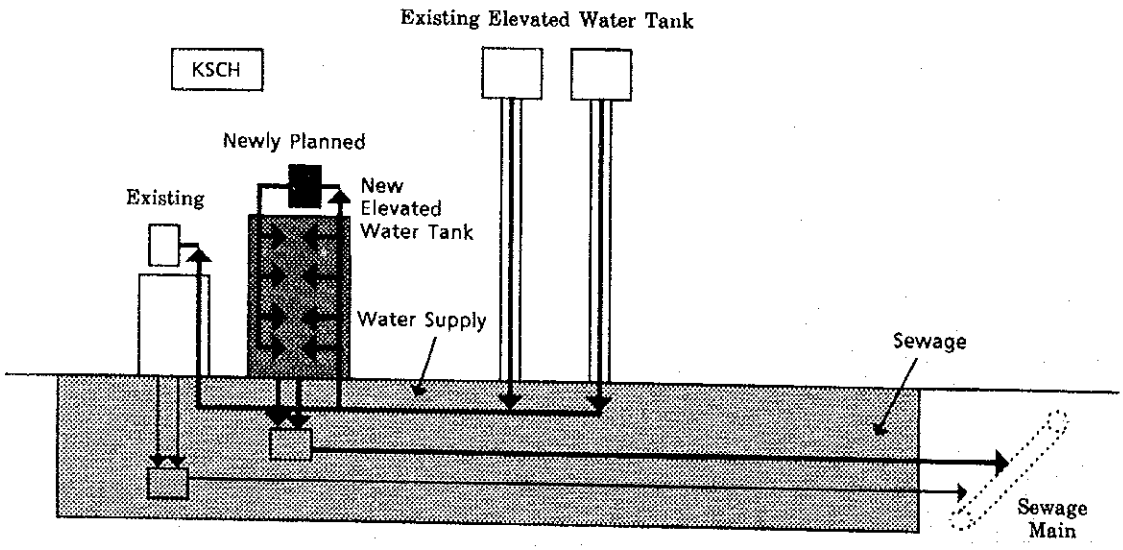


Fig. 3-4 Plumbing System Diagram

■ Hot Water Supply System Plan

In principle, the spot hot water supply system by the use of electric water heaters will be introduced.

■ Drainage System Plan

Waste water from the indoor facilities will flow into the first outdoor waste water pits, from which it will be discharged into the drain pipe installed along the road running in front of the northern side of the project site.

In accordance with applicable local ordinance, rainwater will be made to penetrate into the ground. In principle, collection and treatment of special waste water which contains hazardous materials from the laboratories where examinations are conducted will be contracted out to an outside organization. Other waste water from these laboratories will be discharged in compliance with Indian industrial waste water discharge standards. Route for drainage within the premises is shown on Fig. 2-6 and installation work is included in the Project.

■ Neutralization System Plan

Since the pH of waste water from the laboratories will likely vary according to type of examination, such waste water will be discharged after confirming the pH-value through a neutralization system to be installed under the Project.

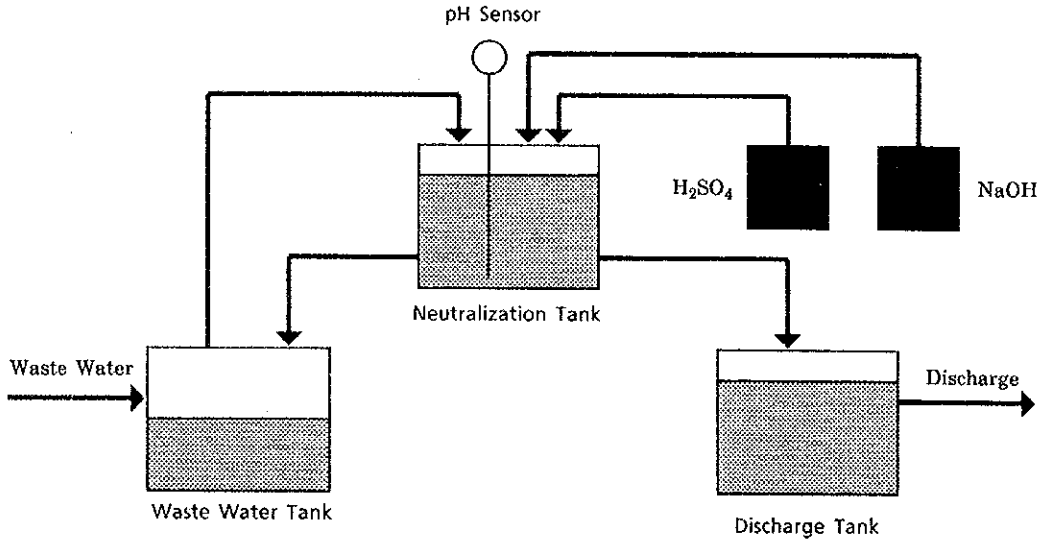


Fig. 3-5 Neutralization System Diagram

■ Sanitary Fixture Plan

Sanitary fixtures that conform to the local standards will be installed.

■ Medical Gas System Plan

The plumbing system for medical gases such as oxygen, laughing gas (nitrous oxide), vaccum gas and compressed air will be installed to supply these gases to the following rooms.

Table 3-9 Rooms That Require Supply of Medical Gases

Room Name	Gas for medical use				Remarks
	Oxygen	Laughing gas	Vaccum	Compressed air	
Major Operation Theatre	○	○	○	○	
Surgical ICU	○		○	○	
Recovery Rm	○		○	○	
Preoperative / Postoperative Rm	○		○	○	
Minor Operation Theatre	○	○	○	○	
Emergency Treatment Rm	○	○	○	○	
ICU	○		○	○	

■ Fire Extinguishing System Plan

An indoor fire extinguishing system will be introduced in accordance with the Indian Building Standards (1983) and the Indian Fire Prevention Manual.

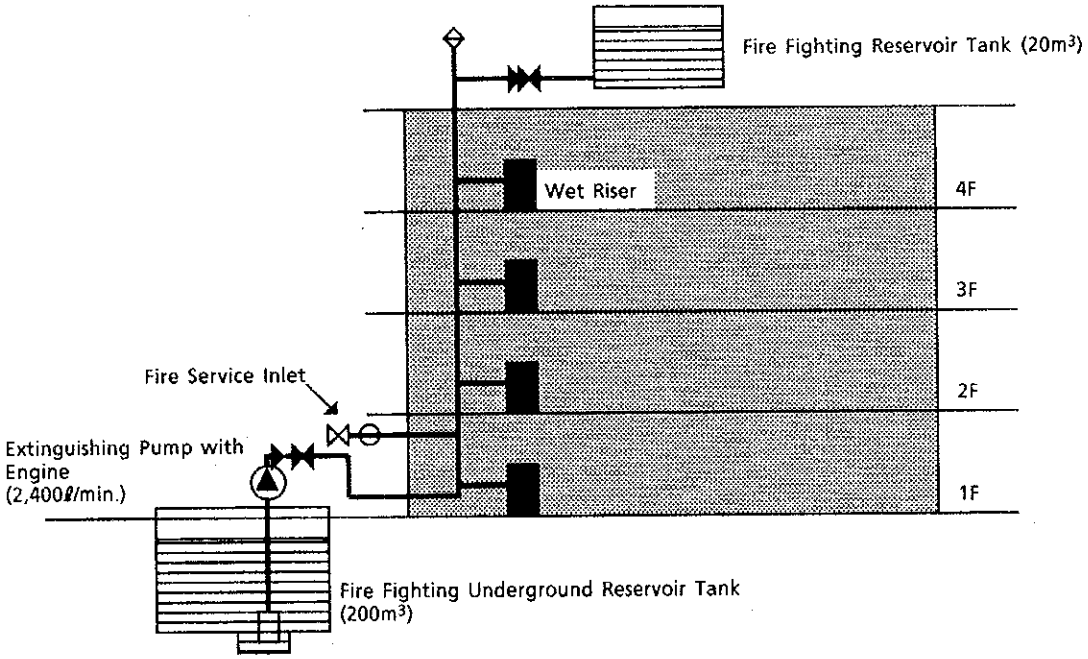


Fig. 3-6 Indoor Fire Extinguishing System Diagram

9) Building Material Plan

Building materials that suit local climatic conditions and local construction methods, as well as functions required of the planned facilities, will be used in the Project construction work. They also must be economical highly durable, and easy to maintain and manage.

■ Main Structural Materials

Table 3-10 Classification of Building Materials by Component (1)

Part of building	Material	Remarks
Foundation Column/ beam Floor	Reinforced concrete	Sufficient quality control of concrete is required.
Wall	Brick	There will be no problem with the quality of locally available bricks since bricks are widely used and there are detailed brick specifications in the country.

■ Exterior Finishing Materials

Table 3-11 Classification of Building Materials by Component (2)

Part of building	Material	Remarks
Roof	Asphalt (for use in asphalt membrane waterproofing) Heat insulating brick concrete	Due consideration should be given to heat insulation to protect the building against intense heat in summer.
Wall	Brick/sand stone	The wall should be a combination of an ordinary brick wall or sand stone wall to ensure sufficient heat insulation.
Fittings	Aluminum sash	Heat reflecting glass will be used to protect the rooms against direct sunlight.

■ Main Interior Finishing Materials

Table 3-12 Classification of Building Materials by Component (3)

Room Name	Floor	Wall	Ceiling	Remarks
Waiting Hall, Corridor	Kota stone	Ceramic tile (FL-2,000) Upper part: paint finishing	Paint on exposed concrete	Ceramic tiles up to FL+2,000 in consideration of ease of maintenance/ management and durability
Operation Theatre	Colored resin mortar	Ceramic tile	Ready-made sound absorbing ceiling	Due consideration should be given to protection against static electricity
Examination Rm Doctor's Rm	Kota stone	Ceramic tile (FL+2,000) Upper part: paint finishing	Plaster board Paint finishing	Ceramic tiles up to FL+2,000 for ease of maintenance/management and durability
X-ray Rm	Ditto	Ditto	Ditto	Fittings should have lead glass to prevent X-ray leaks.
ICU	Ditto	Ditto	Ready-made sound absorbing ceiling	Sound absorbing ceiling should be used to lessen reverberations.
EEG Rm	Ditto	Ditto	Ditto	The walls should be shielded with copper wire mesh.
Laboratories	Colored resin mortar	Ceramic tile	Plaster board Paint finishing	Due consideration should be given to waterproofing and durability.
Toilet	Mosaic tile	Ceramic tile	Chemical board Paint finishing	Due consideration should be given to waterproofing of toilets to be installed on the second to fourth floors.

2. Kalyanpuri Urban Health Centre

(1) Site Plan

The project site, with an area of about 700m2 (21m×33m), is a plane rectangular site. At present it has a single-story brick building with a total floor space of about 160m2, around which is a concrete pavement with a thickness of about 5cm. The allowable maximum building coverage ratio applicable to the project site is 33.33 percent, and the allowable maximum floor area ratio is 100 percent. The work to demolish the existing building will be carried out by the Indian side.

(2) Architectural Plan

1) Floor Plan

The architectural plan covers the following rooms.

Table 3-13 Determination of the Scale of Each Rm

Rm	No. of Rooms	Floor area (m^2)	Rational/function
Ground Floor			
Reception	1	10.0	To be used to receive patients.
Examination Rm	4	12.0	Internal medicine, Paediatrics, obstetrics and gynecology, ophthalmology
Treatment Rm	1	18.0	Minor operations for injuries are to be performed in this room.
Injection Rm	1	8.0	To be used to carry out immunizations
Pharmacy	1	10.0	
Store	1	4.0	
Observation Rm	1	9.0	To be used to screen patients.
Dressing Rm	1	8.0	
Laboratory Rm	1	9.0	Equipment for use in basic malaria, blood and urine examinations is to be installed in this room.
Guard Rm	1	9.0	
First Floor			
Seminar Rm	1	60.0	Seating capacity: 25 to 30; space per person: 2.0 to 2.5m^2
Medical Social Worker's Rm	1	14.0	
Doctors' Rm	1	20.0	A large office room for four doctors

2) Structural Plan

■ Outline of Structure

After demolishing the existing building of the Urban Health Centre (with a total floor space of about 150m^2) by Indian side, construct under the Project a two-story reinforced concrete building with a total floor space of about 400m^2. The story height for the planned building is 3.5m for both the ground floor and the first floor.

■ Foundation System

According to soil investigation conducted at the time of the field survey, the Project site has uniform geological features. There is a sandy silt layer with N values ranging from 7 to 10 up to a depth of 5m, and a layer of fine sand with N values ranging from 14 to 20 below the sandy silt layer. Since it is possible to secure bearing capacity of 12t/m^2 at a depth of 1.5m, it is appropriate to employ continuous footing using the layer at 1.5m below the ground as the supporting layer. At the time of soil investigation during the dry season (December), a groundwater level of 3.5m was confirmed. It is likely that the groundwater level will rise to about 2.0m below ground. But this should not cause any problem since that groundwater level is below the foundation base level.

■ Other Factors

Other factors such as the superstructure system, the applicable structural standard, load and external force are as stated in the plan for Kalawati Saran Children's Hospital.

3) Electric Equipment Plan

■ Power Source Equipment

Low-tension electric power will be led·in from the city line and distributed to the necessary load in the planned facility. No emergency generator will be installed.

■ Lighting Fixtures and Wall Sockets

The same lighting fixtures and wall sockets as those installed in Kalawati Saran Children's Hospital will be installed.

■ Telephone Equipment

A telephone exchange with a capacity of 2 circuits and 10 extension circuits will be installed.

4) Plumbing System Plan

■ Water Supply System Plan

Since Kalyanpuri Urban Health Centre is unable to secure sufficient supply of city water, a tube well will be newly installed in the Project site. Water from the tube well will be sent to an elevated water tank via a water receiving tank, and then will be supplied to the necessary places.

• Estimation of Daily Water Consumption

According to the Japanese standard (Air Conditioning Engineering Handbook), the daily water consumption at a medium-size hospital is 500ℓ/day per bed. Given 50m^2 floor space per bed, a daily water consumption of 10ℓ/day m^2 can be assumed. Therefore, the daily

water consumption at the planned building can be estimated as follows.

Total floor area: $400m^2$

$400m^2 \times 10\ell/day \cdot m^2 = 4,000\ell/day$

The capacity of the water reservoir tank is equivalent to the daily water consumption. Therefore, the capacity of the water reservoir tank capacity will be $4,000\ell/day$.

The capacity of the elevated water tank is equivalent to the daily water consumption. Therefore, the capacity of the elevated water tank will be $4,000\ell/day$.

The well water pump should be able to pump up the above-mentioned quantity of water in an hour.

$4,000\ell/day \div 1hour \div 600min. = 60\ell/min.$

Therefore, the capacity of well water supply pump will be $60\ell/min$.

The depth of the well will be 100m.

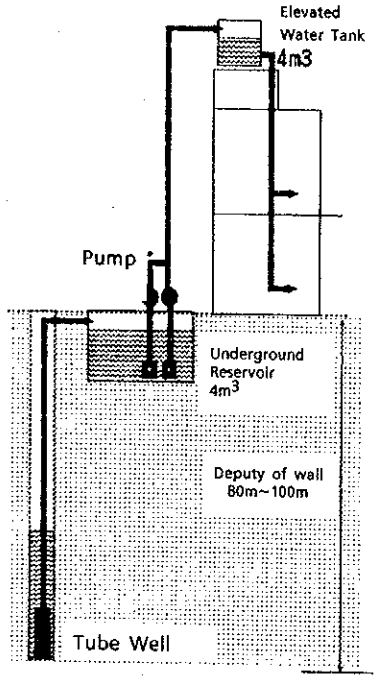


Fig. 3-7 Well System Diagram

Tube Well Specifications:

Regarding installation of the tube well, it is necessary to submit application to the Central Underground Water Board, the organization to do trial drilling. The appropriate depth of the tube well is determined based on the result of the trial drilling. The results of the survey of the wells existing in and around the Project site, conducted at the time of the field survey show that there is a water vein that contains high-quality water at a depth

of 80 to 100m. It is also estimated through the survey that a sufficient quantity of water can be supplied from the water vein.

■ Drainage

Waste water from the indoor facilities will penetrate into the ground via an outdoor septic tank. Rainwater will be discharged into the side ditch laid along the Project site.

3. Palam Primary Health Centre

(1) Site Plan

A deep tube well is to be installed at a point marked on the following rough map of the premises of Palam Primary Health Centre.

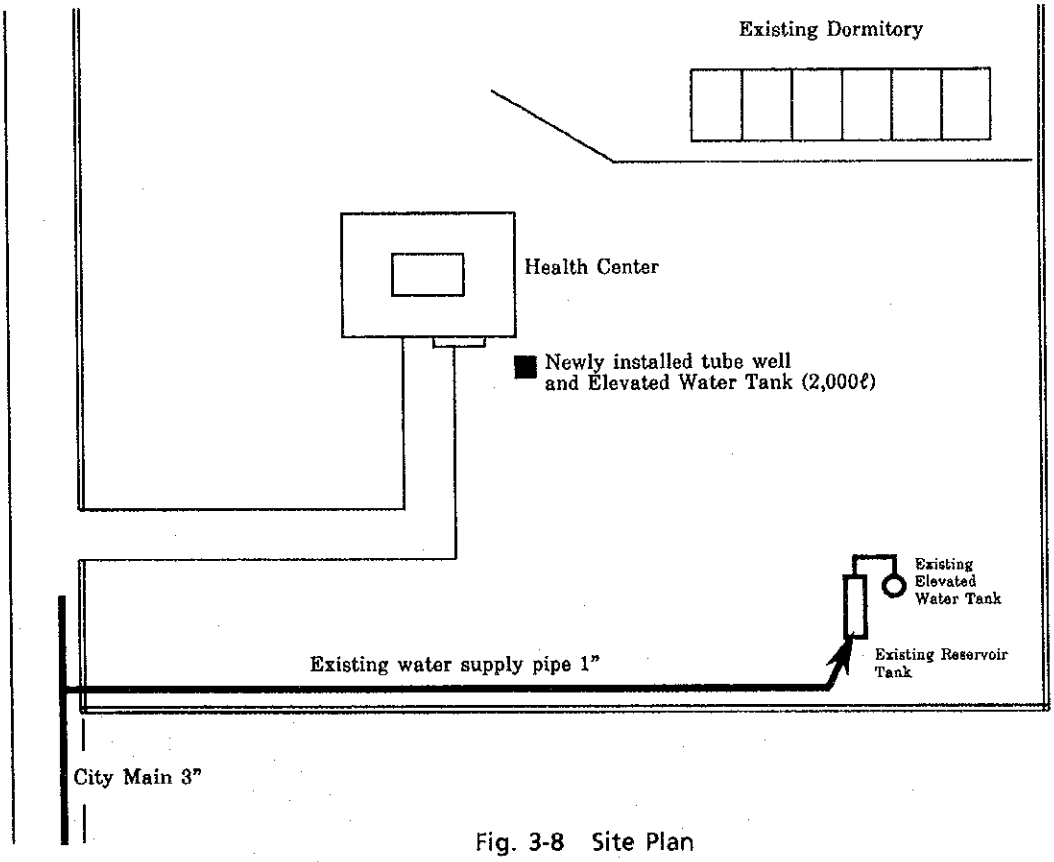


Fig. 3-8 Site Plan

1) Plumbing System Plan

Palam Primary Health Centre is unable to secure a sufficient supply of city water. Furthermore, at present, no city water is supplied to the health centre since its plumbing system has become too old to use. If the plumbing system is to be repaired, it will be necessary to repair all the related facilities as well. Therefore, utmost emphasis should be placed on securing a reliable source of water supply. Under this project, a tube well will be installed and an elevated water tank to receive the water from the tube well will be installed on the premises of the health centre.

- Estimation of Daily Water Consumption

Suppose that the daily water consumption per unit area is 10ℓ/m^2 and that water is to be supplied only to the outpatient clinical department (which means that the boarding facilities are excluded). On above assumption the health centre's daily water consumption can be calculated as follows.

The total floor space of the existing facilities of the health centre is around 200m^2, therefore the daily water consumption is:

$$200m^2 \times 10\ell/day \cdot m^2 = 2,000\ell/day$$

The capacity of elevated water tank should be equivalent to the daily water quantity supplied considering the power failure. Then we have 2,000ℓ as the elevated tank's capacity.

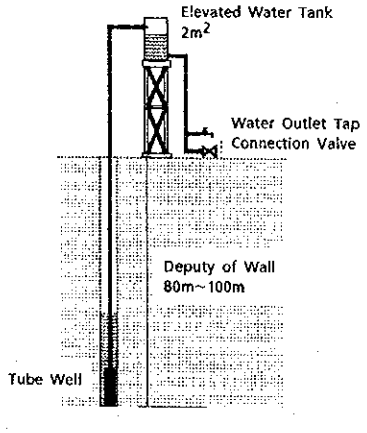


Fig 3-9 Well System Diagram

The well water pump should be able to pump up the above-mentioned quantity of water in an hour.

2000ℓ/day÷60min.=33ℓ/min.

Therefore, the capacity of well water pump will be 33ℓ/m^2.

The depth of the well will be 100m.

Tube Well Specifications:

The tube well specifications which are the same as those for Kalyanpuri Urban Health Centre will apply.

3-2 Equipment Plan

The equipment to be procured under the project can be classified as follows. Table 3-15 shows the details of the items of equipment to be procured under the project.

Equipment for:

1. Radiology Dept.
2. Outpatient Dept.
3. ICU Dept.
4. Operation Theatre Dept.
5. Premature Baby Rm in Existing KSCH
6. Ward
7. Feeding, Bath & Milk Kitchen Room in Suchita Kripalani General Hospital
8. Incinerator
9. Transportation
10. Autopsy Room in Suchita Kripalani General Hospital
11. Central Laboratory Dept.
12. Surgical ICU
13. Follow-up Clinic Kidney
14. Physical Medicine & Rehabilitation Dept.
15. Central Supply & Sterilization
16. OPD Paediatric Orthopedic
17. OPD Paediatric ENT
18. OPD Paediatric Ophthalmology
19. OPD Paediatric Dermatology
20. Endoscopic Room
21. Workshop
22. Laundry
23. Medical Record Dept.
24. Preventive & Social Medicine Dept.
25. Hospital Administration
26. Photography
27. Urban Health Centre & Primary Health Centres

The required items of equipment were determined on the basis of the list of the requested items of equipment and the results of the discussions with the representatives of the departments concerned of the Indian project implementing organization, paying special attention to the following points.

1. Of the requested items of equipment, inclusion of the following items in the Project was judged to be quite appropriate.

   ① Those used widely in medical services offered at the hospital.

   ② Those to replace the existing superannuated items of equipment or to lessen shortages of the existing items.

   ③ Those required to improve the quality of medical services offered at the hospital.

   ④ Those designated as basic items of equipment by the World Bank, the World Health Organization and UNICEF.

2. Of the requested items of equipment, it was decided not to include the following items in the project because they're irrelevant.

   ① Those not related directly to medical services such as medical examination, medical treatment and preventive medicine.

   ② Those not necessary for clinical activities.

   ③ Those not so effective for medical treatment.

   ④ Those whose functions can be fulfilled by other equipment.

   ⑤ Those not used frequently but which are very expensive (Those used for relatively small numbers of specimens and patients.)

   ⑥ Those with which only reagent kits from a limited number of manufacturers can be used.

⑦ Those for which it is difficult both financially and geographically to procure expendable supplies and spare parts.

⑧ Those considered appropriate for use at other departments.

⑨ Those to be procured for other departments or which are in excess supply.

The required items of equipment should not be of higher grade than is needed, but should be of types that can be utilized in the future and that help the planned facilities attain their respective objective.

Table 3-14 Uses and Functions of Main Items of Equipment

Item of equipment	Use and Function
X-ray TV monitor	This equipment is used in fluoroscope and radiography of the digestive organs, as well as contrast radiography of the kidney and the ureter. It consists of an examining table with a movable plate, a control unit, a monitor and a suspended tube unit.
Color doppler ultrasound scanner	This equipment is used mainly to diagnose circulatory disorders. Blood flow and the like can be displayed on the screen accompanied by a voice-over and also can be recorded.
Electro myograph	This equipment is used to examine patients for skeletal muscle disorders. Skeletal muscles can be contracted or relaxed voluntarily to display their functions on the screen.
Neonatal monitor	This equipment is used to monitor abnormalities or changes in newborn infants and infant diseases. Electrocardiograms, respiratory modes and temperatures can be displayed on the screen accompanied by a voice-over.
Infant ventilator (neonatal)	This equipment is used in treatment of respiratory disorders or in life saving. Respiratory modes, oxygen concentration, respiration frequency and air breath flows can be adjusted.
Operating table	This equipment is used by adjusting height, angle and so on according to the positioning of the patients. Its components can be moved electrohydraulically.
Operating light	This is an astral lamp used to perform operations. One provided with a TV camera or a spotlight (for use in E.N.T. operations) is also available.
Anesthesia	This is used for general anesthesia. It consists of an oxygen/laughing gas flow meter, two kinds of vaporizers, a patient monitor and an automatic ventilator.
Scrubber unit	This equipment is used to sterilize the operator's and the assistant's hands. Two persons can use it simultaneously.
Transcutaneous PO_2/PCO_2 monitor	This equipment is used to measure the oxygen concentration and the carbon dioxide concentration in the blood of premature babies and newborn babies. Unlike the blood gas analyzer, this equipment does not require blood collection and therefore does no damage to patients. Measured values of PO_2/PCO_2 are displayed on the screen and the recorder.
High pressure sterilizer, big size	This equipment is used to sterilize linen, copper products and the like. Sterilization is carried out automatically. It is provided with a vaporizer.
C-arm X-ray TV system	This equipment is used to do fluoroscope and radiography of bone fracture patients. It is provided with a monitor.
Argon laser	This equipment is used to treat patients suffering eyeground diseases such as retinal detachment for which no viable pharmacotherapy is available. It consists of a laser beam generator and a treatment table.

The main equipment proposed in basic design are shown in the following list.

Table 3-15 Equipment List

No.	Equipment Name	Q'ty	Unit	Country of Origin
1. Radiology Department				
1	X-ray TV monitor, compatible double tube ※	1	No	Japan
2	Color doppler ultrasound scanner ※	1	No	Japan
3	Diagnostic X-ray ※	1	No	Japan
4	Mobile X-ray unit ※	2	Nos	Japan
5	Darkroom equipment	1	Set	Japan
6	X-ray film cabinet	1	No	Japan
7	Instrument cabinet	1	No	Japan
8	Portable ultrasonic diagnostic apparatus ※	1	No	Japan
9	Film viewer	2	Nos	Japan
2. Outpatient Department				
1	Examination table	8	Nos	India
2	Examination unit	8	Sets	Japan
3	Stethoscope for doctor	10	Pcs	Japan
4	Stethoscope for nurse	10	Pcs	Japan
5	Hemoglobin meter	2	Nos	Japan
6	Clinical thermometer	100	Pcs	Japan
7	Ultrasonic nebulizer	2	Nos	Japan
8	Suction unit	2	Nos	India
9	Examining light	4	Nos	Japan
10	Electro cardiograph 1ch. ※	2	Nos	Japan
11	Electro cardiograph 3ch. ※	1	No	Japan
12	Diagnostic set	2	Sets	Japan
13	Doctor desk	8	Nos	India
14	Doctor chair	8	Nos	India
15	Patient chair	8	Pcs	India
16	Film illuminator	8	Nos	India
17	Sphygmomanometer	8	Nos	Japan
18	Medicine cabinet	2	Nos	Japan
19	Instrument cabinet	2	Nos	Japan
20	Dressing cart with drawers	4	Nos	Japan
21	Instrument cart with 3 trays	2	Nos	Japan
22	Digestive system ultrasound scanner ※	1	No	Japan

No.	Equipment Name	Q'ty	Unit	Country of Origin
23	Chair for patient	100	Nos	India
24	Clothes basket	8	Nos	India
25	Wash basin stand	4	Nos	Japan
26	Treatment bed	2	Nos	Japan
27	Medicine refrigerator	2	No	Japan
28	Refrigerator	4	Nos	India
29	Deep freezer 300ℓ, -20 deg.	1	No	Japan
30	Electro myograph ※	1	No	Japan
3.	ICU Department			
1	Infant incubator, manual ※	3	Nos	Japan
2	Infant incubator, servo / manual ※	3	Nos	Japan
3	Infant warmer ※	3	Nos	Japan
4	Infusion pump ※	3	Nos	Japan
5	Irrigating stand, twin hanger	4	Nos	Japan
6	Ultrasonic nebulizer	3	Nos	Japan
7	Neonatal monitor ※	3	Nos	Japan
8	Infant ventilator (neonatal) ※	1	No	Japan
9	Infant ventilator ※	2	Nos	Japan
10	Instrument cart	2	Nos	Japan
11	Instrument cabinet	1	No	Japan
12	Bilirubin analyzer ※	1	No	Japan
13	Defibrillator ※	1	No	Japan
4.	Operation Theatre Department			
1	Operating table ※	3	Nos	Japan
2	Operating table for pediatric orthopedics ※	1	No	Japan
3	Suction unit	2	Nos	India
4	Automatic infusion pump	1	No	Japan
5	Operating light with TV monitor ※	1	No	Japan
6	Operating light ※	2	Nos	Japan
7	Operating light with focused spot light ※	1	No	Japan
8	Anesthesia Mac. with monitor & ventilator ※	3	Nos	Japan
9	Defibrillator ※	1	No	Japan
10	Film illuminator, two hanging ※	2	Nos	Japan
11	Multi channel patient monitor	2	Nos	Japan
12	Laryngoscope	6	Nos	Japan

No.	Equipment Name	Q'ty	Unit	Country of Origin
13	Electro cautery	2	Nos	Japan
14	Portable light	2	Nos	Japan
15	Emergency power unit	2	Nos	Japan
16	Irrigating stand	4	Nos	Japan
17	Instrument tray table	2	Nos	Japan
18	Instrument cart with 3 trays	2	Nos	Japan
19	Instrument cabinet	2	Nos	Japan
20	Operating instrument set	2	Nos	Japan
21	Patient warming system	1	No	Japan
22	Oxygen analyzer	2	Nos	Japan
23	Stretcher	2	Nos	Japan
24	Recovery stretcher	2	Nos	Japan
25	Hand washing sink unit	2	Nos	Japan
5. Premature Baby Room in Existing KSCH				
1	Intensive care incubator ※	3	Nos	Japan
2	Phototherapy unit ※	3	Nos	Japan
3	Apena alarm	2	Nos	Japan
4	Automatic infusion pump ※	1	No	Japan
5	Neonatal monitor ※	2	Nos	Japan
6	Oxygen analyzer ※	2	Nos	Japan
7	Infant care center ※	2	Nos	Japan
8	Syringe infusion pump ※	1	No	Japan
9	Transcutaneous PO_2/PCO_2 monitor ※	1	No	India
10	Bilbirubin analyzer ※	2	Nos	Japan
11	Hematocrit centrifuge	1	Nos	Japan
12	Instrument cart with 3 trays	2	Nos	Japan
13	Portable infant incubator	2	Nos	Japan
14	Oxygen head box	2	Nos	India
15	Instrument cabinet	1	No	Japan
6. Ward in Existing KSCH				
1	Patient bed (ICU 30, Isolation 3, Surgical ICU 3, Pre/ Postoperation 12, DTTU 2)	50	Nos	India
2	Bedside cabinet	50	Nos	India
3	Overbed table	50	Nos	India
4	Oxygen tent	5	Nos	India
5	Automatic infusion pump ※	2	Nos	Japan

No.	Equipment Name	Q'ty	Unit	Country of Origin
6	Suction unit	8	Nos	India
7	Oxygen analyzer	1	No	Japan
8	Ultrasonic nebulizer	2	Nos	Japan
9	Silicone resuscitator	2	Nos	Japan
10	Oxygen inhalation set	2	Sets	Japan
11	Film Illuminator	4	Nos	India
12	Stretcher trolley	2	Nos	Japan
13	Diagnostic set	4	Sets	Japan
14	Chart film cart	4	Nos	Japan
15	Instrument cabinet	2	Nos	Japan
16	Instrument cart with 3 trays	2	Nos	Japan
17	Examining light	4	Nos	Japan
18	Dressing cart with drawers	2	Nos	Japan
19	Medicine cabinet	2	Nos	Japan
20	Laundry bag with cart	4	Nos	India
21	Irrigating stand, twin hanger	2	Nos	Japan
22	Vacuum cleaners	2	Nos	India
7. Feeding, Bath and Milk Kitchen Room in SKGH				
1	Infant warmer ※	3	Nos	Japan
2	Digital baby scale	2	Nos	Japan
3	Infant length scale	2	Nos	Japan
4	Infant stretcher	2	Nos	Japan
5	Refrigerator	1	No	India
6	Dressing cart	2	Nos	Japan
7	Infant examination dressing table	2	Nos	Japan
8. Incinerator				
1	Incinerator	3	Nos	Japan
9. Transportation				
1	Ambulance with resuscitative measures 4 wheeler (diesel) ※	4	Nos	Japan
2	Mini bus (15 seater) ※	1	No	Japan
3	4 wheeler (Jeep) ※	1	No	Japan
10. Autopsy Room in SKGH				
1	Autopsy table with shower	2	No	Japan

No.	Equipment Name	Q'ty	Unit	Country of Origin
2	Shadowless light, 5000 lux	1	No	Japan
3	Morgue refrigerator, two bodies	1	No	India
4	Photographic unit with camera	1	No	Japan
5	Autopsy instrument set	1	Set	Japan
11.	Central Laboratory Department			
	Chemical Biochemistry			
1	Binocular microscope	1	No	Japan
2	Precision inverted microscope	1	No	Japan
3	Incubator, 150ℓ	1	No	India
4	Drying oven, 150ℓ	1	No	India
5	Vertical sterilizer, 50ℓ	1	No	Japan
6	Water bath	1	No	India
7	Medical refrigerator, 500ℓ	2	Nos	Japan
8	Stirrer, dia. 120 m/m	1	No	Japan
9	Mixer for test tube	1	No	Japan
10	pH meter	2	Nos	Japan
11	Hematocrit centrifuge	1	No	Japan
12	Refrigerated centrifuge	1	No	Japan
13	Electronic balance, 200g	1	No	Japan
14	Distilling apparatus, 5ℓ/h	1	No	Japan
15	Laboratory instrument set	1	Set	Japan
16	Spectrophotometer ※	1	No	Japan
17	Glassware for clinical chemistry	1	Set	Japan
18	Small items for clinical chemistry	1	Set	Japan
19	Ultrasonic cleaner	1	No	Japan
20	Bilirubin meter	1	No	Japan
21	Desiccator	1	No	Japan
22	Elisa system ※	1	Set	Japan
23	Instrument cabinet	1	No	Japan
24	Reagents for biochemistry test	1	Set	India
	Bacteriology			
25	Incubator	1	Nos	India
26	Refrigerator	1	Nos	India
27	CO_2 incubator	1	Nos	India

No.	Equipment Name	Q'ty	Unit	Country of Origin
28	Sterilizer	1	No	Japan
29	Microscope	2	Nos	Japan
30	Table top centrifuge	1	No	Japan
31	Binocular microscope	1	No	Japan
32	Centrifuge	1	No	Japan
33	Glassware for staining preparation	1	Set	Japan
34	Electronic balance	1	No	Japan
35	Low temperature incubator ※	1	No	India
36	Elisa system ※	1	Set	Japan
37	Clean hood ※	1	No	India
38	Freezer	1	No	Japan
39	Small items for bacteriology tests	1	Set	Japan
	Hematology			
40	Hand tally counter	4	Nos	Japan
41	Microscope	2	Nos	Japan
42	Spectrophotometer	1	No	Japan
43	Centrifuge	1	No	Japan
44	Water distiller	1	No	Japan
45	Hot air sterilizer	1	No	India
46	Autoclave	1	No	Japan
47	Shaker	1	No	Japan
48	Coagulometer	1	No	Japan
49	Hemoglobinmeter	4	Nos	Japan
50	Standard hemmometer	20	Nos	Japan
51	Blood sedimentator	50	Pcs	Japan
52	Autlet	3	Sets	Japan
53	Laboratory small instrument sets	1	Set	Japan
54	Glassware set	1	Set	Japan
55	pH meter	2	Nos	Japan
56	Water bath	1	Nos	Japan
57	Ultrasonic cleaner	1	No	Japan
58	Donor bed	1	No	Japan
59	Blood bank refrigerator	1	No	India
60	Instrument cabinet	1	No	Japan
61	Hematocrit centrifuge	1	No	Japan

No.	Equipment Name	Q'ty	Unit	Country of Origin
62	Automatic blood cell counter ※	1	No	Japan
63	Incubator	1	No	India
64	Refrigerated centrifuge	1	Nos	Japan
	Histopathology			
65	Microscope	1	No	Japan
66	Small rotary microtom ※	1	No	India
67	Freezing microtom ※	1	No	India
68	Paraffin bath	1	No	Japan
69	Paraffin spreading apparatus	1	No	Japan
70	Paraffin Cutting and smoothing iron	1	No	Japan
71	Paraffin burying frames	1	No	Japan
72	Paraffin burying cutter	1	Pc	Japan
73	Burying basket	1	No	Japan
74	Histofume hold	1	No	Japan
75	Dissection stand	1	No	Japan
76	Block adjusting box	1	No	Japan
77	Specimen box	1	No	Japan
78	Card filing box	6	Nos	Japan
79	Tissue infiltrator	1	No	India
80	Histological dissecting apparatus	1	No	Japan
81	Staining jar	24	Nos	Japan
82	Slide basket	24	Pcs	Japan
83	Staining jar holder	24	Pcs	Japan
84	Test tube stand	24	Pcs	Japan
85	Incubator	1	No	India
86	Magnetic stirrer	1	No	Japan
87	Mini mixer	1	No	Japan
88	Electronic balance	1	No	Japan
89	Timer	4	Pcs	Japan
90	Pipette washer	1	No	Japan
	Immuno Hematology			
91	Immuno electrophoresis apparatus ※	1	No	Japan
92	Centrifuge	1	No	Japan
93	Incutabor	1	No	India

No.	Equipment Name	Q'ty	Unit	Country of Origin
94	Water bath	1	No	India
95	Fluorescent microscope	1	No	Japan
	Common			
96	Flame photometer ※	1	No	Japan
97	Refrigerator	1	No	India
98	Deep Freezer	1	No	India
99	Autoclave	1	No	Japan
100	Water distiller	2	Nos	Japan
12.	Surgical ICU			
1	Pediatric ventilator (neonatal) ※	1	No	Japan
2	Ventilator for infant ※	2	Nos	Japan
3	Incubator ※	4	Nos	Japan
4	Bed side multichannel monitors ※	4	Nos	Japan
5	Open care system ※	2	Nos	Japan
6	Defibrillator ※	1	No	Japan
7	Instrument cabinet	1	No	Japan
13.	Follow-up Clinic Kidney			
1	Hemodialysis system	2	Nos	India
2	Instrument cabinet	1	No	Japan
14.	Physical Medicine & Rehabilitation			
1	Microwave therapy unit ※	1	No	Japan
2	Air massager	1	No	Japan
3	Whirl pool bath ※	1	No	Japan
4	Traction unit ※	1	Nos	Japan
5	Shortwave apparatus	1	No	Japan
6	Infrared ray lamp	1	No	Japan
7	Ultraviolet lamp	1	No	Japan
8	Paraffin bath	1	No	Japan
9	Shoulder wheel	1	No	Japan
10	Wrist roll machine	1	No	Japan
11	Bicycle exerciser	1	No	Japan
12	Rowing machine	1	No	Japan

No.	Equipment Name	Q'ty	Unit	Country of Origin
13	Wall stall bars	1	No	Japan
14	Wheel chair	2	Nos	India
15	Walker	2	Nos	Japan
16	Parallel bars	1	No	Japan
17	Exercise stairs	1	No	Japan
18	Dumbbell set	1	Set	Japan
19	Training ball	1	Pc	Japan
20	Roll	1	Pc	Japan
21	Laser therapy unit	1	No	Japan
15.	Central Supply & Sterilization			
1	High pressure sterilizer, big size ※	1	No	Japan
2	High pressure sterilizer, middle size ※	1	No	Japan
3	High pressure sterilizer, middle size high speed ※	1	No	Japan
4	Ultrasonic equipment cleaner ※	1	No	Japan
5	Dry/sterilizer	1	No	India
6	Washer/dryer for surgical gloves	1	No	Japan
7	Powder sprayer for surgical gloves	1	No	Japan
8	Transfer cart	1	No	Japan
9	Storage cabinet	1	No	Japan
10	Dressing jar	1	Set	Japan
11	Sink unit	2	Nos	Japan
12	Drying cabinet	1	No	Japan
13	Tube washer	1	No	Japan
14	Tube drying cabinet	1	No	Japan
15	Table top EOG sterilizer ※	1	No	Japan
16	Instrument cabinet	1	No	Japan
16.	OPD Paediatric Orthopedic			
1	Surgical apparatus set for Ortho. Surgery	1	Set	Japan
2	Kuncher intermedullary nail apparatus set	2	Sets	Japan
3	Orthopedic fragment plate and screw set (large/small)	2	Sets	Japan
4	Arthoroscope apparatus set (for shoulder/knee/small joints)	1	No	Japan
5	Electric drill set	1	Nos	Japan
6	Electric surgical saw	1	No	Japan
7	Spinal surgery set	1	Set	Japan

No.	Equipment Name	Q'ty	Unit	Country of Origin
8	Nerve stimulator system	1	No	Japan
9	Coagulator	1	No	Japan
10	Wire traction instrument set	1	Set	Japan
11	Hand drill	2	Nos	Japan
12	Fixation nail set	1	Set	Japan
13	Bone plate set (small mini fragment)	2	Sets	Japan
14	Bone screw set (small mini fragment)	1	Set	Japan
15	Bone fracture set	1	Set	Japan
16	Plaster table	1	No	Japan
19	Gypsum cutter	2	Nos	Japan
20	Automatic pneumatic tourniquets with pressure monitor	1	No	Japan
21	C-arm X-ray T.V. system ※	1	No	Japan
22	Electric dermatome with blades	1	No	Japan
23	Instrument cabinet	1	No	Japan
17.	OPD Paediatric E. N. T.			
1	Otorhinolaryngological treatment table	1	No	Japan
2	Mobile operating light	1	No	Japan
3	Optical fiber light sources, for ENT	1	No	Japan
4	Microsurgery apparatus for ear & throat ※	1	Set	Japan
5	Paediatric hearing tester	1	No	Japan
6	Otorhinolaryngological treatment unit with compressor	1	No	Japan
7	Instrument set for otorhinolaryngology	1	No	Japan
8	Audiometer	1	No	Japan
9	Otorhinolaryngoscope	1	No	Japan
10	Laryngeal fiberscope	1	No	Japan
11	Eardrum fiberscope	1	No	Japan
12	Fiberscope light source	1	No	Japan
13	Head mirror	6	Nos	Japan
14	Instrument set for ORL	1	Set	Japan
15	Instrument cabinet	1	No	Japan
16	Rhinomanometer	1	No	India
17	Electro cochleography	1	No	India
18	Sterilizer (hot air)	1	No	India
19	Deep freezer for storage of graft materials	1	No	Japan

No.	Equipment Name	Q'ty	Unit	Country of Origin
18.	OPD Paediatric Ophthalmology			
1	Slit lamp with camera ※	1	No	Japan
2	Projection perimeter	1	No	Japan
3	Ophthalmometer of javal	1	No	Japan
4	Synoptoscope	1	No	Japan
5	Diathermy unit full system	1	No	Japan
6	Co-ordinator	1	No	Japan
7	Cataract set microsurgery	1	Set	Japan
8	Glaucoma surgery set	1	Set	Japan
9	Retinal detachment surgery set	1	Set	Japan
10	Iris hook and lens manipulator	1	Set	Japan
11	Keratoplasty set	1	Set	Japan
12	Intra ocular lens forceps	1	Set	Japan
13	Forceps cornmeal suturing	1	Set	Japan
14	Scissors iris	1	Pc	Japan
15	Scissors cornmeal vannas	1	Set	Japan
16	Instrument set for Ophthalmology	1	Set	Japan
17	Aspiration irrigation unit simcoe	1	Set	Japan
18	Indirect ophthalmoscope	1	No	Japan
19	Ophthalmoscope	1	No	Japan
20	Three mirror universal contact lens	1	No	Japan
21	Tonometer	1	No	Japan
22	Fundus camera ※	1	No	Japan
23	Slit lamp ※	1	No	Japan
24	Trial lens set	1	No	Japan
25	Test type object chart illuminating unit	1	Set	Japan
26	Instrument sterilizer	1	No	Japan
27	Instrument cabinet	1	No	Japan
28	Refracting unit (complete) with motorized chair	1	No	Japan
29	Pediatric trial frames	1	No	Japan
30	Focimeter	1	No	Japan
31	Echo-scan (ultrasonography A & B scan) ※	1	No	Japan
32	Argon laser phtocoagulator with indirect ophthalmoscope	1	No	Japan
33	Operating microscope with co-observer tube with footswitch ※	1	No	Japan
34	Streak retinoscope	1	No	Japan
35	Perkin's hand held tonometer	1	No	Japan
36	Ultrasonic cleaner for microsurgical	1	No	Japan

No.	Equipment Name	Q'ty	Unit	Country of Origin
37	Single mirror contact lens	1	No	Japan
38	Indirect lens	1	No	Japan
19.	OPD Paediatric Dermatology			
1	UVR therapy unit	1	No	Japan
2	Wood's lamp	1	No	Japan
3	Microscope with photography attachment	1	No	Japan
4	Skin biopsy punches (3mm, 4mm, 5mm)	5	Sets	Japan
5	Automatic slide projector	1	No	India
6	Overhead projector	1	No	India
7	Magnifying lenses	2	Nos	Japan
8	Examination bed	2	Nos	India
9	Biopsy trays	2	Nos	Japan
10	Instrument cabinet	1	No	Japan
20.	Endoscopic Room			
1	Panendoscope ※	1	No	Japan
2	Esophagoscope ※	1	No	Japan
3	Duodenoscope ※	1	No	Japan
4	Colonoscope ※	1	No	Japan
5	Laparoscope ※	1	No	Japan
21.	Workshop			
	Section of Iron Works			
1	Welding machine for their sheets	1	No	Japan
2	Arc welding machine	1	No	Japan
3	Spot welding machine	1	No	Japan
4	Drilling machine	1	No	Japan
5	Bench grinder	1	No	Japan
6	Drill	1	No	Japan
7	Portable cutter	1	No	Japan
8	Disc grinder	1	No	Japan
9	Pipe threading tool set	1	Set	Japan
10	Pipe bias (1/8 2") with stand	1	No	Japan
11	Pipe cutter	1	No	Japan
12	Cord reel	1	No	Japan

No.	Equipment Name	Q'ty	Unit	Country of Origin
13	Instrument shelf	1	No	Japan
14	Iron work tool	1	No	Japan
15	Tool cabinet	1	No	Japan
	Section of Wooden Works			
16	Table saw	1	No	Japan
17	Power planer	1	No	Japan
18	Mortiser	1	No	Japan
19	Router	1	No	Japan
20	Zig saw	1	No	Japan
21	Circular saw	1	No	Japan
22	Finishing sander	1	No	Japan
23	Cord reel	1	No	Japan
24	Instrument cabinet	1	No	Japan
25	Tool cabinet	1	No	Japan
26	Groove cutter	1	No	Japan
27	Angle clamp set	1	No	Japan
28	Hand clamp set	1	No	Japan
	Section of Electric Works			
29	Motor rotor balance controller	1	No	Japan
30	Varnish dryer	1	No	Japan
31	Automatic winding machine	1	No	Japan
32	Phase tester	1	No	Japan
33	Multi tester	1	No	Japan
34	Clump tester	1	No	Japan
35	Meg-ohm tester	1	No	Japan
36	Soldering iron	1	No	Japan
37	Cramping player	1	No	Japan
38	Portable cutter	1	No	Japan
39	Wire stripper	1	No	Japan
40	Cord reel	1	No	Japan
41	Instrument shelf	1	No	Japan
42	Tool cabinet	1	No	Japan
43	Electric work tool set	1	Set	Japan

No.	Equipment Name	Q'ty	Unit	Country of Origin
	Section of Electronic Works			
44	Oscilloscope 30 MHz	1	No	Japan
45	LCR meter	1	No	Japan
46	DC power supply	1	Nos	Japan
47	Digital multimeter	1	No	Japan
48	Meg-ohm tester	1	No	Japan
49	Slide resistor	1	No	Japan
50	Thyristor voltage regulator	1	Nos	Japan
51	Clump meter	1	No	Japan
52	Portable AC voltage meter	1	No	Japan
53	Transistor tester	1	No	Japan
54	Temperature meter	1	No	Japan
55	Circuit tester	1	No	Japan
56	Tool set	1	Set	Japan
57	Instrument shelf	1	No	Japan
58	Biomedical engineering equipment	1	Set	Japan
	Section of Painting			
59	Compressor for painting	1	No	Japan
60	Sprayer for painting	1	No	Japan
61	Brass set	1	No	Japan
62	Scraper	1	No	Japan
63	Vacuum cleaner	1	No	Japan
64	Small items for painting works	1	Set	Japan
22.	Laundry			
1	Washing machine ※	2	Nos	India
2	Washing machine ※	1	No	India
3	Drying tumbler ※	2	Nos	India
4	Drying tumbler ※	1	No	India
5	Press machine ※	2	Nos	India
6	Extractor ※	2	Nos	India
7	Other materials for laundry	1	Set	India
23.	Medical Record Department			
1	Computer	4	Nos	Japan
2	Revolving ladder	1	No	Japan

No.	Equipment Name	Q'ty	Unit	Country of Origin
3	Electronic stapler	1	No	Japan
4	Photocopy machine	1	No	India
5	Patient record shelf	2	Nos	Japan
24.	Preventive & Social Medicine Department			
1	Personal computer system	1	No	Japan
2	Photocopy machine	1	No	India
3	Portable generator	2	Nos	Japan
4	Slide projector	1	No	Japan
5	Overhead projector	1	No	Japan
6	Portable video monitor	1	Nos	Japan
7	Portable PA system	1	No	Japan
8	Video camera system	1	No	Japan
9	Camera with zoom lens	1	No	Japan
25.	Hospital Administration			
1	Personal computer with laser printer and monitor	2	Nos	Japan
2	Photocopy machine	1	No	India
3	Filing rack	4	Nos	India
4	Automatic stencil machine	2	Nos	India
5	Calculator machine	2	Nos	India
6	Stapler machine big size	2	Nos	Japan
7	Weighing machine for dispatch of mail	2	Nos	Japan
8	Typewriter bilingual (English & Hindi)	2	Nos	India
9	Vacuum cleaner	1	No	India
26.	Photography			
1	Camera with zoom lens and accessories	3	Sets	Japan
27.	Three Health Centers			
	Equipment			
1	Sterilizer table model	K: 2 P: 1 N: 1	Nos	Japan
2	Laboratory small equipment	K: 1 P: 1 N: 2	Sets	Japan
3	Suction apparatus - neonatal (foot operated)	K: 2 P: 1 N: 1	Nos	Japan

(Note) K: Kalyanpuri Urban Health Centre P: Palam PHC N: Najafgarh PHC

No.	Equipment Name	Q'ty	Unit	Country of Origin
4	Oxygen cylinder with 2 regulators with key stand and tubing	K: 2 P: 1 N: 1	Nos	Japan
5	Portable resuscitation set	K: 1 P: 1 N: 2	Nos	Japan
6	Portable oxygen concentrator	K: 1 P: 1 N: 2	Nos	Japan
7	Incinerator	K: 1 P: 1 N: 1	Nos	Japan
8	Minor surgical kit	K: 2 P: 2 N: 5	Sets	Japan
9	Examination table	K: 2 P: 1 N: 1	Nos	Japan
	Additional Obstetric / Paediatric Equipment			
10	Obstetric table	K: 1 P: 1 N: 2	Nos	Japan
11	Blower	K: 0 P: 0 N: 1	No	Japan
12	Mini Lap. kit (tubectomy kit)	K: 1 P: 1 N: 2	Kits	Japan
13	MCH kit	K: 1 P: 1 N: 2	Kits	Japan
14	Neonatal care kit	K: 1 P: 1 N: 2	Kits	Japan
15	Family welfare kit	K: 1 P: 1 N: 2	Kits	Japan
16	Episiotomy scissor	K: 1 P: 1 N: 2	Sets	Japan
17	Needle holder	K: 1 P: 1 N: 2	Pcs	Japan
18	Dressing forceps tooth	K: 1 P: 1 N: 2	Pcs	Japan
19	Dissecting forceps without tooth	K: 1 P: 1 N: 2	Pcs	Japan
20	Obstetric forceps wrigley's outlet	K: 1 P: 1 N: 2	Pcs	Japan
21	E. B. currette	K: 1 P: 1 N: 2	Pcs	Japan
22	Skin retractor	K: 1 P: 1 N: 2	Pcs	Japan
23	Detachable scalpel blade handle	K: 1 P: 1 N: 2	Pcs	Japan
24	Cautery machine	K: 0 P: 0 N: 1	No	Japan

(Note) K: Kalyanpuri Urban Health Centre P: Palam PHC N: Najafgarh PHC

No.	Equipment Name	Q'ty	Unit	Country of Origin
25	Towel clips	K: 1 P: 1 N: 2	Pcs	Japan
	High Risk Pregnancies Kit			
26	Obstetric table	K: 1 P: 0 N: 1	Nos	Japan
27	Artery forceps (curved and straight)	K: 3 P: 3 N: 6	Sets	Japan
28	Sponge holding forceps	K: 1 P: 1 N: 2	Pcs	Japan
29	Dissecting forceps (tooth and non-tooth)	K: 1 P: 1 N: 2	Sets	Japan
30	Uterine sound set	K: 1 P: 1 N: 2	Pcs	Japan
31	Scalpel blade handle	K: 1 P: 0 N: 1	Pcs	Japan
32	Umbilical clamp	K: 1 P: 0 N: 1	Pcs	Japan
33	Mosquito forceps (straight and curved)	K: 3 P: 3 N: 6	Sets	Japan
34	Doyen's retractor	K: 2 P: 2 N: 4	Pcs	Japan
35	Kocher's forceps (straight and curved)	K: 2 P: 2 N: 4	Sets	Japan
36	Maternity cradle	K: 1 P: 0 N: 3	Nos	Japan
37	Sterilizer (small) table model	K: 0 P: 0 N: 1	No	Japan
38	Sterilizer (medium)	K: 0 P: 0 N: 1	No	Japan
39	Obstetric forceps (simpsom's and wrigley's)	K: 1 P: 1 N: 2	Pcs	Japan
40	Abdominal retractor	K: 1 P: 1 N: 2	Nos	Japan
41	Shadowless lamp (pedestal)	K: 1 P: 1 N: 2	Nos	Japan
42	Instrument trolley	K: 1 P: 0 N: 1	Nos	Japan
43	Weighing machine (newborn)	K: 1 P: 1 N: 2	Nos	Japan
44	Portable resuscitation set	K: 1 P: 1 N: 2	Sets	Japan
45	Metal catheter case	K: 0 P: 0 N: 1	Set	Japan

(Note) K: Kalyanpuri Urban Health Centre P: Palam PHC N: Najafgarh PHC

No.	Equipment Name	Q'ty	Unit	Country of Origin
46	Cervical punch biopsy	K: 1 P: 1 N: 2	Pcs	Japan
47	EB currette	K: 1 P: 1 N: 2	Pcs	Japan
48	Cautery machine	K: 0 P: 0 N: 1	No	Japan
49	Rubbin's cannula	K: 1 P: 1 N: 4	Pcs	Japan
50	Green armytage clamp	K: 0 P: 0 N: 2	Pcs	Japan
51	Suction apparatus (high vacuum)	K: 1 P: 1 N: 2	Nos	India

(Note) K: Kalyanpuri Urban Health Centre P: Palam PHC N: Najafgarh PHC

3-3 Basic Design Drawings

(1) Area Schedule

1. Kalawati Saran Children's Hospital

Central Building

PH Floor	90.0 m^2
3rd Floor	1,373.0 m^2
2nd Floor	1,373.0 m^2
1st Floor	1,373.0 m^2
Ground Floor	1,391.0 m^2
Total	5,600.0 m^2

Workshop/Substation Building

1st Floor	334.0 m^2
Ground Floor	348.0 m^2
Total	682.0 m^2

Laundry Building	234.0 m^2
Incinerator Building	100.0 m^2

2. Kalyanpuri Urban Health Centre

1st Floor	160.0 m^2
Ground Floor	246.0 m^2
Total	410.0 m^2

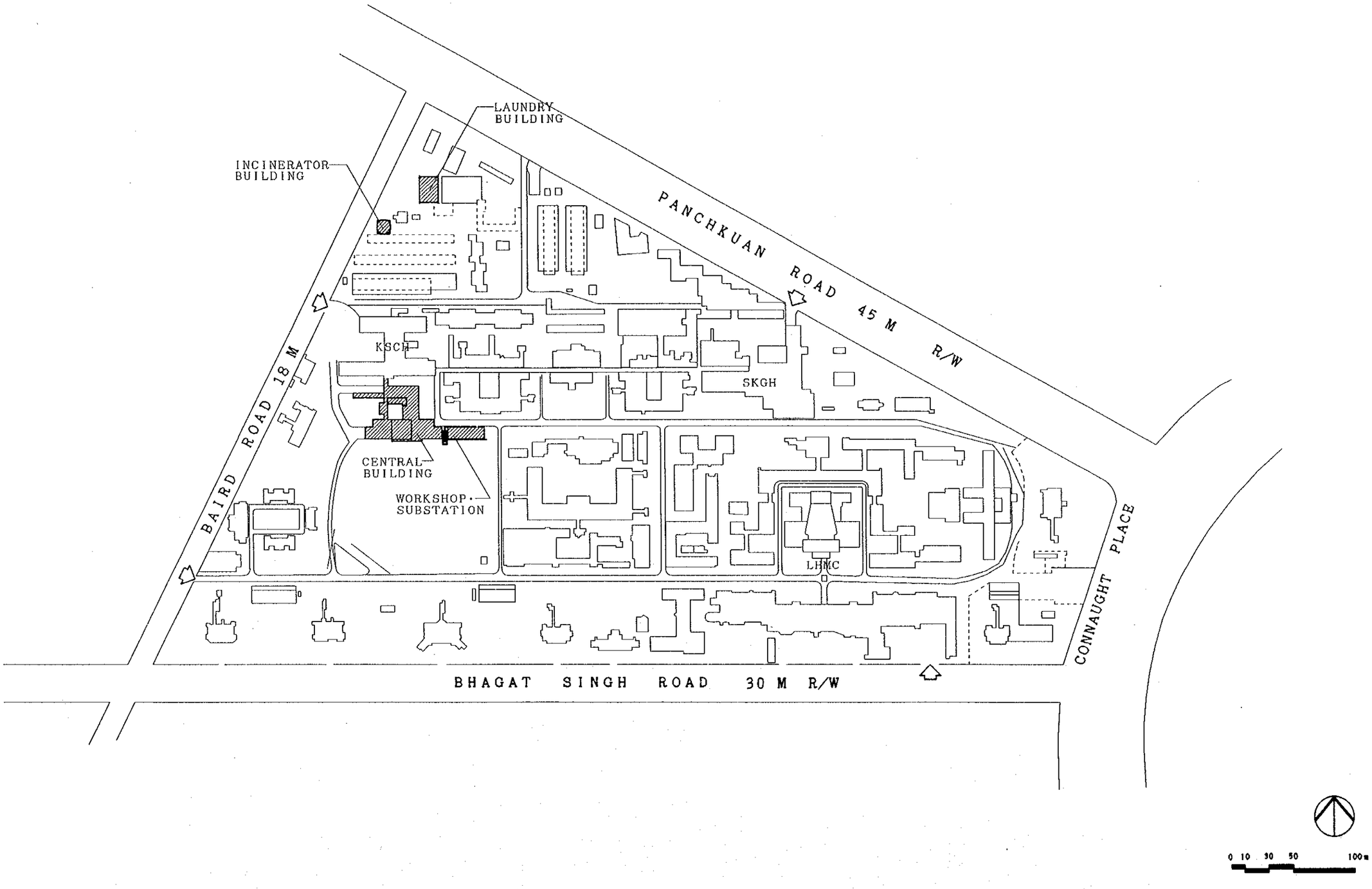
(2) Basic Design Drawings

1. Kalawati Saran Children's Hospital

01	Site Plan (Central Building)
02	Ground Floor Plan (Central Building)
03	1st Floor Plan (Central Building)
04	2nd Floor Plan (Central Building)
05	3rd Floor Plan (Central Building)
06	Roof Floor Plan (Central Building)
07	Sections (Central Building)
08	Elevations (1) (Central Building)
09	Elevations (2) (Central Building)
10	Ground & Roof Floor Plan (Workshop/Substation)
11	Elevations/Sections (Workshop/Substation)
12	Laundry Building·Incinerator Buildng
13	Plan/Elevations/Sections (Incinerator Building)

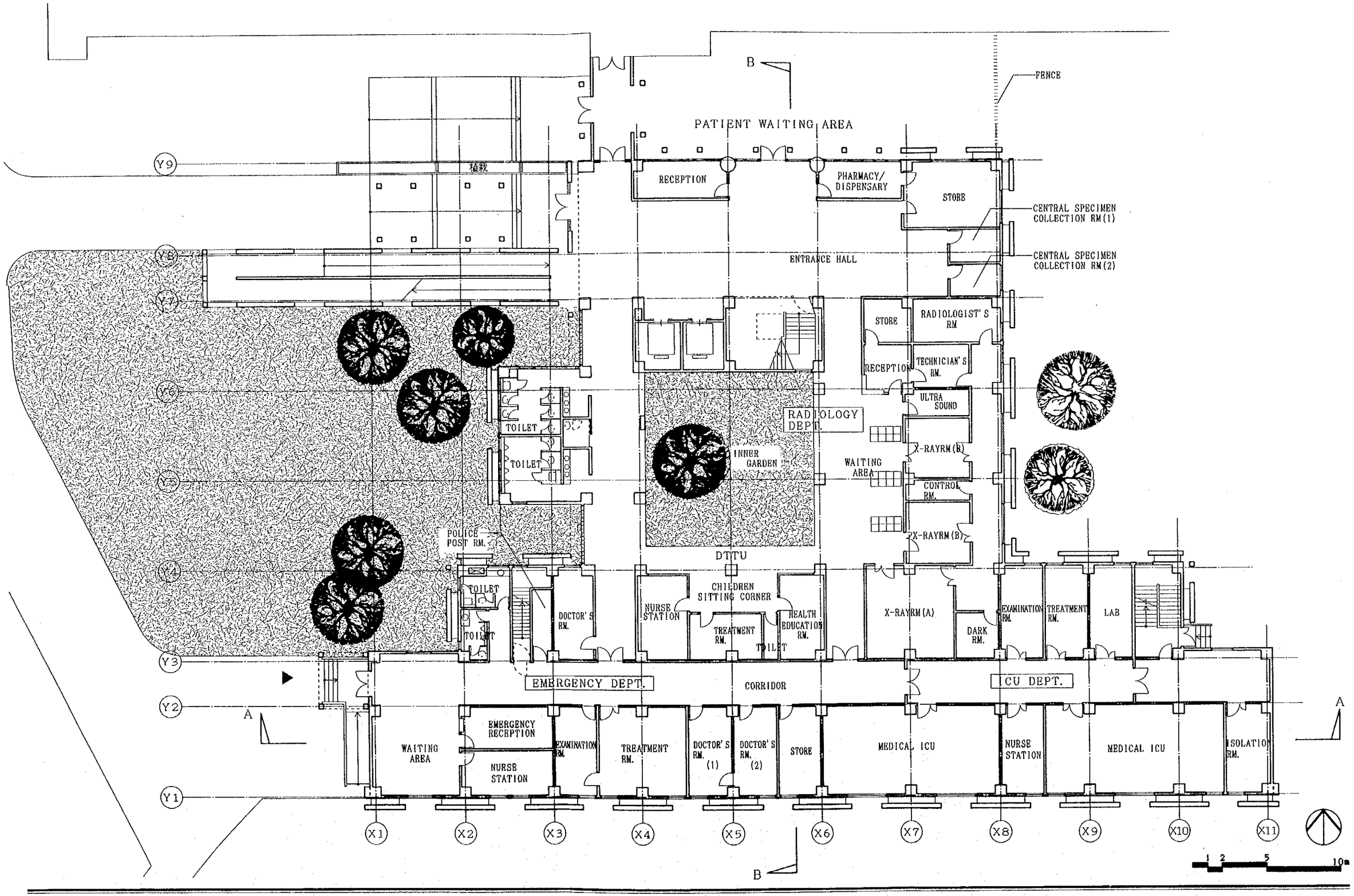
2. Kalyanpuri Urban Health Centre

14	Site Plan/Floor Plan
15	Section/Elevation



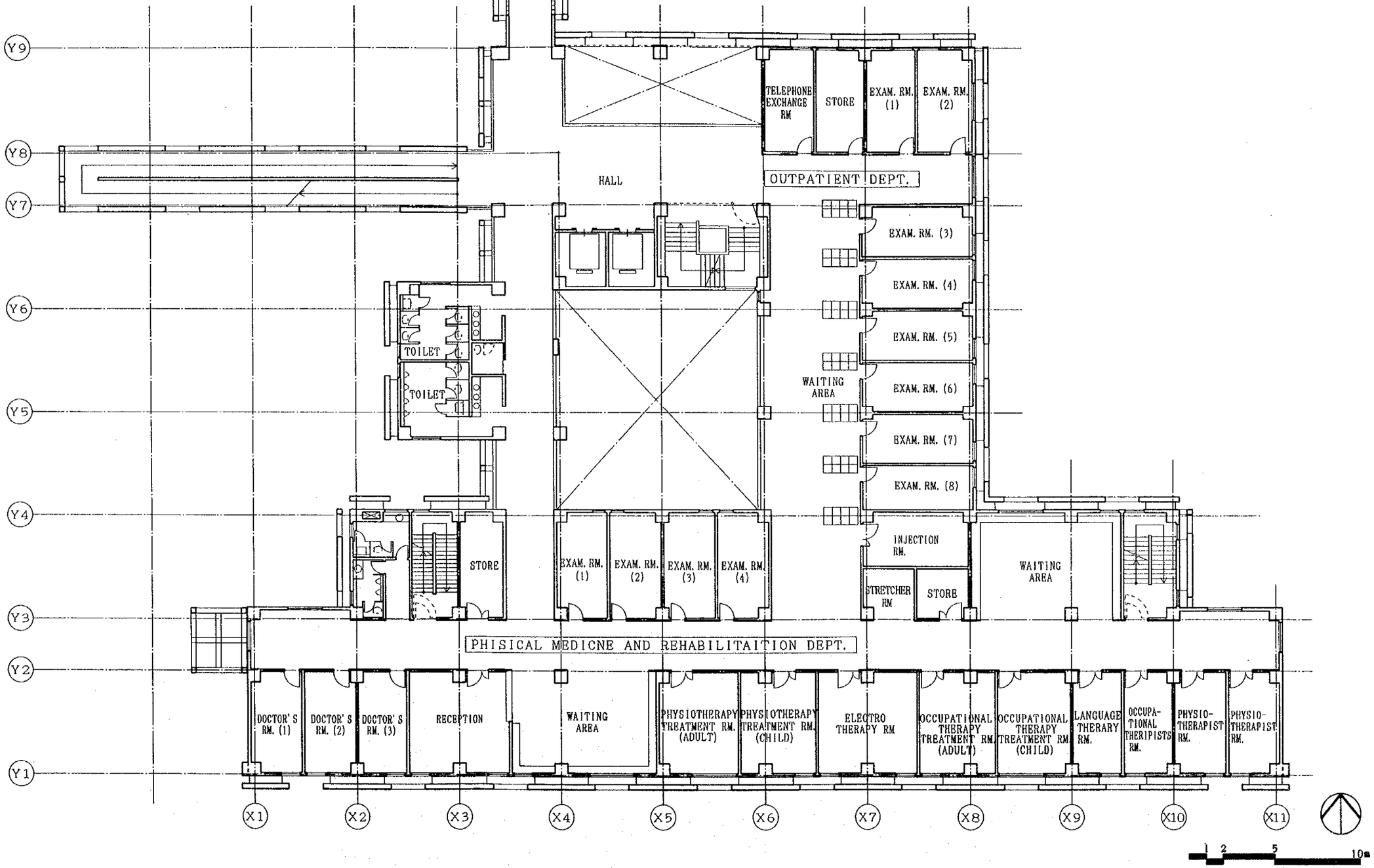
THE PROJECT FOR THE IMPROVEMENT OF
KALAWATI SARAN CHILDREN'S HOSPITAL IN INDIA

CENTRAL BUILDING
SITE PLAN



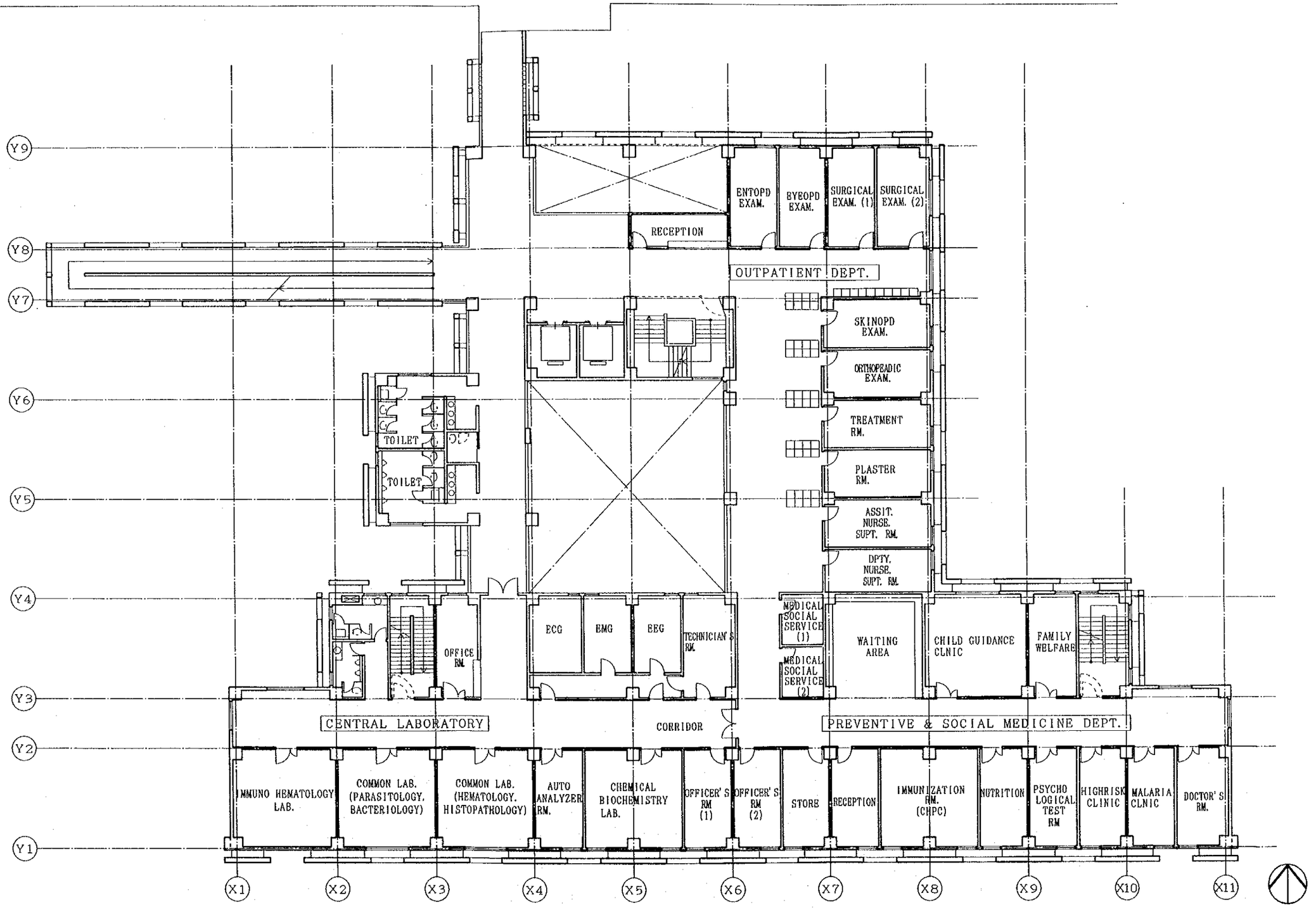
THE PROJECT FOR THE IMPROVEMENT OF
KALAWATI SARAN CHILDREN' S HOSPITAL IN INDIA

CENTRAL BUILDING
GROUND FLOOR PLAN



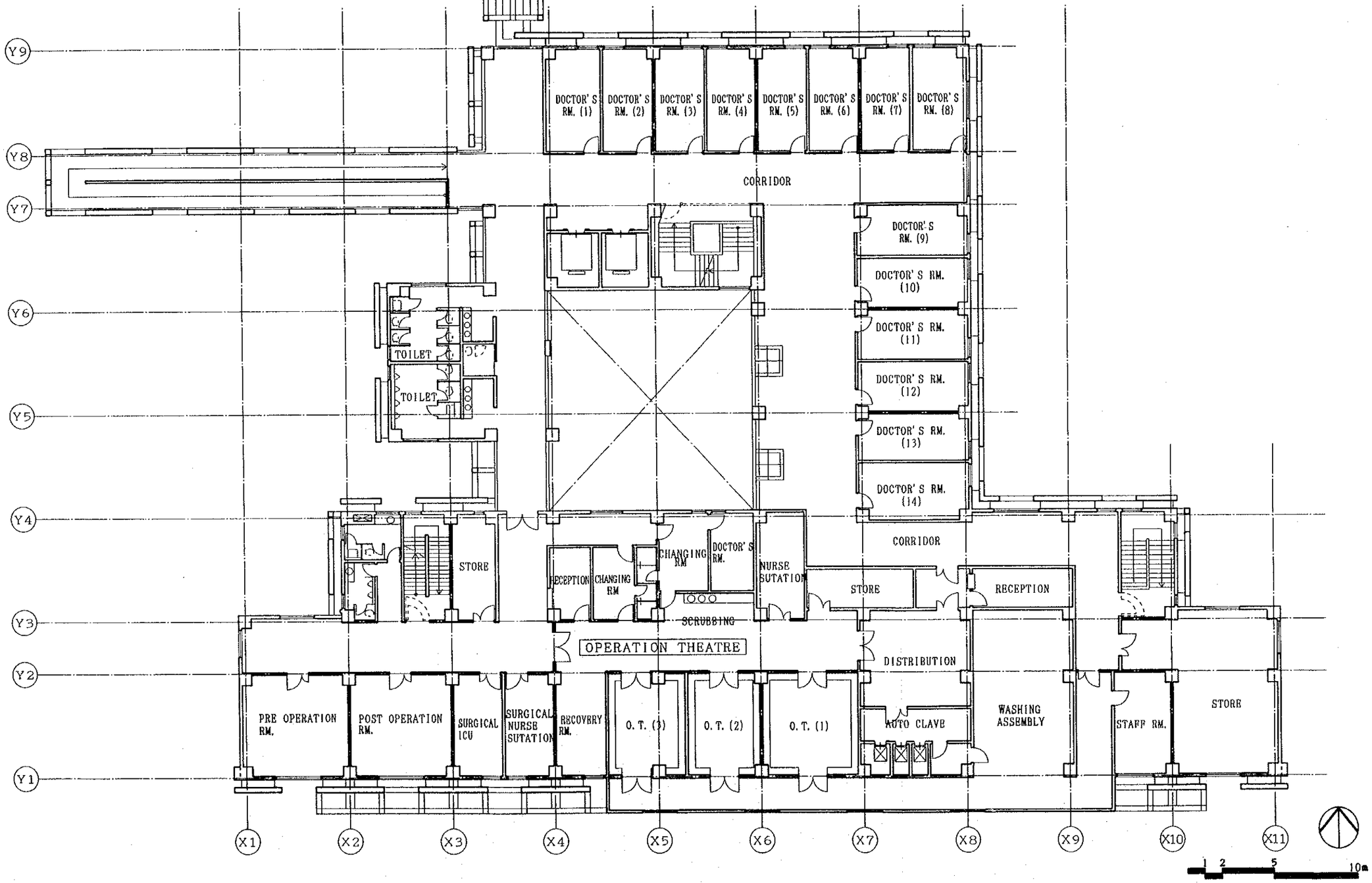
THE PROJECT FOR THE IMPROVEMENT OF
KALAWATI SARAN CHILDREN'S HOSPITAL IN INDIA

CENTRAL BUILDING
FIRST FLOOR PLAN



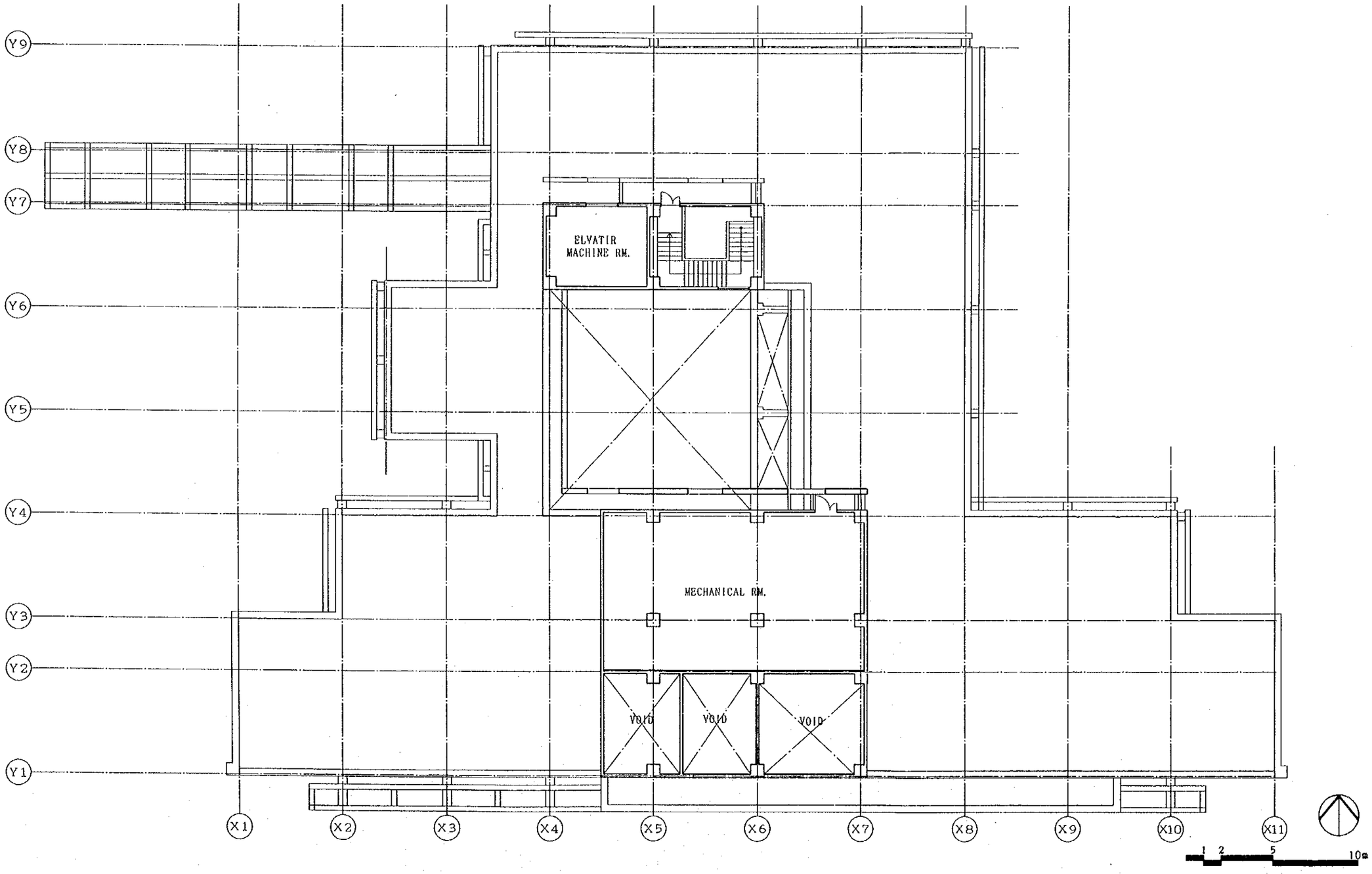
THE PROJECT FOR THE IMPROVEMENT OF
KALAWATI SARAN CHILDREN'S HOSPITAL IN INDIA

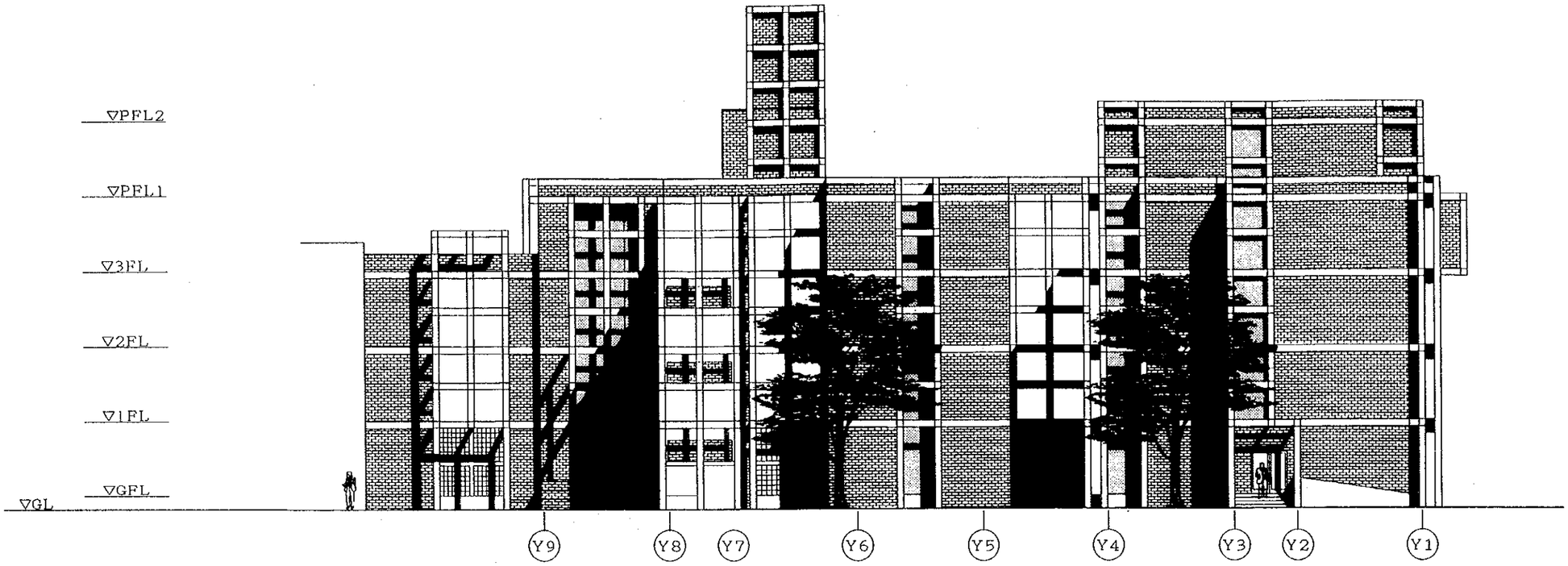
CENTRAL BUILDING
SECOND FLOOR PLAN



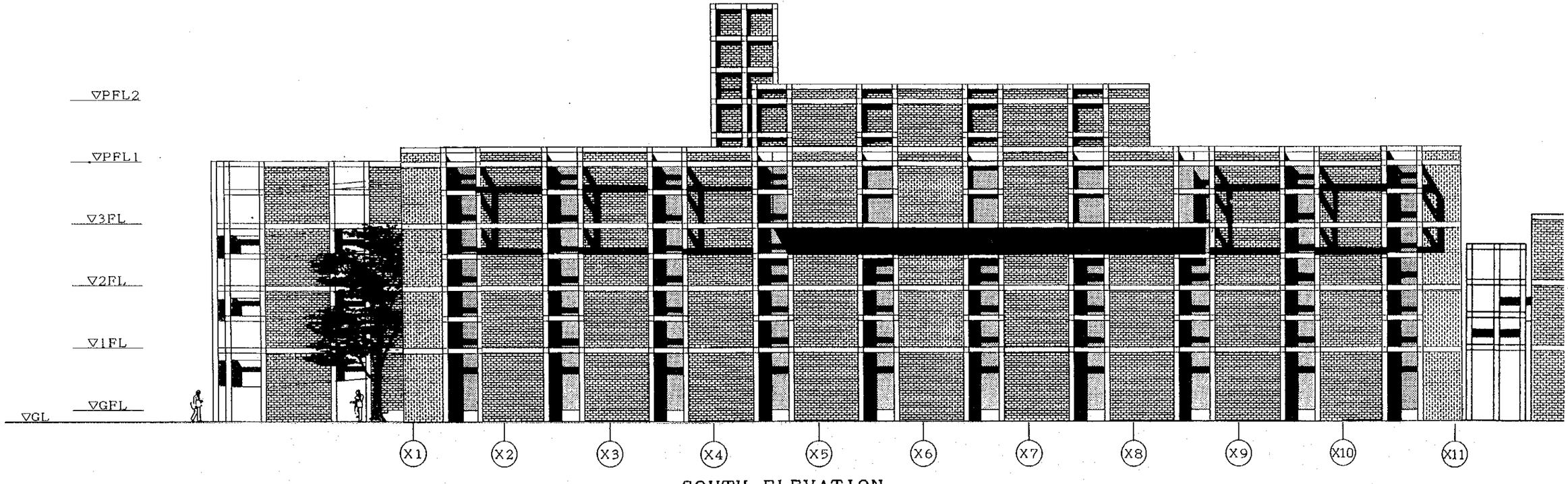
THE PROJECT FOR THE IMPROVEMENT OF
KALAWATI SARAN CHILDREN'S HOSPITAL IN INDIA

CENTRAL BUILDING
THIRD FLOOR PLAN


Y9
Y8
Y7
Y6
Y5
Y4
Y3
Y2
Y1
X1
X2
X3
X4
X5
X6
X7
X8
X9
X10
X11
ELVATIR
MACHINE RM.
MECHANICAL RM.
VOID
VOID
VOID
1 2 5 10m

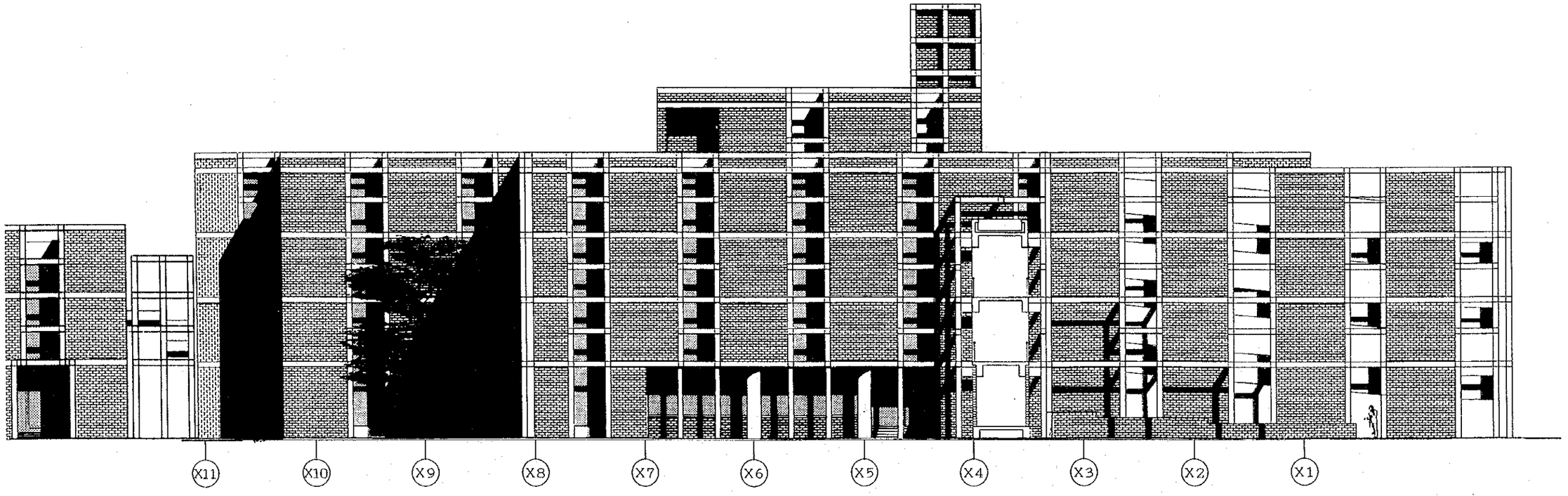


WEST ELEVATION

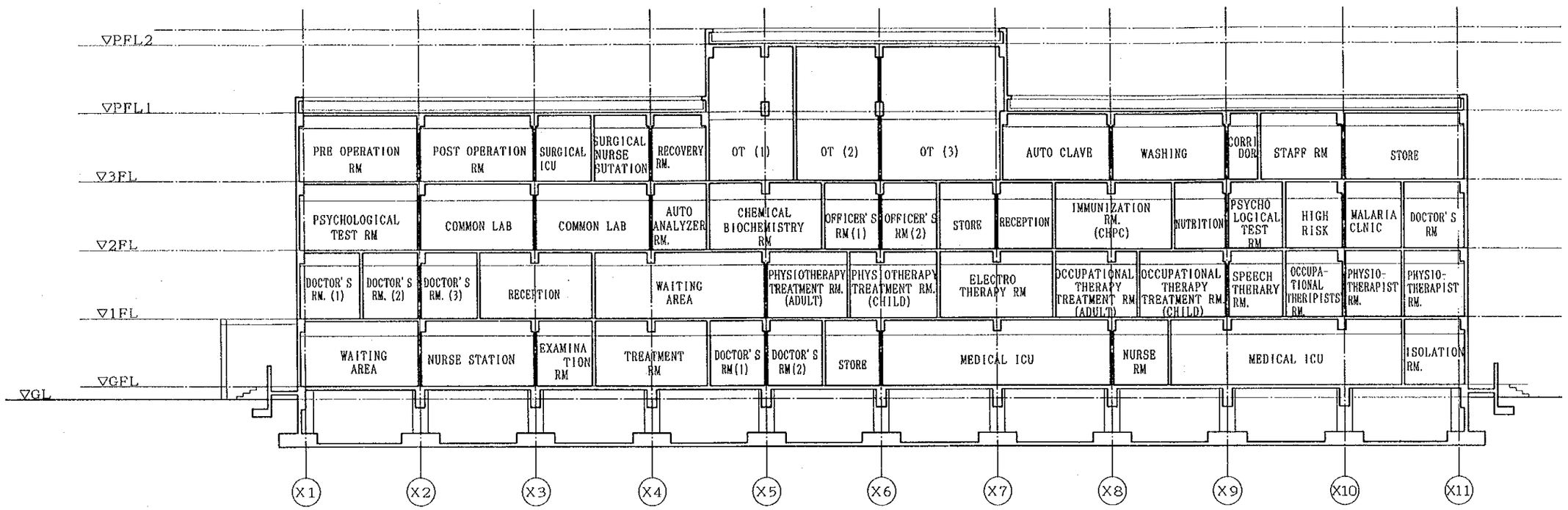


SOUTH ELEVATION

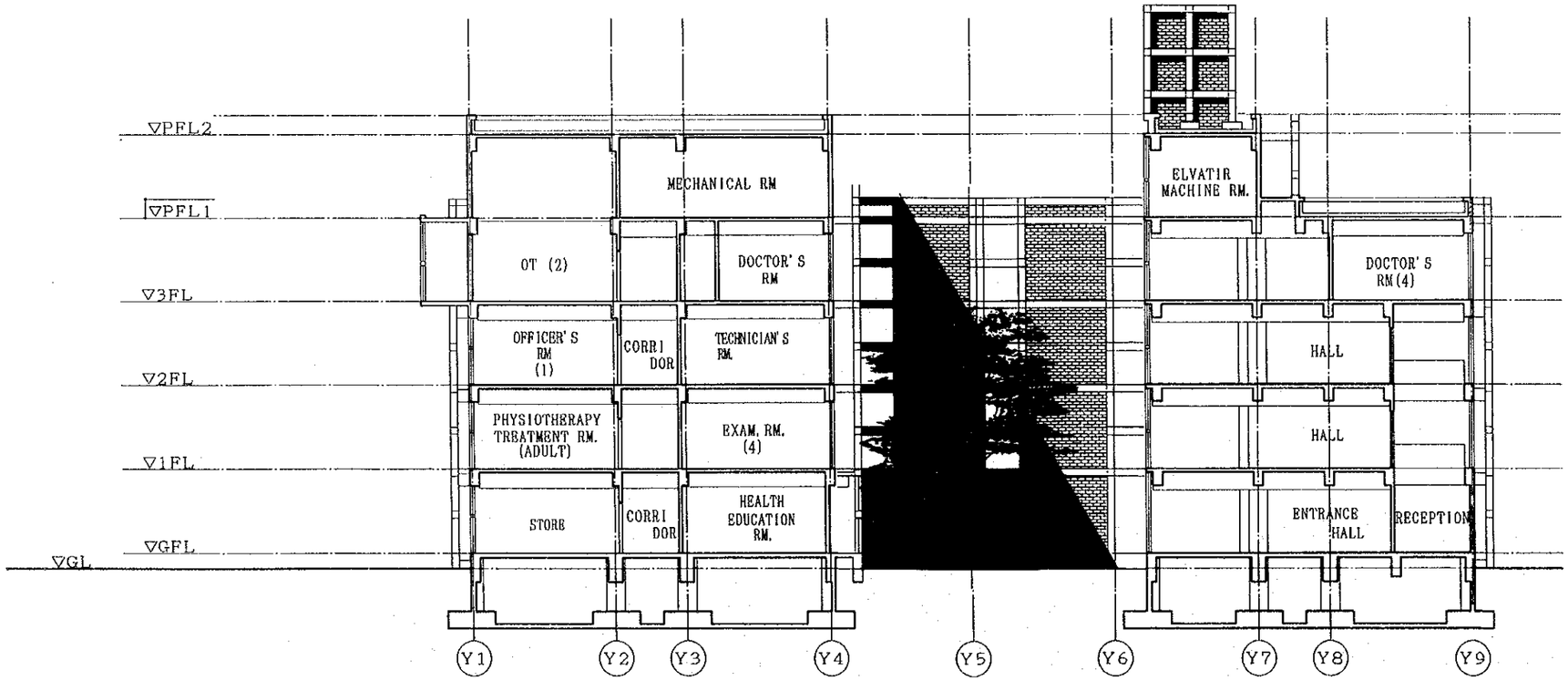
EAST ELEVATION



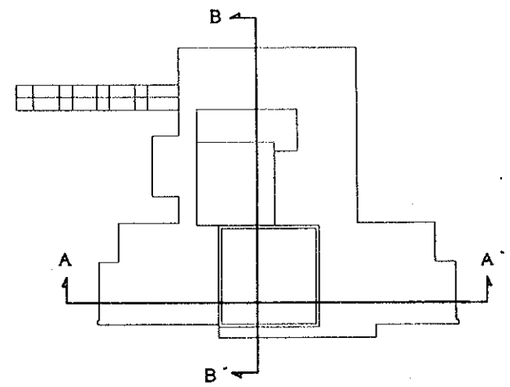
NORTH ELEVATION

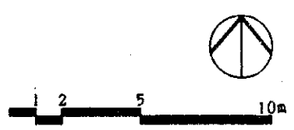


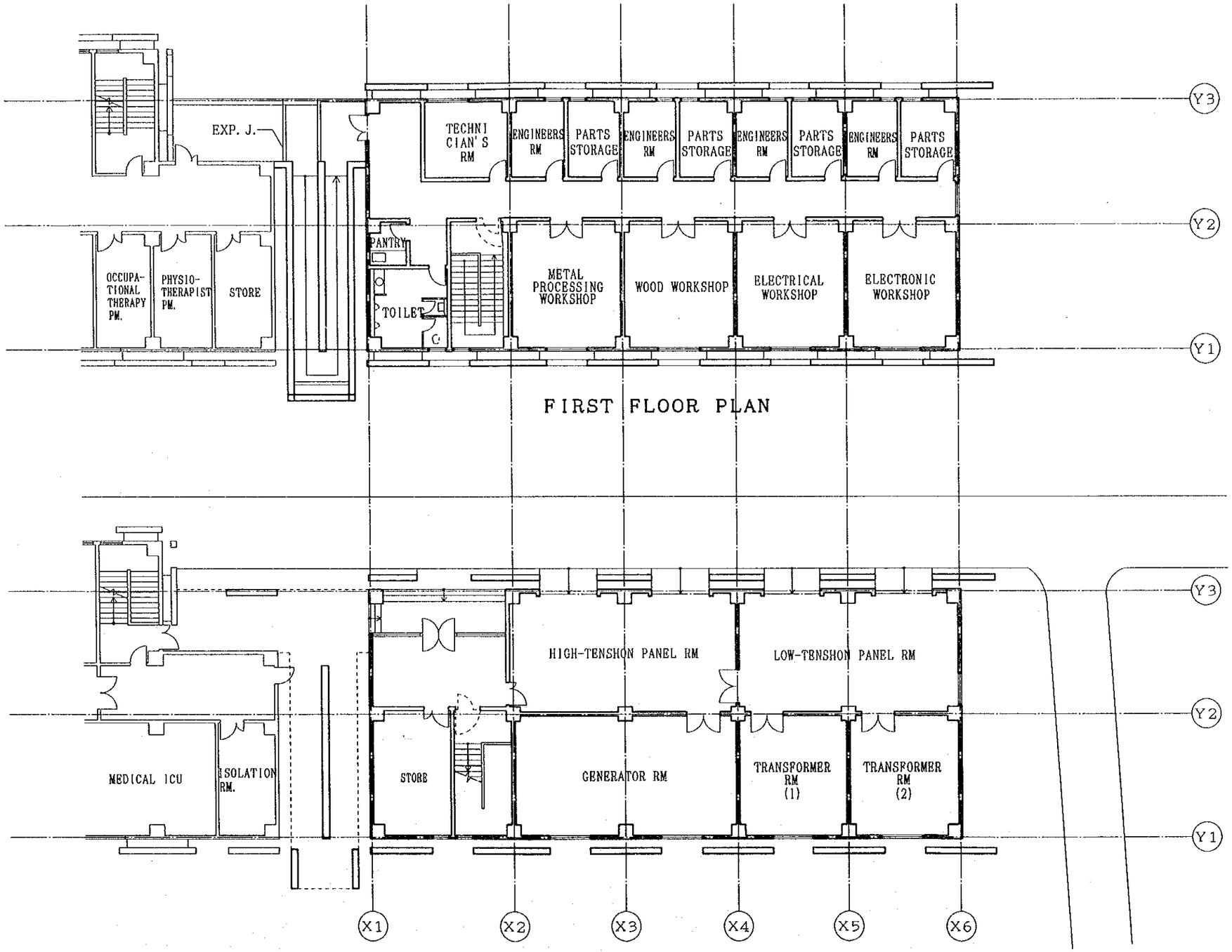
A-A' SECTION



B-B' SECTION

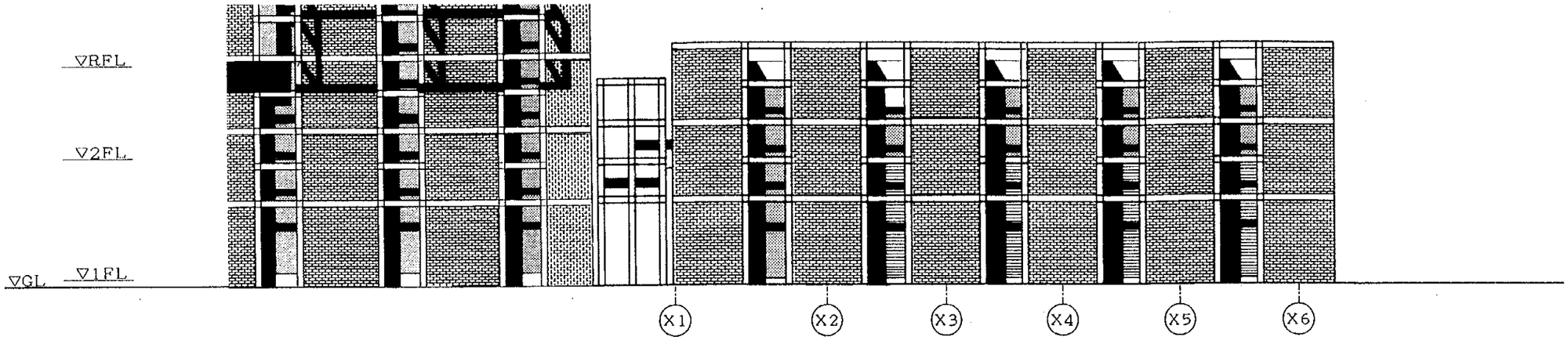




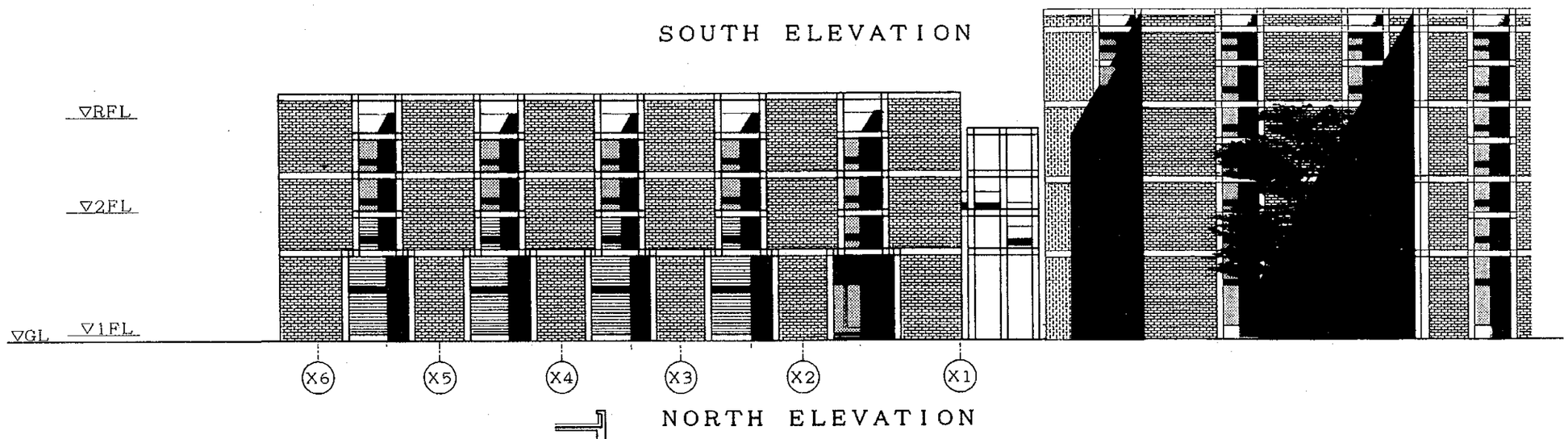


THE PROJECT FOR THE IMPROVEMENT OF
KALAWATI SARAN CHILDREN'S HOSPITAL IN INDIA

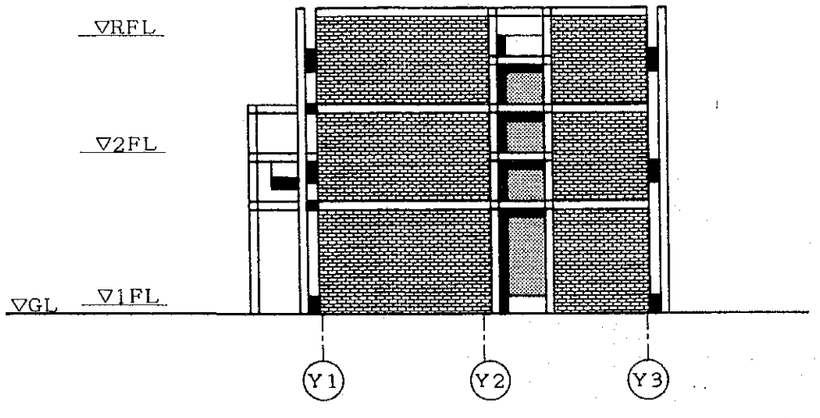
WORKSHOP/SUBSTATION
GROUND FLOORPLAN/ROOF PLAN



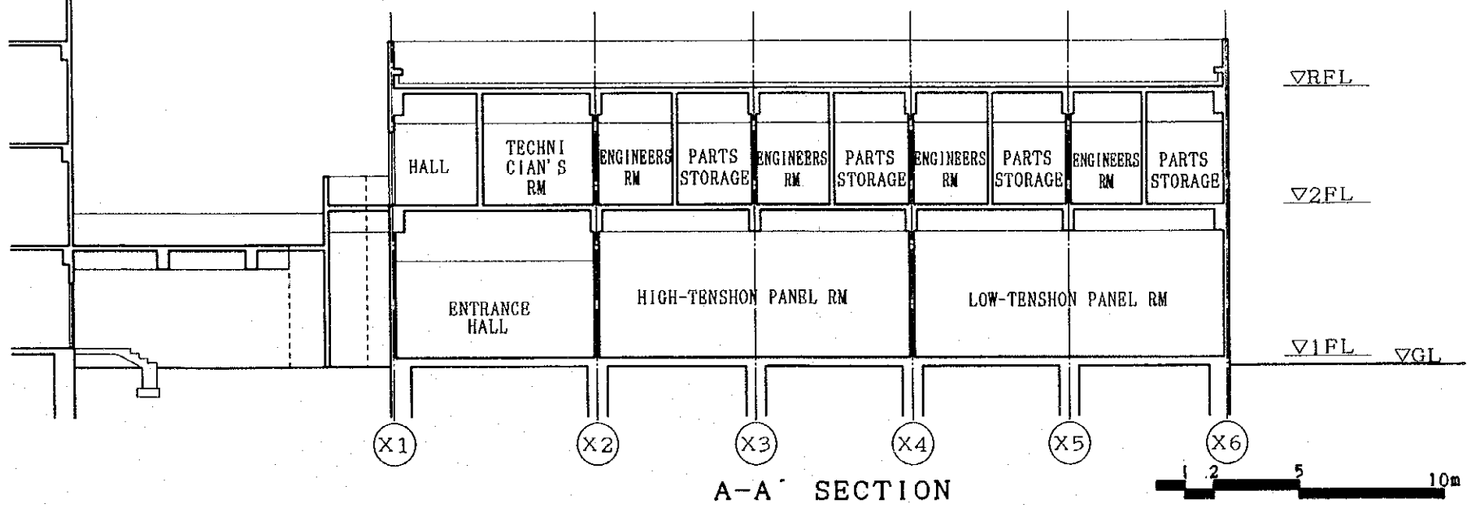
SOUTH ELEVATION



NORTH ELEVATION



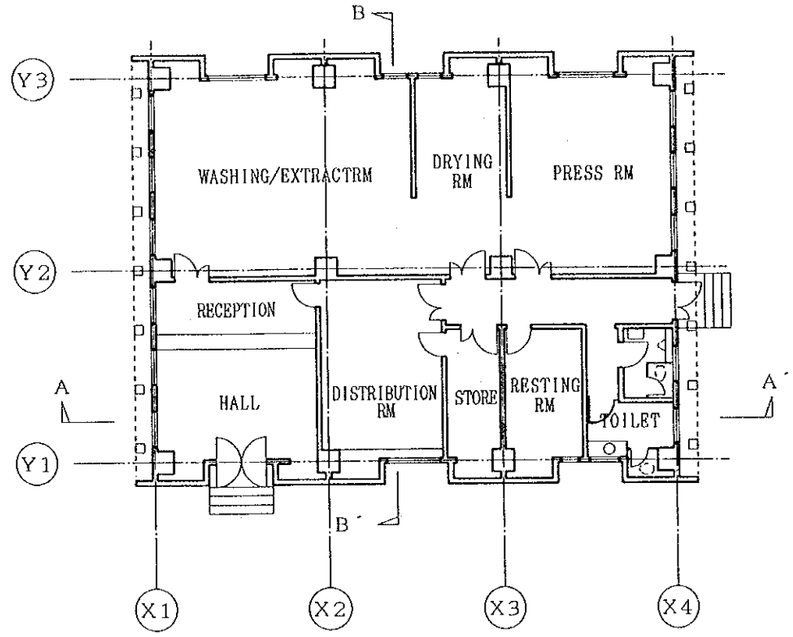
EAST ELEVATION



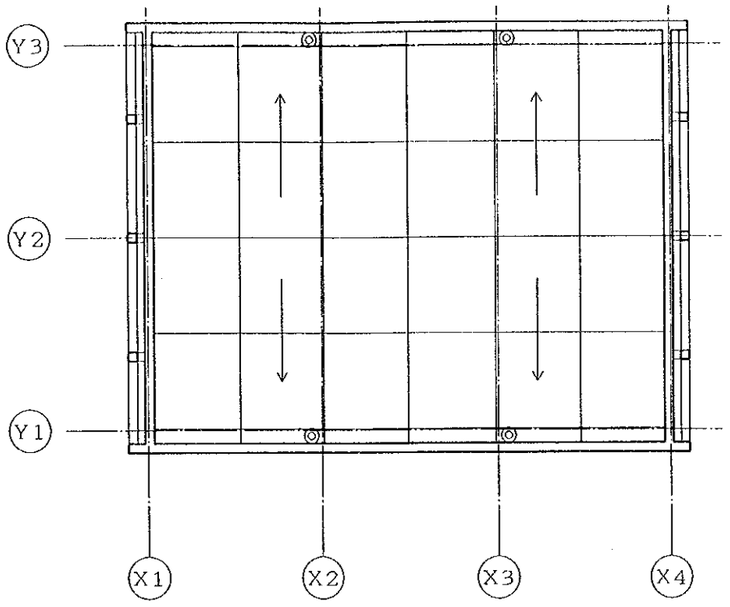
A-A' SECTION

THE PROJECT FOR THE IMPROVEMENT OF
KALAWATI SARAN CHILDREN'S HOSPITAL IN INDIA

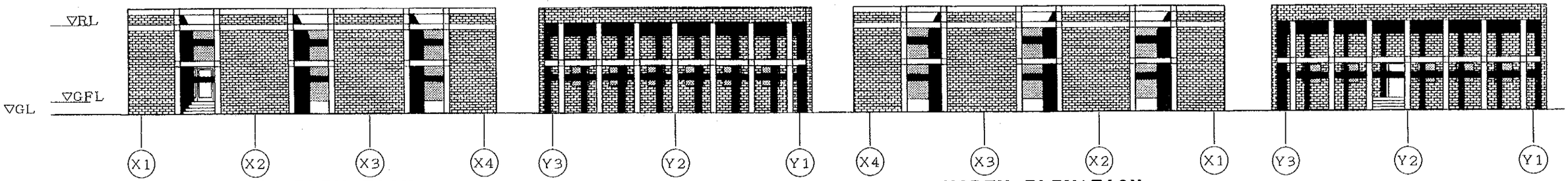
WORKSHOP/SUBSTATION
ELEVATIONS/SECTIONS



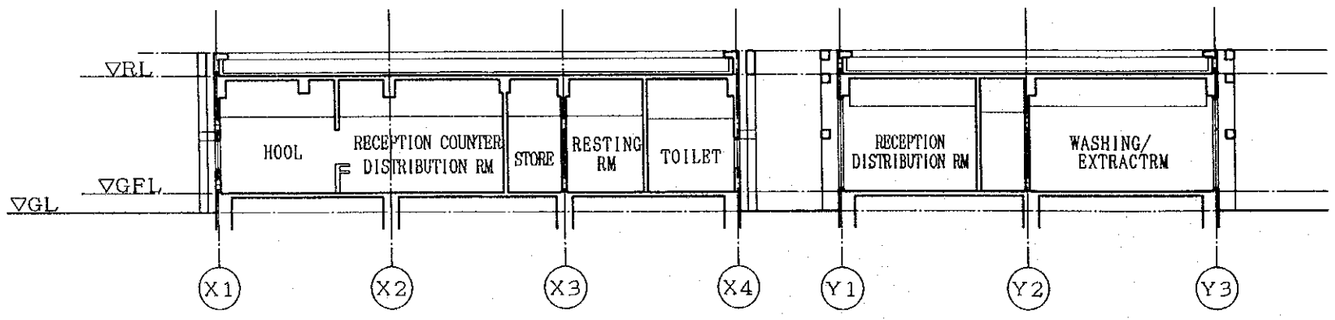
GROUND FLOOR PLAN



ROOF FLOOR PLAN



SOUTH ELEVATION　WEST ELEVATION　NORTH ELEVATION　EAST ELEVATION

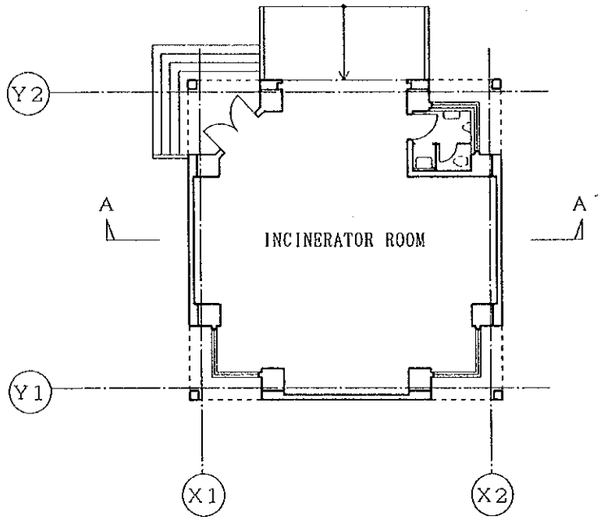


A-A´ SECTION　B-B´ SECTION

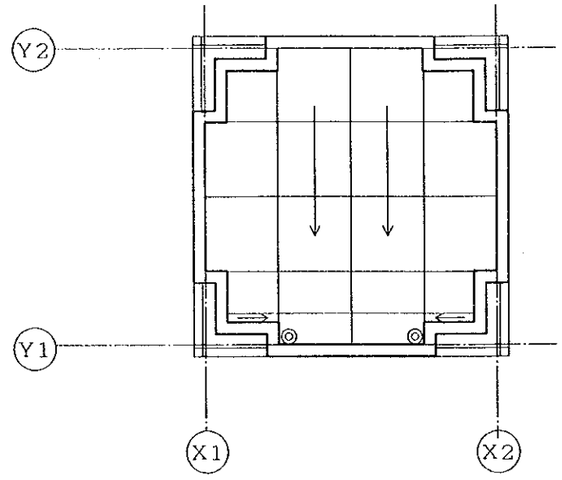
1 2 5 10m

THE PROJECT FOR THE IMPROVEMENT OF
KALAWATI SARAN CHILDREN'S HOSPITAL IN INDIA

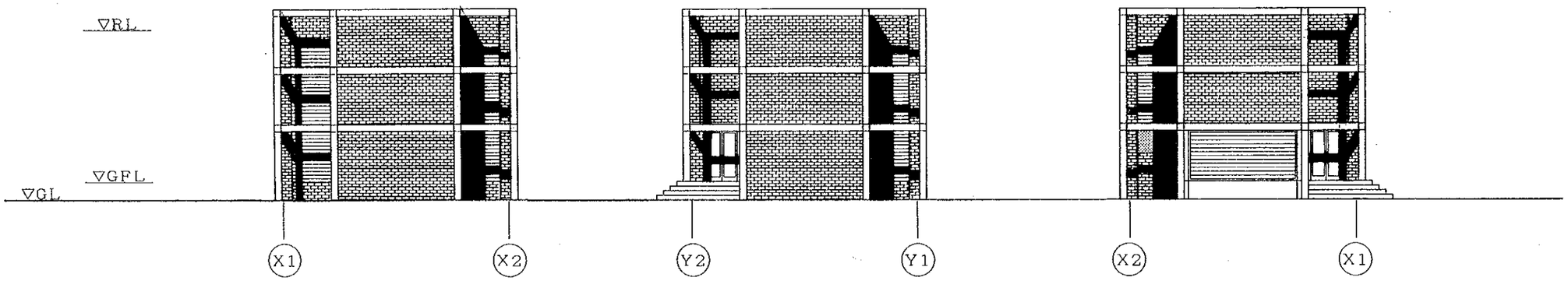
LAUNDRY BUILDING
PLAN/ELEVATIONS/SECTIONS



GROUND PLAN



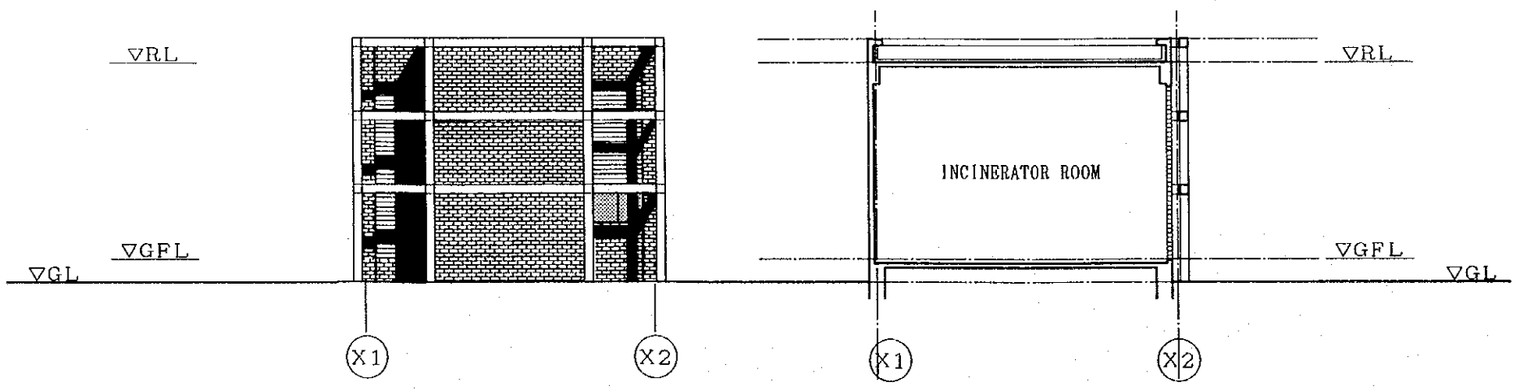
ROOF PLAN



SOUTH ELEVATION

WEST ELEVATION

NORTH ELEVATION



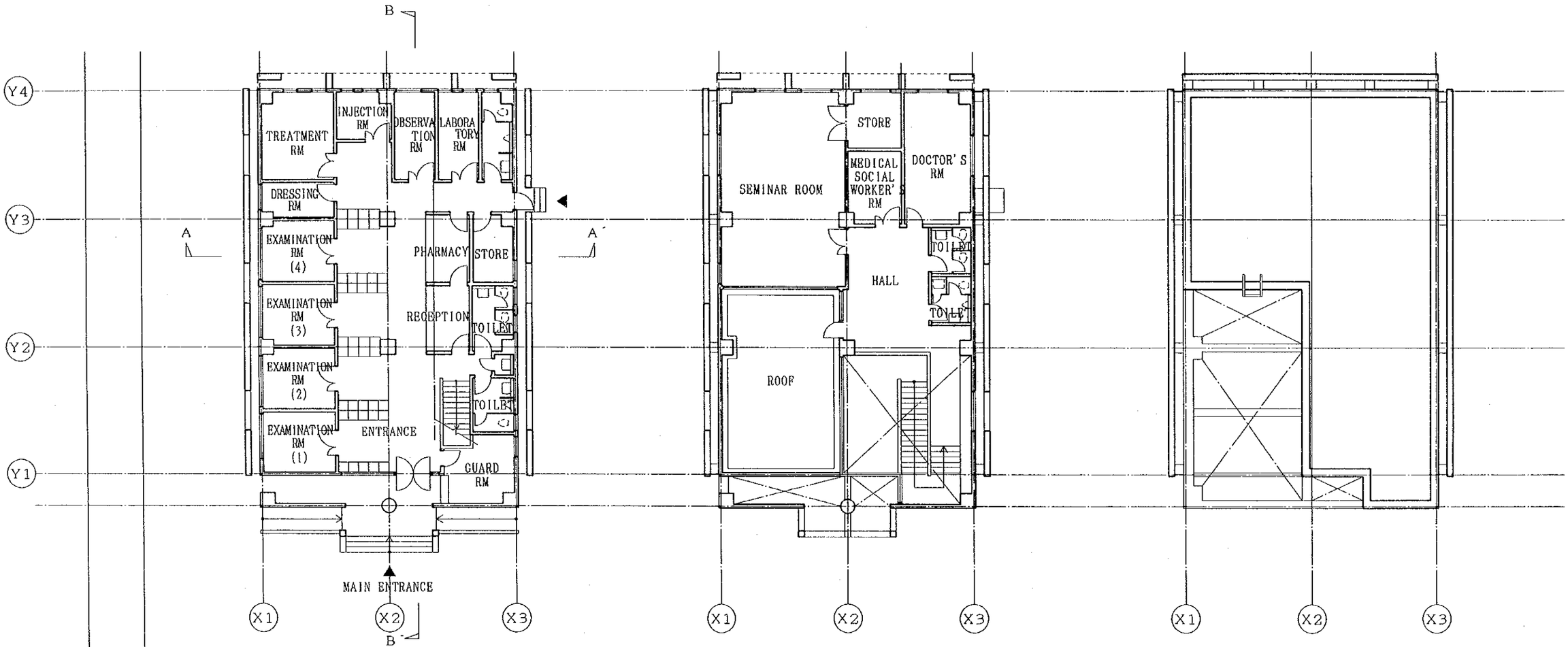
EAST ELEVATION

A-A' SECTION

1 2 5 10m

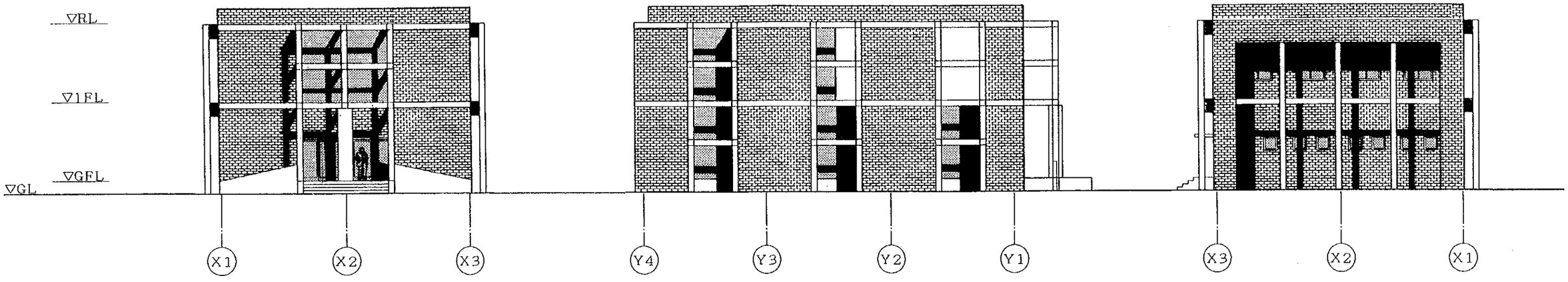
THE PROJECT FOR THE IMPROVEMENT OF
KALAWATI SARAN CHILDREN'S HOSPITAL IN INDIA

INCINERATOR BUILDING
PLANS/ELEVATIONS/SECTIONS

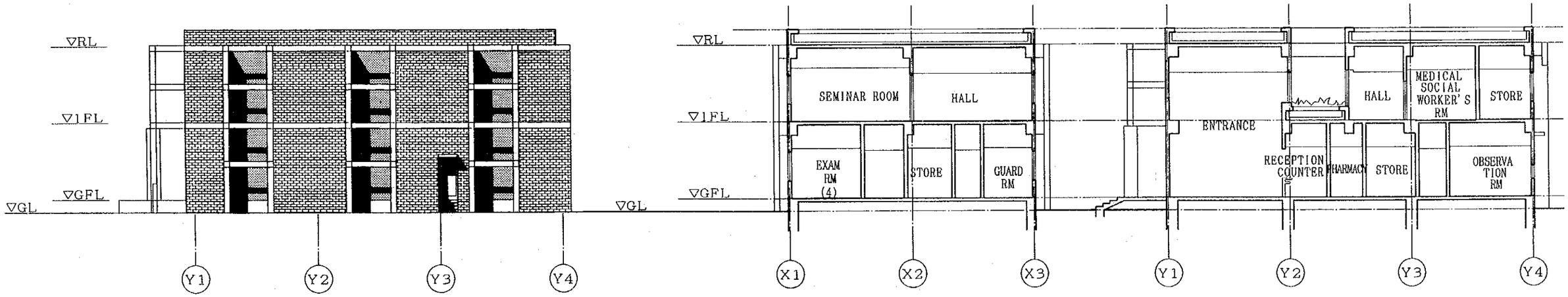


THE PROJECT FOR THE IMPROVEMENT OF
KALAWATI SARAN CHILDREN'S HOSPITAL IN INDIA

KALYANPURI URBAN HEALTH CENTRE
SITE PLAN/FLOOR PLAN



SOUTH ELEVATION　　WEST ELEVATION　　NORTH ELEVATION



EAST ELEVATION　　A-A' SECTION　　B-B' SECTION