

2-3-2 Design Conditions

(1) Facilities Components

The facilities of the Project cover the following five departments.

- Operation Department** : Operation rooms, recovery room, CSSD, etc.
- Obstetrics Department** : Delivery rooms, PBU, MHD room, etc.
- Examination Department** : X-ray examination rooms, ultra sound rooms, histology room, bio-chemistry room, hematology testing room, bacteriology room, etc.
- Outpatient Department** : General outpatients consultation rooms, clinics, pharmacy, etc.
- Administrative Department** : Biomedical engineering services room, duty room, mechanical room, etc.

Besides, the Project includes installation of such auxiliary facilities as private power generator, water treatment facility, waste water treatment facility, incinerating facility, access roads, outdoor waiting space and service parking lots.

(2) Scale of Facility Size

Floor area of each room for the Project will be determined to be able to accommodate the equipment layout, the estimated number of patients and the staff allocation, on the bases of the present conditions and referring to the Japanese standards for floor area of medical institutions (design materials of the Architectural Institute of Japan and others). The renovation of the existing building will be somewhat constrained in structural planning because of the existing building being of masonry structure. Safety is the priority consideration in structural design aspect of the renovation plan and the area of each room will be determined within this constraint.

Table 2-2 Floor Areas of Facilities

Department	Component	Floor Area (m ²)	Remarks
Operation	Operation Theatre	108.0	5.8×6.2m×3rms
	Preparation rm.	28.2	3.6×2.6m×3rms
	Recovery rm.	36.5	6beds
	Anesthesia rm.	14.5	2beds
	Observation rm.	24.0	
	Doctors' rm.	13.1	3shift, max 3doctors
	Lecture rm	26.1	3shift, max Anesthesia 3, Staff 7
	Store rm	32.2	
	Corridor	337.1	Including staircase to 2 nd FL.
	Changing/ WC.etc.	68.2	Male: 2+2, Female: 2
	Rest rm	49.6	3.1×8.0×2 rm
C.S.S.D.	104.5	2 autoclave machines	
	Sub Total	842.0	

Department	Component	Floor Area (m ²)	Remarks
Obstetrics	Labour	306.6	18 labour tables Same as current number
	Labour(Isolation)	40.6	2 labour tables
	Procedure rm.	15.6	5.6×2.8m×1rms
	Mid Wife rm.	30.4	Same as existing rm.
	Nurse Station	20.5	
	M.H.D.	20.5	6beds
	Procedure rm.	15.5	
	Nurse Station	16.0	
	P.B.U.	73.3	7incubators, 8scots
	P.B.U.(Isolation)	45.0	Including corridor, 4rms
	Nurse Station	57.5	
	Feeding Rm.	30.8	
	Nurse Station	68.6	
Store	35.6		
	Sub Total	776.5	

Department	Component	Floor Area (m ²)	Remarks
Laboratory	X-ray rm. 1,2	55.4	4.4×6.3m×2rms
	X-ray rm. 3	25.5	4.4×5.8m×1rm.
	Change rm./Toilet	5.2	For patients with digestive Disease
	Control rm. 1,2	17.4	Decided by medical equipment
	Dark rm.	10.4	Decided by medical equipment
	Consultant rm.	12.7	1consultant
	Technicians' rm.	11.4	5persons
	Nurse Station	11.5	2persons
	Film Record	69.1	Decided by medical equipment
	Ultra Sound rm.	15.6	3×5.2m×1rm.
	Technicians' rm.	13.0	
	E.C.G. rm.	15.6	3×5.2m×1rm.
	Technicians' rm.	13.0	
	E.M.G.rm.	10.4	2.6×4m×1rm.
	E.E.G.rm.	10.4	2.6×4m×1rm.
	E.C.G.rm.	10.4	2.6×4m×1rm.
	Technicians' rm.	19.8	3persons
	Lab.(Bacteriology)	69.1	Decided by medical equipment
	Lab.(Bio-Chemical)	53.0	Decided by medical equipment
	Lab.(Histology)	53.0	Decided by medical equipment
	Lab.(Hematology)	53.0	Decided by medical equipment
	Consultant rm.	22.0	1person
	Minor Operation rm.	22.0	
C.M.L.rm.	19.0	1person	
Media Preparation rm.	18.6		
Waiting Hall	182.9	(200patients/day + family)×25%	
	Sub Total	790.8	

Department	Component	Floor Area (m ²)	Remarks
OPD	OPD (Screening)	161.3	3.1×5.2m×10rms
	Treatment rm.	64.5	3.1×5.2m×4rms
	Registration/	16.1	
	Record rm.	16.1	
	Medical Clinic	129.2	3.1×5.2m×8rms
	Treatment	32.2	3.1×5.2m×2rms
	Reception/Record	16.1	
	Staff rm.	16.1	
	Paediatric Clinic	32.2	3.1×5.2m×2rms
	Treatment rm.	16.1	
	Reception/Record	16.1	
	Staff rm.	16.1	
	Dental Clinic/ Maxilla Facial	64.5	4 dental units, 2 maxilla facialtable, including Dark rm.
	Minor Operation	16.1	
	Reception/Record	16.1	
	Eye Clinic	32.2	2tables
	Minor Operation	16.1	
	Exam rm.	8.0	
	Dark rm.	8.0	

Department	Component	Floor Area (m ²)	Remarks
(OPD)	Reception/Record	16.1	
	E.N.T. Clinic	32.2	2tables
	Exam rm.	8.0	
	Unechoic rm.	8.0	
	Reception, Record	16.1	
	OB & GY Clinic	93.0	3.1×5m×6rms
	Reception/Record	15.5	
	Lab./Toilet	32.5	Toilet: 1 stools
	Staff rm.	15.5	
	Physiotherapy Clinic (Rheumatology)	46.5	3.1×5m×3rms
	Examination rm.	137.2	Decided by medical equipment
	Lab.	15.5	
	Reception/Record	15.5	
	Dermatology Clinic	31.0	3.1×5m×2rms
	Treatment rm.	31.0	3.1×5m×2rms
	Reception/Record	15.5	
	S.T.D. Clinic	31.0	3.1×5m×2rms
	Lab./Toilet	32.5	Toilet:2stools
	Reception/Record	15.5	
	Surgical Clinic	46.5	3×5m×3rms
	Treatment rm.	18.6	
	Reception/Record	14.5	
	Orthopedic Clinic	28.1	3.6×3.9m×2rms
	Treatment rm.	14.0	
	Reception/Record	11.7	
	Psychiatrics Clinic	38.9	3.6×4.5m×1rm 3.6×6.3m×1rm
	Reception/Record	16.2	
	Cancer	37.5	5.0×7.5m
	Reception/Record	7.5	
	Neurology	37.5	5.0×7.5m
	Reception/Record	7.5	
	Pharmacy	20.6	Same as existing area
	Preparation rm. Office	72.6	
Store	28.5		
Waiting Hall	1,000.0		
WC.	36.2	Male: 2+2, Female: 2	
	Sub Total	2,726.6	

Department	Component	Floor Area (m ²)	Remarks
Administration	Bio-Medical rm.	36.0	
	Office/Store	56.0	
	On Call	112.0	16m ² × 7rms, w/toilet+bathroom
	Reception/Office	22.0	6persons
	File rm.	50.0	
	Generator rm.	48.0	Size
	Pump rm.	80.0	Decided by medical equipment
	Control rm.	17.7	Decided by medical equipment
	Tel. Equipment rm.	16.1	
	Waiting rm.	16.7	
	Substation rm.	65.0	Decided by medical equipment
	M.D.F. rm.	8.1	
	Medical Gas rm.1,2	44.6	Decided by medical equipment
	Toilet/Shower	29.9	Toilet:1each for male and female Shower:1each for male and female
Corridor	45.4		
Sub Total	647.5		

Department	Component	Floor Area (m ²)	Remarks
Common Space	Corridor/Stairs, etc	1,956.6	
	Outdoor Waiting Space	220.0	
Sub Total		2,176.6	

New Building, Total Floor Area : 5,390.0 m²
 Renovated Area, Total Floor Area : 2,570.0 m²
 Total Floor Area : 7,960.0 m²
 (excluding balcony area, 550.0 m², on the 1st and 2nd floor)

(3) Future Facility Plan of GHR

1) Renovation Work by GHR

A five-year renovation project of GHR has been underway since 1996 to improve the interior finish in a stepwise fashion on Sri Lanka's own account with a total budget of 50 million rupees. This renovation work will have been completed on completion of the on-going works. This five-year project aims mainly to improve the interior finish and would not substantially improve the functions of the hospital.

2) New Administration Building by GHR

GHR plans to construct a three-storied new administration building scheduled for starting construction in 2000. A budget of 14 million rupees is earmarked for the first fiscal year which will build the first-story portion of the building, according to GHR. Upon completion of this building, the administrative functions, now scattered in the building, will be concentrated in this building, and streamlining of the administrative functions is expected. The new building will house the following functions.

- Director Room
- Matron Room
- Administrative Office
- Overseer Room
- Canteen
- Auditorium
- Others

3) Future Facility Plan

After completion of the renovation work being implemented by the Sri Lanka side and construction of the new administration building, the part of the functions of the existing building will be transferred to the new building. Therefore, some vacant space in the existing building will be created. A future facility plan as shown in Figure 2-3 is developed in order to improve the existing functions of GHR. The major items of the future facility plan are as follows:

- Rearrangement of the layout of the entire existing wards of the existing building to intensify coordination among different functions of the hospital building.
- Transfer of the present Administration Department to the new Administration Building,
- Transfer of the dermatology ward and orthopedics ward to the vacant spaces of the existing building left after relocation of the Administration Department and Examination Department.

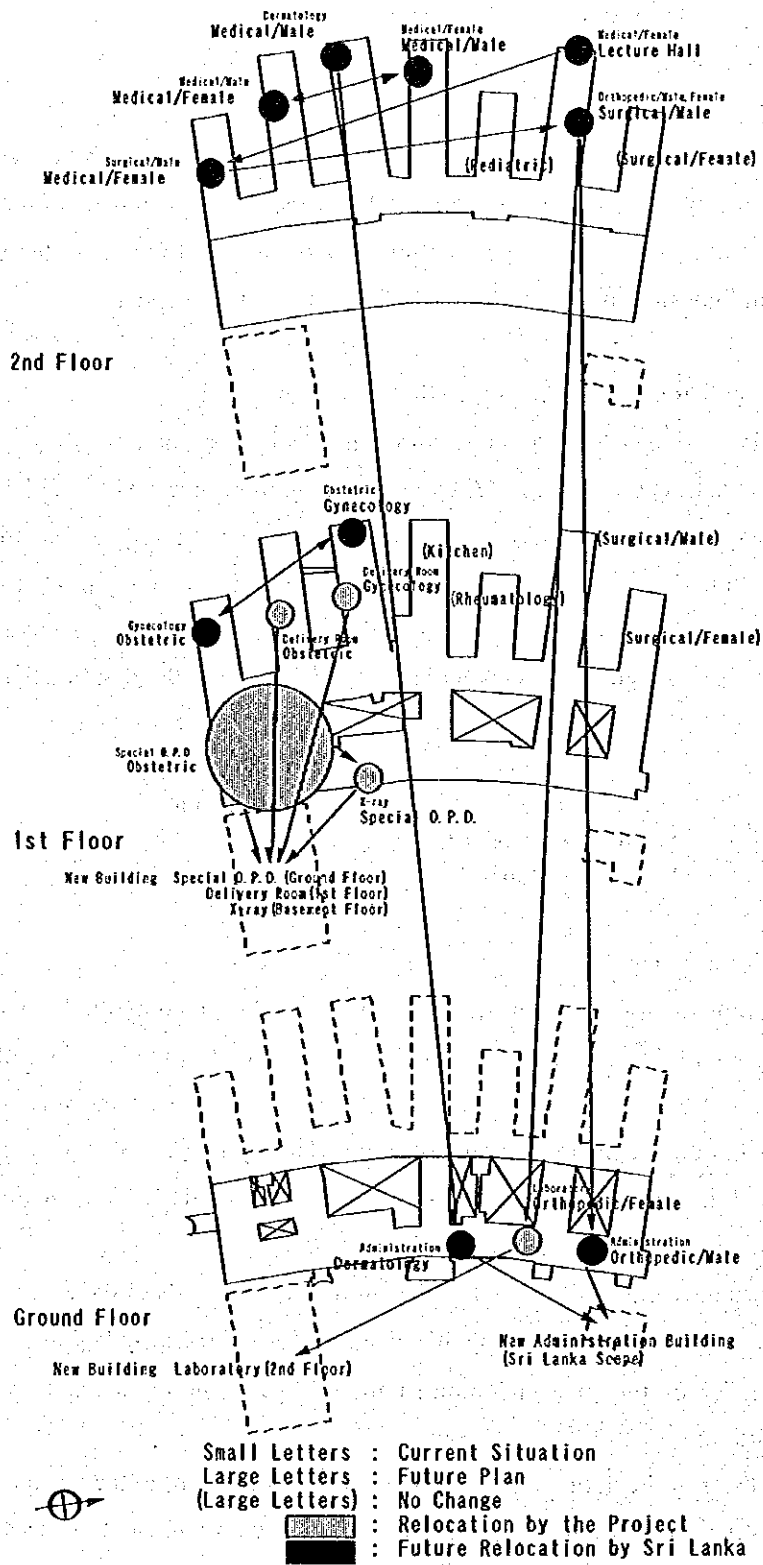


Figure 2-3 Future Facility Plan of GHR

2-3-3 Site Plan

(1) Construction Site

The proposed site by GHR was Site-1 shown in Figure 2-4. The fields survey on this site revealed the following drawbacks to this site.

- a. The location presents some inconvenience for coordination with the existing concerned functions of the hospital.
- b. The area of the site is too small in addition to being located on the back of the existing hospital. Therefore, it is inconvenient for patients and other persons to access.
- c. Any facility that may be built on this site may restrict possible expansion of the word of present hospital.

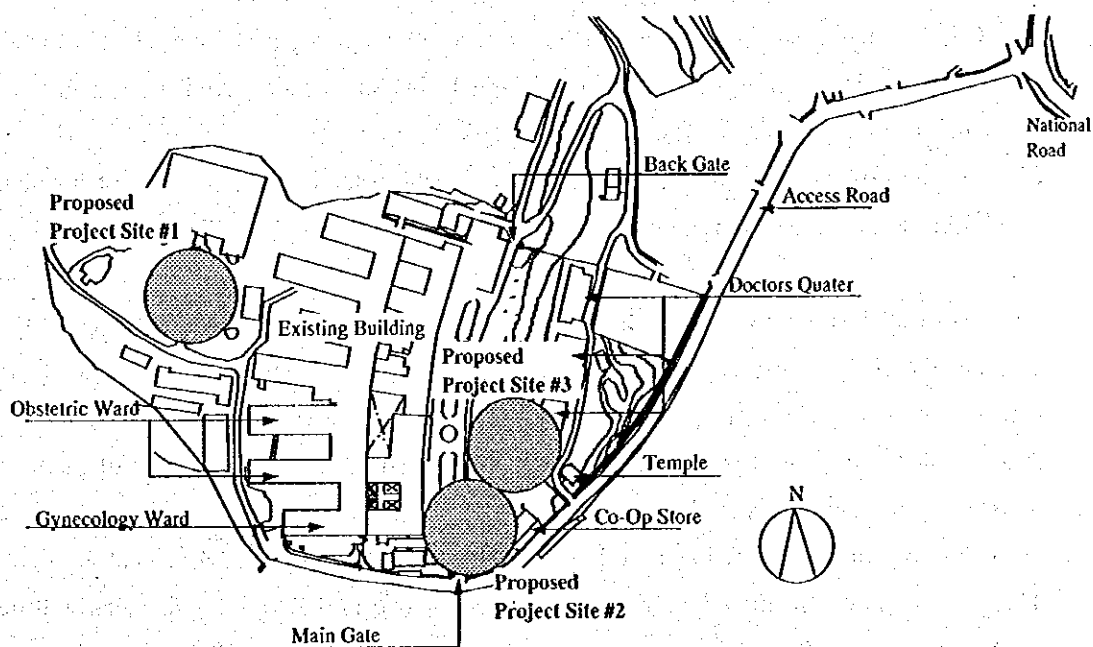


Figure 2-4 Location Map of the Proposed Site

Other candidate sites that may resolve the above problems was searched with the Sri Lanka side and identified two candidate sites, Site-2 and Site-3, as shown in Figure 2-4 were proposed.

However, Site-3 is apart from the existing facilities. Site-3 was selected as one of candidate sites because the Sri Lanka side plans to build new ward near by. However, Site-3 is eventually dropped because the plan is not definite as to contents and schedule as of today.

Site-2 was examined from the viewpoint of resolving the above three problems and was found satisfactory as explained below. Consequently, Site-2 has been chosen as the site for construction of the Project.

- a. In addition to the site being located adjacent to the existing facilities, this site facilitates close coordination with the functions of the existing facilities that would be deemed intimately linked with the Project.
- b. This site has a sufficient area for the Project, although a part of the site is sloped. Being located in front of the existing hospital, this site would permit easy access of patients and concerned persons.
- c. Selection of this site would not restrict any possible expansion of the present hospital buildings because there is no plan on this site.

Site-2 is located on the existing access road from the main gate to the main entrance of the hospital; therefore, a new access road is necessary. Notwithstanding, construction of the new access road is justifiable because of this site being the best choice from the standpoints of assisting future plan of the hospital and achieving the intended improvement of medical service. The new access road has a difference of elevation of 6.3 meters which could be overcome by soil banking and using retaining walls to build a road of 12.4 percent gradient. This compares even favorably with the present access road in that walking distance will be shortened by about 50 meters and gradient will be reduced from 14.5 to 12.4 percent.

It is confirmed that the shop on Site-2 which have to be either demolished or relocated by the Sri Lanka side.

(2) Site Plan

Since GHR is located on a hill, flat pieces of land are available only on limited locations. One of these few places is a piece of land in front of the main entrance of the hospital. There, traffic lines of vehicles and pedestrians cross each other, creating a dangerous situation. During the visiting hours, or at 12:00 and 17:00 hours every day, this place is crowded with several hundreds of people coming to see the inpatients. The Project, therefore, will distinguish the traffic lines of vehicles and those of pedestrians and provide a safe and outdoor waiting space for people visiting the inpatients. A gate will be installed at the entrance of the new access road, which will control the vehicles as does the existing gate.

About one-third of the construction site area is sloped with a difference of elevation of four to five meters. The site plan assigns such rooms as the X-ray Department and the mechanical room, which need not be exposed to atmosphere by function, to 1st floor of basement, thereby making good use of the available space. The waiting hall for the X-ray examination will be located on the lower side of the slope so that it may have windows exposed to the atmosphere to facilitate natural ventilation.

On the level of the 1st floor of basement of the New Building will be prepared a service parking lot to permit carrying in and out of equipment from and to the existing access road. A space exclusively used for bringing in and out medical equipment will also be provided. A separate building will be built to the south of the New Building to house the private power generator room, medical gas room and fire pumps so that their noises and vibration of operation may not affect the New Building.

Location of the new water treatment facility was decided on the hilltop located at the backside of the hospital as a result of a study on the location of the water source (river), space required for piping, securing effective water head for smooth water supply. The new sewage treatment facility will be located adjacent to the existing one in a lot which facilitates discharging treated water to the outside canal.

The bus stops, taxi stops and parking lots for general vehicles will be prepared by the Sri Lanka side as part of the future project.

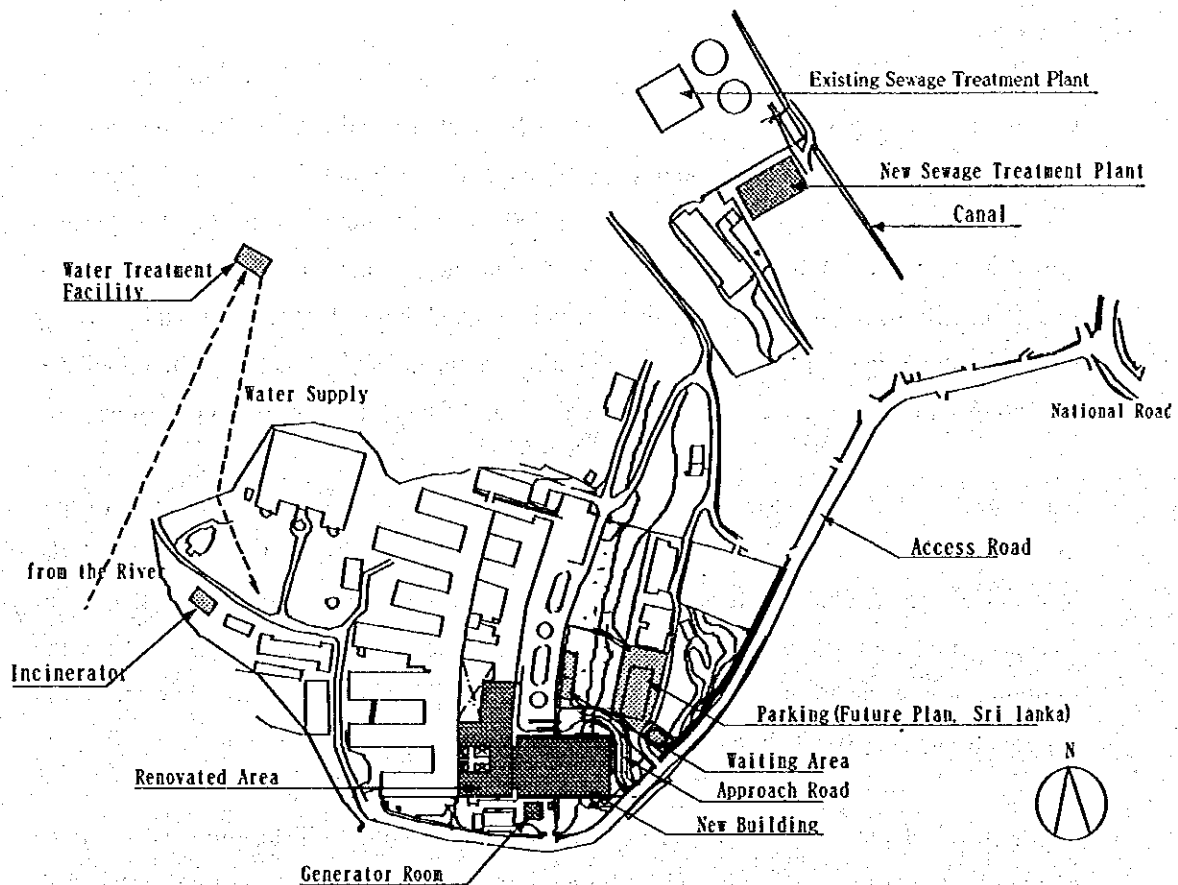


Figure 2-5 Illustrated Site Plan

The facilities in the Project are composed of the New Building and the Renovated Area shown in Figure 2-5 above. Each facility has the following functions.

New Building	B1 st Fl.	: Examination rooms (such as X-ray, Ultrasound), Mechanical rooms and others
	Ground Fl.	: OPD, Clinics and others
	1 st Fl.	: Operation rooms, Delivery rooms, CSSD and others
	2 nd Fl.	: Laboratory, Biomedical Engineering room and others
Renovated Area	Ground Fl.	: Clinics, Pharmacy and others
	1 st Fl.	: PBU, MHD and others

2-3.4 Architectural Plan

(1) Floor Planning

The New Building is laid out longitudinally in the east to west direction to take advantage of natural lighting and ventilation. The New Building are connected to the existing one both on the ground floor and the first floor as indicated in Figure 2-6. As Figure 2-00 shows, the ground floor consists mainly of the General Outpatients Department, outpatients consultation rooms of various departments, and dispensary. The outpatients' entrance, ambulance's entrance, front porch of the hospital are placed on the ground floor. In GHR outpatients wait for their turns not in the central waiting lounge but in the waiting room belonging to each department. Therefore, a waiting room is assigned to each department instead of laying out all the departments surrounding a large central waiting lounge.

On the first floor of the New Building are placed the Operation Department, Obstetrics Department and the CSSD. The delivery rooms are placed in the new building and the premature baby unit (PBU), maternal high dependency room (MHD) and other related rooms are placed in the renovated area. These two areas being close, this could concentrate the obstetric functions and distinguish the concerned traffic lines of people and materials from those of other functions.

The operation rooms have hallways on both sides so that the clean materials to be used for operation and stained ones already used for operation may not cross each other.

On the second floor are placed mainly the Examination Department and Administration Department.

On the basement 1 are placed X-ray examination rooms, ultrasound examination rooms and other test rooms to facilitate examination of outpatients coming to the ground floor. A stairway connecting the ground floor and the basement 1 is installed to the waiting lounge of the ground floor. A service entrance to the entire hospital is placed on the south side of the basement. A service parking lot is also prepared.

There is a stairway and a service elevator providing vertical traffic lines of the renovated area. To provide two emergency escapes, the new building and the renovated area is horizontally connected at each floor.

A new lobby will be prepared in the renovated area at a place facing the inner court to take in as much natural wind as possible for ventilation.

In order to prevent fire from spreading, the connections between the renovated and expanded facilities on the ground floor and the first floor are equipped with fire walls, rolling steel doors and fire doors.

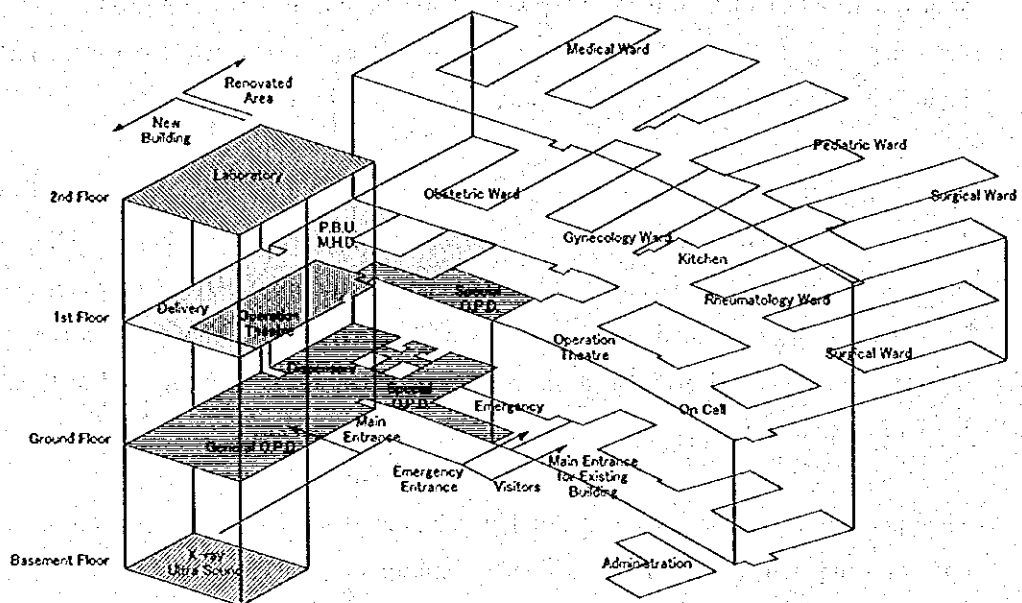


Figure 2-6 Illustrated Floor Plan

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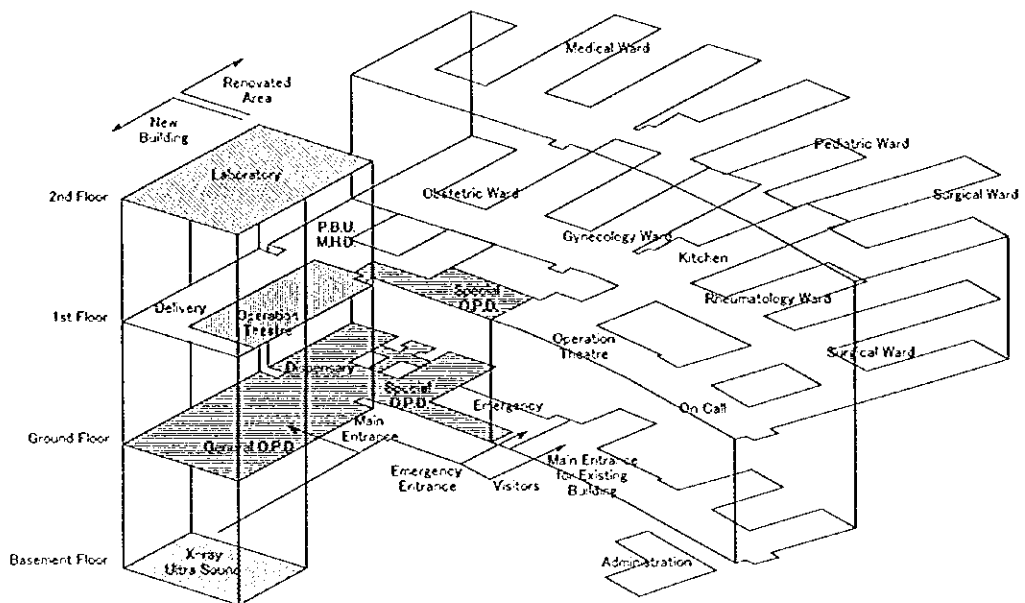


Figure 2-6 Illustrated Floor Plan

(2) Elevation Planning

The exterior design of the renovated area will follow the present one including its colors, because the present image of the hospital has been generally accepted by the hospital personnel.

The roof of the renovated area will be the same as the existing one in shape and slope; however, the present wooden roof trusses and unglazed tiles will be replaced to durable type of roof tile.

The wooden window sashes of the renovated area will be replaced by aluminum sashes or other suitable devices which are more water-tight and durable.

(3) Section Planning

The section planning of the expanded facility considers the following points:

- 1) The floor elevation should be coordinated with that of the existing building.
- 2) The natural conditions should be fully taken into consideration.

The elevation of the ground floor of the new building will be the same as that of the existing one (3,700 mm for floor height) to maintain horizontal connection to facilitate movement of beds, wheelchairs, carriers and movable incubators between the two buildings.

The external walls of the New Building are designed to be effective in shielding the direct sunlight and preventing rainwater from blowing inside by balconies and louvers.

The partition walls inside the building will not be higher than necessary to be effective as wall but have openable windows on the upper sides to assist in natural ventilation.

Through the first and second floors are placed some atriums with top lights on the 2nd floor to take in natural light and promote natural ventilation.

This area has a very high annual precipitation of about 4,000 millimeters and daily precipitation could exceed 120 millimeters; therefore, the roof is given a sufficient gradient of 10: 3.5.

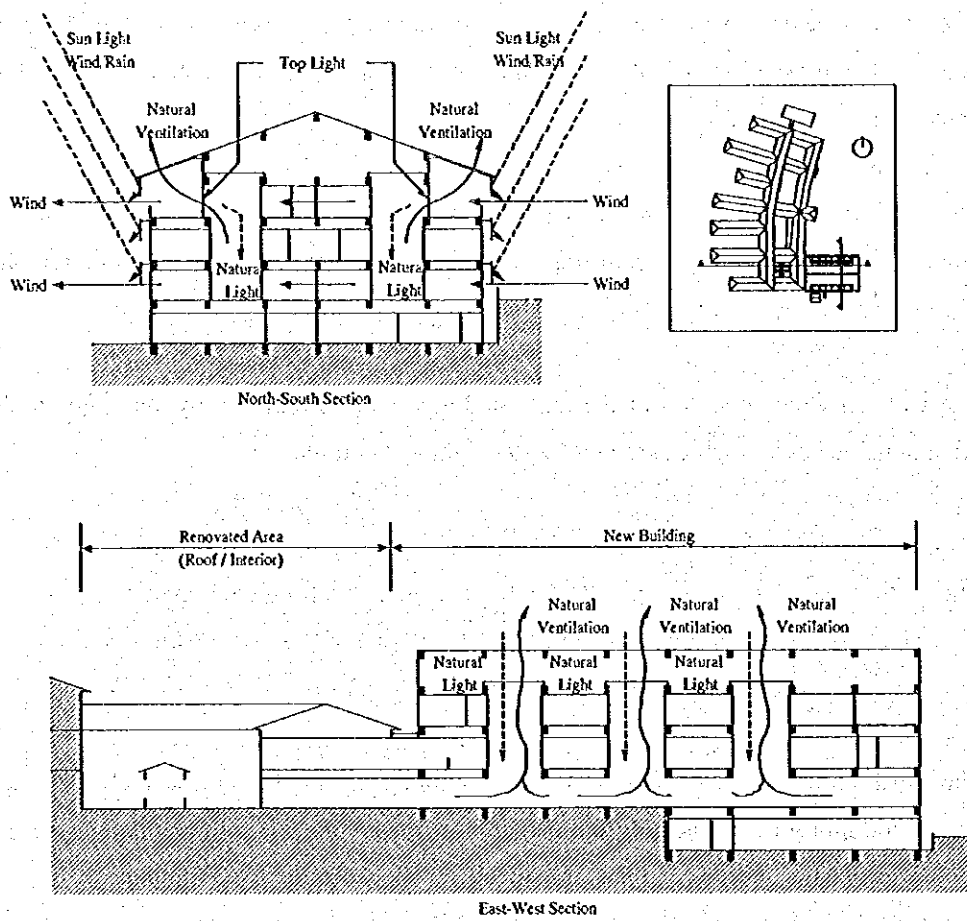


Figure 2-7 Illustrated Section Plan

2-3-5 Structural Plan

(1) Soil Conditions of the Construction Site

According to the results of the boring test at five locations and geological survey, the construction site indicates the following features.

- a. The site has a geological structure in which a formation of medium dense lateritic soils above the base rock, the latter varying largely in depth from 2.5 to 12.5 meters with location.
- b. The construction site has been developed on a steep mountainous area including valleys. The test indicates alternating cuttings and filling. On the upper side of the planned location of new access road in the northern part of the location of the expanded facilities is a layer of insufficiently compacted filled soil.
- c. The existing facilities are mostly build on the cutting part.
- d. The groundwater level is generally above the base rock.

(2) Foundation Plan

Direct foundation and pile foundation could be considered for the expanded portion of the Project.

In the proposed site depth of base rock varies greatly and a formation of insufficiently compacted filled soil exists; therefore, bearing strength of land is insufficient as well as uneven. The direct foundation is ruled out under such a circumstance because there is high possibility of differential settlement.

To minimize the possibility of differential settlement, the Project adopts a pile foundation which is supported by the base rock. Cast-in-place concrete piles are adopted which are adaptable to the different required length and low in noise level of pile casting. However, if the basement rock exist at depth less than three meters below the ground level, the soil is replaced by rubble concrete and the direct foundation is used. This would represent a case of composite foundation, or use of direct foundation and pile foundation for the same building. Generally, the composite foundation is liable to suffer from differential settlement; however, it would not lead to any problem in this case because of the continual structure of the basement rock and seismic force having not to be considered in this region.

(3) Structural Plan

The buildings of the expanded portion of the project will be of rigid frame structure mainly of reinforced concrete generally employed in Sri Lanka. More specifically, columns, beams and floors are made of reinforced concrete, with the external walls and partition walls made of blocks or bricks.

The structural design standards, material specifications and design loads have been determined as explained below mainly as a result of discussion between the Sri Lanka sides in charge and the study team.

(4) Design Loads

The design loads used in the Projects are based on the standards and determined by the methods given below.

- BS 8110 Structural Use of Concrete, 1985
- BS CP3 Chapter 5 Part 2, 1972
- Recommendations for Loads on Building AII, 1993

1) Dead Loads

The dead loads are calculated from the weights of the structural and finishing materials.

2) Live Loads

The live loads are determined as shown below according to the use of each room in addition to those given by the above standards.

Table 2-8 Major Live Loads

Room	Live Loads
Operation Theatre, Laboratory, Consultation Rooms, etc.	300kg/m ²
X-ray Examination Room	400kg/m ²
Mechanical Room	500kg/m ²
Corridor	180kg/m ²

3) Wind Loads

According to BS (CP3, Chap.5, Part 12) in common use in Sri Lanka, reference wind velocity is set at 33.5 meters/second.

4) Seismic Loads

The seismic loads are not dominant in Sri Lanka and are normally ignored in the design of structure unlike Japan where the seismic loads are predominantly important.

(5) Structural Design Standards

- Standard for Structural Calculation of Reinforced Concrete Structures, 1991, AIJ
- Design Standard for Steel Structures, 1973, AIJ
- Recommendations for Design of Building Foundations, 1988, AIJ
- Structural Use of Concrete, 1985, BS8110

(6) Materials and Strength

- Concrete : Plain concrete ($F_c = 210 \text{ kg/cm}^2$) in accordance with BS8810
- Reinforcing bar : Deformed bar (SD295 $f_y = 3,000 \text{ kg/cm}^2$, SD325 $f_y = 3,500 \text{ kg/cm}^2$) based on JIS G3112
- Soil bearing strength : With the basement rock on which piles rest constituting the load bearing layer, the long-term load bearing capacity of spread foundation is supposed to be $100 \text{ tons-force/m}^2$.
The long-term load bearing capacity of a cast-in-place concrete pile is supposed to be $250 \text{ tons-force/m}^2$.
- Steel frame : SS400 ($f_y = 2,400 \text{ kg/cm}^2$) based on JIS G3101

(7) Renovation of the Existing Building

1) Outline of the Existing Building

The existing building is a 47-year old two-storied building without basement. Since the design drawings are missing, it is difficult to determine the structural classification. By measurements and visual inspection, the building may be considered to be of masonry structure made of bricks and crushed stones. The walls were built by piling up bricks and crushed stones, with the circumferential girder and the floor of the first floor made to form one concrete piece.

The window openings are intels, a structure made of reinforced concrete, in which the external walls of the ground floor serve as reinforced-concrete eaves for the ground floor.

The floor of the ground floor is not made of reinforced concrete but presumably of bricks finished with cement mortar. The floor of the first floor is made of reinforced concrete, of which each unit measures 3 meters times 6 meters, supported by 450 millimeter thick reinforced concrete beams.

The building has a hipped roof, with wooden trusses. The roof is thatched with roof tiles directly on the rafters without roof boards. Sky is seen between roof tiles from inside at some places; these portions require renovation including measures to stop leaks of rain water.

The study team has inspected two locations by digging and confirmed that the foundation is not reinforced concrete but a spread foundation of masonry structure fixed by cement mortar.

2) Renovation Concept

The planned renovation of the existing building involves removal and relocation of some walls. In the area around Ratnapura seismic force need not be included in design calculation; therefore, modification of the layout by removal and relocation of some walls is considered possible on condition that appropriate reinforcement is provided by reinforced concrete and others.

The foundation of the existing building is designed not for concentrated load but for distributed load; therefore, modification will be done in a manner to avoid incremental loads. A new foundation and pillars will be installed to support a room with a large space in it, as is the case with the waiting room. The roof truss will be a steel frame structure to avoid adding weight.

The existing wall structures will be used on principle as much as possible. The external walls will be used to the extent possible except for window sashes which will be renewed.

The existing building is generally obsolete; nevertheless, serious cracks or uneven subsidence is not observed. The building frame is judged to be usable after renovation.

2-3-6 Mechanical and Electrical Plan

(1) Electrical System

1) Power Receiving and Substation

The power for the new building will be received at the point of existing high tension receiving area of the hospital. The receiving power voltage is 33KV 50 HZ 3W and the incoming high tension cabling from the area to the new substation is under ground. In the substation, the voltage shall be changed to low voltages 400/230V and supplied to new building and renovated area.

Estimated capacity of the transformer is 400KVA and will be installed two numbers. The cabling root is shown on the Figure2-9.

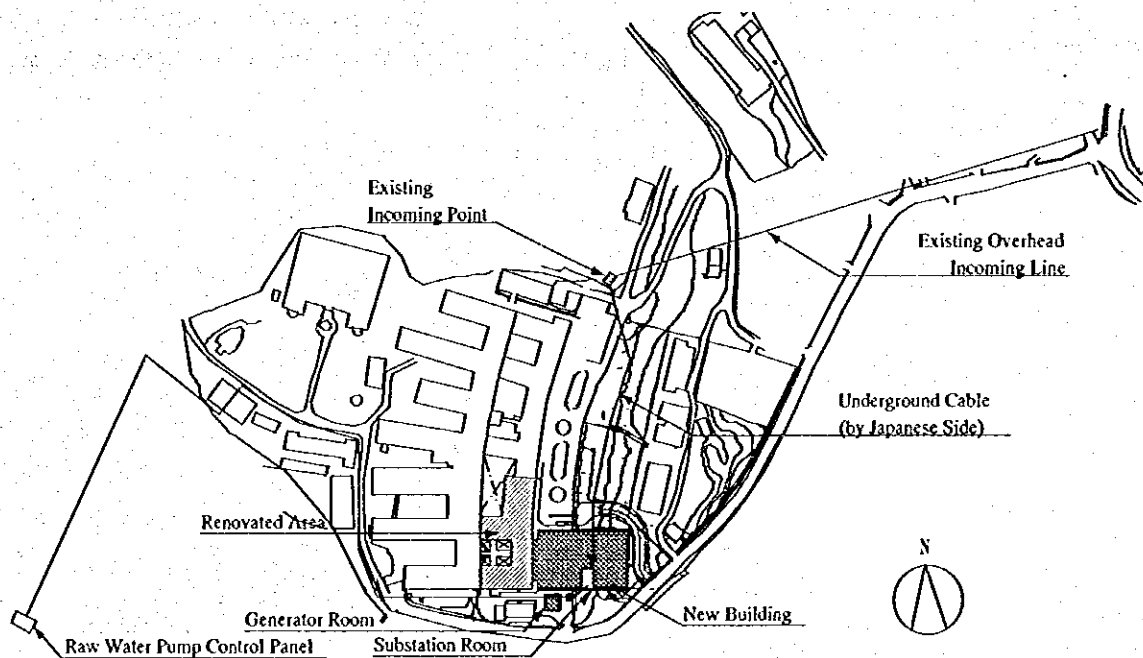


Figure 2-9 Substation System

2) Main feeder and Power supply for the equipment

Two kind of main feeders will be installed. One is essential and the other is nonessential power. Each feeder shall be installed number of circuits. In case of the power failure, only essential feeder will be working for selected equipment, lights, and power outlets. The monitoring system for the necessary equipment will be installed. Diagram of the main feeder is shown on the Figure 2-10.

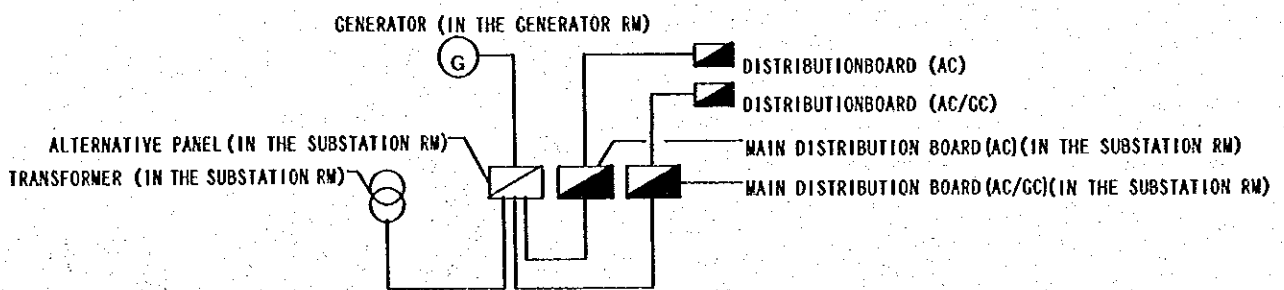


Figure 2-10 Main Feeder Diagram

3) Generator

One set of the generator will be installed as essential power. The generator will work in case of the power failure and the voltage dropping at preset rate.

4) Light and Power outlet

The lighting fixture will be used fluorescent bulb mainly to save the energy and to reduce the maintenance costs. Also the switching of the lighting fixture will be make grouping like window side and corridor side group to save the energy.

The power outlet will be used three kind of the types or color for identify to use. Emergency lights will be installed. Garden lights will be installed only limited areas for security propose.

5) Telephone System

The new PABX will be installed in the operator room of the new building. The capacity of extension and outside lines of it will be 400 and 10 numbers. The handsets will be installed in the new building and renovated area only.

Main telephone cabling for the existing area will be installed from the new PABX to existing terminal boards shown on the Figure 2-11.

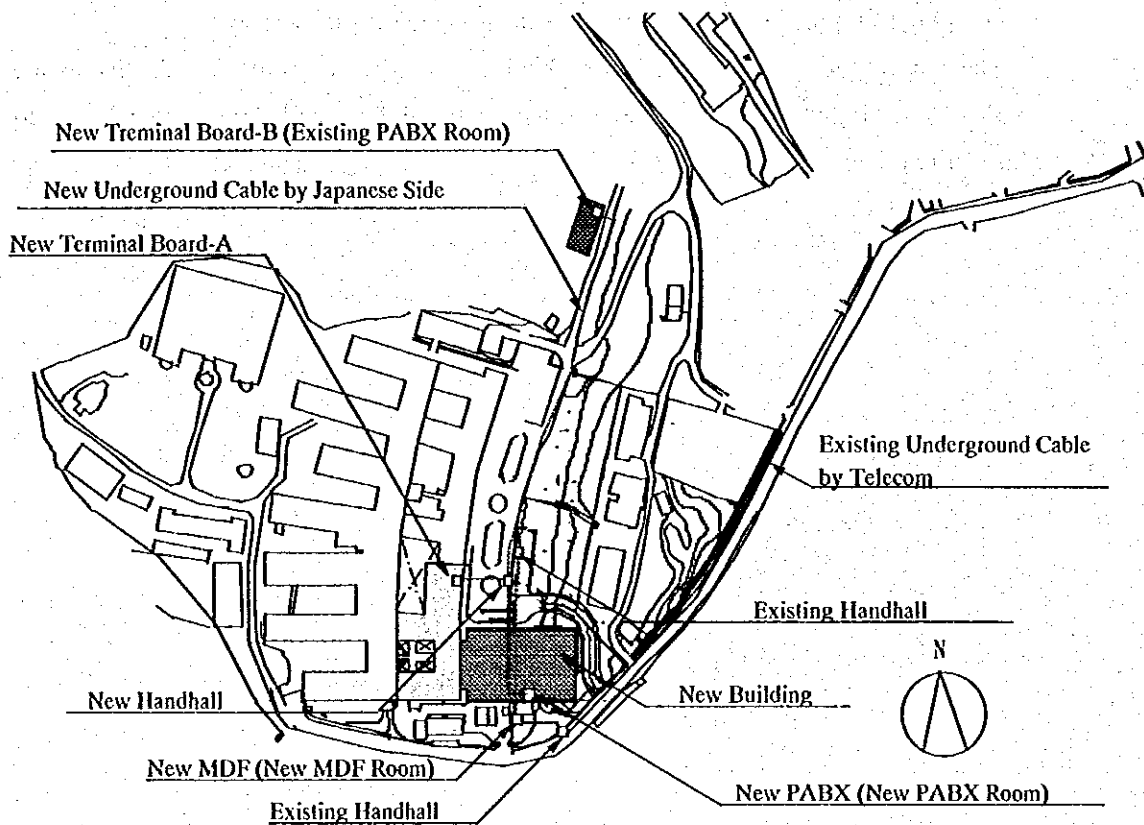


Figure 2-11 Telephone System

6) Public address System

The public address system for the emergency and paging will be installed in the new building and renovated area. The amplifier should be installed in the operator room. Only conduit from operator room to the existing area will be installed for the future use shown on the Figure 2-12.. Estimated capacity of the amplifier is 180w. Also individual paging system will be installed in the waiting hall of the outpatients.

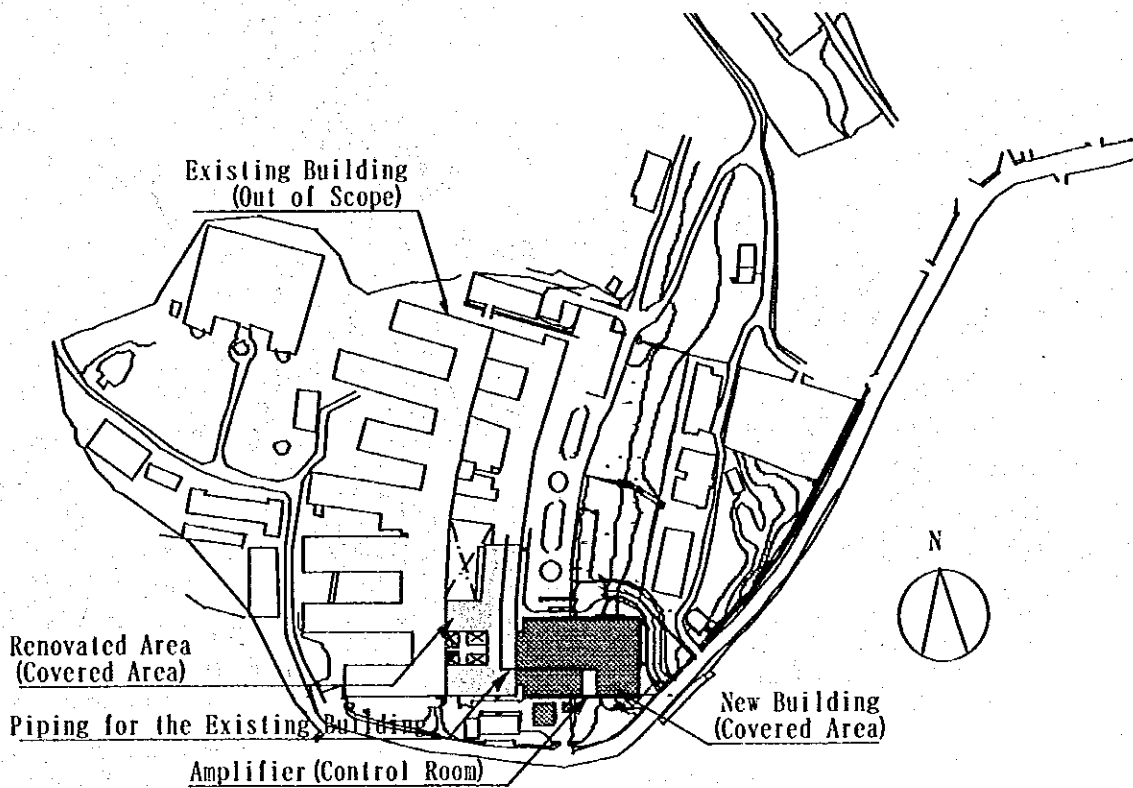


Figure 2-12 Public Address System

7) Automatic Fire alarm System

The Automatic fire alarm system will be installed only for the new building. The system will be design in accordance with Japanese regulation and suggestion of Sri Lanka Fire Department. Only conduit from main panel to the renovated and existing area will be installed for the future use shown on the Figure 2-13.

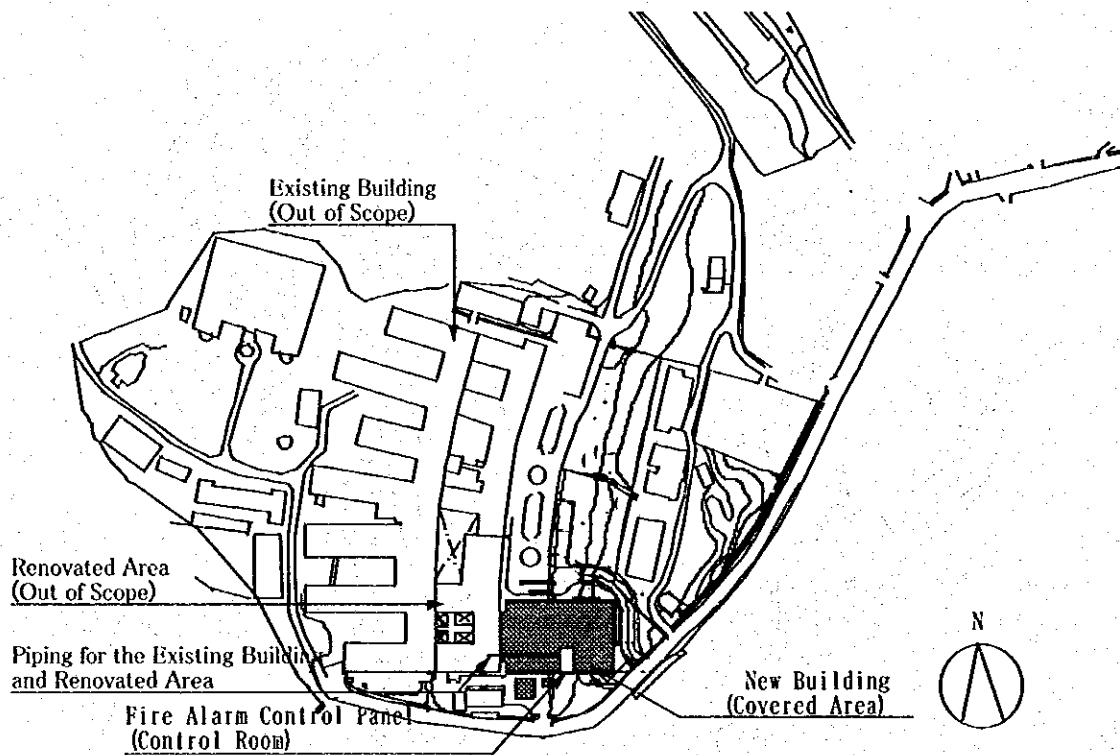


Figure 2-13 Fire Alarm System

8) Video display system

Video display system will be installed in the waiting hall of the outpatients. The system will be used for the patients and the families to educate of public health.

9) Nurse Call and Intercom System

The nurse call system will be installed in the Delivery Room area. Intercom system will be installed Operation Theatre in the new building. See Figure 2-14.

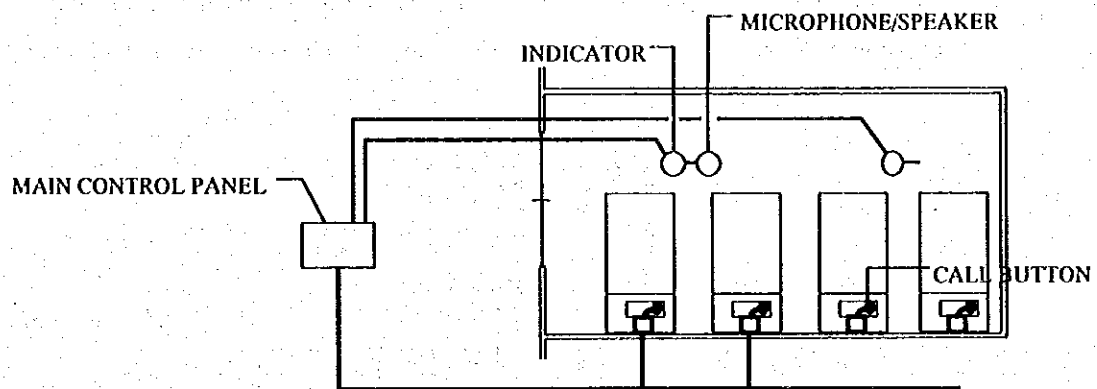


Figure 2-14 Nurse Call System

10) Lightning

The lightning system will be installed to cover the new building only.

(2) Mechanical System

1) Water supply System

The raw water will be carry from Kaluganga River and the correcting system of the water will be installed near by the existing facility. Then, the water will be lifted up to the new water treatment system in the hospital area. The treated water will be supplied to the new building and renovated area from new reservoir by gravity.

Estimated capacity of the water supply is 140 cubic meter per day for the proposed facility. The water piping from the existing reservoir would be installed to the new reservoir of the treated water as a back-up by Sri Lanka scope shown Figure 2-15 and 2-17.

Since the river water is turbid, the raw water will be treated by the sedimentation tank, roughing filter and slow sand filter. Slow sand filtration system is shown Figure 2-16.

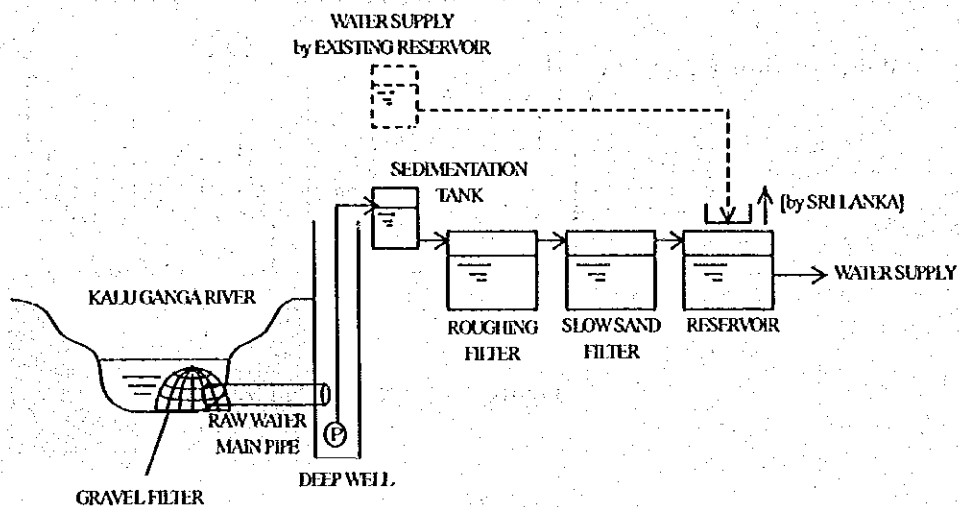


Figure 2-15 Water Supply Diagram

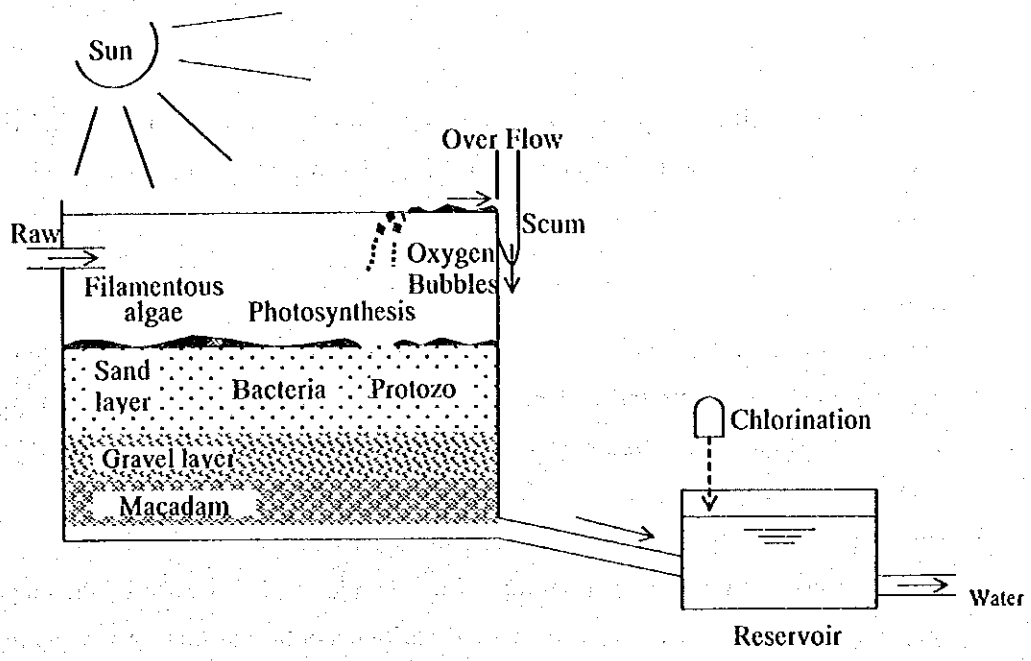


Figure 2-16 Slow Sand Filtration Diagram

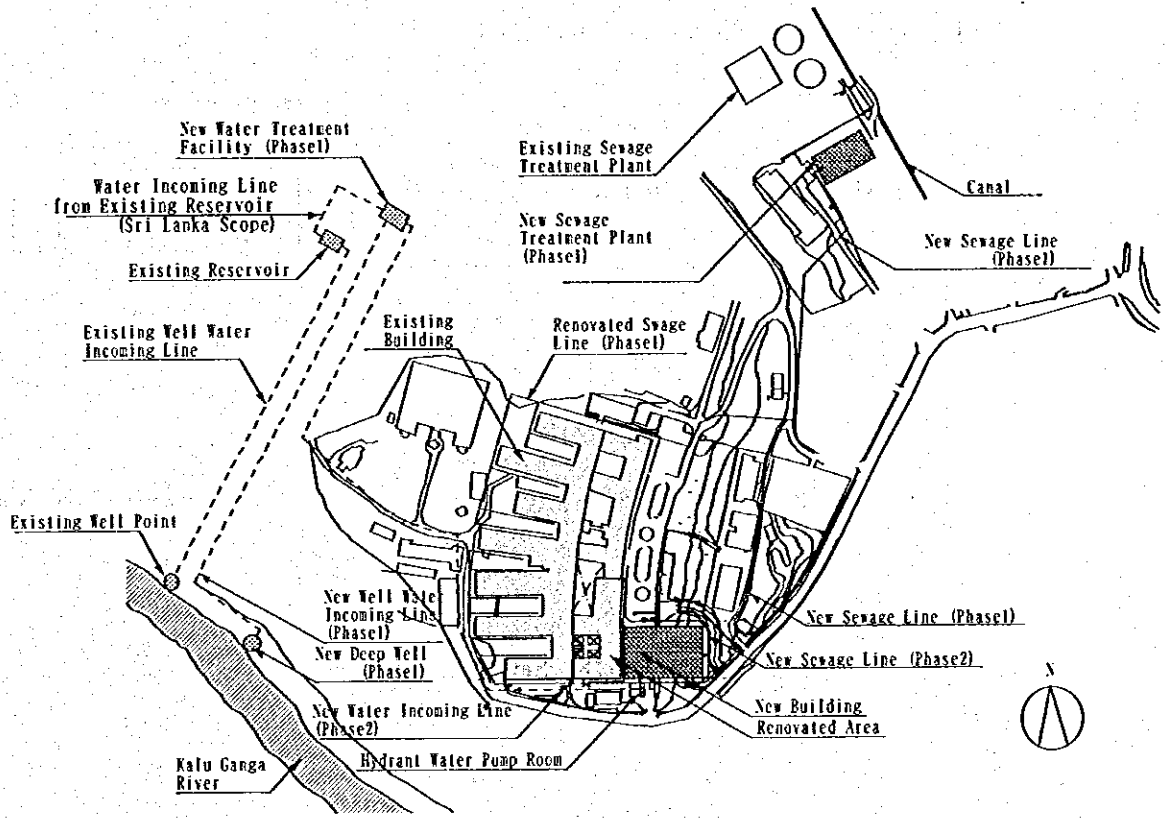


Figure 2-17 Water Supply and Sewerage System

2) Hot water System

The hot water will be supply to the operation theatres and operating rooms. Individual systems with a solar water heater with electric heater in common use in Sri Lanka are used.

3) Drainage System

The soil water from the toilets and waste water from wash basins, showers and sinks are treated in a new sewage treatment plant. The treated water is discharged to canal near by. Infectious waste water from isolation area and laboratory waste water will be treated before discharge.

Storm water is directly discharged to the existing roadside gutters.

The soil water and waste water from the existing hospital will be treated by the proposed sewage treatment plant. The project includes modification of the existing waste water piping. The sewage treatment tank will have an enough capacity to treat sewage both from the existing hospital and the new building/renovated area.

The sewerage diagram is shown Figure 2-18.

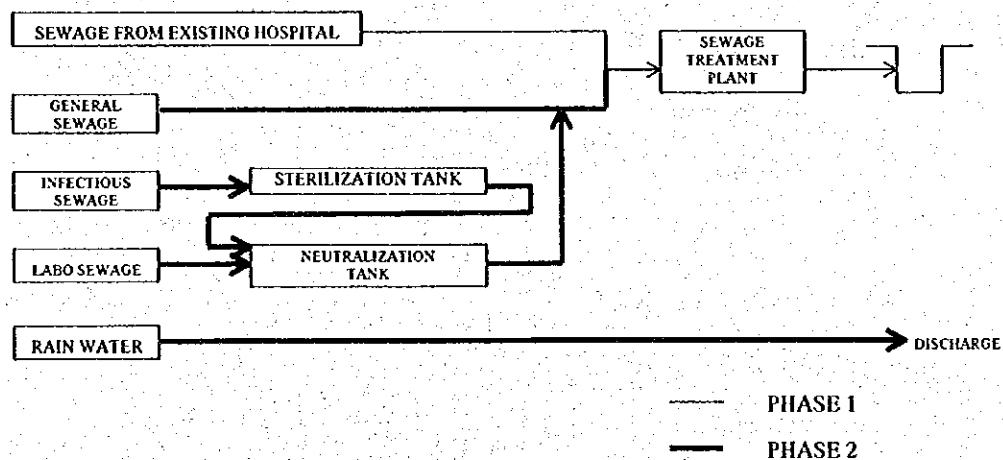


Figure 2-18 Sewerage Diagram

4) Sanitary Fixture System

Sanitary fixtures such as water closet, urinals, lavatories and faucets will be installed. Asian-type toilets are to be procured as toilets for common use. On the other hands, western-type toilets are to be procured as toilet for use in private places.

5) LP Gas Supply System

LP Gas will be used for examination area. LP Gas will be supplied by central system because of safety and easy exchange of LP Gas cylinder.

6) Medical Gas Supply System

The oxygen gas, nitrous oxide gas, compresses air and suction system will be provided. In consideration of safety, easy operation, and maintainability, the central piping system will be adopted, as was the case with the existing hospital. The pipe outlets are installed in the following places shown Table 2-19.

Table 2-19 Medical Gas Installation Room

Dept.	Room	Medical Gas			
		Oxygen	Nitrogen	Pressure	Vacuum
Laboratory	Minor Op.	○		○	○
OB&GY	Delivery Rm.	○	○		○
	Delivery Procedure Rm.	○	○		○
	Delivery Isolation	○	○		○
	Delivery Isolation Procedure Rm.	○	○		○
	PBU	○		○	○
	PBU Isolation	○		○	○
	MHD	○			○
OPD	Minor Op.(Dental / Maxilla Facial)	○		○	○
	Minor Op. (Eye)	○		○	○
Operation	Operation Theatre	○	○	○	○
	Anesthesia Rm.	○	○	○	○
	Recovery Rm.	○			○

7) Fire-fighting System

Fire hose reel system and fire extinguishers will be provided for the project.

The system will be planned following the British Standard (BS) and the Japanese Industrial Standards (JIS).

8) Sewage Treatment System

The sewage water will be treated in a new sewage treatment plant. The sewage treatment plant has special features which is soil coverage type combination method of anaerobic and aerobic microbe treatment, where these streams mix with other waste waters.

The sewage treatment plant will have an enough capacity to treat sewage water, both from the existing hospital facilities and the new building/renovated facilities.

9) Incinerator System

The project plans to install an incinerator capable of incinerating infectious medical wastes. The incinerator will have an enough capacity to burn the medical wastes from the new building/renovated area and existing.

10) Air Conditioning System

Such rooms as operation theatres, PBU (premature baby units), CSSD (central sterilization supply department), MHD (maternal high dependency), etc. requiring utmost cleanliness, and such rooms as X-ray rooms, pharmacy, portions of examination rooms, delivery rooms, etc. requiring function are equipped with air-conditioners.

Individual air-conditioning system is adopted instead of central air-conditioning system for reasons of economy and easier maintenance. Rooms not air-conditioned are on principle equipped with circulating fans.

Ventilation is on principle by natural ventilation except for rooms where generation of a large amount of odorous gases, vapors, and heat is expected. Mechanical ventilation is applied to these rooms.

Air conditioning diagram is shown Figure 2-20.

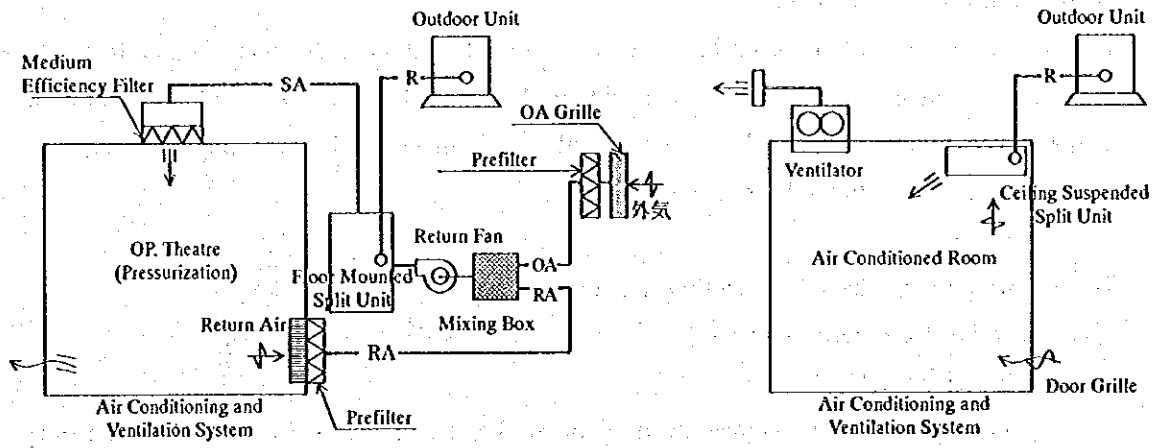


Figure 2-20 Air Conditioning Diagram

2-3-7 Building Materials Plan

The Project preferentially uses local construction materials and methods established in Sri Lanka to facilitate maintenance. It has been agreed with the Sri Lanka side that, in order to be eligible to the Project, locally produced materials should conform to the BS and imported materials should conform either to the BS or to the JIS.

The following criteria have been set for selection of construction materials.

(1) Materials for Exterior Finishing

1) Exterior Wall

Fairfaced concrete, commonly used in Sri Lanka, or mortar-finished block masonry works are sprayed with durable paints.

2) Roof

This area has annual precipitation of more than 4,000 millimeters and the maximum recorded daily precipitation of 120 millimeters. Under such a circumstance, a sloped tile-thatched roof commonly used locally will be adopted. Durable roof tiles will be selected.

(2) Materials for Interior Finish

1) Floor

For consultation rooms, treatment rooms, PBU, MHD room with relatively high risks of contamination, these floors are finished with long sheets which are easy to clean and to be maintain and hygienic. The floors of halls and corridors where durability is important will be finished ceramic tiles. The floors of such rooms as delivery rooms, operation rooms and shower theatres where water washing is a routine have a waterproofing structure covered with terrazzo.

2) Wall

The walls of operation theatres, treatment rooms and corridors which are apt to be stained are painted with resin enamels to facilitate cleaning by wiping. Other general walls are painted with an antifungal resin emulsion in view of the very humid conditions. The walls of the operation theatre and delivery rooms are finished with ceramic tiles. The walls of the X-ray examination rooms are built with RC and the doors or window frames are lined with lead to shield radiation. The walls of corridors, other walls, corners of collums which may be hit by stretchers are equipped with

stretcher guards which serves as handrail as well.

3) Ceiling

Air-conditioned rooms such as operation theatres or X-ray examination rooms will have double layered ceilings of gypsum plaster board to improve air-conditioning efficiency, to mask piping and to absorb sound. Other rooms will have ceilings of rock wool to maintain the facilities in the ceilings.

(3) Doors and Windows

Aluminum window sashes and doors are used on the exterior side for the sake of corrosion prevention. Rooms which need natural ventilation are equipped with jalousie windows to have wider effective openings. There is no standard for tolerable wind pressure of window sashes in Sri Lanka because of the country being free from cyclones. The Sri Lanka side has agreed based on the recorded climatic conditions that the aluminum sashes of normal strength, or those withstanding wind pressure of about 110 Kg/m^2 (wind velocity of 33.5 m/sec.), would be used.

Interior doors and windows are basically wooden except for steel doors used for the mechanical room and warehouse for which sturdiness or sound insulation is required. The Project uses such special doors for X-ray shield for the X-ray examination rooms and electrically operated rolling steel doors for protecting designated areas from fire. Kick plates are applied to the doors installed in areas where traffics of people or materials are busy. The hardware for doors and windows will be imported for the reason of durability and reliability, but those pieces of hardware which could be maintained in Sri Lanka will be chosen.

Table 2-21 Construction Materials Plan

	Local method	Adopted method	Reasons
Roof	Concrete Slab + Protecting Concrete. (Flat Roof)	Concrete Slab + Single Roof. (Pitched Roof)	Pitched roof will be applied to prevent water leaking.
Exterior walls	Exposed concrete and/or mortar finish on blocks + paint	Exposed concrete and/or mortar finish on blocks spray paint	High performance paint will be used to prevent concrete cracks.
Doors & Windows	Aluminum, Wood	Aluminum, Wood, Steel	The doors & windows will be aluminum and wood. Steel will be used wherever necessary. (mechanical room etc.)
Interior walls	Tile, Paint	Tile, Enamel paint	High performance paint will be used to simplify maintenance.
Flooring	Tile, Long sheet, Terrazzo	Tile, Long sheet, Terrazzo	Popular local method will be applied to simplify maintenance.
Ceilings	Paint, Rock wool sound-absorbent panels	Paint, Rock wool sound-absorbent panels	Board ceilings will be partly installed to raise the efficiency of air-conditioning, hide pipes and protect the rooms from dust.

2-3-8 Equipment Plan

(1) Basic Policy for Selection of Equipment

The basic policy enumerated below is applied to selection of the equipment to be provided in the project.

- 1) The selected equipment should help GHR to become fully able to provide intended medical services worthy of one of five designated general hospitals located other than the Colombo Metropolitan Region.
- 2) The equipment to be provided should be on principle operable by the present staff of GHR.
- 3) The equipment to be provided should be amenable to the present operation and maintenance capability of Sri Lanka with BES as the center of the functions.
- 4) The equipment to be provided will be classified into the following three procurement groups according to the implementation schedule.
 - a. **Provision of equipment to the existing facility**
Pieces of equipment to be installed in the existing facility are necessary for medical services in the existing facility. They do not require installation and other associated works.

Some of them will be relocated on completion of the new building and renovated area.
 - b. **Provision of equipment to the new building**
Pieces of equipment to be installed in the new building are needed for its medical services.
 - c. **Provision of equipment to the renovated area**
Pieces of equipment to be installed in the renovated area are needed for the medical services of the renovated area.

(2) Consumables and Spareparts

The project supplies the consumables required for the initial test operation only. The equipment suppliers will supply spareparts for the initial one-year guarantee period from the time of procurement. Therefore, the project does not have to provide spareparts that may be required for initial failures. From the second year onward, BES will provide the spareparts. Spareparts are accordingly not included in the Project.

(3) Operation of Equipment and Staff Training

The equipment suppliers will on principle dispatch engineers at the time of installation and they will directly provide the operators with training on the operation of their respective equipment. The degree of training required will be studied for each piece of equipment.

In Sri Lanka BES classifies medical equipment into the following three grades from the standpoint of operation and maintenance. The equipment to be supplied by the Project will mostly be specified in Grades 1 and 2 as has already been discussed and agreed with BES. Pieces of equipment falling into Grade 3 generally require maintenance by third parties on a maintenance and service contract through agent.

Grade 1 Pieces of basic equipment (equipment of simple design)

Blood pressure gauge, aspirator, X-ray film illuminator, boiling sterilizer, etc.

Grade 2 Specialized equipment (ME equipment)

Operation table, astral lamp, anesthesia machine, respirator, electric cautery, etc.

Grade 3 Advanced equipment (large and sophisticated equipment)

Computer aided diagnosis unit, color doppler ultrasonography unit

Tables 2-22 and 2-23 show specifications of major equipment and a list for equipment procurement plan, respectively.

Table 2-22 Principal Equipment List

(1/3)

No.	Equipment Name	Specification	Application	Qty
1	Adult Ventilator	Drive method: Bellows by electric control Ventilation mode : SIMV, SPONT, FIO2, PEEP, CPAP, FCV Alarm : provided Tidal volume: 100-1200ml	For internal surgical patients whose respiration function deteriorate or who need respiration control, act for respiration function by ventilation of adjustment respiration etc.	2
2	Portable Ventilator (Transport Patient)	Drive method: Bellows by electric control Ventilation mode: SIMV, SPONT, FIO2, PEEP, CPAP, adjustable Alarm : Peak pressure(Upper/Lower), System error Built in battery : Car battery could be used Tidal volume: 200-900ml	For patients whose respiration function stop or deteriorate due to accident or acute illness, act for respiration during transfer to hospital or in transfer of patients	1
3	Neonatal Ventilator	Drive method: Air compressor Ventilation mode : SIMV, SPONT, FIO2, PEEP, CPAP, adjustable Alarm : Peak pressure(Upper/Lower), System error Tidal volume: 1-500ml	Used for premature baby whose respiration function is insufficient or neonatal whose respiration has trouble to treat and protect hypoxia.	1
4	Anaesthetic Machine	Flow meter: O2, N2O, Air 0.1-10L/min. Safeguards: N2O shut-off mechanism Alarm : Oxygen concentration, Oxygen pressure Vaporizer: Halothane Airway pressure gauge : +70cm H2O	For patient's inhalation of anesthetic and operation and treatment without pain	4
5	Operation Theatre Table	Positioning : Elevation by hydraulic foot pump Trendelenburg: Approx. 15° Lateral tilt : Approx. 20° each side	Compliant to each operation. According to operation body parts, adjustable of each position	3
6	Operation Theatre Table (Orthopaedic Unit)	Orthopedic attachment : Provided Positioning : Elevation by hydraulic Trendelenburg: Approx. 15° Lateral tilt: Approx. 20°	Equipped with attachment of orthopedics along with general type compliant to highly technical orthopaedic operation.	1
7	Electro Surgical Unit	Type: Monopolar & Bipolar Function: Cutting, coagulation, bipolar Output: Approx. Cutting: 200W, Coagulation: 120W, Bipolar: 15W	Basic operation machine used for dissection, hemostasis, coagulation in operation	3
8	Washing Machine	Washing and extraction function Capacity: 20kg load or more Materials: Stainless steel	For washing and extractor effectively in theatre block of surgical, of operation scrub suite, gown, cover cloth used in theatre.	3
9	ECG Monitor	Waveforms: ECG and Resp. Number of traces: 2ch Trend time: 1, 2, 4, 8, and 24 hours ECG leads: 3-electrode Respiration rate counting rate: 0 to 150rpm Recorder: Provided, Cart: Provided	For measuring of ECG and respiration of serious patients and monitoring the rate and kinds of tachycardic bradycardia and arrhythmia For monitoring patient of operation and recovery room and ICU	11
10	ECG	12 leads 6 channel or more Cart and hanger provided CMRR: 90dB or more	Diagnosis top grade equipment for irregular pulse, heart disease due to deficiency of blood, ventricular hypertrophy, and electroanalysis.	1
11	ECG Monitor (Neonatal)	Waveforms: ECG and Resp. Alarm: Heart rate, Respiration ECG display range : Approx. 15-250BPH Resp. display range : 5-150BPH Cart: Provided	For monitoring respiration and palmar of pronatus sick neonatal and alarming apnea and bradycardia appearing	2
12	Defibrillator	Heart rate: 20-240PPM Output energy: 2-360 J Charging time : Approx up to 10 sec. Paddle for adult and paediatric, cart, recorder provided	Against ventricular fibrillation by outputting direct electric current, used for recovery of essential heart rhythm. Including of basic ECG function and cart for moving.	5
13	Electrolyte Analyser	Sample type : Whole blood, serum, urine Na : Whole blood Serum : 80-200 Urine : 10-300 K : Whole blood Serum : 1-9.99 Urine : 5-100 Cl : Whole blood Serum : 70-200 Urine : 50-200 Analysis time : Approx. 40-90sec.	Used for measuring electrolyte in blood and urine By analyzing electrolyte, inspection result (Na, K, Cl etc) enables diagnosis of patients.	2
14	Autoclave Machine	Capacity : Approx. 200 liter or more Door : Sliding type Alarm : Provided Boiler, Softner Provided	Used for sterilizing operating instruments and wears etc. used in hospital	2
15	Microtome	The length of vertical movement of specimen clamp : Approx. 60 mm The length of horizontal movement of specimen clamp: Approx. 30 mm Section thickness : Approx. 1-30 μ l with Automatic microtome knife sharpener	For cutting thinly (micron unit) paraffin celloidin embedded specimen. One of the basic equipment used for the field of pathology	1
16	Automatic Stainer	Capacity : 200 slide/time Slide capacity: 30	Automation of dyeing process of specimen for blood image. According to setting time, automation of dyeing against each solution.	1
17	X-ray Fluoroscopic Machine	Radiography voltage : Approx. 40-125 kV mAs setting : Approx. 0.5-800 mAs Fluoroscopy voltage : Approx. 50-125 kV mAs setting : Approx. 0.3-4 mAs X-ray grid : Ratio : 10 : 1.40 line / cm Cassette size : Up to 14 X 17 inch Protective apron, included goggles	In this hospital as well as mainly angiography of gut and bile, fracture, lung disease, heart disease and cerebral disease etc. can be used for multi-purpose diagnosis.	1

No.	Equipment Name	Specification	Application	Q/t
18	Portable X-ray Machine	X-ray voltage : Approx.40-125 kV mAs setting : Approx 0.5-125 mAs Tube electric power : Approx 160 mAs or more	Used for operation filming of orthopedics and filming for patients in ward. The objective is total body and simple filming of each parts is available. Enables to move easily in hospital.	1
19	Automatic X-ray Processing Unit	Processing film size : 4" X 5"-14" X 17" Processing capacity: Approx. 200films/hour or more Processing speed : Approx. 90sec./pcs Facing roller continuous transfer system	Film processing such as X-ray film and other medical films. Automatic process, fix, washing and dryer.	1
20	Ultrasound System	Scan method : Convex and linear electronic scanning Mode : B, M, BB, BM Monitor : Monochrome Probe : 4 pcs Card and print provided	Multi-purpose ultrasound system. Used for diagnosis (mainly abdominal, circulatory organ and tumor). By detection of reflex wave and observation, kinds and tissue of organs or diseases can be judged and each diseases can be diagnosed.	1
21	EEG Monitor	Number of channel : 14 ch. EEG input : 23 or more (Including T1 and T2) Respiration input : 3 or more Discrimination ratio : 100 dB or more	Measurement of EEG and diagnosis of function condition of central nerve accompanied by epilepsy, brain tumor, cerebrovascular accident, cephalo injury, cerebral meningitis.	1
22	EMG Machine	Number of channel : 2 CMRR : 90 dB or more Noise level: Approx 0.7 uVrms Recorder : Provided	Measurement of action potential of many myoplasms caused by contraction of muscle. On the basis of EMG measured by electrode attached to skin and intramuscular needle electrode, used for inspection of diagnosis of motorial, peripheral, myogenic diseases such as peripheral disease, amyotrophy, amyesthesia, myodystrophy, etc.	1
23	Integral Dental Unit	Seat movement : hydraulic Operation light : Brightness : Approx.13,000Lux or more Operation stool high : Approx. max.590mm-min.470mm Air compressor : Motor Approx. 900rpm Air compressor : Air exhaust : Approx 35liter or more Air tank capacity : Approx. 24 liter Filter : Provided	Basic equipment used for consulting and treatment in oral surgery and equipment and kit necessary for this work are equipped.	3
24	Audiometer	Test item : Pure tone audiometry; Air conduction, bone conduction, SISI test, ABLB test, Bekesy audiometry Hearing level scale : Direct reading 5dB steps, electric control	By generating pure tone of many kinds of frequency compliant with range of audition of human ears, The judgement such as diagnosis of deafness, conductive deafness, sensorineural deafness, is available.	1
25	Impedance Meter	Probe tone : 226Hz 85dB SPL Measurement mode : 0.2-9.99 ml Item : Tympanometry, Reflex Printer : Provided	Used for distinguishment of conductive deafness and sensorineural and one of the additional functional inspections of infants.	1
26	ENT Examination Console Unit	Up-down strokes : Approx 550-800 mm Treatment unit, spray device : 4pcs	Used for ENT diagnosis unit and designed for multi-purpose	3
27	Fibre Optic (Naso-Laryngoscope)	Field of view : Approx. 85° Depth of field : 3-50mm Range of distal end bending : Up and down 130° Light source : Halogen	When pharynx is difficult to observe by indirect pharyngoscope mainly, this is advantageous. Cavitas nasi, pharynx, glottis etc. can be observed.	1
28	Visual Field Analyzer	Project type Goldman III Stimulus filter: by level controller	Check all of the visual function from retina to visual central nerve. Used for detecting of glaucoma, retina visual nerve and cerebral tumor etc. and judgement of the stages.	1
29	Laparoscope	Telescope : 5.5mm. Field of view : 45° Light source : Halogen	Used for diagnosis of obstetrics and gynecology and such as gonaduct and ovarian and womb by direct observation.	1
30	Cardiotocogramme	External transducer type Ultrasonic frequency : Approx.1000 kHz Counting range : Approx 50-210 beats /min. FHR calibration signal : Apprpx.160beats /min. Recorder : Provided Cart : Provided	Measurement of fetal heart rate in pregnant delivery, recording labor curve, monitoring fetal low oxygen by heart rate labor drawing and judgement labor stage.	2
31	Bronchoscope (fibre optic)	Field of view : Approx.120° Depth of field : 3-50 mm Range of distal end bending : Up 180° , down 130° Light source : Halogen	For the purpose of diagnosis of lung and bronchia disease, used for observation of bronchia, biopsy of forceps and picking of cell etc.	1
32	Gastroscope (fibre optic)	Field of view : Approx.120° Depth of field : 3-100 mm Range of distal end bending : Up 210° , down 90° Light source : Halogen	Used for diagnosis of upper digestive apparatus disease, tumor of gastroschisis, diagnosis of ulcer etc. and stage observation mainly stomach diseases	1
33	Colonogoscope	Field of view : Approx.140° Depth of field : 5-100 mm Range of distal end bending : Up&down 180° ,right&left 160° Light source : Halogen	Mainly used for diagnosis of colon disease and lower digestive apparatus. Used for observation of sick stage and biopsy. Also used for the confirmation, treatment process observation and diagnosis	1
34	Cysto-Urithroscope	Telescope : 4mm : 3pcs (0° , 30° , 70° approx.) Sheath, biopsy forceps, grasping forceps: Provided Light source : Halogen	Used in urinary. By inserting from urethra, used for diagnosis of bladder biopsy, picking of foreign body, inspection bladder, urethra tumor and urethra inspection etc.	1
35	Basic Instrument Set LC-DCP,DCP	DCP instrument set Fast drill 3 kinds and others	Basic instrument set used for bone coaptation operation	1
36	Screw Set Stainless Steel	Stainless screw 4.5mm Cortax screws and others	Used with plate. Screw for bone coaptation operation	1

No.	Equipment Name	Specification	Application	Qty
37	Plate Set DCP (Stainless Steel)	Plate set Narrow auto compression Sholes, 87.5mm and others	Peculiar material used for compression fix of fracture	1
38	DHS, DCS Instrument Set	Dynamic screw set Guide pin, 2.4mm dia., 230mm and others	Used for fracture operation of regions cervicales of femur and regions of neck	1
39	Wire Instrument Set	Wire combined set Double wire tightener and others	Used for tie and cut in case of wire fix of fracture	1
40	Universal Drill Accessories (Electric)	Drill Driver: Electric motor drive Max. revolution : Approx. 700rpm Max. Torque : 35in/ lbs Reamer Max. revolution : Approx. 300rpm Max torque : 75in/ lbs	Used for operation of pelvis in drilling, pinning and wiring process	1
41	Small Drill & Accessories (Electric)	Drill driver: Electric motor drive Max. revolution : Approx. 1,000rpm Wire dia. : Approx. 0.7-2.0mm dia. Pia collet : Approx 2.0-3.0mm dia.	Used for bonelet operation in drilling, pinning and wiring process	1
42	Hemiarthroplasty Instrument Set	Reamer cutting head 15sets Sterilization case : Provided	Basic instrument used for making articulation	1
43	Instrument Cabinet	Upper, lower deck: 2 windows Made of steel Size: 1200(W) x 450(D) x 1700(H) approx.	To store equipment specially for out-patient dept.	49
44	Operating Light (4 pcs)	Four lamps Ceiling type 80,000 Lux. Approx.	For delivery room	23
45	Examination Light (wall mount)	Wall mount One lamp Intensity: 32,000 Lux.	Essential by examination in out-patient dept.	46
46	Cabinet (steel door)	Upper, lower deck: 2 windows Made of steel Size: 800(W) x 450(D) x 2000(H) approx.	Essential to store the files in out-patient dept.	69

Table 2-23 Equipment Plan List

Medical Equipment for the Existing Building

(1/2)

No.	Item	Q'ty
1. Theatre		
2.	Mobile Theatre Lamp	1
3.	Anaesthetic Ventilator (power driven)	2
4.	Anaesthetic Machine	1
6.	Operation Theatre Table	3
7.	Suction Apparatus	3
10.	Pulse Oximeter	4
12.	ECG Monitor	1
14.	BP Apparatus (NIBP)	3
15.	Capnometer (EtCo2 analyzer)	1
2. ICU		
1.	Adult ICU Bed	4
4.	Electrolyte Analyser	2
5.	Suction apparatus	8
6.	ECG Monitor	4
8.	Pulse Oximeter with Adult & Paediatric Sensors	5
9.	Defibrillator with Adult & Paed. Paddles	1
10.	Nebulizer	4
11.	Adult Ventilator	2
13.	Blood Pressure Apparatus (Electronic)	2
14.	Capnometer (EtCo2 analyzer)	1
15.	Patient Controlled Analgesia Pump (PCA pump)	2
16.	Syringe Pump	7
18.	Portable Ventilator to Transport Patient	1
5. Laboratory		
3.	Centrifuge	2
5.	Water Bath Adjustable with Thermostat	2
10.	Microtome Compatible with Automatic Knife Sharpener Rotary Type	1
11.	Microtome Knife	1
12.	Horning Shove	1
17.	Mixer	1
18.	Water Bath	1
21.	Automatic Pipette (Large Capacity)	4
22.	Automatic Pipette (Small Capacity)	2
26.	Trephire Biopsy Needle (Bone Marrow Biopsy Needle)	2
6. Radiology		
5.	Cassettes and Intensifying Screen (Large)	3
6.	Cassettes and Intensifying Screen (Small)	3
9.	Ultrasound System	1
7. Neurology		
1.	E.E.G Machine (electroencephalogram)	1
2.	EMG Machine	1
9. ENT Unit		
7.	Fibre Optic Naso-Laryngoscope	1
10. Eye Surgery		
2.	Slit Lamp with Tonometer	1
3.	Visual Field Analyzer	1
4.	Lensometer	1
6.	Mobile Binocular Operating Microscope	1
11. Gynaecology & Obstetric		
1.	Laparoscope	1
2.	Cardiotocogramme	2
3.	Vacuum Extractor	3
5.	ECG Monitor	2
6.	Pulse Oximeter	2
7.	Defibrillator	1

Medical Equipment for the Existing Building

(2/2)

No.	Item	Q'ty
12.	Psychiatry Unit	
2.	Suction Apparatus	1
13.	Surgical Unit	
2.	Gastroscope (fibre optic)	1
4.	Colonogoscope	1
5.	Cysto-Urithroscope	1
14.	Medical Unit	
1.	Defibrillator	2
3.	Nebulizer	4
4.	Ophthalmoscope	4
6.	Sphygmomanometer (Mercury/portable)	5
7.	Glucometer	4
8.	Suction Apparatus	4
15.	Rheumatology and Rehabilitation Unit	
6.	Interferatist Therapy Machine	1
16.	Orthopaedic Unit	
1.	Basic Instrument Set LC-DCP/DCP	1
2.	Screw Set Stainless Steel 4.5 & 6.5mm	1
3.	Plate Set DCP (Stainless Steel)	1
4.	DHS/DCS Instrument Set	1
11.	Bone Forceps Set	1
12.	Wire Instrument Set	1
13.	Universal Air Drill & Accessories	1
14.	Small Air Drill & Accessories	1
15.	Oscillating Bone Saw	1
16.	Hemiarthroplasty Instrumentation Set	1
17.	ECG Examination Unit	
1.	ECG	1

Medical Equipment for New Building
(1/2)

No.	Item	Q'ty
1.	Theatre	
1.	Twin Lamp	3
2.	Mobile Theatre Lamp	3
3.	Anaesthetic Ventilator (power driven)	3
4.	Anaesthetic Machine	3
6.	Operation Theatre Table	3
7.	Suction Apparatus	3
8.	Electro Surgical Unit	3
9.	Table Top Autoclave	1
10.	Pulse Oximeter	3
11.	Washing Machine & Dryer	2
12.	ECG Monitor	2
13.	Defibrillator	1
14.	BP Apparatus (NIBP)	3
4.	CSSD	
1.	Autoclave Machine	2
5.	Laboratory	
2.	Water Distilling Apparatus	1
3.	Centrifuge	2
4.	P.H Meter	1
9.	Micro Centrifuge Hematometer	2
15.	Sterilizes (Boiling Water)	1
16.	Rapid Weighing Balance	1
20.	Automatic Stainer	1
25.	Electrophoresis Machine	1
6.	Radiology	
1.	X-ray Fluoroscopic Machine	1
2.	Portable X-ray Machine	1
4.	Automatic X-ray Processing Unit	1
5.	Cassettes and Intensifying Screen (Large)	3
6.	Cassettes and Intensifying Screen (Small)	3
8.	Illuminator (double)	3
8.	Maxillo Facial Unit	
1.	Integral Dental Unit	3
2.	Dental / ENT Drill	1
9.	ENT Unit	
1.	Pure-Tone Audiometer	1
2.	Impedance Meter	1
5.	ENT Examination Console Unit	3
10.	Eye Surgery	
2.	Slit Lamp with Tonometer	1
13.	Surgical Unit	
1.	Bronchoscope (fibre optic)	1
15.	Rheumatology and Rehabilitation Unit	
1.	Short Wave Therapy Unit	1
2.	Infra Red Lamp	1
4.	Muscle Stimulator	1

Medical Equipment for New Building

(2/2)

No.	Item	Q'ty
18.	Additional Equipment	
1.	Operation Theatre Table (For Minor Operation)	2
2.	Examination Couch (Clinic, Treatment, OB&GY, Lab.)	50
3.	Delivery Table	2
4.	Gynaecology Examination Table	3
6.	Film Loading & Unloading Table	1
7.	Film Illuminator(2 pcs.)	41
8.	Instrument Cabinet	49
9.	Operating Light(4 lamp)	23
10.	Instrument Cabinet(for operation theater)	6
11.	Film Illuminator(for operation theater)	6
12.	Cooler Storage(for operation theater)	3
13.	Warmer Storage(for operation theater)	3
14.	Medicine Box	1
15.	Examination Light(wall mount)	46
16.	Desk	82
17.	Chair(for doctor)	82
18.	Chair	137
19.	Chair(for patient)	67
20.	Chair(for nurse, etc.)	33
21.	Working Table(for CSSD)	3
22.	Working Table(for bio medical)	1
23.	Meeting Table(Large)	9
24.	Meeting Table(Small)	2
25.	Instrument Cabinet(glass door)	8
26.	Instrument Cabinet(stainless steel)	5
27.	Table(for equipment)	1
28.	Bench	5
29.	Cabinet(steel door)	69
30.	Cabinet(glass door)	2
31.	Cabinet(for medicine)	15

Medical Equipment for the Renovating Parts

(1/1)

No.	Item	Q'ty
3.	PBU	
3.	Infusion Pump	2
4.	Cardiac Monitor	2
6.	Phototherapy Unit	1
7.	Paediatric Cot (Infant Bassinet Stand with Acrylic Cot)	5
8.	Neonatal Ventilator	1
9.	Syringe Pump	2
10.	ECG Monitor	2
11.	Suction Apparatus	5
12.	Incubator	5
13.	Glucometer	2
11.	Gynaecology & Obstetric	
4.	Beds for High Dependency Ward	6
18.	Additional Equipment	
5.	Washing Machine & Dryer (For PBU)	1

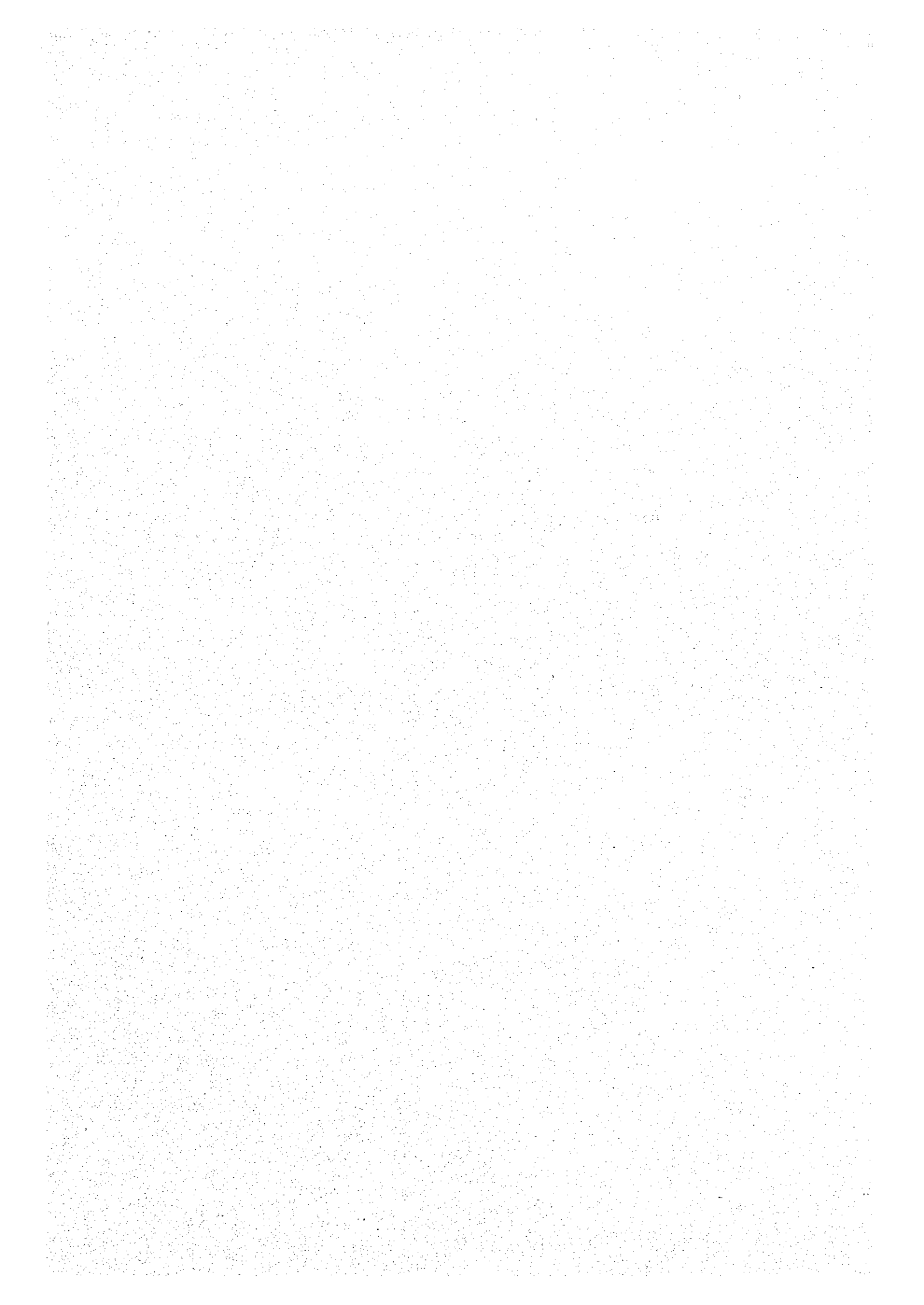
2-3-9 Basic Design Drawings

Table 2-24 Drawing List

No.	Name of Drawings	Scale
1	Site Plan 1	1/2,000
2	Site Plan 2	1/600
3	Foundation, Basement Floor Plan	1/400
4	Ground Floor, 1st Floor Plan	1/400
5	2nd Floor, Roof Plan	1/400
6	Elevation	1/400
7	Section	1/400

Table 2-25 Floor Area Tabulation

	New Building	Renovated Area
Basement Floor	835	0
Ground Floor	2,400	1,325
1st Floor	1,530	1,245
2nd Floor	625	0
Sub Total	5,390 m ²	2,570 m ²
Total		7,960 m ²



PROJECT COMPONENT

PHASE 1

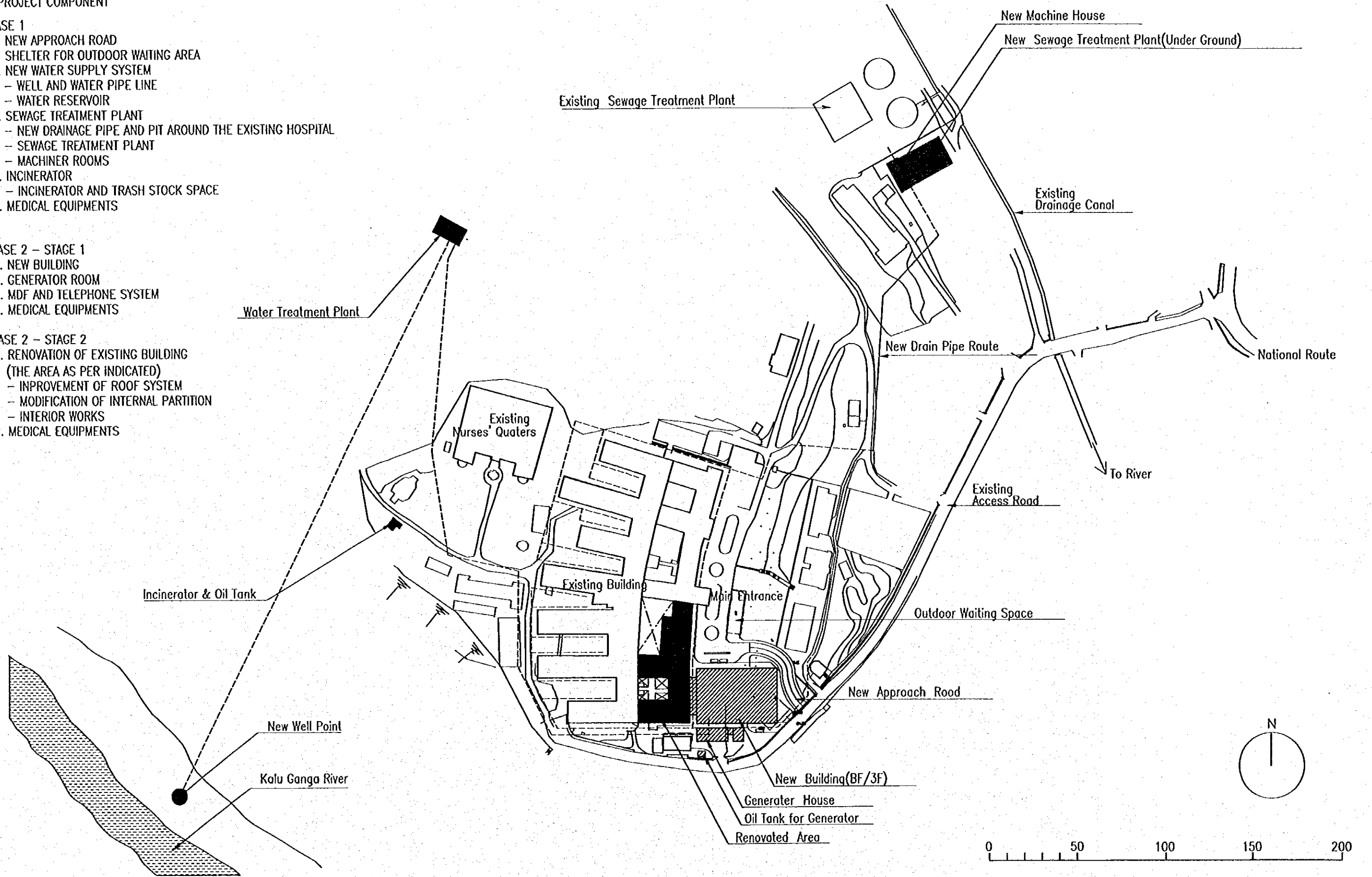
1. NEW APPROACH ROAD
2. SHELTER FOR OUTDOOR WAITING AREA
3. NEW WATER SUPPLY SYSTEM
 - WELL AND WATER PIPE LINE
 - WATER RESERVOIR
4. SEWAGE TREATMENT PLANT
 - NEW DRAINAGE PIPE AND PIT AROUND THE EXISTING HOSPITAL
 - SEWAGE TREATMENT PLANT
 - MACHINER ROOMS
5. INCINERATOR
 - INCINERATOR AND TRASH STOCK SPACE
6. MEDICAL EQUIPMENTS

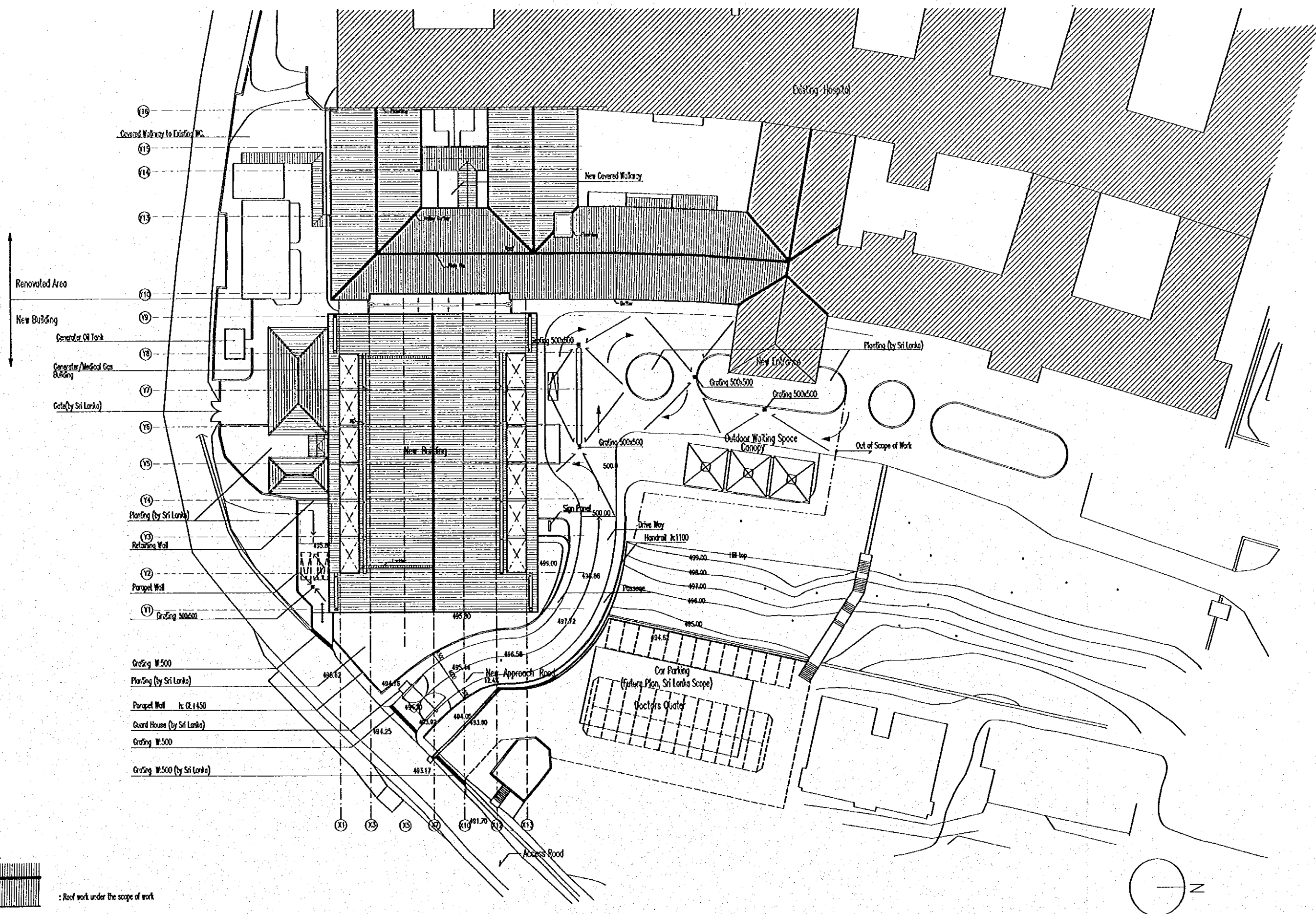
PHASE 2 - STAGE 1

1. NEW BUILDING
2. GENERATOR ROOM
3. MDF AND TELEPHONE SYSTEM
4. MEDICAL EQUIPMENTS

PHASE 2 - STAGE 2

1. RENOVATION OF EXISTING BUILDING
(THE AREA AS PER INDICATED)
 - IMPROVEMENT OF ROOF SYSTEM
 - MODIFICATION OF INTERNAL PARTITION
 - INTERIOR WORKS
2. MEDICAL EQUIPMENTS





Renovated Area

New Building

Generator Oil Tank

Generator/Medical Gas Building

Gate (by Sri Lanka)

Y16

Y15

Y14

Y13

Y12

Y11

Y10

Y9

Y8

Y7

Y6

Y5

Y4

Y3

Y2

Y1

X1

X2

X3

X4

X5

X6

X7



: Roof work under the scope of work

