CHAPTER 2 CONTENTS OF THE PROJECT

2-1 Basic concept of the Project

2-1-1 Objective of the Project

Due to the flood caused by the torrential rain in July 2001, the heaviest rain in the last 80 years, the functions of PIMS (the core agency for providing health services in Pakistan) and the Children's Hospital in charge of medical treatment for children were stopped. Thanks to the temporary rehabilitation works implemented by Pakistan as well as the project of follow-up cooperation implemented by Japan, the functions of the Hospital were partially restored. However, most machines and equipment in the underground machinery room have remained malfunctioning. Moreover, the safety has not been secured in the absence of safety measures to prevent electric shock caused by electric leakage and fire caused by heat generation as well as sudden shutdown of medical equipment.

The objectives of the Project for Rehabilitation of the Children's Hospital Islamabad are to recover the functions of damaged or malfunctioning electrical and mechanical equipment, and to formulate future disaster prevention measures, ultimately restoring the functions of the Hospital. Efforts are to be put within and around the Children's Hospital, and should include the following: the renewal of equipment; replacement of parts; installation of water stopper walls; and improvement of rain drainage pipes.

2-1-2 Examination of the requests from Pakistan

The renewal of medical equipment was included in the requests from Pakistan. The study mission confirmed the intent of the request, and understood that the deterioration of medical equipment that had been delivered 18 years ago through Japan's Grant Aid hindered the provision of adequate medical services to local residents.

The study mission also confirmed the intent of the request for a computer network which had not been procured from Japan but had been used for organizing patients' clinical records in the Hospital. As the server failed to function due to a blackout during the heavy rain, and there were no backup copies of such data, they still have to organize patients' clinical records by hand. Moreover, as the server was used as the main server connecting Islamabad Hospital and the MCH in PIMS, such other facilities also still have problems in organizing patients' records. Although the necessity to recover the Hospital's functions was understandable, this request did not match the objectives of the Project, that is, the rehabilitation from flood damage. Therefore, the study mission decided to

exclude this request from the Project, as in the case of the request for the renewal of medical equipment.

The Pakistan side also requested the installation of a new UPS system, which was included in the Minutes of Discussions (M/D) items as well. However, as a result of analysis, the Survey Team decided to replace only the existing AVR system in the Project. Although the necessity of a new UPS system is acceptable under these social situations where more sophisticated medical services are required compared to 18 years ago when the existing AVR system was installed, a tremendous amount of budget for repairs and renewal of a new UPS system would become necessary for the Pakistan side about ten years after the provision.

Similarly, the installation of a stand-by small generator for pumps to drain out the rainwater, which was one of the items in the mechanical plan, was also included in the M/D items. However, the Survey Team decided not to include this in the Project either. The reason is that it will become possible to take future disaster prevention measures through the installation of concrete walls to act as water-stoppers, the improvement of the rainwater drainage system around the Hospital, and the construction of a bypass from the MCH generator in the project of follow-up cooperation.

The Pakistan side agreed that among the finishing materials and electrical and mechanical equipment, those damaged by deterioration over time should be excluded from the Project. However, equipment damaged by deterioration over time was also included in the Project when the functions within a system consisting of multiple types of equipment require the rehabilitation of the whole system.

As for the future disaster prevention measures, the installation of water stopper walls alone is not sufficient. Therefore, the improvement of rain drainage system around the Children's Hospital should be added to the objectives of the Project.

2-2 Basic design of the requested Japanese assistance

2-2-1 Design policy

The basic design policy of the Project is shown below:

(1) The future flood control measures should be formulated to prevent another case of damage by torrential rain with a similar scale to July 2001 (400 mm rainfall in three hours with the maximum hourly rainfall of 180 mm and the maximum daily rainfall of 620 mm).

(2) As construction works will be carried out during the operating hours of the Children's Hospital, the priority must be given to maintaining and securing the functions of the Hospital, based on a plan to shorten the construction period while taking into account safety measures.

(3) The size and specifications of electrical as well as mechanical equipment to be rehabilitated should be basically similar to the former ones before the disaster.

(4) As for the rehabilitation of electrical and mechanical equipment, the priority should be given to the replacement of parts that had failed or deteriorated due to the disaster; however, in the case when the number of parts to be replaced is large, or when it is desirable to replace for the safety, the whole equipment should be replaced.

(5) When the rehabilitation of damaged equipment alone is not enough for the recovery of the whole system due to the deterioration with time, the rehabilitation of other equipment should be included in the Project.

(6) When designing the facility installation plan, the rain drainage route should be taken into account

2-2-2 Basic plan

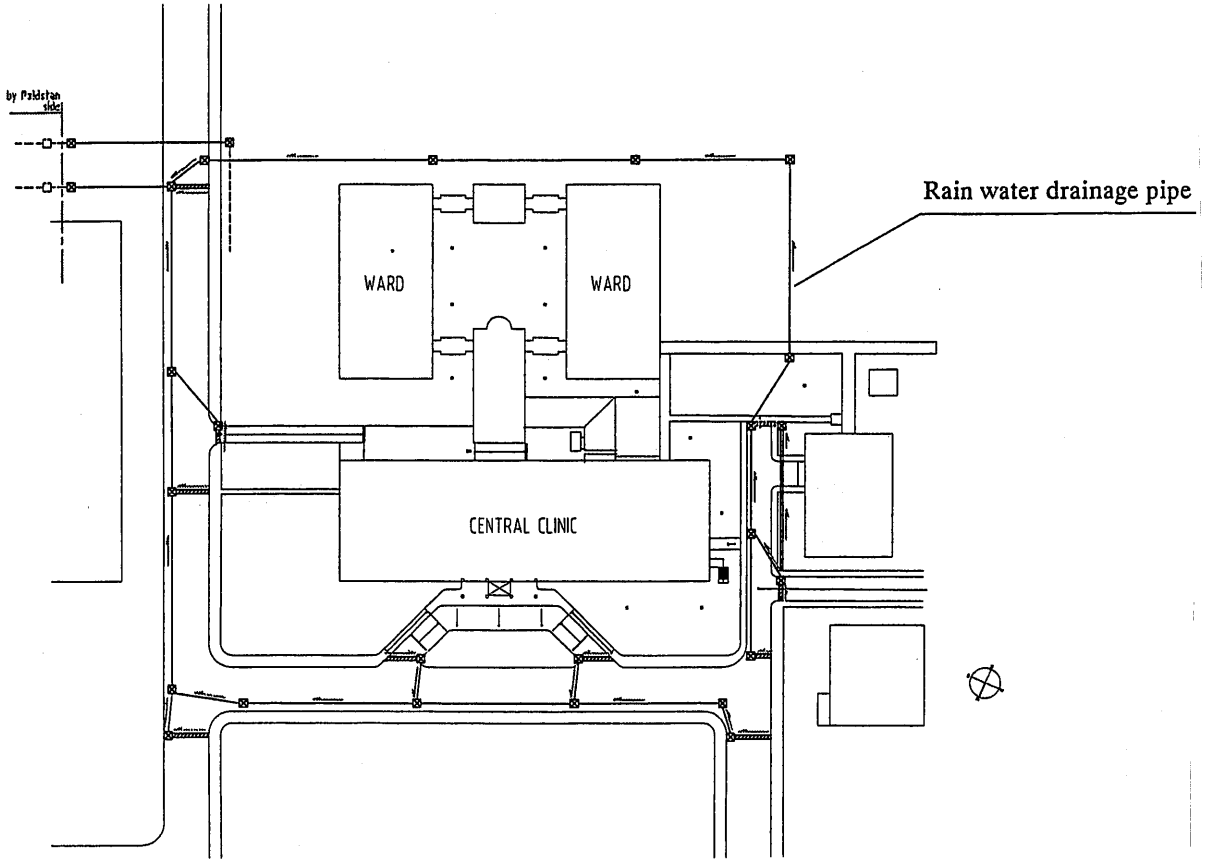
A. Architectural Plan

a. Improvement of rain drainage system around the Children's Hospital

According to the PIMS drawings, the diameter of the drainage pipes within the sites of the Children's Hospital should be 300 mm. However, the survey results show that it measures 200 mm. Moreover, due to insufficient cleaning of these pipes, the drainage capacity has been reduced. Therefore, this rain drainage system seems not to have functioned properly at the time of the heavy rain.

As drainage pipes for the outside area of the Children's Hospital are running within the site, water gushing out from these pits flowed into the site. Therefore, the drainage pipes should be divided at the location of the existing pits (on the east side of the park) into those for outside the site and those for within the site. The storm water will flow down a bypass to be constructed along the outside road on the east side of MCH to a brook that is running in parallel with the outside road. On the other hand, the storm water of the west road will flow down to the south because of the gradient, along a trench under the connecting corridor to the Isolation Ward of the Children's Hospital. Then, via the southern part of the wards, the storm water will flow down a bypass along the east road to the brook, as on the east side. For this purpose, large-scale side gutters and pits should be newly constructed.

Figure 2-1 Water drainage plan



On July 23, 2001, in three hours from 11 am to 14 pm, the rainfall measured 400 mm, and the maximum hourly rainfall was 180 mm.

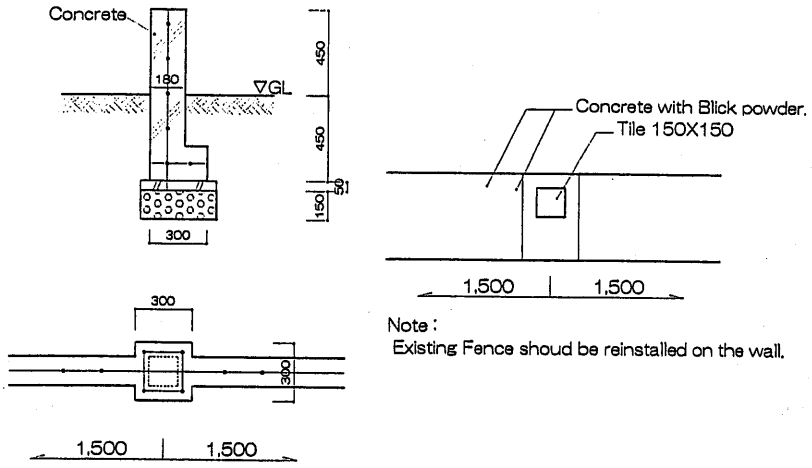
The catchment area around the Children's Hospital, including the roads and parking lots, is 24,100m^2, and the green area including lawn is 51,000m^2. Using the coefficient of discharge, the volume of flowing water is calculated as 2.20m^3/sec. Assuming that the channel gradient of the drainage pipes is 1.5%, the diameter of the pipes can be calculated as approximately 1.2 meters. It is impossible to close the road during the improvement work of the rain drainage system; either lane must be available. As a water-stopper wall will be also constructed, the diameter of pipes should be 800 mm, and increased to 1,200 mm from the junction of east and west bypasses. In order to deal with the overflow, it is desirable to utilize a road surface as a surface drainage canal. Although it is preferable to improve the rain drainage system of PIMS as a whole, the scope of the Project is limited to the rehabilitation work around the Children's Hospital, and the financial budget is also limited. Therefore, it has been decided to carry out the above-mentioned improvement work to install pipes with a diameter of 800 mm, which seems to be enough for drainage. This will make cleaning easier, even allowing staff members at PIMS and

the Children's Hospital handle the maintenance work.

b. Installation of a concrete water-stopper wall at the boundary of the access road around the Clinic Ward of the Children's Hospital

At the time of the heavy rain in 2001, storm water pouring in the PIMS site turned the on-premises road into a river. As the site of the Children's Hospital was at a lower level than the surrounding areas, the building was flooded by the water overflowing from the road. In particular, the underground service yard with an open structure was flooded by water from the upper floors as well as from the perimeter. Therefore, it has been decided to install a concrete water-stopper wall at the road boundary around the Clinic Ward of the Children's Hospital, and around the underground service yard. According to the explanation given by PIMS, the height of the flood water reached 30 cm. As a result of the discussion, the height of the water-stopper wall was set to 45 cm.

Figure 2-2 Water stopper wall



The existing fences will be removed but re-installed on the new water-stopper wall. If the walls are installed around the site, they may function as water-stopper walls. However, these walls may give patients the impression of being closed in. Therefore, in order to mitigate any oppressive feeling and to feature the adorableness of the Children's Hospital, brick powder should be mixed with concrete to resemble the color of exterior brick walls, and tile should be laid one by one to a 1.5-m pitch.

As a flood control measure for the roads used by people and vehicles, it has been planned to pile sandbags on the existing banks temporarily at times of disaster.

c. Change in the floor level of the entrance driveway

To ensure the smooth movement of stretchers and wheel chairs, there had been no bumps at the entrance. However, at the time of the heavy rain, this resulted in extensive flooding. Therefore, it has been planned to create a 150-mm bump by cutting the asphalt pavement, and to provide a ramp for stretchers and wheelchairs. In order to collect storm water efficiently, the pits will be improved to side gutters.

d. Relocation of the electrical room and generator room to the floor above the parking lots

As future flood control measures, the electrical room and generator room will be relocated to a higher place. Although the floor area of each room will decrease from 50 m^2 to 40 m^2, this will not hinder the layout of the equipment. One of the old rooms will be renovated into a technical staff room, and another into a workshop.

e. Exchange of joint fillers of PH doors, windows, and expand joints on the roof

Due to the deterioration of the joint fillers, storm water has been flowing into the building and damaging interior finishes. Therefore, the damaged interior finishes will be replaced, including the ceiling boards (made of Japanese materials). Although Pakistan had requested the replacement of all doors, windows, and finishing hardware, the target was narrowed down according to the objectives of the Project.

f. Exchange of the vinyl floor sheet in the Operating Rooms (ground, first floor)

The deterioration of the floors interfered with medical practice in the Operating Room. Moreover, in order to protect the patients from infection, it was necessary to replace the floors. Therefore, the floors (made of Japanese materials) of the Operating Room, including operating halls, will be replaced. Though this does not directly fall within the objectives of the Project, the Operating Room, being one of the key functions of the hospital, requires expeditious rehabilitation.

g. Change of the existing door to a window at a west corridor

As the building was flooded by storm water at the time of the disaster, the door that is not currently used will be closed, and a spandrel wall will be installed with a window on the upper part.

B. Electrical Plan

a. Replacement of power receiving system and removal of old ones

(1) Location of new incoming & main distribution board to be at basement floor at a corner of Parking area.

- Level of Panel is about 1.2 meters higher than existing place.
- It is located near control room.
- Cable connection work to existing cable will be able to complete in a short time.
- Installation of panel & maintenance is easy.

(2) Incoming cable

- New incoming cable is connected to existing cable in constructed outdoor manhole.
- New incoming cable under the road alongside the building is connected to new incoming panel.
- Scope of work of incoming cable is done by Japanese side.

(3) Specification of equipment (basically the same as existing one)

- When normal power is out, the Generator supplies the emergency load to the Children's Hospital automatically.
- The Generator can supply other load if total load being used in Children's Hospital at that time or seasons below its capacity.

b. Replacement of generator and removal of old one

(1) Location of the Generator to be at a corner of Parking area on basement floor for the same reason as that for Incoming Equipment.

(2) Specification

- Engine: Diesel Engine, because diesel is the normal standard and maintenance is easy
- Starting method: by Battery
- Capacity: 500KVA, same as MCH

(3) Integration of system

- Starting of generator: Automatic starting at electrical power-outage
- Circuit system: To have interdependence between Children's Hospital and Maternal and Child Health Center in case of electrical power-outage at either facility.

c. Replacement of AVR and removal of old one

(1) Location of AVR Equipment to be at a corner of Parking area on basement floor for the same reason as for that of Incoming Equipment.

(2) Specification
- Capacity to be 100KVA, because the maximum capacity for using is 97KVA.

(3) Integration of system
- Circuit system: Same as the existing AVR to supply important load.

d. Cable work accompanied by the relocation of power receiving system

(1) Method of cable connection from new main distribution boards (MDB) to existing cable

For reducing the cabling work of connecting to existing cable, the Connection box for cable termination is installed near the above-mentioned existing MDB.

(2) How to remove existing cables with poor insulation
- Cable route is the same as for the existing cable.
- Cabling to be done without conduit in suspending ceiling, because ceiling has conduit existing.
- If it is impossible to remove the existing cable, it is important tomake sure this cable can not be used.

e. Installation of a new drainage pump board with accompanying cable work

(1) Panel to be installed in a high position in basement floor parking area, 1.2 meters higher than present place
(2) Cabling to be done on existing cable tray

f. Installation of a power control board with accompanying secondary wiring work

(1) Installation of new Power Control Panels
- New Control Power Panels are C-BM-1, C-BM-2, S-BM-1.
- New Control Power Panels are located in the present places to reduce construction work. They are near the control room for easy maintenance, and placed as high as possible.

(2) Secondary cabling to be done on cable tray (or in steel conduit) as flood and safety counter plan

C. Mechanical Plan

a. Repairing of air-conditioning system

(1) Steam Boiler: 2 Sets

- Main body of boiler can be cleaned & re-used, and main accessories for associated equipment for the Boiler shall be replaced.

(2) Air Handling Unit: 25 Sets

1) Flood damaged 5 AHU sets, repair as follows:

- Replace Fan Motor & Fan
- Replace Pre-filter
- Replace Medium air filter
- Clean Fin-coil
- Paint Drain pan
- Replace internal Insulating material

2) A total of 20 AHU sets which had no flood damage have deteriorated over time. For improvement of overall A/C system, repair as follows:

- Replace Pre-filter
- Replace Medium air filter
- Clean Fin-coil
- Paint Drain pan
- Replace internal Insulating material

(3) Center Monitoring Control Panel: 1 Lot

Control equipment of Main plant room and Local control panel is not functioning due to flood damage, so is planned to be renewed. Center Monitoring Control Panel was planned to be renewed at the time of follow-up cooperation, but already power supply was recovered, running at approximately 20% of normal condition using remote control operation. In this Project, the spare parts will be replaced.

1) Plant room Equipment control

- AC heat source Control System: As the following control system is malfunctioning, it is planned to be replaced along with the Control equipment, piping and wiring.
- Pump step control (For Chilled water & Hot water)
- Temperature control (For Hot water & Domestic hot water)
- Cooling tower temperature control
- AHU Control System: As the following control system is malfunctioning, it is planned to be replaced along with the Control equipment, piping and wiring.

- Fresh air intake damper control (warming-up control)
- Chilled water & Hot water control
- Humidity control
- Filter clog alarm

2) Local control panel

Two Control panel sets are malfunctioning due to flood damage, therefore need to be replaced.

3) Center Monitoring Control Panel

Some parts (Incl. Relay, display lamp & push button etc.) should be replaced and wire connection terminal should be cleaned.

(4) Auto filter & dust vacuum collection system: 1 Lot

1) Main equipment, such as Control panel, Blower, Bag-filter, etc., and control panel for AHU, Gear motor, Pre-filter, suction nozzle & vacuum hose are all entirely malfunctioning due to flood and therefore need to be replaced.

2) Pre-filter, central vacuum hose and gear motor for AHU accessories above the ground deteriorated over time, so also need to be replaced, in order to recover the system.

3) Electric 2-way valve is operable at this moment.

b. Replacement of air-conditioning system

(1) Chiller: 2 sets

Steam condensate pipe is leaking due to pipe corrosion. As a tentative measure the Hospital maintenance engineers tried to repair it by themselves, but in vain because of lack of a solution absorption pump, refrigerant pump, control panel and other control-equipment spare parts. Chillers are not in operation at this moment.

In addition to the above, other than the main equipment and numerous spare parts, the inner surface of the heat exchanger tube should be replaced or flushing should be carried out, as Chiller operation may be stopped due to main part trouble in the near future.

(2) Pumps: 15 Sets

Damaged pumps are the condenser water pump, chilled water pump, hot water pump and boiler feed water pump. Motor insides are rusty and pump insides are stuck due to corrosion. Also bearing was not rotating, therefore needed to be fully replaced. When renewing pump, replacement of valve, rubber type flexible

joint and pipe shall also be done.

(3) Cooling tower: 2 Sets

It was checked and confirmed at the time of follow-up cooperation that the scale factor in raw water (supply water) was sticking inside the Cooling tower to a great extent. Performance of the fan inside the Cooling tower was reduced due to deterioration. Replacement of the filter was considered but it was not possible to procure the materials in Pakistan. They were not available in Japan either, because this product is no longer manufactured. Therefore, replacement is required.

(4) Fan: 4 Sets

At the time of flood, the fan motors were fully flooded by the water. They remain out of operation due to rust, therefore need to be replaced.

c. Repairing of medical gas supply system

Tentative measures were carried out by replacement of solenoid valve, pulley and refrigerant gas charge for dryer by the project of follow-up cooperation. However, main equipment totally deteriorated by age and some equipment was malfunctioning, therefore required replacement.

d. Replacement of sanitary equipment

(1) Domestic hot water pump: 2 Sets

Pumps were flooded by the water and not functioning at all due to rust, therefore need to be replaced.

(2) Foal water drainage & Rainwater drainage Pump: 15 Sets

Original plan was to install 2 sets of each to achieve automatic alternative operation for rainwater drainage pump, Foal water drainage pump & Soil water drainage pump. But at this moment, only one pump was running for each service due to deterioration over time. One Soil water drainage pump out of two is operable. 15 Sets of Waste water pumps (submersible type) installed (including inside trench) are forecasted to malfunction in the near future due to deterioration over time, therefore need to be replaced. When replacing valve, flexible joint and pipe shall also be replaced.

e. Conversion of the existing oil tank into a storm adjustment tank with rainwater pump

In consequence of renewal of engine generator, Oil tank (which is no longer required) at basement dry area shall be removed, and remaining concrete structure shall be reused as water flow control pit ($15m^3$) to achieve the improvement of drainage capacity. Above-mentioned work includes removal of the oil from the oil storage tank, treatment for neutralization, chipping the dry area floor, and moving out the oil storage tank.

f. Installation of air conditioning unit in the Accident Emergency Department (nurse station, doctors' room, waiting room)

After completion of follow-up cooperation project, PIMS required additional installation of air-conditioning units in three Emergency Division rooms (doctor's room, nurse station & waiting area) for off-season and night-time operation. As this objective complies with the one in follow-up cooperation project, this is included in this plan.

g. Installation of air conditioning system in the Radiology Department (control room, dark room, staff viewing room)

After completion of follow-up cooperation project, PIMS required additional installation of air-conditioning units in three Radiology Division rooms (control room, dark station & staff room). As this objective complies with the one in follow-up cooperation project, this is included in this plan, as in f).

h. Provision of high performance filters

Although HEPA filters are not the parts damaged by flood, they are used to keep spaces highly clean, and therefore should be provided as a matter of urgency to prevent in-hospital & medication item infection.

i. Repairing of external yard rainwater drainage system

In order to reduce the storm flow ratio of existing rainwater pipe load at north area of hospital yard, renovation plan is as follows:

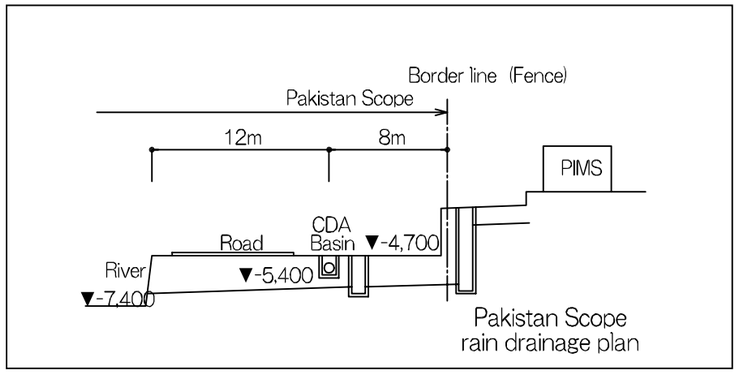
- Modify and re-route the existing pump-up drain pipe (2 lines) and connect to east side rainwater catch basin.
- Newly install pump-up drain pipe and connect to east side rainwater catch basin.

2-2-3 Basic Design Drawings

A. Architectural Plan
   a. Improvement of rain drainage system around Children's Hospital
   b. Installation of a concrete water-stopper wall at the boundary of the access road around the Clinical Ward of the Children's Hospital
   c. Change in the floor level of the entrance driveway
   d. Relocation of the electrical room and generator room to the floor above the parking lots
   e. Exchange of joint fillers of penthouse doors, windows, and expand joints on the roof
   f. Exchange of the vinyl floor sheet in the Operating Rooms (GF and 1F)
   g. Change of the existing door to a window at a west corridor

B. Electrical Plan
   a. Replacement of power receiving system and removal of old ones
   b. Replacement of generator and removal of old one
   c. Replacement of AVR and removal of old one
   d. Cable work accompanied by the relocation of power receiving system
   e. Installation of a new drainage pump board with accompanying cable work
   f. Installation of a power control board with accompanying secondary wiring work

C. Mechanical Plan
   a. Repairing of air conditioning system
   b. Replacement of air conditioning system
   c. Repairing of medical gas supply system
   d. Replacement of sanitary equipment
   e. Conversion of the existing oil tank into a storm adjustment tank with rainwater pump
   f. Installation of air conditioning unit in the Accident Emergency Department (nurse station, doctors' room, waiting room)
   g. Installation of air conditioning system in the Radiology Department (control room, dark room, staff viewing room)
   h. Provision of high performance filters
   i. Repairing of external yard rainwater drainage system



Existing Pipe

Pakistan Scope
outside PIMS.

A. a

A. a

Basin

Building drainage

GUTTER

MOTHER BLK.

A. a

WARD (E)

WARD (W)

Building drainage

OUT PATIENT
DEPARTMENT

CONNECTING CORRIDOR

SERVICE BLK.

A. b

A. a

A. a

TREAT.PLANT

PIMS
SERVICE BLK.

A. a

RAMP WAY

SERVICE YARD

RAIN WATER RESERVER

Building drainage

ISOLATION BLK.

GUTTER

GUTTER

CENTRAL CLINIC BLK.

BASIN

A. a

A. b

A. c

SIDE WALK

SERVICE BLK.

ISLAMABAD
HOSPITAL

ROAD

A. a

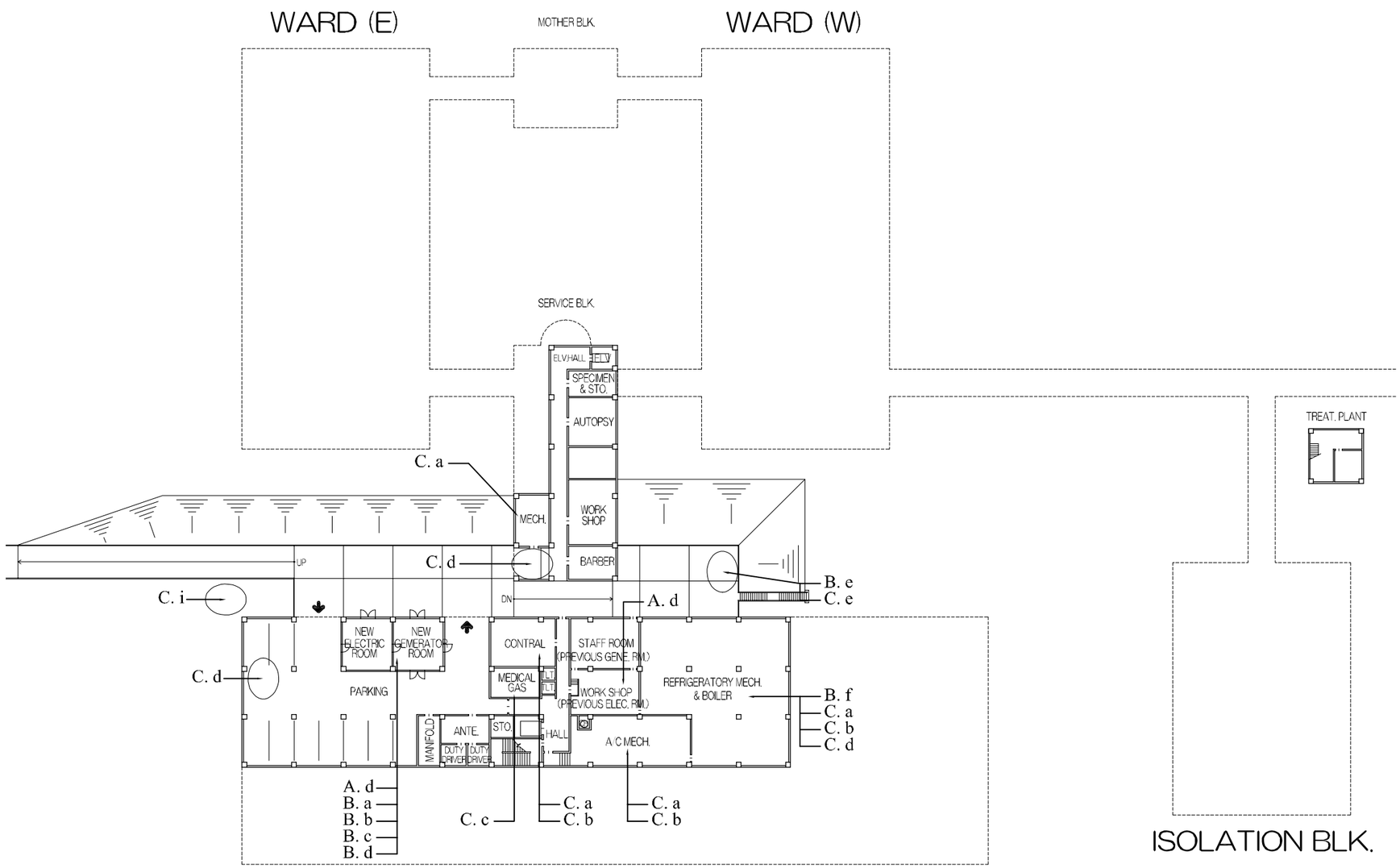
SIDE WALK

GUTTER

Legend

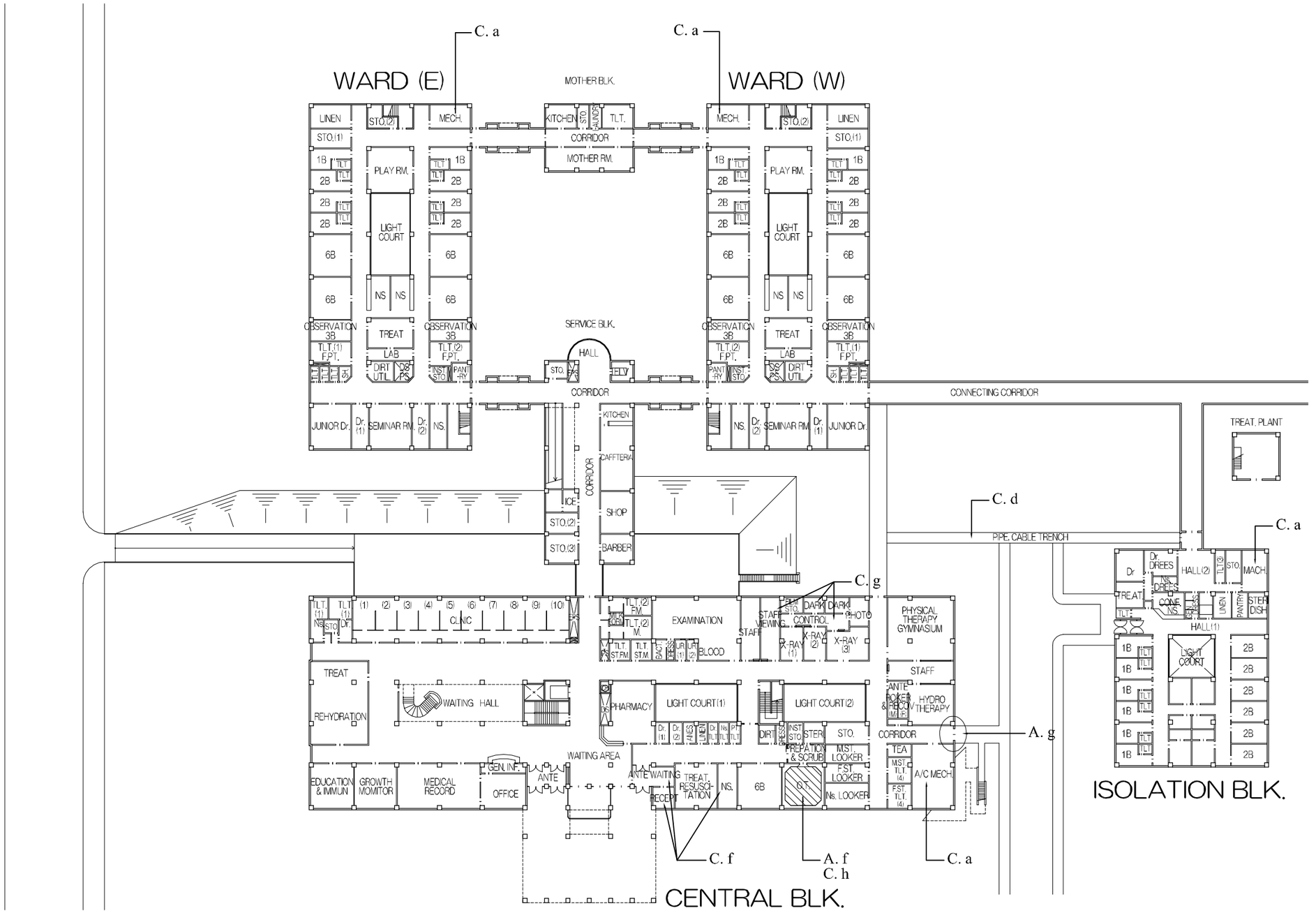
- New drainage pipe
- Existing drainage pipe
- New basin
- Existing basin

Site plan S=1/900

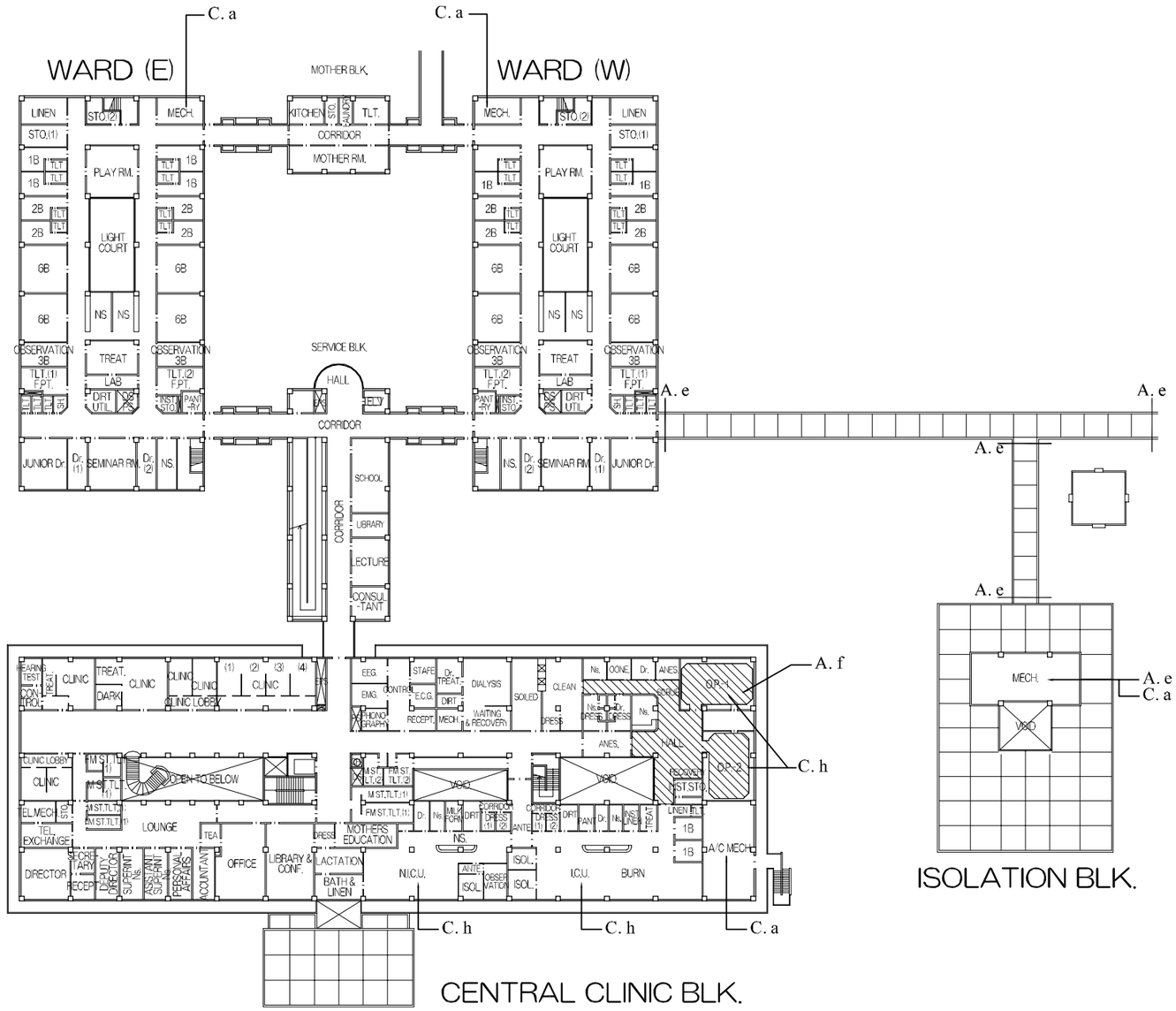


CENTRAL CLINIC BLK.

Basement floor plan S=1/600



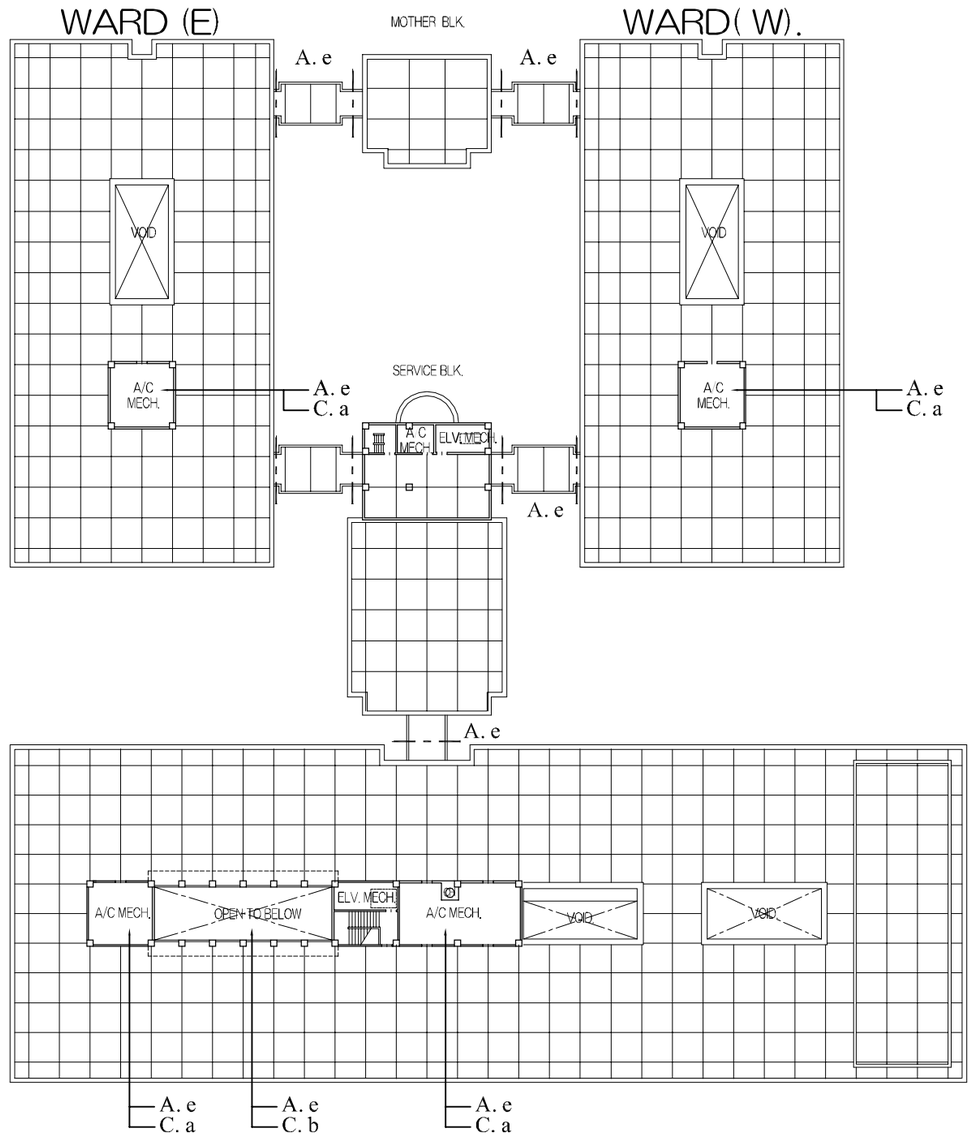
Ground floor plan S=1/600



CENTRAL CLINIC BLK.

ISOLATION BLK.

1st floor plan S=1/600



Roof floor plan S=1/600

A. d. Relocation of Electrical room
and Generator room

New Generator room ・ Electrical room

Structure Concreter block

EXT.finishing C.C.Trowel finish, paited
INT.finishing Floor Existing
Base C.C.trowel finish
H=200
Wall C.C.Trowel finish
Generator R.
Glass wool D 50
Ceiling Existing
Windows & doors
Aluminum louvered window
W2000×H3200×1
W1600×H3200×2
Sound proof steel door
W2600×H2800×1
W900×H2000×1
Steel door
W2600×H2800×1
W900×H2000×2
W1300×H2600×1
W700×H2000×2

Repair work

Generator R.→Staff R.
Floor Removal of Base、Pit concrete buries
Base Existing
Wall Existing AEP repainted
Ceiling H=2500
VP

Removal
Steel door W1800×H2500×1
Aluminum Louvered window
W1200×H3500×1
W1800×H1800×1

Steel door W1800×H2500×1
Aluminum window
W1200×H1500×1
W1800×H1500×1

Electrical R.→Workshop
Floor Removal of Base
Base Existing
Wall Existing AEP
Ceiling Existing

A. e. EXT. window & door(PH) Reinstallation of Sealant

(CENTRAL CLINIC BLK.)

No.	Q'ty	W	H
AW-8	12	2,280	2,190
AG-1	1	5,200	1,350
AG-4	2	2,200	2,500
AG-5	2	2,200	1,100
AG-10	2	1,600	2,000
AG-11	1	1,500	1,350
AG-12	1	1,400	2,000
AG-13	1	1,400	1,300
AG-16	1	500	500
SD-51B	12	1,600	2,000
SD-52B	1	900	2,000
SD-55B	1	1,600	1,350

NOTE: SD-52B Should be exchanged

(EAST WARD BLK.)

No.	Q'ty	W	H
AG-1	2	600	1,800
SD-51A	1	1,600	1,800

(WEST WARD BLK.)

No.	Q'ty	W	H
AG-1	2	600	1,800
SD-51A	1	1,600	1,800

(SURVICE BLK.)

No.	Q'ty	W	H
AG-3	1	450	450
AG-4	1	600	1,200
SD-52A	2	900	1,850
SD-56	1	600	600
SD-57	1	800	1,850

(ISOLATION WARD BLK.)

No.	Q'ty	W	H
AG-6	1	1,000	1,000
AG-7	1	1,500	1,000
AG-8	1	800	1,600
SD-54A	1	1,600	1,600

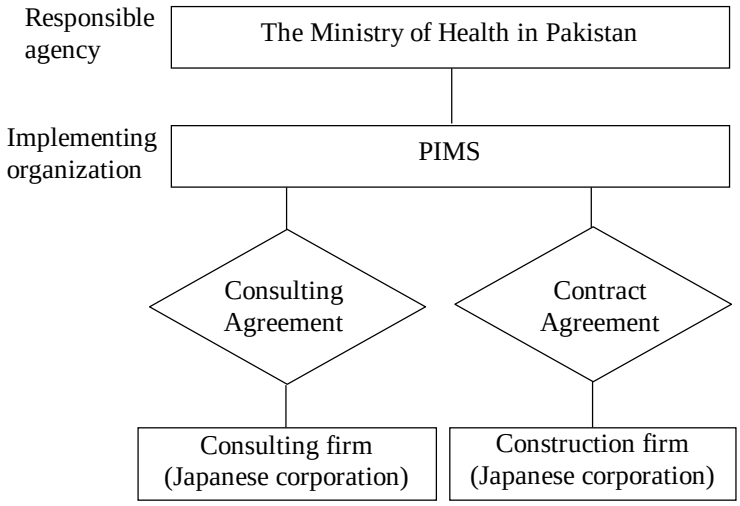
2-2-4 Implementation/ Procurement Plan

2-2-4-1 Implementation/ Procurement Policy

(1) Implementation system

After the approval at the Cabinet meeting in Japan, the Exchange of Notes (E/N) on the Project will be concluded between the Government of Japan and the Government of Pakistan. Consequently, the Project will be implemented according to Japan's grant aid scheme and procedures. The implementation system of this Project is shown in Figure 3-3.

Figure 2-3 Implementation System of the Project



In this Project, the Ministry of Health in Pakistan is responsible for its implementation, while PIMS is in charge of the actual implementation. The Children's Hospital is one of the PIMS facilities. PIMS enters into a Consulting Agreement and Contract Agreement on the Project, and implements the works assigned to the Pakistan side. Moreover, PIMS examines the tender documents (including detailed design drawings and specifications) and inspects construction works.

(2) Consultant

After the conclusion of the Exchange of Notes, PIMS enters into the Consulting Agreement, regarding the preparation of detailed design drawings and the surveillance of the work, with a consulting firm (Japanese corporation), and should obtain the certification from the Government of Japan. For the smooth implementation of the Project, it is important to conclude the Consulting Agreement immediately after the

conclusion of the Exchange of Notes. After the signing of the Agreement, a consultant will prepare the detailed design drawings and specifications based on the report of the basic design study on the Project, and obtain the approval of PIMS. Based on the detailed design drawings and specifications, a consultant will undertake the tendering procedure and proceed with the surveillance of the work.

(3) Contractor

A contractor will be selected from among the eligible Japanese corporations through open competitive bidding based on pre-qualification assessment. PIMS enters into a Contract Agreement with a selected contractor, and should obtain the certification from the Government of Japan. Then, based on the Contract, the construction work will be carried out.

(4) Utilization of local construction firms and dispatch of Japanese technical staff

In general, a Japanese contractor employs local construction firms for the implementation of construction works. There is no problem in carrying out construction work using local construction methods if the work is managed properly and substantial guidance is provided. However, it is necessary to dispatch Japanese technical staff when electrical and mechanical work requires sophisticated precision for the functions of the Hospital.

2-2-4-2 Scope of work

As mentioned in the Minutes, the scope of work is divided between the Japan side and the Pakistan side as shown below.

Table 2-1 Scope of Work

The Japan side	The Pakistan side
Included in the basic plan: A. Architectural work B. Electrical work C. Mechanical work	A. Installation work of drainage pipes under the PIMS site boundary to the brook

2-2-4-3 Consultant supervision

PIMS and a Japanese consulting firm enter into a Consulting Agreement, to prepare detailed designs and to implement the surveillance of work.

A consultant implements the surveillance of work for the following purposes: (i) to confirm whether the construction work is carried out according to the drawings and specifications; (ii) to ensure the appropriate implementation of contracted work; and (iii) to enhance the quality through guidance, advice, and coordination among various works from the standpoint of fairness. The surveillance of work includes the following tasks:

(1) Cooperation in tendering and signing contract

- To prepare tender documents required for the selection of contractors for construction work and equipment work
- To carry out the following activities for tendering: announcement of tender; acceptance of application for tender; pre-qualification; explanatory meeting; issuance of tender documents; acceptance of tender documents; and evaluation of bids
- To provide advice on the conclusion of the Contract Agreement between PIMS and a successful tenderer

(2) Guidance, advice, and coordination for a contractor

- To check the working schedule, working procedure, procurement plan for machinery and materials, and installation plan
- To provide guidance and advice to a contractor based on the above checks, and coordinate the work

(3) Examination and approval of working plans and shop drawings

- To examine the documents, including working plans and shop drawings, submitted by a contractor, and approve these documents with the necessary instructions

(4) Confirmation and approval of construction machinery and materials and medical equipment

- To confirm the conformity between the contract documents and construction machinery and materials to be procured by a contractor, and approve the procurement

(5) Inspection of work

- To attend, if necessary, the inspection of work at a factory where electrical and mechanical equipment is manufactured in order to confirm that quality and performance are ensured

(6) Report on the progress of work

- To confirm the progress of work at the construction site, and inform the related agencies in both countries of the progress of the work

(7) Inspection for final handing-over and test run

- To inspect the completed construction work and electrical and mechanical work, and make a test run, in order to confirm that the performance is as specified in the contract documents
- To submit the document showing the completion of tests to the Pakistan side

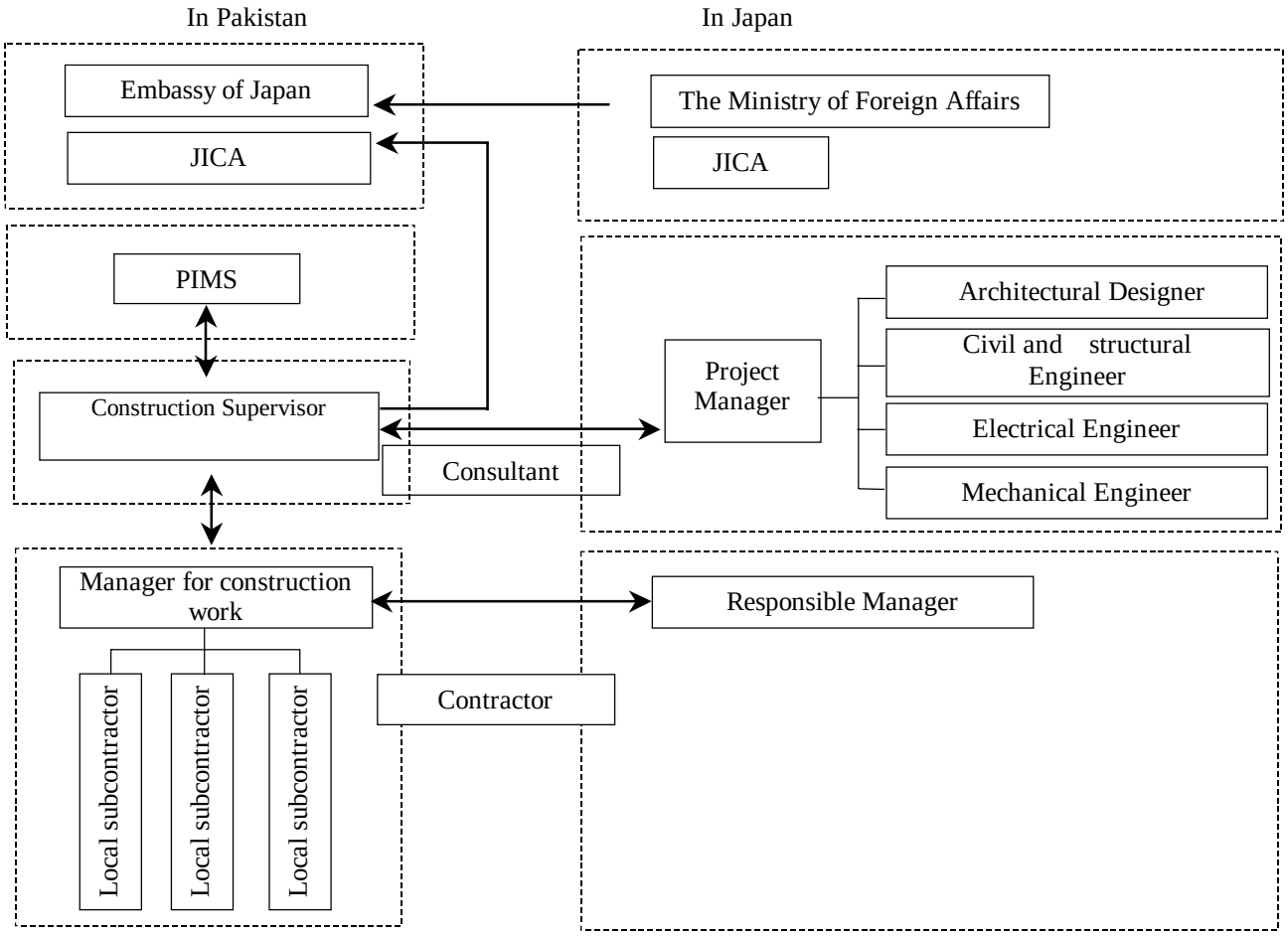
(8) System of supervision of work

When implementing the above-mentioned tasks, a consultant may place one supervisor based on the size of the Project. This supervisor is going to be stationed at the site all the time during the Project. A consultant may dispatch technical staff (specialized both in electrical and mechanical equipment) around the midway of the Project in accordance with the progress of work, and carry out the necessary consultation, inspection, guidance, and coordination. Technical staff should be stationed in an office in Japan as well, serving as a liaison office, thus establishing a back-up system. They will provide assistance for examining the preparation of working plans, working procedures, and shop drawings, and inspect factory products to be procured from Japan.

Moreover, a consultant should inform the related Japanese Government agencies of the necessary matters regarding the Project, such as the progress of work, the payment procedure, and the final hand-over.

The system of supervision of work is shown in Figure 2-4.

Figure 2-4 System of Supervision of Work (draft)



2-2-4-4 Quality control plan

The electrical and mechanical service in the Project will include the renewal and replacement of equipment, and the connection to the existing equipment. Needless to say, it is important to confirm the function and performance of equipment after the work; however, it is also important to do this for each system during the work. For this purpose, a checklist should be prepared for the inspection before the work as well as for the confirmation during and after the work. Such records should be retained and used for developing a maintenance plan after the final hand-over.

In architectural work, concrete is used to make pits, side gutters, and cut-off walls, but not as structural materials. However, both pits and gutters are large-scale underground structures made of concrete produced by an in-site batcher. Thus, it is necessary to carry out the following quality control procedures.

(1) Confirmation of concrete materials

Material	Items for quality control	Inspection method
Cement Sand, sand and gravel, crushed stone	Heat of hydration Grading Specific gravity in absolute dry condition Alkali-aggregate reaction Organic impurities	Confirmation of the heat of dissolution Sieving Specific gravity test and water absorption test Alkali-aggregate reaction test Water quality test

(2) Inspection at the time of preliminary mixing

Items for quality control	Inspection method
Estimation test on the concrete of the structure Slump Temperature of concrete Air content Chloride content	Measurement by a compression tester Measurement by a slump cone Measurement by a thermometer Measurement by a dynamometer Measurement by a salinometer

<Note> Inspection of other materials with the same specifications can be omitted.

(3) Inspection before concrete placement (one time/day)

Items for quality control	Inspection method
The period from mixing to placement Slump Temperature of concrete Air content Chloride content	Checking the completion time of mixing Measurement by slump cone Measurement by thermometer Measurement by dynamometer Measurement by salinometer

(4) Inspection of precision of concrete

Items for quality control	Inspection method
Estimation test on concrete of the structure Condition of finished surfaces	Measurement by compression tester Visual inspection

For asphalt pavement, the compaction and the depth of the pavement should be confirmed according to a core sample from each section.

2-2-4-5 Procurement plan

(1) Local procurement

In order to facilitate repair, maintenance, and management after the completion of work, machinery and materials to be used in the work should be procured locally as much as possible. It is necessary to confirm the quality and the amount of supply during the work, in order not to hinder the progress of the work. When imported machinery and materials are available in the domestic market (i.e. they are constantly on the market without requiring import procedures), they are regarded as locally procured goods.

(2) Procurement by import

Among machinery and materials of the existing facilities, those procured from Japan requiring unified design and/or replacement of parts should be procured from Japan. Moreover, when machinery and materials are not available through local procurement, or do not fulfill the quality standards, or the amount of supply is insufficient, they should be procured from Japan or a third country. In such a case, it is necessary for a contractor to make contact with PIMS regarding import procedures, thereby ensuring a smooth customs clearance. When the price of goods procured from Japan or a third country, including packing and transportation fees, is lower than the purchase price in Pakistan, the goods should be procured from Japan or a third country. In this Project, procurement from a third country is excluded from the plan.

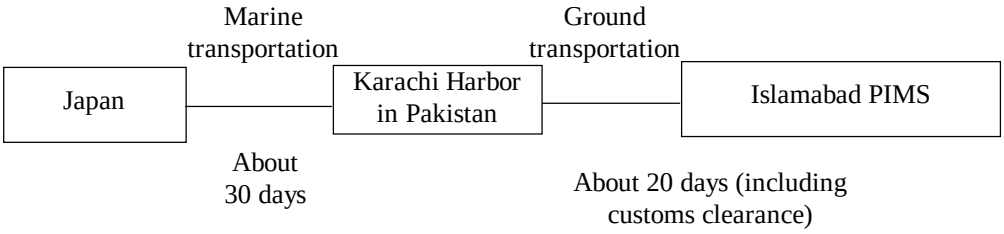
(3) Transportation plan

Machinery and materials procured from Japan will be transported by sea to Karachi Harbor in Pakistan, then to the PIMS site (about 1,500km) by inland transportation.

In marine transportation, container carriers sail quite frequently according to a precise sailing schedule. However, the transportation cost for Pakistan is high. Therefore, it is desirable to use bulk carriers in this Project, when considering the content of cargoes. Bulk carriers sail once in a month, and as ports of call change on route according to cargoes, the date of calling at Japanese ports is not definite. Though it takes about 30 days for marine transportation, it is necessary to allow additional days for waiting for a port of call as well as days for changing ports of call until arriving at Karachi Harbor. It takes about 14 to 18 days for unloading and customs clearance at Karachi Harbor (the whole procedure from submission of documents to completion), and about three to five

days for ground transportation from Karachi Harbor to Islamabad. Moreover, it takes about two weeks for packaging and customs clearance in Japan.

Figure 2-5 Flow of Transportation and Days Required



2 weeks for waiting for a port of call
2 weeks for packaging and customs clearance

Based on the procurement plan in Figure 2-5, machinery and materials used in the Project are classified into two categories: local procurement and procurement from Japan, as shown in the following table.

Table 2-2 Procurement Plan for Major Machinery and Materials

(i) Construction work

Type of work	Material	Local	A third country	Japan	Notes
Reinforced concrete work	Cement	○			
	Aggregate	○			
	Deformed bar	○			
	Forms	○			
Masonry work	Concrete blocks	○			
Waterproofing work	Sealing			○	As the quality of local goods is unsatisfactory, PIMS also wants to procure goods from Japan.
Tile work	Tile	○			
Metal work	Light-Gauge Steel (LGS) components	○			
Main pipe work	Mortar	○			
Finishing builders' hardware work	Aluminum sash			○	Goods procured from Japan have been used for the existing facilities. The quality of local goods is unsatisfactory.
	Steel sash			○	Same as above.
Glazing work	Glass	○			
Painting work	Interior paint	○			
	Exterior paint	○			
Interior finishing work	Gypsum wallboard			○	Replacement of the existing one
	Asbestos acoustic board			○	Replacement of the existing one
	Glass wool board			○	Not available in Pakistan.
	Flexible board	○			
External work and landscaping work	Concrete pipe	○			
	Paving materials (asphalt)	○			
	Grating			○	Those with load resistance are not available in Pakistan.
	Fence	○			

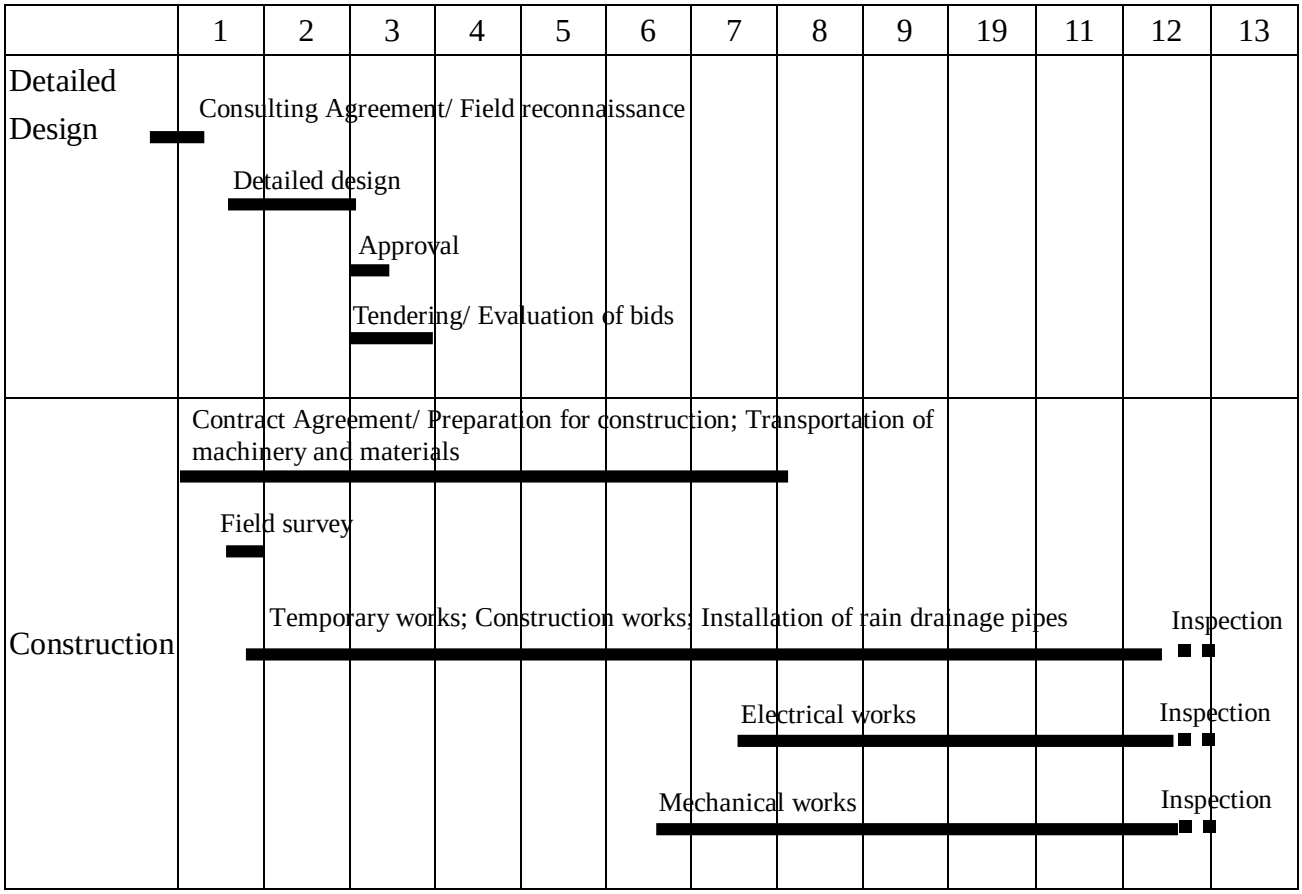
(ii) Electrical and mechanical work

Type of work	Machinery and material	Local	A third country	Japan	Notes
Electrical equipment	Socket outlet	○			
	Switch	○			
	General Equip	○			
	Incoming panel			○	The quality of local goods is unsatisfactory to secure the safety as Hospital.
	Distributing board			○	Same as above.
	lighting panel	○			
	Control panel	○			
	Generator	○			Generator produced by the same manufacturer is used for a network system with MCH.
	UPS			○	Used for important loads.
	Cable (small size)	○			
	Cable (big size)	○			
	Steel conduit			○	Accessories not available in Pakistan.
	PVC pipe	○			
Mechanical equipment	Steam Boiler			○	A boiler made by the same manufacturer of the existing one will be used.
	Chiller			○	Others do not satisfy the performance standards.
	Pump			○	Others do not satisfy the performance standards.
	Air Handling unit	○		○	Locally procured except fans and lining materials procured from Japan.
	Blower, water softener, cooling tower			○	Others do not satisfy the performance standards.
	Piping material	○		○	Piping for medical gas, with a steam pipe made in Japan.
	Heat insulating material	○			
	Automatic controller			○	Replacement of the existing parts
	Air conditioning unit	○			
	Valves			○	Others do not satisfy the performance standards.
	Automatic dust chamber			○	Replacement of the existing parts

2-2-4-6 Implementation schedule

After the conclusion of the Exchange of Notes (E/N), it takes about three months to go through the Consulting Agreement, field reconnaissance, and detailed design, before tendering. After the conclusion of the Contract Agreement, it takes about twelve months to complete the steps including field survey, temporary works, construction works, electrical and mechanical works, performance tests on equipment, and inspection for final handing-over. The draft for the implementation schedule is shown below.

Table 2-3 Implementation Schedule (draft)



As construction works will be carried out during the operating hours of PIMS and the Children's Hospital, it is necessary to give careful consideration to the division of a construction sections, and the implementation of construction works on Saturdays and Sundays, while taking sufficient safety measures. Moreover, external works should be implemented avoiding the rainy season.

2-3 Obligations of recipient country

2-3-1 Portions by Pakistani Side

The installation of rain drainage pipes, serving as a bypass running outside of the site, was planned in the Project as future flood control measures. Effluents will flow down to the brook that is running in parallel with the outside road from the halfway point between the Children's Hospital in the PIMS site and the MCH's Outpatient Department (OPD). Obligations of the recipient country include the construction work of the drainage pipes from the PIMS site boundary to the brook, and the installation of pits.

2-3-2 Procedure by Pakistani Side

In the implementation of Japan's Grant Aid Project, the Pakistan side will take on the following tasks:

1) To exempt all taxes related to the Project
2) To apply for and acquire a permit regarding the connection of drainage pipes in the Project
3) To issue a Banker's Acceptance (B/A) and the Authorization to Pay (A/P), and to bear the related charges
4) To guarantee an expeditious unloading at the unloading port, ensuring smooth tax exemption measures and customs clearance, as well as an expeditious domestic transportation of machinery and materials
5) To facilitate the entry into Pakistan and the stay in Pakistan for Japanese people in charge of the supply of machinery and materials and the implementation of the Project based on the approved contract
6) To exempt from all Pakistani taxes, including tariffs, the Japanese people in charge of the supply of machinery and materials and the implementation of the Project based on the approved contract
7) To take budgetary measures for the effective operation and maintenance of constructed facilities and procured machinery and materials through the Grant Aid Project

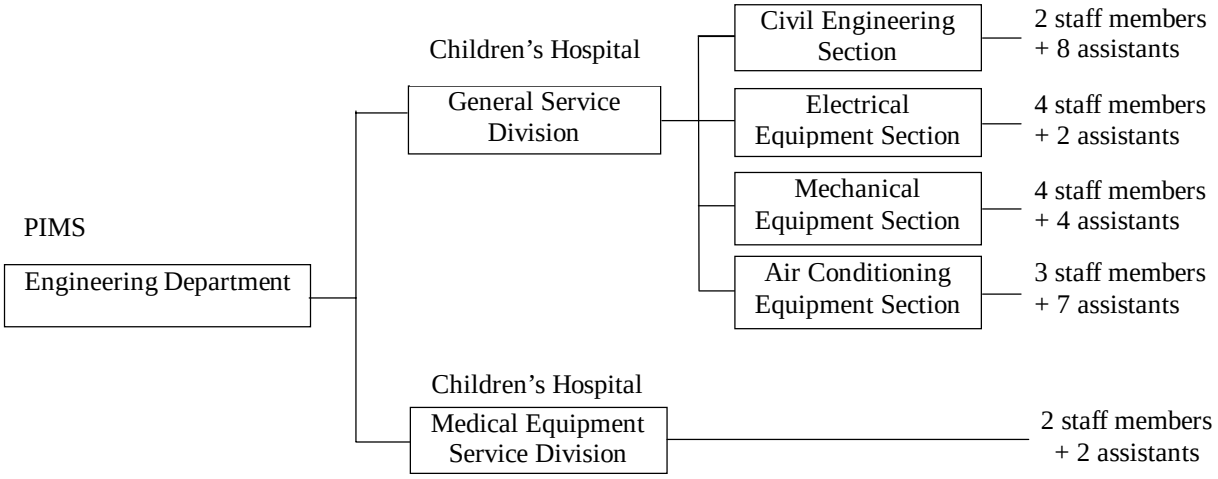
2-4 Project operation plan

2-4-1 Operation Body

As the implementation of the Project will not alter the size of the children's Hospital and services provided, the current staff members will be in charge of the operation of the Hospital.

Currently at PIMS, the Engineering Department is organized under the Vice Director. The Engineering Department is divided into the General Service Division and the Medical Equipment Service Division. The General Service Section consists of the following four sections: (1) Civil Engineering Section (including architecture), (2) Electrical Equipment Section, (3) Mechanical Equipment Section, and (4) Air Conditioning Equipment Section. The Electrical Equipment Section and the Mechanical Equipment Section are in charge of the maintenance and management of the whole PIMS. At the Children's Hospital, there are staff members exclusively in charge of architecture, air conditioning equipment, and medical equipment. After the implementation of the Project, the current staff members will also be in charge of maintenance and management of the Hospital.

Figure 2-6 Organizational Chart of the Maintenance Department of Children's Hospital



2-4-2 Operation and Running Cost

Since the Children's Hospital was completed as Japan's Grant Aid Project and handed over to Pakistan 18 years ago, it has been operating as the children's medical treatment facilities of PIMS, the core medical institution in Pakistan. Its activities in the Outpatient Department, the Inpatient Department, and the Emergency Department have been fulfilling the initial objectives. Regardless

of the insufficient budget for its maintenance and management, technical medical staff have been properly allocated to implement the daily activities.

The implementation of the Project will not cause major changes in costs for operation and maintenance. On the contrary, maintenance costs will decrease, as the facilities and machines that need to be replaced or repaired due to deterioration will be replaced or repaired in this Project. However, as for the facilities and machines that are not included in the Project (mainly on the secondary side) but are in the advanced state of deterioration, it is necessary to prepare a long-term or annual repair work plan after confirming the extent of deterioration, while taking necessary budgetary measures.

Expenses for repairs at the Children's Hospital are shown below.

Table 2-4 Expenses for Repairs at the Children's Hospital (Unit: 1,000 Rupees)

Year	1997	1998	1999	2000
Construction/ External Work	46	225	333	319
Electric Work	195	219	213	165
Mechanical Work	95	416	119	-

(Source: PIMS)

As it has been 18 years since the completion of the Children's Hospital, facilities and equipment have deteriorated significantly. Therefore, it is necessary to prepare a long-term or annual repair work plan, while taking necessary budgetary measures.

2-5 Implementation Condition

(1) General matters

The procurement of construction work in Pakistan, in general, is based on a split contract. Therefore, neither the coordination of various works nor progress control is carried out efficiently. Even a large-scale construction work carried out in Islamabad can be rarely completed within the contract period. Compared to Japanese construction firms, Pakistani construction firms cannot make a detailed plan for temporary work. Moreover, as construction work in Pakistan is not fully mechanized, and in most cases, precise working plans for detailed parts are not prepared, the quality of work is not uniform. Also, Pakistani construction firms tend to regard equipment work separately from other construction work.

As mentioned previously, even though a contractor of the construction works in this Project is a Japanese construction firm, a Pakistani construction firm will be in charge of carrying out the actual work. However, when the need arises for technical construction management in the course of electrical and mechanical works, Japanese technical staff should be dispatched to Pakistan to provide technical guidance and construction management.

Most of the construction materials can be procured around Islamabad. However, the finishing materials market in Islamabad is small, and retail stores are located in a neighboring city, Rawalpindi. Therefore, it is necessary to order goods directly from Lahore or Karachi. It should be noted that it takes about one week to order goods from Lahore, and two weeks from Karachi. The amount of supply is satisfactory. However, as for machinery and materials imported from Japan and a third country, it is necessary to carry out the required procedures in advance, including tax exemption measures, in order not to affect the construction period.

(2) Points to be noted during construction

In this Project, the construction work will be carried out within the site of the Children's Hospital, in the building, and under the road within the PIMS site, where vehicles and patients are passing. Drainage pipes will be laid under the access road to MCH; therefore, it is necessary to make a plan for temporary work carefully so that the line of flow of vehicles and workers does not intersect that of the patients and medical staff. For the implementation of the construction work in the existing facilities, it is necessary to minimize noise, vibration, and dust to the maximum extent possible.

Moreover, as the construction work will be carried out during the operating hours of the Children's Hospital, it is essential to take preventive measures against accidents caused by an interruption in the power and gas supply and make efforts to reduce the time of switching at the time of changeover of power sources or medical gas.