

## 5-2 Study and Examination of Design Criteria

### 5-2-1 Configuration of Facilities

This facility consists of following buildings.

#### 1) Building

##### Delivery Ward

Outpatient Department:	Reception of outpatients and emergency activities
Medical Examination Department:	Examination room and nurse station
Labor Ward:	Labor room
Delivery Department:	Delivery room, nurse station

##### Operation + CSSD Department

Operation Theatre:	Operation room, anesthetic room, cleaning room
Recovery Room:	Recovery room, nurse station
CSSD Room:	Autoclave, sterilizing work room, sterilizing room
Ante-natal Ward:	Ante-natal room

#### 2) Related Facilities

Transformer House, Medical Gas Cylinder Room:	Transforming room, generator room, medical gas cylinder room
Others:	Roofed passage

### 5-2-2 Determination of Scale of Facilities

For size of this facility, in reference to details of requested facilities and space area, personnel plan, the national standard of this country, the floor area standard of Japan (compiled construction data), and in comparison with hospital facilities in Japan, the size of each room is examined.

## 1) Examination of Room Size

### A) Office Space

A size is determined so that it is suitable to the number of people to work there and every person can have each own desk. This facility call have a layout of pairs of desks standing opposite to each other on principle, and an area of 7 m<sup>2</sup> shall be provided for each person for exclusive use.

### B) Sickroom Space

The standard of Zimbabwe regulates the minimum area for exclusive use to be 5 m<sup>2</sup> per bed, while it is 4.3 m<sup>2</sup> in Japan. Therefore the standard of this country is used as the basis of determination of the space.

### C) Operation Room, Delivery Room Space

Due consideration shall be given to the long time required for operation and delivery and easiness of doctors and nurses to move to determine a space suitable to the function of these rooms.

### D) Space of Other Section

The size of special rooms is determined on the basis of the layout of necessary equipment for each room.

Results of examination for each room are as follows by above classification:

#### 1. Office

Function: Reception, recording and management of obstetric ward and outpatients.

Staff: 4 persons

Basis of calculation: Area for exclusive use -7.5 m<sup>2</sup> per person

Equipment: Space for 4 pairs of desk and chair, 7 case history racks, 4 bookshelves, 2 filing cabinets, and 1 duplicator for medical service.

## 2. Sickroom

Function: Accommodation of a parturient woman in travail at an interval of 15 minutes as transferred from the antenatal room. A primipara stays for about 8 to 10 hours, while a multipara stays about 2 to 4 hours.

Basis of calculation:  $6.5 \text{ m}^2 \text{ (bed space)} \times 9 \text{ (beds)} = 59 \text{ m}^2$

Equipment: Space for 9 beds, 9 side lockers, 2 resuscitators, and 2 suction machines.

## 3. Examination room

Function: Observation of progress before and after delivery, and check by question and answer, internal examination, and ultrasonic examination of outpatients.

Basis of calculation: Equipment layout plus area for exclusive use for a patient, a nurse and a doctor,  $4.6 \text{ m}^2$  per person.

Equipment: 1 gynecological examination couch, 1 desk, 1 chair, 1 medical refrigerator, 1 medicine cart, 1 scale for disabled patients, 1 ultrasound apparatus, 1 fetoscope, 1 portable operation light.

## 4. Labour room

Function: Accommodation of a parturient woman in travail at an interval of 5 to 6 minutes as transferred from the antenatal room. A patient stays for about 2 hours on the average.

Basis of calculation: A plan is prepared on the basis of the layout of equipment to be used for above function.

Equipment: Space for 1 bed, 1 entonox equipment, 1 suction machine

#### 5. Delivery room

Function: Accommodation of a parturient woman in travail at an interval of 1 to 3 minutes. Generally, 4.5 to 5 hours are required for delivery.

Basis of calculation: A plan is prepared on the basis of the layout of equipment to be used for above function.

Equipment: Space for 1 delivery bed, 1 entonox equipment, 1 suction machine, 1 vacuum extractor, 1 pulmo-vents, 1 incubator, 2 instrument trays, and 1 operation light.

#### 6. Cleaning room

Function: Cleaning of glass instruments, steel equipment and linen which have been used in the delivery room, labor room, and examination room, and are to be stored in the dirty room.

Basis of calculation: A plan is prepared on the basis of the layout of equipment to be used for above function.

Equipment: Space for 2 linen carts, 3 laundry carts, 1 sink, 3 working tables, 1 ultrasonic cleaner, and 1 instrument sterilizer.

#### 7. Operation Department Chief Nurse room

Function: Performance of official duties by the chief nurse of Operation Department

Basis of calculation: Space for performance of official duties by an officer including the reception area;

22 m<sup>2</sup> x 1 (person)

Equipment: Space for 1 pair of desk and chair, 1 filing cabinet, 1 bookcase with glass doors, 2 subsidiary bookcases.

#### 8. Recovery room

Function: Recovery of a patient after operation. The time for recovery depends on physical conditions of the patient as well as the detail of operation. Generally, it takes 30 minutes to 2 hours to come out from under the anesthesia.

Basis of calculation: 5 m<sup>2</sup> x 8 (beds) = 40 m<sup>2</sup> plus space for passage and equipment

Equipment: Space for 8 beds, 2 pulmo-vents, 2 boyles machines, 4 suction machines, 2 resuscitators, 1 defibrillators, and 1 cardiac monitor.

#### 9. Operation room

Function: Performance of cesarean section

Basis of calculation: Standard operation room in Japan (36 m<sup>2</sup>)

Basis of calculation: A plan is prepared on the basis of the layout of equipment to be used for above function.

Equipment: Space for 1 theatre operation table, 1 pulmo-vents, 1 diathermy machine, 1 nicu care unit, 1 incubator, 1 suction machine, 1 defibrillator, 1 baby scale, 1 boyles

machine, 1 cardiac monitor, 1 resuscitator, 2 instrument trays, 1 operation light, and 1 portable operation light.

#### 10. CSSD room

Function: High-pressure steam sterilizing room

Function: High-pressure sterilization of steel tools, glass instruments, and linen which have been used in the obstetric ward

Basis of calculation: A plan is prepared on the basis of the layout of equipment to be used for above function.

Equipment: Space for 2 autoclaves and 2 working tables

#### 11. Dirty room (central sterilization room)

Function: Cleaning of medical utensils which have been used in the obstetric ward, including the operation room, and returned to this room

Basis of calculation: A plan is prepared on the basis of the layout of equipment to be used for above function.

Equipment: Space for 2 working tables, 2 sinks, 2 ultrasonic cleaners, and 4 shelves

A standard area shall be estimated for each of other rooms and adjustment shall be made for equipment and layout. Then, overall layout of building shall be made to determine the total area and a plan is prepared so that all the requirements are satisfied.

## 5-3 Basic Planning

### 5-3-1 Site and Layout Plan

#### 1) Adequacy as construction site

As summarized in 4-3-2, the site is considered adequate for the purpose on the basis of its configuration, environmental conditions, and completeness of infrastructure.

#### 2) Basic Planning for Use of Site

The site prepared for this facility is about 11,500 m<sup>2</sup> in area and to be used for the following facilities.

1. Obstetric Ward: Facilities including the delivery ward, operation + CSSD ward, and prenatal ward
2. Related Facilities: Facilities incorporating various function necessary for management of above facilities

The basic site size for each function mentioned above is set as follows on the basis of functional necessity.

1. Obstetric ward: } 4,000 m<sup>2</sup>
2. Related facilities: }
3. Roofed passage: 400 m<sup>2</sup>

#### 3) Basic Layout Plan

1. To build this facility, the ward at east side of existing obstetric ward is broken and the roofed passage is connected to the southern side.
2. The roofed passage the two groups of facilities: the delivery, examination, outpatient, prenatal facilities at east side, and operation, central sterilizing facilities at the west side.

### 5-3-2 Architectural Design

Based on the basic plan described in 2) and 3) above, details and results of examination of each ward plan are summarized below.

#### 1) Plane Plan

Main points of design are as follows:

① Safe, ② Cleanliness, ③ Comfortability, ④ Easiness to understand, ⑤ Easiness to use

#### A) Safety

For prevention of a daily accident:

- Not to be broken: Care for an accident due to broken glass
- Not to be slippery: Care for walking comfortability, use of unslippery material
- Not to catch a hand: Care for the door hatching  
If a hand is caught in the door, it may result in an accident.
- Not to drop: Care for the height of handrail and bed

Safety in case of disaster

Prevention of disasters, and refuge plan in the case of a disaster. Protection from being suffocated by smoke.

Safety measures for radial rays.

#### B) Cleanliness

It is necessary to reduce the bacterium density for prevention of in-hospital infection, and general safety for bacterium, virus and microorganism contamination. Zoning is provided for the purpose of cleanliness management.

Different carrying routes are provided for clean and dirty objects as far as practical.



Those materials hard to become dirty and easy to be cleaned should be selected.

C) Comfortability

It is necessary to abolish any unpleasant thing.

Sound: Sounds uncomfortable to patients include door sound, footsteps, talking over the telephone, flush toilet, talking by nurses, machine sound, conversation in the neighboring room, external noise and call by the speaker

Light: Glaring of light

Smell: Smell of antiseptic solution, smell from the kitchen, smell from toilet and dirty object

Difference in temperature

D) Ease to understand

Use of measures to prevent patients from losing his way in the hall, passage, and waiting area

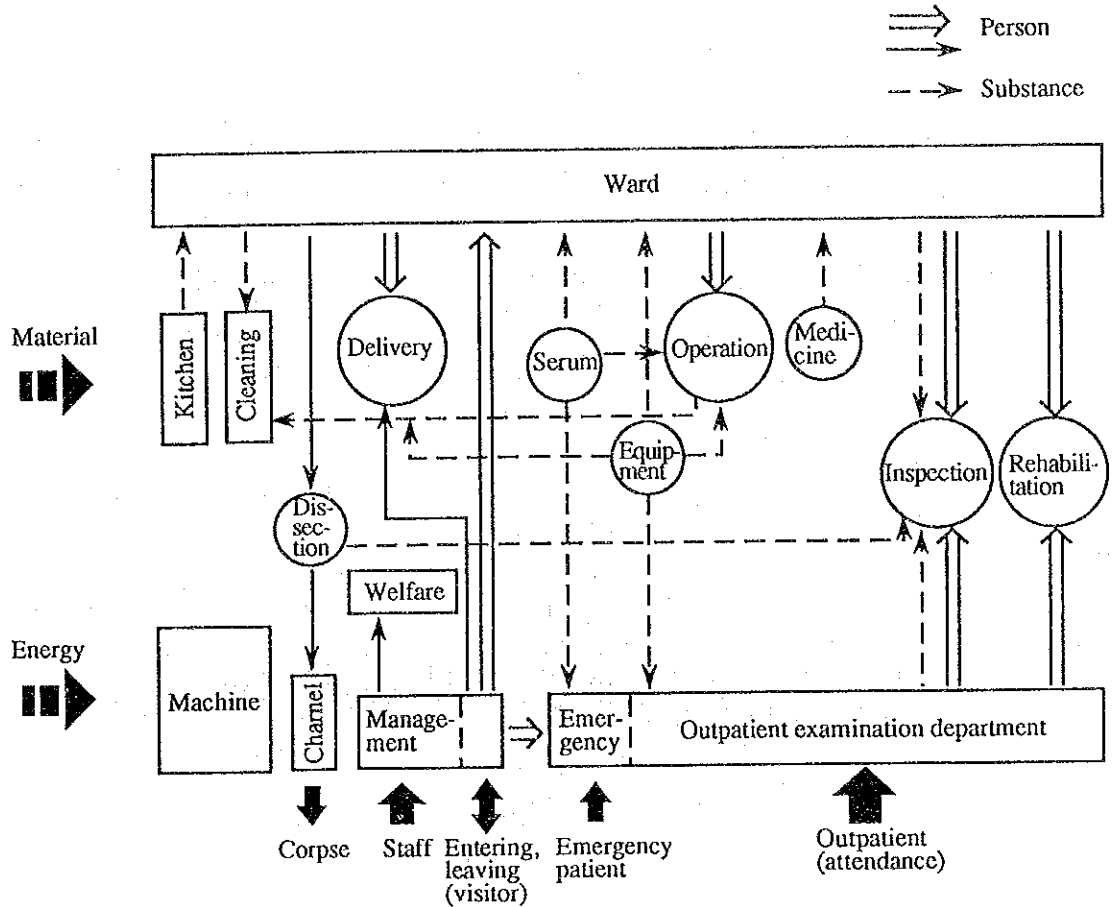
E) Ease to use

Handiness to be experienced by nurses and patients in the hospital, including touching and grasping

The design shall be made on basis of the above.

(1) Block plan

The basic movement line of person and subject is planned as follows:



What should be considered in the hospital is the organization and connection of departments. A due consideration is also required for development and change as a character of the hospital.

Increase and reconstruction of buildings shall be required to meet increase of patients, structural change of the hospital, growth in line with development of the medical field, and sophistication of examination.

Therefore, a consideration is required to provide a facility which withstand the growth and change on the stage of design.

[Examination on growth]

1. The method to be thought of first is to provide an extra space, but this project cannot afford a precedent investment from its character.

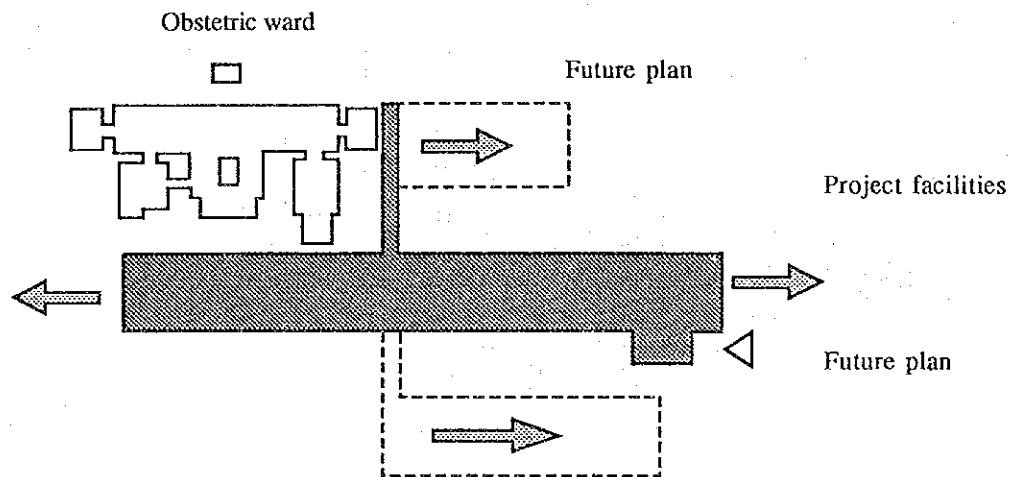
2. Another plan relates to addition and reconstruction in the future. From this viewpoint, a compact plan (reduction of movement line and well settled form) is not suitable for addition.

On the other hand, a plane form of the satellite is relatively easy to use.

According to the basic plan of the Ministry of Construction, the obstetric ward will have a management, prenatal, and postnatal wards in the future.

Therefore, this project employs a satellite-type plane plan.

Existing facilities



[Examination on Change]

Building structure causes a problem in meeting change. In the space which is expected to be changed should have least pole and supporting wall.

It is recommendable for this facility to employ a large span structure because it include a central medical facility which is expected to undergo a particularly large change.

For these reasons, the design should be made in the manner to provide a large space within the range to be allowed by structural and economical viewpoint.

(2) Plane plan of each facility department

This facility shall have the operating department, delivery department, inspection department, central sterilizing department (supply center), and emergency department as the central examination departments of the obstetric ward.

With the roofed passage from the existing obstetric ward, the delivery department and inspection department (outpatient), and ante-natal ward are arranged at the east side.

At the west side of the roofed passage, the central sterilizing department is positioned.

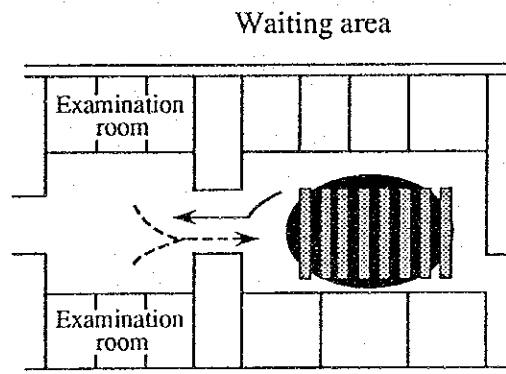
A) Outpatient

Waiting area

Patients are waiting in the passage in existing facilities to get in the way of movement line. This facility will allow them to wait in the hall.

Relationship between waiting area and examination room

Privacy should be kept for the conversation between the doctor and a patient. This plan arranges the waiting room in a place remote from the examination room.



B) Delivery Ward

With the nurse station as the center, the delivery rooms are arranged at both sides as delivery monitor room.

### C) Operation Theatre

Transfer of patients, change of cloth:

The patient brought on the rollaway bed or stretcher is transferred to the stretcher exclusively used in the operation theatre. The transfer line is clearly drawn on the floor, and the stretcher is placed in parallel to the line for transfer of patients.

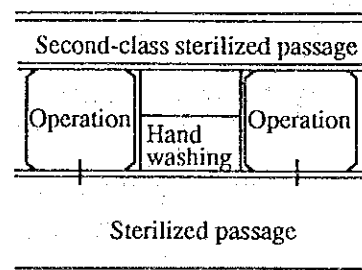
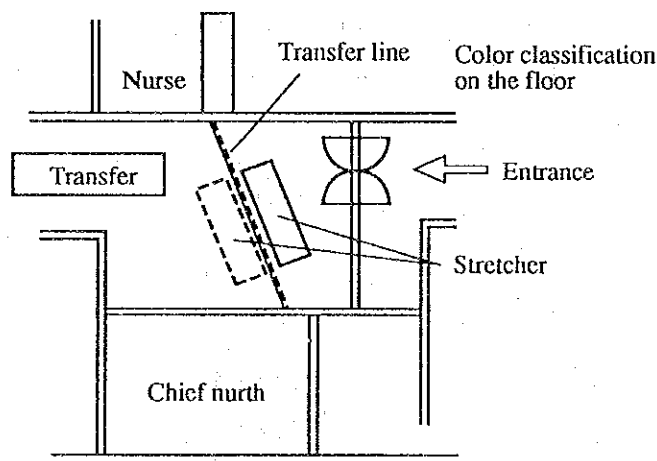
Staff dressing room:

This room is arranged on the border line for the clean and dirty area of the operation department in the go-through manner.

Layout of operation room and operation department:

As a common style of the "middle corridor" type, the middle carrier is set as a sterilized passage, and the corridor at the external side as second-class sterilized passage for use in passing.

Two operation rooms form a pair, separated by handwashing room and preparation room in corner-cut shape to reduce useless space.



#### D) CSSD Department

About 70% of sterilizing materials are used in the operation theatre. The CSSD department is located next to the operation theatre. The flow in the central material room is as follows:

Collecting - Cleaning - Assembling - Sterilizing - existing sterilizing equipment  
- Storage - Supply.

The collection and supply work is performed by the same person.

The dirty zone for cleaning and assembling is discriminated from the clean zone for storage.

#### 2) Elevation and Section Plan

The elevation and section planning is made with consideration for rain water processing plan, security measures and ventilation plan for the rainy season.

1. The first floor is set to the same level as that of neighboring obsteric ward.
2. The room height is set as 3 m, equal to that of existing obstetric ward.
3. The ceiling altitude is set to 2.8 to 3.0 m including the passage area.
4. A large window is used to provide good lighting and ventilation.

Use of the lattice is a safety measure, but this method is not employed since a reliable monitor system has been established. Instead, a secure lock is used.

5. To stand the concentrated rain in the wet season, a gable roof is used at the slope of 28% at least. For prevention of rain noise, asbestos slate is used. The protrusion of eaves is about 1 m to serve as a sunshade.

### 3) Structure Plan

#### 1. Structural design policy

The building shall be of a structure free from a trouble due to deflection by application of a load for a long time or vibration. It is a basic requirement that no damage is caused by an earthquake load or wind pressure.

The design must conform to the MODEL BUILDING BY-LAW in the Republic of Zimbabwe. The structural standard of Japan is also referred to.

#### 2. Structural design standard

British Structural Design Standard lies at the root of structural design in Zimbabwe, which regulates the following items:

Load:	CAS 160	Load, Stress Standard
Reinforced concrete design:	CAS 164	Reinforced Concrete Structure Standard
Iron frame structure design:	CAS 157	Steel-frame Building Standard

\* CAS: (Central African Standard)

#### 3. Framework type

Genuine rigid frame structure of reinforced concrete with no aseismatic wall is employed to allow free planning on the plane, to deal with changes in the partition relatively with ease.

The roof shall be of wooden truss frame.

#### 4. Earthquake load

Since the whole land of Zimbabwe is on a rigid rock bed, no earthquake occurs there and no record is kept on it. However, as a minimum safety measure for life, a local coefficient of earthquake load, 1/4 times Japanese structural design standard is employed in the design of this building.

$$Q = k \cdot \Sigma W$$

k : Shear modules in earthquake (k=0.05)

$\Sigma W$  : Weight of building

Q : Shearing strength in earthquake

## 5. Combination of loads

Type of load for design	Given condition	Combination of stresses
Long time	Any moment	G + P
Short time	In earthquake	G + P + K

G: Stress due to fixed load (Total weight of the building, including finish, fitting, and partition)

P: Stress due to carrying load

K: Stress due to earthquake

Other items, including wind load and roofing, are separately examined.

## 6. Carrying load

As this is a one-story building, and floor slab is employed in the first floor, the load supported by the floor is ignored.

The carrying load of the roof is estimated to be equal to the work load.

Carrying load is examined on the basis of the actual circumstance.

## 7. Engineering method for foundation

This is a one-story building made of reinforced concrete. As the ground is very solid in rock bed form, the earth strength is estimated to be 50 ton/m<sup>3</sup> or more.

Therefore, the direct foundation type is employed.

## 4) Facility Plan

### 1. Power facilities

#### A. Supplied power

Zimbabwe Electricity Supply Authority (ZESA) supplies 11,000 V to the substation in this hospital (situated on the premises at western side) using the underground cable. Stable power supply is ensured with almost no power failure.



## B. Power receiving method

A high voltage is supplied from the existing substation to the transformer room of this facility using the high-voltage switchboard, and this facility receives a lower voltage through the transformer for motive power or single-phase transformer for lighting.

## C. Lighting Plan, Receptacle

In view of various objectives and characters of the facility, a lighting method shall be selected on the basis of suitability to each case. Linear light from the fluorescent lamp is generally used.

Basic points to be examined are as follows:

- a) To sufficiently secure the required brightness,
- b) to receive an even brightness not to provide extreme contrast,
- c) to use means to reduce glaring,
- d) to avoid accentuation to the dark part to provide a soft shadow,
- e) to achieve a good tone of light color,
- f) to be comfortable,
- g) to be efficient, and
- h) to produce less heat.

Natural lighting is desirable, which is usually achieved by a large window, but a room short in lightness is provided with two lighting systems to provide an even lightness at the window and corridor side for adjustment by switching.

Because an unexpectedly large number of electrical appliances are required, a due consideration should be given to the receptacle including spare parts to avoid an accident.

Average Lightness of Main Rooms in the Facility (horizontal lightness  
at 85 cm above the floor)

Room Name	Target Design Lightness	General standard in Japan
Operation room	General lighting	1,000 lx
	Operation table	20,000 lx
	Operating light	10,000~40,000 lx
Delivery room	General lighting	500 lx
	Delivery table	1,000 lx
	Operating light	2,500 lx
Examination room		500 lx
Doctor room		700~1,000 lx
Office		ditto
Operating room	Chief nurth room	500 lx
Nurth room	Nurth station	500 lx
		ditto
Recovery room		300 lx
Disinfection room		300 lx
Anesthetic room		300 lx
Sterilizing room		300 lx
Waiting room		200 lx
Entrance	Meeting	200 lx
Sickroom		100~200 lx
	All-night light	5 lx
Toilet		100 lx
Corridor		100 lx
Laundry		100 lx
Linen room		100 lx
Boiler room		100 lx
Corridor	All-night light	5 lx

Because this is a special facility for the hospital, a general standard is used as the design target and an extreme difference in lightness is evaded.

#### D. Lightning conductor facility

The rain is frequently accompanied by thunder in the wet season to necessitate lightning conductor facilities. The records show an annual average of 70 days for thunderbolt.

As the lightning conductor facility, this facility uses a copper belt on the roof.

E. Voltage stabilizing equipment

Appliances used in this facility require no voltage stabilizing equipment against voltage change (Where a constant voltage is required, a special measuring instrument is used to cause an equipment trouble by change in voltage. Such an instrument is provided by reason of a question for accuracy of data.), the operating light of portable battery type is provided to prevent a trouble in the operation room and delivery room in addition to the generator as an emergency equipment against power failure.

F. Generator facility

A generator is provided as an emergency power source for a power failure. The power necessary for the operation room, delivery room, and emergency lighting shall be secured.

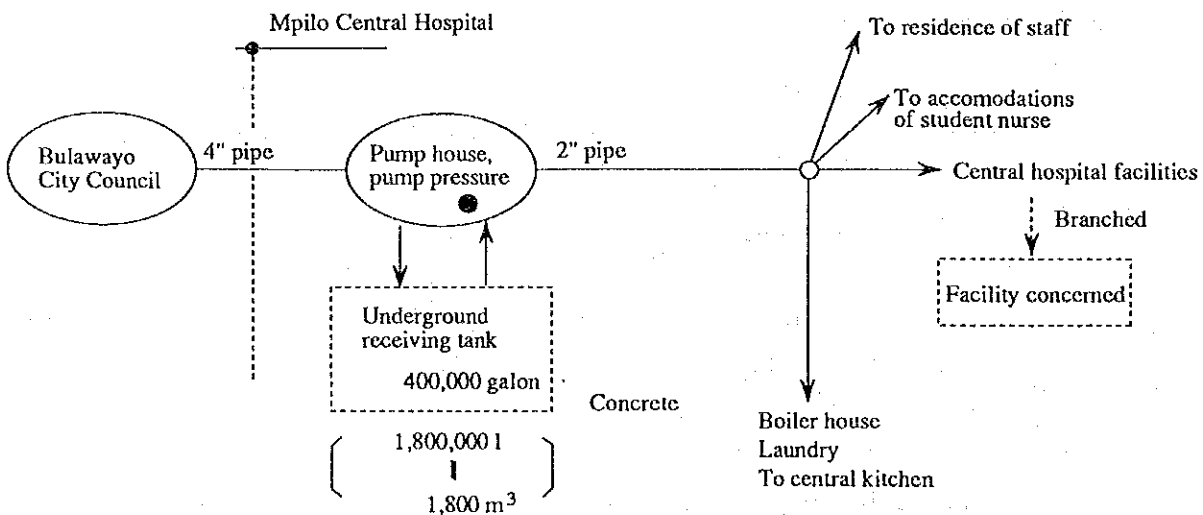
2. Water supply and drainage facilities

A. Water supply facility

Bulawayo City Council manages the water works and takes charge of water supply.

This water is supplied to Mpilo Central Hospital, which can be safely taken as it is, or filtering is unnecessary for drinking.

The water supply system in existing facilities is summarized below.



The hospital uses about 1,080 m<sup>3</sup> of water a day on the average, and an increase by about 7 m<sup>3</sup> per day is expected by addition of this facility, which causes no trouble.

Use of water by this facility:

Use of water per bed: 250 little per day

250 little x 27 beds = 6,750 little, about 7 m<sup>3</sup>

A branch is provided for the water pipe laid in the existing obstetric ward for supply this this facility.

B. Sanitation utensils

Sanitation utensils are procured at the site.

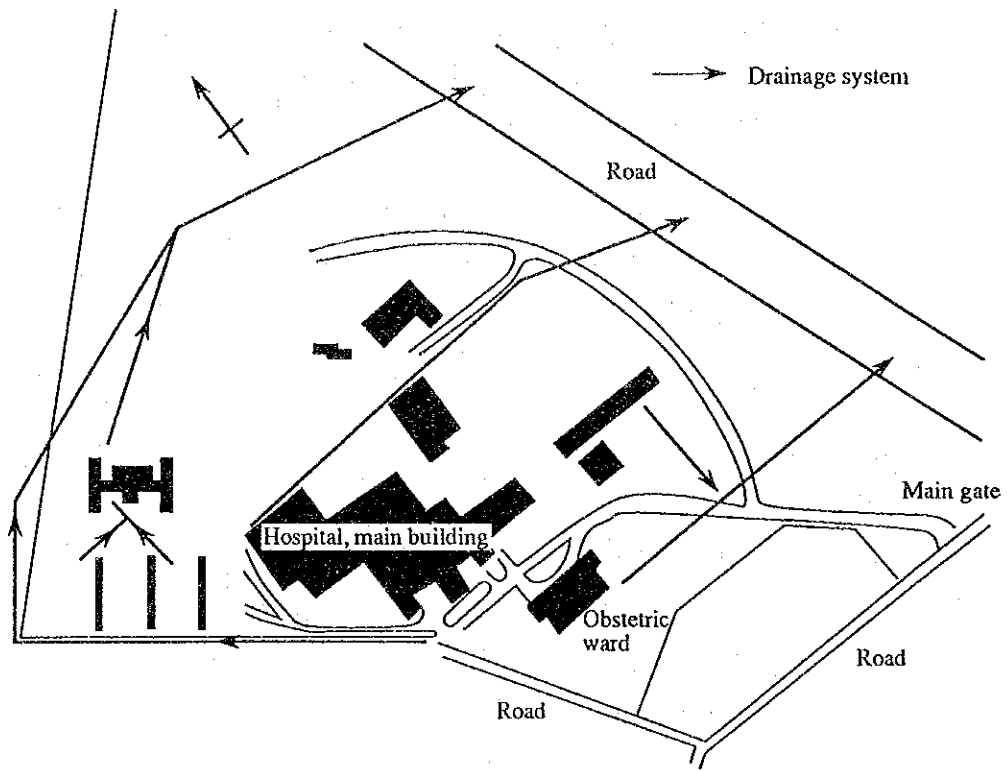
C. Gas facilities

The gas as a heat source is L.P.G., but it is not commonly used. It is rather expensive than electricity, and electric heating is more common. Therefore, this facility uses electric heating with a consideration to use of it by existing facilities.

D. Drainage facility

Bulawayo City Council takes charges both of water supply and drainage under control of the Ministry of Public Construction.

Bulawayo City has a sewage disposal plant at a place about 10 km from the city center with a capability of processing waste water. The sewer pipe from existing facilities is connected to the main sewage pipe, and the sewer pipe from this facility can be connected to the catch basin of existing facilities.



### 3. Air conditioning, ventilation facilities

#### A. Air conditioning facilities

In this facility, the operation room and delivery room are equipped with this system, a fan coil unit with middle level filter for introduction of purified outside air.

The air cleanliness is set to class 100,000. This is a unit to measure the air cleanliness in the clean room, and this value indicates a little higher level than that of a general office.

The ventilation shall be made 10 to 13 times per hour.

Temperature, humidity

plan ..... Operation room, Delivery room (target value)

	Summer	Winter
Temperature	24 to 26°C	24 to 26°C
Humidity	55 to 60%	55 to 60%

## B. Ventilation facilities

Sufficient ventilation should be performed for each room to discharge the smell of medicine, vapor from the sterilizing equipment, and other offensive smell.

Planned number of ventilations (per hours)

Sickroom:	2 to 3 times
Inspection, examination room:	2 to 3 times
Waiting room:	2 to 3 times
Operation, delivery room:	10 to 13 times
Office:	1 time
Toilet:	15 times
Boiler room:	15 times
Dirty room:	15 times
Linen room:	15 times
Laundry:	15 times

## 4. Medical gas facilities

Medical gas facilities are planned to deal with oxygen, nitrous oxide, compressed air and suction air, and installed in each room.

As a safety measure, color coordination should be provided in piping from the source to the outlet in the place of use to prevent an erroneous connection.

This facility shall use exposed piping.

## Medical gas outlet plan

Room name	Number of beds per room	Number of rooms	Type of medical gas				Quantity
			O <sub>2</sub>	N <sub>2</sub>	A <sub>2</sub>	V <sub>2</sub>	
Operation room	1	2	O <sub>2</sub>	N <sub>2</sub>	A <sub>2</sub>	V <sub>2</sub>	2
Recovery room	6	1	O <sub>6</sub>		A <sub>6</sub>	V <sub>6</sub>	6
Delivery room	1	16	O <sub>16</sub>	N <sub>16</sub>		V <sub>16</sub>	16
Anesthetic room	1	2	O <sub>2</sub>	N <sub>2</sub>	A <sub>2</sub>	V <sub>2</sub>	2
Prenatal room	2	3	O <sub>6</sub>			V <sub>6</sub>	12
Oxygen outlet	O	2 + 6 + 16 + 2 + 6					32
Nitrous oxide	N	2 + 0 + 16 + 2					20
Compressed air	A	2 + 6 + 0 + 2					10
Suction air	V	2 + 6 + 16 + 2 + 6					32
							Total 94

### 5. Fire fighting facilities

The specified number of fire extinguishers are installed indoors, in the corridor and on the wall.

### 6. Fireplug facilities

The specified number of fixed fire plugs are installed indoor, in the corridor and on the wall.

### 7. Emergency alarm facilities

An alarming area of the heat sensor is planned for each 50 m<sup>2</sup> of floor area, basically dividing the total area into general sickrooms and the corridor, and the alarming equipment is installed on the specified position.

An alarming area of the smell sensor is planned for each 100 m<sup>2</sup> of floor area, basically dividing the total area into general sickrooms and the corridor, and the alarming equipment is installed on the specified position.

An emergency alarm is given using the emergency bell.

8. Broadcasting facilities

The office is equipped with an amplifier for broadcasting throughout the building.

9. Leading light, leading sign

The escape exit, corridor, and passage, where refuge facilities are installed, are provided with a green sign.

10. Indicator

The nurse call response unit is installed in the nurse center, a room name plate on each room.

### 5-3-3 Equipment Planning

1) Equipment Selection Policy

1. A minimum requirement is examined in selection.
2. Importance is placed on medical equipment in selection in view of the object of the request.
3. Any equipment requiring expensive consumables is deleted.
4. Any equipment requiring consumables unavailable in Zimbabwe is deleted.

2) Equipment Employment Plan

1. A due consideration shall be given to the maintenance system at the site in deciding employment, reliable articles which is maintenance free if possible are selected.
2. Articles requiring consumables available at the site are selected as far as practical.



3. Among from articles with the same function, articles of a low price and excellent in quality are selected.
4. Articles matching to the technical level in Zimbabwe, and unnecessary quality articles and electrical appliances are deleted.

3) Details of equipment for each function

Equipment necessary for each room and facility is are follows.

A) Outpatient facilities

Reception of emergency activities:

Ambulance (with radio set), stretcher

Reception, recording room: Desk, chair, filing cabinet

Office: Desk, chair, filing cabinet

Doctor room: Desk, chair, filing cabinet

B) Examination, inspection facilities

Nurse station:

Trolley for conveying babies, Baby scale, Medical refrigerator

Inspection room:

Examination set, Gynecological Examination Couch, Ultrasound Apparatus

C) Waiting room facilities

Waiting room:

Bed, Feto scope, E.C.G. machine

D) Labor room facilities

Labour room:

Labour bed fetal monitor, Entonox equipment

E) Delivery facilities

Delivery room:	Delivery bed, Vacuum extractor incubator, Normal delivery set
Nurse station:	Trolley for conveying babies, Baby scale, Medical refrigerator
Machinery room:	Portable autoclave Mortuary trolley, Caesarian section set, Drip stand resuscitator, Handwash basin stand

F) Operation facilities

Operation room:	Diathermy machine theatre operation table, Suction machine cardiac monitor, Operation light, Ultrasonic cleaner
Cleaning room:	Scale, Laundry chart, Linen cart, Ultrasonic cleaner, Portable autoclave, Glove drying machine
Anesthetic room:	Boyles machine, Suction machine, Cardiac monitor, Drip stand
Cleaning room:	Scale, Laundry cart, Linen cart, Ultrasonic cleaner, Portable autoclave, Glove drying machine
Operation department chief nurse room:	Desk, Filing cabinet, Obstetric calculator

G) Recovery room facilities

Recovery room:	Bed, Suction machine, Cardiac monitor, Pulmovenets, Defibrillator (with heart resuscitation, ECG) stretcher
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## H) CSSD facilities

Autoclave: Autoclave

Cleaning room: Laundry cart, Linen cart, Ultrasonic cleaner,  
Portable, Autoclave glove drying machine

### 5-3-4 Basic Design

#### Area Table

Basic Design

1. Layout
2. Plane
3. Elevation
4. Section
5. Subsidiary facilities drawing

Area table

Overall facility Area

Ward	Delivery ward	1,387.75 m <sup>2</sup>	] 1,758.25 m <sup>2</sup>
	Antenatal ward	370.5 m <sup>2</sup>	
	Operation + CSSD department	1,235.0 m <sup>2</sup>	
Total		2,993.25 m <sup>2</sup>	
Roofed passage		191.75 m <sup>2</sup>	
Outhouse		87.5 m <sup>2</sup>	
Total		3,272.5 m <sup>2</sup>	

Facility Area Planning Table

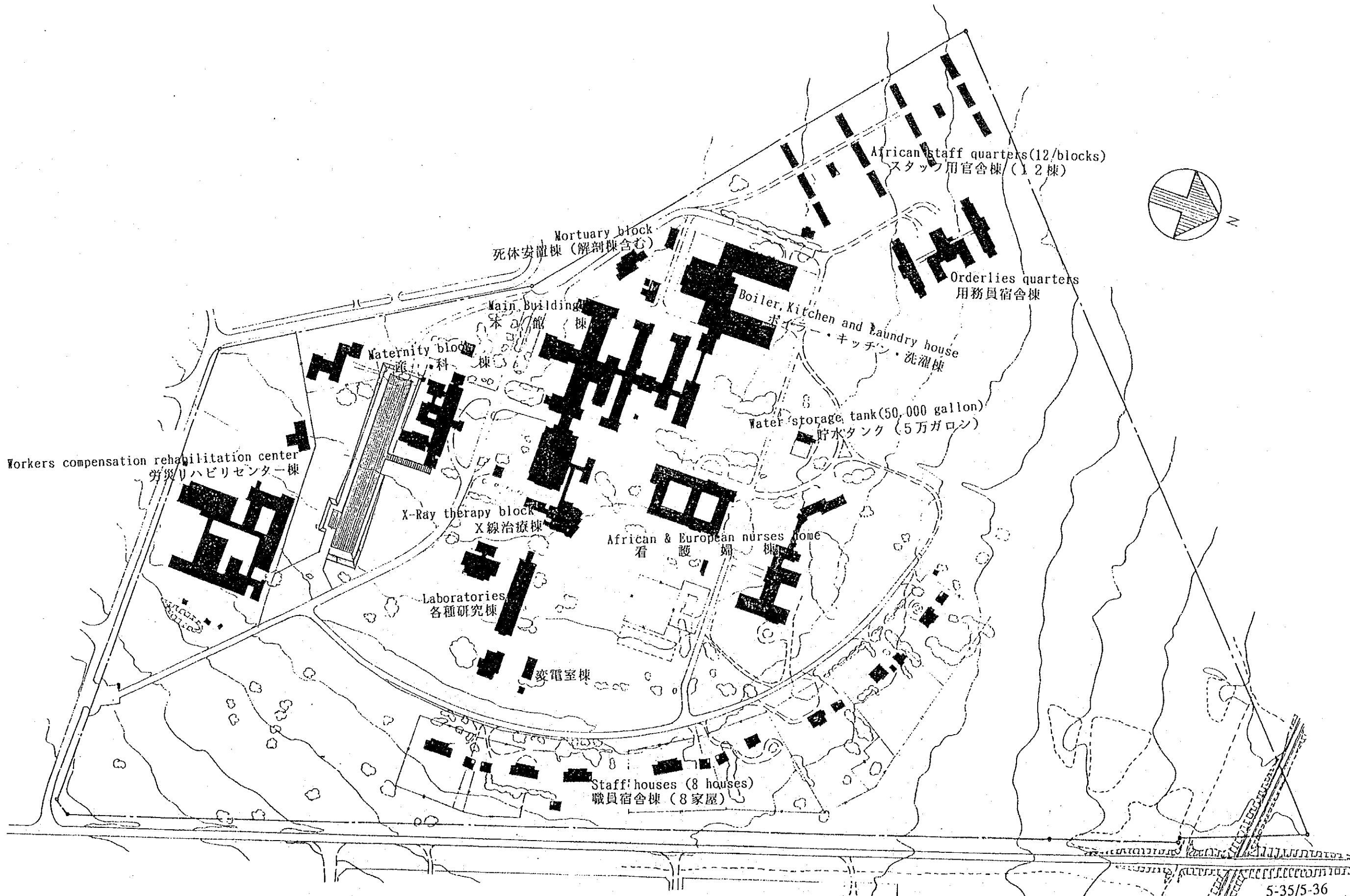
Department	Room Name	Area	Remarks
[Delivery Ward]			
Outpatient Department	Entrance, visitors' area	91 m <sup>2</sup>	
	Reception, recording room	14.625	
	Office	29.25	7.5 mm x 4 = 30
	Doctor room	29.25	2 (rooms) x 14.625 = 14,625
	Kit store	14.625	
	Warehouses	9.0	
	Cleaner	14.625	
	Waiting area	130.0	
	Stretcher shed	20.25	
	Passage	47.125	
Medical Examination, Department	Examination room	90.0	2 (rooms) x 15.75 = 31.5 4 (rooms) x 14.625=58.5; 90 in total
	Nurse station	20.0	
	Warehouses	24.0	
	Dirty room	24.0	
	Corridor	88.0	
Labor Ward Delivery Department	Enema toilet	40.0	2 (rooms) x 20 = 40
	Toilet for staff	32.0	For men (6.8 m <sup>2</sup> ), for women (16 m <sup>2</sup> )
	Linen room	32.0	
	Delivery room	117.0	8 (rooms) x 14,625 = 117
	Labor room	117.0	8 (rooms) x 14,625 = 117
	Nurse station	32.5	Seven persons attend (1 shift)
	Equipment warehouse	31.5	2 (rooms) x 15.75 = 31.5
	Toilet for patients	25.0	4 (rooms) x 6.25 = 25
	Cleaning room	39.0	
	Stretcher shed	13.0	
	Night-duty room	52.0	2 (rooms) x 26 = 52
	Corridor	128.0	
	Total	1,387.75	

Department	Room Name	Area	Remarks
[Operation + CSSD Department]		m <sup>2</sup>	
Operation Theatre	Operation room	78.0	2 (rooms) x 39 = 78
	Preparation room	19.5	
	Handwash room	19.5	
	Cleaning room	16.25	2 (rooms) x 8.125 = 16.25
	Anesthetic room	14.95	2 (rooms) x 7.475 = 14.95
Recovery Room	Recovery room	58.5	
	Cleaning room	16.25	
	Nurse station	11.375	
	Linen room	11.375	
	Sterilized corridor	120.25	
	Operation Department Chief Nurse room	34.0	22 + 12 = 34
	Operation Department Secretary room		
	Porter room	18.0	
	Transportation room	9.0	
	Toilet	78.0	4 (rooms) x 19.5 = 78
	Equipment warehouse	19.5	
	Night-duty room	30.0	2 (rooms) x 15 = 30
	Higher-ranking staff room	21.0	4 (persons) x 5.25
	Lower-ranking staff room	27.0	6 (persons) x 4.1
	CSSD Department	Sterilizing work room	58.5
Sterilizing room		71.5	
Autoclave		38.0	
Sterilized warehouse		40.0	
Dirty room		49.5	
Staff room		27.0	5 (persons) x 5.4
Dressing room		39.0	2 (rooms) x 19.5 = 39
Corridor		29.25	
Gallery		277.8	
Total		1,233.0	

Department	Room Name	Area	Remarks
		m <sup>2</sup>	
[Ante-natal Ward]	Sickroom	214.5	3 (rooms) x 71.5 = 214.5
	Toilet	29.25	2 (rooms) x 14.625 = 29.25
	Cleaning room	14.625	
	Laundry	14.625	
	linen room	14.625	
	Boiler room	14.625	
	Corridor	68.25	3.0 m wide
	Total	370.5	
[Others, outhouse]	Transformer House	50.0	5.0 x 10.0
	Medical gas cylinder room	37.5	5.0 x 7.5
	Total	87.5	
Roofed passage	Roofed passaged	191.75	3.0 m wide







Workers compensation rehabilitation center  
 労災リハビリセンター棟

Mortuary block  
 死体安置棟 (解剖棟含む)

Waternity block  
 産科棟

Main Building  
 本館棟

X-Ray therapy block  
 X線治療棟

Laboratories  
 各種研究棟

変電室棟

African & European nurses home  
 看護婦棟

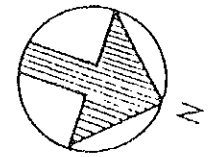
Boiler, Kitchen and Laundry house  
 ボイラー・キッチン・洗濯棟

Water storage tank (50,000 gallon)  
 貯水タンク (5万ガロン)

African staff quarters (12 blocks)  
 スタッフ用官舎棟 (12棟)

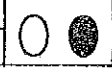
Orderlies quarters  
 用務員宿舎棟

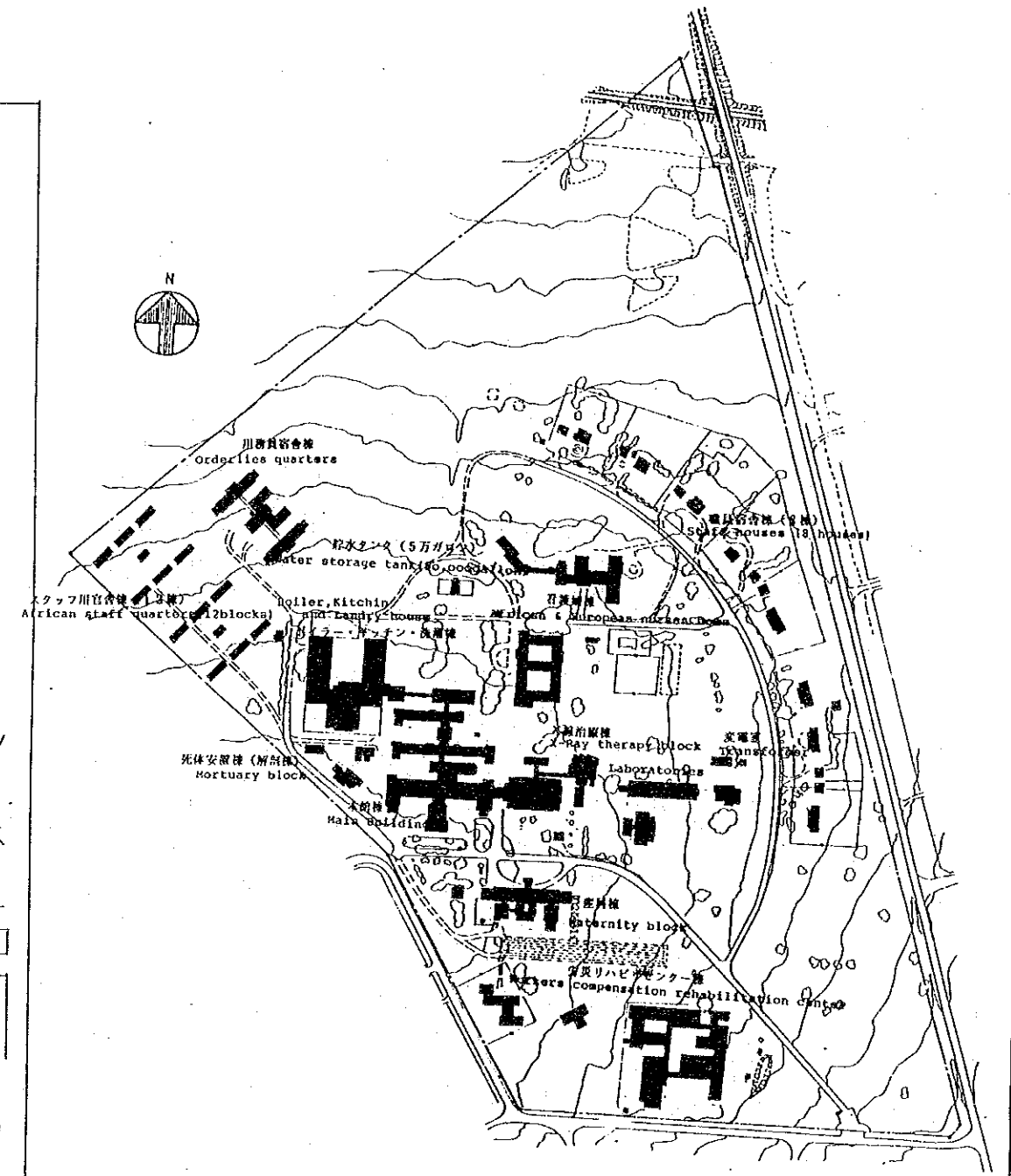
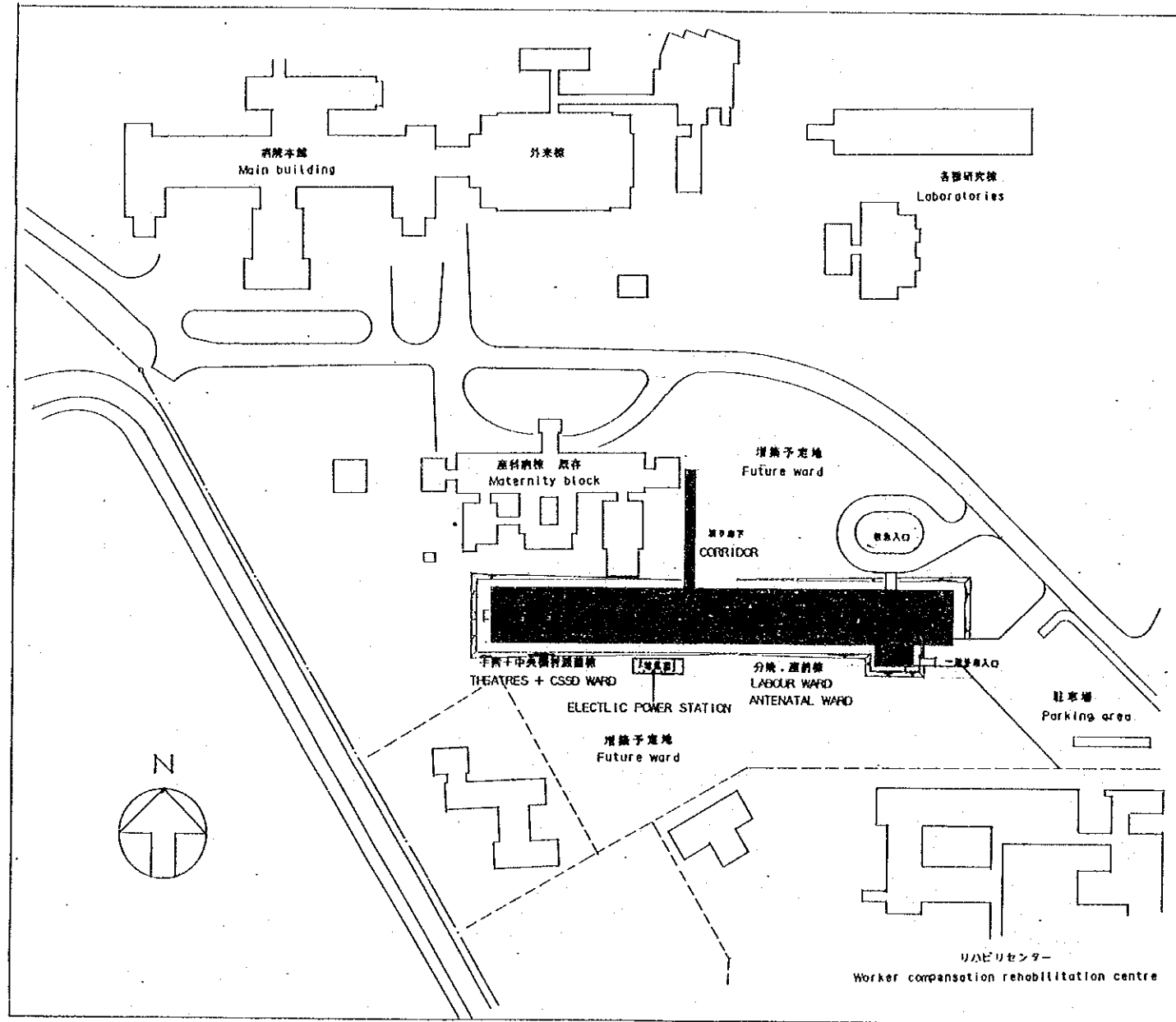
Staff houses (8 houses)  
 職員宿舎棟 (8家屋)



5-35/5-36

LOCATION MAP

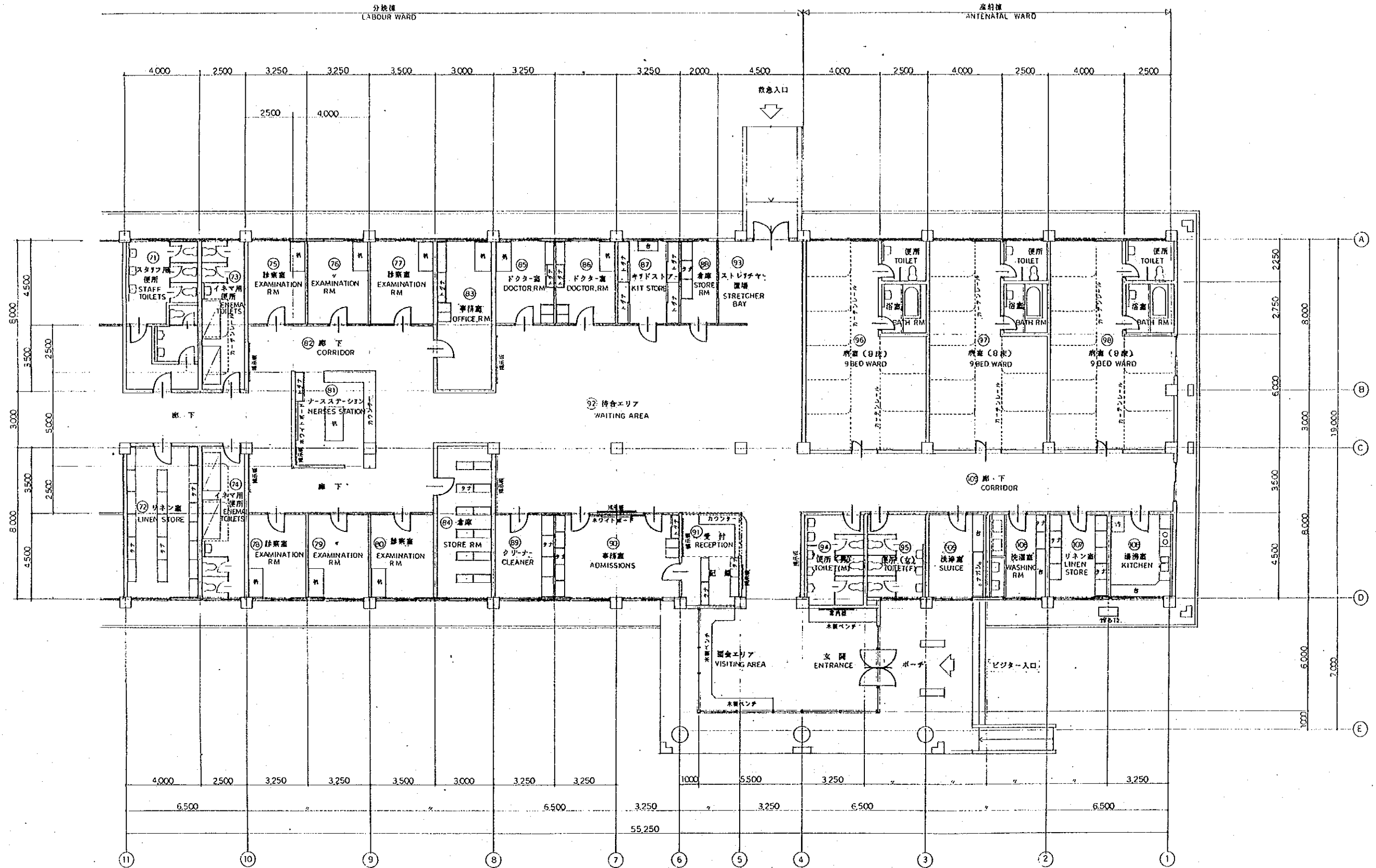




5-37/5-38

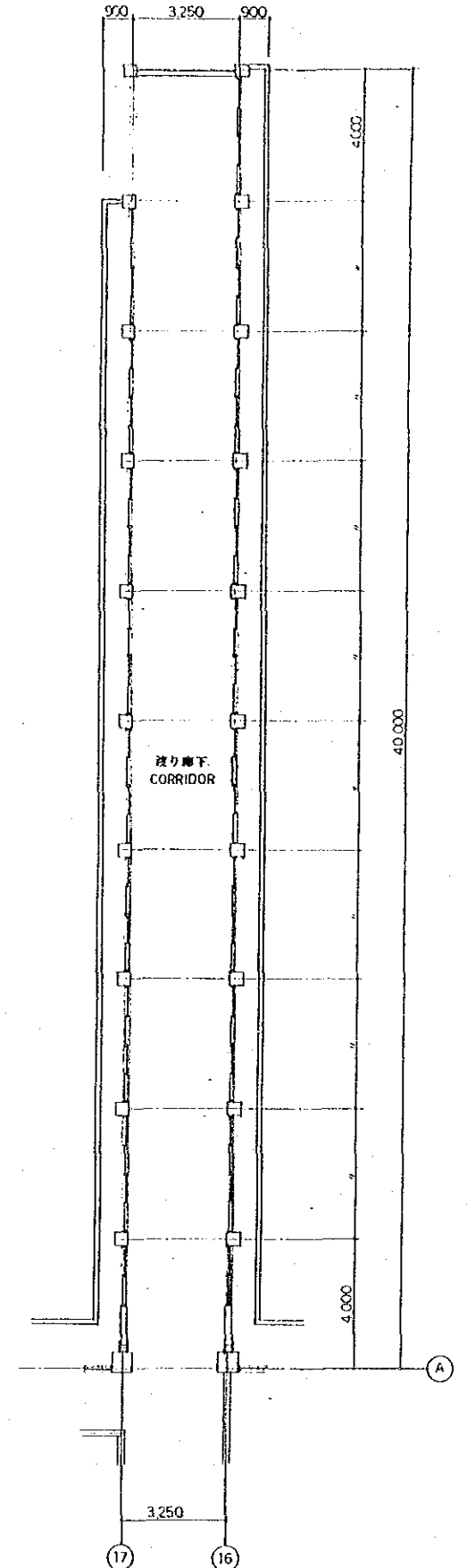
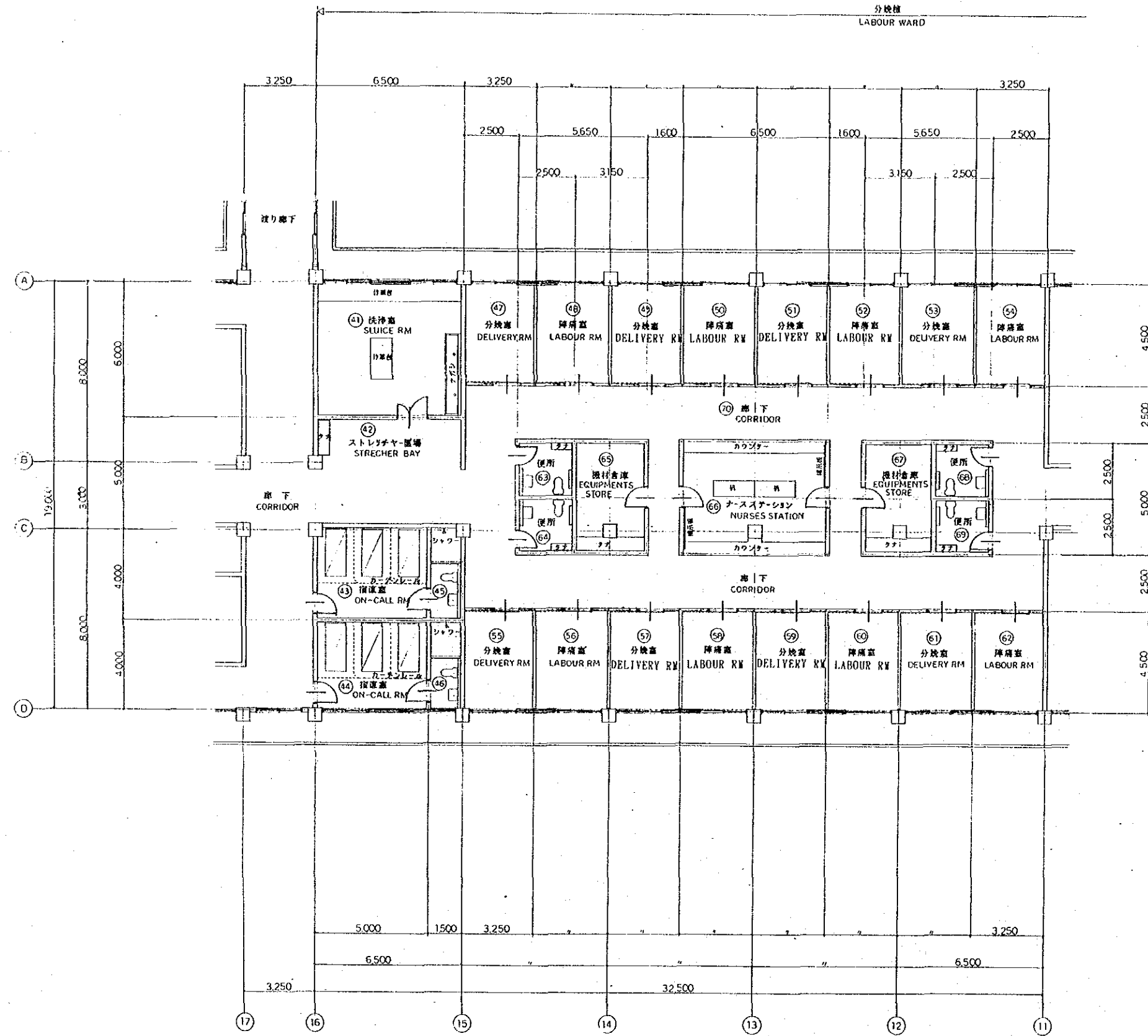
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	APPROVAL	SCALE	1:1000	01

19



5-39/5-40

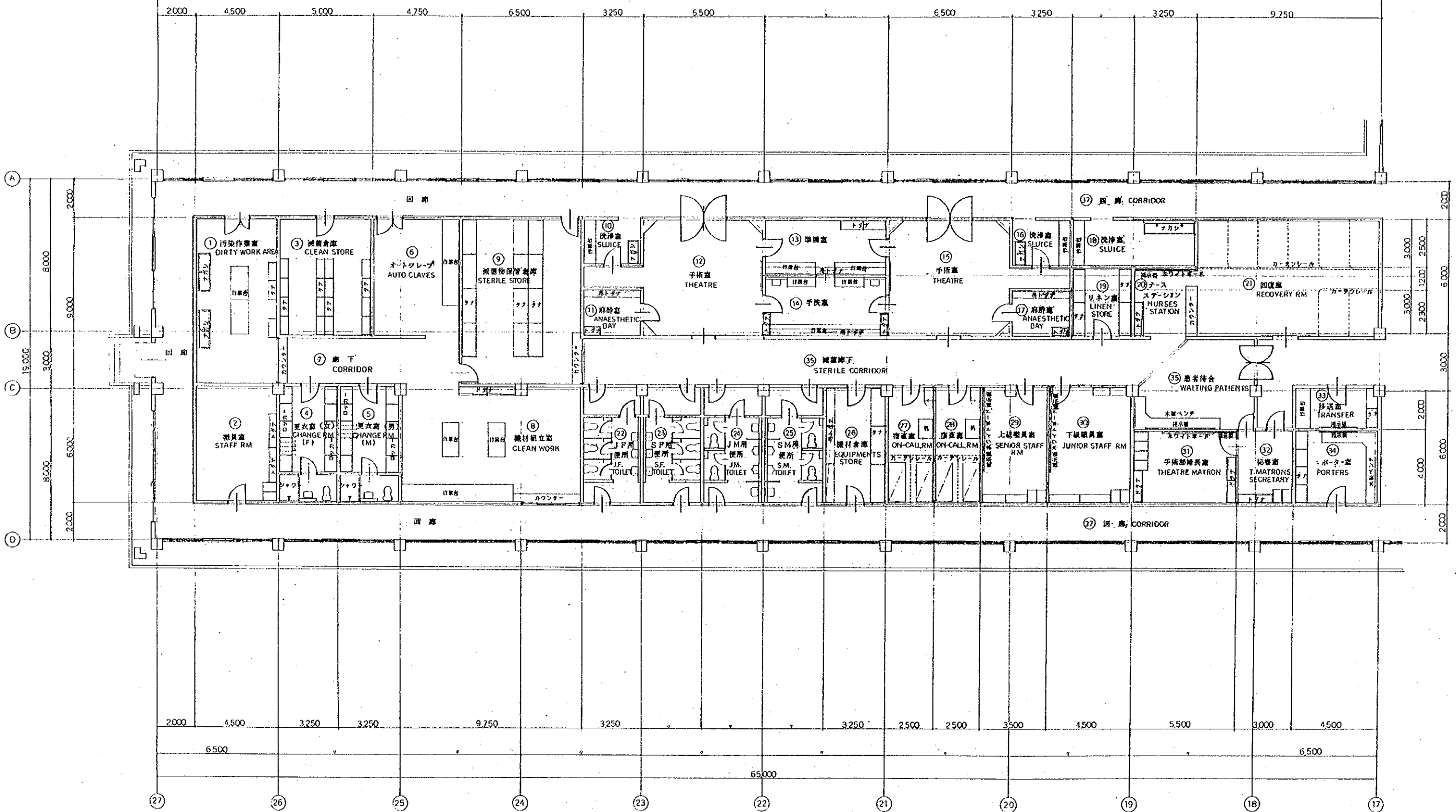
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	APPROVAL	SCALE 1:100	FLOOR PLAN 平 面 図 - 1	



5-41/5-42

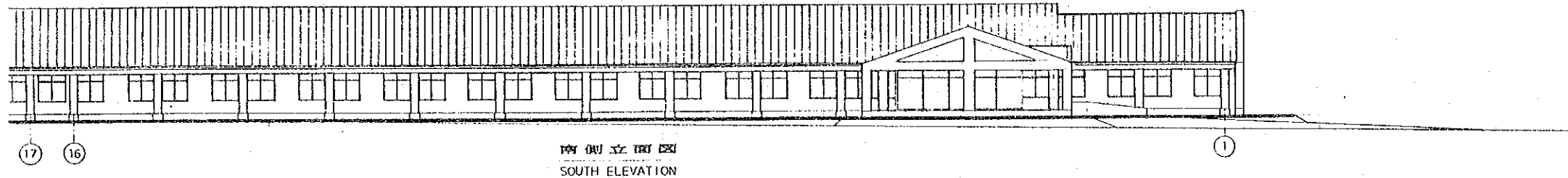
NOTE	WORK NO.	DATE	TITLE	DRAWN NO.
	APPROVAL	DRAWN	SCALE 1:100	FLOOR PLAN 5-41/5-42 - 2
				3

手術+中央器材消毒棟  
THEATRES + CSSD WARD

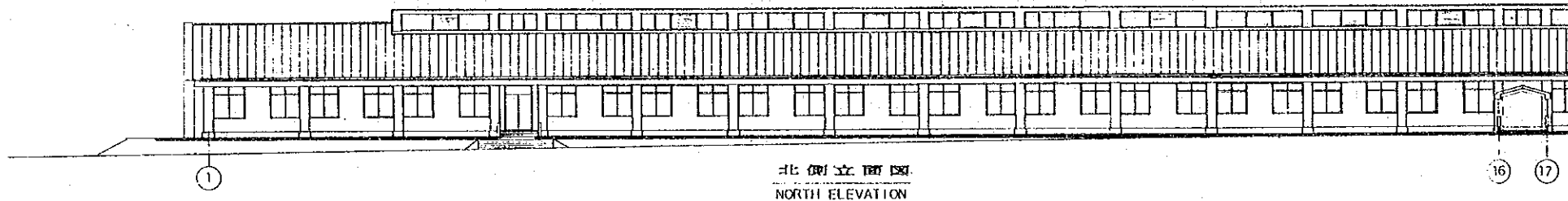


5-43/5-44

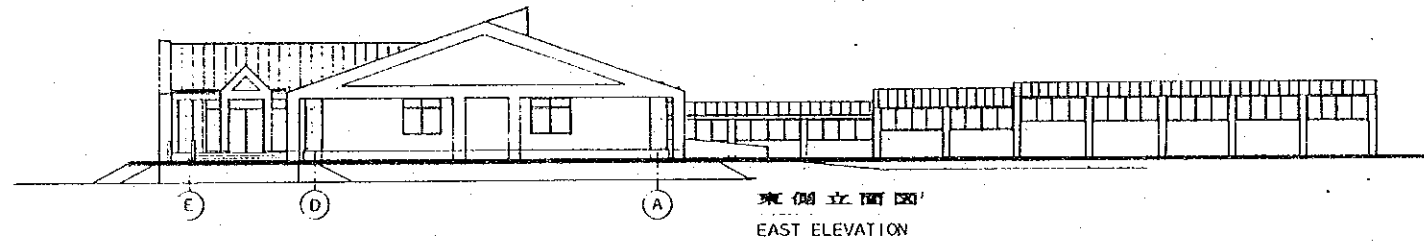
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	APPROVAL	DRAWN	SCALE 1:100	FLOOR PLAN 平 建 図 - 3



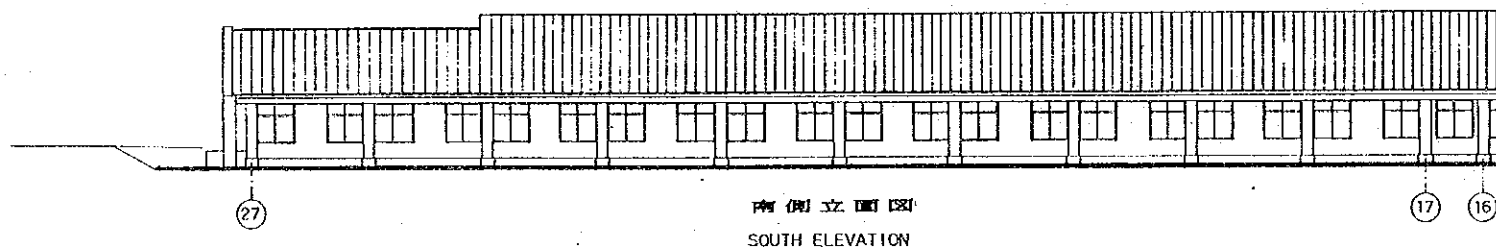
南侧立面图  
SOUTH ELEVATION



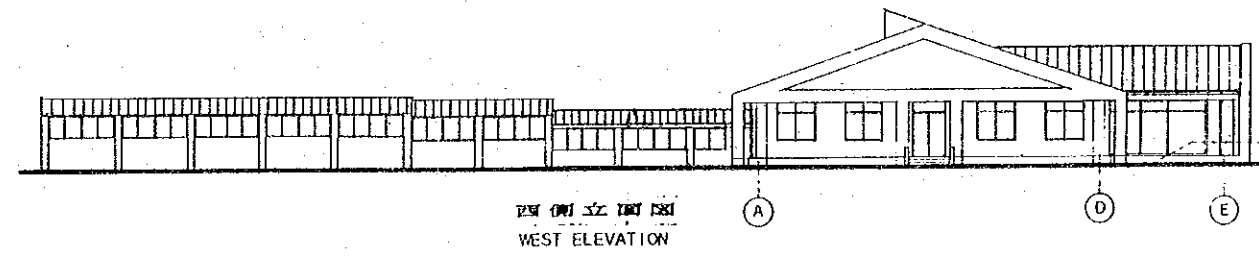
北侧立面图  
NORTH ELEVATION



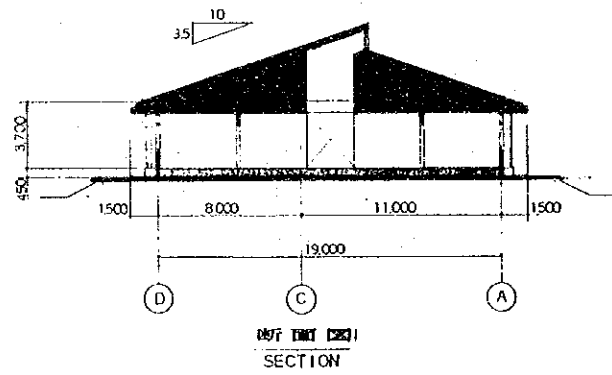
东侧立面图  
EAST ELEVATION



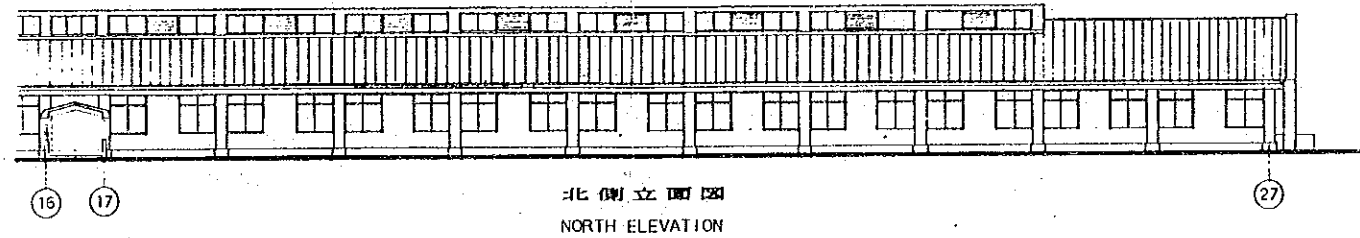
南侧立面图  
SOUTH ELEVATION



西侧立面图  
WEST ELEVATION



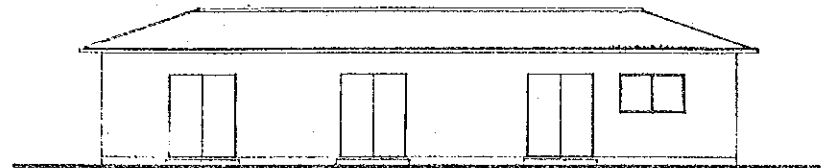
剖切面图  
SECTION



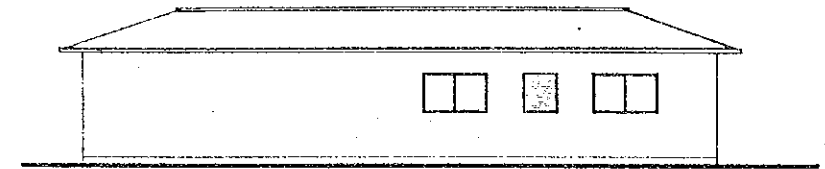
北侧立面图  
NORTH ELEVATION

5-45/5-46

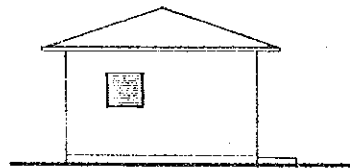
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	APPROVAL	DRAWN	ELEVATION SECTION 立面图 剖面图	
		SCALE 1:200		05



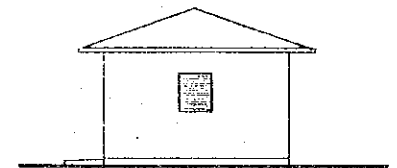
南側立面図  
SOUTH ELEVATION



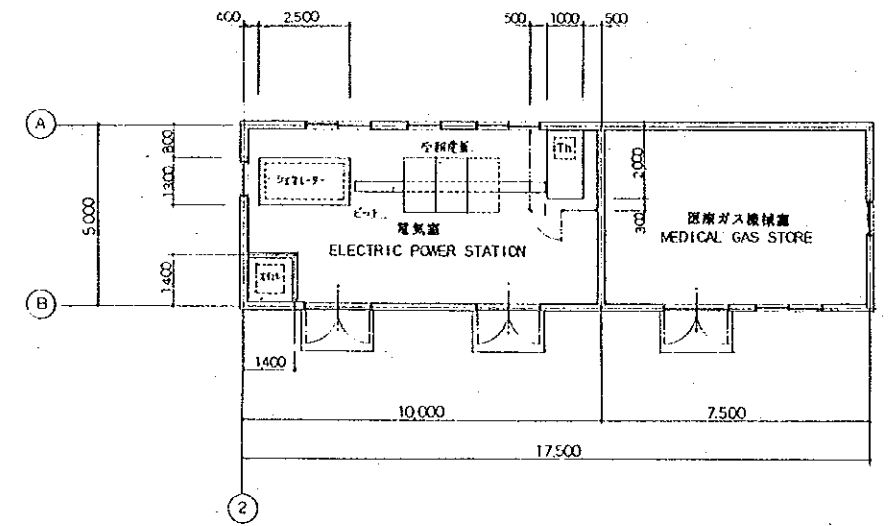
北側立面図  
NORTH ELEVATION



西側立面図  
WEST ELEVATION



東側立面図  
EAST ELEVATION



平面図  
PLAN

5-47/5-48

NOTE	WORK NO.	DATE	TITLE	DRAWN NO.
	APPROVAL	DRAWN	SCALE 1:100	FLOOR PLAN ELEVATION 平面図 立面図





## 5-4 Construction Execution Program

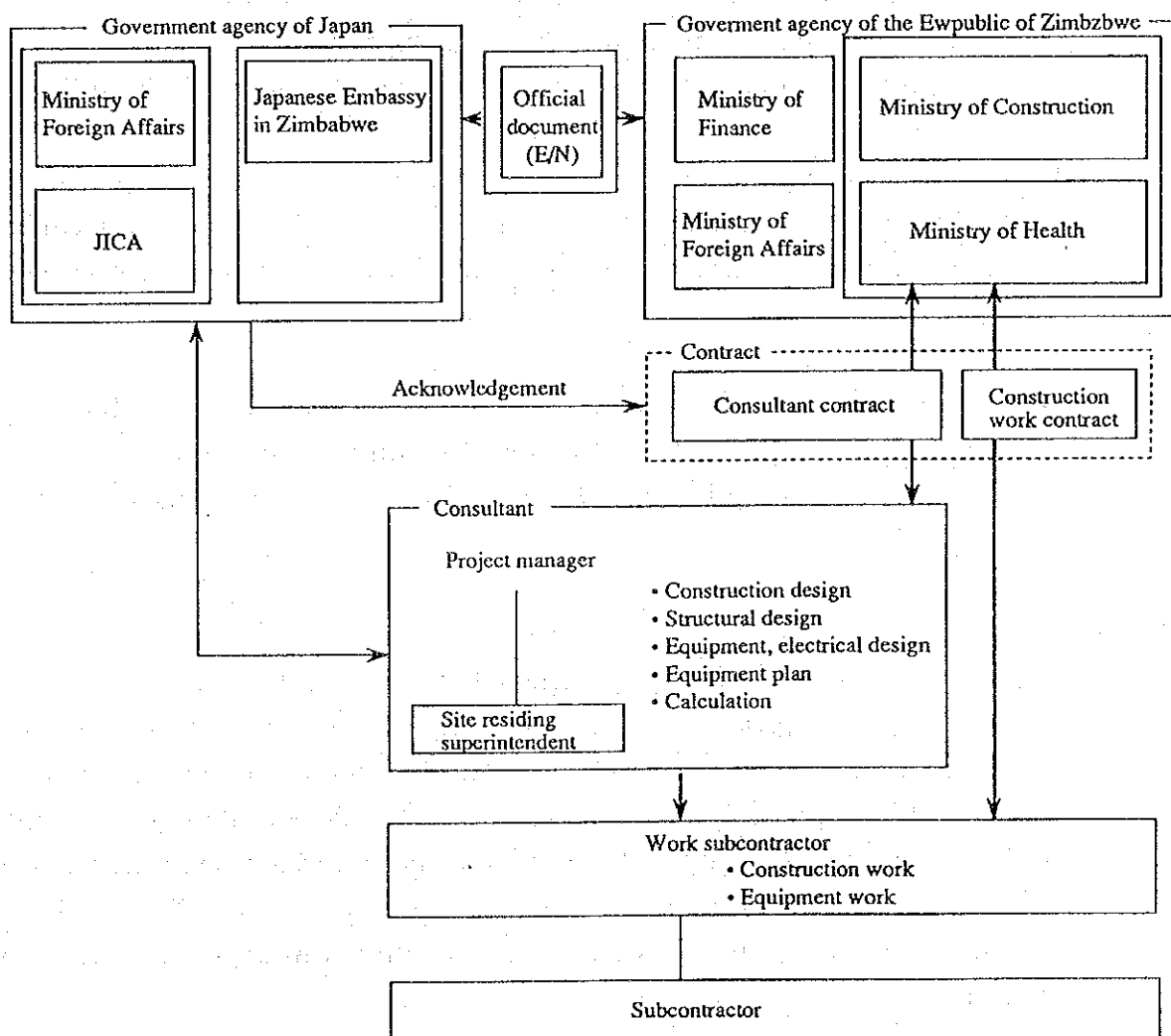
In view of the system of Zimbabwe, it is considered appropriate to execute this project with assistance from Japan in the manner as follows.

### 5-4-1 Construction Execution Policy

#### 1) Executing System (executing body of the work)

The executing body of Zimbabwe is the Ministry of Health, who is a party of the contract with Japanese consultant and construction company. The Ministry of Finance takes charge of the procedure of official document exchange between these two Governments as well as bank agreement.

The Ministry of Construction receives the application for design of this facility, approval of construction work, and various inspections.



## 2) Consultant

The Japanese corporation consultant will make detailed arrangement with the Ministry of Construction, each relevant authority, the consultant at the site as well as Japanese construction companies to help smooth progress of the project in line with executing drawings and specifications within the specified period by its superintendence works, including confirmation, adjustment, and recording, and periodically report to the Government of the Republic of Zimbabwe and of Japan. This body send specialists of facility superintendence when required for confirmation of facility construction work and adjustment. It issues the completion certificate on each stage of the work and receive acknowledgment from the Government of Zimbabwe. It send specialists of equipment delivery to the site. On delivery of the equipment to the Government of Zimbabwe, collation with documents and acknowledgment is made on the items and quantity with attendance of those concerned, the delivery completion certificate is issued to receive recognition from the Government of Zimbabwe.

The consultant of Zimbabwe side enters into a contract with this consultant and checks the drawings in reference with the executing design and work specifications so that approval is successfully received from the Government of Zimbabwe.

The Ministry of Construction accepts the application for construction permit, and examines the drawing submitted by the consultant. When an explanation is required by each related department, the consultant of Zimbabwe side assist the Japanese consultant.

When the consultant recognizes necessity for a meeting with the Ministry of Construction, Waterworks Bureau, or Fire Department and needs a help by the consultant of Zimbabwe side, he will assists the Japanese consultant.

## 3) Executing Company

A Japanese construction company carries out the work as the principal contractor, and performs work plan superintendence, safety management, quality control and material management keeping a close contact with those concerned to smoothly complete the work. Among the construction materials, there are those to be procured in Japan, which makes it difficult for the workers at the site to appropriately deal with them, therefore, Japanese engineers are sent when required. The workers on the site are engaged in the work under the subcontract with Japanese construction company.

#### 4) Equipment procuring company

Japanese equipment procuring companies gathers articles conforming to the equipment specifications. When necessary, these companies explains the operation, maintenance, and repair method, and receives the receipt as well as operation explanation attendance certificate from the Ministry of Health.

### 5-4-2 Construction Conditions

#### 1) Construction Conditions

##### A) Construction Industry

The construction industry in Zimbabwe is generally at a very high level of construction capability, and some companies are playing an active part internationally. But shortage of foreign currency and resultant a severe restriction for foreign money allocation makes it difficult to procure repair parts, even those who have construction vehicles (concrete, plant, and tower crane) classified into the heavy construction machinery group is at a low rate of operation and they have to discontinue the work in some cases.

##### B) Technical level

The technical level of the workers at the site is relatively high. There is no problem for general buildings. But the work efficiency stays at a level of 40% of that of Japan, which makes the necessity of the supervisor high.

##### C) Construction material

Some articles are produced in Zimbabwe, while the others are imported. For general articles necessary in the construction work, 80% is available at the site.

However, due to shortage of foreign currency, it is difficult to receive foreign money allocation for import in Zimbabwe to result in quantitative shortage. Thus, procurement of equipment is considered to exert an influence to the working period.

The following are the present state of construction materials.

### Major machinery and materials produced in Zimbabwe

Construction materials: Sand, stone, cement, iron frame, brick

Finish material: Tile, wooden fixture, steel sash,  
plastic tile, marble

Construction materials: Electric wire, electric wire pipe, sanitary  
instrument, illuminator

### Major imported materials

Structural material: Iron frame

Finish material: Aluminium sash, steel fittings, glass, sound-absorbing  
board, metal fitting

Equipment: Switchboard, wiring equipment,  
transformer, electronic appliances, controller,  
PVC pipe, pump, meter, air conditioner,  
water heater, ventilation fan, medical piping,  
lightening rod

#### 2) Check point of construction work

- A) Connecting method of power line and drainage system, as well construction work period require due arrangement with those concerned.
- B) In view of the level of skill of the workers, appropriate leading by the engineers sent from Japan is necessary. Therefore, a detailed construction plan including provisional planning is required to reduce the construction period and rationalization of the work.
- C) As the wet season lasts from December to March, care should be taken for the foundation work to be executing in this period.

### 5-4-3 Scope of Work

When the project is executed with assistance from Japan, the respective parts of the work born by Japanese side and Zimbabwe side are as follows.

Scope born by Japanese side	Scope born by Zimbabwe Side
1. Construction work  Structural frame, finish of building	1. Construction work  None
2. Electrical facility work  Power receiving and transforming facilities, motive force and main line facilities, lamp, receptacle installation, in-hospital telephone facility, broadcasting facility, lightning conducting facility, medical gas facility	2. Land readjustment  Cutting of existing trees, removal of roots, land readjustment
3. Water supply and drainage, ventilation facilities  Water supply facility, drainage and ventilation facility, sanitation instrument facility, ventilation facility, air-conditioner	3. Exterior work  Gardening, planting
4. Exterior work  In-hospital passage, external lighting facility	4. Infrastructure lead-in, connection work  Telephone, electric power, water supply
5. Medical and office utensils  Medical equipment, vehicle, office utensils	5. Equipment and utensils  Curtains, blinds, general furniture, portable fire extinguisher  6. Others  Application fee for approval, boring investigation, measurement, custom duty and exemption procedure  7. Expenses for maintenance, management and administration  8. Expenses for events

#### 5-4-4 Construction and Supervisory Plan

On the stage of construction superintendence, the consultant will send site residing supervisor with the skill appropriate for the work site of this project for leadership of work and report. Moreover, in line with the progress of work, specialists are sent for a short period for inspection, attendance and leadership of construction work.

##### 1) Main points of supervisory plan

- A) Close contact with officials concerned of both Governments for arrangement and report aiming at successful completion of the construction work without delay
- B) Appropriate instruction and advice to workers for facility construction strictly conforming to the design documents
- C) Employment of the construction method common to the site and use of equipment available there as far as practical keeping in mind promotion of technical development of Zimbabwe
- D) Attitude to perform technological transfer for construction method and technique for full effect as a project with assistance from Japan
- E) Appropriate advice and instruction to those concerned in maintenance and management for smooth management after delivery

##### 2) Details of supervisory work

###### A) Cooperation related to the work contract

Selection of work executing company, decision on work contract method, preparation work contract draft, investigation of work detail, attendance on work contract.

###### B) Inspection and acknowledgment of construction drawing

Investigation of construction drawing, material, finished sample, facility material presented by the work executing company.

C) Leadership of work

Examination of work planning and process, instruction to the work executing company, report on progress of work to the orderer.

D) Cooperation to payment approval procedure

Examination of details of the statement related to the work expenses during and after completion of the work, and cooperation to the required procedure.

E) Attendance on inspection

Inspection is made on the output at each stage from start to completion of the work, and instruction is given to the work executing company. The consultant, when the work is completed and execution of contract conditions are acknowledged, attend the work of delivery of the object, receives the acknowledgment from the orderer, and end the work. Then, he will report to the officials concerned of the Government of Japan on the progress of the construction work of this project, payment procedure, and necessary items after delivery.

#### 5-4-5 Procurement Plan

1) Construction work

For materials used in the construction work of this facility, it is important to employ those articles to allow easy maintenance management of the facility and immediate repair when damaged. This project intends to procure necessary articles at the site as far as practical. But, some items have to be procured from Japan because of capability or availability.

After comparison of the costs of articles to be procured from Japan and at site, those lower in cost shall be employed.

On the basis of the above, major articles to be used in planning and the facility are summarized as follows:

Table 4-9 Materials Procurement Plan

Name of material	Procurement on site	Procurement from Japan	Procurement from third country
1 Sand, gravel	○		
2 Cement	○		
3 Wood	○		
4 Reinforcing rod	○		
5 Iron frame	○		
6 Block, brick	○		
7 Tile	○		
8 Wooden furniture	○		
9 Metallic fitting	○		
10 Aluminium fitting	○		
11 Glass	○		
12 Waterproof material	○		
13 Base plywood	○		
14 Roofing material	○		
15 Plastic tile	○		
16 Ceiling board	○		
17 Paint	○		
18 Miscellaneous hardware	○		
19 Switchboard		○	
20 Lighting instrument	○		
21 Telephone facility		○	
22 Power line, line tube	○	○	
23 Wiring instrument	○		
24 Transformer		○	
25 Electronic devices		○	
26 PVC pipe	○		
27 Sanitation equipment	○		
28 Overhead tank	○		
29 Pump		○	
30 Medical gas piping		○	

2) Material procurement

Medical equipment introduced into this facility are procured from Japan since unavailale at the site. Office equipment, including the copying machine, is procured at the site since these articles require an established support system.

Installation of such an article on the site requires specialists to be sent, and it requires a certain period and training for the staff at the site to be accustomed to use of the equipment for efficient use after installation.



On the basis of the above, major articles to be used in planning and the facility are summarized as follows:

	Materials to be procured at the site	Materials to be procured from Japan
Outpatient facility equipment	Desk Filing cabinet	Ambulance (with radio set)
Medical examination facilities	Trolley for conveying babies Baby scale Medical refrigerator	Diagnostic set Ultrasound apparatus
Antenatal room facility	Bed	Feto scope E.C.G. machine
Labour room facility	Labour bed	Fetal monitor Entonox equipment
Delivery facility	Baby scale Trolley for conveying babies Medical refrigerator Mortuary trolley Drip stand Handwash basin stand	Delivery bed Vacuum extractor Incubator Delivery set Portable autoclave Caesarian section set Resuscitator
Operation facility	Drip stand Linen cart Laundry cart Desk Filing cabinet	Theatre operation table Diathermy machine Cardiac monitor Operation light Ultrasonic cleaner Portable autoclave Glove washing machine Glove drying machine
Recovery facility	Bed Stretcher	Suction machine Pulmo-vents Defibrillator Cardiac monitor
CSSD facility	Laundry cart Linen cart	Autoclave Ultrasonic cleaner Glove washing machine Portable autoclave Glove drying machine

### 5-4-6 Execution Schedule

Execution of this construction plan with assistance from Japan, the work will be carried out in two construction term because of the length of time required. Therefore, term division should be made for the execution plan and construction work. Summary for each term is as follows:

First term: Execution plan, construction of the delivery, outpatient, examination and inspection, antenatal, labor and delivery ward, as well as the power room, and procurement of related machinery and materials.

Second term: Execution plan, construction of the operation + CSSD ward and roofed passage, and procurement of related machinery and materials.

The agency in charge of respective work after conclusion of E/N is as follows:

Promotion of B/A:	Ministry of Health
Consultant contract:	Ministry of Health
Acknowledgment of executing design:	Ministry of Construction
Acknowledgment of P/q:	Ministry of Health
Attendance to bidding:	Ministry of Health, Ministry of Finance
General contractor's contract:	Ministry of health
Acknowledgement and permit:	Ministry of Construction
Issue of construction Certificate:	Ministry of Construction
Permission related to construction work:	District authorities of Bulawayo

#### 1) Executing Design

The bidding documents are prepared on the basis of the basic design. These documents include the executing design, specification, statement of account, budget. Detailed arrangement is made on the early, middle, and final stages of the executing design with the authorities concerned of Zimbabwe side to enter the bidding procedure after acknowledgment of the final results.

The work requires 3.5 months for the first term and another 3.5 months for the second term.

## 2) Bidding Procedure

After completing the executing design, prior qualification of bidders are carried out in Japan by announcement. Based on the results of judgment, calls are issued to the participants by the executing agency and bidding is executed in the presence of those concerned. The company who has offered the lowest price is permitted to enter into the construction work with the Government of Zimbabwe as the successful bidder provided no irregularities are found in the bidding.

Two months are required for the process from bidding to conclusion of construction work contract.

## 3) Construction and Work Contract

Once the construction work contract is concluded, the work is commenced after verification by Japanese Government. On the basis of the size of this project and details of the facility, it is estimated for the first phase to take 12 months and for the second phase to take another 8 months provided construction machinery and materials are smoothly procured and the preparatory work is carried out by Zimbabwe side as scheduled.

## 5-4-7 Estimated Project Cost

### 1) Preconditions

In calculating an estimated project cost, the following factors have been used as preconditions:

1. Time of calculation: As of December, 1990
2. Foreign Exchange rate: US\$1 = 142.75 Japanese yen (Z\$1 = 56.42 yen)
3. Construction period: First phase - 12 months  
Second phase - 8 months

The work is divided into parts. Execution design, work, procurement of machinery and materials are as shown in the schedule.

4. Contractor: General contractor of Japan
5. Miscellaneous: Within the limits of the grant aid system of Japan, taxes, levies, import duties, etc., which will otherwise be imposed upon local construction materials and equipment to be used in the Project, and enterprise tax, value-added tax, etc. on the Japanese general contractor, are not included in the estimated project cost.

2) Estimated cost born by the side of Zimbabwe	Z\$131,000.00 (approx. 7.3 mil.J. yen)
Grounding work (tree cutting, root removal)	Z\$1,000.00 (approx 60.000 mil.J. yen)
Furniture (curtain, fire extinguisher, general furniture)	Z\$ 90,000.00 (approx. 5 mil.J. yen)
Others (application fee, borring data, etc.)	Z\$40,000.00 (approx. 2.24 mil.J. yen)

Work Schedule

	1	2	3	4	5	6	7	8	9	10	11	12
First Term	Implementation design (Operation, CSSD facilities)	Site work	Inland work	Site acknowledgment	Tender evaluation							
	Construction (Operation, CSSD facilities)	Preparatory work	Provisional, engineering, basic work	External frame work	Finish work							Total: 12 months
	Procurement (Operation, CSSD facilities)	[Equipment]				Production, procurement			Transportation			Installation, adjustment
Second Term	Implementation design (Delivery, outpatient facilities, Antenatal)	Site work	Inland work	Site acknowledgment	Tender evaluation							
	Construction (Delivery, outpatient facilities, Antenatal)		Provisional, engineering, basic work	External frame work	Finish work	Equipment work						Total: 8 months
	Procurement (Delivery, outpatient facilities, Antenatal)	[Equipment]				Production, procurement			Transportation			Installation, adjustment

## **SECTION 6 PROJECT EVALUATION AND CONCLUSION**

**6-1 Project Evaluation**

**6-2 Conclusion**





## SECTION 6 PROJECT EVALUATION AND CONCLUSION

### 6-1 Project Evaluation

Execution of this project is expected to produce the following effects.

Direct effect from the medical activities of the examination department concerned.

- 1) Solution of shortage of beds to allow the patients now lying under the bed to come into a normal sleeping manner.
- 2) Increase of floor area of the examination department concerned to provide a larger working area for medical specialists, including doctors and nurses, to improve the work.
- 3) Provision of a consistent delivery facility, including the antenatal room, labor room, and delivery room, provides a desirable care system for the parturient women and babies from antenatal stage to delivery, which will ensure early detection of abnormal delivery and reduction of the death rate of pregnant women.
4. Provision of two operation rooms facilitate a countermeasure for emergency during the cesarean section to eliminate miscarriage due to delayed treatment and enable an appropriate treatment for the baby to reduce the neonatal and pregnant women mortality.
5. By separating the outpatient inspection department from the existing facility, the congestion around the inspection department of existing facility is resolved, and the existing inspection area of 72 m<sup>2</sup> can be used as a sickroom, which means an addition of about 14 beds.
6. By separation of existing two delivery rooms from the sterilizing room, the existing area of 57 m<sup>2</sup> can be used as a sick room, which means an addition of about 11 beds.
7. As neonatal cot and incubator procurement is included in this project, congestion of neonates can be resolved to help resolution of the infection problem.
8. By procurement of the central sterilizing material department, reinfection of sterilizing materials is prevented to use a safet device for patients.

9. By procurement of ambulance with radio set by this project, an appropriate advice can be received during transportation of a pregnant woman to the hospital, which will help prevention of death of the women, miscarriage or premature birth due to insufficient treatment.

For reference, statistics of 1989 for the hospital concerned indicates, 1,472 cases of delivery (including 41 cases of still birth) taking place during transportation of total 12,960 neonates (including still birth).

#### Indirect effect

- 1) It help Mpilo Central Hospital to be positioned as the quaternary medical service facility and sufficiently meet patients transferred from subordinate medical institutions.
- 2) This project will provide the people of 470 million residents in four provinces (Matabeleland North, Matabeleland South, Masvingo, and Midland) whom this hospital takes charge of with a medical institution where they can made delivery work free from fear.

Under the present circumstance that subordinate medical facilities are not fully supplies with financial assistance from the Government, the resultant effect to be exerted to the residents will be uncountable.

#### 6-2 Conclusion

The gratuitous assistance for this project is judged appropriate because a great effect is expected for execution of this project as mentioned before to contribute enhancement life of inhabitants in the aspects of medical and sanitary affairs, and in particular, to the reduction of maternal and child mortality to which the Government of the Republic of Zimbabwe gives top priority.

## ANNEX



## ANNEX 1 Survey Team Organization

### Basic design survey

Name	Duty	Belonging
Tai Akera	Team leader	Ministry of health and Welfare Vice-President of National Children's Hospital
Motonobu Miyazaki	Hospital planning	Assistant Chief of the Ministers Secretariat International Affairs Division of Ministry of Health and Welfare
Koichiro Koroki	Project coordinator	First Basic Design Study Division, Grant Aid Study and Design Department, JICA
Yasunari Baba	Construction planning	Sozosha, Ltd.
Isao Kaneko	Construction design	Sozosha, Ltd.
Kenji Tomaru	Facility planning	Sozosha, Ltd.
Koichi Murao	Medical equipment planning	Sozosha, Ltd.

### Draft explanation survey

Name	Duty	Belonging
Tai Akera	Team leader	Ministry of health and Welfare Vice-President of National Children's Hospital
Koichiro Koroki	Project coordinator	First Basic Design Study Division, Grant Aid Study and Design Department, JICA
Yasunari Baba	Construction planning	Sozosha, Ltd.
Koichi Murao	Medical equipment planning	Sozosha, Ltd.

## ANNEX 2 Survey Schedule

### 1. Basic Design Survey

Survey Period: October 6 to November 1, 1989

#### Survey Schedule

		Contents of Work			
No.	Date	GOJ	Con.	GOJ	Con.
1	Oct. 6 Sat		20:00 Tokyo → JAL 771		Departure
2	7 Sun		6:51 Sydney Lodging		Lodging
3	8 Mon		10:35 19:55 Sydney QF 023 → Harare		Arrival
4	9 Tue				Visit to Japanese Embassy Visit to Minister of Health Conference
5	10 Wed				Survey of Harare Central Hospital site, conference with related organs
6	11 Thu				Survey of Harare Central Hospital site, conference with related organs
7	12 Fri		Harare → UM333 Bulawayo		Survey of Mpilo Central Hospital site, conference with related organs
(1) 8	13 Sat	14:25 19:10 Tokyo → Frankfurt LH 711 Loading			Survey of Mpilo Central Hospital site, conference with related organs Collection of data
(2) 9	14 Sun	23:15 Frankfurt → LH 574	2 persons Bulawayo → UM 340 Harare		Collection of related data General survey
(3) 10	15 Mon	11:40 Harare			Visit to Japanese Embassy Conference, joining
(4) 11	16 Tue		2 persons Bulawayo → UM 332 Harare		Conference with Ministry of Health, kickoff meeting Visit to Minister of Health Visit to Ministry of Economical Planning and Development
(5) 12	17 Wed				Survey of Harare Central Hospital site
(6) 13	18 Thu		20:00 Harare → UM 333 Bulawayo	Survey of Mpilo Central Hospital site	Collection of data
(7) 14	19 Fri			Survey of Mpilo Central Hospital site	Collection of construc- tion related data, confer- ence with related organs

		Contents of Work				
No.	Date	GOJ	Con.	GOJ	Con.	
(8)	15	20 Sat			Survey of Mpilo Central Hospital site	Collection of construction related data, conference with related organs
(9)	16	21 Sun	Bulawayo → Harare UM332	2 persons Bulawayo → Harare UM332	Collection of general life related data Conference within committee	
(10)	17	22 Mon			Conference with Ministry of Health	Collection of related data Conference with related organs Conference with counterparts
(11)	18	23 Tue			Conference with Ministry of Health	Conference with related organs, survey of construction, facilities, machinery costs
(12)	19	24 Wed			10:00 Signature by minutes at Ministry of Health	Conference with related organs, survey of construction, facilities, machinery costs
(13)	20	25 Thu	22:20 Harare BA 052		Adjustment of data, report to Japanese Embassy	Conference with related organs, survey of construction, facilities, machinery costs Conference within committee
(14)	21	26 Fri	07:25 London → Loading		Movement	Collection of related data Construction cost survey
(15)	22	27 Sat	15:30 London → BA 007	2 persons Harare → UM 333 Bulawayo	Movement	Collection of related data Survey of general life related matters
(16)	23	28 Sun	11:20 → Tokyo	2 persons Bulawayo → UM 332 Harare	Return to Japan	Conference with Mpilo Central Hospital
	24	29 Mon				Conference with Ministry of Construction Conference with Ministry of Health Survey of machinery costs
	25	30 Tue		10:10 Harare → BA 052		Report to Japanese Embassy Report to Ministry of Health
	26	31 Wed		06:10 14:30 London London BA 007		Movement
	27	Nov. 1 Thu		11:25 → Tokyo		Return to Japan

## 2. Draft Explanation Schedule

Survey Period: February 13 to March 2, 1991

### Survey Schedule

		Contents of Work			
No.	Date	GOJ	Con.	GOJ	Con.
1	Feb. 13 Wed		20:30 Tokyo → QF 022		Movement
2	14 Thu		07:50 Arrival in Sydney 11:30 Departure from Sydney QF 023 Arrival in Harare 18:40		
3	15 Fri				Visit on Embassy for greeting, visit on Ministry of Health for greeting and conference (The draft is handed over and explained.)
4	16 Sat				Conference with Ministry of Construction
(1) 5	17 Sun	20:30 Tokyo → QF 020		Movement	Make-up of materials
(2) 6	18 Mon	07:50 Arrival in Sydney 11:30 Departure from Sydney QF 023 18:40 Arrival in Harare		Movement	Conference with Ministry of Health
(3) 7	19 Tue			Visit on Embassy for greeting, visit on Ministry of Health for greeting and conference	Accompaniment to government officers
(4) 8	20 Wed			Conference with Ministry of Finance Ministry of Health	
(5) 9	21 Thu	20:15 Harare → QF 024		Signing on the minutes, report to Embassy, Conference with Ministry of Construction movement by night flight	Accompaniment to government officers
(6) 10	22 Fri	20:15 Arrival in Sydney			Conference with Ministry of Construction
(7) 11	23 Sat	22:30 Departure from Sydney QF 021	07:30 UM 333 Harare → Bulawayo	Movement	Mpilo Central Hospital
(8) 12	24 Sun	6:10 Arrival in Tokyo		Homecoming	Make-up of materials



		Contents of Work			
No.	Date	GOJ	Con.	GOJ	Con.
13	Feb. 25 Mon		17:30 → UM332 Bulawayo → Harare		Conference with Mpilo Central Hospital
14	26 Tue				Conference with Ministry of Construction Conference with Material Supplier
15	27 Wed				Conference with Ministry of Construction
16	28 Thu	20:15 Harare → QF 024		Movement	Report to Embassy of Japan
17	1 Fri	20:15 Arrival in Sydney 22:30 Departure from Sydney QF 021			Movement
18	2 Sat	6:10 Arrival in Harare			Movement

## ANNEX 3 Major Interviewees List

### 1. Basic Design Survey

#### Ministry of Health

Dr. T. Stamp	Minister of Ministry of Health
Dr. R. Chatora	Acting Permanent Secretary
Mr. T. Zigora	Deputy Secretary: Administration & Finance
Dr. W. Muchenje	Co-ordinator FHP/PSIP
Ms. E. Serima	Dputy Co-ordinator FHP/PISP
Mr. D. Taonana	Administrative Officer
Ms. E. Ushewokunze	Assistant Planning Consultant FHP
Mr. J.W. Pfunye	Assistant Secretary
Mr. O. Rutsate	Assistant Secretary: Aid Section
Mr. B. Manyame	Director of MCH Services

#### Ministry of Finance, Economic Planning and Development

Mr. O.M. Matshalaga	Under Secretary
Mr. I.W. Nembaware	Administrative Officer
Mrs. M.A. Bamu	Assistant Secretary
Miss Rugaranganda	Administrative Officer
Mr. R.B. Makahamadze	Chief Executive Officer
Mr. W. Chirimuuta	Assistant Secretary PSIP

#### Ministry of Foreign Affairs

Mr. C. Hove	Under Secretary (Asia, Far East, Pacific & E. Europe)
Mr. J. Wutawunashe	Assistant Secretary (Asia & Pacific)
Mr. B. Marowa	Administrative officer (Asia & Pacific)

#### Ministry of Labour, Manpower Planning & Social Welfare

Mrs. E.D. Mapondera	Child Survival & Development Foundation
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#### Ministry of Public Construction & National Housing

Mr. D.E. Bronselaer	Project Architect
Ms. G. Maboreke	Chief Architect for Health & offices
Mr. A.K.M. Nur-Uz-Zaman	Deputy Director: Architectural Services

**Mpilo Central Hospital**

Dr. W.T. Chaibva	Medical Superintendent
Miss. V.T.S. Ndloun (HRS)	Hospital Administrator

**Harare Central Hospital**

Dr. M.N. Chimedza	Medical Superintendent
Ms. D.R. Chidavaenzi	Hospital Administrator

**Embassy of Japan**

Mr. Y. Rokujo	Counsellor/Chargé d'Affairs
Mr. Y. Kawajiri	First Secretary
Mrs. B. Lewins	Senior Officer: PR

## 2. Draft Explanation Survey

### Ministry of Health

Dr. G.G. Sikipa	Secretary for Health
Dr. Q. Chatora	Acting Permanent Secretary
Dr. W. Muchenje	Co-ordinator FHP/PISP
Ms. E. Serima	Dputy Co-ordinator FHP/PISP
Mr. D. Taonana	Administrative officer

### Ministry of Finance, Economic Planning and Development

Mr. Sibanda	Acting Permanent Secretary
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### Ministry of Public Construction & National Housing

Mr. A.K.M. Nur-Uz-Zaman	Deputy Director (Architectural Services)
Mr. D.E. Bronselaor	Chief (Architectural Services)
Ms. D. Hubka	Architect

### Mpilo Central Hospital

Dr. W.T. Chaibva	Medical Superintendent
Mr. V.T.S. Ndlovu (HRS)	Administrator

### Embassy of Japan

Mr. M. Iijima	Ambassador
Mr. Y. Rokujo	Counsellor/Chargé d' Affairs
Mr. Y. Kawajiri	First Secretary

## ANNEX 4

### 1 Basic Design Survey

MINUTES OF DISCUSSION  
ON  
THE BASIC DESIGN STUDY OF THE PROJECT  
FOR  
THE REHABILITATION OF THE CENTRAL HOSPITALS  
IN  
THE REPUBLIC OF ZIMBABWE

In response to the request from the Government of the Republic of Zimbabwe, the Government of Japan has decided to conduct a basic design study on the project for Rehabilitation of the Central Hospitals (hereinafter referred to as "the Project") and entrusted the study to Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to the Republic of Zimbabwe a study team headed by Dr. Tai Akeru, Director of Medical Research Center, Vice President of the National Children's Hospital, from October 6 to November 1 1990.

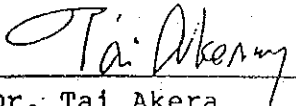
The team had a series of discussions on the Project with the authorities concerned of the Government of the Republic of Zimbabwe headed by Dr. R. Chatora, Acting Permanent Secretary, Ministry of Health and conducted a field survey at the proposed project sites.

As a result of the study, both parties have agreed to recommend to their respective Governments that major points of understandings reached between them, attached herewith, should be examined towards the realization of the Project.

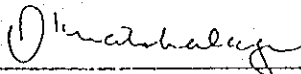
Harare, October 24th, 1990

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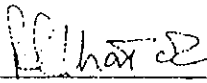
signed by

  
Dr. Tai Akeru  
Team Leader of the  
Basic Design Study  
Team

signed by

  
Mr. O.M. Matshalaga  
Under Secretary  
Ministry of Finance,  
Economic Planning &  
Development

signed by

  
Dr. R. Chatora  
Acting Permanent  
Secretary,  
Ministry of Health

ATTACHMENT

1. The title of the Project

The Project for the Rehabilitation of the Mpilo Central Hospital.

2. The object of the Project

The object of the Project is to improve the current conditions of the Mpilo Central Hospital in the field of medical services through the construction of Labour Ward, Operation Theatre and Central <sup>STERILIZATION</sup> Sterilized and Supply Department.

3. The Responsible and Coordinate Agency

The Mpilo Central Hospital shall have a responsibility for the efficient management and execution of the project under overall direction of the Government of the Republic of Zimbabwe through the Ministry of Health and other relevant Ministries.

4. The executing and implementing Agency

The Government of the Republic of Zimbabwe through Ministry of Health.

5. The Project site

The Project site is in the premises of the Mpilo Central Hospital in Bulawayo as shown in Annex-1.

6. The major items requested for the Project

The major items requested for the Project are listed in Annex-2.

7. Grant Aid Programme

(1) The Government of the Republic of Zimbabwe has understood the system of Japan's Grant Aid Programme and the use of Japanese consulting firm and contractor(s) for the implementation of the Project in principle.

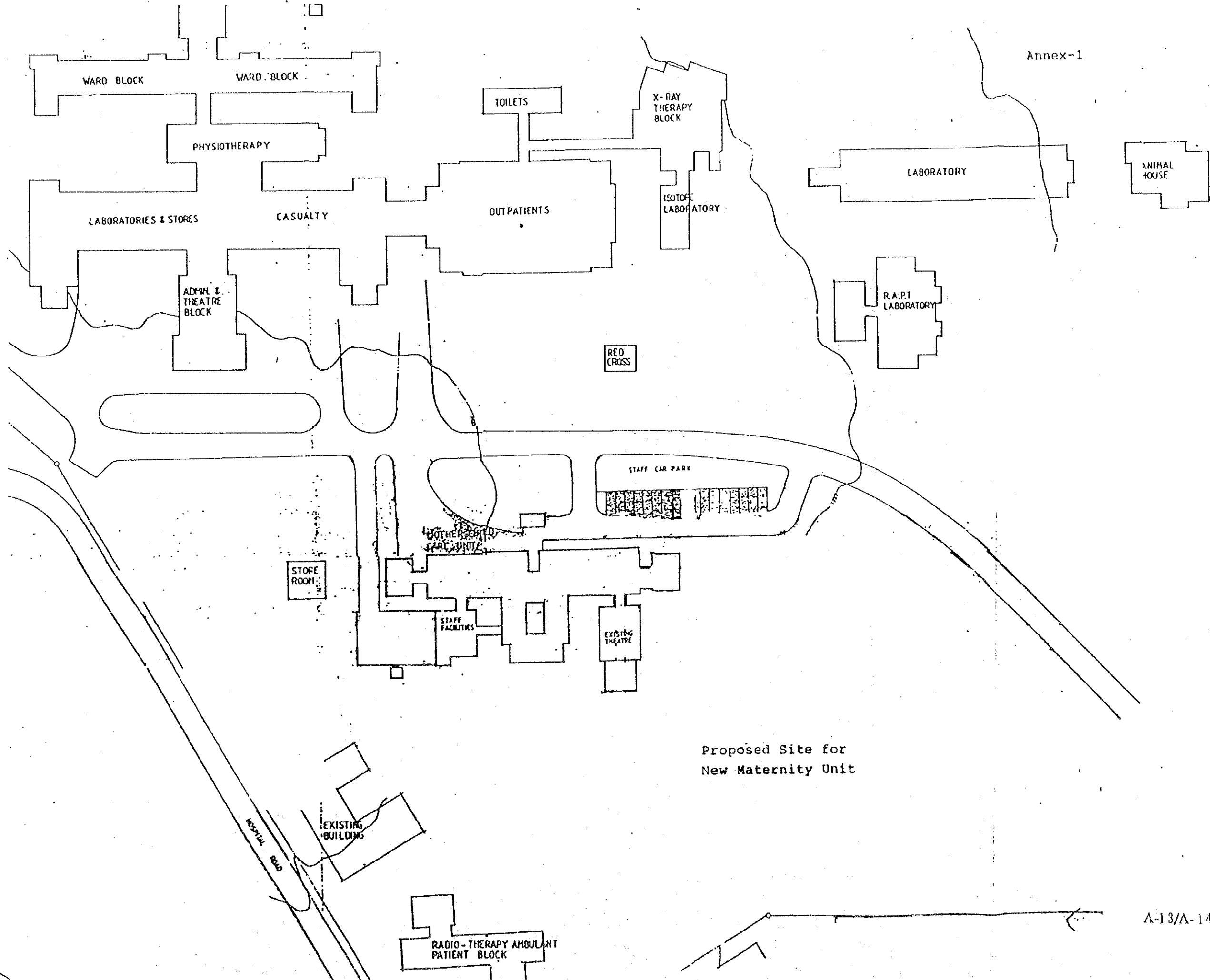
- (2) The study team will convey to the Government of Japan the desire of the Government of the Republic of Zimbabwe that the former takes necessary measures to cooperate in implementing the Project by providing necessary facilities and equipment as listed in Annex-2 under Japan's Grant Aid Programme.
  
- (3) The Government of the Republic of Zimbabwe through the Ministry of Health will take necessary measures as listed in Annex-3, on condition that the Grant Aid by the Government of Japan would be extended to the Project.

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Proposed Site for  
New Maternity Unit

A-13/A-14

*J.L.*  
i.l.



The major items requested for the Project

1. The first priority items requested by the Government of the Republic of Zimbabwe through the Ministry of Health are as follows;

- a) Construction of Labour Ward consisting of;
- \* Waiting area
  - \* Nurses station
  - \* Examination rooms
  - \* Toilets
  - \* Linen store
  - \* Labour bays
  - \* Other rooms to be considered as necessary

*J.A.*

b) Construction of Operation Theatre and Central ~~Sterilized~~ and Supply Department

STERILIZATION

*J.A.*

- \* Staff room
- \* Central ~~Sterilized~~ and Supply Department
- \* Sluice room
- \* Operation Theatre
- \* Toilets + Change
- \* Nurses station
- \* Recovery room
- \* Other rooms to be considered as necessary

STERILIZATION

c) Construction of Antenna if possible

2. Medical Equipment

Appropriate medical equipment for the above items will be included in the Project.

*J.A.*

Annex-3

The arrangements required to be taken by the Government of the Republic of Zimbabwe through Ministry of Health

1. To secure the site for the Project
2. To demolish, clear and level the project site prior to the commencement of the construction.
3. To undertake incidental outdoor work such as gardening, fencing, gates and exterior lighting in and around the project site.
4. To construct the access roads to the project site prior to the commencement of the construction.
5. To provide facilities for distribution of electricity, water supply, telephone, drainage, sewage and other incidental facilities to the project site.
6. To bear commissions to the Japanese foreign exchange bank for the banking services based on the Banking Arrangement.
7. To ensure the necessary budget and the personnel for the proper and effective operation and maintenance of the facilities and the equipment provided under the Grant Aid.
8. To ensure prompt unloading, tax exemption, customs clearance at the port of disembarkation in the Republic of Zimbabwe for prompt inland transportation of the materials and equipment provided under the Grant Aid.
9. To exempt Japanese nationals from custom duties, internal taxes and other fiscal levies which may be imposed in the Republic of Zimbabwe with respect to the supply of products and services for the Project.
10. To accord Japanese nationals whose services may be required in connection with the supply of products and the services under verified contract such facilities as may be necessary for their entry into the Republic of Zimbabwe and stay therein for the performance of their work.
11. To maintain and use properly and effectively the facilities constructed and equipment purchased under Grant Aid.
12. To bear all the expenses other than those to be borne by the Grant Aid necessary for the construction of the facilities as well as for the transportation and installation of the equipment.

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T.A.

THE BASIC DESIGN STUDY ON THE PROJECT  
FOR  
THE REHABILITATION OF THE MEDICAL FACILITIES  
OF  
CENTRAL HOSPITALS IN THE REPUBLIC OF ZIMBABWE  
(Consultations on Draft Report)

In October 1990, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched to the Republic of Zimbabwe a Basic Design Study Team for the Project for the Rehabilitation of the Medical Facilities of Central Hospitals in the Republic of Zimbabwe (hereinafter referred to as "the Project") and, through a series of discussions held and a field survey conducted in Zimbabwe and technical examination of the results of the latter in Japan, has designed an appropriate plan for the Project and prepared the draft report of the Basic Design Study.

In order to explain and to consult with relevant officials of the Government of Zimbabwe on the components of the Draft Report, JICA dispatched to Zimbabwe for the period February 13 to 24, 1991 a Report Explanation Team headed by Dr. Akera, Director of the Medical Research Centre and Vice-President of the National Children's Hospital of Japan. Ensuing discussions resulted in both parties confirming, in relation to the Draft Basic Design Study Report, the main items described in the attached sheet.

Harare, February 21, 1991

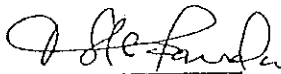
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Signed by:

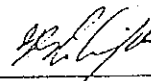
Signed by:



Dr. Tai Akera  
Team Leader  
Draft Report  
Explanation Team  
Japan International  
Cooperation Agency  
(JICA)



Mr. M. Sibanda  
Under Secretary  
Ministry of Finance,  
Economic Planning &  
Development



Dr. G.G. Sikipa  
Permanent Secretary  
Ministry of Health

ATTACHMENT

1. Components of the Draft Report

The Government of the Republic of Zimbabwe has agreed and accepted in principle the components of the Draft Report proposed by the JICA Team.

2. Japan's Grant Aid System

- (1) The Government of the Republic of Zimbabwe has understood the system of Japanese Grant Aid as explained by the Team.
- (2) The Government of the Republic of Zimbabwe will take necessary measures, described in the attached Annex-1, to ensure the smooth implementation of the Project on the condition that Grant Aid assistance is extended for the Project by the Government of Japan.

3. Further Schedule

The Team will make the Final Report in accordance with the confirmed items and forward it to the Government of the Republic of Zimbabwe by the end of April 1991.

*est.*  
*T. A.*  
*JJP*

ANNEX-1

The measures required to be taken by the Government of the Republic of Zimbabwe through the Ministry of Health:

1. To secure the site for the Project
2. To demolish, clear and level the Project site prior to the commencement of construction
3. To undertake incidental outdoor work such as gardening, fencing, gating and exterior lighting in and around the Project site
4. To construct the access road to the Project site prior to the commencement of construction
5. To provide facilities for distribution of electricity, water supply, telephone, drainage and other incidental facilities to the Project site
6. To bear commissions to the Japanese Foreign Exchange Bank for banking services provided in accordance with the Banking Arrangement
7. To ensure the necessary budget funds and provide the personnel for the proper and effective operation and maintenance of the facilities and the equipment provided under Grant Aid
8. To ensure prompt unloading, tax exemption, customs clearance at the port of disembarkation in the Republic of Zimbabwe for prompt inland transportation of the materials and equipment provided under Grant Aid
9. To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the Republic of Zimbabwe with respect to the supply of products and services for the Project
10. To accord Japanese nationals whose services may be required in connection with the supply of products and the services under verified contract such facilities as may be necessary for their entry into the Republic of Zimbabwe and stay therein for the performance of their work
11. To maintain and use properly and effectively the facilities constructed and the equipment purchased under Grant Aid

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T. A.  
*[Handwritten signature]*



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

*John*  
*J. A.*  
*R. D.*

## ANNEX 5 Management and Maintenance Expenses

Expenses required for management and maintenance of this facility are outlined below. The amount is calculated on the rate of 1990.

### 1) Electric power

a. Name apparatus	Capacity	Power factor	Demand factor	Consuming hours per day	Consuming days per year
Illuminator	44,660 W	0.9	0.8	8 H	365 days
Air conditioner	24,960 W	0.8	0.8	8 H	120 days
Electric stove	37,500 W	1.0	1.0	8 H	90 days
Hot plate	4,500 W	1.0	0.4	4 H	365 days
Exhaust fan	5,188 W	0.8	0.8	8 H	365 days
Plug socket	19,700 W	1.0	0.4	4 H	365 days
Hot water supply system	60,000 W	1.0	1.0	4 H	365 days

Consumption per day: 986 kWh

Consumption per year: 246,850 kWh

### b. Power rate

- Minimum charge

Increase in contract demand:

135 kW x Z\$7.3/month/kW = Z\$985.5/month

Z\$985.5/month x 12 = Z\$11,826/year

- Electric charge

986 kWh x Z\$0.665/kWh = Z\$655.69/day

246,850 kWh x Z\$0.665/kWh = Z\$164,155.25/year

Subtotal Z\$175,981.25/year

2) Generator (assumed power failure frequency: 1 time/month, capacity: 75 kVA)

• Oil cost + consumable (filter) replacement cost: Z\$900

Subtotal Z\$900/year

3) Air cooler (assumed filter replacement frequency and gas refill: 1 time/year)

• Service (filter replacement including parts): Z\$455 x 16 units Z\$7,280/year

• Gas refill: Z\$45 x 16 Z\$720/year

Subtotal Z\$8,000/year

4) Illuminator (assumed replacement frequency: 1 time/year, personnel expenses included)

• FL40W : Z\$18 x 1,010 units x 1 time/year Z\$18,180/year

• FL20W : Z\$11 x 280 units x 1 time/year Z\$3,080/year

• Natural light lamp : Z\$2 x 30 units x 1 time/year Z\$60/year

Subtotal Z\$21,320/year

5) City water charge

Amount use per day: 250 liter/person

Average consuming hours per day: 8 hours

Number of personnel:  $120/3 = 40$  (10,000 liter)

Number of in-patients: 45 (11,250 liter)

Number of nurses and visitors: 30 ( 7,500 liter)

Total 28,750 liter =28.75 m<sup>3</sup>/day

City water rate:

Within 15 m<sup>3</sup> (amount consumed): Z\$0.665/m<sup>3</sup>

Over 15m<sup>3</sup> (amount consumed): Z\$1.44/m<sup>3</sup>

28.75 m<sup>3</sup>/day x 30 = 862.5 m<sup>3</sup>/month x 12 = 10,350 m<sup>3</sup>/year

• Z\$1.44/m<sup>3</sup> x 10,350 Z\$14,904/year

Subtotal Z\$14,904/year

6) Telephone charge

• Inter-city call: Z\$0.125/3 minutes x 600 times/month x 12 = Z\$900/year

Out-of-town call

(Harare): Z\$2.34/3 minutes x 150 times/month x 12 = Z\$4,212/year

Subtotal Z\$5,112/year

7) Gas for medical use

Charge for gas refill, excluding gas cylinder cost

• Oxygen gas:

Z\$45 x 20 units

(number of cylinders required at one side)

Z\$900/6 days

Z\$150/day x 365 =

Z\$54,750/year

• Nitrous oxide gas: Z\$648 x 2 units

Z\$1,296/6 days

Z\$216/day x 365 =

Z\$78,840/unit

Subtotal Z\$80,136/year

- 8) Building mending charge (glass replacement, repainting, roof mending, tile resetting)

Subtotal: Allowance (including material cost)  
Z\$50/person-day x 60 person-day/year Z\$3,000/year

- 9) Gasoline, oil (vehicle)

• Gasoline:

1,200 liter/vehicle-month x Z\$1.70 = Z\$2,040 x 12 Z\$24,480/year

• Oil:

Z\$24,480 x 20% Z\$4,896/year

Subtotal Z\$29,376/year

- 10) Machinery maintenance (repair, parts replacement)

Subtotal: Allowance (excluding part cost)  
Z\$80/person-day x 120 person/day/year Z\$9,600/year

- 11) Office supplies, miscellaneous expenses (stationery, recording paper, consumable for office use)

• Estimated to be 10% of total expenses of Mpilo Hospitals

Subtotal: Z\$240,000 x 0.1 = Z\$24,000/year

- 12) Medical machinery maintenance

Subtotal: Repair: Z\$75/person x 120 person-day/year Z\$9,000/year









JICA