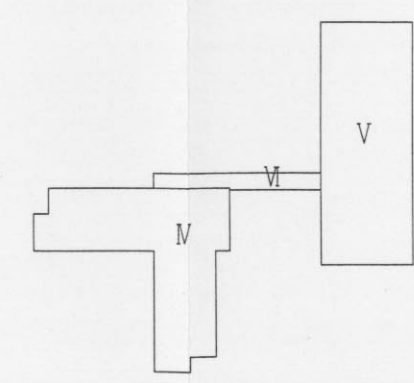
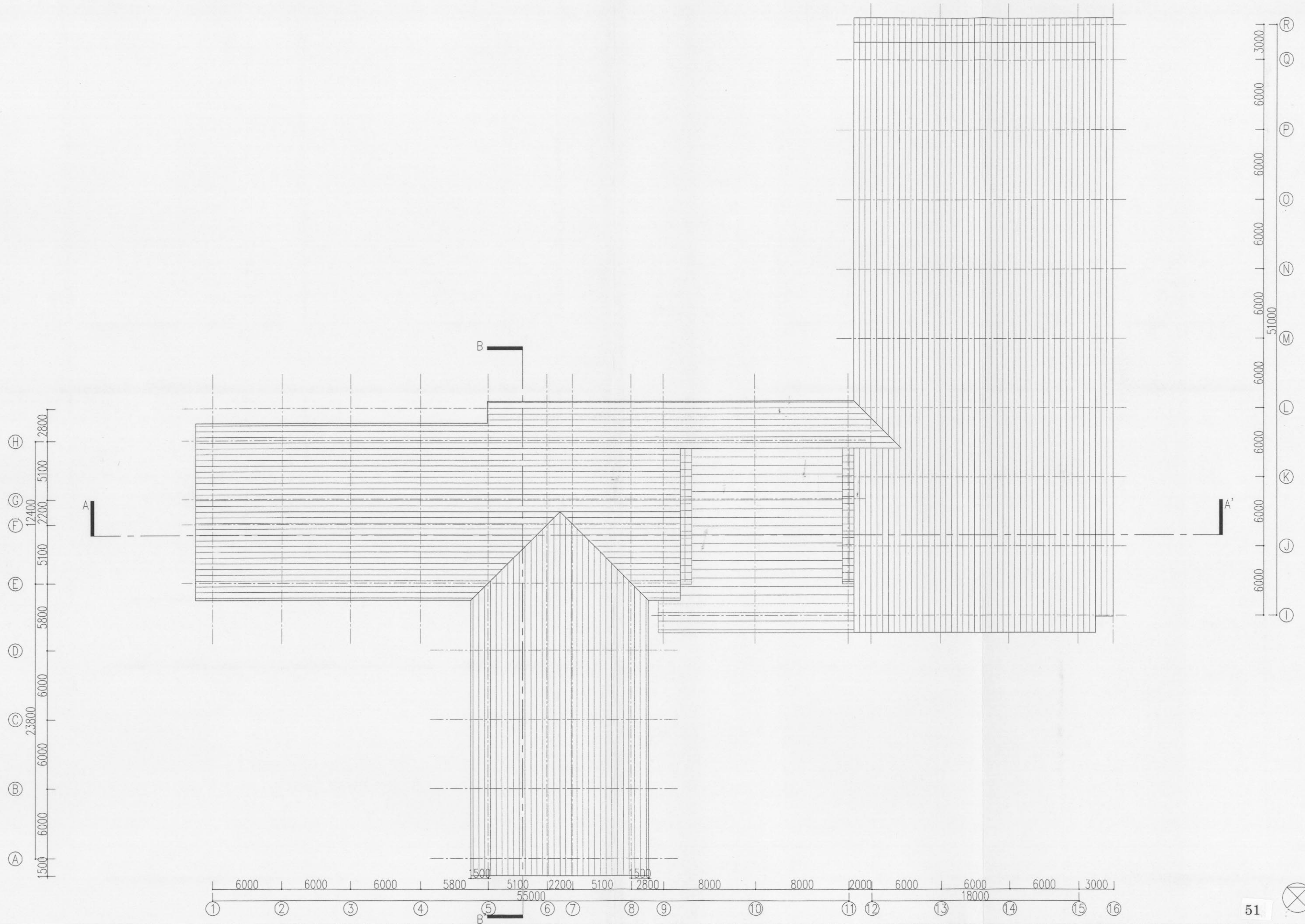


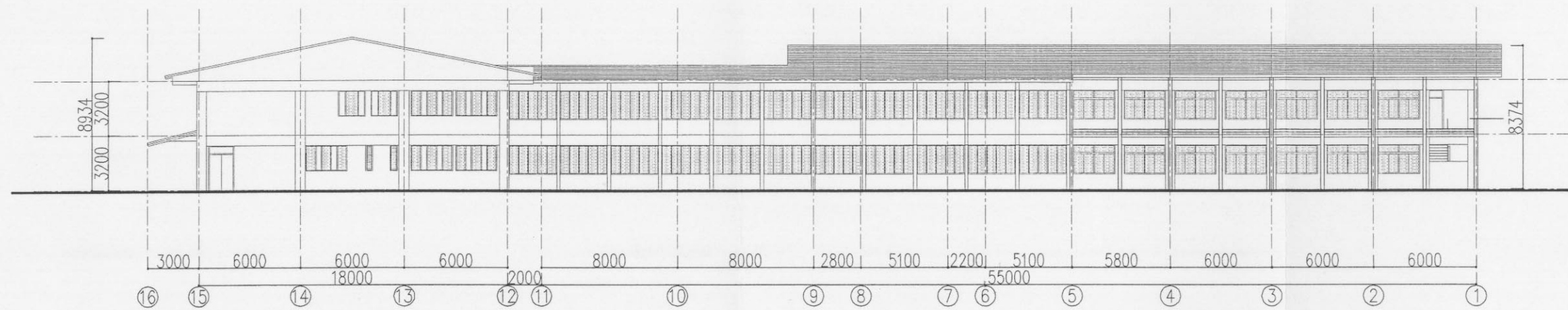
2F	(m ²)
Area IV	748.1
Area V	864.0
Area VI	105.4
Subtotal	1,717.5
Total	3,756.5



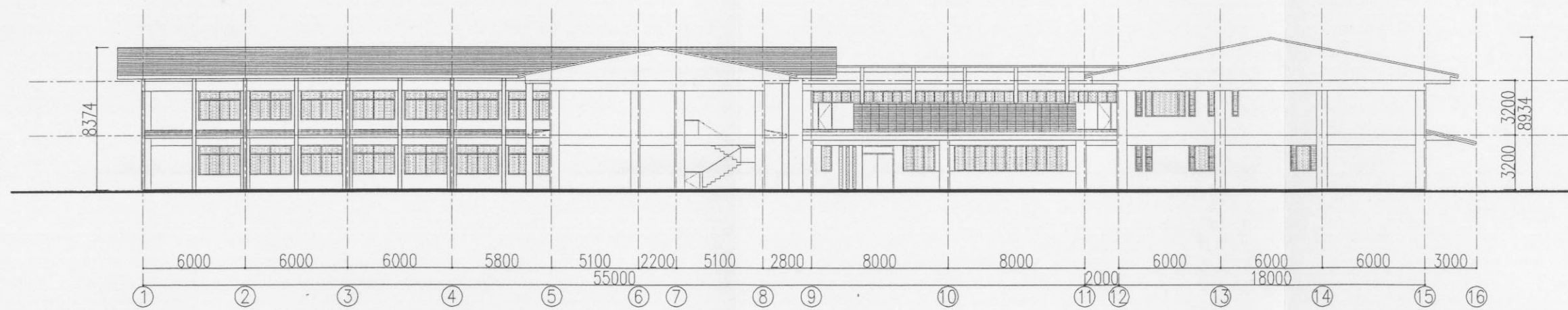
The Project for Upgrading and Refurbishment of Vaiola Hospital in the Kingdom of Tonga

Surgical Ward, CSB
1st Floor Plan
SCALE 1:300





A Elevation



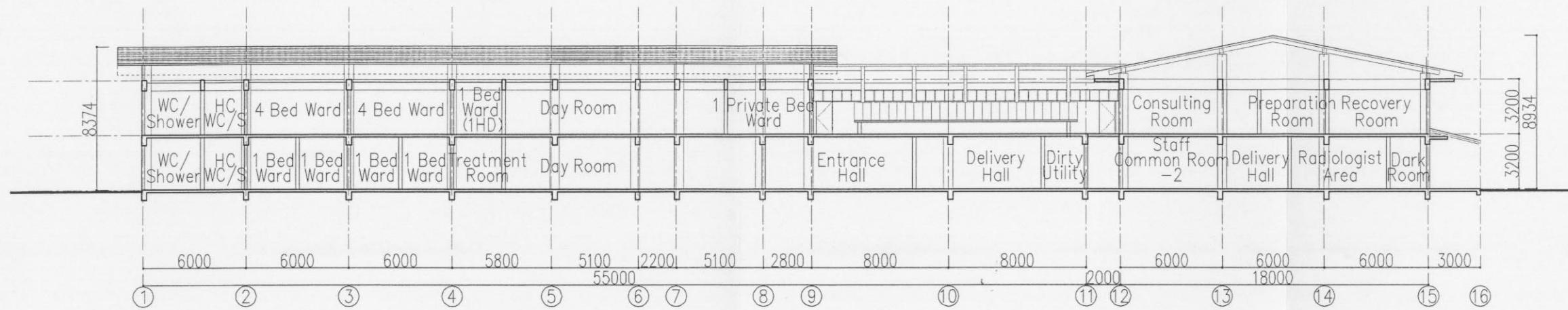
C Elevation



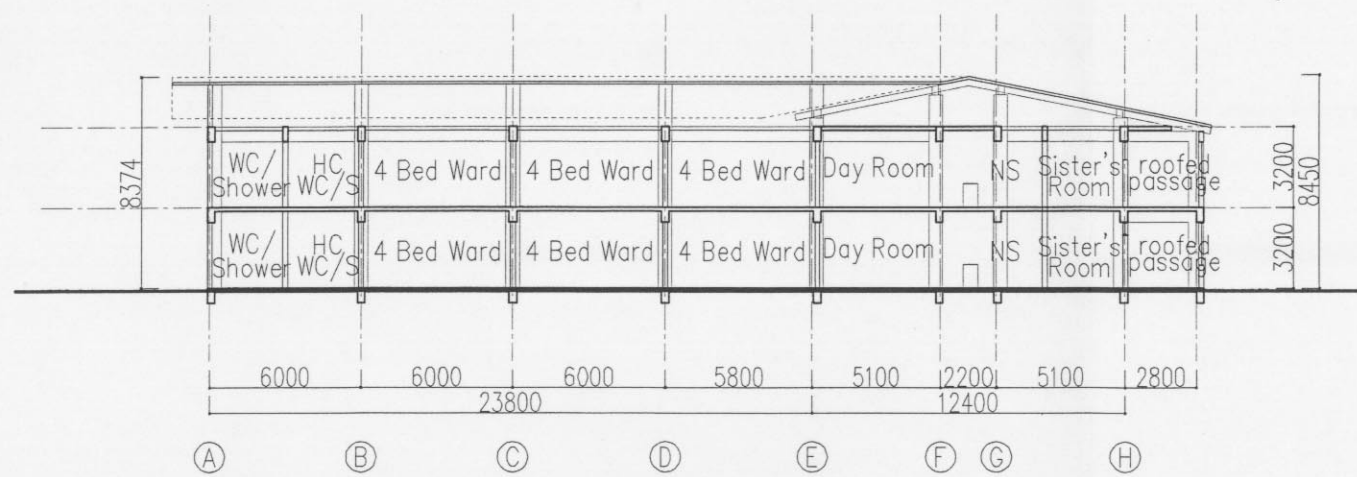
B Elevation



D Elevation



A-A' Section



B-B' Section

SCN (Special care nursery)

No.	Name of Equipment	Q'ty Planned	Q'ty. to be moved	Total Q'ty
SC-1	Baby resuscitation trolley	2	2	4
SC-2	Baby's weighing scale	1	0	1
SC-3	Pulse oxymeter	1	1	2
*1 SC-4	Infusion pump	1	1	2
*1 SC-5	Syringe pump	1	1	2
*1 SC-6	Resuscitation bag for infant	2	0	2
SC-7	Infant incubator	1	1	2

Obstetric ward

No.	Name of Equipment	Q'ty Planned	Q'ty. to be moved	Total Q'ty
*2 OW-1	Flowmeter, oxygen regulator	2	0	2
OW-2	Doppler fetus detector	1	1	2
OW-3	Examination light	1	1	2
*2 OW-4	Suction unit, medium size	2	1	3
*2 OW-5	Obstetric treatment set	1	0	1
*2 OW-6	Emergency cart with resuscitation bag for adult	1	0	1
*2 OW-7	Baby cot	19	15	34
OW-8	Bedpan sanitiser	1	0	1
OW-9	Bed	0	34	34
OW-10	Gynecology examination table	1	0	1
OW-11	Weighing scale (Adult)	1	0	1
*2 OW-12	IV Stand	4	0	4
*2 OW-13	Sphygmomanometer	3	0	3
OW-14	Dressing Trolley (Delivery Trolley)	2	0	2
*2 OW-15	Thermometer, Electric	2	0	2

Biomedical unit

No.	Name of Equipment	Q'ty Planned	Q'ty. to be moved	Total Q'ty
BM-1	Maintenance Set	1	0	1

Ultrasound room

No.	Name of Equipment	Q'ty Planned	Q'ty. to be moved	Total Q'ty
UL-1	Color Doppler Ultrasound	0	1	1
UL-2	Ultrasound Scanner B/W	1	0	1
UL-3	Examination Table	2	0	2

Dark room

No.	Name of Equipment	Q'ty Planned	Q'ty. to be moved	Total Q'ty
D-1	Automatic Film Processor	1	0	1
D-2	Cassette Pass Box	2	0	2
*4 D-3	Darkroom accessories	1	0	1
*4 D-4	X-ray Cassette and Screen	1	0	1

Microbiology laboratory

No.	Name of Equipment	Q'ty Planned	Q'ty. to be moved	Total Q'ty
MB-1	Incubator	1	0	1
MB-2	Table top autoclave	1	0	1
MB-3	Safety cabinet	1	0	1
MB-4	Autoclave for laboratory	1	0	1
MB-5	Microscope	0	2	2

Blood bank

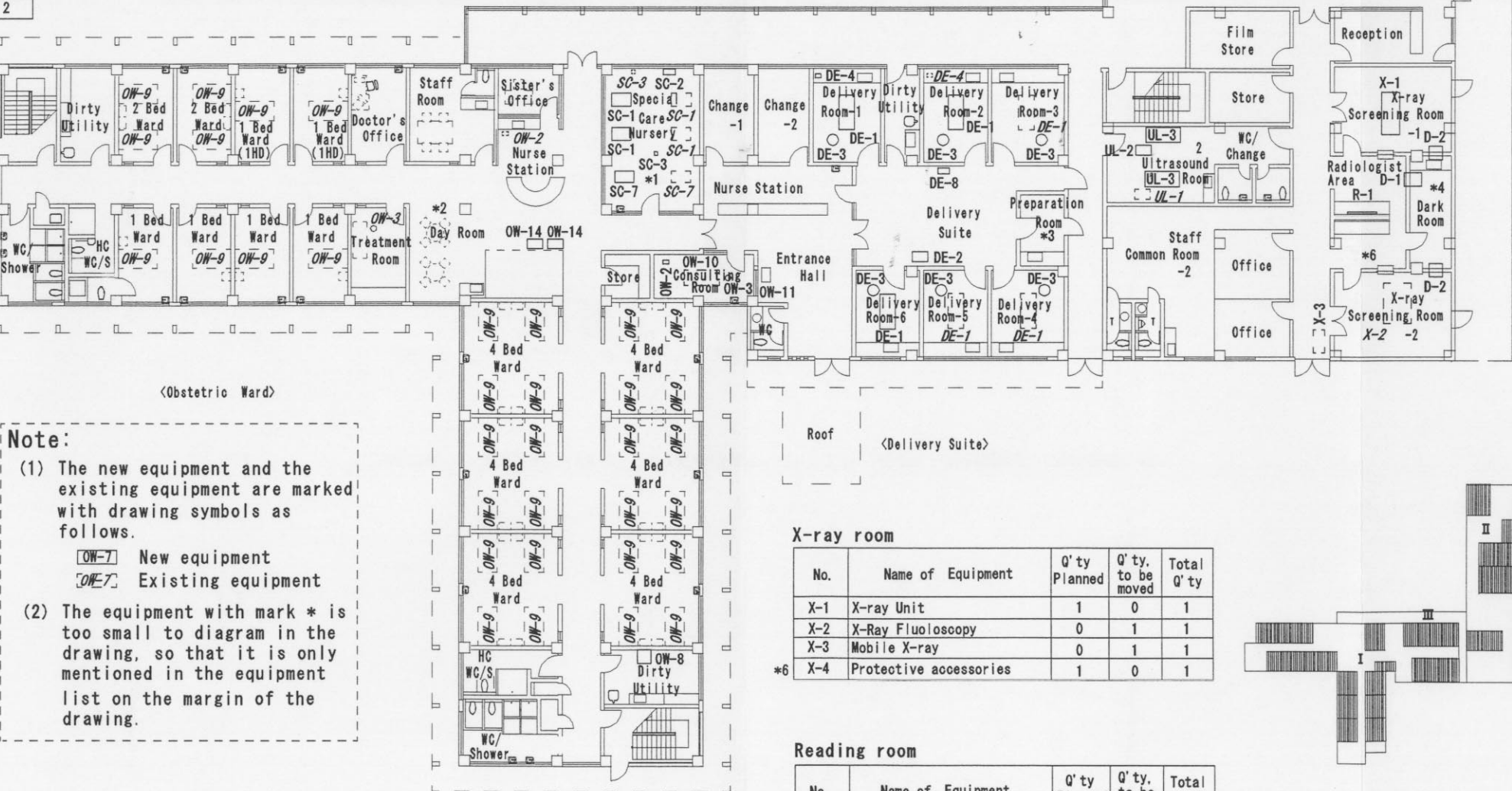
No.	Name of Equipment	Q'ty Planned	Q'ty. to be moved	Total Q'ty
BB-1	Blood Bank Refrigerator	1	1	2
BB-2	Blood Bank Freezer	0	1	1
*5 BB-3	Balance for Blood Bank	1	0	1
BB-4	Donor's Bed	1	0	1
BB-5	Blood Bank Centrifuge	0	1	1
BB-6	Water Bath	0	1	1

Inpatient's pharmacy

No.	Name of Equipment	Q'ty Planned	Q'ty. to be moved	Total Q'ty
IP-1	Medical Refrigerator	1	0	1
IP-2	Distilled Water Unit	1	0	1
IP-3	Medicine Cabinet	1	0	1

Delivery room

No.	Name of Equipment	Q'ty Planned	Q'ty. to be moved	Total Q'ty
DE-1	Delivery bed	3	3	6
DE-2	Medications trolley	1	0	1
DE-3	Delivery light, stand type	6	0	6
DE-4	Fetal monitor (CTG)	1	1	2
*3 DE-5	Delivery instrument set	2	4	6
*3 DE-6	IV Stand	2	0	2
*3 DE-7	Pulse oxymeter	1	0	1
DE-8	Baby's weighing scale	1	0	1



Note:

(1) The new equipment and the existing equipment are marked with drawing symbols as follows.

[Symbol] New equipment
[Symbol] Existing equipment

(2) The equipment with mark * is too small to diagram in the drawing, so that it is only mentioned in the equipment list on the margin of the drawing.

Clinical laboratory

No.	Name of Equipment	Q'ty Planned	Q'ty. to be moved	Total Q'ty
LB-1	PH Meter	1	0	1
LB-2	Distilled Water Unit	1	0	1
LB-3	Medical Refrigerator	0	1	1
LB-4	Water Bath	1	0	1
LB-5	Magnetic Stairrer	1	0	1
*7 LB-6	Electrical Balance	1	0	1
LB-7	Spectro photometer	0	1	1
LB-8	Electrolyte Analyzer	0	1	1
LB-9	Table Top Centrifuge	0	1	1
LB-10	Blood Cell Counter	1	0	1
*7 LB-11	Haematocrit Centrifuge	1	0	1
*7 LB-12	Blood Coagulation	1	0	1
*7 LB-13	Microscope	0	2	2
LB-14	Autoclave Laboratory	1	0	1

Pathology laboratory

No.	Name of Equipment	Q'ty Planned	Q'ty. to be moved	Total Q'ty
PH-1	Safety Cabinet	0	1	1
PH-2	Microscope	0	2	2

TB corner

No.	Name of Equipment	Q'ty Planned	Q'ty. to be moved	Total Q'ty
TB-1	Safety Cabinet	1	0	1
TB-2	Incubator	0	1	1
TB-3	Autoclave for laboratory	0	1	1

X-ray room

No.	Name of Equipment	Q'ty Planned	Q'ty. to be moved	Total Q'ty
X-1	X-ray Unit	1	0	1
X-2	X-Ray Fluoroscopy	0	1	1
X-3	Mobile X-ray	0	1	1
*6 X-4	Protective accessories	1	0	1

Reading room

No.	Name of Equipment	Q'ty Planned	Q'ty. to be moved	Total Q'ty
R-1	X-ray Film Viewer	1	0	1

Area	Area (m ²)
Area I	992.3
Area II	918.0
Area III	128.7
合計	2,039.0

Surgical ward

No.	Name of Equipment	Q'ty Planned	Q'ty. to be moved	Total Q'ty
SW-1	Bedpan Sanitiser	2	0	2
*8 SW-2	Pulse Oxymeter	1	0	1
SW-3	Suction (Medium Size)	0	1	1
*8 SW-4	X-Ray Viewer (Large)	0	1	1
SW-5	Traction apparatus with Bed	2	4	6
SW-6	Emergency Trolley	0	1	1
SW-7	Medications Trolley	0	1	1
SW-8	Dressing Trolley	2	0	2
*8 SW-9	Thermometer, Electric	1	0	1
*8 SW-10	Ophthalmic Instrument Set	0	1	1
*8 SW-11	Flowmeter, oxygen regulator, humidifier	1	0	1
SW-12	Wheel Chair	1	0	1
*8 SW-13	Automatic BP monitor	1	0	1
SW-14	Stretcher	0	1	1
SW-15	Bed	0	41	41
SW-16	Treatment Table	0	1	1
SW-17	Examination light	1	0	1

CSDD

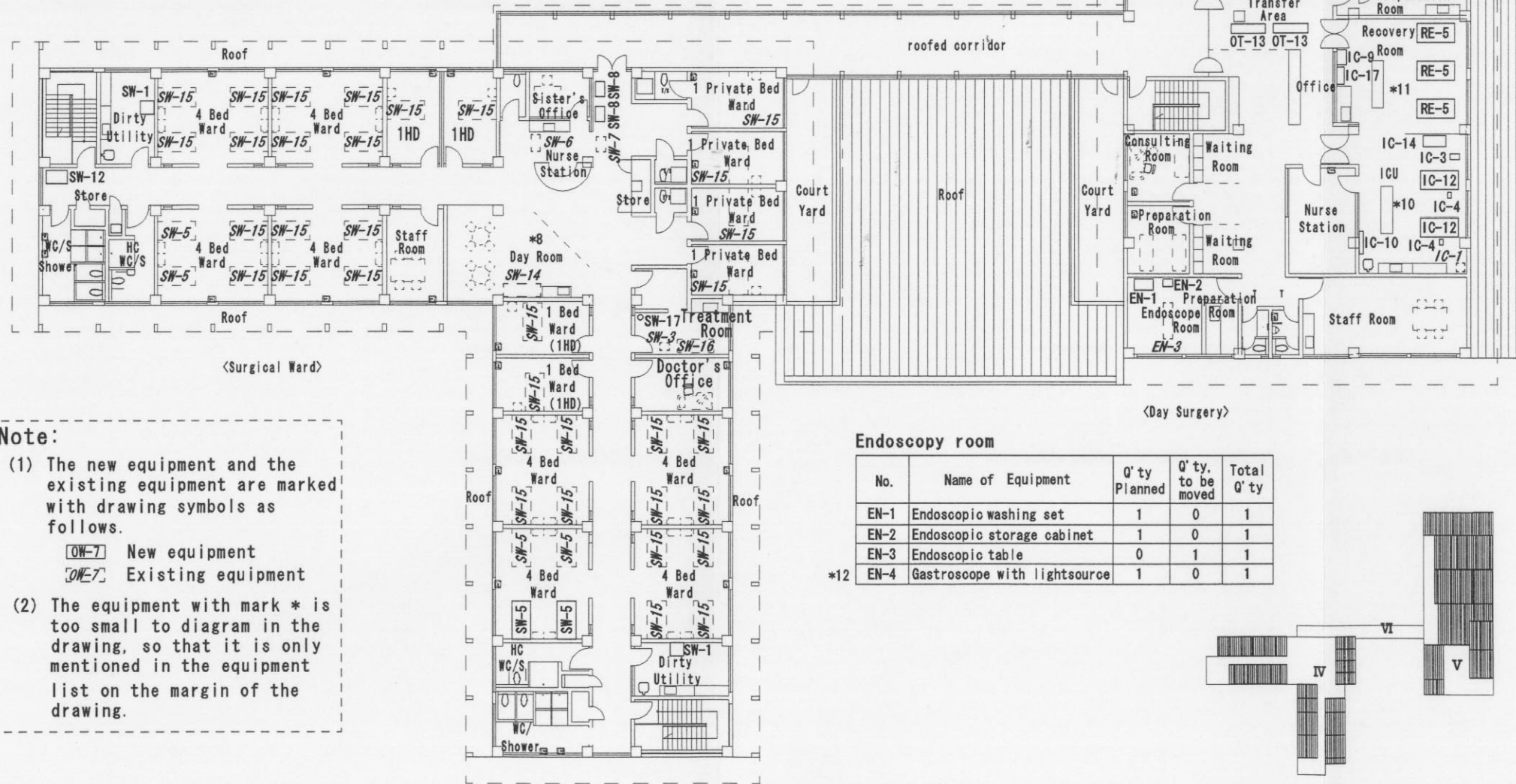
No.	Name of Equipment	Q'ty Planned	Q'ty. to be moved	Total Q'ty
CS-1	High Pressure Steam Sterilizer	2	0	2
CS-2	Table Top ultrasonic Washer	1	0	1
CS-3	Working Table	0	2	2

Operating theatre

No.	Name of Equipment	Q'ty Planned	Q'ty. to be moved	Total Q'ty
OT-1	Operating Light	3	0	3
OT-2	Operating Table	3	0	3
*9 OT-3	Traction Unit for table	1	0	1
OT-4	Anaesthesia apparatus	1	2	3
OT-5	Electrosurgical unit	1	2	3
OT-6	X-ray film viewer	3	0	3
OT-7	Defibrillator	1	1	2
OT-8	Patient monitor	2	1	3
*9 OT-9	Suction unit, large size	3	0	3
*9 OT-10	Suction unit, wall hanging type, small size	3	0	3
*9 OT-11	Infusion pump	1	0	1
*9 OT-12	Syringe pump	1	0	1
OT-13	Slide board for stretcher	2	0	2
OT-14	Stretcher	0	2	2
*9 OT-15	Mayo instrument stand	3	0	3
*9 OT-16	Dressing trolley, curved	3	0	3
*9 OT-17	Anaesthesia instrument set	1	0	1
*9 OT-18	Laparotomy instrument set	1	4	5
*9 OT-19	Orthopedic instrument set	1	1	2
*9 OT-20	Plaster instrument set	1	0	1
*9 OT-21	Caesarean section set	1	1	2
*9 OT-22	Ophthalmology surgery set	1	0	1
*9 OT-23	ENT surgery instrument set	1	0	1

Operating theatre

No.	Name of Equipment	Q'ty Planned	Q'ty. to be moved	Total Q'ty
OT-24	Surgical scrub station	2	0	2
*9 OT-25	Kick bucket	3	0	3
*9 OT-26	Instrument trolley	3	0	3
*9 OT-27	Surgeon and assistant's stool	3	0	3
*9 OT-28	Laryngoscope set	2	0	2
*9 OT-29	Laryngoscope for neonatal	1	0	1
*9 OT-30	Peak flow meter	1	0	1
*9 OT-31	Weighing scale, pediatric	1	0	1
*9 OT-32	Blood warming equipment	1	0	1
*9 OT-33	Flowmeter, humidifier	3	0	3
OT-34	Newborn resuscitation trolley	0	1	1
OT-35	Operating microscope for ENT	1	0	1
OT-36	Operating microscope for Opt	0	1	1
OT-37	Pump set for eliminate gas	1	0	1
OT-38	Instrument cabinet	1	1	2
*9 OT-39	Plastic instrument set	1	0	1
*9 OT-40	Examination light	2	0	2
*9 OT-41	Mobile X-ray	1	0	1
*9 OT-42	Weighing scale for adult	1	0	1
*9 OT-43	IV Stand	2	0	2
*9 OT-44	Basin S.M.L	0	6	6
*9 OT-45	Plaster bandage table	1	0	1



Note:

(1) The new equipment and the existing equipment are marked with drawing symbols as follows.
 [OW-7] New equipment
 [OW-7] Existing equipment

(2) The equipment with mark * is too small to diagram in the drawing, so that it is only mentioned in the equipment list on the margin of the drawing.

Endoscopy room

No.	Name of Equipment	Q'ty Planned	Q'ty. to be moved	Total Q'ty
EN-1	Endoscopic washing set	1	0	1
EN-2	Endoscopic storage cabinet	1	0	1
EN-3	Endoscopic table	0	1	1
*12 EN-4	Gastroscope with lightsource	1	0	1

ICU

No.	Name of Equipment	Q'ty Planned	Q'ty. to be moved	Total Q'ty
IC-1	Defibrillator	0	1	1
*10 IC-2	Laryngoscope	1	0	1
IC-3	Ventilator	1	0	1
IC-4	Patient monitor	2	0	2
*10 IC-5	Resuscitation bags	1	0	1
*10 IC-6	Suction unit medium size	2	1	3
*10 IC-7	Infusion pump	1	0	1
*10 IC-8	Syringe pump	1	0	1
IC-9	Medical refrigerator	1	0	1
IC-10	X-ray film viewer, stand	1	0	1
*10 IC-11	Nebulizer	1	0	1
IC-12	ICU bed	2	0	2
*10 IC-13	Glucometer (Portable type)	1	0	1
IC-14	Instrument cabinet	1	0	1
*10 IC-15	Instrument trolley	1	0	1
*10 IC-16	Double basin stand	1	0	1
IC-17	Medicine cabinet	1	0	1
*10 IC-18	Flowmeter, humidifier	2	0	2
*10 IC-19	Low pressure continuous	1	0	1
*10 IC-20	IV Stand	2	0	2

Recovery

No.	Name of Equipment	Q'ty Planned	Q'ty. to be moved	Total Q'ty
*11 RE-1	Flowmeter, humidifier	3	0	3
*11 RE-2	IV Stand	3	0	3
*11 RE-3	Double basin stand	1	0	1
*11 RE-4	Stethoscope	1	0	1
RE-5	Recovery bed	3	0	3

2F	(m ²)	
Area IV	748.1	
Area V	864.0	
Area VI	105.4	
合計	1,717.5	
延床面積	(m ²)	
	3,756.5	

Table Equipment List

Operating theatre

Item No.	Name of Equipment	Quantity, planned	Quantity, will be moved	Total quantity
OT-1	Operating light for operating theatre	3	0	3
OT-2	Operating table	3	0	3
OT-3	Traction unit for operating table	1	0	1
OT-4	Anesthesia apparatus with ventilator	1	2	3
OT-5	Electrosurgical unit	1	2	3
OT-6	X-ray film viewer for operating theatre	3	0	3
OT-7	Defibrillator	1	1	2
OT-8	Patient monitor for operating theatre	2	1	3
OT-9	Suction unit, large size	3	0	3
OT-10	Suction unit, wall hanging type, small size	3	0	3
OT-11	Infusion pump	1	0	1
OT-12	Syringe pump	1	0	1
OT-13	Slide board for stretcher	2	0	2
OT-14	Stretcher	0	2	2
OT-15	Mayo instrument stand	3	0	3
OT-16	Dressing trolley, curved	3	0	3
OT-17	Anaesthesia instrument table set	1	0	1
OT-18	Laparotomy instrument set	1	4	5
OT-19	Orthopedic surgery instrument set	1	1	2
OT-20	Plaster instrument set	1	0	1
OT-21	Caesarean section instrument set	1	1	2
OT-22	Ophthalmology surgery instrument set	1	0	1
OT-23	ENT surgery instrument set	1	0	1
OT-24	Surgical scrub station	2	0	2
OT-25	Kick bucket	3	0	3
OT-26	Instrument trolley	3	0	3
OT-27	Surgeon and assistant's stool	3	0	3
OT-28	Laryngoscope for adult and pediatric	2	0	2
OT-29	Laryngoscope for neonatal	1	0	1
OT-30	Peak flow meter	1	0	1
OT-31	Weighing scale for pediatric	1	0	1
OT-32	Blood warming equipment	1	0	1
OT-33	Flowmeter, humidifier, wall hanging type	3	0	3
OT-34	Newborn resuscitation trolley	0	1	1
OT-35	Operating microscope for ENT	1	0	1
OT-36	Operating microscope for ophthalmology	0	1	1
OT-37	Pump set for eliminate surplus gas	1	0	1
OT-38	Instrument cabinet	1	1	2
OT-39	Plastic instrument set	1	0	1
OT-40	Examination light	2	0	2
OT-41	Mobile X-ray	1	0	1
OT-42	Weighing scale for adult	1	0	1
OT-43	IV Stand	2	0	2
OT-44	Basin S,M,L	0	6	6
OT-45	Plaster bandage table	1	0	1

Endoscopy room

EN-1	Endoscopic washing set	1	0	1
EN-2	Endoscopic storage cabinet	1	0	1
EN-3	Endoscopic table	0	1	1
EN-4	Gastroscope with lightsource	1	0	1

CSSD

CS-1	High pressure steam sterilizer	2	0	2
CS-2	Table top ultrasonic washer	1	0	1
CS-3	Working table	0	2	2

ICU

IC-1	Defibrillator	0	1	1
IC-2	Laryngoscope for adult and pediatric	1	0	1
IC-3	Ventilator for adult and infant	1	0	1
IC-4	Patient monitor for ICU	2	0	2
IC-5	Resuscitation bags and masks for adult/pediatric	1	0	1
IC-6	Suction unit, medium size	2	1	3
IC-7	Infusion pump	1	0	1
IC-8	Syringe pump	1	0	1
IC-9	Medical refrigerator	1	0	1
IC-10	X-ray film viewer for ICU	1	0	1
IC-11	Nebulizer	1	0	1
IC-12	ICU bed	2	0	2
IC-13	Glucometer(Portable type)	1	0	1
IC-14	Instrument cabinet	1	0	1
IC-15	Instrument trolley	1	0	1
IC-16	Double basin stand	1	0	1
IC-17	Medicine cabinet	1	0	1
IC-18	Flowmeter, humidifier, wall hanging type	2	0	2
IC-19	Low pressure continuous suction unit	1	0	1
IC-20	IV Stand	2	0	2

Recovery

RE-1	Flowmeter, humidifier, wall hanging type	3	0	3
RE-2	IV Stand	3	0	3
RE-3	Double basin stand	1	0	1
RE-4	Stethoscope	1	0	1
RE-5	Recovery bed	3	0	3

Clinical laboratory

LB-1	PH meter	1	0	1
LB-2	Distilled water unit	1	0	1
LB-3	Medical refrigerator	0	1	1
LB-4	Water bath	1	0	1
LB-5	Magnetic stirrer	1	0	1
LB-6	Electrical balance	1	0	1
LB-7	Spectrophotometer	0	1	1
LB-8	Electrolyte analyzer	0	1	1
LB-9	Table top centrifuge	0	1	1
LB-10	Blood cell counter	1	0	1
LB-11	Haematocrit centrifuge	1	0	1
LB-12	Blood coagulation machine	1	0	1
LB-13	Microscope	0	2	2
LB-14	Autoclave for laboratory	1	0	1

TB corner

TB-1	Safety cabinet	1	0	1
TB-2	Incubator	0	1	1
TB-3	Autoclave for laboratory	0	1	1

Microbiology laboratory

MB-1	Incubator	1	0	1
MB-2	Table top autoclave	1	0	1
MB-3	Safety cabinet	1	0	1
MB-4	Autoclave for laboratory	1	0	1
MB-5	Microscope	0	2	2

Pathology laboratory

PH-1	Safety cabinet	0	1	1
PH-2	Microscope	0	2	2

Blood bank				
BB-1	Blood bank refrigerator	1	1	2
BB-2	Blood bank freezer	0	1	1
BB-3	Balance for blood bank,manual type	1	0	1
BB-4	Donor's bed	1	0	1
BB-5	Blood bank centrifuge	0	1	1
BB-6	Water bath	0	1	1
Inpatient's pharmacy				
IP-1	Medical refrigerator	1	0	1
IP-2	Distilled water unit	1	0	1
IP-3	Medicine cabinet	1	0	1
Biomedical unit				
BM-1	Maintenance set	1	0	1
X-ray room				
X-1	X-ray unit	1	0	1
X-2	X-ray fluoroscopy	0	1	1
X-3	Mobile X-ray	0	1	1
X-4	X-ray protective accessories	1	0	1
Dark room				
D-1	Automatic film processor	1	0	1
D-2	Cassette pass box	2	0	2
D-3	Darkroom accessories	1	0	1
D-4	X-ray film cassette and screen	1	0	1
Reading room				
R-1	X-ray film viewer for reading room	1	0	1
Ultrasound room				
UL-1	Color doppler ultrasound scanner	0	1	1
UL-2	Ultrasound scanner,B/W	1	0	1
UL-3	Examination table	2	0	2
Obstetric ward				
OW-1	Flowmeter,oxygen regulator,humidifier	2	0	2
OW-2	Doppler fetus detector	1	1	2
OW-3	Examination light	1	1	2
OW-4	Suction unit,medium size	2	1	3
OW-5	Obstetric treatment instrument set	1	0	1
OW-6	Emergency cart with resusitasion bag for adult	1	0	1
OW-7	Baby cot	19	15	34
OW-8	Bedpan sanitiser	1	0	1
OW-9	Bed	0	34	34
OW-10	Gynecology examination table	1	0	1
OW-11	Weighing scale (Adult)	1	0	1
OW-12	IV Stand	4	0	4
OW-13	Sphygmomanometer	3	0	3
OW-14	Dressing Trolley (Delivery Trolley)	2	0	2
OW-15	Thermometer, Electric	2	0	2
Delivery room				
DE-1	Delivery bed	3	3	6
DE-2	Medications trolley	1	0	1
DE-3	Delivery light	6	0	6
DE-4	Fetal monitor (CTG)	1	1	2
DE-5	Delivery instrument set	2	4	6
DE-6	IV Stand	2	0	2
DE-7	Pulse oxymeter	1	0	1
DE-8	Baby's weighing scale	1	0	1

SCN (Special care nursery)

SC-1	Baby resuscitation trolley	2	2	4
SC-2	Baby's weighing scale	1	0	1
SC-3	Pulse oxymeter	1	1	2
SC-4	Infusion pump	1	1	2
SC-5	Syringe pump	1	1	2
SC-6	Resusitation bag for infant	2	0	2
SC-7	Infant incubator	1	1	2

Surgical ward

SW-1	Bedpan sanitiser	2	0	2
SW-2	Pulse oxymeter	1	0	1
SW-3	Suction, medium size	0	1	1
SW-4	X-ray viewer (Large)	0	1	1
SW-5	Traction apparatus with bed	2	4	6
SW-6	Emergency trolley	0	1	1
SW-7	Medications trolley	0	1	1
SW-8	Dressing trolley	2	0	2
SW-9	Thermometer, Electric	1	0	1
SW-10	Ophthalmic instrument set	0	1	1
SW-11	Flowmeter, oxygen regulator, humidifier	1	0	1
SW-12	Wheel chair	1	0	1
SW-13	Automatic BP monitor	1	0	1
SW-14	Stretcher	0	1	1
SW-15	Bed	0	41	41
SW-16	Treatment table	0	1	1
SW-17	Examination light	1	0	1

Medical gas

FA-1	Oxygen condensing system	1	0	1
------	--------------------------	---	---	---

2.2.4 Implementation Plan

2.2.4.1 Construction Policies and Procurement Policies

(1) Basic Items

This Project will be executed by the single fiscal year system of Japanese Government.

1) Cabinet Approval and Exchange of Notes

The Exchange of Notes (E/N) for the Grant Aid Project will be concluded between the Government of Japan and the Government of Tonga pursuant to the cabinet approval by the Japanese Government.

2) Execution of the Project

With the E/N, Japan shall commit itself officially to provide Grant Aid for the Project.

3) Detailed Design and Supervising Work by the Consultant

After the above – mentioned conclusion, a consultant contract shall be signed between a consultant of Japanese nationality immediately pursuant to the contract.

(2) Detailed Design Stage

1) Confirmation

For the implementation of Detailed Design, full details of facilities and equipment in the Basic Design Stage should be carefully confirmed and discussed with the MOH.

2) Technical Issues

The consultant shall discuss the technical issues through meeting with the relevant authorities in Japan and Tonga during the detail design stage.

3) Design Period

The detailed design will probably require approximately 3.5 months to complete after the signing of the Consultant Agreement.

(3) Tender

1) Tender

The Tender for the construction of the facility and procurement and installation of equipment shall be conducted in accordance with the guidelines of JICA.

2) Package of Tender

The Contract shall be conducted either as one package with a Contractor or classified in two packages with a Contractors to carry out the construction work and for the procurement and installation of the equipment necessary for the facility.

3) Construction and Verification

The consultant will assist the MOH in the negotiation of the construction contract in accordance with the guidelines of JICA. And the MOH concludes construction contract with the contractor, which was selected by the tender and the construction contract need to be verified by the Government of Japan.

2.2.4.2 Important Points for Construction and Procurement

(1) Construction Condition

Conditions of local construction industry and special Characteristics of Tonga, Which affect the construction work in Tonga.

1) The conditions of the local construction industry in Tonga are outlined below.

Construction Company in Tonga

The local construction industry consists of one Tongan office of a company based in New Zealand and Australia, which is a partnership with a Tongan company selling building materials and six other local construction companies. None of these are large.

It is said that local construction companies can only accept a contract up to a maximum of T\$ 50,000 (¥2.8 million). Apart from the small size of their capitalisation, problems are also pointed out in regard to their financial and process control abilities. For this reason, careful examination will be conducted in terms of capitalisation and past work records, etc. for the selection of the subcontractor.

Price of Construction Material

The price of construction materials shows an increasing trend due to the continual decline of the value of the local currency.

Taxes

There is a Goods and Services Tax (GST) of 5% and the import duty depends on the item. While the import duty for construction materials is approximately 15%, this tax may be waived for an ODA project if the tax exemption procedure is completed.

Prohibit Work of Sunday

As the Constitution of Tonga prohibits any work on Sundays, it is essential to omit Sundays from the work schedule. There are no flight, boat or bus services on Sundays and ports, airports, regular bus services and shops are all closed.

Working Condition of Saturday

The national economy greatly depends on the harvest from farmland. As Saturdays are commonly used for farming work, the number of available local workers for the Project drops, reducing the work efficiency. The work schedule will, therefore, reflect this fact.

2) Construction Materials

Locally Procurable Construction Materials

The only construction materials produced in Tonga are sand and aggregate, ready mixed concrete and concrete blocks. In regard to other construction materials, they will be imported either from Japan or such other third countries as New Zealand and Australia, Indonesia and so on.

3) Use of Local Construction Methods and Workers

Local construction methods will be employed, i.e. a RC rigid structure, concrete block walls and iron sheet roofing. The employment of local construction methods is

recommended to employ of local workers.

As most local engineers work abroad, the use of foreigners as foremen and supervisors is assumed. Ordinary workers will be recruited locally.

4) Delivery of Imported Materials by Ship

There are regular shipping services between Port Nuku'alofa in Tonga and New Zealand, Australia, Japan and the US. It takes approximately six days to reach Port Nuku'alofa from Auckland in New Zealand, approximately six days from Fiji via Samoa and approximately 30 days from Port Yokohama in Japan via Fiji.

In terms of distance, New Zealand is the nearest. The procurement of construction materials mainly from Japan and such other third countries as New Zealand, Australia and Indonesia are planned under the Project.

5) Important Points for Construction

The contractor need to take necessary measure and plan for following important points for the construction under the Project.

Construction Planning

The construction work plan should ensure the smooth and efficient progress of the construction work without delay while maintaining (i) a certain standard of the construction work and (ii) the continuous operation of the Vaiola Hospital. Especially, the contractor need to take necessary measure for noise, dust, vibration and traffic control in and around the hospital.

Building Material Suppliers

Prior to the selection and use of locally produced materials, their quality and supply capacity should be carefully examined. More than one supply source is planned to encourage competition and also to ensure a stable supply.

Employment of Workers

Workers should be employed from Tongatapu Island where possible and efforts should be made to improve their abilities by means of technical guidance and training.

Execution of Environmental Management Guideline (EMG) in the Master Plan for the Redevelopment of Vaiola Hospital

The contractor need to execute the EMG 1-17 described in the Master Plan when they develop Vaiola Hospital.

Necessary Procedure need to be taken for Environmental Impact Assessment (EIA)

Ministry of Environment at this stage does not approve EIA, hence, nobody know what kind items are stipulated in EIA. However, if it approved, the contractor need to follow the stipulation and need to take necessary procedure before or during construction. It was agreed between MOH and JICA draft report explanation Team that the additional construction cost necessary for execution of EIA stipulation shall be borne by the MOH.

2.2.4.3 Scope of Work

The scope of work to be undertaken by the Japanese and Tongan sides is outlined in Table 2-16.

Table 2-16 The scope of work to be undertaken by the Japanese side and Tongan side

Japanese Portion	Tonga Portion
1. Building	1. Preparation
(1) Building Work	(1) Application and secure approval of EIA
Open corridor to the Mental Health Ward, CSB, Obstetrics Ward and Delivery suite, Surgical Ward	2. Site preparation
(2) Building services	(1) Allow to use electricity for construction
1) Route change of existing trench	3. Necessary approval and others
2) Water supply after water meter	(1) Application and approval of Building permit
3) New STP and connection work from above buildings	(2) Custom Clearance, tax and duties exemption to the building materials and medical equipment
4) Fire Hydrant and pressure pump	(3) Tax exemption to the Japanese and third countries staffs
5) Power supply after transformer	(4) Assist the Japanese staffs to enter into Tonga
6) Telephone after MDF	(5) Banking arrangement and issue Authorization to Pay (AP)
	(6) Arrangement of budget allocation for operation and maintenance of hospital
2. Equipment Work	4. Building service work
1) Medical Equipment supply and installation	(1) Electric power supply
	New trunk line and installation of 500KVA transformer
	(2) Sewage work
	Existing sewer line to connect to the new STP
	(3) Telephone
	Additional telephone lines to MDF and expansion of PABX if necessary
	5. Necessary arrangement
	(1) Providing furniture and curtains to the new buildings
	(2) Transfer and install of existing medical equipment
	(3) Paving the road for ambulance to the delivery suites and service car access road and carparking
	(4) Disposal of Chemical waste water from Laboratory
	(5) Expenses for the additional works by the Environmental Regulation stipulated in EIA

2.2.4.4 Work Supervision Plan and Procurement Supervision Plan

(1) Selection of the Consultant and its specific works

The consultant, which will carry out the detail design of the Project facilities and equipment, shall be selected by MOH from Japanese consultants that have ample experience of designing and planning hospital facilities and taking part in grant aid projects and have the capacity to execute the Project. Based on the purport of the Basic Design, the Consultant shall hold discussions with the Government of Tonga, carry out detailed design of the Project facilities and equipment, and prepare the necessary tender documentation. In the supervision stage of construction works, Japanese resident supervisors shall be dispatched to supervise the Japanese general contractor and local subcontractors and liaise with MOH and Vaiola Hospital or construction committees, etc. The specific work contents of the Consultant are as follows:

Detailed design

Design in detail and prepare tender documentation (specifications, detailed design drawings) for the construction works and furniture and equipment.

Promotion of tender and contract

Carry out decision-making on the construction contract concept, preparation of the draft contract, internal inspection for the itemized breakdown of works, and selection of the nominated contractors (announcement of tender, pre-qualification, tender assessment and witnessing of the contract signing).

Inspection and approval of working drawings, etc.

Carry out inspection and check of the working drawings, construction execution plans, materials, finished samples, and equipment presented by the contractor.

Works guidance

Examine the works plans and works schedules and provide guidance to the contractor.

Report of works progress

Report on the progress of works to the related parties and agencies and manage monthly meetings of representatives of the MOH and the contractors.

Cooperation with payment approval procedures

Examine the contents and cooperate with procedures of bills for payment of works charges to be paid during and after the works.

Witnessing of inspections

Carry out inspections of progress and quality during construction from start to end.

(2) Basic Policies and Important Points for Detailed Design and Supervision

1) Coordination drawing

The outline of the building services for each room should be verified using the coordination drawings.

2) Monthly meeting

A monthly meeting on the construction work should be held with the participation of project-related personnel from the MOH and Vaiola Hospital. These participants should develop a proper understanding of the purpose of construction, the need for their

cooperation and the necessary measures to be implemented through these meetings where reporting on the relevant matters is made.

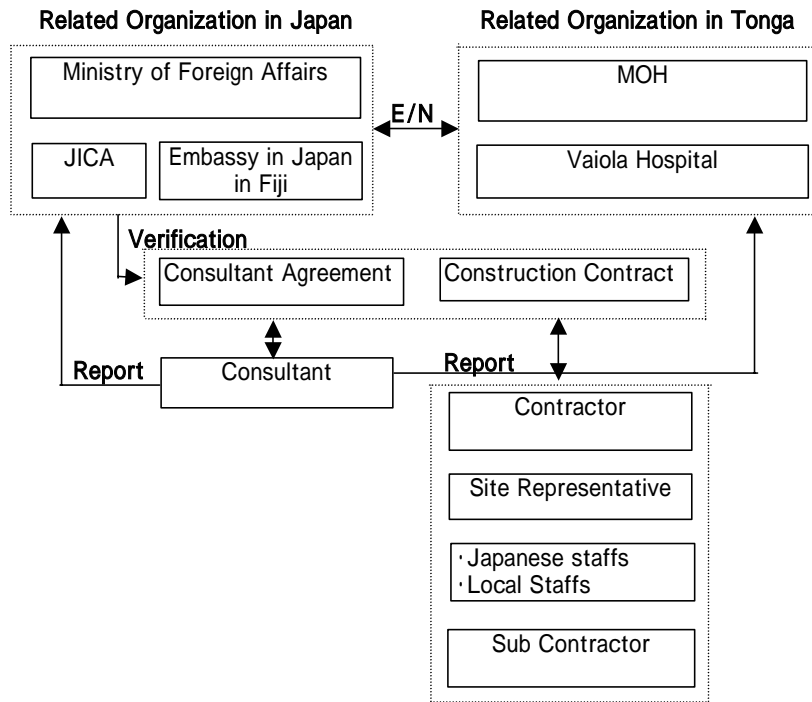
(3) Supervisory Regime by the Consultant

A Japanese engineer as the full-time supervisor and a locally employed engineer as an assistant supervisor will be permanently stationed at the project site to control the quality, progress and safety of the construction work. During the construction work, Japanese engineers (structure, mechanical, electrical engineers) will be dispatched to Tonga to supervise the commencement of the work, the interim work inspection and the completion inspection.

(4) Project Implementation Regime

The relationship between the various organizations involved in the Project and the project implementation regime at the implementation stage are shown in the following diagramme.

Figure 2-10 Project Implementation Organization



(5) Work Supervision Regime

The Japanese contractor will use local construction companies as subcontractors to conduct the construction work. In view of the site conditions at the hospital premises and the construction capacity of the subcontractors, the Japanese contractor must ensure the appropriate deployment of manpower and the regime to proceed with the work so that the subcontractors can apply appropriate construction techniques and quality management.

2.2.4.5 Quality Control Plan

(1) Confirmation of Soil Bearing Capacity

During the Basic Design Study, ground conditions on 5 points at Vaiola Hospital were excavated until we found the coral stone (0.6m – 2.7m) and 12 cone penetration test and confirmed by laboratory analysis also visual inspections. As a result, soil condition was deemed to have good ground. However, before starting work, cone penetration test shall be carried out on a site in order to make sure that the ground has enough bearing capacity estimated on design stage.

(2) Confirmation of Site Conditions and Building Layout

Through comparing with survey drawings, overall confirmation shall be carried out on site perimeters, conditions of existing structures and underground objects, in-site drainage routes, treatment methods of miscellaneous water and sanitary sewage, etc., site gradients, existing trees and vegetation, conditions of power and water supply line installation, and so on. Upon doing this, lines shall be drawn or territory marked using slaked lime powder, and positions of the proposed buildings shall be confirmed and adjusted in the presence of consultant and person in charge from the Tonga side.

Benchmarking

Benchmark shows the elevation (height) of existing structures and/or new piles, etc., and shall be enclosed by curing fences to prevent movement to avoid movement.

Batter boards and setting-out

Since batter boards and setting-out are important for securing work accuracy, the correct usage of surveying instruments (auto levels, theodolite, etc.) shall be thoroughly ensured and Japanese engineers and supervisors shall carry out final confirmation.

(3) Scaffolding

Care shall be shown when selecting logs and steel scaffolding materials, etc., in order to secure work precision and safety. Any scaffolding materials that are badly damaged, deformed, corroded, or have serious cracks, knots, slanting grain and bending, etc. that affects strength shall not be utilized.

(4) Foundation work

Foundation work shall be carried out on rough concrete slab cast over crushed stone pitching for the purpose of setting-out. Polyethylene film shall be laid underneath the slab for damp proofing.

Excavation and backfilling

Surface soil at the construction site shall be scraped the thickness of 30cm and keep it at the instructed area.

After scrape the surface soil, excavation shall be carried out over an area 200 mm larger than the foundation width in order to allow work to be carried out easily and accurately formwork. Excavation shall be carried out both mechanically and manually. Concerning flooring, a work manual that assumes deep excavation and rock exposure shall be prepared and concrete measures shall be examined in advance. Backfilling shall basically use the excavated earth, however, earth having a small content of black soil and clay soil shall be used. Compaction shall be carried out every 30 cm when backfilling and additional piling shall be carried out in consideration of settlement

(depending on the soil quality). Remaining soil shall be evenly spread on sites.

(5) Reinforcing Bar Works

For round bars, deformed bars and reinforcing mesh that conform to specifications in advanced countries shall be adopted, and these products shall as a rule be procured from local supplier or from Japan or other countries through such supplier. Quality confirmation shall be based on test result sheets from the manufacturers' association, however, if such documents cannot be obtained, tensile/bend testing shall be carried out to confirm materials quality every time a batch of reinforcing materials is carried on to site. Moreover, concerning test methods, storage, processing, tool and joint specifications, set length, hook shape, covering depth and spacers, etc., a work manual shall be prepared and confirmation performed based on this.

(6) Formwork

Plywood is generally adopted for formwork in Tonga. Form working, ample care shall be taken not to cause poor hardening of surface concrete, and necessary curing shall be carried out in accordance with the climate. When executing formwork, a work-plan of formwork shall be prepared in advance and quality secured by carrying out ample confirmation.

(7) Concrete Works

When mixing concrete, common buckets shall be established and setups established to ensure that a set quality level is secured irrespective of the skill level of operators. Agitation Truck mixers shall be used to perform concrete mixing from gravel yard to the construction site, separate mix plans shall be prepared for each area, and concrete trial mixing shall be carried out before starting casting concrete.

Cement shall be stored storage with roof temporarily constructed in order to offer protection against the weather and theft. A work manual covering storage methods, storage periods and aggregate size control, etc. shall be compiled to enable operators to easily understand the work process from mixing and kneading to curing, and work shall be executed upon conducting sufficient examination and confirmation.

Concrete quality control shall be implemented by carrying out slump testing and sampling test pieces. A standard number of three test pieces shall be sampled to confirm the one-week and four-week strength and the designated strength shall be confirmed via compression destruction testing implemented by an authorized agency.

(8) Steel Works

Steel for structure shall be used good material from certificated workshop area. Quality confirmation shall be based on Mill-sheets from the manufacturers' association, however, if tensile testing shall be carried out to re-confirm materials quality at authorized laboratory such as Ministry of Works.

When executing steel work, a work-plan shall be prepared in advance and quality secured by carrying out ample confirmation.

(9) Wooden Structure Work

Wood or laminated wood for structure shall be used good material imported from other countries. Quality confirmation shall be based on test-results report from the manufacturers' association and compression / bending test shall be carried out to re-confirm materials strength at authorized laboratory such as Ministry of Works. When executing wooden work, a work-plan shall be prepared in advance and quality secured by carrying out ample confirmation. Anti-Termite processed wooden materials shall be procured for the work.

(10) Masonry

Factory-made concrete block procured at authorized factories shall be used. Concrete block shall be used for wall and partitioning, and in addition to confirmation of strength based on plant test results reports, destructive tests shall be carried out at laboratories of the Ministry of Works. Concerning sand for bonding mortar, priority shall be given to river sand, however, when using mountain sand, it shall first be checked to ensure that mud and organic content is appropriate. Normal Portland cement shall be used and the cement to sand mixing ratio shall be 1: 2.5.

When carrying out masonry work, work procedures for all tasks including reinforcement methods shall be compiled into a work-plan to be fully examined prior to execution.

(11) Plaster work

The proposed facilities shall mostly be finished using mortar. Mortar quality and precision greatly affect the final appearance of buildings. Concerning sand, priority shall be given to river sand, however, when using mountain sand, it shall first be checked to ensure that mud and organic content is appropriate. Concerning particle size of sand, Class A sand shall be used for under-wall and floor plastering, and Class B for wall plastering. Normal Portland cement shall be used and mixed according to the following proportions. Mixer shall basically perform mortar mixing, and work procedures for all tasks shall be compiled into a work manual to be fully examined and confirmed prior to execution.

Table 2-17 Mortar Mixing Table (cement: sand)

	Place	Undercoat (A)	Final coat (B)
Concrete	Floor	-	1 :3.0
	Wall	1 :2.5	1 :3.0
Concrete Block	Inside Wall	1 :2.5	1 :4.0
	Outside Wall	1 :2.5	1 :4.0

(12) Roof and rainwater drainage works

Roof shall be a sloped galvanized-iron sheet with corrugation. Rain girder shall be installed all roofs and leading to rain water drainage pipe through downspout. All of rainwater shall be stored in the rainwater storage tank for potable water.

(13) Doors and Windows

Windows shall be ready-made steel frames, and steel doors shall be case-door with steel frame manufactured in other countries.

(14) Painting Works

Outdoor paint possessing good weather ability shall be used on external parts, and ordinary emulsion paint shall be used indoors. When carrying out painting, ample time shall be allowed for base treatment, inspection, and drying and curing after application.

The quality control plan for the main work areas is shown below.

Table 2-18 Quality Control Plan

	Works	Q.C. Item	Method
Structure Work	Concrete	Mixing	Mixing Ratio, Slump, Air Volume, Temperature, Sulphate Contents
		Strength	Compression Test
	Reinforcement	Steel Bars	Tensile Test, Mil-sheets confirmation
		Reinforce	Reinforcement Site Examination (pitch, length of lap, thickness of cover)
Finish Work	Roof	Asphalt	Observation, Waters Spray Test
	Stone	Workmanship	Observation, Material/Joint Check
	Tile	Workmanship	Observation, Adhesion & Cruck Check
	Mortar	Workmanship	Observation, Adhesion & Cruck Check
	Door & Windows	Manufacturing	Manufacture Examination
		Fixing	Observation, size, incline, function
	Painting	Workmanship	Color uniformity, adhesion check
Water & Drainage Work	Waters Supply	Leakage	Water pressure test
	Drainage	Drain Slope	Slope, Water Flow Test
	Water Tank	Leakage	Fill-up test

2.2.4.6 Procurement Plan

(1) Procurement Policy

Table 2-19 Procurement of material

	Material	Procurement			Notes
		Tonga	3rd Country	Japan	
Framework	Cement				Standard materials from third countries
	Rebar				Import from Japan.
	Aggregate				This can be procured locally.
	Concrete				Concrete mixed at plant and shall be made
	Formwork				Plywood shall be imported from Japan.
	Steel				
	Concrete Block				Local standardized products shall be procured and strength-test shall be at laboratory.
	Wood				
	Tiles				
	Plaster:				
	Paint:				
	Glass:				
Finishing Work / Doors and Windows	Steel Doors				
	Window frame				
	Hardware				
	Paint				
	Epoxy floor coating				
	PVC sheet				
	Glass				
Plumbing Work	Roof Material				
	Piping				
Electric Works	Sanitary ware:				
	Wiring:				
Furniture and fittings	Switch Board				
	Furniture				

The basic concept for selecting construction materials shall be that procurement of items for maintenance and repair is easy after handing-over the facilities. All major construction materials are imported from New Zealand, Australia, Fiji and other countries in Tonga. The contractor needs to arrange to import directly those necessary materials through suppliers in those countries. The contractor needs to arrange plural numbers of suppliers to have constant supply. Procurement plan for the major materials is shown in the table 2-19.

Having said that, in cases where it is deemed necessary judging from quality, cost and supply capacity, etc., consideration shall also be given to procurement through supplier in those countries.

When selecting suppliers, careful consideration shall be given to capacity of supply, quality and durability, and as a rule multiple supply sources shall be secured in order to achieve supply stability. The procurement plan for major equipment and materials is shown below.

(2) Procurement of the medical equipment

There are many sales agents for the medical equipment including Japan made products, but there are few manufactures in New Zealand and Australia. Some companies in New Zealand have been operated in the business in the South Pacific countries including Tonga and have enough business results.

Table 2-20 Procurement Plan of the Main Equipment

Equipment	Countries where the Equipment is Procured			Remarks
	Tonga	Japan	3rd Countries	
Anesthesia apparatus with ventilator				
Automatic film processor				
Blood cell counter				
Defibrillator				
Fetal monitor (CTG)				
High pressure steam sterilizer				
Laparotomy instrument set				
Mobile X-ray				
Baby resuscitation trolley				
Operating microscope for ENT & ophthalmology				
Operating table				
Patient monitor for operating Theatre				
Patient monitor for ICU				
Pump set for eliminate surplus gas				
Surgical scrub station				
Ultrasound scanner, B/W				
Ventilator for adult and infant				
X-ray unit				
Gastroscope with lightsource				
Oxygen condensing system				

Each company has many sales engineers and stocks spare parts and consumables as a sales agent. The representative agents that have business results in Tonga are EBOS and MSP in New Zealand. They have business relations with Viola Hospital and also deal in many Japan made products. Livingstone in Australia supplies administration sets and other consumables to the Central Medicine Control Department of Tonga.

As a result of inspection of a manufacturing plant of S.S.H.Medical in Australia, it was confirmed that their products, such as Stretcher, Instrument Trolley and Examination Table, were larger than those made in Japan and built of big and strong frames. Also, there is no problem in quality. As for the equipment such as Delivery Bed and Examination Table, procurement is planned in consideration of large build of Tongans for the products made in New Zealand or Australia, which are large and strongly made. As for the equipment such as Medicine Cabinet and Dressing Trolley, procurement is also planned for the products made in New Zealand or Australia, of which shipping cost is less than that from Japan. In selecting the medical equipment to procure, it is important to choose the products which are dealt in such sales agents in New Zealand or Australia.

2.2.4.7 Implementation Schedule

(1) Approval of the EIA

The implementation of an EIA of the entire aspects of the Master Plan of the MOH is necessary and this EIA must be approved by the Ministry of Environment prior to the implementation of the Project. As the environmental conditions for the implementation of the Master Plan will be indicated in the EIA report, this EIA report will have a close link to the design conditions for the Project. If the approval process commences after the approval of the Project, there will be uncertainty regarding the likely timing for EIA approval, affecting the commencement of the construction work. For this reason, it was confirmed at the time of the Basic Design Study that the approval of the EIA by the Ministry of Environment should be obtained by the end of March, 2004.

(2) Signing of the E/N

Following the signing of the E/N, a design and supervision agreement will be concluded between the Government of Tonga and the consultant. Based on this agreement, the consultant will prepare the detailed design documents and the tender documents.

(3) Tender

Following the completion of the detailed design work, the consultant will announce the P/Q in newspapers in Japan on behalf of the MOH of Tonga and will report the P/Q results to the MOH for approval. The pre-qualified construction companies will then be invited to participate in a competitive tender which will take place in Japan while being witnessed by the Tongan side. The bidder with the lowest bid will be declared the successful bidder if the contents of the bid are judged to be appropriate. This successful bidder will conclude a construction agreement with the MOH of Tonga. This agreement will become valid once it has been verified by the Government of Japan.

It will take approximately five months from the signing of the agreement with the consultant to the conclusion of the construction agreement after the completion of the detailed design work and tender process.

(4) Construction Work

Following the conclusion of the construction agreement, the actual work will commence with the verification of the agreement by the Government of Japan. Including the relocation work for the building service systems prior to the commencement of the construction work, an appropriate construction period is estimated to be 15 months.

Figure 2-11 Implementation Schedule

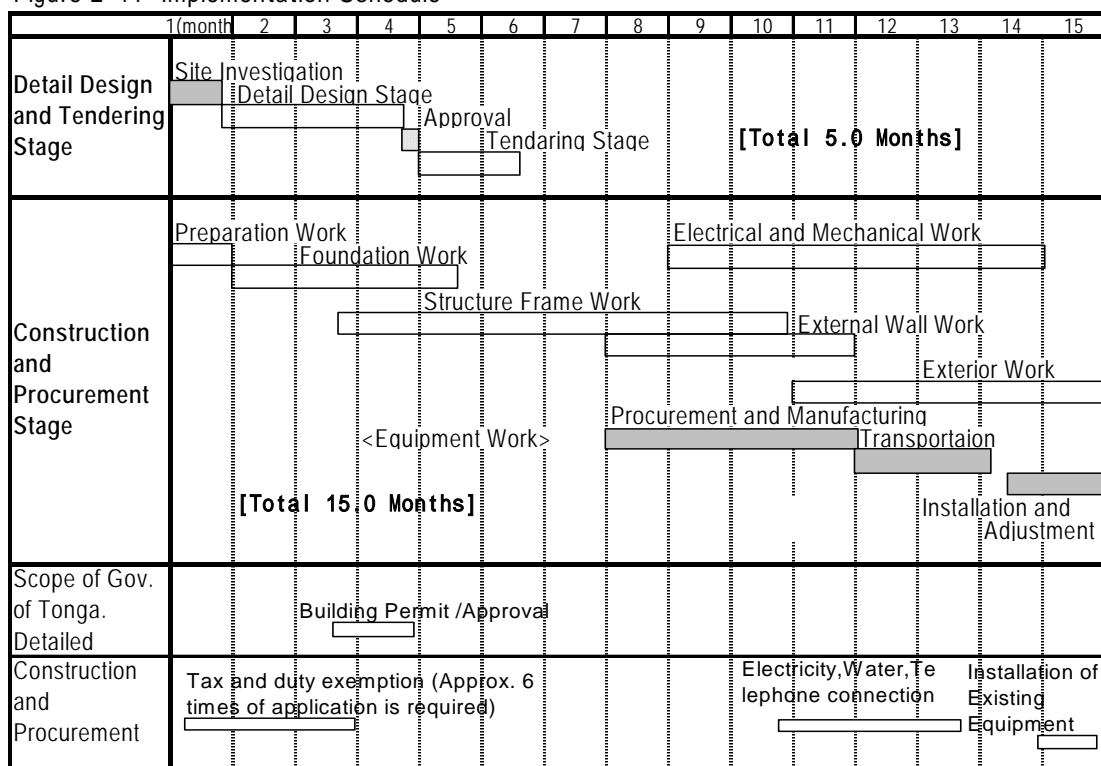


Table 2-21 Project Execution Schedule

Phase	Months	Year/Month	Government of Tonga	Government of Japan	Consultant	Building Contractor
Basic Design (6 months)	4	2004.1		Explanation of D/R		
	5	2004.2				
	6	2004.3	EIA Approval		Submission of B/D Report	
		2004.4		Application of the Project to MOFA		
		2004.5		Approval of Cabinet		
		2004.6	Exchange of Notes	Exchange of Notes		
Detail Design and Tender (5 months)	1	2004.7	Consultant Agreement, A/P	Verification of Agreement	Consultant Agreement, Detail Design	
	2	2004.8				
	3	2004.9	Approval of Detail Design, Tender Notice, Building Permit Application and Approval		Approval of Detail Design, Tender Notice	Preparation of PQ documents
	4	2004.10				
	5	2004.11	Tender in Tokyo, Approval of Building Permit			Tender in Tokyo
Construction (15 months)	1	2004.12	Construction Contract, A/P	Verification of Contract	Supervising at Construction Site	Construction Contract, Starting Construction
	2	2005.1				
	3	2005.2				
	4	2005.3				
	5	2005.4				
	6	2005.5				
	7	2005.6	Oxygen Plant renovation start			
	8	2005.7				
	9	2005.8				
	10	2005.9	Electricity, Water, Telephone Application			
	11	2005.10				
	12	2005.11				
	13	2005.12	Completion of Electricity, Water and telephone work, oxygen Plant			
	14	2006.1				
	15	2006.2	Completion Inspection, Road paving of Access Road		Completion Inspection / Completion of Supervising Work	Completion / Turnover
		2006.3	Installation of Existing Equipment. Connection of Sewer line			

2.3. OBLIGATIONS OF THE RECIPIENT COUNTRY

The Government of Tonga will be required to fulfill the following obligations to secure the implementation of the Project with Grant Aid provided by the Government of Japan.

(1) Obligations Related to Construction Work

- 1) Application for building verification, obtaining of the construction permit and other necessary applications to various government offices
- 2) Provision of the sites for the temporary buildings and a material warehouse; supply of temporary power
- 3) Installation of the transformer (500 kVA); extension of the trunk power line; extension and connection of the additional telephone lines
- 4) Paving of the ambulance road, service road and construction of parking area
- 5) Procurement of general office furniture and fixtures, etc. (bedding and curtains, etc. for the bedrooms)
- 6) Expansion of the existing telephone switchboard (PABX) (if no spare terminals are available)
- 7) All of additional expenses required by the execution of EIA regulation

(2) Obligations Related to Equipment Procurement

- 1) Provision of a temporary storage place for the equipment at the site

(3) Obligations Related to Maintenance

- 1) Arrangement of the necessary budget and medical and technical staff for the appropriate and efficient operation and maintenance of the facilities and equipment provided by Japanese grant aid
- 2) Procurement of the consumables and spare parts required for the proper maintenance of the facilities and equipment

(4) Obligations Related to Procedures

- 1) Provision of all necessary assistance for Japanese personnel and Japanese companies of which the services may be required in connection with the supply of products and services under the verified agreements for their entry into Tonga and stay therein
- 2) Exemption of Japanese personnel and Japanese companies from customs duties, internal taxes and other fiscal levies which are imposed in Tonga with respect to the supply of products and services under the verified agreements
- 3) Payment of expenses which are essential for the implementation of the Project but which are not covered by the Japanese grant aid
- 4) Arrangement of the banking agreement and payment of the banking fees

5) The supply of products and services for the Project should, in principle, be exempt from all taxes without delay.

(5) Equipment Transfer Cost

The transfer of existing equipment which is still usable to the new facilities is planned. Among the candidate equipment, the transfer of the fluoroscopic (X-ray) apparatus must be requested to its manufacturer. It has been agreed that the Tongan side will bear the cost of equipment transfer which will take place immediately after the completion of the new facilities. This agreement is included in the Minutes.

(6) Renewal of Oxygen Concentrator

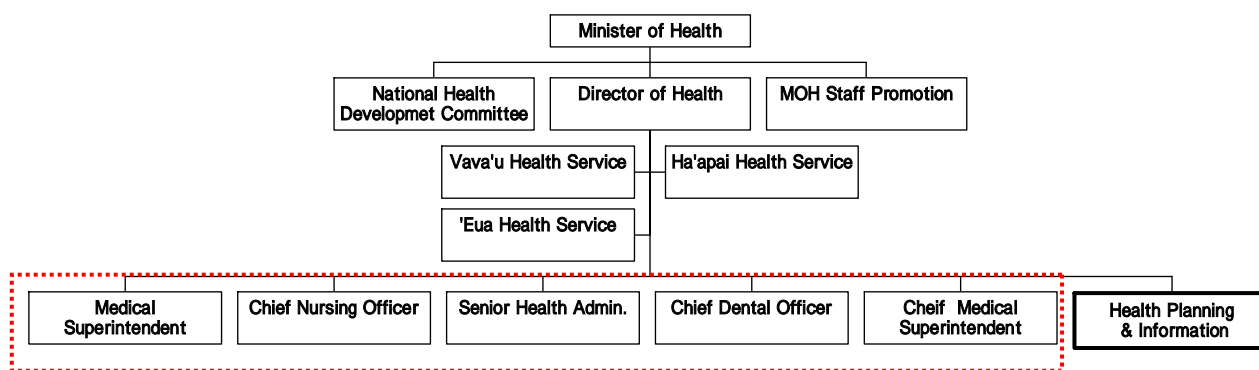
As the existing oxygen concentrator cannot meet the oxygen density required for medical purposes, its renewal is necessary.

2.4. PROJECT MANAGEMENT AND MAINTENANCE PLAN

(1) Management System

The implementation body for the Project is the MOH of which the organizational chart is shown in Fig. 2-12. The MOH uses part of the Vaiola Hospital Complex for its offices. As the MOH and the Vaiola Hospital form an integral organization as shown in Fig. 2-12, it is impossible to clearly separate the staff members of the MOH from those of the hospital. In short, all hospital staff members are also MOH staff.

Fig. 2-12 Organization chart of MOH



: Vaiola Hospital : Responsible Div. of the Project in MOH

(2) Staff Members of MOH

As shown in Table 2-22 MOH Staff Strength for 1998 – 2002, the number of staff members working for the MOH in 2002 was 705 compared to the total number of positions of 945 (filled position ratio: 74.6%). The average filled position ratio for the last five years is 80%, making it necessary to juggle the staff within the MOH as well as the hospital. Particularly in the case of medical staff, the filled position for doctors is 51% compare to required staffs 90 and occupancy rate become around 50% technical staff filled position is 116 compare to required staffs 172 and the occupancy rate become 67%, indicating a chronic shortage. To improve this situation, the MOH is trying to train medical staff through overseas training and the dispatch of medical students (under-graduates and graduates) abroad. The Queen Salote Nursing College which is part of the Vaiola Hospital educates and trains nurses.

Table 2-22 MOH Staff Strength for 1998 – 2002

Job Type	1998		1999		2000		2001		2002	
	Required	Actual	Required	Actual	Required	Actual	Required	Actual	Required	Actual
Minister	1	1	1	1	1	1	1	1	1	1
Administration	5	4	5	4	5	4	8	4	8	6
Medical Staff	83	64	87	66	83	71	89	61	90	51
Dental Staff	36	32	42	33	47	32	52	38	52	37
Nursing Staff	350	301	366	323	373	321	381	322	386	326
Technical Staff	115	94	143	106	161	124	166	116	172	116
Accounting/ Clerical Staff	42	38	37	33	46	39	47	45	48	45
Auditors/ Assistants	134	111	135	111	166	121	178	156	188	123
Total	766	649	816	677	882	713	920	743	945	705
Filled Position Ratio (%)	84.7		82.9		80.8		80.7		74.6	

Source: MOH Annual Report 2002

(3) Operation Staffs at Vaiola Hospital

Table 2-23 Operation Staffs of Vaiola Hospital

	Clinical Services	Medical Doctor	Nurse	Techni cian	Assistant	Others
<Medical Service>						
Ward/Out Patient	Pediatric	1	21		1	
	Surgical, (CSSD)	2	17		3	
	Medical	2	10			
	Obstetrics / Gynecology	3	16			
	Anaesthesia and Intensive Care	4	***			
	Mental Health	1	9		7	
	Operating Theater		13			
Outpatient	Ophthalmology		1			
	Ear, Nose and Throat	2	1			
	Emergency and General Outpatient	4	15		4	1
<Medical Support>						
Diabetes/Cardiovascular		1	3			1
Nutrition						1
Dental	*					
Laboratory	BB	1		25	4	2
Radiology		2		11	1	1
Physiotherapy				1		
Pharmacy	Vaiola Hospital				6	2
	Central Pharmacy, Drug Store					
CSSD				1	4	
Nursing Services	Management					
	Hospital Nursing			**		
	Queen Salote School of Nursing					
	Public Health Nursing					
Catering				4	5	
Laundry						9
Seamstress						4
						5
Droivers						24
Telephone Communoication						4
Maintenance				17		
Security						8
Sub Total		23	106	59	35	62
Grand Total		285				

Source: Answer to the Questionnaire

*:Dentist is different organization, **:Nursing Services is Independent Organization

The interview survey conducted at the Vaiola Hospital found the management system shown in Table 2-23. Excluding dentists, the total number of doctors at the Vaiola Hospital is 23. Compared to the number of doctors in Table 2-22, the filled position ratio is 72%. However, this rate is higher in reality because some doctors are stationed at hospitals on other islands.

(4) Budget

1) MOH Budget

The budget, personnel cost, lighting and heating cost and communication cost, etc. are all shown as the total amounts for the MOH and the Vaiola Hospital. It is, therefore, impossible to establish the budget of the Vaiola Hospital alone because Vaiola Hospital staffs are also MOH staff and they receive salaries as MOH staffs.

Table 2-24 Budget of Government and MOH (Unit: Tonga \$)

Fiscal Year	Total Government Recurrent Expenditure (T\$)	MOH Gross Recurrent Expenditure (T\$)	Ratio (%)	Additional Ratio (%)	MOH Revenue (T\$)
1997/1998(Actual)	62,345,317	7,371,542	11.8	-	63,427
1998/1999(Actual)	71,735,410	7,463,457	10.4	1.2	68,701
1999/2000(Actual)	71,499,578	8,550,106	12.0	0.0	63,312
2000/2001(Actual)	90,537,999	8,552,973	9.4	0.0	249,405
2001/2002(Estimate)	85,939,341	9,744,818	11.3	13.9	200,000
2002/2003(Estimate)	98,632,662	10,144,818	10.3	4.1	250,000
2006/2007(Estimate)	114,501,232	11,776,973	10.3	3.80	-
Add additional cost	-	12,139,216	10.6	7.0	-

Source: Answer to the Questionnaires

For the last five years, the MOH received an average of some 10.3% of the current budget of the government. This amount puts the MOH in the position of the fourth largest ministry in terms of budgetary allocation after the Ministry of Finance (28.7%), the Ministry of Education (13.9%) and the Ministry of Public Works (10.5%).

In regard to the income of the MOH, as hospital treatment and the provision of drugs are basically free in Tonga, income from medical treatment only comes from dental treatment. The income of the MOH listed in the table comprises (i) fees for passports, medical examination reports which are required for job application, birth certificates and death certificates, etc., (ii) X-ray examination certificates required for emigration, (iii) blood test and vaccination certificates required for passport or emigration applications, (iv) meal charges for inpatients, (v) dental treatment charges and (vi) charges for mortuary use. As this income is that of the MOH, it cannot be directly used for the Vaiola Hospital.

2) Expenditure of Vaiola Hospital

The questionnaire survey conducted as part of the field survey clarified the breakdown of expenditure at the Vaiola Hospital. As the total figure is similar to that in the MOH budget, the difficulty of separating the expenditure of the MOH from that of the Vaiola Hospital is again illustrated.

According to ratio of Table 2-25 of the Vaiola Hospital from Fiscal Year 1998/1999 to 2002/2003.

Table 2-25 Breakdown of Expenditure of Vaiola Hospital (Unit: Tonga \$)

Breakdown	1999/2000	2000/2001	2001/2002	2002/2003	Ratio (%)	Japan Ratio(%)
Personnel	5,124,221	5,606,056	6,099,081	6,147,959	51.3	51.2
Pharmaceutical	297,949	218,927	899,651	1,160,999	9.7	25.3
Administration	3,054,918	3,351,322	5,623,827	3,989,936	33.3	12.0
Maintenance	20,000	30,000	48,190	213,617	1.8	0.7
Medical Equipment	20,000	20,000	15,505	20,229	0.2	0.2
Electricity Bill	100,000	100,000	201,294	232,426	1.9	2.7
Water Bill	51,000	51,000	55,992	57,692	0.5	
Diesel Oil/Heavy Oil	40,000	40,000	48,779	48,269	0.4	
Communication	70,000	70,000	106,787	108,837	0.9	0.1
Depreciation	-	-	-	-	-	7.1
Others	-	-	-	-	-	0.3
Total	8,778,088	9,487,305	13,099,106	11,979,964	100.0	100.0

Source : Answer to the Questionnaire

If we compare this ratio showing in Table 2-25 with Japanese Hospital in Yokohama (See attached Appendix), personnel expenses in Vaiola Hospital 51.3% and average of 2 Japanese Hospitals 52.4% are almost same ratio. Pharmaceutical in Vaiola Hospital 9.7% and average of two Japanese hospital is 25.8% include pharmaceutical and medical treatment material. This different is more than 2.5 times of Vaiola Hospital expense and this different shows the medical treatment cost difference per patient. Administration expense in Vaiola Hospital is 33.3% but there is no same item in Japanese hospital. Total of maintenance cost and medical equipment cost is 2.0% in Vaiola Hospital and Japanese hospital average is 1.4% including consumable for medical treatment, consumable items and spare parts and repair cost.

3) Trial Calculation of Expenditure of Vaiola Hospital

Table 2-26 Trial Calculation of Expenditure of Vaiola Hospital (Unit: Tonga \$)

Expenditure	'2002/03		2006/07			Remarks
	Estimated	Ratio (%)	Estimate	Additional Cost	Total	
. Operation Cost	9,568,592	94.3%	11,099,567	214,500	11,314,067	
(1) Personel Expenses	5,206,321	51.3%	6,039,332	214,500	6,253,832	Growth rate 3.8% and added 11 Medical Doctors
(2) Medical Drugs	983,033	9.7%	1,140,318	0	1,140,318	Growth rate 3.8%
(3) Administration	3,379,239	33.3%	3,919,917	0	3,919,917	Growth rate 3.8%
. Maintenance Cost	576,226	5.7%	668,422	156,727	825,149	Growth rate 3.8%
(1) Maintenance	180,578	1.8%	209,470	13,300	222,770	Growth rate 3.8%
1) Building	-	-	-	7,000	7,000	
2) M/E	-	-	-	6,300	6,300	
(2) Medical Equipment	17,246	0.2%	20,006	10,427	30,433	Growth rate 3.8%
(3) Cost	378,402	3.7%	438,946	133,000	571,946	
1) Electricity	196,809	1.9%	228,299	119,000	347,299	Growth rate 3.8%
2) City Water	48,695	0.5%	56,486	14,000	70,486	Growth rate 3.8%
3) Telephone	92,318	0.9%	107,089	0	107,089	Growth rate 3.8%
4) Fuels	40,579	0.4%	47,072	0	47,072	Growth rate 3.8%
Total	10,144,818	100.0%	11,767,989	371,227	12,139,216	

Based on the budget of MOH in fiscal year 2002/2003, trial calculation of expenditure of Vaiola Hospital was estimated by the 5 years (1997/98 – 2002/03) growth rate of 3.8%. Total amount of T\$11,767,989 is estimated MOH budget and T\$371,227 was added as additional cost by the completion of Japanese Grant Aid construction. Table 2-26 shows that total amount (T\$12,139,216) were distributed to each expenditure based on the ratio of Table 2-25. Detail of additional cost shows in 2.5.2. Basic Design Survey team explained that this project may complete in February 2005 and there is 4 months until new fiscal year (July 2006). Therefore, it need additional budget of T\$209,000 to add in the 2005/06 budget and additional budget of T\$157,000 for the fiscal year 2006/07 and MOH agreed to arrange the additional budget for operation of Vaiola Hospital.

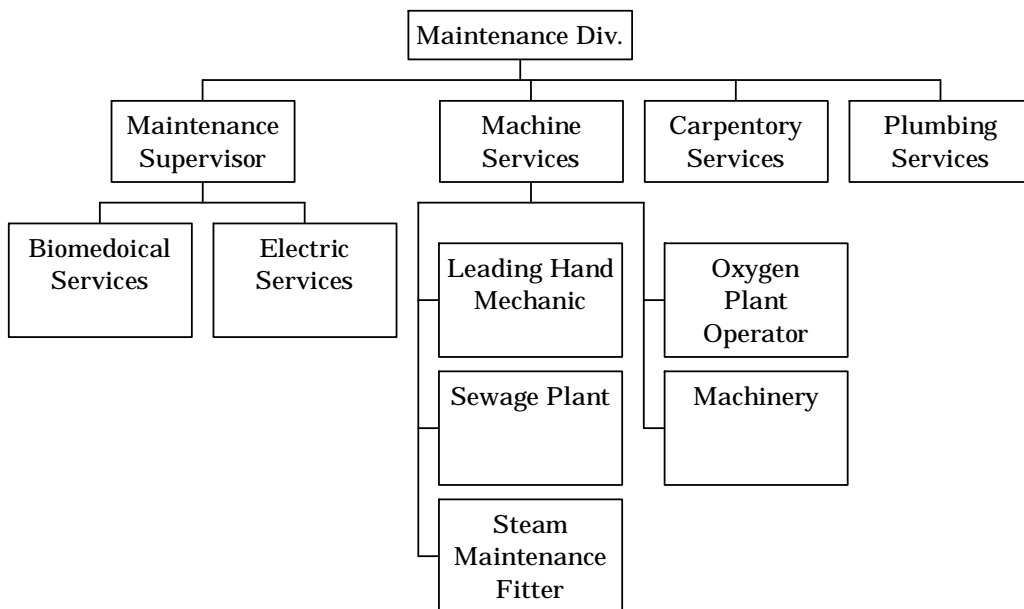
According to the MOH explanation, Tongan Government allocated additional budget (T\$1,200,000) for MOH every year from 2003/04 by the source of aiding fund from other country and this budget can be used if there is unexpected expenditures.

Operational cost shall be covered by recurrent budget of MOH basically, so it should be arranged to add additional cost onto yearly budget for smooth operation of Vaiola Hospital.

(5) Maintenance System

The facilities and equipment which are constructed or procured under the Project will be maintained by the Maintenance Department of the Vaiola Hospital which currently has 18 employees. As shown in Fig. 2-13, the Maintenance Management Section is responsible for medical equipment and electrical installations, the Mechanical Service Section is responsible for building service systems, the Woodwork Service Section is responsible for woodwork and painting and the Water Supply and Drainage Service Section is responsible for water supply and drainage.

Fig.2-13 Organization Chart of Maintenance Staff at Vaiola Hospital



(6) Maintenance Budget

1) Budget

The maintenance budget for 2002 was T\$ 145,946 and its breakdown is shown below.

Table 2-27 Budget for Dep. of Maintenance

Clarification	Budget(T\$)	Items
Budget for repair of Building	118,946	Window, Bathroom, Tools for Maintenance, Repair of Health Centers, SARS (Isolation Rooms), Boiler, Washing machine
Medical Equipment	27,000	More than 250 repair and maintenance of medical equipment
Total	145,946	

Source : Answer to the Questionnaire

Fiscal Year 2006/07, it will need additional cost of 23,727 for maintenance cost T\$13,300 and medical equipment maintenance cost T\$10,427 as shown in Table 2-25. This cost is 16.3% higher than fiscal year 2003/04, but it deemed necessary for the operation of Vaiola Hospital, so it need to budget T\$8,000 in fiscal year 2005/06 and T\$ 23,727 in fiscal year 2006/07.

2) Problems in maintenance

The field survey found the following problems.

- Insufficient skills
- Lack of service manuals
- Shortage of spare parts and tools
- Inadequate budget

In regard to the insufficient skills, a senior JOVC volunteer specializing in the maintenance of medical equipment has been assigned to the Vaiola Hospital since July, 2001, providing basic education/training for maintenance staff on medical equipment repair methods and the basic theory of electricity, etc. Accordingly, it is believed that the technical strength of the hospital's maintenance staff will be improved.

Much of the medical equipment used at the Vaiola Hospital was provided without any proper manual under foreign aid. The maintenance of this equipment is insufficient, partly because of the lack of spare parts even at the manufacturers as these items are more than 10 years old. The shortage of spare parts and tools is related to the problem of an inadequate budget. Efforts must be made to secure the necessary budget which is related to the fundamental operation of the Vaiola Hospital.

2.5. ESTIMATED PROJECT COST

2.5.1 Estimated Cost of Requested Japanese Assistance

In the case of the Project's implementation with grant aid provided by the Government of Japan, the required total project cost is estimated to be approximately ¥10.30 thousand million Yen)(Japanese portion of ¥10.30 thousand million Yen and Tongan portion of ¥1.07 thousand million Yen+ (Cost of processing) as shown below based on the division of work between the two countries and the estimation conditions. However, this estimated project cost does not immediately mean the upper limit for grant aid referred to in the E/N.

(1) Estimated Total Project Cost

Approximately ¥1,030.3million was estimated as total Project cost.

Table 2-28 Total Project Cost

Cost Item		Estimated Cost (Million Yen)			Estimated Cost (1,000T\$)	
Facilities	CSB	370.4	798.1	1,030.3	14,514	18,736
	Ward Building	333.7				
	Furniture	94.0				
Equipment	CSB	111.9	130.1		2,366	
	Ward Building	18.2				
	Furniture	0				
Detailed Design, Work Supervision and Technical Guidance		102.1	102.1		1,857	

(Exchange rate T\$1.0=¥54.99)

(2) Costs to be Borne by the Government of Tongan

Government of Tonga needs to provide budget allocation for their works during the construction.

Table 2-29 Cost to be borne by the Government of Tonga

Cost Item	Cost(Tonga\$)		Cost (¥)
	2004/2005	2005/2006	2005/2006
1) Construction-Related Items		1,923,280	105,761,000
Building Permit Application	0	-	0
Electricity connection and new transformer	-	71,000	3,904,000
Water supply connection	-	800	44,000
Additional telephone line connection	-	480	26,000
Construction site works including road works, car parking, landscaping, bus shelter, covered waysets. (M/P package, C)	-	1,514,000	83,255,000
Connection of sewer line to new STP (Approximately 50m)	-	27,500	1,512,000
Installation existing medical equipment		27,700	1,523,000
Gardening, tree plant (10 % of M/P)		60,000	3,167,000
Beds and curtain		224,700	12,330,000
EIA		Unknown	Unknown
2) BA.AP Commission (0.1% of E/N Amount)	18,200	-0	1,000,000
Sub-Total	18,200	1,923,280	106,761,000
Total		1,941,480	

(Estimated in March, 2004 Exchange rate T\$1.0=¥54.99)

(3) Estimation Conditions

- 1) Date of Estimation : April, 2004
- 2) Foreign Exchange Rate : Aus\$:¥79.14 (October, 2003 to end of March, 2003)
NZ\$:¥72.29 (October, 2003 to end of March, 2003)
T \$:¥54.99 (October, 2003 to end of March, 2003)
- 3) Work Period : The detailed design and construction periods are as shown in the project implementation schedule
- 4) Others : The Project will be implemented in accordance with the grant aid scheme of the Government of Japan

(4) Breakdown of the cost

The cost breakdown of the work to be done by the Government of Tonga is attached the Appendix -5.

2.5.2 Maintenance Cost

(1) Maintenance Plan

1) Facilities

The key features of the maintenance of hospital facilities are ① daily cleaning, ② repair of any damage or deterioration and ③ the inspection and repair of the medical equipment. The implementation of daily cleaning is the best way of embodying the concept of hospital hygiene which has a good influence on hospital users, i.e. inpatients and outpatients, and which improves the trust of the public in the hospital. Cleaning can also make the early discovery of any damage or breakdown to facilitate preventive maintenance and prolongs facilities. The perceived repairs involve the interior and exterior finishing. Without such repair, the facilities eventually become inconvenient for not only the hospital staff but also for the patients.

The detailed items for periodic inspection and repair will be submitted in the form of a “maintenance manual” by the contractor at the time of the handing over of the facilities to the Tongan side. At the same time, the contractor will explain the inspection methods and regular cleaning methods. The required inspection and maintenance work is outlined in Table 2-30.

Table 2-30 Outline of Periodic Inspection of Facilities

	Description of Inspection	Frequency of Inspection
Exterior	<ul style="list-style-type: none"> • Repair and repainting of external walls • Inspection and repair of roofing materials • Periodic cleaning of gutters and drains • Inspection and repair of sealing of external windows and doors • Periodic inspection and cleaning of side ditches and manholes, etc. • Cleaning and sludge removal of septic tank 	Repair: once every five years Repainting: once every 15 years Inspection: once a year Repair: once every five years Once a month Once a year Once a year Several times a year
Interior	<ul style="list-style-type: none"> • Change of interior decoration • Repair and repainting of partition walls • Renewal of ceiling materials • Adjustment of windows and doors; replacement of metal ware for windows and doors 	As required As required As required Once a year and also as required

2) Building Service Equipment

In regard to building service equipment, routine “preventive maintenance” is very important to prevent breakdown repair and/or parts replacement as much as possible. The life of building service equipment is partly determined by the length of the operating hours but can certainly be prolonged by correct operation and routine inspection, lubrication, adjustment, cleaning and repair. Such routine inspection can possibly prevent breakdowns or accidents or the magnification of accidents. At the time of periodic inspection, the replacement of expendable parts and cleaning of the filters, etc. should be conducted in accordance with the maintenance manual.

What is crucial is the creation of a proper maintenance system where maintenance staff conduct routine inspection and maintenance and agents of the manufacturers are

contracted to conduct periodic inspection if required. The common lives of the main equipment are shown in Table 2-31.

Table 2-31 Life of Building Service Equipment

	Type of Equipment	Expected Life
Electrical Installations	<ul style="list-style-type: none"> • Distribution panels • Fluorescent lamps • Incandescent lamps 	20 – 30 years 5,000 – 10,000 hours 1,000 – 1,500 hours
Water Supply and Drainage Systems	<ul style="list-style-type: none"> • Pumps, pipes and valves • Tanks • Sanitary ware 	15 years 20 years 25 – 30 years
Air-Conditioning System	<ul style="list-style-type: none"> • Pipes • Ventilation fans • Air-conditioning units 	15 years 20 years 8 years

3) Equipment

As for the maintenance management of the equipment to be procured, it is necessary to make "daily maintenance" that is a performance test before and after operating the equipment and "periodical maintenance" in which the inspection and the maintenance are mainly made once a year. Periodical maintenance is made in accordance with the instruction manuals. It is necessary to peruse the instruction manuals and be familiar with operation and maintenance of the equipment.

Table 2-32 Maintenance of the Equipment to be Procured

Equipment	Use	Qty
Operating Light	This is lighting that lights up the operation region with the main light and the auxiliary light. It is used for main operations such as abdominal operation.	3
Operating Table	When a patient has an operation, the patient is laid on this table. It is used by adjusting the height and tilt angle of the table to the surgical form and the operation region.	3
Anaesthesia Apparatus with Ventilator	It is used for operations under general anaesthesia with an anaesthetic gas or a volatile anesthetic.	1
Electrosurgical Unit with Standard Accessories	It is used for incising and coagulating tissues during surgery to minimize bleeding.	1
Defibrillator	It is used for resuscitating a patient in cardiac arrest. This is a device that gives countershocks on a patient in ventricular fibrillation and restores the pulsation of his heart to the original rhythm.	1
Patient Monitor for Operating Theatre	It is used in the operating theatre for monitoring the vital signs of a patient in anesthetization.	2
Surgical Scrub Station	It is used for cleansing hands in water sterilized by ultraviolet rays.	2
Operating Microscope for ENT	It is used for delicate otolaryngology operations such as tympanoplasty.	1
Mobile X-ray	It is used for roentgenography of serious patients, those who are unable to move, those who are undergoing surgical operation, and those who have just gone through surgical operation.	1
Gastroscope with Light Source	It is a set of flexible gastroscope and light source that are used to diagnose the upper digestive tract by inserting it from the mouth of the patient. It observes the site with a crooked tip of gastroscope.	1

Equipment	Use	Qty
High Pressure Steam Sterilizer	It is used for sterilizing the operating gowns and surgical appliances that are used in the hospital with high-pressure steam.	2
Ventilator for Adult and Infant	This is a life-support system that makes respiratory care for the patient who cannot make voluntary respiration.	1
Patient Monitor for ICU	It is used for monitoring the fundamental vital signs of a serious patient such as ECG, pulsation and saturation of oxygen.	2
Safety Cabinet	It is used for protecting laboratory workers from bacteria during bacteriological examinations.	2
Blood Cell Counter	It is used for calculating the numbers of erythrocytes, leukocytes, etc. The result is submitted to the diagnosis.	1
Maintenance Set	This is a set of maintenance tools for the medical equipment.	1
X-ray Unit	It is used for taking X-ray photographs of the skeletal structures, chest, abdomen and soft tissues.	1
Automatic Film Processor	It is capable of automatic film processing from developing to drying after the X-ray photography.	1
Ultrasound Scanner B/W	It is mainly used for echography of the abdomen, and it contributes to the imaging diagnosis.	1
Oxygen Condensing System	It produces oxygen to supply the patients in the Operating Theatres, ICU and others, and it replenishes cylinders with oxygen.	1

(2) Running and Maintenance Costs

The annual running and maintenance costs of the new facilities are estimated as described below. The (1) running cost is estimated in terms of 1) the electricity cost, 2) the water cost and 3) the telephone/communication cost, 4) the fuel cost etc 5) LPG , 6) Disposal of chemical waste water, 7) equipment Spare parts, 8) EIA regulation while the (2)maintenance cost is estimated in terms of the 1) Building, 2) building service equipment maintenance cost and 3) elevator maintenance cost. The estimated running cost of the planned facilities is shown in Table 2-33.

Table 2-33 Breakdown of Estimated Running Cost for Project-Related Facilities

Cost Item	2002 Results (TS/year) :a	Estimate After Completion of M/P (TS/year) :b	Remarks (Increase: TS/year)	Rate of Increase (%) (b/a x 100)
(1) Running Cost	466,800	610,200	145,800	
1) Electricity Cost	225,000	344,000	119,000	52.8
2) Water Cost	55,000	69,000	14,000	25.5
3) Telephone and Communication Cost	104,000	104,000	0	0.0
4) Diesel Oil (Fuel Cost)	55,000	55,000	0	0.0
5) LPG (Fuel) Cost	800	800	0	0.0
6) Disposal of Chemical waste water	0	0	0	0.0
7) Equipment Spare Pars	27,000	37,400	12,800	40.7
8) EIA	-	Unknown	Unknown	-
(2) Maintenance Cost	119,000	132,300	13,300	-
1) Building	119,000	126,000	7,000	5.9
2) Building Services	0	6,300	6,300	100
3) Elevator	0	0	-	-
Total	585,800	742,500	156,700	

The cost breakdown of running cost for the Project is attached the Appendix -5.

CHAPTER 3 PROJECT EVALUATION AND RECOMMENDATIONS

CHAPTER 3 PROJECT EVALUATION AND RECOMMENDATIONS

3.1 Project Effects

The implementation of the Project is expected to have the following effects.

(1) Improved Environment for Health and Medical Services at Vaiola Hospital

The improvement of the Vaiola Hospital as described below following the implementation of the Project will improve the environment for Health and Medical Services in the Kingdom of Tonga.

1) Direct Effects

Table3-1 Effects of Project Implementation and Extent of Improvement

Current Situation and Problems	Improvement Measures Under the Project	Project Effects and Extent of Improvement
<ul style="list-style-type: none"> • There is a shortage of Operating Theatres as the two existing theatres have to deal with all types of operations, including minor operations (annual number of operations: 2,985). • There is a shortage of intensive care beds (one ICU unit) and recovery beds (two beds) • Ophthalmic operations cannot be performed (no operations). 	<ul style="list-style-type: none"> • Two Operating Theatres plus one for outpatients (handling minor operations) are planned with additional equipment (anaesthetic machinery, electric scalpels, operating table, astral lamp, aspirator and forceps, etc.). • Two ICU units and three Recovery Beds are planned. • A set of ophthalmic operating tools will be provided. 	<ul style="list-style-type: none"> • The shortage of Operating Theatres will be eliminated • The quality of operations will be improved • Increase the number of operations (annual number of operations: 3,300). • Post-operation observation will be facilitated and sudden changes of the p • It will be possible to perform Ophthalmic Operations (104 cataract operations a year).
<ul style="list-style-type: none"> • There is no separation between clean and contaminated zones in the Operating Theatres and CSSD, risking hospital infection. • The small capacity and frequent breakdowns of the sterilizer results in an insufficient sterilization volume (1,760 litres). 	<ul style="list-style-type: none"> • The clean and contaminated zones are clearly separated on the floor plan. • Two sterilizers with a capacity of 220 litres are planned. 	<ul style="list-style-type: none"> • The risk of hospital infection will be reduced. • The required sterilizations volume (2,640 litres) will be secured.
<ul style="list-style-type: none"> • The X-ray photography apparatus and mobile X-ray apparatus frequently break down (annual number of X-ray photographs taken: 9,504). • The absence of a protective wall in the Radiology Room causes a risk of exposure to radiation among X-ray engineers. 	<ul style="list-style-type: none"> • Both types of apparatus will be renewed. • A protective wall will be introduced. 	<ul style="list-style-type: none"> • The continuous use of the new apparatus will increase the number of X-ray diagnoses and will also improve the diagnosis accuracy (annual number of X-ray photographs taken: 10,500). • The level of exposure to radiation among X-ray engineers will be reduced.
<ul style="list-style-type: none"> • The bed occupancy rate of the Obstetric Ward is as high as 80%, resulting in a bed shortage. 	<ul style="list-style-type: none"> • The number of beds will be increased from the present 28 to 34. 	<ul style="list-style-type: none"> • Hospitalization on the planned day will become possible and the care for pregnant women will improve.
<ul style="list-style-type: none"> • The occupancy rate of Obstetrics and Surgery are high as 80%, and CSB function is spread causes inefficiency in the work. 	<ul style="list-style-type: none"> • The construction of the new Obstetric Ward and Surgical Ward, and the centralization of the CBS functions. 	<ul style="list-style-type: none"> • Strengthen the medical services as well as primary treatment at the hospital, improving health and medical services for all Tongans.
<ul style="list-style-type: none"> • The capacity of the open-type septic tank is insufficient and carries a risk of infection and the spread of contamination in addition to the problem of bad odor. 	<ul style="list-style-type: none"> • Closed-type septic tanks (three x 600 persons) are planned. 	<ul style="list-style-type: none"> • Impact to the environment will be reduced.

The above-expected effects of the Project implementation will directly benefit all people in Tonga who are potential patients for medical care at the Vaiola Hospital which is the highest ranked hospital in Tonga.

2) Indirect Effects

The reduced risk of hospital infection will enhance the reliability of the hospital, giving peace of mind to medical workers as well as patients.

This Project contribute to Mother and Child Health Index (Infant Mortality Rate and Maternal Mortality Rate) improvement.

3.2 Recommendations

3.2.1 Tasks to be Dealt with by Government of Tonga

(1) Allocation of Operating Budget

The budget to cover the salaries of the staff of the Ministry of Health and the operation and maintenance cost of the hospital is supposed to be funded by the current budget of the Tongan government and the aid budget of which the continued provision has been approved. The funding of the required budget size each year without fail will be essential. As the total operation and maintenance cost of the Vaiola Hospital can be established to a certain extent one year after the completion of the new facilities, the Ministry of Health must make a request for proper budget allocation to the government.

(2) Appropriate Deployment of Medical Staff

Tonga is aiming at improving the doctor-population ratio from one doctor per 2,279 persons (44 doctors for a population of 100,283) in 2000 to one doctor per 823 persons (127 doctors for a population of 105,011 based on the assumed population increase rate of 0.3% a year) in 2015 to improve the environment for health and medical services. The formulation of an annual medical staff expansion plan, securing of the necessary budget and the recruitment of additional staff members by the Government of Tonga is highly desirable to achieve the target doctor-population ratio for each year.

(3) Strengthening of referral system

Strengthening of referral system by reinforcement of information network including islands medical facilities is important to serve standardised Medical and Health Services.

(4) Establishment of payment of medical expenses

Operation budget of MOH including Vaiola Hospital is consisted by fiscal year budget, Bed Room charge from Private bed room, charges for issuance of health certificate, X-ray examination / Laboratory Examination / Vaccination and Inoculation for Passport and Immigration Requirement and so on. Medical fees and charges in the hospital for outpatients and inpatients are basically free of charge except dental treatment.

Capacity to generate additional income is a key factor in the capacity to sustain the future role, scope and function of Vaiola Hospital. One of the options is to amend the legislative to be able to charge the medical fees and charges. Income generating potential should be considered for a wide range of activities including provision of commercial laundry services, sales of staffs and relatives meals, large scale event catering and others for outside people of hospital.

(5) Secure budget for Tongan Government portion and execution schedule

Appropriate budget allocation and management of Tongan side work are very important for smooth execution of the Project. Especially, renewal of transformer, paving road connection from the main road, paving of parking space and completion of additional work from the EIA approval are necessary to be completed as schedule.

3.2.2 Collaboration with Other Donors

Tonga has been continually receiving aid from the UK, its former suzerain country, such neighbors as Australia and New Zealand and such multi-national organizations as the WHO, World Bank, ADB and EU, etc. Aid for the Ministry of Health and the Vaiola Hospital mainly features soft assistance for the improvement of hospital operation, dispatch of medical teams and provision of equipment. The World Bank is the only organization so far to provide assistance for the facility improvement of the Vaiola Hospital, having decided to fund the cost of facility construction based on the Vaiola Hospital Improvement Master Plan.

The construction of a mental health ward and kitchen building with a World Bank loan is scheduled to commence in September, 2004 with completion in May, 2005 and the process to select the responsible company for design and construction started in February, 2004. As this construction work will precede the planned construction work under the Project, there are many matters, including the temporary plan, scope of construction work and suppliers of infrastructure-related equipment, which must be coordinated with the Project. The Ministry of Health must, therefore, make proper coordination efforts in regard to these matters.

3.2.3 Possibility of Technical Cooperation

At present (February, 2004), five Japanese volunteers are working at the Vaiola Hospital, consisting of two JOCV volunteers specializing in the control of infectious diseases (public health) and three senior volunteers specializing in medical equipment, physiotherapy and health/medical care (ultrasonic examination). There are other positions for which the Vaiola Hospital requires external help, including a building/equipment maintenance engineer, an X-ray engineer, a pharmacist and so on. Japanese technical cooperation (using the scheme to dispatch individual experts or JOCV, etc.) in these fields should further improve routine activities at the hospital to further enhance the health and medical services provided by the hospital.