No.

BASIC DESIGN STUDY REPORT

ON

THE PROJECT FOR REHABILITATION OF HEALTH FACILITIES AND SUPPLY OF MEDICAL EQUIPMENT

IN

MBALE, TORORO, BUGIRI AND BUSIA DISTRICTS

IN

THE REPUBLIC OF UGANDA

July 2005

Japan International Cooperation Agency (JICA)

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PREFACE

In response to a request from the Government of the Republic of Uganda, the Government of Japan decided to conduct a basic design study on The Project for the Rehabilitation of Health Facilities and Supply of Medical Equipment in Mbale, Tororo, Bugiri and Busia Districts in the Republic of Uganda and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Uganda a study team from January 23 to February 26, 2005.

The team held discussions with the officials concerned of the Government of the Republic of Uganda, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Uganda in order to discuss a draft basic design, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Uganda for their close cooperation extended to the teams.

July 2005

Seiichi KOJIMA
Vice-President
Japan International Cooperation Agency

July 2005

Letter of Transmittal

We are pleased to submit to you the basic design study report on The Project for the Rehabilitation of Health Facilities and Supply of Medical Equipment in Mbale, Tororo, Bugiri and Busia Districts in the Republic of Uganda.

This study was conducted by the joint venture between Kume Sekkei Co., Ltd. and International Techno Centre Co., Ltd. under a contract to JICA, during the period from January 2005 to July 2005. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Uganda and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

Shigeru ENOMOTO

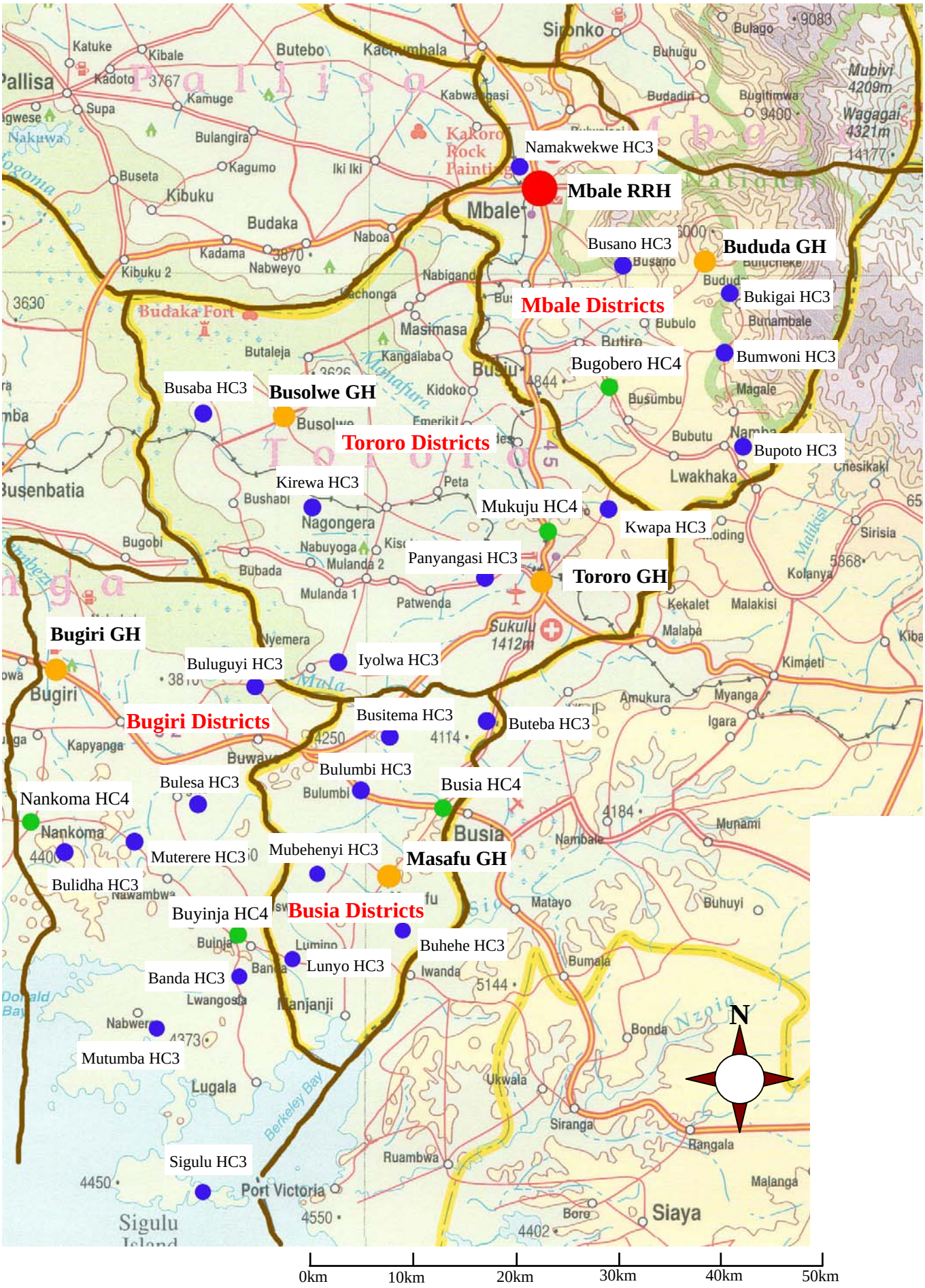
Project Manager,
Basic Design Study Team on
The Project for the Rehabilitation of Health Facilities
and Supply of Medical Equipment
in Mbale, Tororo, Bugiri and Busia Districts in the Republic of Uganda.
The Joint Venture between Kume Sekkei Co., Ltd.
and International Techno Centre Co., Ltd.

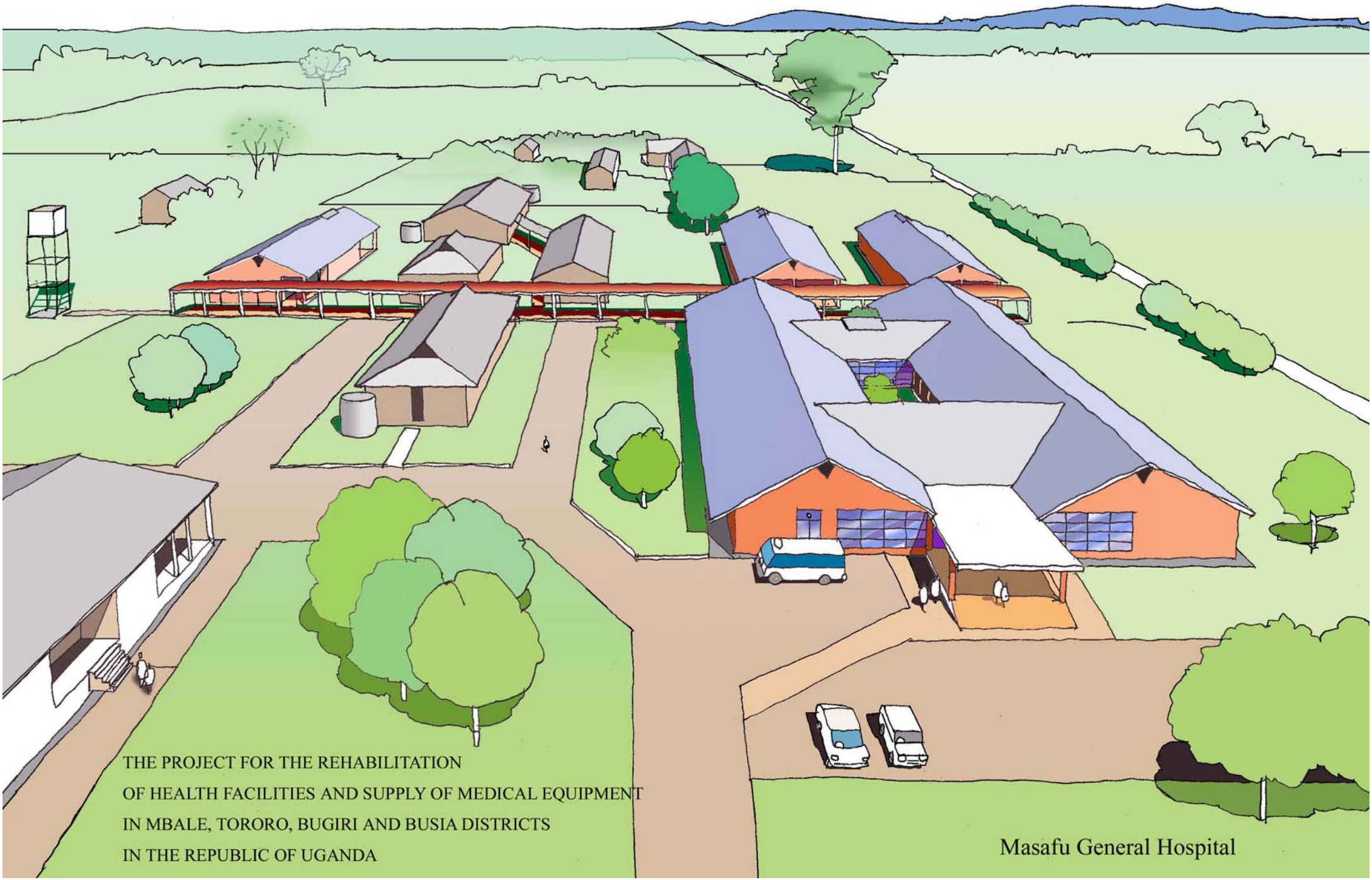
Location Map of the Project Sites 1

Targeted Area

Mbale, Tororo, Bugiri and Busia Districts

Location Map of the Project Sites 2




THE PROJECT FOR THE REHABILITATION
OF HEALTH FACILITIES AND SUPPLY OF MEDICAL EQUIPMENT
IN MBALE, TORORO, BUGIRI AND BUSIA DISTRICTS
IN THE REPUBLIC OF UGANDA
Masafu General Hospital

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Abbreviations

A/P	Authorisation to Pay
AfDB	African Development Bank
AIDS	Acquired Immuno-Deficiency Syndrome
ARI	Acute Respiratory Infections
B/A	Banking Arrangement
BS	British Standard
CO	Clinical Officer
E/N	Exchange of Note
GH	General Hospital
HC	Health Centre
HIV	Human Immuno-Deficiency Virus
HSD	Health sub-district
HSSP	Health Sector Strategic Plan
JICA	Japan International Cooperation Agency
MMR	Maternity Mortality Rate
MO	Medical Officer
MOWHC	Ministry of Works, Housing and Communications
MWP	Medical Waste Pit
NGO	Non Governmental Organization
NRH	National Referral Hospital
OPD	Outpatient Department
PEAP	Poverty Eradication Action Plan
PHC	Primary Health Care
PL	Pit Latrine
PP	Placenta Pit
RRH	Regional Referral Hospital
TFR	Total Fertility Rate
U5MR	Under 5 Mortality Rate
UEDCL	Uganda Electric Distribution Company Ltd.
UNBS	Uganda National Bureau of Standards
UNMHCP	Uganda Minimum Health Care Package
US	Ugandan Standard
Ush	Uganda Schilling
VCT	Voluntary Counselling and Testing

Summary

Summary

Looking at public health indicators for Uganda, for example, a neonatal mortality rate of 82 per 1,000 infants born (2002), a child mortality rate (under 5 years old) of 141 per 1,000, and a mortality rate among pregnant women and nursing mothers of 880 per 10,000 (2002), the health and medical care situation is extremely poor. According to the government, the major causes of mortality are Complications related to pregnancy or childbirth (20%), malaria (15%), acute respiratory infections (ARI) (11%), AIDS (9%) and diarrhea (8%). In order to realize improvement in these public health and medical care indicators, it is essential to take measures such as providing appropriate care for pregnant women and nursing mothers, improving public sanitation and preventing infections, etc.

The Government of Uganda compiled the Poverty Eradication Action Plan (PEAP) and, within the framework of the PEAP, the Health Sector Strategic Plan (HSSP I) in 2000 and has since strived to improve conditions in the health and medical care sector via development targets such as the reduction of disease and mortality rates among citizens and correction of disparities between the cities and rural areas and so on. As a result of these efforts, a certain degree of improvement has recently been witnessed in primary health care indicators in rural areas, however, conditions surrounding health and medical care on the rural level, in particular, the environment surrounding women's and children's health, still remain very poor.

The regional health care system in Uganda is composed of Regional Referral Hospitals, General Hospitals, and Health Centres IV, III, II and I; however, because many existing facilities centring on the General Hospitals are deteriorated and basic medical equipment is either broken down or lacking in quantity, the system is unable to provide appropriate health and medical care services to local citizens. The Ministry of Health, with support from many donors, is hurrying to construct and supply medical care facilities and equipment and also assign human resources in rural areas.

It was against such a background that the Government of Uganda in 2003 made a request to the Government of Japan for the provision of grant aid concerning facilities construction and equipment supply for national medical care agencies (Regional Referral Hospital (RRH), General Hospitals (GH) and Health Centres (HC)) in target areas within four eastern districts (Mbale, Tororo, Bugiri and Busia) where the deterioration of facilities and equipment has been extreme and improvements are urgently required.

In response to the request, the Government of Japan consigned the Japan International Cooperation Agency (JICA) to implement the Preparatory Study from September to October 2004 in order to verify the validity of the contents of the request as a grant aid project and to compile an appropriate scope of cooperation. Based on the study findings, JICA dispatched the Basic Design Study Team to Uganda from January to February 2005. In addition to discussing and confirming the contents of the request with government officials in Uganda, the Study Team surveyed the target sites and related facilities and collected the necessary materials and data, etc. In

subsequent analysis in Japan, the contents and scale of the facilities and equipment were examined, the rough project cost was estimated and the basic design summary was prepared. Based on this, JICA dispatched the Basic Design Outline Explanation Study Team from May to June 2005 in order to explain and discuss the Basic Design Summary and reach a basic agreement with the Government of Uganda.

The plan that was finally arrived at comprises facilities construction (extension, rebuilding and new construction) at one Regional Referral Hospital and three General Hospitals, renovation of electric equipment at two General Hospitals, and equipment supply to these six facilities plus an additional 28 Health Centres (34 facilities in total). The following policy was adopted when examining the Project.

- Carry out facilities construction and equipment supply giving priority to core facilities of health and medical care activities
- Construct facilities and procure equipment according to the scale, quantities and specifications suited to the current conditions of each agency.
- Plan so that operation and maintenance work following the completion of facilities and supply of equipment does not become excessive.
- Fully utilize existing buildings and equipment and be careful to avoid redundancy with existing equipment including items in storage.

The following table gives an outline of the Project in terms of facilities and equipment.

Outline of Facilities

Hospital	Building	Area (m2)	Type of Work
Mbale RRH	Operation Theatre	280.4	Extension
	X-Ray Unit	158.7	Rebuilding
	Maternity Ward	376.5	Rebuilding
	Delivery Unit	161.3	Rebuilding
	Operation Theatre For Obstetrics	80.6	New construction
	Attached Shed	49.2	New construction
	Connecting Passageway	221.0	Renovation and Extension
Bududa GH	Outpatient Department	1424.6	Rebuilding
	Delivery Unit	113.5	Extension
	Operation Theatre	306.6	Rebuilding
	Attached Shed	41.7	New construction
Tororo GH	Operation Theater	306.6	Rebuilding
	Outpatient Department	1424.6	Extension
	Delivery Unit	161.3	Rebuilding
	Female Ward	752.9	Rebuilding
	Attached Shed	49.2	New construction
	Connecting Passageway	221.0	Extension

Busolwe GH	Renovation Of Electrical Wiring		Renovation
Bugiri GH	Renovation Of Electrical Wiring		Renovation
Masafu GH (Existing Health Centre IV)	Outpatient Department	1209.6	Rebuilding
	Maternity Ward	308.6	Rebuilding
	Female Ward	218.9	New construction
	Paediatric Ward	218.9	Rebuilding
	Attached Shed	49.2	New construction
	Connecting Passageway	377.0	New construction
Total		8511.9	

Summary of Equipment (Regional Referral Hospitals and General Hospitals)

Equipment Classification	Equipment (Quantity)	Purpose of Use
Outpatient treatment and diagnosis equipment	Mobile operation lights (6), operation tables (6), suction apparatus (6), ECG (6), examination lights (13), stretchers (6), diagnostic equipment sets (24)	Dressing of emergency patients, examination of general patients
Outpatient clinical inspection room and pharmacy equipment	Microscopes (5), centrifuges (5), colorimeters (5), semi-analytical balances (5), hot air ovens (5), refrigerators (10), water distillers (5)	Blood, urine and stool inspections, etc., washing of inspection apparatus
Radiation and image diagnosis equipment	Mobile X-ray unit (1) C-arm X-ray unit (1), fluoroscopy X-ray unit (1), basic Bucky system X-ray units (4), ultrasound scanner (1)	Radiation photography of bones and organs, ultrasound diagnoses of stomach and circulatory organs
Dental equipment	Complete dental units (6), dental X-ray units (6) Dental film processor	Dental treatment
Operating apparatus	Operation tables (8), orthopaedic operation table (1), anaesthesia units (9), electro surgical units (9), patient monitors (7), general surgery instrument sets (6), orthopaedic surgery instrument sets (6), caesarean surgery instrument sets (6), gynaecology and obstetrics instrument sets (6)	Apparatus and instruments for use in operation theatres
Sterilization equipment	Vertical autoclaves (6) Tabletop autoclaves (14)	For high-pressure steam sterilization of operating apparatus and instruments
Obstetrics equipment	Delivery beds (21), vacuum extractors (6), portable ultrasound scanners (5), baby incubators (4), infant warmers (11), neonate and paediatric weighing scales (9), adult weighing scales (5)	Equipment for use in delivery, neonatal oxygen treatment and body temperature maintenance
Ward equipment	Traction beds (11), dressing instrument sets (24), wheelchairs (12)	For care of inpatients
Transportation equipment	Ambulances (6)	For transporting emergency patients from Health Centres to hospitals, and from hospitals to the capital Kampala

Summary of Equipment (Health Centres)

Agency Level	Equipment Classification	Equipment (Quantity)	Purpose of Use
Health Centre IV	Operating	Vertical autoclaves (3), caesarean instrument sets (3), mobile operation lights (3), operation tables (3), stretchers (3), vacuum extractors (3), instrument trays (3), instrument trolleys (3)	For use in operations up to caesarean sections
	Lighting	Solar electric systems (3)	For use in lighting operation theatres
	Other	Gas refrigerators (3)	Storage of chemicals and blood
Health Centre III	Obstetrics	Delivery tables (8), delivery instrument sets (8), instrument trays (8), instrument trolleys (8), neonate and paediatric weighing scales (8), adult weighing scales (8)	For use in delivery
	Lighting	Solar electric systems (23)	For use in lighting delivery rooms

In the event where the Project is implemented under the Grant Aid Scheme of the Government of Japan, the overall Project implementation period will be 25 months, comprising 5 months for the detailed design and tender work and 20 months for the construction work. As for the Project cost, it is estimated that approximately 1.766 billion yen (1.658 billion yen from the Government of Japan and 108 million yen from the Government of Uganda) will be required. This cost estimate is provisional and would be further examined by the Government of Japan for the approval of the Grant.

Moreover, in consideration of the contents and scale of the Project, it is considered appropriate to implement it over two phases.

The operation and maintenance budgets of each target agency are expected to increase in line with implementation of the Project. Out of the target agencies, Mbale Regional Referral Hospital is under the jurisdiction of the Ministry of Health while the other General Hospitals and Health Centres are managed by each Office of District Director of Health Services; however, in view of the fact that the overall budget of the Ministry of Health is steadily increasing, with budget allocations for Office of District Director of Health Services s particularly on the rise, it is deemed amply possible that the necessary budget allocations will be provided to these agencies.

The major effects anticipated in the event of Project implementation are as follows:

[Direct Effects]

(1) Hospital functions will be improved as follows at Regional Referral Hospital and General Hospitals:

- More basic inspections (X-ray inspections, ultrasound scans, ECG scans, etc.) will be possible.
- More operations will be made possible as a result of the construction and renovation of operation theatres and supply of operation equipment.

- More deliveries and caesarean sections will be made possible as a result of the construction and renovation of obstetrics facilities and supply of obstetrics equipment.
- The overall number of outpatient treatments will increase in line with the strengthening of examination, inspection and treatment functions.
- The number of inpatients at Masafu General Hospital will increase as a result of extension of the inpatient wards.

(2) Health and medical care services will be improved on the level of Health Centres. In particular, by procuring solar electric lighting systems and delivery equipment, the quality of delivery services including nighttime deliveries will be improved.

(3) Through providing ambulances to Regional Referral Hospital and General Hospitals, means for transferring emergency patients to agencies both inside and outside of target areas will be secured.

(4) As a result of the effects described in (1) through (3) above, the referral setup in the four eastern districts will be strengthened.

[Indirect Effects]

(1) As a result of strengthening the functions including means of transferring patients of each health and medical care agency, it is anticipated this will lead to improvement in regional health indicators, in particular reduction of Maternity Mortality Rate, in the four target districts.

Accordingly, since it is expected that the Project will greatly contribute to improvement of health and medial care services in the four target districts in the east of Uganda, it may be concluded that implementing the Project under Japan's Grant Aid Scheme is extremely significant, valid and necessary.

Moreover, in order to link Project implementation to effective improvement in the quality of health and medical care services, it will be necessary to simultaneously strengthen the operation and maintenance systems of each agency. Accordingly, it will be necessary for the Ugandan side to take the following measures.

(1) Securing of sufficient human resources

The number of personnel at many health and medical agencies are currently less than the standard numbers designated by the Ministry of Health, and this is one of the reasons behind the declining quality of services. Accordingly, it is necessary to increase numbers of personnel at each agency with a view to securing standard numbers.

(2) Implementation of appropriate facilities and equipment maintenance

The decline in functions at General Hospitals arising from deterioration of facilities is conspicuous all over the country. The main reason for this is that facilities have not received appropriate maintenance since they were first constructed around 1970. Accordingly, it will be essential to implement appropriate maintenance in future.

(3) Strengthening of coordination between each facility

Rather than functioning as individual units, each hospital and Health Centre should complement each other as parts of the regional health and medical care network. It will be important to strengthen coordination between each agency under the guidance of the Ministry of Health and each Office of District Director of Health Services.

(4) Collection of appropriate health and medical care data

Currently, even though health and medical care data are collected at each target facility, there is still a lack of unification and verification of data collection methods. It is difficult to plan future measures without having an accurate grasp of current conditions. In order to accurately gauge the actual state of medical care activities within each agency, it is desirable for the Ministry of Health to implement regular monitoring.

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Chapter 1

Background of the Project

1 Background of the Project

1-1 Background of the Project and Outline of the Request

1-1-1 Background of the Project

The Government of Uganda compiled the Poverty Eradication Action Plan (PEAP) in 2000 and this is currently being implemented over the term of 2000/01 ~ 2004/05. The main strategy of PEAP lies in making improvements to income, health, education and human rights. Concerning one of the strategies, i.e. improvement in health of people in poverty, the dissemination of primary health care (PHC) is regarded as a priority issue. In particular, with 87% of the population living in rural farming villages, the poor state of health services in regional areas and differentials between cities and regional areas in terms of health services are critical problems. According to the government, the major causes of mortality are Complications related to pregnancy or childbirth (20%), malaria (15%), acute lower respiratory infections (11%), HIV/AIDS (9%) and diarrhoea (8%). In view of these figures it is essential to take measures such as providing appropriate care for pregnant women and nursing mothers, improving public sanitation and preventing infections, etc. in order to realize improvement in the public health and medical care indicators.

The Government of Uganda in 2000 compiled the Health Sector Strategic Plan (HSSP I: 2000/01~2004/05), in which it has raised the reduction of disease and mortality among citizens and correction of disparities between the urban and rural area and so on as development targets. Under the HSSP, the government has strived to strengthen the regional medical care setup and disseminate primary health care (PHC) with a view to providing appropriate health and medical care services to rural areas. Thanks to these efforts, a certain degree of improvement has recently been witnessed in primary health care indicators in rural areas, however, conditions surrounding health and medical care on the rural level, in particular, the environment surrounding women's and children's health, still remain very poor.

The health care system in the rural area of Uganda is composed of Regional Referral Hospitals (RRH), General Hospitals (GH), and Health Centres (HC) IV, III, II and I. The per capita quantities of health facilities and medical care workers are said to be insufficient and, even though the Ministry of Health has constructed the lacking facilities, rebuilt and renovated deteriorated facilities and assigned more personnel with the emphasis on HC IV and lower level facilities under the HSSP, the deficiencies have still not been fully resolved. Moreover, since the TFR in Uganda has constantly remained high at 7.1 (2000-2005) and population increase is expected to continue, it is forecast that these problems will persist into the future.

Furthermore, some health and medical care facilities suffer from very serious deterioration of facilities caused by deterioration over time and lack of maintenance, as well as equipment damage and breakdowns. In particular,

many of the country's General Hospitals that were constructed around 1970 are more than 30 years old and are confronted with severe problems of equipment deterioration and rain leaks, etc. As a result, because facilities in rural areas are unable to provide appropriate health and medical care services for local citizens, the Ministry of Health, with support from many donors, is making ongoing efforts to construct medical care facilities, supply equipment and also assign human resources in rural areas.

It was against such a background that the Government of Uganda in 2003 made a request to the Government of Japan for the provision of grant aid concerning facilities construction and equipment supply for national medical care agencies (Regional Referral Hospital, General Hospitals and Health Centres) in four eastern districts (Mbale, Tororo, Bugiri and Busia) where the deterioration of facilities and equipment has been extreme and improvements are urgently required. In this region, Mbale RRH, which is the area's top referral hospital, Tororo GH and numerous other medical care facilities are confronted with the deterioration and breakdown of facilities and equipment.

The superior goals of the Project are to improve health and medical care services in the target agencies (RRH, GH, HC-IV, HC-III) in the four eastern districts, and as a result to improve the quality of local health and medical care services and ensure the effective functioning of the regional referral system.

1-1-2 Outline of the Request and Main Components

The original request targeted many (70) agencies spread over a wide area and covering a broad range of institutions from levels 2 through 6. Moreover, the requested work contents covered a wide spectrum from new construction to renovation of existing facilities. Accordingly, the Japan International Cooperation Agency (JICA) implemented the Preparatory Study from September to October 2004 in order to narrow down the contents of the request. The following table shows the outline contents and major components of the request following the Preparatory Study.

Table 1-1 Outline of the Request

Superior Goal	Improvement in the health of citizens in the four eastern districts
Project goal	Improvement in the quality of health and medical care services at the target facilities, and expansion in the area covered by each agency
Anticipated outputs	Construction, improvement and supply of facilities and equipment at the target agencies
Output indicators	Increases in the number of patients and inspections Increased numbers of transferred and referred patients
Investment	Facilities: new construction (18 sites), renovation (6 sites), including 6 sites deemed to be urgent

	Equipment: provision of equipment to 48 facilities
Input by the Ugandan side	1) Securing of land, 2) Electricity and water supply, 3) Budget measures, 4) Personnel assignment
Target areas	Mbale District, Tororo District, Bugiri District, Busia District
Beneficiaries	Direct beneficiaries: 1,980,000 citizens living in the four eastern districts (720,000 in Mbale, 600,000 in Tororo, 430,000 in Bugiri, and 230,000 in Busia) Indirect beneficiaries: More than 5,600,000 citizens in Eastern Uganda

Chapter 2

Contents of the Project

2 Contents of the Project

2-1 Basic Concept of the Project

The Project will cover one (1) Regional Referral Hospital (RRH), five (5) General Hospitals (GHs), and Health Centres IV and III in the above-mentioned targeted districts. It includes rebuilding of facilities facing difficulty in continuous usage, renewal of building facilities and equipment, allocating sufficient personnel, securing the necessary budget, and also improvement of the operation and maintenance. The health indexes of the above-mentioned districts are expected to improve through the improvement of medical and health care services at targeted facilities, which are regarded to be the key of a regional medical referral system.

2-2 Basic Design of the Requested Japanese Assistance

2-2-1 Design Policy

2-2-1-1 Requested Contents and Targets of Assistance

In 2003, the Government of Uganda made a request to the Government of Japan for a grant aid scheme for medical institutions including hospitals and Health Centres located in four (4) districts (Mbale, Tororo, Bugiri and Busia districts) in eastern Uganda. As a result of a Preparatory Study implemented between September and October 2004, the following modifications were made. An outline of the initial contents requested and the contents after the Preparatory Study is described below.

Table 2-1 Outline of Requested Contents

	Initial Request (August 2003 ＆ June 2004)	After Preparatory Study (October 2004)
Number of Requested Sites	70	48 (Of these, target of facility plan are 20)
Level of Requested Sites	Medical Institutions from HC II to RRH	Medical Institutions from HC III to RRH
Other	Construction of medical facilities and staff houses Supply of medical equipment. Main target are HC IIIs and GHs.	20 sites for construction and renovation of medical facilities are classified into three stages from higher urgency (A) to lower urgency (C). With respect to the request for equipment, the criteria for narrowing down were established.

In consequence of the above-mentioned process, The Basic Design Study was conducted in January and February 2005. In this field survey, a mutual agreement on following matters about the content of the request was reached through discussions between the study team and the Ministry of Health.

- Items whose urgency was judged to be C (lower urgency) in the Preparatory Study will be excluded from the Project in principle. The construction of new facilities on the Health Centre level and renovation of hospital facilities mainly fall under these. As a result, targets of the study on a facility plan will be six (6) sites, Mbale RRH, Bududa, Tororo, Bugiri and Busolwe General Hospitals and Masafu Health Centre IV (scheduled to be upgraded to General Hospital).

- Medical equipment necessary for basic medical care will be targeted at the above-mentioned six (6) hospitals (level V and VI), so that their medical care functions can be reinforced. Nonetheless, some equipment was eliminated from the list;
  - Simple equipment which is not suitable as items for Japanese grant aid
  - Beds for wards which could be supplied by MOH
  - Refrigerator for mortuary (electric supply condition is not stable and fuel cost for generator would be too expensive.)
  - Infusion production equipments (quality control is difficult and there is fear of contamination by impurities)

- As for equipment for health centres, equipment which was already supplied in other projects, existing equipment stocked in the storage, simple equipment which is not fabricated in Japan anymore, are excluded from the Project. As a result, main component of equipment for HC will be obstetric equipment (delivery-related equipment: HC-III) and operation equipment (Caesarean section: HC-IV). However, since the current grade and the scheduled one after new construction are confused at the time of the Preparatory Study, the criteria were set for targeted facilities such as;
  - A facility should be HC-III or IV at the stage of project implementation
  - Building construction should be completed before supply of medical equipment.

- To enforce a referral system, two types of vehicles are included in the request, which are ambulances for hospitals to transport emergency patients including pregnant women; and bikes used for preventive activities at Health Centres in each village.

- About the radio device for communication, the spread of cellular phones in Uganda is remarkable these days, and the Ministry of Health lend cellular phones to high-level staffs at almost all hospitals and health centres so that it was excluded from the Project.

As a result of the field survey and discussions with the Ugandan government, the requested contents as attached in the Minuets of Discussions (M/D) of 14th February 2005 are as follows.

Table 2-2 List of requested facilities (final)

Hospital	Category	Item
Mbale RRH	Hospital Facilities	Operation Theatre
		X-Ray Unit
		Maternity Ward including Operation theatre for Obstetrics
		Roof of Connecting passageway (between X-Ray unit and Ward)
		Generator and G-circuit
Bududa GH	Hospital Facilities	Administration
		Outpatient Dept. including X-Ray, Casualty Unit & Child Health Centre
		Delivery Unit of Maternity Ward
		Operation Theatre and its Connecting passageway
		WC Unit for 4 Wards (Maternity, Female, Paediatric, Male)
		Mortuary
	Residence for Staff	Staff Houses
	Infrastructure	Water and Sewage Line for related facilities
		Booster Pump and Water Filter
Tororo GH	Hospital Facilities	Operation Theatre
		Outpatient Dept. including X-Ray and Casualty Unit
		Delivery Unit of Maternity Ward
		Female Ward
		Male Ward
		Connecting Passageway
		Laundry/Store
		Mortuary
	Residence for Staff	Staff Houses
	Infrastructure	Related Sewage system for facilities
Busolwe GH	Hospital Facilities	WC Unit for 4 Wards (Maternity, Female, Paediatric, Male) + OPD
		Renovation of Roofs and Ceilings
	Infrastructure	Renovation of Elevated Water Tank
		Water Supply and Sewage Line of Ward Block
		Generator and G-circuit
Bugiri GH	Hospital Facilities	WC Unit for 4 Wards (Maternity, Female, Paediatric, Male) + OPD
		Renovation of Roofs and Ceilings
	Infrastructure	Renovation of Elevated Water Tank
		Water Supply and Sewage Line of Ward Block
		Pump for Drainage of Rain Water
		Generator and G-circuit
Masafu HC4	Hospital Facilities	Outpatient Dept. including X-Ray and Casualty Unit
		Maternity Ward
		Male Ward
		Paediatric Ward
		Connecting Passageway
		Administration
		Mortuary
	Residence for Staff	Staff Houses
	Infrastructure	Elevated Water Tank and Water Supply Line
		Sewage System (Septic Tank & Soak Pit)
		Electric system including Generator and G-circuit

Table 2-3 List of requested equipment (final)

Summary of Equipment (Regional Referral Hospitals and General Hospitals)

Equipment Classification	Equipment	Purpose of Use
Outpatient treatment and diagnosis equipment	Operation lights, operation tables, suction apparatus, ECG, examination lights, stretchers, diagnostic equipment sets	Dressing of emergency patients, examination of general patients
Outpatient clinical inspection room and pharmacy equipment	Microscopes, centrifuges, colorimeters, semi-analytical balances, hot air ovens, refrigerators, water distillers	Blood, urine and stool inspections, etc., washing of inspection apparatus
Radiation and image diagnosis equipment	Mobile X-ray unit C-arm X-ray unit, fluoroscopy Basic Bucky System X-ray Unit X-ray units , ultrasound scanner	Radiation photography of bones and organs, ultrasound diagnoses of stomach and circulatory organs
Dental equipment	Complete dental units , dental X-ray units Dental film processor	Dental treatment
Operating apparatus	Operation tables , orthopaedic operation table , anaesthesia units , electro surgical units , patient monitors , general surgery instrument sets , orthopaedic surgery instrument sets , caesarean surgery instrument sets , gynaecology and obstetrics instrument sets	Apparatus and instruments for use in operation theatres
Sterilization equipment	Vertical autoclaves Tabletop autoclaves	For high-pressure steam sterilization of operating apparatus and instruments
Obstetrics equipment	Delivery beds, vacuum extractors, portable ultrasound scanners, baby incubators, infant warmers, neonate and paediatric weighing scales, adult weighing scales	Equipment for use in delivery, neonatal oxygen treatment and body temperature maintenance
Ward equipment	Traction beds, dressing instrument sets, wheelchairs	For care of inpatients
Transportation equipment	Ambulances	For transporting emergency patients from Health Centres to hospitals, and from hospitals to the capital Kampala
Ophthalmology equipment	Biometer, Ophthalmic Fundus Camera, Auto Refractometer ND-Yag Laser Unit, Perimeter, Cataract set Pulse Tonometer, Phacoemulsification	For Ophthalmology Dept. of Mbale RRH
Otolaryngology equipment	Carbon dioxide Laser System, Fiber Optic Rhino- Pharingo-Laryngo Esophagoscope Electric response audiometer (ERA) Laryngeal Stroboscope Equipment ENT Operating Microscope Auditory Brainstem Response	For Otolaryngology Dept. of Mbale RRH
Orthopaedics surgical instrument	Laminectomy set (Spinal) Pedicle Screw set (Spinal) Herrington Rod and Instrumentation set (complete) Arthroscopy set complete with accessories (Light source, camera, scopes)	For Orthopaedics Operation Theatre of Mbale RRH

Summary of Equipment (Health Centres)

Agency Level	Equipment Classification	Equipment	Purpose of Use
Health Centre IV	Operating	Vertical autoclaves, caesarean instrument sets, Mobile operation lights, operation tables, stretchers, Vacuum extractors, instrument trays , instrument trolleys	For use in operations up to caesarean sections
	Diagnostic	Ultrasound scanner	
	Lighting	Solar electric systems	For use in lighting operation theatres
	Other	Refrigerators	Storage of chemicals
		Generator	For power failure
		Motorbike	For use in prevention
Health Centre III	Obstetrics	Delivery tables, delivery instrument sets, instrument trays, instrument trolleys, neonate and paediatric weighing scales, adult weighing scales	For use in delivery
	Lighting	Solar electric systems	For use in lighting delivery rooms
	OPD	Diagnostic set	For use in OPD
	Other	Motorbike	For use in prevention

2-2-1-2 Examination of Project Contents and Basic Policy

(1) Confirmation of Appropriateness

Medical institutions for the facility improvement are outlined as follows.

Table 2-4 Outline of the targeted hospitals

District	Mbale		Tororo		Bugiri	Busia
District Population (Thousand)	721		604		426	228
Name	Mbale	Bududa	Tororo	Busolwe	Bugiri	Masafu
Level	RRH	GH	GH	GH	GH	GH (HC4)
Established	1924	Constructed 1968 Open 1971	1938	Constructed 1972 Open 1980	Constructed 1972 Open 1975	1930
Catchment population (Thousand)	2,905	400	354	250	426	(228)
Beds	410	170	214	123	104	44
Outpatient/year	50,725	29,977	21,785	49,052	58,636	34,590
Inpatient /year	39,422	8,076	14,070	8,457	37,618	1,812
ALOS (days)	7.4	5.0	4.0	7.1	3.8	3.6
BOR	86%	86-96%	86%	59%	99%	40%
Operation Nos/year	4,242	518	1,242	1,468	1,244	444
Normal Delivery Nos/year	3,855	887	1,788	857	1,045	1,170
Caesarean Section Nos/year	592	88	128	166	289	102
Staff Total	305	86	137	113	122	30

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1) Beneficiaries

According to the Ministry of Health, standard target population of RRH is 2,000,000 and that of GH is from 100,000 to 1,000,000. The above table shows that Mbale RRH has more beneficiaries than the standard number, and Bududa, Tororo, Busolwe, Bugiri GH have enough beneficiaries. As for Masafu GH, it is assumed that whole population of the district would be beneficiaries, since there is no existing GH in the district.

This upgrading of Masafu GH is judged to be most appropriate, since the referral from Busia district to other districts is not easy. It takes at least one hour for the transport from Busia (the capital of the district) to nearest General Hospitals (Bugiri GH or Tororo GH). From health centres in the district, considering their dispersion and bad condition of the roads, it will take more time than it. However, Busia district is smaller than other districts with total population of 228,000 and it would be necessary to take this point into consideration in scale setting of the institution. Here we will take Bugiri GH as a reference, which is the only GH in the adjoining district, and whose management state is fairly good. The ratio of population of two districts (Bugiri and Busia) is 1 to 0.54 and Bugiri GH has 104 beds totally. If we apply this proportion to the scale setting, Masafu GH

should have 56 beds. As a result of the discussion with the Ministry of Health on this point, it is agreed that Masafu GH is planned with the size of 60 beds instead of 100 beds for ordinary general hospitals,

In addition, it could be judged that each HC, target of equipment supply, has sufficient beneficiaries since they are supposed to be established for a predetermined population scale in each HSD.

2) Operation

In the targeted hospitals, deterioration of facilities, or breakdown of equipment often makes hospital operation difficult. Therefore, it is desirable to improve physical conditions of the hospitals in order to ameliorate of medical care services.

3) Staff Allocation

Although the number of staffs tends to be insufficient on the whole, it is thought that there is no big problem in management with present staffs since the major content of this project is rebuilding of facilities and renewal of equipment. However, in order to improve medical care services from the both viewpoint of quantity and quality from now on, it is required to secure sufficient staffs in each organization. In addition to the inputs from the Japanese side, ongoing efforts by the Ugandan side on this point shall become indispensable.

Taking above-mentioned factors into consideration, it could be concluded that the inputs from the Japanese side will be sufficiently effective.

(2) Principles in Setting Contents and Scale

In determining the contents and scale of the Project, the following principles will be adopted.

- Emphasis should be placed on the improvement of medical care activities, so that priority shall be given to buildings and equipment indispensable to medical care activities.
- The Existing facilities and equipment should be utilized effectively. If continuous utilization is found to be difficult or if functional problems exist, those facilities will be rebuilt. In addition, special consideration should be given so that equipment, including those stored in warehouses, will not overlap.
- Main part of the project shall be rebuilding and renewal of existing and deteriorated facilities and equipment. Consequently, increase of the maintenance cost will be kept to a minimum. Thus, operation and maintenance after the completion of the project shall remain within a feasible scope technically and financially.
- Although extensive renovation was requested for some buildings, such work will be excluded from the Project for the following reasons: (i) Service life after renovation is anticipated to be short; (ii) Indirect cost will be higher than newly constructed facilities; (iii) Accurate drawings (such as construction plans) could not be obtained so that it is difficult to clarify total impact of the work.

- Electrical systems at some hospitals in areas such as consultation rooms, laboratories and Operation Theatres will be improved in keeping with the supply of medical care equipment. If the utility systems do not function, medical care equipment to be improved cannot be utilized properly.
- In accordance with the Criteria of the Ministry of Health, the staff housing should be established at the hospital for some staff. If staff housing is established, it is advantageous from the viewpoint of hospital services when securing staff or dealing with an emergency medical situation. Although its necessity was sufficiently recognized, it will be excluded from the Project for the following reasons: (i) Compared with medical facilities where both patients and medical staff are beneficiaries, there are fewer direct beneficiaries. Also, it does not contribute directly to medical care services; (ii) Performance required for staff housing is lower than that of medical facilities, so that it would be appropriate to build housing through local specifications; and, (iii) Correlation between housing and a suitable number of staff is not always clear because some hospitals have enough staff despite a shortage of housing, and some hospitals lack staffs despite adequate housing.

2-2-1-3 Principles of the Facility Plan

The following principles will be taken in planning of newly constructed and renovated facilities under the Project in due consideration of the results of the field survey and the grant aid scheme.

(1) Security of Durability

In some existing buildings at the targeted facilities structural defects such as uneven settling or large cracks can be observed. In addition, leakage associated with deterioration of the water supply and drainage systems have had a serious impact on the buildings themselves in many places. This is a result of insufficient maintenance and lack of consideration given to durability. Consequently, in the case of building new facilities, in order to ensure sufficient durability the following principles will be taken.

- A foundation structure should be carefully planned by analyzing the results of the geological survey.
- The frame should be primarily an RC Rahmen (rigid-frame) and steel structure for durability.
- The approximate renewal period for building facilities is from fifteen (15) to twenty (20) years in general. Accordingly, piping embedded in walls or frames should be minimum in order to avoid the impact of deterioration of piping on the building itself.

(2) Consideration of Natural Conditions

A design should sufficiently take into account local climate (rain, sunlight and ventilation). Considering abundant rainfall and harmony with the existing facilities, sloped roofs will be applied and eaves shall be projected sufficiently in order to protect external walls. In addition, tiled roofing + corrugated sheet or corrugated sheet + thermal insulating material will be adopted to block strong sunlight. Taking maintenance problems into account, gutters will not be installed and terraces will be installed under the eaves to protect the building. Gravel will also be spread out to receive rainwater. Brick double-framed walls will be applied for waterproofing and to block the heat. The lower part of walls will be treated with waterproofing for possible water infiltration.

(3) Cost Reduction

In satisfying hospital functions, designs shall be simple as much as possible in order to make harmony with the existing facilities, and at the same time, to reduce the cost of construction and maintenance. In addition, standard sizes (modules) will be adopted for concrete frames to reduce the construction cost. Also, natural energy should be utilized where possible, in order to reduce operating costs such as lighting and air conditioning,

(4) Size and Grade

In 2003, the Ministry of Health compiled “Detailed Working Drawings, Specifications and Bills of Quantities for the Standard Building Plans 2003 (the Standard Building Plans)”. It is thought that the contents reflect the medical services which now the Ministry of Health considers to be appropriate at each level of medical institutions.

However, inconsistency can be observed between building plans shown there and the standard lists of medical equipment or medical services carried out currently at each hospital or health centre. In addition, its structure consists of simple wooden truss roof and masonry works of concrete blocks. It may be inexpensive and suitable for quantities of construction in a short period but seems to be insufficient from the viewpoint of durability. In discussion with people of the Ministry of Health, the opinion was given that " the Standard Building Plans " shall reflect opinions of those on the spot and is scheduled to be revised in the future.

In consideration of these points, scale setting of each facility will be based upon the scale of existing buildings and also " the Standard Building Plans ". As for the grade setting, cost reduction and durability will be taken into consideration.

2-2-1-4 Principles on Equipment Plan

(1) Principals for Selection of Target

The target of Equipment plan shall be 6 hospitals (Mbale RRH, Bududa GH, Tororo GH, Busolwe GH, Bugiri GH, Masafu GH) and HC-IV and HC-III in Mbale, Tororo, Bugiri and Busia Districts. The appropriateness of these six hospitals as targets was confirmed as shown in 2-2-1-2 (1). Thus medical care equipment necessary for basic medical examination and treatment activity will be mainly planned. As for Health Centres, those which satisfy either of the following conditions will be chosen as target; a) There is already a facility, which lacks medical equipment, b) facilities are scheduled to be constructed by the Ministry of Health by the time of delivery of equipment.

Among the health centres in the request list, construction work is planned in the following institutions;

HC-Ⅳ: Nankoma (Under construction)

HC-Ⅲ: Bumwoni, Buputo, Panyangasi, Kirewa, Bulidha, Mutumba, Sigulu, Buhehe

In addition to the completion of construction work, electrification by the Ugandan side will be a prerequisite condition for the supply of equipment which needs electricity such as operation light, electric suction apparatus. On the contrary, solar system for lightning will be supplied where electricity is not distributed.

(2) Equipment Required for Services and Basic Concept

An equipment plan will be formulated by applying the following principles.

- Equipment shall be appropriate for medical services currently provided at each hospital and HC. As for medical equipment for HC, the contents shall be consistent with the equipment which the Ministry of Health has already delivered in other HCs.
- Equipment shall be suitable for technical level of the current medical staff.
- Kind of planned equipment and its quantity shall be sufficiently examined so that running costs for consumables or spate parts shall not exceed the sum which targeted organizations can

afford.

- Equipment which is already supplied or simple equipment which should be delivered by Ugandan side shall be out of scope.
- If existing equipment is available for the required usage or other type of equipment could be substituted, that type of equipment shall be out of scope.

1) Regional Referral Hospital (Mbale RRH)

Outpatient Dept.:	Renewal of the equipment in casualty room.
Operation Dept.:	Renewal and addition of operating equipment in the main operation theatres and obstetrics operation theatre.
X-ray Dept.:	Scheduled to provide a general X-ray Unit and X-ray Unit (Fluoroscopy Unit) at new X-Ray Unit, X-ray unit (C-arm) in of the orthopaedics operation theatre. Portable and stationary Ultrasound Scanner will be distributed in the maternity ward and the X-ray room respectively.

Transportation and communication equipment: Ambulance will be provided.

Dentistry:	Dental equipment will be renewed as requested.

2) General Hospitals (Bududa, Busolwe, Tororo, Bugiri and Masafu GHs)

Outpatient Dept.:	Renewal of the equipment in casualty room.
Dentistry:	Renewal of old dentistry units
Laboratory:	Renewal of basic equipment such as microscopes
Pharmacy:	Only refrigerators for storing medicines
Operation Dept.:	Renewal of operating equipment.
X-ray dept.:	Renewal of old X-ray units. Ultrasound Scanners will be planned for the obstetrics diagnosis. Since Ultrasound Scanners are manipulated by radiologists in Uganda, it is preferable that a qualified person who has completed courses at the ECUE be posted for more effective usage of the appliance.
General ward:	Addition and renewal of sterilizers and medical care apparatus
Maternity ward:	Renewal of delivery-related equipment.
Transportation Dept:	Ambulances will be provided.

3) Health Centres

General medical care equipment has almost been sufficient so further equipment improvement is deemed unnecessary. Accordingly, delivery-related equipment (HC-III) and operating equipment for Caesarean Sections (HC-IV) will be planned.

2-2-2 Basic Plan

2-2-2-1 Basic Content of the Project

(1) Outline of the Basic Plan

Based on various principles described in 2-2-1-2 (2), 2-2-1-3, 2-2-1-4 and the results of the field survey and its analysis conducted in Japan with respect to the requested contents listed in 2-2-1-1, an examination has been made. The results are described as follows.

1) Results of Examination on Components of Requested Facilities

The facility construction will target one Regional Referral Hospital and three General Hospitals (of those, one hospital is scheduled to be upgraded). At two General Hospitals, only electrical system renovation will be done.

Table 2-5 Results of Examination on Requested Facilities

○ shall be implemented
△ partly implemented
× shall be out of scope

Hospital	Building & Item	Present Situation & Evaluation	Imple-mentation	Contents of the Plan	No. of Buildings
Mbale RRH	Operation Theatre	Severe deterioration such as leakage from roofs or exposure of reinforcing bars can be observed. From a sanitary point of view, it is difficult to continuously use as an Operation Theatre.	○	An additional Operation Theatre will be constructed adjacent to the orthopaedic Operation Theatre built through the assistance of the African Development Bank.	1
	X-ray unit	Due to the progress of concrete neutralisation and corrosion of the reinforcing bars, continuous utilization of the building is difficult.	○	It will be rebuilt at the same place.	1
	Maternity Ward	Of two wards, one is deteriorated and too small for increasing patients so that continuous utilization of the building is difficult.	○	It will be rebuilt next to the existing building.	1
	Delivery Unit	Same as above	○	It will be rebuilt next to the existing building.	1
	Obstetric Operation Theatre	Since the general Operation Theatre, which is 150m away from the obstetrics department, is utilized for obstetrics operations, prompt response is difficult. In addition, due to the frequency this hinders other operations.	○	It will be newly constructed close to the maternity ward.	1
	Connecting Corridor	Due to the progress of concrete neutralisation of roof slab, corrosion and explosion of reinforcing bars, it is difficult to utilize continuously.	○	Roof of reinforced concrete will be replaced by steel one.	-
Bududa GH	Administra-tion	Due to deterioration and settlement of foundation, etc., it is difficult to utilize continuously.	×	Existing Admin. will be demolished. The mother and child health ward will be renovated and used as Admin.	

Hospital	Building & Item	Present Situation & Evaluation	Imple-mentation	Contents of the Plan	No. of Buildings
	OPD	Due to deterioration and settlement of the foundation, etc., cracking of the frame is serious, so it is difficult to utilize continuously.	○	Rebuilt at the place of the existing Admin.	1
	Delivery Unit	Due to the breakdown of equipment and deterioration of the facility, it does not function as delivery space.	○	New delivery unit will be constructed beside the maternity ward and the present space will be converted to a consultation room.	1
	Operation Theatre	Due to deterioration and settelement of the foundation, etc., cracking of the frame is serious, so it is difficult to utilize continuously.	○	Rebuilt at the same place.	1
	WC Unit for Ward× 4	Due to breakdowns of the piping and fixtures, it does not function as a toilet. But only repair of the plumbing equipment is enough for rehabilitation.	×		
	Mortuary	Despite deterioration of the roof and cracks on some walls, minor repairs are all that is needed.	×		
	Staff Housing	Although it is insufficient for the number of staff, the degree of urgency is lower than that of other facilities.	×		
	Water Supply & Sewerage System	Existing water pipes occasionally leak and the drainage system does not function.	○	It will be newly set up as a new building.	-
	Booster Pump & Water Filter	There is an existing pump. As a result of the water quality survey, the degree of urgency for a water filter is low.	×		
Tororo GH	Operation Theatre	The building was constructed in the 1930s and has deteriorated severely, and there are leaks of rainwater. There is a possibility of infection because circulations of cleanliness and contamination are crossed. So it is difficult to utilize continuously.	○	It will be rebuilt close to the new Outpatient Department.	1
	OPD	Since it is extremely small for the number of outpatients, it should be greatly expanded. Due to relatively favourable conditions of the building, it is possible to convert by renovating.	○	After construction of the new Outpatient Department, it will be renovated as an administration bldg.	1
	Delivery Unit	Although the maternity ward is under repair by the Ugandan side, the delivery unit is insufficient.	○	An insufficient delivery unit will be created.	1
	Female Ward	The building with wooden trusses has deteriorated severely and leakage also arises. It is difficult to utilize continuously.	○	It will be rebuilt close to the new Outpatient Department.	2*
	Male Ward	Since the building with steel trusses has been deteriorated, it is difficult to continuously utilize for a long period. However, the degree of the urgency is lower than that of other facilities.	×		
	Connecting Passageway	This is necessary for connecting to the new Outpatient Department.	○	The existing connecting passageway will be extended to the new OPD	-

Hospital	Building & Item	Present Situation & Evaluation	Imple-mentation	Contents of the Plan	No. of Buildings
	Laundry & Storage Ward	Although the existing laundry room is too small for the number of patients, the degree of the urgency is lower than that of other facilities.	×		
	Mortuary	Despite leakage of the facility, cracking on walls and damage to fixtures, etc., it is possible to fix with minor repairs. Also its contribution to the medical service is minor.	×		
	Staff Housing	Due to the conversion from the official residence for the former veterans, the deterioration is severe. However, the priority is lower than that of medical facilities.	×		
	Related Sewerage System	This is necessary for the building to be newly constructed.	○	It will be newly set up for new buildings.	-
Busolwe GH	WC Unit for 4 wards	Due to the breakdown of piping, it does not function as a toilet. However, it is possible to rehabilitate by only repairing the equipment.	×		
	Renovation of Roofs & Ceilings	Although there is leaks of rainwater from the roof, steel trusses has not yet deteriorated. Thus by repairing the roofing sheet, it is possible to utilize continuously. The degree of the urgency of renovation of ceiling tiles is lower than that of other facilities.	×		
	Renovation of Elevated Water tank	There is breakdown of piping, but only minor repair is necessary.	×		
	Water Supply & Sewerage for Wards	There is breakdown of piping, but only minor repair of equipment is necessary.	△	Electricity will be newly provided for the medical equipment.	-
	Generator (G-circuit)	The service life has passed so it has broken down.	×	Lamps with batteries will be installed in the operation theatre.	
Bugiri GH	WC Unit for 4 wards	Due to the breakdown of piping, it does not function as a toilet. However, it is possible to rehabilitate by only repairing the equipment.	×		
	Renovation of Roofs & Ceilings	Although there is leaks of rainwater from the roof, steel trusses has not yet deteriorated. Thus by repairing the roofing sheet, it is possible to utilize continuously. The degree of the urgency of renovation of ceiling tiles is lower than that of other facilities.	×		
	Renovation of Elevated Water tank	Only minor repairs are necessary.	×		
	Water Supply & Sewerage for Wards	There is breakdown of piping, but only minor repair of equipment is necessary.	△	Electricity will be newly provided for the medical equipment.	-

Hospital	Building & Item	Present Situation & Evaluation	Imple-mentation	Contents of the Plan	No. of Buildings
	Pump for Drainage of Rain Water	The degree of the urgency is lower than that of other facilities.	×		
	Generator (G-circuit)	The service life has passed so it has broken down.	×	Lamps with batteries will be installed to the operation theatre.	
Masafu GH (Ext. HC- IV)	OPD	Since the size of the existing Outpatient Department is for health centre level, it cannot function as an OPD of General Hospital.	○	By renovating, the building used as the OPD will be converted to Antenatal Consultation.	1
	Maternity Ward	Although the building is old, its conditions are relatively favourable. As a General Hospital, the area is insufficient.	○	By renovating the maternity ward, the existing building will be renovated and utilized as an administration bloc.	1
	Male ward	Although the building is in relatively favourable condition, it is confined.	○**	Female Ward will be constructed since there are more patients. It is scheduled to renovate the existing surgery ward and utilize it as new Male Ward.	1
	Paediatric Ward	Presently this does not exist.	○	It will be newly constructed.	1
	Connecting Passageway	Presently this does not exist.	○	It will be newly constructed.	-
	Mortuary	The building is in relatively favourable condition and the degree of the urgency is lower than that of other facilities.	×		
	Staff Housing	In spite of insufficient housing, the Project places a priority on medical facilities.	×		
	Elevated Water Tank & water Supply System	Presently this does not exist.	○	It will be newly set up for new buildings.	-
	Septic Tank & Soak Pit	Presently this does not exist.	○	It will be newly set up for new buildings.	-

* indicates that 2 wards are considered necessary through a calculation based on the number of beds at the existing facility.

** indicates that female ward is planned instead of male ward, since the number of female patients are found to be greater.

Accordingly, 4 sites and 17 buildings in total will be target in the Project. In addition to those, a facility plan will include attached sheds and building facility related to the above-mentioned facilities.

2) Result of examination for the requested equipment

Equipment will be provided to the six targeted hospitals as well as Health Centres III and IV.

a) Mbale RRH

Facilities targeted for construction are the main operation theatre, the obstetrics operation theatre and the X-ray unit. In addition, equipment will be supplied to the outpatient casualty room and dental unit.

<Casualty>

The operation tables and lights will be renewed. The Casualty in the Outpatient Department is too small and always overcrowded with many patients. Accordingly, it is planned to move patients by stretcher to the X-ray unit for radiation diagnoses. Each examining department will share the requested mobile X-ray equipment, which will be permanently stored in the X-ray unit and moved to each department whenever needed.

<Dental department>

The deteriorated dental unit and broken down dental X-ray unit will be renewed.

<Operation theatres>

Equipment will be provided for the two operation theatres to be additionally constructed. Halothane anaesthesia units will be planned on condition that oxygen is continually supplied. Mobile operation lights are excluded because it is planned to adopt battery-powered operation lights.

<X-ray unit>

Basic Bucky System X-ray Unit, Fluoroscopy X-ray Unit, Ultrasound Scanner will be planned.

< Obstetrics department>

Equipment will be provided to the delivery room and obstetrics operation theatre to be additionally constructed in the existing obstetrics unit. Mobile operation lights are excluded because it is planned to adopt battery-powered operation lights.

<Equipment additionally requested at the time of the Basic Design Study >

The following equipment is excluded by the reasons given below.

Equipment	Reasons
Biometer, Ophthalmic Fundus Camera, Auto Refractometer ND-Yag Laser Unit, Perimeter, Cataract set Pulse Tonometer, Phacoemulsification	By the assistance of Norway, Auto Refractometer, Pulse Tonometer, Microscope for Ophthalmology etc. were already supplied.
Carbon dioxide Laser System, Fiber Optic Rhino- Pharingo-Laryngo Esophagoscope Electric response audiometer (ERA) Laryngeal Stroboscope Equipment ENT Operating Microscope Auditory Brainstem Response	Existing building is not suitable for installation of equipment.
Laminectomy set (Spinal), Pedicle Screw set (Spinal) Herrington Rod and Instrumentation set (complete) Arthroscopy set complete with accessories (Light source, camera, scopes)	It is judged to be inappropriate technically.

The following table indicates the contents of the examination regarding equipment for Mbale RRH.

Table 2-6 Examination of Equipment for Mbale RRH

Section	Equipment	Request	Plan	Examination
Casualty	Operation Table	1	1	Because of Decrepitude, replace 1pc.
	Mobile Operation Light	1	1	Because of Decrepitude, replace 1pc.
	Patient Stretcher	2	1	Because of Decrepitude, replace 1pc.
	Electric Suction Apparatus	1	0	Out of Scope.
	Instruments Tray	2	1	Because of Decrepitude, replace 1pc.
	Instruments Trolley	1	1	Because of Decrepitude, replace 1pc.
	Trolley, Medicine	2	0	Out of Scope.
	Mobile X-ray Unit	1	0	To X-ray Room.
Dental	Dental Unit Complete	1	1	Because of Decrepitude, replace 1pc.
	Dental X-ray Unit	1	1	Because of Decrepitude, replace 1pc.
	Dental Film Processor	0	1	Add 1pc. in order to develop films.
OP Section	Vertical Autoclave	1	1	Procure 1pc. to New OP Theatre.
	Patient Monitor	1	2	Procure 1pc.each to 2 new OP Theatre. 2pcs. in total.
	Instruments Trolley	1	4	Procure 2pcs.each to 2 new OP Theatre. 4pcs. in total.
	General Surgery Instrument set	2	1	Add 1set only because they have already 1set.
	Orthopaedic Instrument set	2	1	Add 1set only because they have already 1set.
	Instrument Set, Anaesthesia, Adult	2	0	Out of Scope because this is used for ether anaesthesia.
	Instrument Set, Anaesthesia, Paediatric	2	0	Out of Scope because this is used for ether anaesthesia.
	Instrument Set, Surgical, Paediatric	2	0	Out of Scope because its component is unclear.
	Instrument Cupboard	1	2	Procure 1pc. to each room. 2pcs. in total.
	Fixed Operation Light	1	2	Procure 1pc. to each room. 2pcs. in total.
	Mobile Operation Light	1	0	Out of Scope. Fixed Operation Light will be equipped
	Operation Table	1	1	Add 1 set to New OP Theatre.
	Orthopaedic Operation Table	0	1	Add 1 set to New OP Theatre.
	Oxygen Concentrator	1	0	Out of scope because MOH will supply it.
	Instruments Tray	0	2	Procure 1pc. to each room. 2pcs. in total.
	Electric Suction Apparatus	2	2	Procure 1pc. to each room. 2pcs. in total.
	Anaesthesia Unit	1	2	Procure 1pc. to each room. 2pcs. in total.
	Electro Surgical Unit	1	2	Procure 1pc. to each room. 2pcs. in total.
	C-arm X-ray Unit	1	1	Necessary for Orthopaedics Operation.
	Patient Stretcher	0	2	Procure 1pc. to each room. 2pcs. in total.
Imaging	Ultrasound Scanner	1	1	Because of Decrepitude, replace 1pc.
	X-ray Cassettes Set	1	1	To New Developing Section.
	X-ray Protective Clothing Set	1	1	Because of Decrepitude, replace 1pc.
	Fluoroscopy X-ray Unit	1	1	Because of Decrepitude, replace 1pc.
	Basic Bucky System X-ray Unit	1	1	Because of Decrepitude, replace 1pc.
	X-ray Film Viewer	1	2	Necessary for New X-ray Doctor's Room.
	Film Processor	1	1	Because of Decrepitude, replace 1pc., Table Top Type.
	Mobile X-ray Unit	0	1	Because of Decrepitude, replace 1pc., from Out Patient
Obstetrics Section	Vertical Autoclave	0	1	Necessary for New Obstetrics OP Theatre for instrument sterilizing.
	Gyn & Obstetrics Instrument set	2	2	Necessary for New Obstetrics OP Theatre.
	Instrument Set, Anaesthesia, Adult	2	0	Out of Scope because this is used for ether anaesthesia.
	Caesarean Instrument Set	0	2	Necessary for New Obstetrics OP Theatre.

Section	Equipment	Request	Plan	Examination
	Instrument Cupboard	1	1	Necessary for New Obstetrics OP Theatre for instrument storage.
	Fixed Operation Light	1	1	Necessary for New Obstetrics OP Theatre.
	Mobile Operation Light	1	0	Out of Scope. Fixed Operation Light will be equipped
	Operation Table	1	1	Add 1pc. to New Obstetrics OP Theatre.
	Oxygen Concentrator	1	0	Out of scope because MOH will supply oxygen.
	Electric Suction Apparatus	1	1	Need to New Obstetrics OP Theatre.
Delivery	Baby Incubator	0	2	Add to New Delivery Room.
	Delivery Bed	0	6	Add to New Delivery Room.
	Infant Warmer	0	2	Add to New Delivery Room.
	Delivery Instrument Set	0	1	Add to New Delivery Room.
	Portable Ultrasound Scanner	0	1	Add to New Delivery Room for unborn baby
	Vacuum Extractor	0	1	Add to New Delivery Room.
Ward	Traction Bed	0	3	Procure 3 beds. because of lack in quantity.
Transportation	Ambulance	1	1	Because of Decrepitude, replace 1ambulance.

b) Bududa GH

Equipment will be renewed in the OPD (Casualty, dental unit, examination rooms (male, female, pediatric, obstetrics), clinical inspection room, pharmacy, X-ray unit), the operation department, the obstetrics department, and the existing male ward and female ward.

<OPD, Casualty>

The operation tables and lights will be renewed.

< OPD, Dental Clinic>

The deteriorated dental unit and broken down dental X-ray unit will be renewed.

< OPD, Other Clinics>

Diagnostic equipment sets and examination lights will be renewed in the female, male and paediatric examination rooms. The ECG will be shared but will be installed inside the female examination room.

<Clinical inspection room/pharmacy>

The deteriorated microscopes, colorimeters and centrifuges, etc. will be renewed.

<X-ray department>

Broken down X-ray units will be renewed and protective wear and cassettes will be added.

<Operation theatres>

Existing equipment will be renewed. Mobile operation lights are excluded because it is planned to adopt battery-powered operation lights.

<Delivery room>

Equipment will be renewed and additionally installed in the delivery room that is to be additionally built.

<Wards>

Dressing Instrument Sets and so on in the nurse centres will be renewed.

<Transport>

Ambulances will be renewed.

The following table shows the specific examination contents regarding each item.

Table 2-7 Examination of Equipment for Bududa GH

Section	Equipment	Request	Plan	Examination
Dressing Room	Sterilizer	1	0	Out of Scope.
	ECG	1	0	To Female Exam. Room.
	Operation Table	1	1	Because of Decrepitude, replace 1pc.
	Mobile Operation Light	1	1	Because of Decrepitude, replace 1pc.
	Electric Suction Apparatus	1	1	Because of Decrepitude, replace 1pc.
	Patient Stretcher	0	1	Procure 1 pc because of lack in quantity.
Female Exam.	Diagnostic Equipment Set for CO	1	1	Necessary for New Exam. Room
	Dressing Instrument set	1	1	Necessary for New Exam. Room.
	Examination Light	1	1	Necessary for New Exam. Room.
	ECG	1	1	For Common Use in Exam. Rooms.
Male Exam.	Diagnostic Equipment Set for CO	0	1	Add 1set. to New Exam. Room.
	Examination Light	0	1	Add 1pc. to New Exam. Room.
	Dressing Instrument set	0	1	Add 1set. to New Exam. Room.
Paediatric	Diagnostic Equipment Set for CO	0	1	Add 1set. to New Exam. Room.
	Examination Light	0	1	Add 1pc. to New Exam. Room.
	Dressing Instrument set	0	1	Add 1set. to New Exam. Room.
Dental	Table Top Autoclave	1	1	Because of Decrepitude, replace 1pc.
	Dental Unit Complete	1	1	Because of Decrepitude, replace 1pc.
	Dental X-ray Unit	1	1	Because of Decrepitude, replace 1pc.
	Dental Film Processor	0	1	Necessary for dental film developing.
Laboratory	Table Top Autoclave	1	1	Because of Decrepitude, replace 1pc.
	Balance Semi Analytical	1	1	Because of Decrepitude, replace 1pc.
	Electric Centrifuge	1	1	Because of Decrepitude, replace 1pc.
	Colorimeter	1	1	Because of Decrepitude, replace 1pc.
	Hot Air Oven	1	1	Because of Decrepitude, replace 1pc.
	Binocular Microscope	1	1	Because of Decrepitude, replace 1pc.
	Refrigerator	1	1	Add 1pc. to New Laboratory because of lack in quantity .
	Water Distiller	1	1	Because of Decrepitude, replace 1pc.
Pharmacy	Refrigerator	1	1	Add 1pc. to New Pharmacy because of lack in quantity.
X-ray Room	X-ray Cassettes Set	1	1	Because of Decrepitude, replace 1pc.
	X-ray Protective Clothing Set	1	1	Because of Decrepitude, replace 1pc.
	Basic Bucky System X-ray Unit	1	1	Because of Decrepitude, replace 1pc.
	X-ray Film Viewer	1	1	Because of Decrepitude, replace 1pc.
Ultrasound	Portable Ultrasound Scanner	0	1	For Obstetrics Examination. From Obstetrics Section.
OP Bldg.	Vertical Autoclave	1	1	Necessary for reconstructing OP Theatre.
	Anaesthesia Unit	1	2	Necessary for reconstructing OP Theatre.
	Patient Monitor	1	1	Necessary for reconstructing OP Theatre.
	Caesarean Instrument Set	1	1	Procure 1pc. because of lack in quantity.
	General Basic Instrument Set	1	0	Out of Scope because its component is unclear.

Section	Equipment	Request	Plan	Examination
	General Surgery Instrument set	1	1	Procure 1pc. because of lack in quantity.
	Gyn & Obstetrics Instrument set	1	1	Procure 1pc. because of lack in quantity.
	Orthopaedic Instrument set	1	1	Procure 1pc. because of lack in quantity.
	Operation Table	1	2	Procure 1pc. to each reconstructing OP Theatre. 2pcs. in
	Fixed Operation Light	1	2	Procure 1pc. to each reconstructing OP Theatre. 2pcs. in
	Mobile Operation Light	1	0	Out of Scope. Fixed Operation Light will be equipped
	Oxygen Concentrator	1	0	Out of scope because MOH will supply oxygen.
	Electric Suction Apparatus	1	2	Procure 1pc. to each reconstructing OP Theatre. 2pcs. in
	Instruments Trolley	1	2	Procure 1pc. to each reconstructing OP Theatre. 2pcs. in
	Instruments Tray	2	2	Procure 1pc. to each reconstructing OP Theatre. 2pcs. in
	Electro Surgical Unit	0	2	Procure 1pc. to each reconstructing OP Theatre. 2pcs. in
Delivery Room	Table Top Autoclave	1	1	Add to New Delivery Room.
	Delivery Bed	2	3	Add to New Delivery Room.
	Delivery Instrument Set	2	2	Add to New Delivery Room.
	Vacuum Extractor	1	1	Add to New Delivery Room.
	Neonate & Paediatric Weighing Scale	1	1	Add to New Delivery Room.
Obstetric Bldg.	Portable Ultrasound Scanner	1	0	Procure to Ultrasound Room.
	Baby Incubator	2	2	Need in Additional Procurement.
	Infant Warmer	2	2	Necessary for Neonate Treatment.
	Adult Weighing Scale	1	1	Need in Additional Procurement.
	Neonate & Paediatric Weighing Scale	0	1	Need in Additional Procurement.
	X-ray Film Viewer	1	0	Out of scope because it is not to be used in Obstetrics
	Patient Stretcher	0	1	Add 1pc. to Obstetrics Section because of lack in quantity.
Female Ward	Table Top Autoclave	1	0	Out of Scope.
	Diagnostic Equipment Set for CO	2	1	Because of damage, replace 1set.
	Dressing Instrument set	2	1	Need in Additional Procurement.
	Adult Weighing Scale	1	0	Out of Scope.
	Neonate & Paediatric Weighing Scale	1	0	Out of Scope.
	Wheel Chair	1	1	Need in Additional Procurement.
	X-ray Film Viewer	1	1	Need in Additional Procurement.
	Patient Stretcher	0	1	Add 1pc. because of lack in quantity .
	Traction Bed	0	1	Add 1pc. because of lack in quantity .
Male Ward	Diagnostic Equipment Set for CO	0	1	Because of damage, replace 1set.
	Dressing Instrument set	0	1	Because of damage, replace 1set.
	Wheel Chair	0	1	Add 1pc. because of lack in quantity .
	X-ray Film Viewer	0	1	Add 1pc. because of lack in quantity .
	Patient Stretcher	0	1	Add 1pc. because of lack in quantity .
	Traction Bed	0	1	Add 1pc. because of lack in quantity .
Transportation	Ambulance	1	1	Because of Decrepitude, replace 1pc.

c) Tororo GH

<OPD>

Equipment will be renewed in the Casualty, examination rooms (male, female, paediatric, obstetrics, dental), clinical inspection room, pharmacy and X-ray room in the outpatient department that is to be rebuilt. Also, a new ultrasound scanner will be supplied to the ultrasound examination room.

<Operation theatres>

Deteriorated equipment will be renewed in the operation theatres that are to be rebuilt. Mobile operation lights are excluded because it is planned to adopt battery-powered operation lights.

<Obstetrics and delivery room>

Equipment will be renewed and additionally installed in the delivery room that is to be additionally built.

<Wards>

Dressing Instrument Sets and so on in the nurse centres will be renewed.

<Transport>

Deteriorated ambulances will be renewed.

The following table shows the specific examination contents regarding each item.

Table 2-8 Examination of Equipment for Tororo GH

Section	Equipment	Request	Plan	Examination
Dressing Room	Operation Table	1	1	Because of Decrepitude, replace 1pc.
	Mobile Operation Light	1	1	Because of Decrepitude, replace 1pc.
	Electric Suction Apparatus	1	1	Because of Decrepitude, replace 1pc.
	Sterilizer	1	0	Out of Scope.
	Patient Stretcher	0	1	Add 1pc. because of lack in quantity.
Common Exam.	Diagnostic Equipment Set for CO	1	1	Procure 1pc. because of lack in quantity.
	Dressing Instrument set	1	1	Procure 1pc. because of lack in quantity.
	ECG	1	1	Newly procure or common use.
	Examination Light	1	1	Procure 1pc. because of lack in quantity.
Female Exam.	Diagnostic Equipment Set for CO	0	1	Add 1set because of lack in quantity.
	Examination Light	0	1	Add 1pc. because of lack in quantity.
	Dressing Instrument set	0	1	Add 1set because of lack in quantity.
Male Exam.	Diagnostic Equipment Set for CO	0	1	Add 1set because of lack in quantity.
	Dressing Instrument set	0	1	Add 1set because of lack in quantity.
	Examination Light	0	1	Add 1pc. because of lack in quantity.
Paediatric Exam	Diagnostic Equipment Set for CO	0	1	Add 1set because of lack in quantity.
	Dressing Instrument set	0	1	Add 1set because of lack in quantity.
	Examination Light	0	1	Add 1pc. because of lack in quantity.
Laboratory	Table Top Autoclave	1	1	Because of Decrepitude, replace 1pc.
	Balance Semi Analytical	1	1	Because of Decrepitude, replace 1pc.
	Electric Centrifuge	1	1	Because of Decrepitude, replace 1pc.
	Colorimeter	1	1	Because of Decrepitude, replace 1pc.
	Hot Air Oven	1	1	Because of Decrepitude, replace 1pc.
	Binocular Microscope	1	1	Because of Decrepitude, replace 1pc.

Section	Equipment	Request	Plan	Examination
	Refrigerator	1	1	Because of Decrepitude, replace 1pc.
	Water Distiller	1	1	Because of Decrepitude, replace 1pc.
Pharmacy	Refrigerator	1	1	Because of Decrepitude, replace 1pc.
Dental Room	Table Top Autoclave	1	1	Because of Decrepitude, replace 1pc.
	Dental Unit Complete	1	1	Because of Decrepitude, replace 1pc.
	Dental X-ray Unit	1	1	Because of Decrepitude, replace 1pc.
	Dental Film Processor	0	1	Need for Dental Film Developing.
X-ray Room	X-ray Cassettes Set	1	1	Because of Decrepitude, replace 1pc.
	X-ray Protective Clothing Set	1	1	Because of Decrepitude, replace 1pc.
	Basic Bucky System X-ray Unit	1	0	Out of Scope.
	X-ray Film Viewer	1	1	Because of Decrepitude, replace 1pc.
Ultrasound Room	Portable Ultrasound Scanner	0	1	From Maternity Ward.
OP Bldg.	Anaesthesia Unit	1	2	Procure 1pc.each to 2 OP Theatre. 2pcs. in total. Halothane Type.
	Patient Monitor	1	1	Newly procure for operation monitoring.
	Operation Table	1	2	Procure 1pc.each to 2 OP Theatre. 2pcs. in total.
	Fixed Operation Light	1	2	Procure 1pc.each to 2 OP Theatre. 2pcs. in total.
	Electric Suction Apparatus	1	2	Procure 1pc.each to 2 OP Theatre. 2pcs. in total.
	Instruments Trolley	1	2	Procure 1pc.each to 2 OP Theatre. 2pcs. in total.
	Instruments Tray	2	2	Procure 1pc.each to 2 OP Theatre. 2pcs. in total.
	Vertical Autoclave	1	1	1pc. for Reconstructing OP Theatre.
	Caesarean Instrument Set	1	1	1set for Reconstructing OP Theatre.
	General Basic Instrument Set	1	0	Out of Scope because its component is unclear.
	General Surgery Instrument set	1	1	1set for Reconstructing OP Theatre.
	Gyn & Obstetrics Instrument set	1	1	1set for Reconstructing OP Theatre.
	Orthopaedic Instrument set	1	1	1set for Reconstructing OP Theatre.
	Mobile Operation Light	1	0	Out of Scope. Fixed Operation Light will be equipped with Batt.
	Oxygen Concentrator	1	0	Out of scope because MOH will supply oxygen.
	Electro Surgical Unit	0	2	Procure 1pc.each to 2 OP Theatre. 2pcs. in total.
Delivery Room	Table Top Autoclave	1	1	Need for Reconstructing Delivery Room.
	Delivery Bed	1	6	Need for Reconstructing Delivery Room.
	Delivery Instrument Set	1	2	Need for Reconstructing Delivery Room.
	Vacuum Extractor	1	1	Need for Reconstructing Delivery Room.
	Weighing Scale, Neonate & Pediatric	1	1	Need for Reconstructing Delivery Room.
Maternity Ward	Portable Ultrasound Scanner	1	0	Procure to Ultrasound Room.
	Adult Weighing Scale	1	1	Procure 1pc. because of lack in quantity.
	Weighing Scale, Neonate & Pediatric	1	1	Procure 1pc. because of lack in quantity.
	Baby Incubator	2	2	Procure 1pc. because of lack in quantity.
	Infant Warmer	2	2	Procure 1pc. because of lack in quantity.
	Patient Stretcher	0	1	Procure 1pc. because of lack in quantity.
Female Ward	Table Top Autoclave	1	0	Out of Scope.
	Diagnostic Equipment Set for CO	2	1	Need for Reconstructing Ward.
	Dressing Instrument set	2	1	Need for Reconstructing Ward.
	Adult Weighing Scale	1	0	Out of Scope.
	Neonate & Paediatric Weighing Scale	1	0	Out of Scope.

Section	Equipment	Request	Plan	Examination
	Wheel Chair	1	1	Need for Reconstructing Ward.
	X-ray Film Viewer	1	1	Need for Reconstructing Ward.
	Patient Stretcher	0	1	Need for Reconstructing Ward.
	Traction Bed	0	2	Need for Reconstructing Ward.
Transportation	Ambulance	1	1	Because of Decrepitude, replace 1pc.

c) Bugiri, Busolwe General Hospital

These two hospitals were constructed at almost the same period based upon the same standard floor plan (mirror symmetry), and they are also equipped with almost the same equipment. Accordingly, joint examination was carried out on both facilities.

<Block A: OPD>

Deteriorated equipment will be renewed in the outpatient Casualty, outpatient examination room, clinical inspection room and pharmacy. As for the refrigerators, it is planned to install one in the pharmacy.

<Block B: Central examination and service department>

Deteriorated equipment will be renewed in the X-ray unit and dental unit.

<Block D: Wards + operation theatres>

Deteriorated equipment in the operation theatres and delivery rooms, as well as nurse centre equipment in each ward will be renewed or additionally installed.

<Transport>

Deteriorated ambulances will be renewed.

The following table shows the detailed examination contents.

Table 2-9 Examination of Equipment (Bugiri & Busolwe GH)

Section	Equipment	Request	Plan	Examination
Diagnostic	Operation Table	1	1	Because of Decrepitude, replace 1pc.
	Mobile Operation Light	1	1	Because of Decrepitude, replace 1pc.
	Electric Suction Apparatus	1	1	Because of Decrepitude, replace 1pc.
	Table Top Autoclave	1	1	Because of Decrepitude, replace 1pc.
	Patient Stretcher	0	1	Add 1pc. because of lack in quantity.
Exam. Room	Diagnostic Equipment Set for CO	2	1	Because of damage, replace 1set.
	Dressing Instrument set	2	1	Because of damage, replace 1set.
	ECG	1	1	For Common Use in Out Patient Section.
	Examination Light	2	1	Because of Decrepitude, replace 1pc.
	Portable Ultrasound Scanner	0	1	To Ultrasound Room.
Laboratory,	Sterilizer, Table Top	1	0	Out of Scope.
	Balance Semi Analytical	1	1	Because of Decrepitude, replace 1pc.
	Electric Centrifuge	1	1	Because of Decrepitude, replace 1pc.
	Colorimeter	1	1	Because of Decrepitude, replace 1pc.
	Hot Air Oven	1	1	Because of Decrepitude, replace 1pc.
	Binocular Microscope	1	1	Because of Decrepitude, replace 1pc.

Section	Equipment	Request	Plan	Examination
	Refrigerator	1	1	Because of Decrepitude, replace 1pc.
	Water Distiller	1	1	Because of Decrepitude, replace 1pc.
Pharmacy	Refrigerator	1	1	Because of Decrepitude, replace 1pc.
X-ray Room	X-ray Cassettes Set	1	1	Because of Decrepitude, replace 1pc.
	X-ray Protective Clothing Set	1	1	Because of Decrepitude, replace 1pc.
	Basic Bucky System X-ray Unit	1	1 (0)	Because of Decrepitude, replace 1pc. (Busolwe GH Only)
	X-ray Film Viewer	1	1	Because of Decrepitude, replace 1pc.
Dental	Table Top Autoclave	1	1	Because of Decrepitude, replace 1pc.
	Dental Unit Complete	1	1	Because of Decrepitude, replace 1pc.
	Dental X-ray Unit	1	1	Because of Decrepitude, replace 1pc.
	Dental Film Processor	0	1	Necessary for Dental Film Developing.
OP Theatre	Anaesthesia Unit	1	1	Halothane Type.
	Vertical Autoclave	1	1	Because of Decrepitude, replace 1pc.
	Patient Monitor	1	1	For operation monitoring.
	Caesarean Instrument Set	1	1	Need in Additional Procurement.
	General Basic Instrument Set	1	0	Out of Scope because its component is unclear.
	General Surgery Instrument set	1	1	Need in Additional Procurement.
	Gyn & Obstetrics Instrument set	1	1	Need in Additional Procurement.
	Orthopaedic Instrument set	1	1	Need in Additional Procurement.
	Operation Table	1	1	Because of Decrepitude, replace 1pc.
	Fixed Operation Light	1	1	Because of Decrepitude, replace 1pc.
	Mobile Operation Light	1	0	Out of Scope. Fixed Operation Light will be equipped
	Oxygen Concentrator	1	0	Out of scope because MOH will supply oxygen.
	Electric Suction Apparatus	2	1	Because of Decrepitude, replace 1pc.
	Instruments Trolley	2	1	Need in Additional Procurement.
	Instruments Tray	2	1	Need in Additional Procurement.
	Electro Surgical Unit	0	1	Because of Decrepitude, replace 1pc.
	Patient Stretcher	0	1	Add 1pc. because of lack in quantity .
Delivery	Table Top Autoclave	1	1	Because of Decrepitude, replace 1pc.
	Delivery Bed	2	2	Because of Decrepitude, replace 1pc.
	Delivery Instrument Set	2	2	Because of Decrepitude, replace 1pc.
	Vacuum Extractor	1	1	Because of Decrepitude, replace 1pc.
	Neonate & Paediatric Weighing Scale	2	1	Add 1pc. because of lack in quantity.
Maternity	Baby Incubator	2	2	Necessary for low weight infant treatment.
	Infant Warmer	2	2	Necessary for Neonate Treatment.
	Adult Weighing Scale	1	1	Add 1pc. because of lack in quantity.
	Neonate & Paediatric Weighing Scale	0	1	Add 1pc. because of lack in quantity.
	X-ray Film Viewer	1	1	Because of Decrepitude, replace 1pc.
	Diagnostic Equipment Set for CO	0	1	Add 1set because of lack in quantity.
	Dressing Instrument set	0	1	Add 1set because of lack in quantity.
	Wheel Chair	0	1	Add 1pc. because of lack in quantity.
	Portable Ultrasound Scanner	1	0	Procure to Out Patient Room.
Female Ward	Table Top Autoclave	1	0	Out of Scope.
	Diagnostic Equipment Set for CO	2	1	Because of damage, replace 1set.
	Dressing Instrument set	2	1	Because of damage, replace 1set.

Section	Equipment	Request	Plan	Examination
	Adult Weighing Scale	1	0	Out of Scope.
	Neonate & Paediatric Weighing Scale	1	0	Out of Scope.
	Wheel Chair	1	1	Add 1pc. because of lack in quantity.
	X-ray Film Viewer	1	1	Because of Decrepitude, replace 1pc.
	Patient Stretcher	0	1	Add 1pc. because of lack in quantity.
	Traction Bed	0	1	Add 1pc. because of lack in quantity.
Male Ward	Table Top Autoclave	0	0	Out of Scope. Because of availability of existing one.
	Diagnostic Equipment Set for CO	0	1	Because of damage, replace 1set.
	Dressing Instrument set	0	1	Because of damage, replace 1set.
	Wheel Chair	0	1	Add 1pc. because of lack in quantity.
	X-ray Film Viewer	0	1	Because of Decrepitude, replace 1pc.
	Patient Stretcher	0	1	Add 1pc. because of lack in quantity.
	Traction Bed	0	1	Add 1pc. because of lack in quantity.
Transportation	Ambulance	1	1	Because of Decrepitude, replace 1pc.

e) Masafu General Hospital

Since this hospital will be upgraded from Health Centre IV to General Hospital in line with the Project, many facilities will be newly constructed. Accordingly, equipment will be procured for each department according to the facilities plan.

<OPD>

Main rooms in the OPD are as follows: 1) Casualty 2) dental room, 3) female examination room, 4) male examination room, 5) paediatric examination room, 6) X-ray room, and 7) Laboratory and pharmacy. Necessary equipment for each room was examined in consideration of the building plan.

<Operation theatres>

Equipment that is lacking when compared with that at other General Hospitals will be supplied to the existing operation theatres.

<Obstetrics department>

In line with renovation of the maternity ward including delivery room, deteriorated equipment will be renewed.

<Wards>

Equipment will be supplied to the nurse centres in the female ward and paediatric ward to be newly constructed.

<Transport>

Ambulances will be renewed.

The following table shows the detailed examination contents.

Table 2-10 Examination of equipment for Masafu GH

Section	Equipment	Request	Plan	Examination
Emergency	Mobile Operation Light	1	1	Necessary for Dressing Room in New Out Patient Bldg.
	Operation Table	1	1	Necessary for Dressing Room in New Out Patient Bldg.
	Electric Suction Apparatus	1	1	Necessary for Dressing Room in New Out Patient Bldg.
	Patient Stretcher	0	1	Add 1pc. because of lack in quantity.
Female Exam.	Table Top Autoclave	1	0	Out of Scope.
	Diagnostic Equipment Set for CO	2	1	Necessary for Exam. Room in New Out Patient Bldg.
	Dressing Instrument set	2	1	Necessary for Exam. Room in New Out Patient Bldg.
	ECG	1	1	Necessary for Exam. Room in New Out Patient Bldg.
	Dressing Instrument set	0	1	Necessary for Exam. Room in New Out Patient Bldg.
Male Exam.	Diagnostic Equipment Set for CO	0	1	Necessary for Exam. Room in New Out Patient Bldg.
	Examination Light	0	1	Necessary for Exam. Room in New Out Patient Bldg.
	Dressing Instrument set	0	1	Necessary for Exam. Room in New Out Patient Bldg.
Pediatric	Diagnostic Equipment Set for CO	0	1	Necessary for Exam. Room in New Out Patient Bldg.
	Examination Light	0	1	Necessary for Exam. Room in New Out Patient Bldg.
	Dressing Instrument set	0	1	Necessary for Exam. Room in New Out Patient Bldg.
Dental	Table Top Autoclave	1	1	Necessary for Dental Room in New Out Patient Bldg.
	Dental Unit Complete	1	1	Necessary for Dental Room in New Out Patient Bldg.
	Dental X-ray Unit	1	1	Necessary for Dental Room in New Out Patient Bldg.
	Dental Film Processor	0	1	Necessary for Dental Film Developing.
Laboratory	Table Top Autoclave	1	1	Necessary for Lab. in New Out Patient Bldg.
	Balance Semi Analytical	1	1	Necessary for Lab. in New Out Patient Bldg
	Electric Centrifuge	1	1	Necessary for Lab. in New Out Patient Bldg.
	Colorimeter	1	1	Necessary for Lab. in New Out Patient Bldg.
	Hot Air Oven	1	1	Necessary for Lab. in New Out Patient Bldg.
	Binocular Microscope	1	1	Necessary for Lab. in New Out Patient Bldg.
	Refrigerator	1	1	Necessary for Lab. in New Out Patient Bldg.
	Water Distiller	1	1	Necessary for Lab. in New Out Patient Bldg.
Pharmacy	Refrigerator	1	1	Need to Pharmacy in New Out Patient Bldg.
X-ray Room	X-ray Cassettes Set	1	1	Necessary for X-ray Room in New Out Patient Bldg.
	X-ray Protective Clothing Set	1	1	Necessary for X-ray Room in New Out Patient Bldg.
	Basic Bucky System X-ray Unit	1	1	Necessary for X-ray Room in New Out Patient Bldg.
	X-ray Film Viewer	1	1	Necessary for X-ray Room in New Out Patient Bldg.
Ultrasound	Portable Ultrasound Scanner	0	1	For Obstetrics Examination. From Obstetrics Section.
OP Bldg.	Anaesthesia Unit	1	1	Halothane Type.
	Patient Monitor	1	1	For Anaesthesia Patient Monitoring.
	Operation Table	1	0	Out of Scope.
	Fixed Operation Light	1	0	Out of Scope.
	Electric Suction Apparatus	1	0	Out of Scope.
	Instruments Trolley	1	1	Procure 1pc. because of lack in quantity.
	Instruments Tray	2	1	1pc. is enough to procure.
	Vertical Autoclave	1	0	Out of Scope.
	Caesarean Instrument Set	1	1	Add 1set because of lack in quantity.
	General Basic Instrument Set	1	0	Out of Scope because its component is unclear.
	General Surgery Instrument set	1	1	Add 1set because of lack in quantity.
	Gyn & Obstetrics Instrument set	1	1	Add 1set because of lack in quantity.

	Orthopaedic Instrument set	1	1	Necessary to be a GH.
	Mobile Operation Light	1	0	Out of Scope.
	Oxygen Concentrator	1	0	Out of scope because MOH will supply oxygen.
	Electro Surgical Unit	0	1	Necessary for up-grading to be a GH.
Delivery	Delivery Bed	1	2	Necessary for Reconstructing Delivery Room.
	Delivery Instrument Set	1	2	Necessary for Reconstructing Delivery Room.
	Vacuum Extractor	1	1	Necessary for Reconstructing Delivery Room.
	Neonate & Paediatric Weighing Scale	1	1	Necessary for Reconstructing Delivery Room.
Obstetric	Table Top Autoclave	1	0	Out of Scope.
	Baby Incubator	2	2	Necessary for low weight infant treatment.
	Infant Warmer	2	1	Necessary for neonate treatment.
	Portable Ultrasound Scanner	1	0	To Ultrasound Room.
	Adult Weighing Scale	1	1	Out of Scope.
	X-ray Film Viewer	1	0	Out of Scope.
	Wheel Chair	0	1	Need additional one.
	Patient Stretcher	0	1	Need additional one.
Female Ward	Table Top Autoclave	1	0	Out of Scope.
	Diagnostic Equipment Set for CO	2	1	Need 1set.
	Dressing Instrument set	2	1	Need 1set.
	Adult Weighing Scale	1	0	Out of Scope.
	Wheel Chair	1	1	To New Ward.
	X-ray Film Viewer	1	1	To New Ward.
	Patient Stretcher	0	1	Need additional one.
Paediatric	Diagnostic Equipment Set for CO	0	1	Need additional one.
	Dressing Instrument set	0	1	Need additional one.
	Wheel Chair	0	1	Need additional one.
	X-ray Film Viewer	0	1	Need additional one.
	Patient Stretcher	0	1	Need additional one.
Transportation	Ambulance	1	1	Because of Decrepitude, replace 1pc.

f) Health Centre IV

The following table shows the contents of equipment requested for the HC-IV.

Table2-11 Requested Equipment for Health Centre IV

Health Centre IV / Requested Equipment	Bugobero	Busiu	Mukuju	Nagongera	Buyinja	Nankoma	Busia	**Total**
Caesarean Instrument Set			1			1	1	**3**
Surgery Instrument Set			1			1	1	**3**
Operation Table	1		1			1	1	**4**
Mobile Operation Light	1		1			1	1	**4**
Patient Stretcher			1			1	1	**3**
Vertical Autoclave			1			1	1	**3**
Electric Suction Apparatus			1			1	1	**3**
Instruments Tray			1			1	1	**3**
Instruments Trolley			1			1	1	**3**
Ultrasound Scanner	1	1	1	1	1	1	1	**7**
Generator			1		1	1	1	**4**
Refrigerator for Blood Bank	1		1		1	1	1	**5**
Motorcycle	1	1	1	1	1	1	1	**7**

Concerning this, the following examination was conducted.

- The Ministry of Health intends for HC-IV to be capable of conducting caesarean sections and other simple operations. Therefore, the request for caesarean section equipment is justified. However, since Bugobero HC-IV already possesses an operation table and mobile operation lights, it is deemed appropriate to target the operation theatres in the three Health Centres of Mukuju, Nankoma and Busia, which are still under construction by the Ministry of Health and are not yet equipped. However, equipment provision will be conditional on the building work being completed first.
- Concerning the ultrasound scanners, these are not contained in the list of HC-IV equipment indicated in the standard specification of the Ministry of Health. Moreover, it would be difficult to assign appropriate personnel for such equipment.
- Motorcycles could be effective tools for conducting outreach activities in the target areas, however, it would be difficult to control their usage properly.
- The surgical instrument sets are not contained in the standard specifications prescribed by the Ministry of Health, and it is not possible to ascertain the specific contents of this request.

- The generators were additionally requested at the time of the Basic Design Study; however, it will be difficult to secure maintenance budget on the level of Health Centres.
- Blood bank refrigerators were omitted because, from the viewpoint of supply, it was deemed that vaccine refrigerators and other refrigerators could be used instead.
- During the outline explanation study, the Ministry of Health additionally requested provision of solar electric lighting systems for operation theatres and blood bank gas refrigerators at the Health Centres in Nankoma, Bugobero and Buyinja, which will not be electrified in the near future. As a result of examination, it was judged to be appropriate to include them in the project.

The following table summarizes the above examination contents.

Table2-12 Examination of Equipment for Health Centre IV

Equipment	Request	Plan	Examination
Caesarean Instrument Set	3	3	Procure to 3 OP Bldg. which are now on construction.
Surgery Instrument Set	3	0	Out of scope because MOH will supply it.
Operation Table	4	3	Procure to OP Bldg. Except Bugobero HC III
Mobile Operation Light	4	3	Procure to OP Bldg. Except Bugobero HC III
Patient Stretcher	3	3	Procure to OP Bldg. which are on construction.
Vertical Autoclave	3	3	Procure to OP Bldg. with a condition (Electric Supply).
Electric Suction Apparatus	3	3	Procure to OP Bldg. with a condition (Electric Supply).
Instruments Tray	3	3	Procure to OP Bldg. which are on construction.
Instruments Trolley	3	3	Procure to OP Bldg. which are on construction.
Ultrasound Scanner	7	0	Technically Out of Scope for HC.
Generator	4	0	Out of Scope because of Difficulty in Maintenance.
Refrigerator, Blood Bank	5	0	Out of Scope because of Difficulty in Needs and Supplies.
Gas Refrigerator	0	3	Procure to 3 HCs who does not have electrical supply.
Solar Electric System	0	3	Procure to 3 HCs who does not have electrical supply for operation light.
Motorcycle	7	0	Out of Scope because of Difficulty in Management.

The equipment to be procured for HC-IV and the agencies to be targeted in the Project are shown in the following table. However, when it comes to implementing the Project, it will be necessary to confirm the progress of works

and power distribution implemented by the Ministry of Health at an appropriate time following the exchange of notes (E/N) and reflect the findings in the tender documents.

Table2-13 Planned Equipment for Health Centre IV

Health Centre IV / Planned Equipment	Mbale District	Tororo District	Bugiri District		Busia District	
	Bugobero	Mukuju	Buyinja	Nankoma	Busia	**Total**
Caesarean Instrument Set		1		1	1	**3**
Operation Table		1		1	1	**3**
Mobile Operation Light		1		1	1	**3**
Patient Stretcher		1		1	1	**3**
Vertical Autoclave		1		1	1	**3**
Electric Suction Apparatus		1		1	1	**3**
Instruments Tray		1		1	1	**3**
Instruments Trolley		1		1	1	**3**
Gas Refrigerator	1		1	1		**3**
Solar Electric System	1		1	1		**3**

g) Health Centre III

The following table shows the contents of equipment requested for the HC-III.

Table 2-14 Requested Equipment for Health CentreⅢ

Requested Equipment / Health Centre III	Delivery Bed	Diagnostic Equipment Set for CO	Delivery Instrument Set	Motorcycle	Solar Electric System	Instruments Tray	Instruments Trolley	Adult Weighing Scale	Neonate & Paediatric Weighing Scale
Bumwoni	1	1	1	1	1	1	1	1	1
Bupoto	1	1	1	1	1	1	1	1	1
Bubutu		1		1					
Btiru		1		1					
Busano		1		1	1				
Nakaleke		1		1					
Bukigai		1		1	1				
Namakwekwe		1		1	1				
Panyangasi	1	1	1	1	1	1	1	1	1
Busaba		1		1	1				
Butaleja		1		1					
Kwapa		1		1	1				
Merikit		1		1					
Iyolwa		1		1	1				
Kisoko		1		1					
Kirewa	1	1	1	1	1	1	1	1	1
Kayango		1		1					
Bulidha	1	1	1	1	1	1	1	1	1
Mutumba	1	1	1	1	1	1	1	1	1
Sigulu	1	1	1		1	1	1	1	1
Banda		1		1	1				
Buluguyi		1		1	1				
Muterere		1		1	1				
Bulesa		1		1	1				
Buteba		1		1	1				
Lunyo		1		1	1				
Buhehe	1	1	1	1	1	1	1	1	1
Bulumbi		1		1	1				
Mbehenyi		1		1	1				
Busitema		1		1	1				
Total	**8**	**30**	**8**	**29**	**23**	**8**	**8**	**8**	**8**

As was mentioned above, the goal for HC-III is to carry out normal deliveries. Since the Ministry of Health plans to construct obstetrics departments at eight HC-III by June 2006, assuming that these works are completed according to schedule, delivery equipment will be supplied to the HC-III concerned. Moreover, since 23 HC-III have no electricity supply, solar electric lighting systems to facilitate nighttime deliveries will be procured as requested. As for the motorcycles, even though they could be effective tools for conducting outreach activities in the target areas, it was decided to omit them because it would be difficult to control their usage properly. Diagnostic Equipment Sets for CO were also omitted because they have been already provided by the Ministry of Health.

The following table summarizes the above examination contents.

Table 2-15 Examination of Equipment for Health Centre III

Equipment	Request	Plan	Examination
Motorcycle	29	0	Out of Scope because of Difficulty in Management.
Solar Electric System	23	23	Procure to 23 HCs who does not have electrical supply for light.
Delivery Instrument Set	8	8	Plan to 8 New Obstetrics Buildings.
Delivery Bed	8	8	Plan to 8 New Obstetrics Buildings.
Diagnostic Equipment Set for CO	30	0	Already procured by MOH → Out of Scope.
Instruments Tray	8	8	Plan to 8 New Obstetrics Buildings.
Instruments Trolley	8	8	Plan to 8 New Obstetrics Buildings.
Adult Weighing Scale	8	8	Plan to 8 New Obstetrics Buildings.
Neonate & Paediatric Weighing Scale	8	8	Plan to 8 New Obstetrics Buildings.

The equipment to be procured for HC-IV and the agencies to be targeted in the Project are shown in the Table 2-16. However, when it comes to implementing the Project, it will be necessary to confirm the progress of works and power distribution implemented by the Ministry of Health at an appropriate time following the exchange of notes (E/N) and reflect the findings in the tender documents.

Based on the above examinations, 2-2-3-2 gives the full list and specifications of the equipment scheduled to be procured in the Project.

Table 2-16 Planned Equipment for Health Centre III

Planned Equipment / Health Centre III		Delivery Bed	Delivery Instrument Set	Solar Electric System	Instruments Tray	Instruments Trolley	Adult Weighing Scale	Neonate & Paediatric Weighing Scale
Mbale District	Bumwoni	1	1	1	1	1	1	1
	Bupoto	1	1	1	1	1	1	1
	Busano			1				
	Bukigai			1				
	Namakwekwe			1				
Tororo District	Panyangasi	1	1	1	1	1	1	1
	Busaba			1				
	Kwapa			1				
	Iyolwa			1				
	Kirewa	1	1	1	1	1	1	1
Bugiri District	Bulidha	1	1	1	1	1	1	1
	Mutumba	1	1	1	1	1	1	1
	Sigulu	1	1	1	1	1	1	1
	Banda			1				
	Buluguyi			1				
	Muterere			1				
	Bulesa			1				
Busia District	Buteba			1				
	Lunyo			1				
	Buhehe	1	1	1	1	1	1	1
	Bulumbi			1				
	Mbehenyi			1				
	Busitema			1				
Total		**8**	**8**	**23**	**8**	**8**	**8**	**8**

2-2-2-2 Site Layout Plan

The following matters were taken into account, when arranging the targeted buildings in each facility under the Project

(1) Security of Lot and Regulations

Since all targeted buildings will be constructed within the existing hospital premises, regulations on the use or problems with acquisition of lot will not arise.

(2) Overall Constitution and Zoning

Most hospitals in Uganda are composed as an aggregate of several independent buildings, which are often single-story buildings connected by passageways. This type of composition has advantage that large outside areas are effectively utilized by patients and their families. On the other hand, unplanned extension and construction has been carried out in some hospitals, which causes incoherent and inconsistence overall design as a result.

The Project will also mainly cover the reconstruction of facilities within existing hospitals so that the above-mentioned design method will be continued. Accordingly, based on the layout of existing buildings, coordination and unification between existing and rebuilt ones should be taken into consideration as much as possible.

Consequently, after the entire layout is zoned into five categories: 1) Administration 2) Outpatient Department (OPD), 3) Central Diagnostic & Treatment, 4) Wards, and 5) Services, new plan will be formulated.

In particular, with respect to Tororo, OPD and the administration bloc are currently separated at both ends of the lot, which causes inconvenience for daily operation of the hospital. Therefore, new zoning will be carried out through this Project. In addition, to strengthen the coordination between each building, connecting corridors will be installed where necessary.

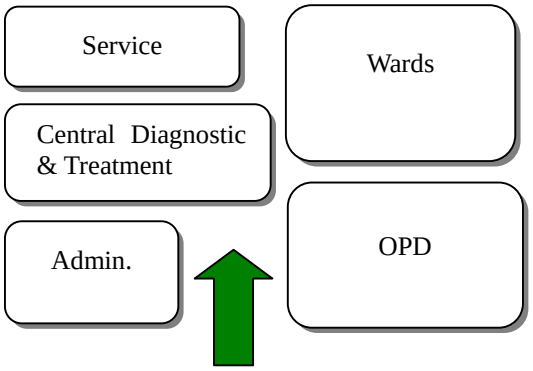


Figure 2-1 Zoning of hospital

(3) Bearings

Although the buildings will be arranged on an east-west axis in principle, depending on the lot conditions, modifications will be made for conformity with existing facilities. In addition, buildings should be arranged along contour lines at the site with a big inclination.

(4) Conservation of Surrounding Environment

There are many natural trees and lawns within the lot of each hospital. Each building will therefore be scattered

throughout such an environment. Consequently, a layout plan should be planned so that green areas should be conserved whenever possible.

An outline of a layout plan at each facility is shown in the following tables.

Table 2-17 Outline of the Layout Plan

Hospital	Present Layout State	Target Building	Main Point of Layout Plan
Mbale RRH	Favourable zoning in general. There is a distance between the ward bloc and the OPD.	Operation Theatre	By rebuilding the theatre beside orthopaedic operation theatre with favourable conditions, the operation departments will be intensified.
		X-ray Unit	Current location is fairly good in consideration of cooperation with other facilities. Therefore, it will be renovated at almost the same place.
		Maternity Ward Delivery Unit Obstetrics Operation Theatre	By building a new Maternity Ward + Delivery Unit + Obstetric Operation Theatre beside the existing maternity bloc, the obstetrics department will be reinforced.
Bududa GH	Favourable zoning in general, but the location of the Operation Theatre is a little far from the OPD. Since the hospital is located on the slope of the hill, a roofed passage also has an inclination and movement is inconvenient a little.	OPD	It will be renovated beside the existing OPD
		Operation Theatre	Due to special lot shape, there is no suitable place, so it will be renovated in the same location.
		Delivery Unit	By expanding it beside the existing maternity ward, the obstetrics system will be reinforced.
Tororo GH	The OPD and the administration bloc are greatly separated to the south and the north so that two main entrances exist. Since the Operation Theatre is located between the administration bloc and the male ward so that it is extremely far away from the OPD.	OPD	By constructing a new OPD beside the existing OPD, the present OPD will be renovated and be transferred to Admin. By this, the main gate of a hospital will be unified and patients acceptance and management of the hospital shall be strengthened..
		Operation Theatre	It will be transferred in the middle between the OPD and each ward so that prompt action is possible.

		Female Ward	It will be transferred to the side of the new OPD.
		Delivery Unit	By expanding the existing maternity ward, the obstetrics system will be reinforced.
		Connecting Passageway	By connecting each building with the new OPD, the axis of the hospital will be reinforced.
Masafu GH	The buildings of the Health Centre are just scattered randomly. There is also no connecting passageway.	OPD	By building a new OPD beside the present maternity ward, the present maternity ward will be renovated to include an administration bloc.
		Female Ward	It will be newly constructed beside the new OPD.
		Paediatrics Ward	It will be newly constructed beside the new OPD.
		Maternity Ward	It will be transferred and rebuilt to the back of the lot.
		Connecting Passageway	By connecting each building with the new OPD, the axis of the hospital will be reinforced.

2-2-2-3 Architectural Plan

(1) Basic Policy

The following points will be regarded as the common basic principles.

- Since the aim of the Project is primarily to rebuild the existing facilities, the scale of existing facilities or latest standards prepared by the Ministry of Health in 2003 will be the basis. However, the scale will be partially reviewed in due consideration of the utilization of existing facilities.
- Although the current number of personnel at each facility does not satisfies the standardized number of the Ministry of Health, any shortage of staff will be addressed by the Ministry of Health. Therefore, building scale will be determined by assuming the standard number of staff to be arranged.
- Circulation of hospital staff, patients and their families should be easy to understand and shortened as much as possible.
- Basic span of 6.4mx4.2m, which the Ministry of Health uses, will be standard size.
- The climate at target sites is relatively stable. If there are breezes in the shade, it will be comfortable throughout the year. Accordingly, each building should be long and narrow on an east-west axis whenever possible for easy adjustment to daylight. In addition, the interval of buildings should be sufficiently ensured to ensure both natural ventilation and delighting.
- So that patients, their families and medical staff can effectively utilize exterior space, the exterior areas such as courtyards or gardens between hospital buildings should be designed with adequate clearance.

(2) Examination of Necessary Various Rooms

As mentioned in 2-2-2-2, by dividing hospital facilities into five (5) zones: 1) Administration 2) Outpatient Department (OPD), 3) Central Diagnostic & Treatment, 4) Wards, and 5) Services, buildings and rooms in each zone are as follows.

Table 2-18 Composition of Department

Department	Building	Major Constituent Rooms
Administration	AdministrationBldg.	Reception, Waiting, Director, Secretary, Hospital Administration, Chief Nurse, Meeting, Accountant, Recording, Library
OPD	OPD	Reception And Registration, Pharmacy, Waiting, Outpaient Clinics, Casulaty, X-ray Department, Laboratory, WC etc.
Central Diagnostic & Treatment	Operation Theatre	Operation, Strelization, Sluice, Gypsum, Recovery, Change
	X-ray Unit	X-Ray, Dark Room, Reception, Waiting, Fluoroscopy, Change, Doctor
Ward	Maternity Ward	Patients Bedroom, Staff Station, Treatment, Family Room, Sluice, WC and Shower
	Delivery Unit	Delivery, Strelization, Sluice, Labour, Pre Eclamptic, WC and Shower
	Operation Theatre for Obsteric	Obsteric Operation, Strelization, Sluice, Staff, Change

	General Ward	Patients Bedroom, Staff Station, Treatment, Family Room, Sluice, WC and Shower
Services	Kitchen & Laundry	Kitchen, laundry

Mesh parts will be excluded from the Project.

X-ray and laboratory are generally included in the Central Diagnostic & Treatment Zone in Japanese hospitals, whereas in Uganda families generally accompany patients. The Project will include these two spaces in the OPD. Consequently, the circulation of outpatients and their families can be shortened to avoid unnecessary confusion. However, the existing X-ray building is separated from the OPD at Mbale RRH and its required functions are also higher than those of other General Hospitals. This will therefore be an independent building in the Central Diagnostic & Treatment Zone.

(3) Planning Contents of Each Building

1) OPDs

This will be composed of three (3) sections: reception and pharmacy, clinic groups, X-ray and laboratory. The overall plan will be to create waiting spaces throughout the courtyard for easy viewing of visitors. Planning contents and the area of each room are described below.

a) Main Entrance

At General Hospitals, anybody can receive a free diagnosis without a reservation, so many patients can be seen waiting for a consultation in front of the hospital. Consequently, the Main Entrance including the space in front of the Reception will be planned as ample space (8.4m x 16m), in order to handle a large number of people.

b) Reception for Registration

Reception for Registration will be situated near the main entrance hall in order to secure enough waiting space. It is composed of two spaces of 6.4m x 4.2m (Reception & Guidance, Clinical recording room). The size of the Clinical recording room is the same as that of “the Standard Building Plans.” Although the former is not clearly shown in “the Standard Building Plans”, the size was decided assuming that it will be used also as a waiting room for clinical officers or other staff who take a key role in OPD.

c) Pharmacy

This will be located next to the main entrance. It will be comprised of an operation room, storage & an office. In “the Standard Building Plans”, area 9.6m x 8.4m is applied. However, this size is too large based upon the present stockpile of medicines, so area 6.4m x 8.4m, which is 2/3 of the size, will be applied. In front of this, a waiting area will be secured.

d) General Outpatient Clinics (Male, Female, Paediatric)

Due to social & cultural conditions in Uganda, clinics are usually divided by male & female instead of diagnosis

& treatment department such as internal medicine and surgery. In “the Standard Building Plans”, a general clinic is comprised of 4 rooms of area 3.2m x 4.2m (consultation room, laboratory, treatment room & reception). This size is nearly the same as Japanese consultation rooms which have a waiting area in front. In the Project, by following “the Standard Building Plans” the above-mentioned 4 spaces will be arranged in an area of 6.4m x 8.4 m.

Generally speaking, related consultation departments should be assembled. In other words, (i) female, obstetrics, & paediatric department, (ii) male department, (iii) dental department & (iv) common department will be located close to each other..

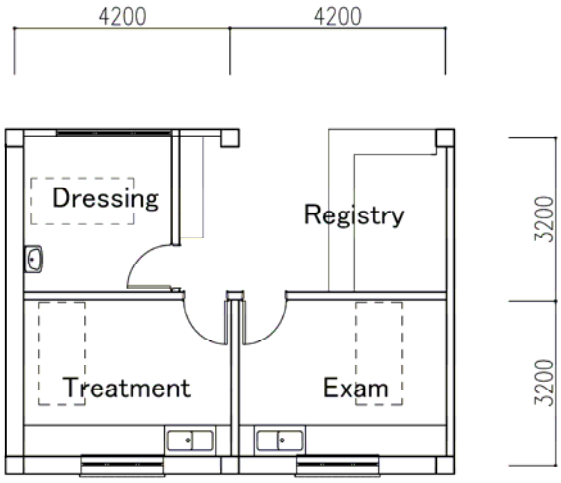


Figure 2-2 Layout of Clinics of OPD

e) Maternity Clinic

The overall size is 6.4m x 8.4m just as the above-mentioned clinics. In addition to a consultation room, instead of examination & treatment, 2 examination rooms including a gynaecological examination corner is planned. In principle, the clinic will be open to healthy women, and vaccinations or health education activities before & after delivery will be provided as a “mother & child clinic”. Therefore, an adjoining multi-purpose space will be provided. At Tororo and Masafu General Hospital, since it is possible to utilize another existing building for this purpose, this space will be excluded from the Project.

f) Dental Clinic

The overall size is 6.4m x 8.4m just as the other clinics. At dental clinic, in the similar manner as the general clinic, in addition to a consultation and treatment room, a dental technicians room and preparation room will be provided.

g) Other Outpatient Clinics

At Tororo GH, in addition to the basic five (5) clinics (Male, Female, Paediatric, Maternity, Dental), since there are consultations for otolaryngology, ophthalmology & tuberculosis, “Common clinic” will be provided for

consultations for the first 2 departments and “Tuberculosis clinic” will be independently provided in order to prevent spread of the infection. The size will be 6.4m x 8.4m like other clinics.

h) Waiting Area

In due consideration of the current conditions at each hospital, a larger waiting space will be arranged in front of each clinic. Along with a courtyard, a passageway 3.2m in width will be secured to facilitate inside traffic, and in some cases it is possible to expand the waiting area.

i) Casualty

Diagnosis and treatment during overtime & holidays will be major tasks of Casualty unit. Therefore, Casualty unit will be located where direct access is possible from outside in order that more efficient X-ray diagnosis & laboratory work, rapid receiving of urgent patients may be possible. Consequently, easy movement during an emergency can be secured. At the same time, utilizing time will be limited to nighttime & overtime, which will mean easier building maintenance. In addition, for easier transporting to the place of operation, it will be located closer to the exit for a connecting passageway.

The whole size of the Casualty unit is 12.6m x 9.6 m. Inside there will be 4 areas of diagnosis, a staff station, minor operation theatre and observation beds. Although in “the Standard Building Plans” Casualty unit includes storage, staff waiting room, gypsum room, toilet, approach space for ambulances. However, these spaces are excluded since other rooms could be served for the purposes; minor operating room can be utilized as a gypsum room; whereas, the general toilet will be utilized as a toilet. A waste disposal & sterilising room will be attached to the minor operating area. Although in “the Standard Building Plans”, 5 observation beds are recommended, 4 observation beds will be secured in the Project, considering the current situations at the target hospitals.

j) X-ray

According to “the Standard Building Plans”, it should be composed of X-ray room, storage space, darkroom, ultrasonic diagnosis, staff & changing rooms. This composition will be followed in this Project in principle. However, X-ray operation room is not independently provided in “the Standard Building Plans” (Operators conduct the equipment from behind a lead-glass screen installed in the room.) and it will be modified in this Project. By installing the operating room outside the X-ray room and by performing operations via a window, the amount of radiation exposure will be decreased. The size of the X-ray room will be 4.2m x 6.4m, which is about the same size as Japanese X-ray rooms.

k) Laboratory

Laboratory will include Laboratory, Storage and VCT (Voluntary Counselling Testing). In addition to specimen testing such as blood and urine, blood for blood transfusion will be stored. The overall scale will be 12.6m x 9.6m following “the Standard Building Plans”. This is the same as the laboratories at Bugiri and Busolwe General Hospitals. A large peninsula-shape testing stand will be installed, which create 3 areas (Sterilisation & cleaning,

blood test and biochemistry test) inside the room.. Blood sampling of outpatients will be taken in the laboratory and urine will be collected at the nearest toilet. All specimens from inpatients are collected in the relevant ward.

VCT is a space for consultation and blood test of HIV/AIDS. For the protection of patient's privacy and prompt execution of blood test, it will be isolated from other clinics and located inside the laboratory.

l) Toilets

The size will be the same as the present one. Separate male and female toilets will be secured. Toilets for wheelchairs will be also added. For toilets for patients, so-called Turkey style toilet which is dug into the floor will be applied in OPD and Wards. WC for hospital staffs and handicapped people, pregnant women will be western style, with that of private patient bedrooms.

m) Corridor

Corridor is used not only as a passageway but also as a waiting space. Although the width of corridor is 2m in "the Standard Building Plans", some hospitals have corridors of 3m wide. In this project, corridor of 3.2m will be planned, and by securing a larger space than the standard design, many persons including patients & families or passers-by can be accommodated.

2) Operation Theatre

Operation Theatres can be categorized into the following three (3) types.

A. Operation Theatres of General Hospitals (Bududa and Tororo GHs)
B. Central Operation Theatre at Regional Referral Hospital (Mbale RRH)
C. Obstetric operating room (belonging to the obstetric department at Mbale RRH)

A. Operation Theatres of General Hospitals

Main operation theatre and another septic theatre, and gypsum room will be planned. The size of the operating rooms will be of 6.0m x 6.0m as in "the Standard Building Plans", which has been the standard size in Japan. (However as operation is getting more complex and its equipment is increasing, the size tends to become larger gradually.)

B. Central Operation Theatre at Regional Referral Hospital

Two operating rooms will be added on one side of a relatively new operating room (one room) constructed through the financing of the African Development Bank. Accordingly, three (3) operating rooms: a special operating room for ophthalmology and otolaryngology, etc., general operating room, septic operating room can be secured. A gypsum room will be affiliated in front of an septic operation room. A confined sterilizing room and the staff locker room can be expanded at the existing facilities. In addition, by installing new operating control room

which have not yet been secured at the present time, efficiency of the operation department will improve. Since a 7.0m x 7.0mmodule was adopted for the existing operating room, and since the Project will annex new theatres on one side of it , the 7m module will be adopted for the planning.

C. Obstetric operating room

Although obstetric operating room at Mbale RRH has not been secured at the present time, new construction is recommended for the following reasons.

- As a Regional Referral Hospital there are many complicated childbirths.
- The obstetric department is around 150m from the central Operation Theatre so that long-distance transportation is necessary during an emergency. This is therefore a hindrance to rapid correspondence.
- Caesarean sections hinders other operations.

In addition to Maternity ward and Delivery unit, by establishing emergency obstetrics operations rooms, efficient operation during normal times and rapid correspondence during emergencies is possible. (At Tororo GH, obstetrics operation room is under construction at the side of the existing maternity ward.) Since the present number of caesarean section at Mbale RRH is between 500~700 cases per year (1.4 ~ 1.9 cases per day), only one operation theatre will be planned. The size of the theatre will be 4.2m x 5.4m considering the level of operations.

3) X-ray Unit

As mentioned earlier, X-ray department will be accommodated in the OPD in general hospitals. However, at Mbale RRH, it will be rebuilt at the current location. It will be comprised of X-ray room, Fluoroscopy room, ultrasound testing room, doctor's office and consultation room.

4) General Wards

According to the Standard of the Ministry of Health, General Hospitals should have 4 wards (male, female, maternity and paediatrics) and the total bed capacity is determined to be 100 (25 beds for each ward). In this project, Maternity Ward of Mbale RRH and Female ward of Tororo GH will be planned as 25-bed ward. The former is designed just as the latter without space for delivery since Delivery Unit will be separately constructed. With respect to Masafu GH which is to be upgraded, as was mentioned previously, the total bed capacity will be 60. Therefore each ward will be planned with 15 beds. In this project, Female Ward and Paediatric Ward will be targeted.

Twenty-five (25) bed wards are comprised of four 6-bed bays surrounded by spandrel walls and one private bedroom as isolation space will be secured. At the present time, hospital meals are provided only once a day, so attendance and the assistance of family members are indispensable, and the role displayed by families is extremely

important. Consequently, family space will be secured around beds, and a space for napping and staying such as terraces and balconies will also be provided. Furthermore, ward space and water section (toilet & shower) will be separated by the balcony. This will secure natural ventilation and help to prevent moisture or bad smell from coming into the bedrooms.

The size of each 6-bed bay will be 6.4m x 6.4m similar to the standard size. Although this size is slightly larger than the Japanese standard, in due consideration of the many families who attend patients, it is judged to be most appropriate. With respect to the width of hallways, in order to secure 2.2m internal dimensions, the width of the centre line of the walls will be 2.4m. As for a Private bedroom, it will be planned with the dimension of 3.2 m x 6.4 m including WC & shower. Although the standard plan indicates the size of 3.2 m x 3.2 m (without WC & shower), it would be too small in consideration of nursing.

5) Obstetrics and Delivery Department

For obstetrics department, ward of 25 beds and 2 beds for delivery and labour are regarded to be standard at General Hospitals. In the case of HC-IV, ward will be with 8 beds and delivery and labour have 1 bed. In this project, target shall be a) Delivery Unit of Mbale RRH and Tororo GH b) Delivery Unit of Bududa GH c) Maternity Ward of Masafu GH (including delivery space).

a) Delivery Unit of Mbale RRH and Tororo GH

The existing maternity ward at Tororo GH is under renovation by the Ugandan side, and in line with this, the department for antenatal examinations bloc and obstetrics operation department are under construction, but there is no appropriate space for delivery. Accordingly, considering the coordination with existing buildings, the delivery unit will be expanded at the side of the maternity ward. Since the annual number of childbirths (without caesarean section) exceeds 2,000, it will be planned with 6 delivery beds + 1 labour bed.

At Mbale RRH, the annual number of childbirths exceeds 4,000. Presently 2 wards are utilized by the obstetrics and gynaecology department. One is used for normal deliveries and the other is used for referrals and complications. Of the 2 wards each with 25 beds, the ward for complications, which has deteriorated and difficult to utilize continuously, will be rebuilt. Reconstruction will be on a similar scale as the present conditions so that needed capacity of the new ward will be 2,000 births per year (half of 4.000), which is the same as the case of Tororo GH. Consequently, the unit will be planned with the same scale as Tororo GH.

b) Delivery Unit of Bududa GH

At Bududa GH, the delivery unit will be rebuilt at the side of the existing delivery unit, which has deteriorated and unsuitable as delivery space. The existing unit will be renovated and will become a counselling room and guidance room, etc Currently, Bududa GH has around 1,000 deliveries per year, but it is expected to exceed 1,200

in the near future. Since 1,000~1,200/365 equals 2.7~3.3, three delivery beds and one labour bed will be planned.

c) Maternity Ward of Masafu GH (including delivery space)

Since Masafu GH is smaller than other general hospitals, the Maternity Ward including Delivery Unit will be planned, as indicated in "the Standard Building Plans". The annual number of delivery is about 1,200, thus the necessary capacity of delivery space will be the same as Bududa GH (three delivery beds and one labour bed).

In Uganda, many parturient women leave hospital shortly after delivery, so the period of hospitalization is usually 2 days on average. If 1,200 x 2 ÷ 365 (÷ 0.8 of bed availability)＝8.2 beds is planned, the number of beds is deemed sufficient. However, due to the necessity for hospitalization prior to delivery, and the prolonging of hospitalization after delivery or hospitalization in gynaecology, 15 beds are judged to be adequate for Masafu GH.

(4) Summary of Floor Area

As described above, floor area of each building is outlined in the following table.

Table 2-19 Floor Area of Planned Buildings

Hospital	Facility	Department	Room	Unit Area/ Rm (m^2/Room)	Number	Area	Total Area	Total Area (Hospital)
Mbale RRH	Operation Theatre	Operation	Operation Room	49.00	2	98.00	280.40	1327.71
			Storage	21.70	1	21.70		
			Scrub	8.40	1	8.40		
			Operation Corridor	49.70	1	49.70		
			Plaster Room	20.25	1	20.25		
			Gypsum Room Storage	11.25	1	11.25		
			Change (Male/Female)	18.00	2	36.00		
			Resting Place	13.50	1	13.50		
			Anteroom 1, 2	10.80	2	21.60		
	X-Ray Unit	X-Ray	X-Ray	26.88	1	26.88	158.72	
			Dark Room	13.44	1	13.44		
			Control Room/Reception	13.44	1	13.44		
			Fluoroscopy	26.88	1	26.88		
			Ultrasound	13.44	1	13.44		
			Doctor	13.44	1	13.44		
			Clinic	13.44	1	13.44		
			Change	6.40	1	6.40		
			Corridor/Waiting Space	31.36	1	31.36		
	Maternity Ward	Bedroom etc.	Bed Room	184.32	1	184.32	376.47	
			Nurse	20.48	1	20.48		
			Treatment	20.48	1	20.48		
			Staff	10.24	1	10.24		
			Family	30.72	1	30.72		
		Others	Corridor	69.12	1	69.12		
			Sluice	10.24	1	10.24		

			WC	30.87	1	30.87		
	Delivery Unit	Delivery	Delivery Room	70.56	1	70.56	161.28	
			Sterilisation/Sluice	18.48	1	18.48		
			First Stage	9.24	1	9.24		
			Pre eclamptic	13.44	1	13.44		
			Sister	13.44	1	13.44		
			WC / Shower	6.72	1	6.72		
			Corridor	29.40	1	29.40		
	Obstetric	Operation	Operation Room	22.68	1	22.68	80.64	
	Operation Theatre		Sterilisation/Sluice	17.64	1	17.64		
			Nurse	13.44	1	13.44		
			Change 1, 2	13.44	1	13.44		
			Corridor/Anteroom	13.44	1	13.44		
	Generator Rm.						25.70	
	Fire Pump Rm.						16.00	
	Water Pump Rm.						7.50	
	Connecting Passageway						221.00	
Bududa GH	OPD	Reception	Reception/Record	53.76	1	53.76	1424.64	1886.42
		Pharmacy	Pharmacy	26.88	1	26.88		
			Storage	13.44	1	13.44		
			Office	13.44	1	13.44		
		Multipurpose	Multipurpose Room	70.56	1	70.56		
		Maternity Clinic	Consultation	10.24	1	10.24		
			Exam 1, 2	13.44	2	26.88		
			Registry & Waiting	16.64	1	16.64		
		Clinic (Paediatric/	Examination	13.44	3	40.32		
		Male/Female)	Treatment	13.44	3	40.32		
			Dressing	10.24	3	30.72		
			Registry & Waiting	15.68	3	49.92		
		Dental Clinic	Dental	21.44	1	21.44		
			Store	5.44	1	5.44		
			Preparation	11.20	1	11.20		
			Registry & Waiting	15.68	1	15.68		
		Laboratory	Laboratory	94.08	1	94.08		
			Storage	13.44	1	13.44		
			VCT	13.44	1	13.44		
		X-Ray	X-Ray	26.88	1	26.88		
			Dark Room	13.44	1	13.44		
			Reception/Control	13.44	1	13.44		
			Ultrasound	13.44	1	13.44		
			Storage	7.36	1	7.36		
			Change	6.08	1	6.08		
			Corridor	6.40	1	6.40		
		Casualty	Clinic	17.85	1	17.85		
			Staff	17.85	1	17.85		
			Observation	16.00	1	16.00		
			Minor Operation	26.88	1	26.88		
			Sterilisation/Sluice	13.44	1	13.44		
			Corridor	28.94	1	28.94		
		Waiting Space (8)		208.30	1	208.40		
		WC		32.00	1	32.00		

		Corridor		408.40	1	408.40		
	Delivery Unit	Delivery	Delivery Room	32.76	1	32.76	113.52	
			Sterilisation/Sluice	21.00	1	21.00		
			First Stage	13.44	1	13.44		
			Pre eclamptic	13.44	1	13.44		
			Sister	7.04	1	7.04		
			WC/Shower	7.04	1	7.04		
			Corridor	27.00	1	27.00		
	Operation Theatre	Operation	Operation Room	38.40	2	76.80	306.56	
			Sterilisation/Sluice	51.52	1	51.52		
			Scrub	5.92	2	11.84		
			Corridor	28.80	1	28.80		
			Staff	11.30	2	22.60		
			Induct/Recovery	30.39	1	30.39		
			Change (Female/Male)	18.00	2	36.00		
			Corridor	24.23	1	24.23		
			Gypsum Room	16.88	1	16.88		
			Gypsum Storage	7.50	1	7.50		
	Generator Rm.						25.70	
	Fire Pump Rm.						16.00	
Tororo GH	Operation Theatre	Same as Bududa GH Operation Theatre					306.56	2915.62
	OPD	Reception		53.76	1	53.76	1424.64	
		Pharmacy		53.76	1	53.76		
		Clinic (Paediatric, Male, Female, Dental, Common, TB)		53.76	6	322.56		
		Laboratory		120.96	1	120.96		
		X-Ray		87.04	1	87.04		
		Casualty		120.96	1	120.96		
		Waiting Space (8)		221.80	1	221.80		
		WC		32.00	1	32.00		
		Corridor		411.80	1	411.80		
	Delivery Unit	Same as Mbale RRH Delivery Unit					161.28	
	FemaleWard1、2	Same as Mbale RRH Maternity Ward		376.47	2	752.94	376.47	
	Generator Rm.						25.70	
	Fire Pump Rm.						16.00	
	Water Pump Rm.						7.50	
	Connecting Passageway						221.00	
Masafu GH	OPD	Reception		53.76	1	53.76	1374.70	2382.16
		Pharmacy		53.76	1	53.76		
		Clinic (Paediatric, Male, Female, Dental)		53.76	4	215.04		
		Laboratory		120.96	1	120.96		
		X-Ray		87.04	1	87.04		
		Casualty		120.96	1	120.96		
		Waiting Space (8)		168.00	1	168.00		
		WC		32.00	1	32.00		
		Corridor		358.08	1	358.08		
	Maternity Ward	Bed Room etc.	Bedrooms	122.88	1	122.88	308.60	
			Nurse	19.20	1	19.20		
			Hall	16.80	1	16.80		
			Corridor	30.72	1	30.72		
		Delivery	Delivery Room	28.16	1	28.16		
			Sterilisation/Sluice	12.80	1	12.80		

			First Stage	12.24	1	12.24		
			Pre eclamptic	19.20	1	19.20		
			WC/Shower	4.08	1	4.08		
			Hall/Corridor	15.64	1	15.64		
		WC	WC	26.88	1	26.88		
	Female Ward		Bedrooms	122.88	1	122.88	218.88	
			Nurse	15.36	1	15.36		
			Treatment	15.36	1	15.36		
			Corridor	38.40	1	38.40		
			WC	26.88	1	26.88		
	Paediatric Ward	Same as Female Ward					218.88	
	Electric Rm.						25.70	
	Fire Pump Rm.						16.00	
	Water Pump Rm.						7.50	
	Connecting Passageway						377.00	
							Total	8511.91

(5) Cross-Section Plan

1) Level Setting

Since four targeted hospitals of construction work (Mbale RRH, Bududa GH, Tororo GH, Masafu GH) only have one-storey buildings, all buildings in this project will be planned as single-storey too. A floor level will be set at 300mm from ground level in due consideration of flash flooding. At sites where there is a difference in elevation, the reference for ground level will be the highest point in principle. If there are connecting corridors, the floor level will be sufficiently set to accommodate them.

2) Barrier Free

The facilities of the Project are hospitals where a wide variety of persons congregate, especially patients. Consequently, all facilities will be one-storied buildings in principle and the installation of unnecessary difference in level should be avoided. In addition, slopes will be installed on doorways such as entrances so as not to hinder traffic from wheelchairs or stretchers.

3) Roofs

Sloping roofs will be applied by deepening the projection of eaves to protect buildings from direct sunlight and rainfall. In due consideration of durability and weathering, galvanized steel panel roofing will be applied. However, in order to blend with the surrounding existing buildings, tile roofing will be applied to some buildings. The gradient will be 4/10, which is common in the region.

4) Interior Profile

The ceiling height in each room will be 3m and the ceilings will be mounted entirely using T bars. Air space in the attic is ensured and ventilation in the loft will be possible using a louver at the gable end, which should help to prevent hot air from entering the room. Electrical wiring will be applied through the ceiling in order to reduce cost and easy maintenance.

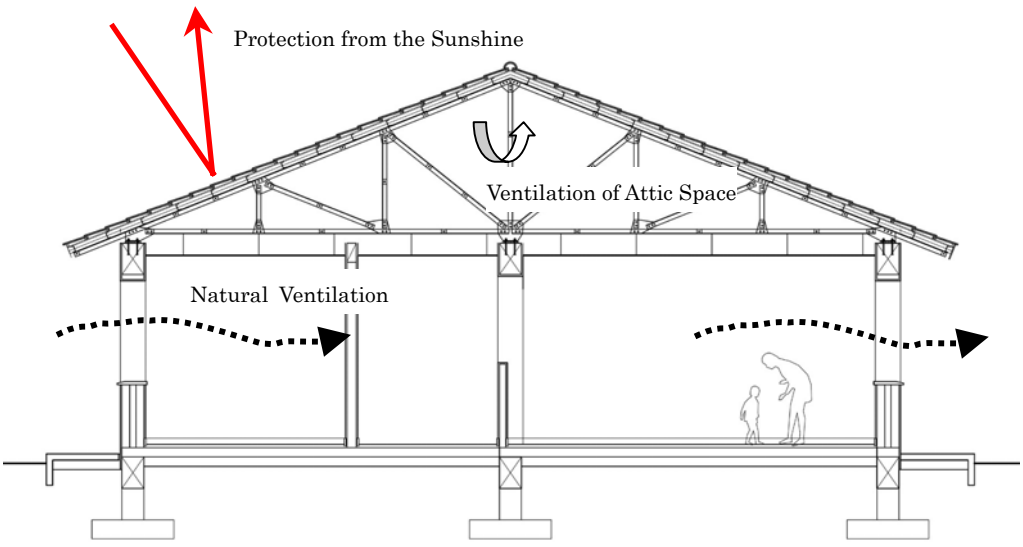


Figure 2-2 Cross-Section Plan

5) Opening

Large transom windows will be posed on the upper part of doors and windows in order to ensure continuous ventilation.

(6) Measures for Cost Reduction in Architectural Planning

In general, simple designs should be used to reduce construction and maintenance costs after the completion of facilities. However, special consideration should also be taken in order to prevent an increase in maintenance cost by reducing the initial (front-end) cost.

1) Assuming that the existing facilities will be effectively utilized to the utmost, some rooms and equipment will be shared in order to reduce the overall scale.
2) The standard design of the Ministry of Health in Uganda should be taken into account and appropriate space in each room should be created.
3) By standardizing effective spans and frame sizes, an economical design and rational execution should be conducted.
4) By contriving a floor and profile planning, the running cost should be reduced through effective utilization of natural ventilation and lighting.
5) Local construction materials should be utilized as much as possible. In particular, finishing materials for easy maintenance after the completion of the Project should be utilized. In addition, construction methods adapted to local conditions should be chosen in the interests of promoting cost reduction.

(7) Other issues

Independent Ugandan design standards are currently under review so that the British Standard (BS) will occasional be used as a reference. Accordingly, the BS or Japanese standards will be applied to the Project.

As for the application for building certification and its procedures, letters from the Ministry of Health and a series of drawings will be submitted to the Building Department of the Ministry of Works, Housing and Communications. The examination period is approximately three (3) weeks. Any comments will be reflected in the detailed design.

2-2-2-4 Structural Design

(1) Basic Policy

For the structural design under the Project, the following matters are regarded to be basic policy.

- A plan should sufficiently take into account local construction conditions and skill competency.
- A durable construction method and structural type should be applied. In particular, a plan should be formulated for a safe and rational foundation by accurately grasping the ground conditions at targeted sites.
- A structure type that does not hinder utilization should be applied after considering deflection or oscillation, etc. resulting from long-term load.
- Based on the specific features of hospital facilities, sufficient precaution against earthquakes and moderate gales as short-term load should be applied.

(2) Structural Design Standard

Since the Building Control Regulations and Structural Design Guidelines are being prepared by the Ministry of Works, Housing and Communications (MOWHC). Therefore, the Project will refer to a draft of the above-mentioned standards under preparation and will also apply the structural design standards of the Architectural Institute of Japan (AIJ) as a method for analysis of design structures. With respect to earthquake resistance, since the following “Seismic Code of Practice for Structural Designs” was recently established, this will be used to set the base shear coefficient.

＜Ugandan Seismic Standard＞

Seismic Code of Practice for Structural Designs-US319:2003

(Uganda National Bureau of Standards)

(3) Structural Classification and Construction Method

A mixed system of steel frames supporting a roof and reinforced concrete Rahmen (rigid frame) will be applied. Reinforced concrete rigid-framed structures are frequently utilized for buildings in Uganda. The Project will also apply this construction method to walls and foundations in order to unify spans in rough, which will help to promote the rationalization of execution of work.

Although cavity wall with bricks will be applied for the walls, to improve earthquake resistance they will be reinforced with puncheons (studs) made by reinforced concrete and lintels over an area of 10 m^2 or less. A trussed structure gable roof will be applied to a steel-framed roof. A spread foundation (isolated footing) will be used for the foundation.

(4) Ground and Foundation Structure

The geological features at four (4) hospitals where the construction work is scheduled were confirmed through boring surveys at three (3) locations for each site. As the results of these soil surveys, the long-term bearing capacity of each site was calculated as shown in the following table.

Table 2-20 Soil Bearing Capacity of Each site

Site	Depth	Type of soil	Bearing Capacity for sustained loading(N/㎡)
Mbale	GL-1.5m	Red-brown clay with sand	105
Bududa	GL-1.5m	Clay of high plasticity	80
Masafu	GL-1.5m	Clayey sand	100
Tororo	GL-1.5m	Silty sand	120
Masafu	GL-1.5m	Clayey sand	100

Since the facilities to be newly constructed will be one-story building, a spread foundation will be applied in principle. However, rigidity will be secured by installing ground beams in order to improve durability.

(5) Design Load

Dead load, live load, seismic load, wind load will be considered as design load.

1) Dead Load

Weight of each part of the buildings will be calculated based on the plan.

2) Live Load

The Japanese standards will be applied.

3) Seismic load

Although earthquakes are rarely recorded in eastern Uganda, based on zoning in the Seismic Code of Practice for Structural Designs enacted in 2003 and coefficients by importance of buildings, half (Co=0.1) of the value prescribed in the Japanese Building Standards Law will be adopted for the base shear coefficient. The calculation is as following,

Cd=CZIK

Cd: The Base Shear Coefficient

C: The Basic Seismic Coefficient (=0.08)

Z: Zoning Coefficient (=0.8 for the Eastern Region including targeted four districts)

I: Importance of buildings (=1.5 for Hospitals)

K: Structure Specification Coefficient (=1.0 for Concrete Frame buildings)

Cd=0.08 x 0.8 x 1.5 x 1.0=0.096 thus Cd will be set as 0.1.

4) Wind load

Japanese standards will be applied to the wind endurance design and 30m/sec will be adopted as a design velocity pressure.

(6) Construction Materials

The following construction materials will be utilized for structures.

Table 2-21 Structural Material and Applied Standard

Concrete	BS5328 Specified Design Strength 21Mpa
Cement	BS12 Ordinary Portland Cement
Mixture	Water reducing Agent
Sand	BS882 Crushed Stone
Aggregate	BS882 River Sand
Steel Bars(Deformed)	BS4449 GRADE460(T10～T19)
Steel frame	BS4360 GRADE43(C, L, H, Pipe)
Bolt	BS4604 General Grade
Brick	US 102

2-2-2-5 Utility and Building Facility Plan

(1) Basic Policy

A facility plan should be coordinated with a construction plan and an equipment plan for key rooms such as medical examination and treatment rooms, laboratories and Operation Theatres to be functionally operated. In addition, a basic design plan should be formulated in due consideration of maintenance costs, etc. by sufficiently confirming the infrastructure (electricity, water supply and drainage) within hospitals and the surroundings. Specifically, the following points should be taken into account.

- Facility will be planned in due consideration of the contents of the medical equipment to be supplied, in order that medical services can be provided without any hindrance. Specifically, examination for connections of medical equipment, pipe arrangement and power distribution will be made.
- Although the existing facilities and facilities to be newly constructed will coexist together at the targeted hospitals, since the existing equipment systems are severely deteriorated and functions cannot be guaranteed, equipment systems at the new facilities are scheduled to be independent. Accordingly, trouble should be avoided after the completion of the new facilities by clarifying the obligations of both the Ugandan and Japanese sides.
- Electricity rehabilitation work will be carried out, where the existing wiring is deteriorated or broken and stable power cannot be provided for medical equipment to be supplied in this Project.
- For easy maintenance after completion such as easy procurement of parts or smooth maintenance and repairs, standards locally available products should be utilized for equipment as much as possible.
- As a general rule, related Ugandan legislation should be applied and standard designs of the Ministry of Health should be used as reference. As the occasion arises, Japanese standards will also be used.
- Special consideration should be given when formulating an equipment plan so that lighting expenses will not become excessive.
- Water supply and drainage pipes in each building should be provided from outdoors. In addition, pipes embedded in walls should be avoided as much as possible by utilizing linings for pipe arrangements in each room in order to reduce the impact of equipment deterioration on the building.
- In due consideration of maintenance, gas cylinders should be adopted instead of central medical gas system.

(2) Electrical System

1) Distribution Unit Substation (Power System)

Since UEDCL (the Uganda Electricity Distribution Company Ltd) has jurisdiction over the distribution substation, switchboards for each building from the meter and secondary side (including trunk lines) will be covered in the

construction work. If it is necessary to increase the volume of a transformer system under the Project, based on the results of previous arrangements with UEDCL, this will be renewed by the Ugandan side at its own expense. In particular, since only one-phase initial power (1 phase, 2 wires, 240V) receiving exists at the Masafu Health Centre IV at the present time, a three-phase power source (3 phase, 4 wires, 415/240V) should be lead in from the trunk line in front of the hospital by the Ugandan side.

2) Generator and Main Feeder System

As a result of measuring voltage fluctuations during the Basic Design Study, power failures at the target sites occur approximately once every two (2) days on average. And in some places power failure persists for long time such as ten (10) hours or longer. Voltage fluctuations (drop) are also great. Consequently, generators will be installed at all facilities where Operation Theatres will be constructed in order to backup emergency circuits. If a refrigerator is furnished, this will be included in the generator circuits. In the case of determining the capacity of a generator, based on equipment capacity within the above-mentioned targeted scope, the minimum capacity should be adopted in order to minimize operating cost.

Table 2-22 Capacity of Generator & Emergency Circuit

Hospital	Capacity of Generator	Emergency Circuit
Mbale RRH	50kw	Operation Theatre、Obstetric Operation Theatre、Fire pump
Bududa GH	37kw	Operation Theatre、Lab. of OPD、Fire pump
Tororo GH	37kw	Operation Theatre、Lab. of OPD、Fire pump

In the existing operation theatres, battery-powered operation lights will be supplied in order to avoid power break during operation. In addition, As for other equipment, voltage regulators will be provided for the protection against rush current at the time of recovery from power failure.

3) Main Feeder Wiring System

Main Feeder System will be composed of two systems, that of commercial power supply and that of commercial /emergency power supply (for operation theatres, refrigerators, emergency related equipment). The power (3 phases 4 Wires 415V/240V) will be distributed from the incoming panel in the electrical room to each distribution board. The capacity of wiring should be planned in due consideration of equipment to be connected in order that it would satisfy appropriate voltage drop or allowable electric current. The wiring method is with cable ladder in principle and also with conduit piping where needed.

The cabling and power distribution will be as follows.

Power Distribution Main Feeder: 3 phases 4 Wires 415V/240V

Lighting and small appliance: 1 phase 2 Wires 240V

Power: 3 phases 3 Wires 415V

4) Lighting and･Electrical Outlets

Special attention should be given so as not to exceed the design for lighting and electrical outlets by referring to the Standard Building Plans of the Ministry of Health and lighting utilization at each hospital.

The maximum length of rainfall in the region of the target sites is only about three (3) hours in general, even during the rainy season. Therefore daylight is relatively stable. In the case of applying the Japanese Industrial Standards (JIS), since it is sufficiently anticipated that maintenance becomes difficult, 30% of the JIS will be adopted for illumination in order to secure necessary, minimum amount of brightness. This will be almost the same illuminance as "the Standard Building Plans."

With respect to the layout of electrical outlets, after taking the Standard Building Plans into account, planning that corresponds to the equipment layout should be made. Other than the equipment to be newly installed, electrical outlets for old equipment to be transferred should be prepared. In the patients' rooms, outlets are rarely utilized so an outlet for every six (6) bedrooms is planned. A red light and electrical outlets for equipment will be installed in the darkroom.

5) Fire Protection System

A fire alarm system will be installed for the safety of outpatients and inpatients.

6) Lightning Rods

Lightning work will be carried out.

(3) Sanitary Installations

1) Water Supply System

Since Bududa GH has existing 48m^3 elevated water tanks, water will be fed to each building from this tank. For the other three (3) facilities, the following installation will be carried out.

1) Mbale RRH:

   City water will be supplied. Since operating and X-ray unit and other buildings (maternity) are separate, two tanks (1 unit each)—one receiving and one elevated water tank—will be installed.

2) Tororo GH:

   City water will be supplied. One receiving tank and one elevated water tank will be installed for the newly constructed buildings.

3) Masafu GH:

   Water will be supplied from a village-managed well to be newly constructed. The Project will cover the part from the receiving tank.

For all hospitals, receiving tanks will be installed underground; whereas, an elevated water tank will be installed on a steel trestle. Electric hot water heaters will be installed only in the delivery room.

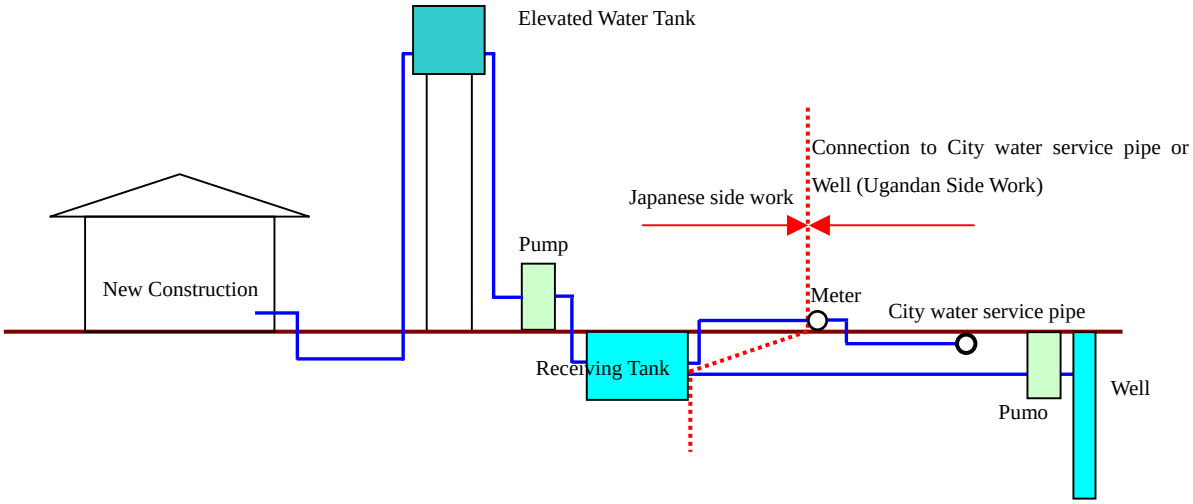


Figure 2-3 Conception of Water Supply

2) Fire Extinguishing Installation (together with fire extinguisher)

Emergency bells, fire hydrants and extinguishers will be installed in order to provide effective fire fighting during the early stage of fire.

3) Drainage System

A public sewerage system has not yet been laid around each target site except for Mbale RRH, so that septic tanks and soak pit process drainage is in use. Accordingly, a similar method will be adopted for drainage discharges from buildings to be newly constructed at this time. Drainage discharges from the Mbale RRH will be connected to the municipal sewerage system.

4) Plumbing (Sanitary) Fixtures

Since damage to plumbing fixtures is often observed at existing hospitals, products with good durability will be adopted. Toilets for patients will be Turkish type so that daily cleaning is easy. OPD will have toilet for handicapped people. WC for hospital staffs and handicapped people, pregnant women will be western style, with that of private patient bedrooms.

(4) Air Conditioning and Ventilation System

Although natural ventilation will be applied in principle, exhaust wall fans will be installed in the operation rooms and dark rooms. This is because highly volatile gas for anaesthesia and developer are utilized in the operation theatres and dark rooms respectively. Air will be supplied via a louver on a door leaf.

2-2-2-6 Construction Materials Plan

(1) Basic Policy

When viewing supply conditions of construction materials in Uganda, although structural materials (cement, aggregates and some reinforcement bars) and some finishing materials (such as bricks, wood and furniture) are domestically produced, many materials used are imported from various countries. In the case of formulating a construction materials plan, the following matters will be regarded to be basic policies by taking various conditions of climate, local construction situations, a construction period, a construction cost and maintenance cost into account, and at the same time, by examining the contents shown in 2-2-1-3 Design Policy.

- Locally procurable products should be adopted in principle in due consideration of cost reduction and harmony with existing facilities. However, concerning products which have problems with quality and production quantity, relevant products will be imported.
- Selecting products with good durability and easy maintenance shall reduce maintenance cost.
- Construction materials should fully display their function at a hospital.
-

(2) Materials Selection

1) Structural Materials

Walls will be composed of the frame of reinforced-concrete Rahmen (rigid frame) and bricks infill. A sloping roof will be constructed using steel frames for durability, not a wooden truss that is common in the area.

The Specified Design Strength of concrete (foundation, underground beams, dirt floor slabs, pillars and beams) will be standard 21Mpa. Since a ready-mixed concrete plant does not exist near the targeted sites, field mixing has to be done by installing a mixer at each site. Fine aggregates (sand) and coarse aggregates will be supplied from areas surrounding the sites; whereas, cement will be imported from Kenya. The British Standard (BS) will be applied to deformed reinforcing bars and steel frame.

2) Outside Finishing Materials

(i) External Wall Finishing Materials

After applying double-framed brick walls for external walls, waterproofing will be applied to the lower part. Coating with good durability and easy maintenance will be selected among locally-produced materials. With respect to the plasterwork which is substrate, scrupulous attention should be given when mixing mortar and the curing period in order to prevent problems such as cracks or delamination (segregation) from occurring.

(ii) Roofing Materials

There are very few terraced roofs in Uganda and most are mildly sloping roofs. Steel sheets are frequently

utilized as materials, followed by red clay roofing tiles. The Project will also adopt sloping roofs in due consideration of the rainfall and harmony with the surrounding landscape. As for the finishing material, galvanized sheet roofing or red clay roofing tiles will be applied depending on the surrounding existing buildings. In addition, although terraced roofs will be applied in some parts such as connecting passageways (corridors), considering the strong sunlight experienced near the equator, brick cover sheets will be installed on asphalt sheet waterproofing.

(iii) Exterior Sashes

In due consideration of durability, fitting accuracy, waterproofing and air tightness, aluminium sashes will be utilized. Although there are an overwhelming number of steel sashes, and the local construction method in Uganda is steel-framed *jalousie* windows, there are problems with maintenance from a long-term perspective; so these will not be utilized. Fanlights and wire screen s will be attached to the upper part in order to ensure constant natural ventilation.

3) Interior Finishing Materials

(i) Floor Materials

The most popular floor finishing method in Uganda is a mortar trowel finish, followed by ceramic tiles. In consideration of cost reduction, durability and easy maintenance, mortar trowel finish including colour pigment will be employed.

(ii) Wall Materials

Motor + painting finish will be applied to the brick substrate following the standard method in Uganda. Since problems faced with external walls may also occur on interior walls, sufficient attention should be given to plaster work. Maintenance inside each room should be taken into account and tile finish that can be easily wiped will be applied to spandrel walls or full-face (overall) walls in rooms such as operating rooms or refuse disposal rooms where contaminated objects may adhere.

Reinforced concrete walls, lead glass and fittings will be installed in X-ray rooms in order to minimize the impact of radioactive rays on patients and medical staff. Moreover, corner guards and stretcher guards will be installed in places where it is feared stretchers may collide with protruding corners in hallways or rooms.

(iii) Ceilings

Suspended ceiling system is widely used in Uganda so that the Project will finish the ceilings using T bar + rock wool acoustic absorption boards due to their sound dampening ability and heat insulation properties. A ceiling type that can be easily wiped off will be applied in ordinary rooms; whereas, a type that can be directly cleaned will be applied around watered zones such as operation rooms where water is frequently utilized.

(3) Main Materials Plan

Based on the above-mentioned examination, a main materials plan is described in the following table.

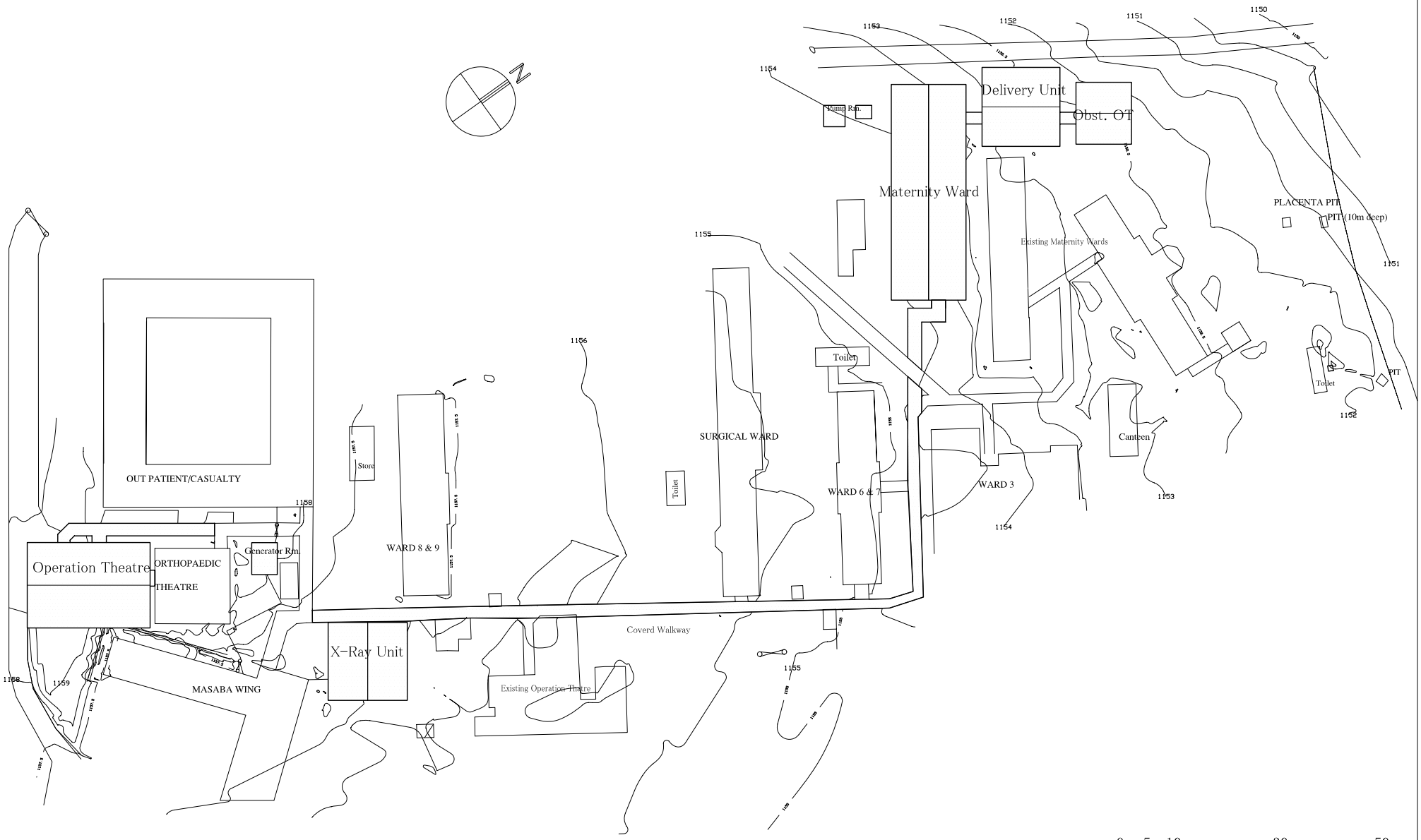
Table 2-23 Major Finish Materials

Structure		Reinforced concrete frame and steel truss for roofing				
Eaves height		3200				
Exterior	Roof	Steel Truss (Corrugated sheet＋Red clay roof tile/Corrugated sheet)				
	Eaves	Non-finish				
	Wall	Mortar ＋EP				
	Window	Aluminium window				
	Door	Steel or Alminium door				
	Outside floor	Mortar trowel finish				
Interior	Room	Operation, Obstetric Operation	Sterl. Sluice Delivery Plaster	WC Shower	Ward OPD,Clinic,Lab.	X-ray
	Floor	Mortar trowel finish				
	Base	Mortar trowel finish				
	Wall	Brick				RC
	Spandrel	Ceramic Tile(150)		Mortar ＋AEP		
	Wall (Upper)	Ceramic Tile(150)	Mortar ＋AEP			
	Door	Wooden Door				Steel Door
	Ceiling	Rock wool Acoustic board			Rock wool Acoustic board	
	Ceiling Height	3000				

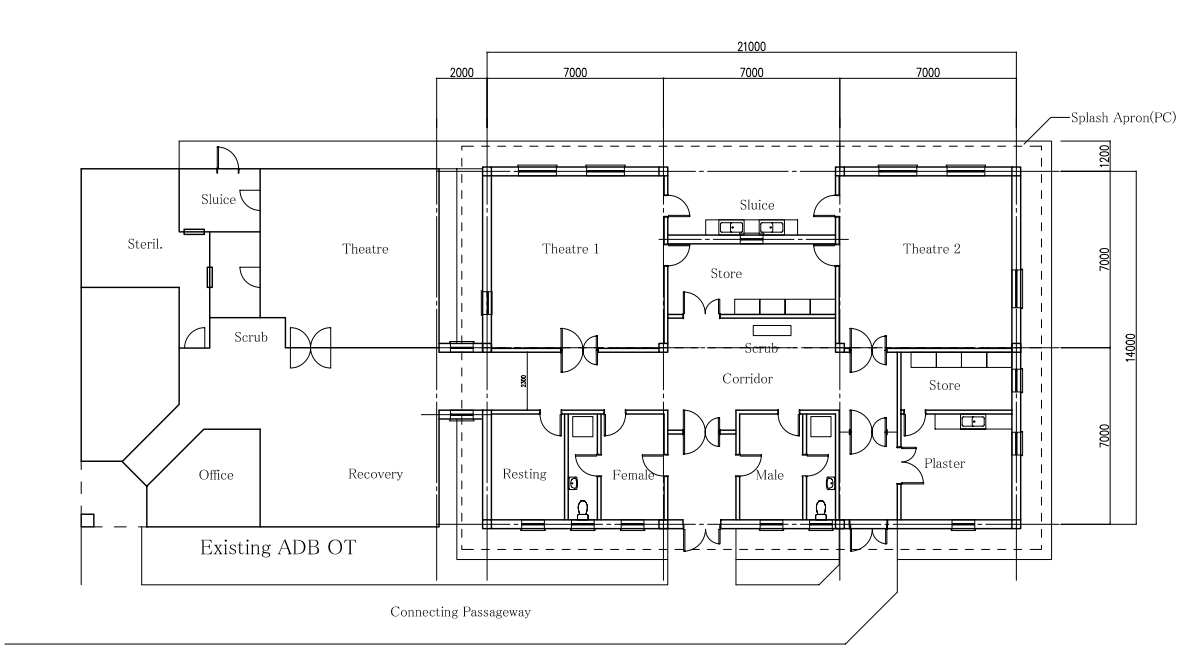
2-2-3 Basic Design Drawings and Equipment List

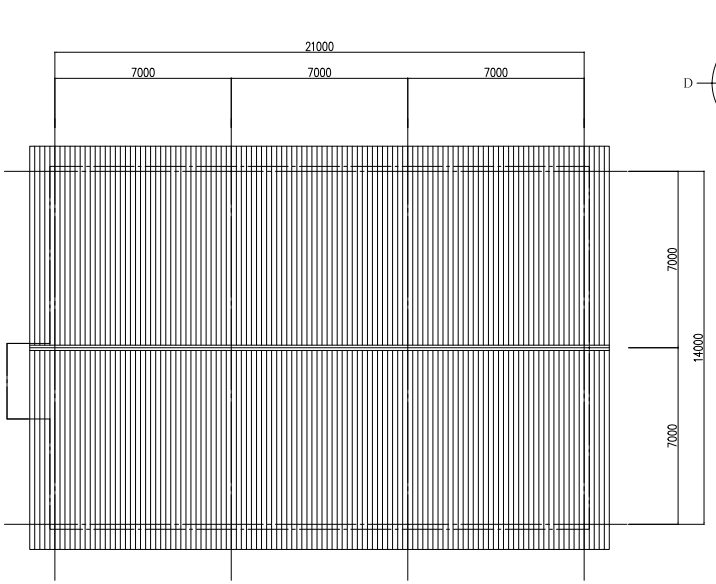
2-2-3-1 Basic Design Drawings

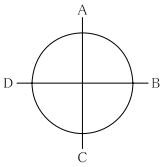
Hospital	Drawings	Scale	Remarks
Mbale RRH	Site Plan	1/1,000	
	OT	1/300	
	X-ray Unit	1/300	
	Maternity Ward	1/300	Female Ward of Tororo GH has the same plan.
	Delivery Unit	1/300	Delivery Unit of Tororo GH has the same plan.
	Obstetric OPT	1/300	
Bududa GH	Site Plan	1/1,000	
	OPD Plan	1/300	
	OPD Elevation	1/300	
	OT	1/300	OT of Tororo GH has the same plan.
	Delivery Unit	1/300	
Tororo GH	Site Plan	1/1,500	
	OPD Plan	1/300	
	OPD Elevation	1/300	
Masafu GH	Site Plan	1/1,000	
	OPD Plan	1/300	
	OPD Elevation	1/300	
	Maternity Ward	1/300	
	Female/Paediatric Ward	1/300	
Common	Standard Section	1/75	

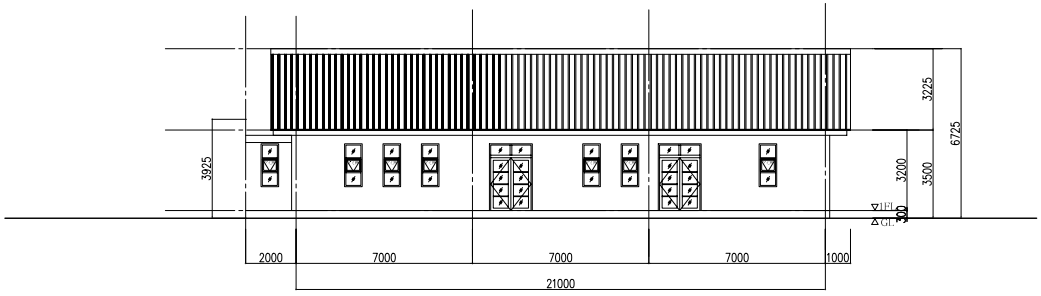


THE PROJECT FOR REHABILITATION OF HEALTH FACILITIES AND SUPPLY OF MEDICAL EQUIPMENT IN MBALE, TORORO, BUGIRI AND BUSIA DISTRICTS IN THE REPUBLIC OF UGANDA	Mbale RRH		Site Plan DRAWINGS 1 SCALE 1:1000

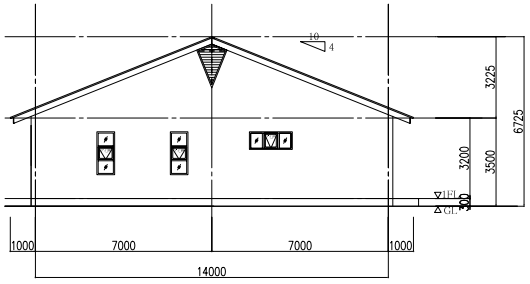






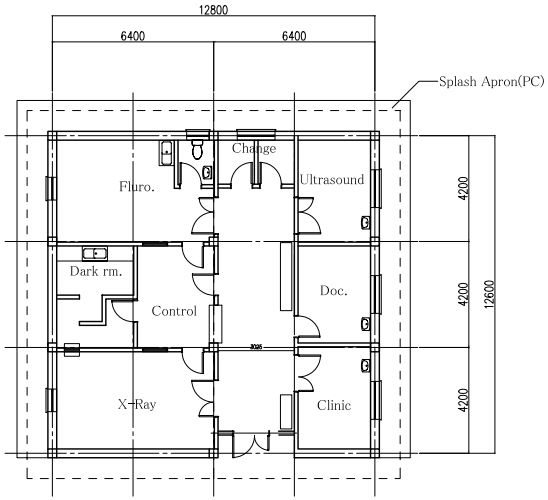


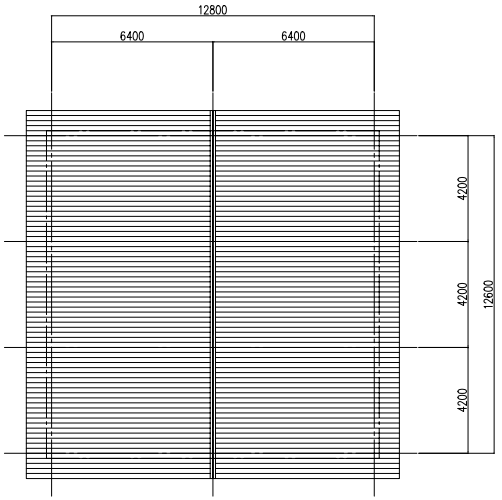
C Elevation

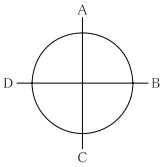


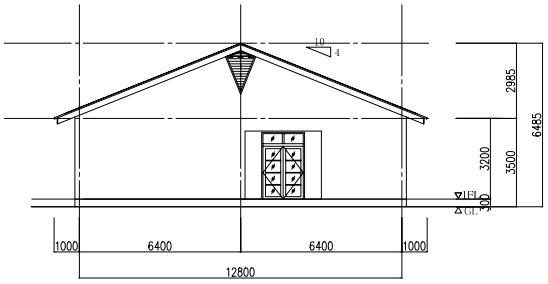
B Elevation

THE PROJECT FOR REHABILITATION OF HEALTH FACILITIES AND SUPPLY OF MEDICAL EQUIPMENT IN MBALE, TORORO, BUGIRI AND BUSIA DISTRICTS IN THE REPUBLIC OF UGANDA	Operation Theatre, Mbale RRH		Plan & Elevation
		SCALE 1:300	DRAWINGS 2









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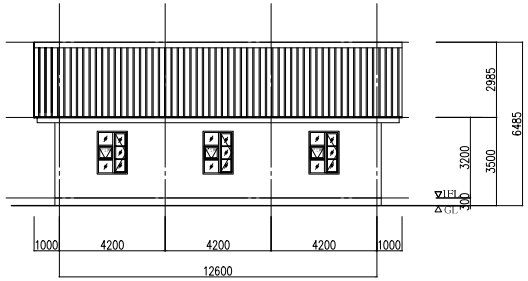
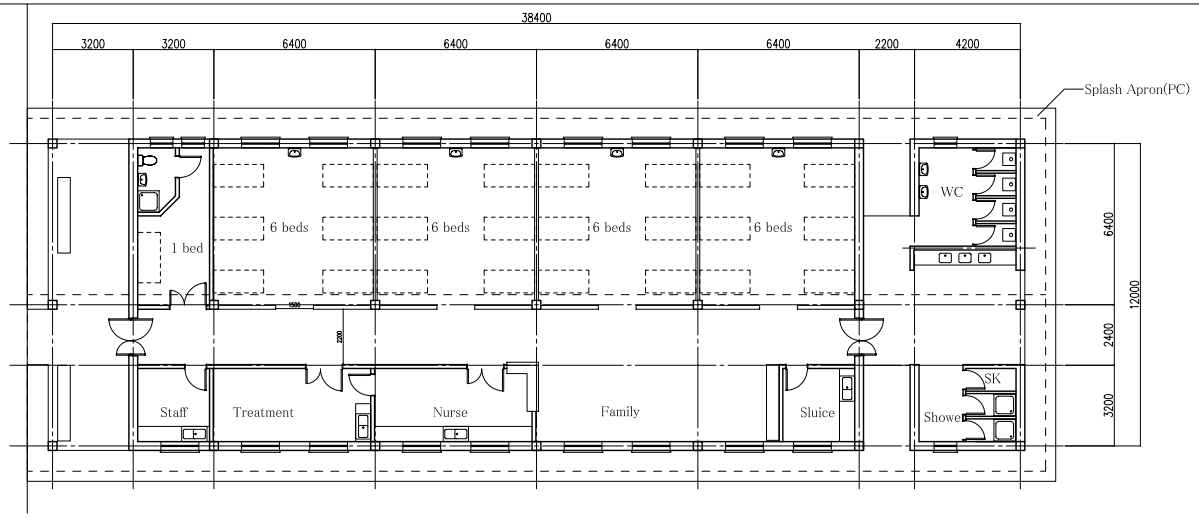
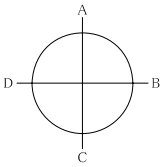
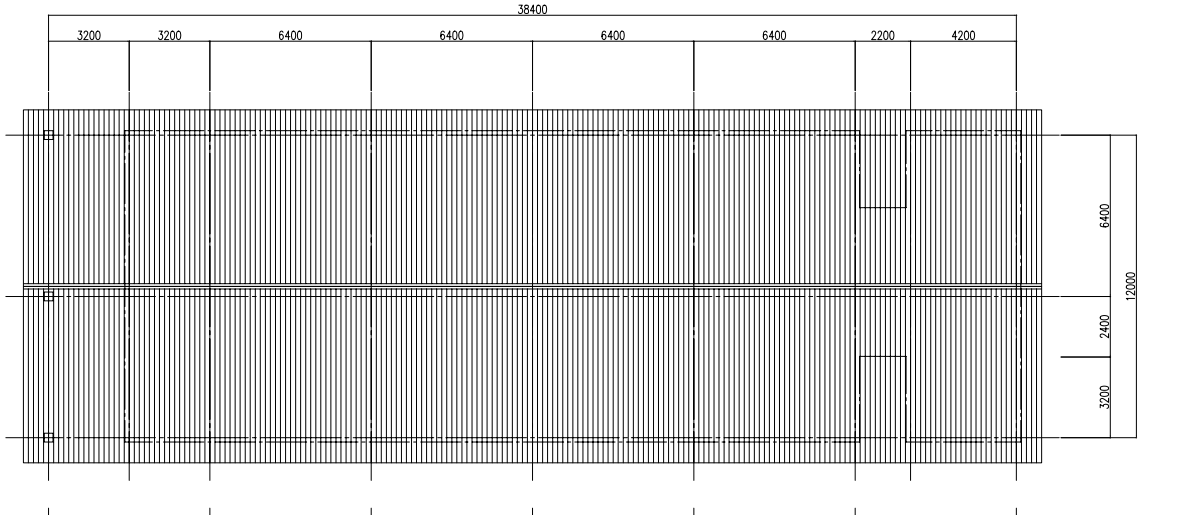


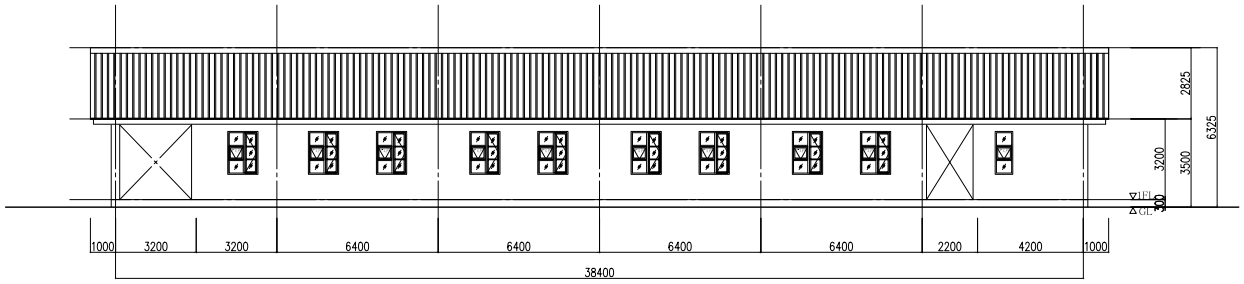
B Elevation

THE PROJECT FOR REHABILITATION OF HEALTH FACILITIES AND SUPPLY OF MEDICAL EQUIPMENT IN MBALE, TORORO, BUGIRI AND BUSIA DISTRICTS IN THE REPUBLIC OF UGANDA	X-Ray Unit, Mbale RRH		Plan & Elevation	DRAWINGS 3
			SCALE 1:300	

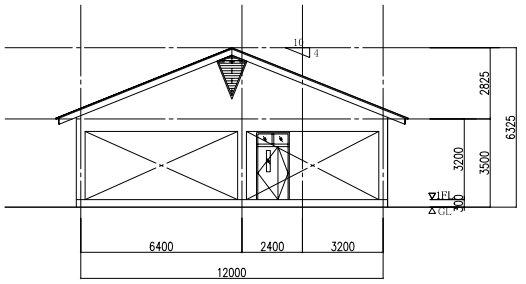






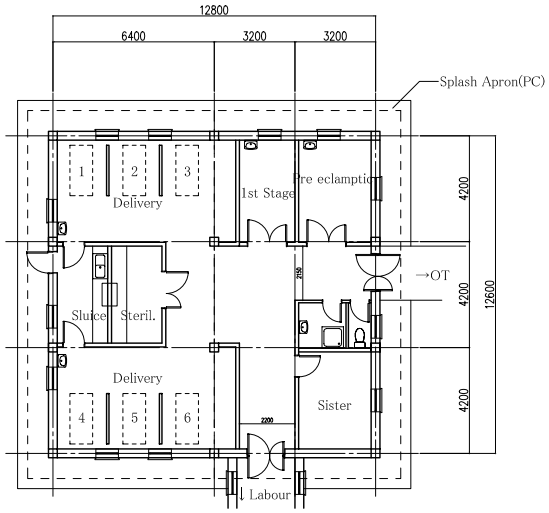


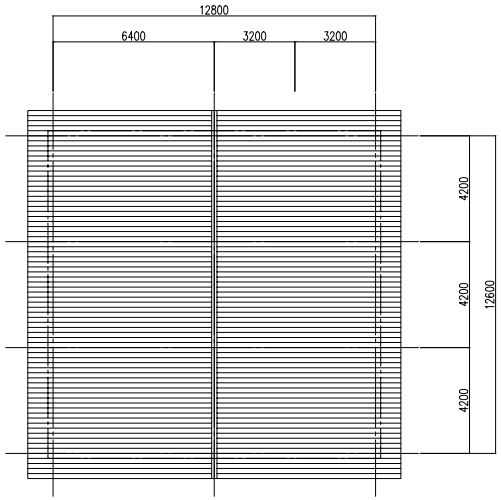
C Elevation

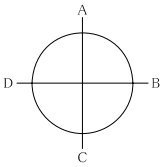


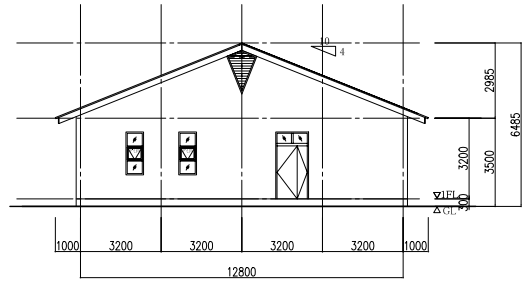
D Elevation

THE PROJECT FOR REHABILITATION OF HEALTH FACILITIES AND SUPPLY OF MEDICAL EQUIPMENT IN MBALE, TORORO, BUGIRI AND BUSIA DISTRICTS IN THE REPUBLIC OF UGANDA	Maternity Ward (25Beds), Mbale RRH		Plan & Elevation SCALE 1:300
			DRAWINGS 4









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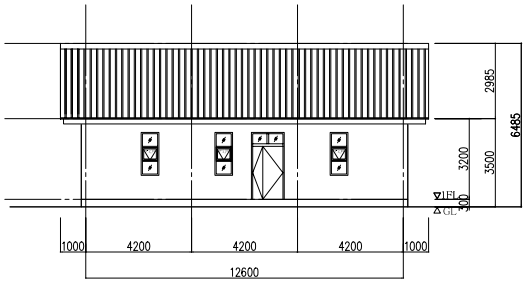
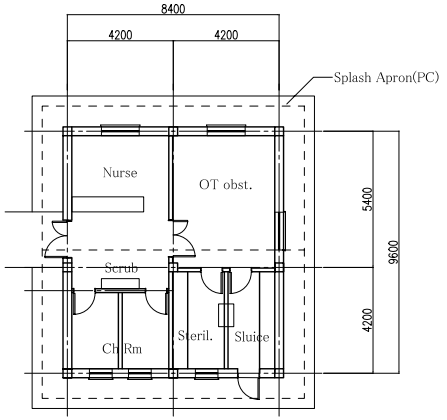
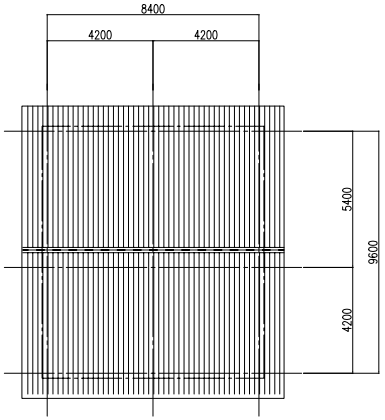
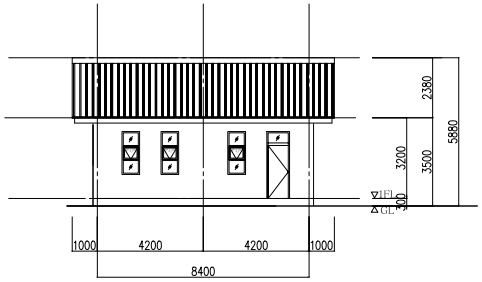


B Elevation

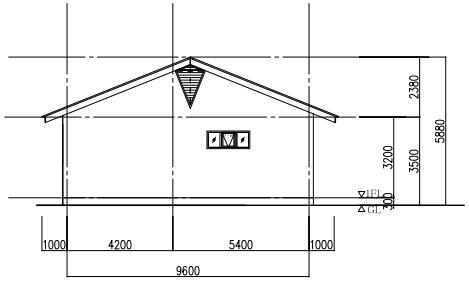
THE PROJECT FOR REHABILITATION OF HEALTH FACILITIES AND SUPPLY OF MEDICAL EQUIPMENT IN MBALE, TORORO, BUGIRI AND BUSIA DISTRICTS IN THE REPUBLIC OF UGANDA	Delivery Unit, Mbale RRH		Plan & Elevation
		SCALE 1:300	DRAWINGS 5





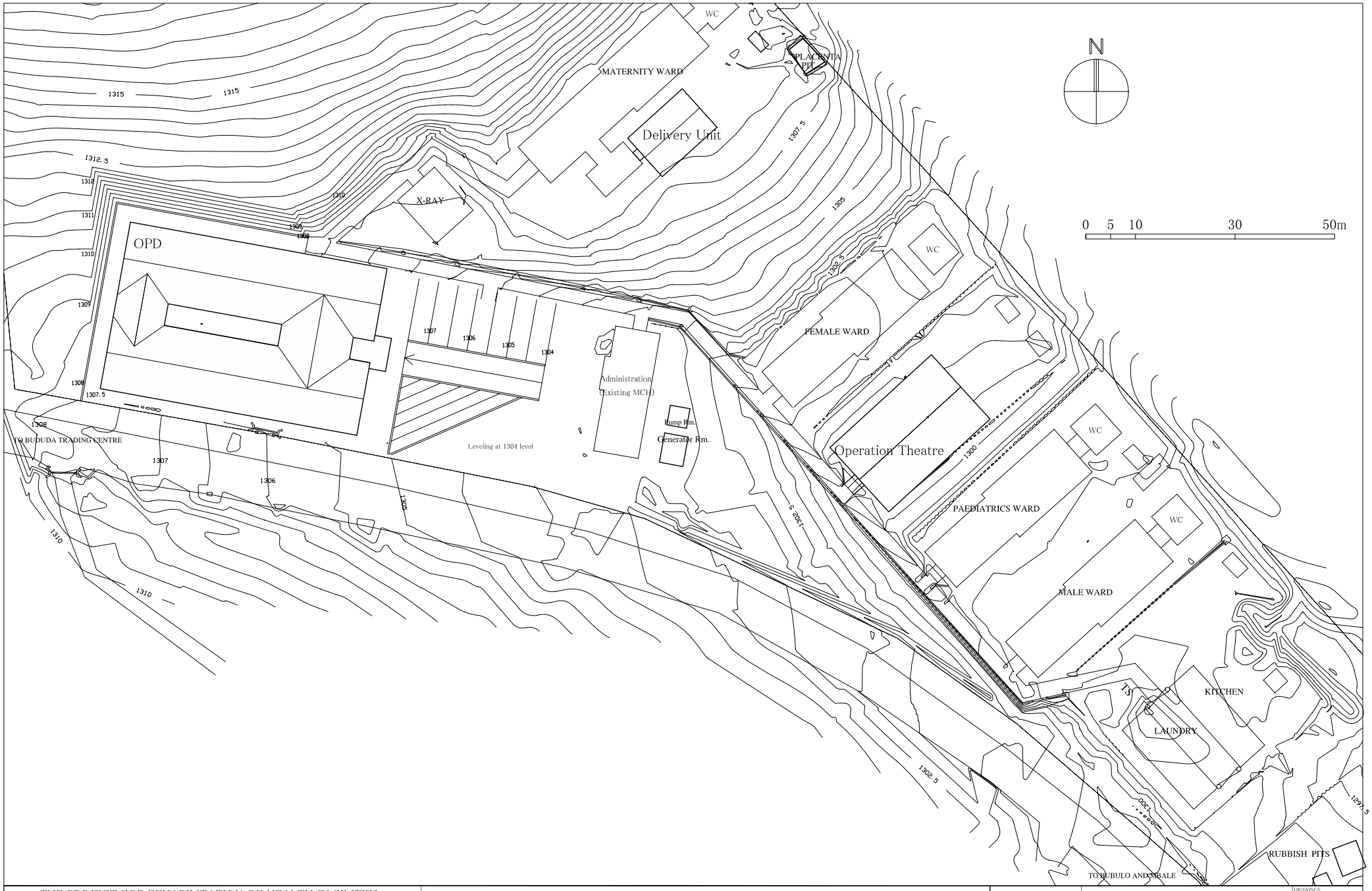


C Elevation

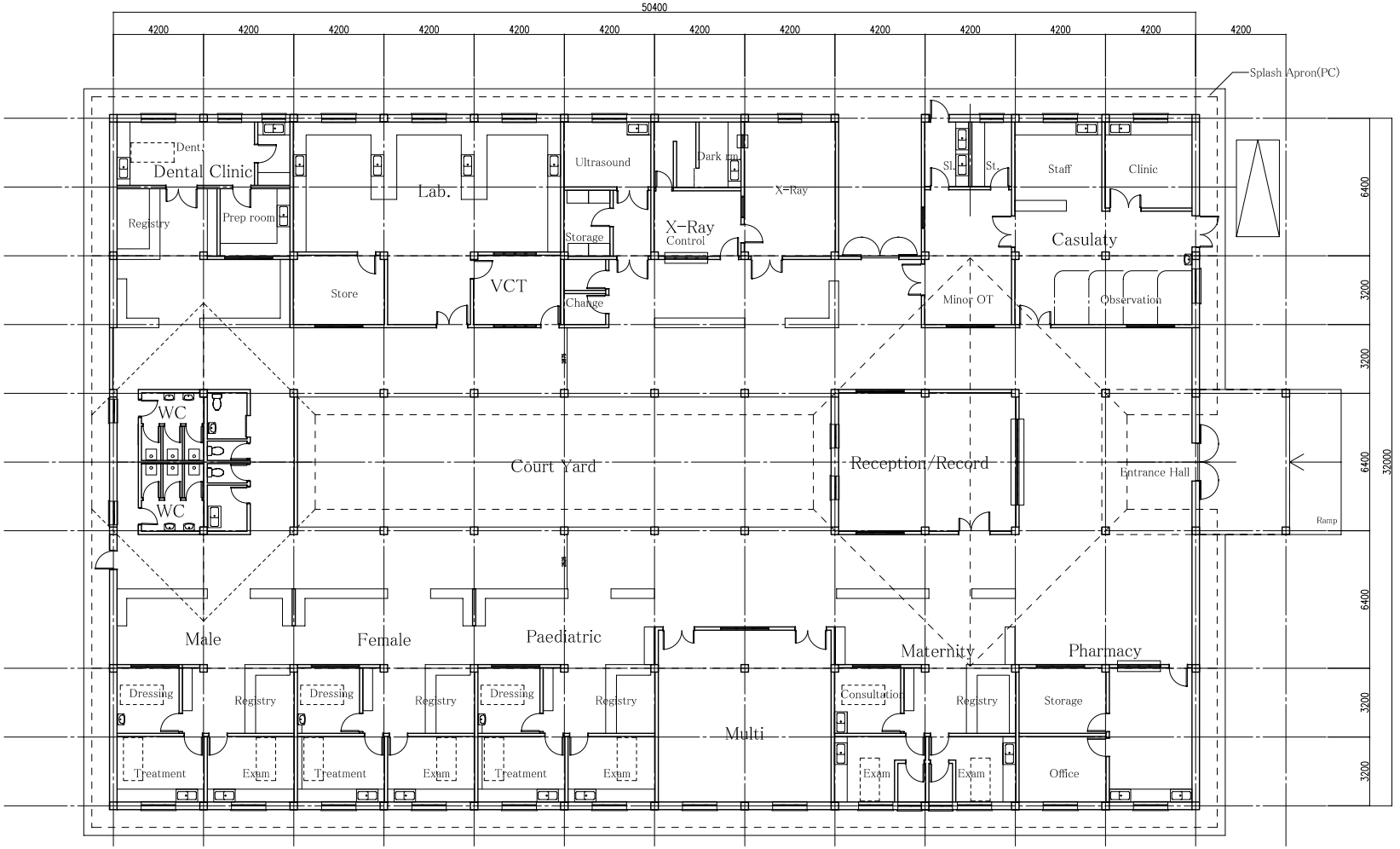


B Elevation

THE PROJECT FOR REHABILITATION OF HEALTH FACILITIES AND SUPPLY OF MEDICAL EQUIPMENT IN MBALE, TORORO, BUGIRI AND BUSIA DISTRICTS IN THE REPUBLIC OF UGANDA	Obstetric Operation Theatre, Mbale RRH		Plan & Elevation	DRAWINGS 6
			SCALE 1:300	



THE PROJECT FOR REHABILITATION OF HEALTH FACILITIES AND SUPPLY OF MEDICAL EQUIPMENT IN MBALE, TORORO, BUGIRI AND BUSIA DISTRICTS IN THE REPUBLIC OF UGANDA	Bududa GH	Site Plan	DRAWINGS 7
		SCALE 1:1000	


50400
4200
Splash Apron(PC)
Dent.
Dental Clinic
Registry
Prep room
Lab.
Store
VCT
Ultrasound
Storage
Change
Dark rm.
X-Ray
Control
X-Ray
St.
St.
Staff
Clinic
Casualty
Minor OT
Observation
WC
WC
Court Yard
Reception/Record
Entrance Hall
Ramp
Male
Female
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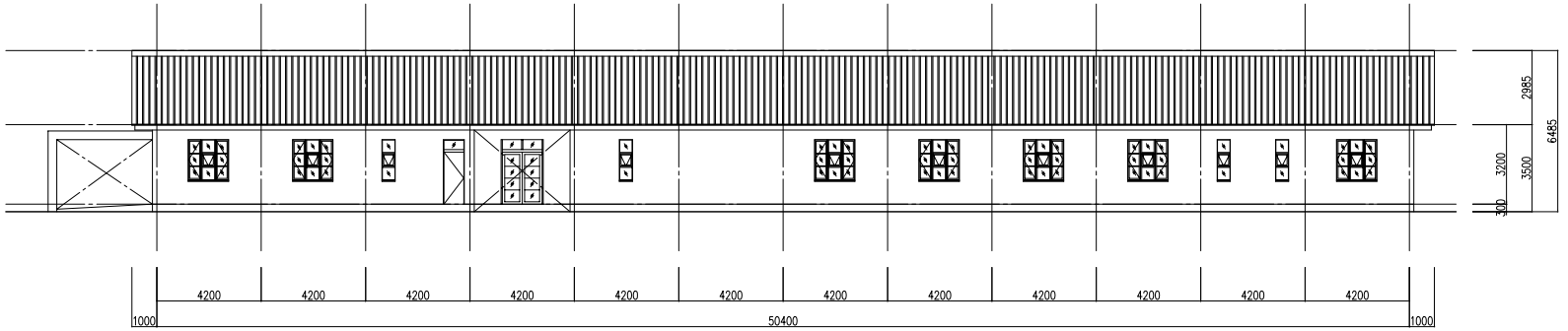
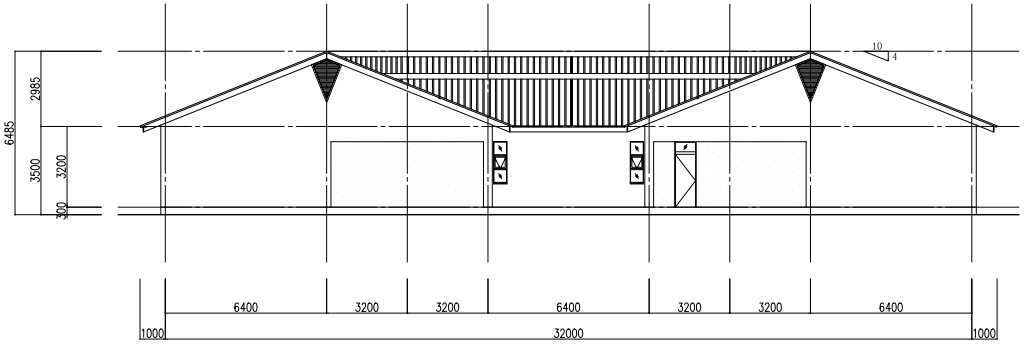
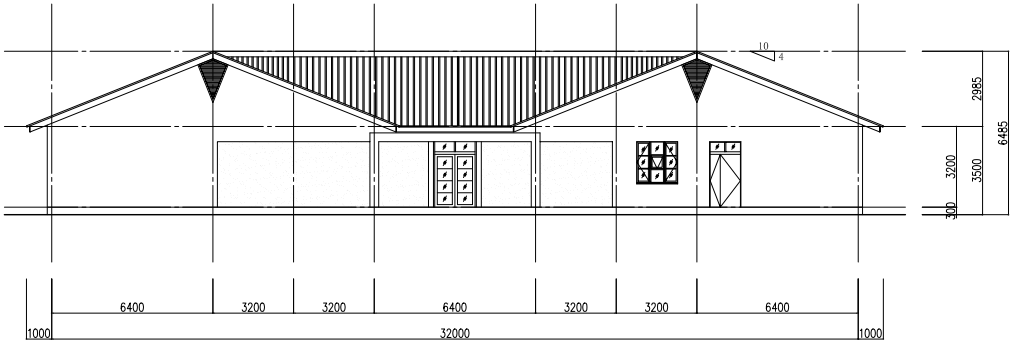
Exam
Multi
Consultation
Storage
Office
6400
3200
32000



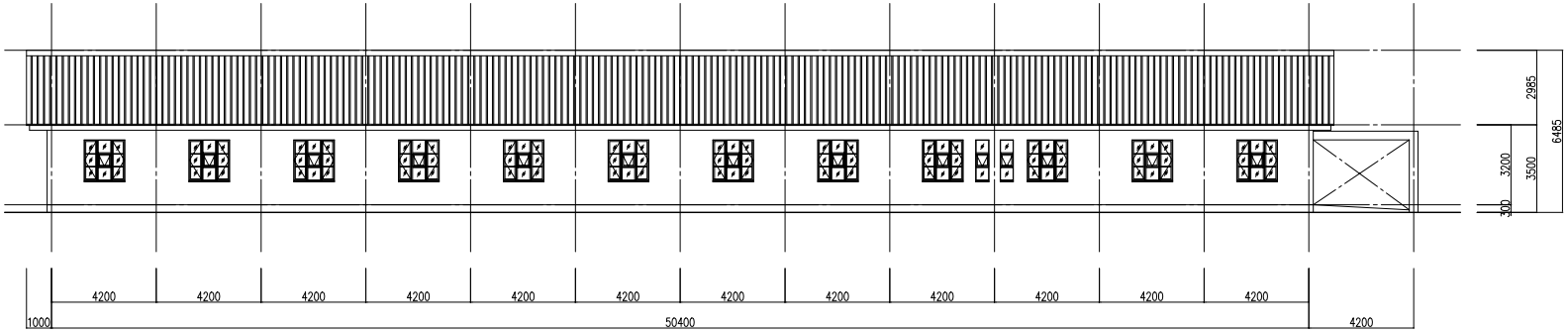
A Elevation



D Elevation

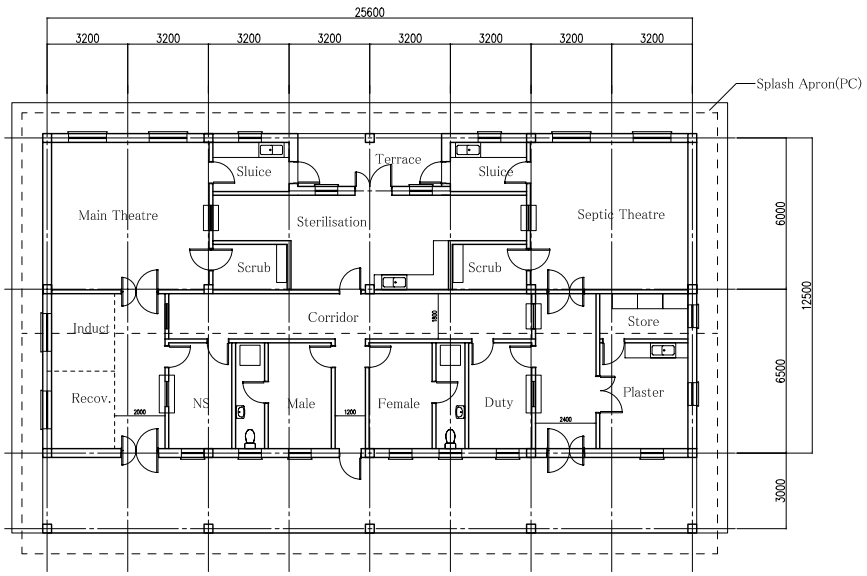


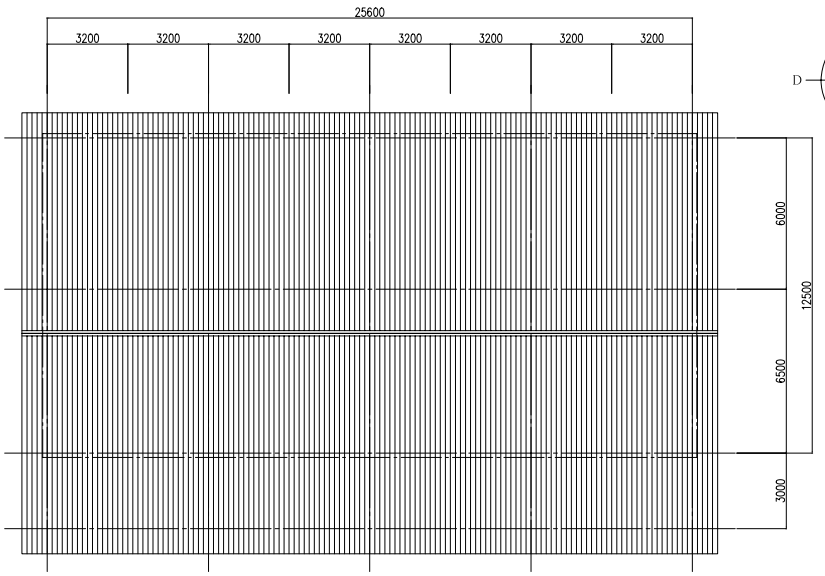
B Elevation

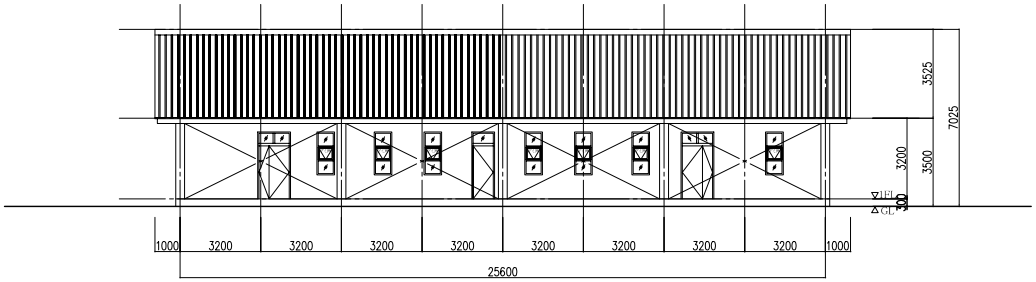


C Elevation

THE PROJECT FOR REHABILITATION OF HEALTH FACILITIES AND SUPPLY OF MEDICAL EQUIPMENT IN MBALE, TORORO, BUGIRI AND BUSIA DISTRICTS IN THE REPUBLIC OF UGANDA	OPD, Bududa GH		Elevation SCALE 1:300
			DRAWINGS 9







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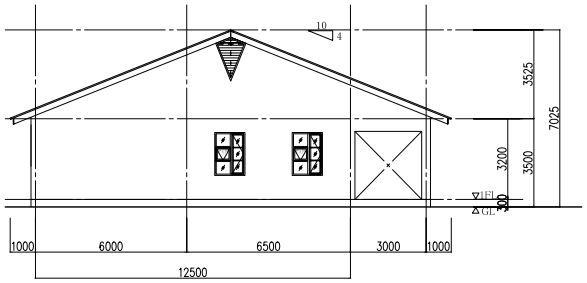
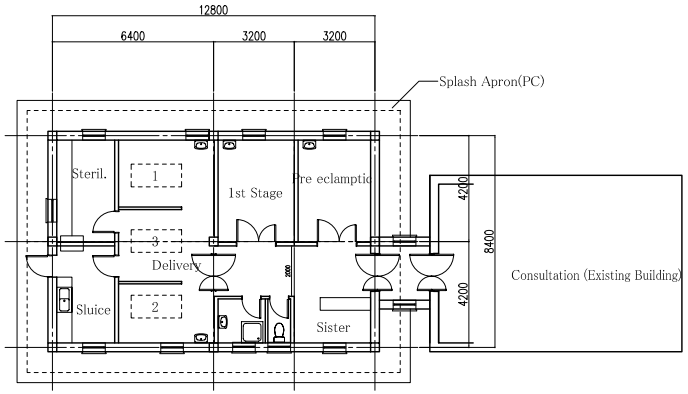
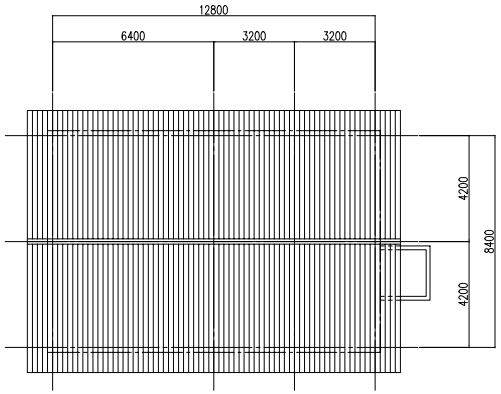
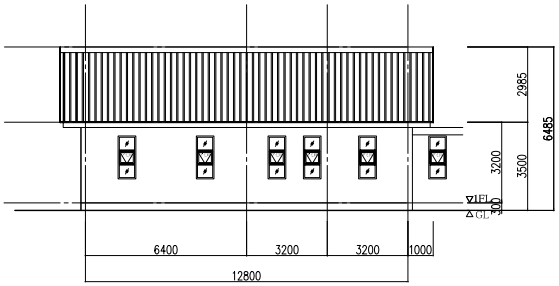


D Elevation

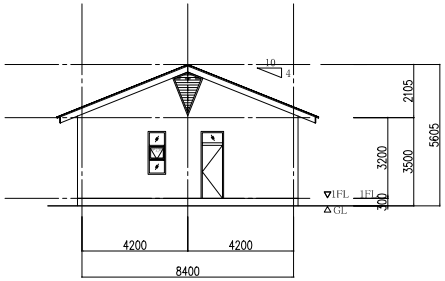
THE PROJECT FOR REHABILITATION OF HEALTH FACILITIES AND SUPPLY OF MEDICAL EQUIPMENT IN MBALE, TORORO, BUGIRI AND BUSIA DISTRICTS IN THE REPUBLIC OF UGANDA	Operation Theatre, Bududa GH		Plan & Elevation	DRAWINGS 10
			SCALE 1:300	







C Elevation



D Elevation

THE PROJECT FOR REHABILITATION OF HEALTH FACILITIES AND SUPPLY OF MEDICAL EQUIPMENT IN MBALE, TORORO, BUGIRI AND BUSIA DISTRICTS IN THE REPUBLIC OF UGANDA	Delivery Unit, Bududa GH		Plan & Elevation	DRAWINGS 11
			SCALE 1:300	