MINISTRY OF HEALTH
THE KINGDOM OF CAMBODIA

PREPARATORY SURVEY REPORT
ON
THE PROJECT FOR IMPROVEMENT OF
SVAY RIENG PROVINCIAL REFERRAL HOSPITAL
IN
THE KINGDOM OF CAMBODIA

February, 2015

JAPAN INTERNATIONAL COOPERATION AGENCY

AZUSA SEKKEI CO., LTD.
INTEM CONSULTING, INC.

PREFACE

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey and entrust the survey on the Project for Improvement of Svay Rieng Provincial Referral Hospital in the Kingdom of Cambodia to the consortium consist of Azusa Sekkei Co., Ltd. and INTEM Consulting, Inc..

The survey team held a series of discussions with the officials concerned of the Royal Government of Cambodia, and conducted a field investigations. As a result of further studies in Japan, 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.

Finally, I wish to express my sincere appreciation to the officials concerned of the Royal Government of Cambodia for their close cooperation extended to the survey team.

February, 2015

Takao TODA
Director General,
Human Development Department
Japan International Cooperation Agency

Summary

Summary

① Outline of the Recipient Country

1) Geographical and Climatic Conditions

The Kingdom of Cambodia (hereinafter referred to as Cambodia) is a constitutional monarchy, which became independent from France in 1953, located in the southwest of Indochinese peninsula. The land area is 181,035 km^2 (approximately a half size of Japan) and has borders with Thailand, Vietnam and Laos.

The Köppen climate classification of Svay Rieng is savanna climate (Aw), with the rainy season of each year generally lasting from May to November, and the dry season from December to April. Ninety percent of the annual rainfall of 1,800 mm falls during the rainy season. The period from the last half of the dry season in March until the rainy season starts in May is one of intense heat, and while the average temperature during the dry season is around 30ºC, high temperatures can exceed 38ºC during the rainy season. Like Phnom Penh, Svay Rieng is located inland and receives nearly the same average annual rainfall of around 1,800 mm. Humidity is relatively high at 80 to 90 percent. Most typhoons expire along the Vietnamese coastline, and hardly any reach Cambodia.

2) Socio-Economic Conditions

After the end of the civil war, Cambodia has been achieving smooth economic growth and poverty reduction through the full-scale reconstruction of the devastated nation with the assistance of international society. The reconstruction got into stride after signing of Paris Peace Accord in 1991, carrying out the first parliamentary election in 1993 and joining as a member of ASEAN in 1999. GDP annual growth rate reached an average of 6.2%(IMF) from 1991 to 1999. Although there was the Asian Financial Crisis, the country is continuing to grow after the Hun Sen administration established and the country regained political stability. GDP growth rate in Cambodia reached an average of 7.9% (IMF) from 2004 to 2013.

The industrial composition based on GDP is agriculture (33%), sewing (9.9%), construction (6.5%) and tourism (4.6%) (Ministry of Economy, Trade and Industry). Although the ratio of primary industry such as agriculture is still high, manufacturing industry and service industry are also growing recently, and the direct investment from abroad is increasing. Recently, the direct investment from Japan is increasing rapidly, with the amount of 320 million US dollars of authorized investment amount (The Council for the Development of Cambodia, CDC) from the Japanese-affiliated companies in 2012, due to the low labor cost as well as the easy access to surrounding countries and a large number of developed industrial parks. Similarly, the companies from China, Taiwan and Japan is expanding into the Special Economic Zone in Svay Rieng Province. The town near Vietnam border carries a huge number of casino hotels. The improvement of traffic network is also progressing to meet the increasing traffics along the development.

Along with the economic growth, the poverty rate decreased rapidly from 35% (2004) to 14% (2014). On the other hand, the new problem have arisen that the gap between the rich and the poor is widening. “National Social Protection Strategy for the Poor and Vulnerable (2011)” aiming for poverty prevention and

improvement in access to the health, nutrition and education, Cambodia is also proceeding to expand the outreach funds and social securities also in healthcare sector. In order to accelerate further democracy, a variety of efforts are required such as the redistribution of wealth by introducing new taxation system, anticorruption measures, reform of the electoral system, etc.

Development of basic infrastructure, especially in remote area, is lagging behind. It has been a long term issue to have a big gap in health sector as well between Phnom Penh and remote areas, due to the lack of medical staff, hospital facilities and equipment. Although the Human Development Index of Cambodia is ranked 136th out of 186 countries all over the world, the improvement of health index is way behind that of neighboring countries. The crucial damages to healthcare service foundation including the lack of human resources during the civil war has been improving gradually, however, the number of high professionalized human resources and provision of high quality services is still insufficient in remote areas, therefore the improvement of those are one of the big future issues.

② Background and Outline of the Request for Japan's Grant Aid Assistance

As a result of the persecution of medical personnel and the destruction of medical equipment and facilities due to civil war in the Kingdom of Cambodia (hereinafter called "Cambodia") since the 1970s, the nation's health care system has experienced collapse. After the end of the civil war, health indicators improved through assistance from donors; e.g. the maternal mortality rate was lowered from 472 (per 100,000 births) in 2005 to 206 (per 100,000 births) in 2010. However, there is still room for improvement in comparison with surrounding countries.

Svay Rieng Province is located 122 km southeast of Phnom Penh on National Highway 1. In addition to bordering the Prey Veng Province on the west, it also shares a border with Vietnam, covering an area of 2,966 km^2 (1.36 times the size of Tokyo). The population of Svay Rieng Province is approximately 594,000 (in 2014)[1], and nearly 60% of that population is concentrated along National Highway Route 1. Thirty-nine (39) km east of the provincial capital Svay Rieng on the border with Vietnam, 11 Special Economic Zones (SEZ) have been authorized near the town of Bavet, making Svay Rieng an important province in leading the economic development of Cambodia.

In terms of the health and medical care situation in Svay Rieng Province, the under-5 mortality rate is 93 per 1,000 live births (national average: 54)[2] and there are 3.5 hospital beds per 10,000 people (national average: 6.7),[3] showing that conditions are much worse than the Cambodian national averages. Thus, improving medical services in the province is an urgent issue.

On the Mekong River crossing National Highway 1, the Neak Loeung Bridge is schedule to be completed in 2015 through Japanese Grant Aid. With this, Svay Rieng will become a hub for the southern Economic Corridor for traffic from the Thai border in the northwest region of Cambodia to Vietnam via National Highways 5 and 1. Therefore, an increase in patients injured in traffic accidents associated with

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[1] *Questionnaire Answer Sheet (Svay Rieng Provincial Health Department)*
[2] *Cambodia Demographic and Health Survey 2010 (CDHS 2010)*
[3] *National Health Statistic Report 2011 (Ministry of Health of Cambodia)*

the increased traffic volume is expected. Moreover, the population increase in Svay Rieng Province has been moderate at 1.2% (2009~2014 average), but with medium to long term growth of the SEZ in the future, the provincial population may increase greatly. In turn, this will further increase the need for medical services in the future.

Opened in 1959, the Svay Rieng Provincial Hospital is the only tertiary hospital in the province. Currently with 168 beds, it has also been designated as a top referral hospital in the province. Since the 1980s, facility construction/repairs and equipment maintenance has been performed through the Ministry of Health's budget as well as aid from donors and NGOs from various countries. However, the situation is still grave with the deterioration of facilities and equipment due to age and an insufficient quantity of equipment. In buildings that have been constructed relatively recently as well, toilets are unusable due to pipe blockage. Additionally, since there are no slopes or elevators, the transport of patient using stairs makes appropriate and efficient hospital operations extremely difficult. The number of inpatients rose from approximately 5,400 in 2009 to more than 10,000 in 2013. There is a shortage of both facilities and equipment, with bed occupancy rates exceeding 100%.

In this way, the importance of Svay Rieng Provincial Hospital will continue to increase in the future as a top referral hospital in Svay Rieng Province. However, the capacity of its facilities and medical equipment are reaching their limit. Additionally, Svay Rieng Provincial Hospital, compared to other CPA3[4] provincial hospitals, is lacking of inpatient beds due to a crowded inpatients (with bed occpancy rate of 103.8%, which is ranked at bottom 3 of total 17 CPA3 provincial hospitals) and has fewer outpatients per day (61 per day, which is ranked at bottom 5) due to the deterioration and and crowded with inpatients (with bed occupancy rate of 103.8%, which is ranked at bottom 3). At this point of view, the priority of the needs of improving facilities and equipment of Svay Rieng Provincial Hospital is higher than most other CPA3 provincial hospitals.

Under these conditions, the Government of Cambodia requested grant aid from the Government of Japan for the development and maintenance of Svay Rieng Provincial Hospital, which is a top referral hospital in the province, with the purpose of improving health care conditions in the Svay Rieng Province.The upgrade of Svay Rieng Provincial Referral Hospital will directly make a major contribution to strengthening the medical referral system and improving medical services in Svay Rieng Province. It will also indirectly contribute to the training of nurses and midwives in Svay Rieng Province since practical training for the above will be conducted in the hospital. The Project is therefore assessed as being of high need and relevance.

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[4] *Complementary Package of Activities (CPA) is a guideline of primary (CPA1) to tertiary (CPA3) hospitals in Cambodia which defines the necessary medical services and equipment at each level. CPA3 hospital is a general hospital with specialty clinic such as Eye and ENT.*

③ Outline of the result of survey and contents of the Project (outline design, outlines of the facility and equipment Plan)

Based on above mentioned request, Japan International Cooperation Agency decided to conduct preparatory survey and dispatched the survey team from August 3 30, 2014. The survey team held a series of discussions with the officials concerned of the Government of Cambodia, and conducted a field investigation. As a result of further studies in Japan and the explanation of draft report from December 10 to 20, 2014, the present report was finalized.

The upgrades to Svay Rieng Provincial Referral Hospital to be implemented under this project will go a long way toward enhancing the medical care referral system and improving medical care services in Svay Rieng Province. In accordance with the request from the Ministry of Health of Cambodia and the result of field investigation and discussions, the project plan was decided including the following policies.

1) Design Policy

a) Site Selection

- For the benefit of the Cambodia side, planning will be conducted within a scope such that facilities to be demolished are kept to a minimum, and so that construction does not interfere with medical care activities.
- In order to utilize the existing buildings, they will be organically connected; paths between buildings used by patients and staff will be planned in a manner keeping distances to a minimum.

b) Facilities

- Policy for selecting target components

  The buildings of Svay Rieng Provincial Hospital scatters within the premises, but the main medical functions are concentrated in three existing buildings (Building A~C) surrounding the plaza behind the front gate. However, those three buildings are not connected with corridors and there is a problem in circulation planning between the buildings. For example, the patients on stretcher have to be transported from surgery ward or from emergency room to operation room through the plaza exposed to rain. Moreover, those three buildings, without any elevators or slopes, have also difficulty in carrying patients even inside the building. The existing buildings are also deteriorated and some wards don't have enough space with BOR exceeding 100%. The Project is designed to address to these problems. The departments which is having difficulty in providing continuous medical care services due to the deterioration or facilities or lacking of the space is selected as the target components of this Project.

  Conversely, since the grounds of the Svay Rieng Provincial Hospital are small and area of the planned construction site is limited, it will be difficult to accommodate all of the target components in the new building to be built under Japan's Grant Aid. Therefore, the departments which can be improved by simple renovation or relocation without big burden are chosen as components to be

implemented by Cambodia side and the departments requires not only simple renovation or the departments which will improve the circulation planning by relocating them in the new building will be selected as components to be included in the Japanese assistance. The Project is planned assuming that the hospital can be used effectively and efficiently as a whole by organically connecting the existing facilities through the construction of a new facility under the Project. Furthermore, departments that are targeted for cooperation by other donors will not be included in this Project to avoid overlap.

- Policy for setting the scale

Setting the target year for the Project for 3 years after its completion in 2020, the scale will be set based on the number of patients forecast for that year. The projection for the number of patients will be estimated from provincial population trends and a percentage of the number of current patients, taking the following factors into consideration:

- Natural population growth;
- Number of patients flowing in from other provinces due to the creation of new facilities;
- An increase in the number of patients due to more traffic accidents.

Since the infrastructure of the SEZ has not yet been developed, it is unlikely that it will grow dramatically by the target year. Therefore population growth due to the development of the SEZ will not be considered for setting the scale of the Project. However, since it is highly probable that infrastructure will be developed in the future and thus bringing growth to the SEZ, a facility plan will be created to accommodate this possible growth.

c) Equipment

- Equipment will be selected according to the Medical Equipment Standard for CPA 3 Referral Hospital First Edition, 2014 (Medical Equipment Standard List) formulated by the Ministry of Health, and plans will fully consider such things as technological innovations t expected to improve the effectiveness and efficiency of current clinical services.
- Taking into consideration the role played by the target hospital in its area, plans will apply to ENT, dental and laboratory departments that currently lack critical equipment, though their facility buildings are not in the scope of the project.
- Plans will keep consistency with activities of the target hospital.
- Plans will take consideration of easy maintenance for the targeted hospital by such as selecting equipment in proper level.
- Plans will avoid overlaps with existing equipment or equipment supplied by other donors to ensure efficiency.
- For essential machinery, including sophisticated equipment and that for which serious problems would arise if malfunctions occurred, maintenance management contracts will be concluded with manufacturers or local agents for 3 years after delivery. This cost will be borne by the Japanese side. Maintenance contacts will include 2 types of service: periodic inspection service, for which a technician will visit the hospital at regular intervals to inspect and calibrate

equipment, and on-call service, for which equipment inspection will be conducted at the request of the user when equipment fails, etc. Additionally, the on-call service will consist of the dispatch of a technician and/or technical services for troubleshooting only. If a part must be replaced, the cost of this will be borne by the hospital side. However, during the manufacturer's 1-year warranty period, all costs, including the replacement of parts, will be borne by the manufacturer.

2) Details and Scale

a) Facilities

Planned facilities consist of Main Building which contains Outpatient Department, Emergency Department, Imagery Department, Operation Department, OB/GY Department, Administration Department, etc. The major contents, structure and floor areas are as shown in Table- i.

Table i Contents of the Project (Facilities)

Building	Detailed Structure	Department	Major Rooms	Floor Area
Main Building	Reinforced Concrete, 3 stories building	OPD	Consultation room, Staff Room, Counseling Room, Patient Waiting, Pharmacy, etc.	134.47m^2
		ER	Consultation & Treatment Room, Observation Room, Special Observation Room, Family Waiting, Shower Room, etc.	174.93m^2
		Imagery Dept.	X-ray Room, Ultrasound Room, ECG Room, Staff Duty Room, Film Storage, etc.	121.42m^2
		Operation Dept.	Operation Theater, ICU, Recovery Room, Sterilization Room, Conference Room, Equipment Storage, etc.	816.64m^2
		Obstetrics Dept.	OB Ward (8 beds, 6 beds), Private Room, Labor Room, Toilet for Handicapped, Doctor's Office, Midwife Duty Room, Delivery Room, Preparation Hall, etc.	607.56m^2
		Gynecology Dept.	GY Ward (6 beds), Toilet for Handicapped, Consultation Room, Treatment Room, Doctor's Office, Counseling Room, etc.	212.44m^2
		Administration Dept.	Administration Office, Meeting Room, Laundry, Electrical Room, Pump Room, Changing Room, etc.	156.50m^2
		Others	Entrance Hall, Corridor, Stair, etc.	394.29m^2
			Total	2,618.25m^2
Slope	Reinforced Concrete		Slope connecting Main Building and existing building C, Elevated Water Tank, etc.	556.70m^2
			Grand Total	3,147.95m^2

b) Equipment

The major planned equipment are shown in Table- ii.

Table ii Major Planned Equipment

Department	Major Planned Equipment
Outpatient Dept.	Diagnostic Set, Consultation Desk, Examination Bed, etc.
Emergency Dept.	Diagnostic Set, ECG Unit, Emergency bed, etc.
ICU	Denudating Set ICU Bed, etc.
General Medicine Department	Examination Bed, Patient Monitor, Aspirator, etc.
Surgery Department	Examination Bed, Examination Lamp, Minor Surgery Instrument Set and etc.
OB/GY Department	Delivery Bed, Gynecological Examination Bed, Caesarian Set, etc.
Pediatric Department	Examination Bed, Infant Incubator, Infusion Pump, etc.
ENT Department	Examination Instrument Unit for ENT, Electric Scalpel for ENT, etc.
Dental Department	Dental Chair Unit、Dental X-ray Unit, etc.
Operation Theater	Operating Table, Shadowless Surgical Lamp, Anesthesia Machine, etc.
Imagery Department	CR System, Ultrasound Tomography Diagnostic Apparatus, ECG Unit, etc.
Laboratory	Tabletop Autoclave, Automatic Hematology Analyzer, etc.

c) Soft Component (Technical Assistance) Plan

The outline of the planned trainings under Soft Component are as shown below:

- Technical training for the CR system
- Technical training in Central Sterilization Department (CSD)
- Training in clinical techniques (fields of OB/GY and orthopedic surgery)

d) Maintenance Service for Equipment

Among the planned equipment, for some equipment (18 items) which will strongly affect the medical activities when there is a fault or the equipment which tends to fail often, both periodic inspection service for 3 years after handover and on-call service for 2 years after 1 year guarantee period shall be included in the works to be done by the Project. It is noted that the expense for replacement parts including any associated costs charged by maintenance service provider after the 1 year guarantee period shall be borne by Cambodia side.

④ Implementation Schedule and Cost Estimation

The project would be implemented in a single fiscal year, taking 7 months for the detailed design, 16 months for the construction and equipment procurement and 9 months for the soft component. The period for equipment maintenance service will last 3 years after the handover. In case of implementation by Japan's Grant Aid, the initial cost to be borne by Cambodian side is estimated as 11 million Japanese Yen.

⑤ Project Evaluation

In light of the following points, this project has recognized relevance as a focus project through Japan's Grant Aid.

1) Relevance

a) Focus of the project's benefits

The focus region of the project is Svay Rieng Province, in which the project site of Svay Rieng Provincial Hospital is located. The province has a population of 573,000 people (2013) who are the direct beneficiaries. The Neak Loeung Bridge, a Japanese grant aid project on which National Route 1 will cross the Mekong River, is scheduled for completion in 2015, and Svay Rieng Province is set to become a hub of the Southern Economic Corridor in which Route 1 links National Route 5, which runs from the Cambodian border with Thailand through Northwest Cambodia, to Vietnam. Thus, traffic is expected to increase, and with it the number of traffic casualties should also increase. The population of Svay Rieng Province grew steadily at an average rate of 1.2% from 2009 to 2014, but the mid- to long-term development of the SEZ could cause the population to increase dramatically, which would further increase the province's health and medical needs. The project will enhance the medical care referral system and greatly improve medical care services in Svay Rieng Province, therefore it is deemed to be highly relevant.

b) From a Human Security Standpoint

The project aims to enhance the healthcare services in remote area such as Svay Rieng Province, which is one of the important province to the country from the economic point of view, through the improvement of Svay Rieng Provincial Hospital to serve as a top referral hospital in the province. The project objective is in line with Japan's Strategy on Global Health Diplomacy (June 2013) and the needs of human security of the habitants of project target province. Therefore, it is highly necessary and relevant to implement the project under Japan's Grant Aid.

c) Contribution to achieving Cambodia's targets for its mid- to long-term development plan

This project exists to help strengthen the health care system (which covers the five areas of health service delivery, health care financing, human resources for health, health information systems and health system governance) illustrated in HSP2, an implementation plan that is part of the NSDP of Cambodia. Scaling up provision of CPA at referral hospitals such as Svay Rieng Provincial Hospital, and strengthening medical care services and referral systems are a part of the Health Service Delivery Strategy Components. Therefore the project is deemed to be highly relevant.

d) Consistency with Japan's Assistance Policy

Section (2) Promotion of Social Development, (b) Enhancement of Health and Medical Care of the Country Assistance Strategy for Cambodia (2011) established by the Japanese Ministry of Foreign Affairs sets forth the "investigation, maintenance and improvement of key regional hospitals through grant aid" as a priority area (central target). As the top referral hospital of Svay Rieng Province, Svay Rieng Provincial Hospital qualifies as a key regional hospital. Therefore, the project is sufficiently consistent with Japan's assistance policy.

2) Effectiveness

Below are the expected target levels of implementing this project.

a) Quantitative Effects

Table -iii Outcome Indicators for Quantitative Effects

Indicators	Current Value (2013)	Target Value (2020, three years after project completion)
Total Length of Stay for OB/GY (people-days/year)	8,899	14,281
No. of Emergency Patients (people/year)	2,056 (estimated value of 2014; 2013 data not available)	2,483
No. of Deliveries (cases/year)	2,304	3,037
No. of Outpatient Surgeries (cases/year)	609	892
No. of Outpatients in Four Key Departments (Surgical, Internal Medicine, OB/GYN, Pediatrics) (people/year)	9,736	15,994

b) Qualitative Effects

(i) The quality medical service is provided to the patients including OB/GY, Emergency and Outpatient Departments.

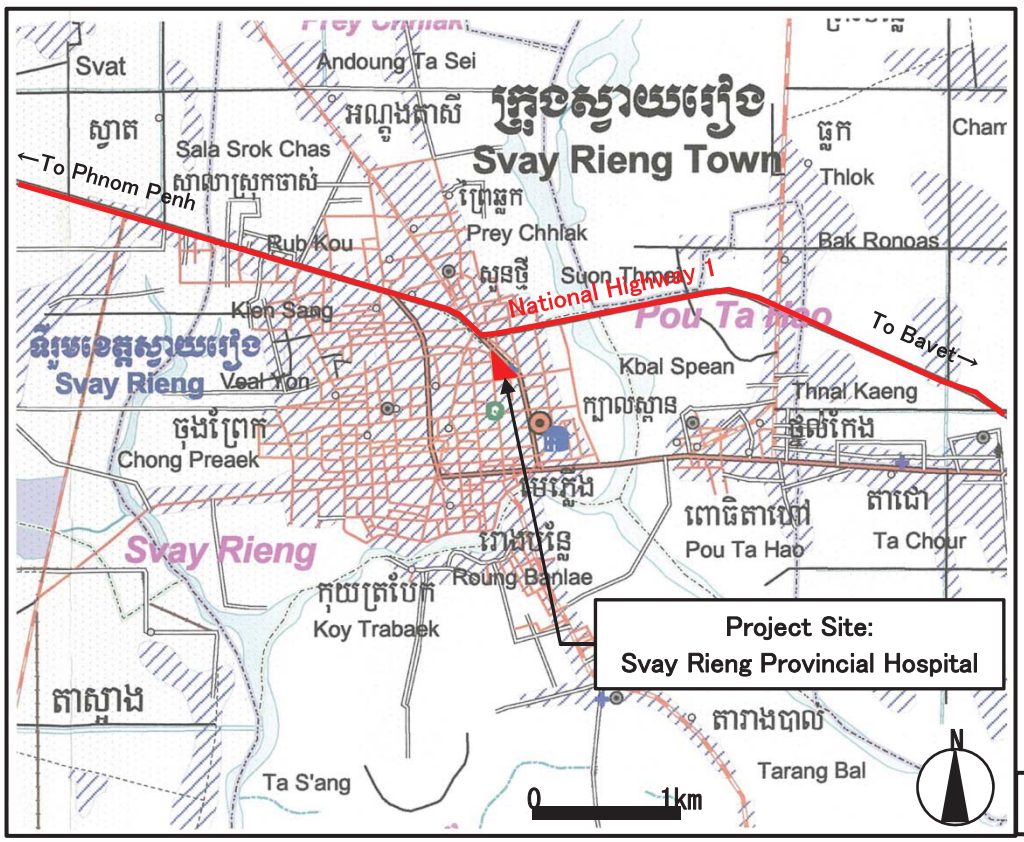
(ii) The referral system of the Svay Rieng Province is enhanced.

Contents

[Appendices]

Location Map

Map of Cambodia



Map of Svay Rieng Town

Perspective
(North-East Side Façade)

Perspective
(South Side Bird’s Eye View)

List of Figures and Tables

Abbreviations

Abbreviation	Term
ADB	Asian Development Bank
AFD	Agence Française de Développement
AIDS	Acquired Immune Deficiency Syndrome
ALOS	Average Length of Stay
AOP	Annual Operational Plan
ASEAN	Association of Southeast Asian Nations
AusAID	Australian Agency for International Development
BHN	Basic Human Needs
BOR	Bed Occupancy Rate
BTC	Belgian Technical Cooperation
CDHS	Cambodia Demographic and Health Survey
CHC	Cambodia Health Committee (NGO)
CMDGs	Cambodia Millennium Development Goals
CMS	Central Medical Store
CPA	Complementary Package Activity
CR	Computed Radiography System
DAC	Development Assistance Committee
DES	Diplóme d'études Spécialisées
DFID	Department for International Development
DU	Diplóme Universitaire
EDC	Electricite du Combodge
ENT	Ear, Nose and Throat
EIA	Environmental Impact Assessment
EoJ	Embassy of Japan
E/N	Exchange of Notes
EP	Emulsion Paint
G/A	Grant Agreement
GAVI	Global Alliance for Vaccination and Immunization
GDP	Gross Domestic Product
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
GL	Ground Level
HC	Health Center
HDI	Human Development Index
HEF	Health Equity Fund:
HIV	Human Immunodeficiency Virus
HP	Health Post
HSP2	Health Sector Strategic Plan 2, 2008-2015
HSP3	Health Sector Strategic Plan 3, 2016-2020
HSS	Health System Strengthening
HSSP2	Second Health Sector Support Program　2009-2013
ICU	Intensive Care Unit
IEC	International Electrotechnical Cmmission
IMF	International Monetary Fund
IPPF	International Planned Parenthood Fedecation
ISO	International Organization for Standardization
JICA	Japan International Cooperation Agency

Abbreviation	Term
JIS	Japanese Industrial Standard
JOCV	Japan Overseas Cooperation Volunteers
KOICA	Korea International Cooperation Agency
KOFIH	Korea Foundation for International Healthcare
LAN	Local Area Network
LED	Light Emitting Diode
MCH	Mother and Child Hospital
MEDEM1	JICA Project on Promotion of Medical Equipment Management System
MEDEM2	Project for Strengthening Medical Equipment Management at Referral Hospital
MEM-WG	Medical Equipment Management Working Group
MOH	Ministry of Health
MPA	Minimum Package of Activities
NCU	Neonatal Care Unit
NGO	Non-Governmental Organization
NiDA	National ICT(Information & Communication Technology) Development Authority
NMCHC	National Maternal and Child Health Center
NSDP	National Strategic Development Plan 2006-2013
NWT	National Workshop Team
OB/GY	Obstetrics / Gynecology
OD	Operational District
ODA	Official Development Assistant
OECD	Organisation for Economic Co-operation and Development
OT	Operation Theater
PHD	Provincial Health Department
RC	Reinforced Concrete
RH	Referral Hospital
RHAC	Reproductive Health Association of Cambodia
RTC	Regional Training Center
SDG	Service Delivery Grant
SEZ	Special Economic Zone
STD	Sexually Transmitted Disease
UNDP	United Nations Development Program
UNICEF	United Nations Children's Foundation
UNPFA	United Nations Population Fund
VAT	Value Added Tax
VCCT	Voluntary Confidential Counseling and Testing
WB	World Bank
WHO	World Health Organization
WPRO	Western Pacific Regional Office

Chapter 1 Background of the Project

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1-1 Background and Outline of the Request for Japan's Grant Aid Assistance

The Cambodian Civil War that started in the 1970s caused a dramatic decrease in the number of medical practitioners and destroyed medical equipment and facilities, which destroyed the nation's health system. Since the end of the war, Cambodia has prioritized the recovery of the public health sector with national plans such as "National Strategic Development Plans" (NSDP), and assistance from multiple development partners in a number of efforts has halved the infant and maternal mortality rate (from 470 per 100,000 births in 2000 to 206 in 2010) and produced other results that continue to improve health benchmarks in the nation's health sector. Though the health indicators have more room for improvement compared to the neighboring countries.

Health Indicators in Svay Rieng Province are well below the national average; under 5 mortality rate is 93 per 1,000 birth (national average 54) and the number of inpatient beds is 3.5 per 100 thousand population (national average 6.7). The improvement of the Svay Rieng provincial health services is a pressing issue.

Svay Rieng Provincial Hospital, the target of the project, was established in 1959, and is the only CPA3 hospital as well as the top referral hospital in the province. Facilities have been built and improved and equipment upgraded intermittently since the 1980s with funds from the Ministry of Health and assistance from donor nations and NGOs, but now the facilities are in a gravely deteriorated and inadequate state. Most buildings have deteriorated significantly. Patients must be carried up and down stairs for lack of ramps and elevators, and multiple toilets are unusable due to lack of repairs. It is difficult to provide appropriate, efficient service to patients, who themselves find the facilities difficult to use. There is a lack of facilities and equipment, as the number of inpatients doubled from 5,400 in 2009 to over 10,000 in 2013 and the bed occupancy ratio exceeded 100%.

More traffic accidents are expected due to the opening of Neak Loeung Bridge over the Mekong River crossing national road, route 1, which is now under construction through the Grant Aid of Japan and scheduled to complete in 2015. Moreover, the population of Svay Rieng Province in long term is expected to increase significantly, due to the development of Special Economic Zone in Bavet, and the health care needs is predicted to increase further in the future.

The importance of Svay Rieng Provincial Hospital will increase as the need for health care in the area increases, but its facilities and medical equipment are already stretched to capacity. In light of these circumstances, the Cambodian government requested grant aid from the Japanese government.

Below is a summary of the requests made to Japan.

[Facilities]

Reconstruction of facilities housing the following departments (around 4,500 m^2):

- Outpatient; OB/GYN; Emergency; Operation; Surgery; Laboratory; Imagery; Dental; ENT; Pediatric

[Equipment]

Medical equipment befitting the above departments and the internal medicine department of a CPA3 hospital (Ultrasonic Scanner, operating tables, patient monitor, autoclave, infant incubators, infant treatment tables, X-ray machine, etc.)

[Soft Component (Technical Assistance)]

Technical guidance for appropriately using and maintaining medical equipment

1-2 Natural Conditions

(1) Climatic Condition

The Köppen climate classification of Svay Rieng is savanna climate (Aw), with the rainy season of each year generally lasting from May to November, and the dry season from December to April. Ninety percent of the annual rainfall of 1,800 mm falls during the rainy season. The period from the last half of the dry season in March until the rainy season starts in May is one of intense heat, and while the average temperature during the dry season is around 30ºC, high temperatures can exceed 38ºC during the rainy season. Like Phnom Penh, Svay Rieng is located inland and receives nearly the same average annual rainfall of around 1,800 mm. Humidity is relatively high at 80 to 90 percent. Most typhoons expire along the Vietnamese coastline, and hardly any reach Cambodia.

Meteorological data for Svay Rieng is shown in Table 2-15.

Table 1-1 Meteorological Data for Svay Rieng (2010–2013 Average)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual Average
Avg. Temp. (ºC)	25.8	27.4	29.8	31.1	30.6	29.6	28.7	28.7	29.1	27.8	27.2	25.4	28.4
Avg. High Temp. (ºC)	33.0	34.9	37.8	37.8	37.5	36.0	35.4	35	34.5	34.2	33.6	32.7	35.2
Avg. Low Temp. (ºC)	18.4	19.8	21.7	24.1	23.6	22.9	22.4	22.9	23.2	21.2	21.1	17.9	21.6
Avg. Hum. (%)	84	86	84	88	87	90	92	89	89	89	88	88	88
Avg. High Hum. (%)	95	95	94	95	95	97	98	97	96	96	97	96	96
Avg. Low Hum. (%)	77	78	74	80	82	83	85	87	85	78	80	76	80
Rainfall Amount (mm)	15	1	31	95	173	189	147	239	318	377	182	15	1,782
Avg. Max. Wind Speed (m/s)	8	8	8	11	12	9	18	10	15	16	11	10	11

Source: Provincial Department of Water Resources and Meteorology, Svay Rieng

(2) Natural Environment Surveys

A re-commissioned survey including a topographical survey, geographical survey and water quality test was conducted focusing on the construction site on the property of the Svay Rieng

Provincial Hospital. For detailed data, see "Reference Material 7: Results of Natural Environment Study.

1) Topographical Survey

Svay Rieng Provincial Hospital is located in downtown Svay Rieng, very close to National Route 1, which connects Phnom Penh to Ho Chi Minh City, Vietnam. The hospital property is shaped like an isosceles right triangle with equal sides of around 140 m, and the area of the property is 14,146 m^2. The hospital's tuberculosis and HIV/AIDS wards are located on the 1,494-m^2 trapezoidal property across the road to the west of the hospital property, which also belongs to the hospital. The property is flat, with hardly any variation in altitude. Hospital facilities are scattered throughout the property, so it is difficult to secure enough space for new buildings.

The planned construction site is in the open space inside the northeast gate to the property, and the Ministry of Health and the hospital both confirmed that the hospital owns the site.

The Cambodian side has agreed to remove the Emergency Department Building (D Building); the one-story annexed part of the Outpatient, HC, Internal Medicine, Pediatrics, Dentistry, ENT, Diagnostic Imaging, Sexually Transmitted Disease and Pharmacy Building (B Building) on the side of the open area; part of the retail shop (Q Building); the bicycle parking area adjacent to the gate; and pavement, flagpoles, trees and other obstructions in the open area within the planned construction site, and to grade the site.

2) Geographical Survey

According to five boring surveys conducted in the planned construction site, the ground is mostly made up of silty clay and contains some organic soil. The N level is 0 to 3 down to 1.0 m beneath the surface, 8 to 13 at around 2.0 m beneath the surface, and 10 to 14 around 3.0 m beneath the surface. Because the ground contains organic soil, special considerations are required for ground improvement work that involves unequal settling, stirring and mixing with on-site ground soil or other measures. Cambodia is far removed from the circum-Pacific seismic zone, thus there is no record of past earthquake damage. The borehole groundwater level observed in the boring survey was relatively high, from GL-0.8 to GL-1.4 m beneath the surface, but the coefficient of permeability at the base of the foundation at 2.0 to 3.0 m is small (2.3×10^{-7} to 9.9×10^{-8}). It was therefore assessed that groundwater will have no effect during or after construction.

3) Water Quality Survey

Svay Rieng Provincial Hospital is served by two public water pipes that run from the water main on the west side of the property; one pipe supplies water mainly to the A and B Buildings while the other supplies water mainly to the C Building. Water was sampled from the ends of each of the two pipes, and its quality was tested based on Cambodian drinking water standards. It was confirmed that water supply facilities in the Svay Rieng urban area are maintained by ADB, that

operation and maintenance are being implemented in accordance with the Project on Capacity Building for Urban Water Supply System (Phases 1 through 3) in Cambodia, a Japanese technical cooperation project, and that the quality of the public water supply is extremely high, and the results of the water quality tests revealed that values for all items are within standards and that there are no problems with water quality.

In light of the above, it was decided to use water from the public water supply for the project.

1-3 Environmental and Social Considerations

Since this project is for the construction of a hospital on preexisting hospital grounds, there is little environmental and social effect on the site and its surroundings; therefore the project is assessed as "Category C" according to the "JICA Guidelines for Environmental and Social Considerations".

The project involves a hospital, thus the Environmental Act stipulated by the Ministry of Environment of Cambodia does not require an Environmental Impact Assessment (EIA). Similarly, since the land area of the project is less than 8,000 m^2, it is small enough that an EIA for general architectural structures is not required.

Chapter 2　Contents of the Project

Chapter 2 Contents of the Project

2-1 Basic Concept of the Project

2-1-1 Overall Goal and Project Goal

As a result of the persecution of medical personnel and the destruction of medical equipment and facilities due to civil war in the Kingdom of Cambodia (hereinafter called "Cambodia") since the 1970s, the nation's health care system has experienced collapse. After the end of the civil war, health indicators improved through assistance from donors; e.g. the maternal mortality rate was lowered from 470 (per 100,000 births) in 2000 to 206 (per 100,000 births) in 2010. However, there is still room for improvement in comparison with surrounding countries.

Svay Rieng Province is located 122 km southeast of Phnom Penh on National Highway 1. In addition to bordering the Prey Veng Province on the west, it also shares a border with Vietnam, covering an area of 2,966 km^2 (1.36 times the size of Tokyo). The population of Svay Rieng Province is approximately 594,000 (in 2014)[1], and nearly 60% of that population is concentrated along National Highway Route 1. Thirty-nine (39) km east of the provincial capital Svay Rieng on the border with Vietnam, 11 Special Economic Zones (SEZ) have been authorized near the town of Bavet, making Svay Rieng an important province in leading the economic development of Cambodia.

In terms of the health and medical care situation in Svay Rieng Province, the under-5 mortality rate is 93 per 1,000 live births (national average: 54)[2] and there are 3.5 hospital beds per 10,000 people (national average: 6.7),[3] showing that conditions are much worse than the Cambodian national averages. Thus, improving medical services in the province is an urgent issue.

On the Mekong River crossing National Highway 1, the Neak Loeung Bridge is schedule to be completed in 2015 through Japanese Grant Aid. With this, Svay Rieng will become a hub for the southern Economic Corridor for traffic from the Thai border in the northwest region of Cambodia to Vietnam via National Highways 5 and 1. Therefore, an increase in patients injured in traffic accidents associated with the increased traffic volume is expected. Moreover, the population increase in Svay Rieng Province has been moderate at 1.2% (2009~2014 average), but with medium to long term growth of the SEZ in the future, the provincial population may increase greatly. In turn, this will further increase the need for medical services in the future.

Opened in 1959, the Svay Rieng Provincial Hospital is the only tertiary hospital in the province. Currently with 168 beds, it has also been designated as a top referral hospital in the province. Since the 1980s, facility construction/repairs and equipment maintenance has been performed through the Ministry of Health's budget as well as aid from donors and NGOs from various countries. However, the situation is still grave with the deterioration of facilities and equipment due to age and an insufficient quantity of equipment. In buildings that have been constructed relatively recently as well, toilets are unusable due to pipe blockage. Additionally, since there are no slopes or elevators, the transport of patient using stairs makes appropriate and efficient hospital operations extremely difficult. The number of inpatients rose from approximately 5,400 in 2009 to

[1] *Questionnaire Answer Sheet (Svay Rieng Provincial Health Department)*
[2] *Cambodia Demographic and Health Survey 2010 (CDHS 2010)*
[3] *National Health Statistic Report 2011 (Ministry of Health of Cambodia)*

more than 10,000 in 2013. There is a shortage of both facilities and equipment, with bed occupancy rates exceeding 100%.

In this way, the importance of Svay Rieng Provincial Hospital will continue to increase in the future as a top referral hospital in Svay Rieng Province. However, the capacity of its facilities and medical equipment are reaching their limit. Additionally, Svay Rieng Provincial Hospital, compared to other CPA3[4] provincial hospitals, is lacking of inpatient beds due to a crowded inpatients (with bed occpancy rate of 103.8%, which is ranked at bottom 3 of total 17 CPA3 provincial hospitals) and has fewer outpatients per day (61 per day, which is ranked at bottom 5) due to the deterioration and and crowded with inpatients (with bed occupancy rate of 103.8%, which is ranked at bottom 3). At this point of view, the priority of the needs of improving facilities and equipment of Svay Rieng Provincial Hospital is higher than most other CPA3 provincial hospitals.

Under these conditions, the Government of Cambodia requested grant aid from the Government of Japan for the development and maintenance of Svay Rieng Provincial Hospital, which is a top referral hospital in the province, with the purpose of improving health care conditions in the Svay Rieng Province.

This Project will contribute to improving the delivery of health services, which is one of the five cross-cutting strategies (health service delivery, heath care financing, heath care human resources, heath information, and governance) listed the Second Health Strategic Plan 2008-2015 (HSP2) and the Third Health Strategic Plan that is set to start in 2016 (HSP3). These plans are designated as national heath projects by the Government of Cambodia. Strategies for the delivery of health services include strengthening the implementation of CPA in referral hospitals like Svay Rieng Provincial Hospital, as well as strengthening the system for delivering medical services and the referral system.

The purpose of this Project is to improve health care conditions in Svay Rieng Province. As a top referral hospital in the province, it will strengthen the medical referral system and contribute greatly to the improvement of medical services. Additionally, the Project is judged to have a high level of necessity and relevance, since it will also enhance the health care environment of workers from the SEZ, where Japanese companies also have invested. The Overall Goal and Project Goal of this Project are summarized below.

Table 2-1 Overall Goal and Project Goal

	Medical Service
Overall Goal	The healthcare services in Svay Rieng Province is fulfilled.
Project Goal	The medical services including OB/GY, Emergency and Outpatient of the top referral hospital in Svay Rieng Province is improved through the provision of necessary facility and medical equipment.

[4] *Complementary Package of Activities (CPA) is a guideline of primary (CPA1) to tertiary (CPA3) hospitals in Cambodia which defines the necessary medical services and equipment at each level. CPA3 hospital is a general hospital with specialty clinic such as Eye and ENT.*

2-1-2 Outline of the Project

In order to achieve the goals noted above, the Project will provide facilities and equipment for the improvement and expansion of health care services required by Svay Rieng Provincial Hospital as a CPA3 hospital and for functioning as a top referral hospital in the province.

The facilities and equipment implemented for the Project are outlined below.

■ Facilities

Table 2-2 Outline of the Project (Facilities)

Department		Major Rooms	Total Area
Main Building	Outpatient Dept.	Consultation Room, Staff Room, Counseling Room, Patient Waiting, Pharmacy	178.45m^2
	Emergency Dept.	Consultation & Treatment Room, Observation Room, Special Observation Room, Family Waiting, Shower Room	174.93m^2
	Imagery Dept.	X-ray Room, Ultrasound Room, ECG Room, Staff Duty Room, Film Storage	121.42m^2
	Operation Dept.	Operation Theater, ICU, Recovery Room, Central Sterilization Room, Conference Room, Equipment Storage	816.64m^2
	Obstetrics Dept.	OB Ward (8 beds, 6 beds, Private Room), Labor Room, Toilet for Handicapped, Doctor's Office, Duty Room, Delivery Room, Preparation Hall	607.56m^2
	Gynecology Dept.	GY Ward (6 Beds), Toilet for Handicapped, Consultation Room, Treatment Room, Doctor's Office, Counseling Room	212.44m^2
	Administration Dept.	Administration Office, Meeting Room, Laundry, Doctor Duty Room, Nurse Duty Room	156.50m^2
	Others	Water receiving tank, Septic tank, Walkways, Manifold Room, Electrical Room, Pump Room	350.31m^2
		Grand Total of Building	2,618.25m^2
Slope		Slope connecting existing wards and new building, Elevated water tank	556.70m^2
		Grand Total	3,147.95m^2

■ Equipment

Table 2-3 Outline of the Project (Equipment)

Department	Major Equipment
Outpatient Dept.	Diagnostic Set, Consultation Desk, Examination Bed, etc.
Emergency Dept.	Diagnostic Set, ECG Unit, Emergency bed, etc.
ICU	Denudating Set ICU Bed, etc.
General Medicine Department	Examination Bed, Patient Monitor, Aspirator, etc.
Surgery Department	Examination Bed, Examination Lamp, Minor Surgery Instrument Set and etc.
OB/GY Department	Delivery Bed, Gynecological Examination Bed, Caesarian Set, etc.
Pediatric Department	Examination Bed, Infant Incubator, Infusion Pump, etc.
ENT Department	Examination Instrument Unit for ENT, Electric Scalpel for ENT, etc.
Dental Department	Dental Chair Unit、Dental X-ray Unit, etc.
Operation Theater	Operating Table, Shadowless Surgical Lamp, Anesthesia Machine, etc.
Imagery Department	CR System, Ultrasound Tomography Diagnostic Apparatus, ECG Unit, etc.
Laboratory	Tabletop Autoclave, Automatic Hematology Analyzer, etc.

■ Technical Assistance (Soft Component)

- Technical training in the Computed Radiography (CR) system
- Technical training in the Central Sterilization Department (CSD)
- Training in clinical techniques (field of OB/GY and orthopedics)

■ Maintenance Service of the Equipment

In order to avoid the equipment falls into trouble and left unused soon after the handover, the Supplier shall, in this particular project, provide maintenance services for 3 years after the handover for the selected 18 items which strongly requires the service. Normally, 1 year guarantee is included in the equipment procurement. During the period, the manufacturer will dispatch the worker and repair at no charge based on the request from the user, so-called “on-call service”. In addition to this, the maintenance services of the project shall include periodic inspection for 3 years after the handover and on-call service for 2 years after 1 year guarantee period. However, the expense of replacement parts after 1 year guarantee period shall be borne by user.

2-2 Outline Design of the Japanese Assistance

2-2-1 Design Policy

As a top referral hospital in Svay Rieng Province, patients at this hospital are seen through introductions from lower medical institutions within the province. However, due to the shortage and deterioration of its facilities and equipment, it is not necessarily fulfilling its role sufficiently. From among the patients introduced from lower medical institutions, if it is too difficult to treat patients in critical condition or emergency patients at Svay Rieng Provincial Hospital, they are transported to the national hospital in Phnom Penh or to hospitals in Vietnam. Additionally, since there are currently only a few medical facilities in the province, many patients go directly to Svay Rieng Provincial Hospital for treatment. The bed occupancy rate for the four principal departments (General Medicine, Surgical, OB/GYN, Pediatrics) exceeds 100% with an average of 103% (in 2013), making the improvement of the medical care environment a pressing issue.

Table 2-4 Svay Rieng Provincial Hospital Bed Occupancy Rates

	No. of Beds	2009	2010	2011	2012	2013
General Medicine Department	35	79.3%	89.7%	84.7%	79.8%	85.0%
Surgery Department	28	128.2%	143.1%	151.8%	134.1%	136.0%
OB Department	18	100.9%	71.2%	90.2%	99.2%	100.2%
GY Department	6	94.9%	109.2%	108.0%	119.5%	105.8%
Pediatric Department	22	81.3%	100.0%	102.4%	131.6%	92.3%
Tuberculosis Department	45	38.4%	40.6%	34.3%	21.2%	16.6%
Others	14	8.7%	9.3%	12.3%	19.5%	17.4%

Source: Svay Rieng Provincial Referral Hospital

This Japanese Grant Aid will directly strengthen the medical referral system in Svay Rieng Province and contribute greatly to the improvement of medical services. Indirectly, it will contribute to the development of medical personnel such as nurses and midwives from Svay Rieng and neighboring provinces, since Svay Rieng Provincial Hospital isa teaching hospital as well. In order to fulfill these objectives, the design of the facilities was planned based on the following policy.

(1) Basic Policy

1) Site Selection

There are several existing buildings on the grounds of Svay Rieng Provincial Hospital, which is a top referral hospital in Svay Rieng Province. Therefore, securing sufficient space for construction is difficult. Site selection was conducted based on the policy described below.

① For the benefit of the Cambodia side, planning will be conducted within a scope such that facilities to be demolished are kept to a minimum, and so that construction does not interfere with medical care activities.

② In order to utilize the existing buildings, they will be organically connected; paths between buildings used by patients and staff will be planned in a manner keeping distances to a minimum.

2) Facilities

The scope and scale of cooperation were configured based on the following basic policies.

① Policy for selecting target components

The buildings of Svay Rieng Provincial Hospital scatters within the premises, but the main medical functions are concentrated in three existing buildings (Building A~C) surrounding the plaza behind the front gate. However, those three buildings are not connected with corridors and there is a problem in circulation planning between the buildings. For example, the patients on stretcher have to be transported from surgery ward or from emergency room to operation room through the plaza exposed to rain. Moreover, those three buildings, without any elevators or slopes, have also difficulty in carrying patients even inside the building. The existing buildings are also deteriorated and some wards don't have enough space with BOR exceeding 100%. The Project is designed to address to these problems. The departments which is having difficulty in providing continuous medical care services due to the deterioration or facilities or lacking of the space is selected as the target components of this Project.

Conversely, since the grounds of the Svay Rieng Provincial Hospital are small and area of the planned construction site is limited, it will be difficult to accommodate all of the target components in the new building to be built under Japan's Grant Aid. Therefore, the departments which can be improved by simple renovation or relocation without big burden are chosen as components to be implemented by Cambodia side and the departments requires not only simple renovation or the departments which will improve the circulation planning by relocating them in the new building will be selected as components to be included in the Japanese assistance. The Project is planned assuming that the hospital can be used effectively and efficiently as a whole by organically connecting the existing facilities through the construction of a new facility under the Project. Furthermore, departments that are targeted for cooperation by other donors will not be included in this Project to avoid overlap.

② Policy for setting the scale

Setting the target year for the Project for 3 years after its completion in 2020, the scale will be set based on the number of patients forecast for that year. The projection for the number of patients will be estimated from provincial population trends and a percentage of the number of current patients, taking the following factors into consideration:

- Natural population growth;
- Number of patients flowing in from other provinces due to the creation of new facilities;
- An increase in the number of patients due to more traffic accidents.

Since the infrastructure of the SEZ has not yet been developed, it is unlikely that it will grow dramatically by the target year. Therefore population growth due to the development of the SEZ will not be considered for setting the scale of the Project. However, since it is highly probable that infrastructure will be developed in the future and thus bringing growth to the SEZ, a facility plan will be created to accommodate this possible growth.

3) Equipment

① Equipment will be selected according to the Medical Equipment Standard for CPA 3 Referral Hospital First Edition, 2014 (Medical Equipment Standard List) formulated by the Ministry of Health, and plans will fully consider such things as technological innovations expected to improve the effectiveness and efficiency of current clinical services.

② Taking into consideration the role played by the target hospital in its area, plans will apply to ENT, dental and laboratory departments that currently lack critical equipment, though their facility buildings are not in the scope of the project.

③ Plans will keep consistency with activities of the target hospital.

④ Plans will take consideration of easy maintenance for the targeted hospital by such as selecting equipment in proper level.

⑤ Plans will avoid overlaps with existing equipment or equipment supplied by other donors to ensure efficiency.

⑥ For essential machinery, including sophisticated equipment and that for which serious problems would arise if malfunctions occurred, maintenance management contracts will be concluded with manufacturers or local agents for 3 years after delivery. This cost will be borne by the Japanese side. Maintenance contracts will include 2 types of service: periodic inspection service, for which a technician will visit the hospital at regular intervals to inspect and calibrate equipment, and on-call service, for which equipment inspection will be conducted at the request of the user when equipment fails, etc. Additionally, the on-call service will consist of the dispatch of a technician and/or technical services for troubleshooting only. If a part must be replaced, the cost of this will be borne by the hospital side. However, during the manufacturer's 1-year guarantee period, all costs, including the replacement of parts, will be borne by the manufacturer.

(2) Policy on Natural and Environmental Conditions

① Policy on weather conditions

As stated in Chapter 1-2, The Köppen climate classification of Svay Rieng is savanna climate (Aw), with the rainy season of each year generally lasting from May to November, and the dry season from December to April. Ninety percent of the annual rainfall of 1,800 mm falls during the rainy season. The period from the last half of the dry season in March until the rainy season starts in May is one of intense heat, and while the average temperature during the dry season is around 30ºC, high temperatures can exceed 38ºC during the rainy season.

Thunderstorms and strong winds are prevalent during the rainy season. Therefore, large, protruding eaves are built on rooftops, and walls are finished with waterproofing materials to prevent mold from growing where rainwater may seep in. Additionally, sunlight exposure and natural ventilation are taken into account for finishing materials in order to combat high humidity, especially in rooms where air conditioning facilities are not installed.

② Flood countermeasures

The city of Svay Rieng is bordered by the Waiko River on its east and south sides. In August 2000, the river overflowed due to heavy rains, causing subsequent flood damage. The normal water level of the Waiko River is approximately 2.7m, but in August 2000, the level of the river reached 4.1m. Presently, an embankment has been built by raising the level of the road adjacent to the river, which has made the possibility of river overflow extremely low. However, considering the recent abnormal weather that has occurred on a global scale, and in preparation for the unlikely event of flooding, the buildings newly constructed for this Project will be built with the ground floor height at a level of 500 mm above the ground. Also, the guide rails will be constructed outside the exterior doors so that flood barriers can be affixed.

The Project will also be planned based on the following policies as well.

③ Plans will put precedence on properties of waterproofing, insulation, durability and other functional aspects, allow for the selection of materials that are relatively easy to maintain and enable the grade to be maintained.

④ Plans will call for large eaves to be built to account for sunlight and rain and will keep the exterior walls clean and prevent leakage due to rain while taking advantage of natural ventilation.

⑤ Direct sunlight during the dry season (December through April) can cause temperatures to rise over 40ºC, so the roof will be insulated and a gallery will be built to ensure sufficient ventilation beneath the roof. The ceilings and exterior walls of air-conditioned rooms will also be insulated to improve the efficiency of the air conditioning.

⑥ In order to secure natural ventilation, horizontal-sliding, aluminum sash, glass windows are installed in most existing buildings. Windows under this project will also be aluminum sash as in existing buildings.

⑦ Lightning rods will be installed to deal with the many lightning strikes that occur during the rainy season.

(3) Policy on Social and Economic Conditions

Steeply sloped roofs and raised, wooden floors are characteristic of the construction style of the average private residence in Cambodia. The style seems to incorporate considerations for wind passage, waterproofing and other natural conditions. Pagoda construction also features steeply sloped roofs stacked up in many layers, which is adopted for temples. In olden times, temples were built with wood and brick; now, the relatively new construction style calls for temples to be built mostly of reinforced concrete with complex, light structural steel roofs.

These plans will rely on general construction methods in the local area and call for reinforced concrete rigid frames, outer walls made of brick, and perforated blocks and steel/aluminum grids for rooms that will use natural wind passage. The exterior walls will be finished with mortar, which is the current construction method, and washed gravel for durability. Roofs will be sloped and consist of cement tiles and a space will be left inside the roof for the purpose of insulation.

(4) Policy on Construction and Procurement Conditions

1) Facilities

Very few large-scale construction projects take place in the countryside urban areas outside of the Cambodian capital of Phnom Penh. In Svay Rieng Province, development including the construction of casino hotels and the SEZ is progressing in Bavet near the Vietnamese border. Most of the skilled workers involved in construction are to be dispatched from Phnom Penh, while normal and light-duty workers will be procured from areas around the project site. This project demands quality befitting a medical facility, and there is no sufficient training for skilled construction workers of this kind in countryside areas, so skilled workers and other workers must be sent in from Phnom Penh for this project. The ability of these skilled workers is not necessarily satisfactory, thereby making it essential to have guidance on construction supervision by Japanese personnel. Additionally, the design will use local general construction methods as a base. Complicated and difficult details will be avoided as much as possible, with a simple and sturdy construction taken into account.

All of the major construction materials used in the Project can be procured within Cambodia. Construction materials made in Cambodia are limited to aggregate, lumber, bricks, unglazed roof tile, and concrete blocks, etc. Other materials are imported goods from Thailand or Vietnam, but these goods are in general circulation through local sales agents. Since there is no collection site for aggregate near Svay Rieng, aggregate will be procured from Phnom Penh. Additionally, since only low-quality brick can be obtained near the project site, brick will also be procured from Phnom Penh. It is thus necessary to review the procurement plan, estimating transport costs and possible damage loss during transport.

2) Equipment

In general, equipment will be procured from Japan or locally, but the scope of procurement will be spread to include other countries if the competitiveness of equipment cannot be ensured in the course of bidding. However, regarding equipment require consumables or repair service from an agent in trouble, appropriate care will be taken to select the equipment handled by the agent locally or in surrounding countries to ensure smooth operation and maintenance.

(5) Policy on Utilization of Local Contractors

1) Facilities

There are around 200 local construction companies in Cambodia, and 5 or 6 Japanese construction companies have made a foray into Phnom Penh. Companies among those that could be called major have received grant aid from Japan in the past. In general, there is not much awareness of aspects of quality and safety control in Cambodia, so it is difficult to say that they have comprehensive construction capabilities, and Japanese management methods must be taught well. There are not many skilled workers in the area, so Japanese people will be assigned as site supervisors, and they will oversee construction and make maximum use of local contractors wherever they can be used.

2) Equipment

It has been confirmed that the manufacturers of the medical equipment to be procured under this project

have local agents for equipment that requires after-sales services. It has been also confirmed the local agents in Phnom Penh had hired experienced engineers with the sufficient operating and installing skills and experience and were able to provide spare parts and other after-sales services. Thus, it is planned to make full use of these local agents for installation and instruction of operation. Additionally, to ensure proper operation and maintenance of the equipment procured under this project, the Japanese side will conclude maintenance contracts for a period of 2 years after the 1-year warranty periods of equipment for which after-sales service is deemed necessary. This equipment will include high cost equipment, lifesaving equipment, and precision equipment. Thus, it will be necessary to be taken into consideration such as to include conditions on procuring equipment which requires making maintenance service contract with local agents.

(6) Policy on Operation and Maintenance

1) Facilities

At Svay Rieng Provincial Hospital, there is only one anesthetist serving concurrently as the maintenance manager. No engineers with technical expertise have been allocated. Therefore, only simple work such as starting and stopping pumps/generators and cleaning filters can be performed, with the maintenance of facilities and equipment limited. Cases that call for repairs or replacements are outsourced to contractors through Administration Department. The hospital lacks an organization that functions as a maintenance department, so it needs to hire people and get organized in the future.

These plans call for facilities to stay within the technical operation and maintenance abilities of current maintenance staff and for the selection of facilities and equipment with low maintenance costs. These plans also aim to cut down on running costs.

2) Equipment

The following points will be duly considered to make it possible for the Cambodian side to sustain operation and maintenance with their own system after equipment is procured:

① Equipment that does not require high cost for operation will be chosen.
② Specifications of equipment should be corresponding with the technical level at the target hospital.
③ Procurement plans will be taken into consideration to prepare adequate time to instruct how to operate equipment in installation such that operation and maintenance capability can be improved.
④ Due consideration will be given during the planning or implementing stage, so that equipment handled by appropriate agents locally or surrounding countries will be chosen.

(7) Policy on Grade Setting for Facilities and Equipment

1) Facilities

The following policies will be used for planning the facilities. Setting the target year for 2020, the influx of patients from other provinces due to population growth as well as the fact that the hospital will be rebuilt and upgraded will be taken into consideration.

① In the course of implementing this project, CPA guidelines shall be treated as the major basis for planning conditions. The content of these guidelines shall be fully understood and basic plans that conform to them shall be developed after considering the results of surveys pertaining to issues facing Svay Rieng

Provincial Hospital and the state of medical care in the province. The major criteria related to facility planning contained in the CPA Guidelines are as follows.

CPA Facility Standards (excerpted)

- The total floor area of the hospital shall be 40 m^2 or more per bed.
- Guidance signs shall be easy to understand and written in both English and Khmer.
- Natural ventilation will be used, with the minimum celling height for habitable rooms with natural ventilation set at 4 m or more.
- In areas where flooding is expected, the floor height shall be elevated 2 m from the ground.
- Door will be double doors, with each door having a width of at least 90 cm and 30 cm, totaling 1.20 m or more.
- Fire fighting vehicles must be able to approach all buildings.

② Since the land area of the planned construction site is limited, the area where new building construction is possible is also limited. However, the layout will be planned by giving consideration to the walking paths of patients and connectivity to existing buildings.

③ Since both the existing and new hospital buildings must be multi-story buildings due to the limited space on the grounds, elevators and slopes will be installed to improve vertical access.

④ The bulkiness of the buildings will be kept to a minimum, and visual harmony with the existing buildings on the site will be taken into account.

⑤ Some private rooms will be built in the Obstetrics and Gynecology Ward for the purposes of accommodating isolation needs and increasing hospital revenue.

⑥ Harmony with the existing buildings on the site will be taken into account.

⑦ Facility grades and scales will be such that operation and maintenance expenses are not excessive.

⑧ As the top of RHs in the province, the structure will be strong enough to function as a critical location for treatment and recovery in case of disasters. Facilities will be planned to allow for continuous medical activities by securing infrastructure during disasters through the installation of an elevated water tank and an emergency power generator.

⑨ An operating theater for infectious patients will be built that allows for direct access from the outside to the anteroom in order to help prevent the spread of infection.

⑩ X-ray rooms will be planned such that they eliminate the risk of radiation exposure to technicians and family members.

⑪ Consideration will be given to efficiency through centralization of management.

- The Ultrasound Room and ECG Room will be brought together with the X-ray room as the Imagery Department to strive for efficient operation.
- In addition to construction of the new building, the wards of various departments house in other buildings scattered around the grounds will be reconfigured (as a responsibility of the Cambodian side). The various medical treatment functions will be connected via walkways, making easier to transport patients, even when raining.
- With the construction of a slope, patient can be transported on stretchers and beds, thereby improving the connecting environment between the new building and existing buildings.

⑫ Cramped environments for nurses and patients will be improved.

⑬ Since Svay Rieng Provincial Hospital is a teaching hospital for the Kampong Cham Health District, rooms will be built for practical training in nursing and birthing. Dual-purpose training/meeting rooms will also be built, allowing for the smooth practical training of students.

2) Equipment

Equipment plans will be developed based on CPA guidelines put forth by the Ministry of Health. Standard list shows descriptions and specifications as well, and the equipment from these plans will match the grades and specifications put forth in those standards. However, much time has passed since those standards have been developed, and they do not necessarily fit the current technical level or activities of the target hospital. Thus, these standards should serve as a reference while developing equipment plans, but appropriate grades should be selected with existing equipment at similar facilities and the activities and technical abilities of staff members at the target hospital in mind.

(8) Policy on Construction/ Procurement Methods and Schedule

1) Facilities

Much of the framework, finishing materials and other construction materials and equipment can be procured from within Cambodia, but reliance on imports necessitates sufficient consideration toward factors like future maintenance, and construction methods that can accommodate local technology will be selected. Meticulous preparation must be done for material procurement on aspects such as temporary structures and labor, importing and transportation, and construction. Construction schedules need to allow ample time for foundations to cure, especially if finishing is to take place during the rainy season. The supply of sands and gravels for the stage when concrete is being poured into the framework needs to be procured early. Plans will consider measures to prevent mold and rust brought on by humidity from affecting construction materials and leading to the early demise of facilities. Though construction materials will be procured locally in principle, the procurement of materials and equipment will have a huge effect on the construction schedule because most of them will be imported from Japan or other countries. Thus, expected quantities and up-to-date inventory statuses of materials and equipment need to be checked constantly to avoid setting the schedule back for lack of materials.

2) Equipment

Precision equipment that could have a huge effect on human life are abundant among medical equipment. Thus, equipment of high quality and precision must be selected and procured and engineers familiar with said equipment must install and adjust it. It follows that careful consideration will be given such that equipment for this project is procured by experts with a wealth of experience procuring medical equipment for Japanese grant aid project.

In addition, since this project concerns both facilities and equipment, schedules for equipment procurement, installation and such must coordinate properly with facility construction schedules and actual progress.

Thus, those involved in equipment procurement will coordinate closely with those involved in the work for facilities, giving care to appropriate construction schedules.

2-2-2 Basic Plan (Construction Plan/ Equipment Plan)

(1) Site/Facility Layout

① Current layout

Svay Rieng Province is located 122 km southeast of Phnom Penh on National Highway 1. In addition to bordering Prey Veng Province on the west, it also shares a border with Vietnam. On the border with Vietnam, 39 km east of the provincial capital Svay Rieng, casino hotels and a SEZ are under construction in the town of Bavet. This development may cause the provincial population to increase greatly in the medium to long term future. Additionally, on the Mekong River crossing National Highway 1, the Neak Loeung Bridge is schedule to be completed in 2015 through Japanese Grant Aid. With this, Svay Rieng will become a hub for the southern Economic Corridor for traffic from the Thai border in the northwest region of Cambodia to Vietnam via National Highways 5 and 1. Therefore, increases in traffic volume and patients injured in traffic accidents are expected.

Svay Rieng Provincial Hospital is located in the urban district of Svay Rieng. The area of the site is 14,146 m^2 and is close to triangular in shape. There are no elevation differences on these flat grounds.

When entering through the gate to the grounds, there is an open space in the front. The existing hospital ward buildings have been built so that they surround the open space, with the other ancillary facilities spread over the grounds.

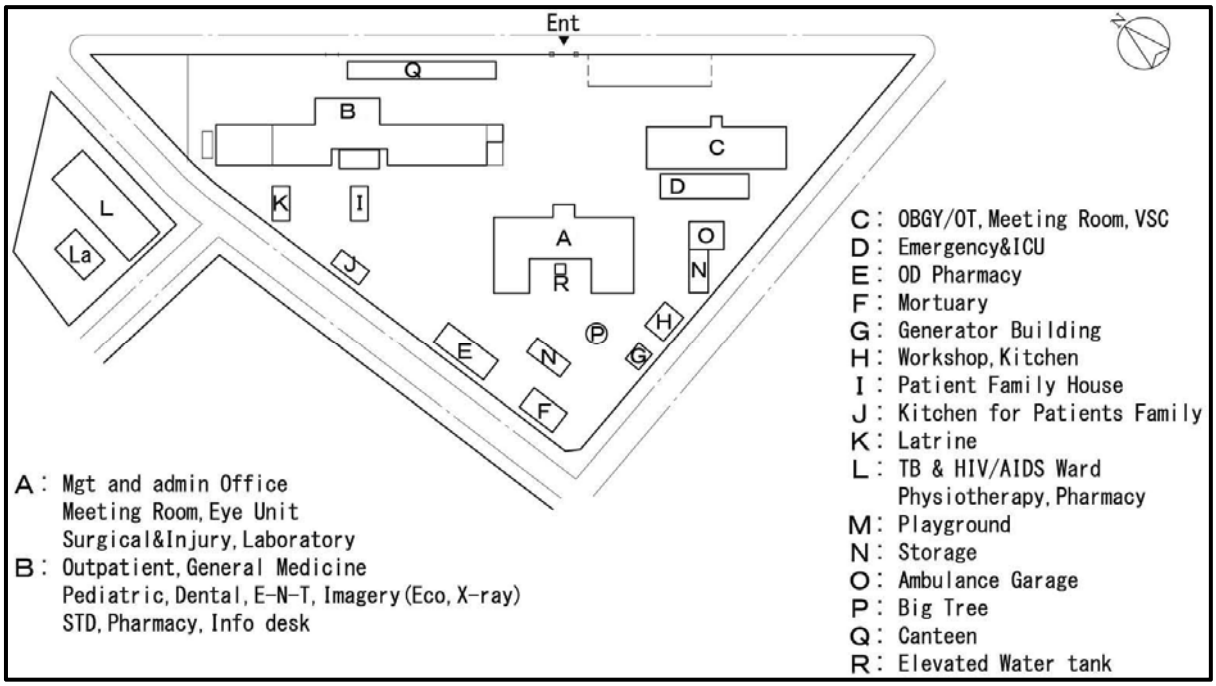


Figure 2-1 Current Hospital Layout Drawing

Figure 2-1 shows the current layout of the hospital. The conditions of each building are described in the table below. As shown in Table 2-5, there is marked deterioration in most of the buildings, and their rebuilding or the equivalent renovations have been deemed necessary.

Table 2-5 Current Conditions of Each Hospital Building

No.	Building Name	Story	Structure	Year of Construction	Construction/ Aid Source	Current Conditions
A	Administration Dept., Meeting Room, Eye Unit, Surgical & Injury, Laboratory	2	RC	1996, renovations in 2004	Private company (Lottery Corp.), Govt. of Cambodia	Reinforced concrete (RC) 2-story building facing the hospital front gate. Only 20 years old, but shows pronounced deterioration including unusable toilets in the ground floor Surgical Department due to blocked pipes. Renovated in 2004, the Laboratory has a relatively good environment.
B	Outpatient/HC, General Medicine, Pediatric, Dental, ENT, Imagery, STD, Pharmacy	2	RC	1959, renovations in 2004	Govt. of Cambodia	An old building from when the hospital first opened. The Diabetes/Hypertension Clinic established with KOICA aid and the Pediatric AIDS ward established with UNICEF assistance are located in this building. Although departments where renovation work has taken place though assistance from other donors maintain a relatively good interior environment, the interior walls of Outpatient/HC show obvious mold growth. Additionally, the rooms are small and dark, creating a poor environment.
C	OBGYN, Operation Dep., Meeting Room, VSC	3	RC	2009	Donation from Minister of Defense (born in the region)	This building is newer for the hospital, but shows severe deterioration including unusable toilets due to blocked pipes. The operating theater is on the ground floor, the delivery rooms and obstetrics ward on the 1st floor, and the gynecology ward is on the 2nd floors, along with meeting rooms. However, since there are no slopes or elevators, patients must be transported via stairs, thereby being very inconvenient and difficult to use.
D	Emergency Dept.	1	RC	2012	Private company (hospital bicycle parking management)	This is the newest building for the hospital. Near its entrance are diagnostic/observation rooms, with break rooms for doctors and nurses in the back. There is a lack of rooms for conducting training and meetings for nursing students. Since the floor level is nearly the same as the ground level, flooding during heavy rain is a concern.
E	OD Pharmacy storage	1	RC	1999	UNICEF	Pharmacy storage for the operational district (OD). Building is managed by the Svay Rieng Provincial Health Department.
F	Mortuary	1	RC		Govt. of Cambodia	The mortuary and autopsy room are located here. With no refrigerated storage for bodies or autopsy equipment, the environment is poor.
G	Generator Building	1	RC		Govt. of Cambodia	A 30 KVA generator has been installed. Since switching over to generators must be done manually, operating theaters will cease to function for several minutes during emergency power outages.
H	Workshop, Kitchen	1	RC		Govt. of Cambodia	This building consists of the kitchen for preparing hospital meals and a simple workshop. There are no gas facilities in the kitchen, and cooking is done using firewood. Since ventilation in the room is inadequate, there are serious concerns about damaging the health of the cooks. The building itself also shows pronounced deterioration.
I	Patient family house	1	RC S	2005	UNICEF	This open space construction consists only of a frame of RC pillars and steel columns/girders with a roof and partition walls. Families of patients use it to rest and prepare meals. This building shows pronounced deterioration and is structurally dangerous, as rusting of the steel columns has caused them to split.
J	Kitchen for patient families	1	RC			As with Building I, this building consists of a roof and partition walls only. A concrete cooking table has been placed in the building for cooking with firewood.
K	Latrine	1	BR	1959, renovations in 2011	Govt. of Cambodia hospital budget	Latrine from when the hospital first opened. The environment is quite poor, with the inside booths being completely covered in moss.
L	Isolation Ward	2		1968, renovations in 2005	Govt. of Cambodia, Local NGO (CHC)	The Adult HIV/AIDS Pharmacy, Pain Management Department, and Pediatric Tuberculosis Ward are located on the ground floor. The 1st floor is an isolation ward for adult tuberculosis and HIV/AIDS. The building itself is old, with a poor environment even after renovations. Trash including needles is scattered around the building, causing risk of hospital-acquired infection.
M	Playground	-	-	2005	UNICEF	Swings, see-saw, etc. were installed through UNICEF aid.
N	Old medical equipment storage	1	BR	2006	Govt. of Cambodia	Presently used for laundry and storage. Although a relatively new building, it is simple and shows pronounced deterioration.
O	Ambulance garage	1	BR	2005	UNICEF	This is a simple building, using tarps to cover the entrance. The environment is extremely poor.
P	Big Tree	-	-	-	-	This big tree is located behind Building A. The main roots are surrounded by a concrete pedestal and a small shrine has been erected.
Q	Bicycle parking, Canteen	1	BR	2006	Private company (bicycle parking management)	Bicycle parking is an outdoor space surrounded by a fence of steel pipe. The canteen is semi-outdoor space with brick walls and a roof only. Both spaces are rented out to private companies to engage in business.
R	Elevated water tank	1	RC	1998	Govt. of Cambodia	An elevated water tank for supply water to Building A. (Building B has 2 elevated water tanks installed on its roof for supplying water. Building C is connected directly to the city water supply, with water not passing through elevated tanks.)

② Layout plan

In the request, it was proposed that Building A (Administration, Laboratory, Eye Unit, Surgical Ward) be demolished, and a new building be built in that area. However, the functions of Building A must be relocated so that the hospital can continue operating during the construction period, and the burden placed on the Cambodian side for removal work would be large. Also, since the Laboratory located in Building A was renovated by another donor in 2012 and can still be sufficiently used, coordination is necessary for its removal. For these reasons, and upon discussions with the Provincial Health Department (PHD) and the provincial hospital, it was agreed that the new building will be constructed in the open space in front of the front gate.

Placing the new building in the open space will allow it to be adjacent to Buildings A~C, which contain the major medical care functions of the hospital. With this, the buildings can be organically connected and the existing buildings can continue to be used. Furthermore, a slope will be built behind Building C, which will simplify access from the 1st and 2nd floors of Building C to the new building, and also allow easier access for stretchers and wheelchairs. The ground floors of Building A and Building B will be connected to the new building with covered walkways.

Additionally, the placement of the new building will minimize the removal and relocation of existing buildings. This will reduce the amount of items for which the Cambodian side is responsible, and will make it easier for the hospital to continue activities during the period of construction. Since construction and renovations of the existing Building B and Building C were done through aid from other donors, removal of these buildings would require coordination with those donors. However, the proposed layout plan can be achieved with only the removal of Building D. Since Building D was donated by a private company that currently manages bicycle parking at the hospital, coordination for its removal can be conducted without difficulty.

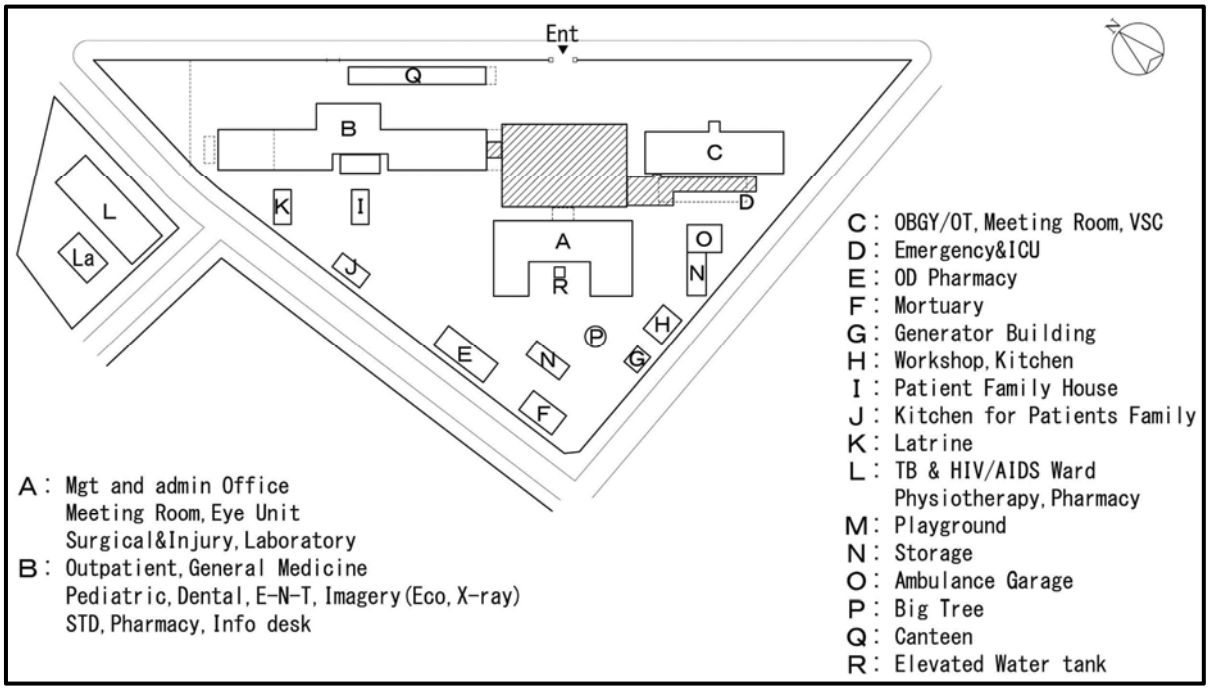


Figure 2-2 Planned Hospital Layout Drawing

(2) Building Plan

1) Selecting Target Facilities (Components)

In the request, nearly all of the departments were targeted for rebuilding. However, since the available area at the planned construction site mentioned above is limited, the Project must narrow down the target departments to those with a high level of need for improvement, and must also utilize the existing buildings. As a result of discussions with the PHD and hospital, the components from among the requested target departments and including the new building to be provided by the Project were determined to be as shown in Table 2-6. By effectively placing these components in the new building, the various problems with the current conditions will be resolved, as described in Table 2-6.

Table 2-6 Current and Post-Project Conditions for Requested Target Departments

Request No.	Department	Current conditions (problems)	Japanese side facilities targeted for Project	Post-project
1.1	Outpatient Dept.	▪ Centrally located on the ground floor of existing Building B, it is difficult to use because it is placed together with the Health Center (HC) managed by the OD. ▪ Building B has been on site since the hospital opened in 1959, and has a relatively good environment, as some parts of the building have been renovated through assistance from other donors. However, the environment of the Outpatient Dept. is poor. ▪ The number of patients is expected to increase in the future with a population increase in the province and an influx of patients from other provinces. However, there is a lack of space, especially with the adjoined HC.	○ Relocation to new building	▪ Space will be divided from the HC, resolving congestion and the intermingling of patients visiting the Outpatient Dept. and the HC. ▪ The entrance for outpatients will be centralized to simplify hospital operation and management. ▪ Patient access to the Laboratory in Building A and the new Imagery Dept. will be improved. ▪ A shared staff preparation hall will be placed behind the consultation rooms to divide patient and medical personnel traffic, as well as help maintain cleanliness in the consultation rooms.
1.2	Emergency Dept.	▪ With consultation/observation rooms near the entrance, it is difficult to keep the rooms clean with a mixture of patients requiring follow-up observation and those needed consultations. ▪ Patient traffic is not smooth, as patients sent to other departments must go outside. ▪ Since the floor level is nearly the same as the ground level, flooding during heavy rain is a concern. ▪ Emergency medical facilities and equipment are insufficient for handling the projected increase in traffic accidents that may accompany an increased traffic volume due to the completion of the Neak Loeung Bridge (Scheduled for 2015.)	○ Relocation to new building	▪ By dividing the consultation rooms and the observations rooms, they can be used more functionally. ▪ Patient access to other departments such as the Operation Dept. and the Imagery Dept. will be improved. ▪ A patient shower room will be placed near the entrance and cleanliness in the emergency consultation rooms will be maintained. ▪ With adequate space and facilities prepared, a total of 12 beds (emergency consultation and observation beds) will be installed to create an environment in which appropriate emergency treatment can be provided for any future increase in emergency patients.
1.3	Surgical Ward	▪ Located on the ground floor of existing Building A, the ward shows pronounced deterioration including toilets that have become unusable. ▪ Some patient rooms are without windows, and the indoor environment is poor. ▪ There is a shortage of beds, with the bed occupancy rate for 28 beds (nominal) at 143% (2009~2014 average).	× Existing Building C will be renovated and ward will be relocated (Borne by Cambodian side)	▪ The ward will be relocated to existing Building C, which is a newer building in the hospital, and the indoor environment will be improved. ▪ The nominal number of beds will be increased from the existing 28 to 49 to relieve the bed shortage.
1.4	Operation Dept.	▪ Located on the ground floor of existing Building C, access from the Obstetrics Ward on the 1st floor of the same building is difficult since there are no slopes or elevators. Accessibility from the Surgical Ward and Emergency Dept. is also poor since patients must go outside to reach the department. ▪ The traffic paths of infectious patents and general patients are the same, causing concern for hospital-acquired infection. ▪ The only hospitals where surgical operations (excluding emergency operations) can currently be performed within the province is the provincial hospital. This includes both public and private hospitals. With a future increase in population and operations for patients injured in traffic accidents, a 65% increase in the number of operations is projected (2020). However, with the poor accessibility to operation theaters, handing these numbers will be difficult.	○ Relocation to new building	▪ With the installation of patient transport elevators, patient access from various wards and the Emergency Dept. will be improved. ▪ Since the entrance to operation theaters for infectious patients will be separated from general patients, the risk of hospital-acquired infection will be lowered. ▪ A staff changing room will be placed on the border with the clean zone, which will maintain cleanliness in the Operation Hall. ▪ By improving access to the operation theaters, it will be possible to efficiently accommodate a 65% increase in the number of operations.

Request No.	Department	Current conditions (problems)	Japanese side facilities targeted for Project	Post-project
1.5	Pediatrics	▪ Located on the 1st floor of existing Building B, access to departments in other buildings such as the Laboratory and Operation Dept. is poor. ▪ There is a shortage of beds, with the bed occupancy rate for 22 beds (nominal) at 100% (2009~2014 average).	× Existing Building C will be renovated and ward will be relocated (Borne by Cambodian side)	▪ The ward will be relocated to existing Building C, improving access to various departments. ▪ The number of beds (22 nominal, 28 actual) will be increased to 42, which will secure an adequate number of beds for handling any future increase in the number of patients.
1.6	Ear, Nose, and Throat	▪ Located on the 1st floor of existing Building B, there are no major problems with the inside environment. ▪ Since the department has less interaction with other departments, there are no major problems in terms of patient access.	× Existing building used	▪ The ward will remain in its existing location, but renovation work necessary for procured equipment will be implemented.
1.7	Obstetrics	▪ Located on the 1st floor of existing Building C, access for pregnant women to the Obstetrics Ward and for transporting patients to the Laboratory or operation theaters is difficult since there are no slopes or elevators. ▪ The toilets are clogged and have become unusable, creating a poor living environment for patients. ▪ The Delivery Room is small, with 2 delivery beds pushed in. When there are multiple deliveries at the same time, they are sometimes performed in the delivery preparation room, which is a hallway separated by a single door and thus lacking privacy. ▪ The ward is crowded, with a bed occupancy rate of 96.1% (2009~2014 average), but a shortage in the number of beds is predicted for the near future with the increasing population.	○ Relocation to new building	▪ With the installation of slopes and elevators, access to other departments will be improved. ▪ The number of delivery beds will be increased to 3 to secure privacy. ▪ One of the delivery rooms is planned to have slightly more space. This will make it easier for nurse and midwife trainees to be present during births for training in deliveries. ▪ As is currently, 2 private rooms will be built. This will allow infectious patients to be isolated and increase consultation revenues. ▪ The number of beds will be increased from the nominal 18 to 32. These new beds will be sufficient to handle increased numbers, including any influx of patients from other provinces. The bed occupancy rate will be 90% (in 2020).
1.8	Gynecology	▪ Located on the 2nd floor of existing Building C, patient access and access to other departments is difficult since there are no slopes or elevators. ▪ There is a slight shortage of beds, with the bed occupancy rate at 103% (2009~2014 average).	○ Relocation to new building	▪ With the installation of slopes and elevators, access to other departments will be improved. ▪ Since the entrance and space will be separated from Obstetrics, privacy will be secured. ▪ The number of beds will be increased from the nominal 6 to 12, which will be sufficient to handle increased numbers, including any influx of patients from other provinces. The bed occupancy rate will be 90% (in 2020).
1.9	Dental	▪ Located on the 1st floor of existing Building B, there are no major problems with the inside environment. ▪ Since the department has less interaction with other departments, there are no major problems in terms of patient access.	× Existing building used	▪ The ward will remain in its existing location, but renovation work necessary for procured equipment will be implemented.
2.1	Imagery	▪ Located on the ground floor of existing Building B, it houses X-ray imaging apparatus and a radiation protection box, both of which were provided through Japanese Grant Aid. ▪ Since the X-ray room is not protected from radiation, the protective box had to be installed. Therefore, space in the room is not used efficiently. ▪ There is no patient waiting room, causing crowding in the hallway.	○ Relocation to new building	▪ This department will be included in the new building so that it can be adjacent to the new Emergency Dept. and Operation Dept. ▪ A radiation protected X-ray room will be built to prevent technicians from being exposed to radiation. ▪ An electrocardiogram room and ultrasound room will be built adjacently to enable centralized management of expensive equipment. ▪ The X-ray protection box will be relocated to Chiphu Hospital to secure the safety of X-ray technicians at that hospital.
2.2	Laboratory	▪ Located on the ground floor of existing Building A, the inside environment is satisfactory due to renovation work done in 2004.	× Existing building used	▪ The ward will remain in its existing location, but renovation work necessary for procured equipment will be implemented.
3.1	Administration	▪ Located on the 1st floor of existing Building A, there are no major problems with the inside environment. ▪ Since the department has less interaction with other departments, there are no major problems in terms of patient access.	× Existing building used	
3.2	Training rooms, Meeting rooms	▪ Meeting rooms are located on the 1st floor of existing Building A and the 2nd floor of existing Building C. There are no major problems with the inside environment of either. ▪ Since the department has less interaction with other departments, there are no major problems in terms of patient access. ▪ There are no dedicated rooms for training in the hospital, which is inconvenient for training activities.	× Vacant rooms in existing Building A and B will be renovated as training rooms. (Borne by Cambodian side)	▪ The Surgical Ward in existing Building A and the Pediatrics Ward in existing Building B will be relocated to existing Building C. The vacated rooms will be turned into training rooms and lodgings.
4.1	Sterilization Room, Laundry	▪ The Sterilization Room is located in a corner of the Operation Dept. on the ground floor of existing Building C. Access to the Operation Dept. is good, but poor for going to other departments. ▪ The Sterilization Room lacks adequate space, making work inefficient.	○ Relocation to new building	▪ Access from various departments that require sterilization such as the Operation Dept., Obstetrics, and Emergency will be improved. ▪ A path for collection → washing/assembly → sterilization → storage will be secured, ensuring cleanliness for sterilization equipment.

Request No.	Department	Current conditions (problems)	Japanese side facilities targeted for Project	Post-project
4.2	Workshop	▪ This is located in the existing Building H, but it is rarely used since there are no workers.	× Existing building used	▪ Facility maintenance management system will be established and the Workshop will be utilized properly.
5.1	Power receiving and generating facilities	▪ A 30 kVA power generator has been installed in existing Building G, but response to emergency power outages is delayed since it must be manually switched over.	○ Added for new building	▪ A generator for the new building will be installed, making it possible for operations and treatment to continue even during emergency power outages.
5.2	Drainage facilities	▪ Since the waste water storage tank is clogged with trash, waste water is discharged without passing through the storage tank. ▪ Waste water from laboratory testing and used developing fluid is discharged in the same manner as general waste water.	○ Added for new building	▪ A maintenance-free septic tank will be installed for the new building. Waste water will thus be discharged into the public sewer line after being treated.
6.1	Hallway, etc.		○	

2) Target Scale

The plans for facilities and equipment are based on the scale of examination and treatment, which includes the number of patients and operations. The scale will be planned with the goal set in 2020, 3 years after the completion of the new hospital.

① Population Trends and Projections of Svay Rieng Province

Svay Rieng Province consists of 3 Operational Districts (OD). National Highway 1 passes through both Svay Rieng OD and Chiphu OD, but does not pass through Romeas Haek OD. The population of both Svay Rieng OD and Chiphu OD show an increasing trend, but a decrease can be observed in Romeas Haek OD. This is an economic problem, with the decrease attributed to emigration to Vietnam. The population trends and projected population for 2020 due to natural growth in Svay Rieng Province are shown below.

Table 2-7 Population Trends and Projections for Svay Rieng Province

OD Name	2009	2010	2011	2012	2013	2014	Annual Average Growth Rate	Projection for 2020	Compared to 2014
						A	B	$C=A\times B^6$	D=C/A
Svay Rieng OD	315,289	321,111	326,097	329,602	335,526	340,445		373,293	109.65%
Year on year		101.85%	101.55%	101.07%	101.80%	101.47%	101.55%		
Romeas Haek OD	137,415	138,322	140,125	139,079	123,848	139,656		142,392	101.96%
Year on year		100.66%	101.30%	99.25%	89.05%	112.76%	100.32%		
Chiphu OD	107,029	108,901	110,770	113,134	114,043	114,190		123,420	108.08%
Year on year		101.75%	101.72%	102.13%	100.80%	100.13%	101.30%		
3 OD Total	559,733	568,334	576,992	581,815	573,417	594,291		639,105	107.54%
Year on year		101.54%	101.52%	100.84%	98.56%	103.64%	101.21%		

Source: Svay Rieng PHD

Using the 2020 projections from Table 2-7, the population growth rate due to natural growth that will be used is 107.54%, the average of the three ODs. Additionally, the influx of patients from other provinces as described below will also be taken into account.

② Projections for the influx of patients to the hospital from other provinces

At Kampong Cham Provincial Hospital, where a Japanese Grant Aid project was implemented in the past, the number of obstetrics patients rose dramatically past the number of patients forecast at the time of

planning, which led to a shortage of hospital rooms and delivery beds. This is likely due to the fact that since the hospital facilities and equipment were upgraded, patients that had previously been going to other hospitals began to visit Kampong Cham Provincial Hospital. Kampong Cham Province is especially impacted by patient influx from other provinces since it is surrounded by the 5 provinces of Kratie, Kampong Thom, Kampong Chhnang, Prey Veng, and Phnom Penh. It is also located at an important point as a hub on National Highway 7. In comparison, Svay Rieng Province is bordered only by Prey Veng Province on the west side, with all other sides surrounded by the Vietnamese border. Therefore, any influx of patients to the hospital from other provinces will likely be from Prey Veng Province only.

To set the scale of the Project, Kampong Cham Provincial Hospital will be used as a base reference to predict the number of patients that may come to Svay Rieng Provincial Hospital from other provinces.

■ Kampong Cham Provincial Hospital

- Number of deliveries at the time of planning: 1,024 per year (2004)
- Number of deliveries 3 years after completion of construction: 5,149 per year (2013); 71.3% annual increase after completion of construction
- Population of provinces surrounding Kampong Cham Province (2014 estimates taken from 2008 National Census): 2,569,017
  (Kratie: 370,447, Kampong Thom: 681,180, Kampong Chhnang: 535,444, Prey Veng: 981,946 Excludes Phnom Penh.)

■ Predictions for obstetric patient influx from other provinces to Svay Rieng Provincial Hospital

- Population of provinces surrounding Svay Rieng Province: 981,946 (Prey Veng Province only)
  Of the Prey Veng provincial population, people living in areas near Highway Route 1 are likely to flow into Svay Rieng Provincial Hospital. Thus, applying the population ratio of 0.6, which is the ratio of the total population of Svay Rieng Province living along Highway Route 1, the population flow into Svay Rieng Provincial Hospital from Prey Veng Province is estimated as follows:
  981,946×0.6÷2,569,017≒22.9%.
  The projected increase in number of patients is 16.3%, which is 22.9% of the 71.3% annual increase.
  Therefore, in the 3 years from the completion of construction for the Project in 2017 to 2020, an increase in the influx of patients from other provinces is estimated at a rate of $16.3\%^3$=<u>57.3%</u>.

③ Calculating the number of hospital beds

③−1) Reviewing the number of observation beds

With the increase in traffic on National Highway 1 due to the completion of the Neak Loeung Bridge in 2015, the movement of people and goods will become more active, and an increase in injuries due to traffic accidents is predicted.

Statistical data on the number of emergency patients to the Emergency Department begins in 2014, and although there are no statistics from 2013 or before, the number of patients in 2014 will be used as the basic data. The number of observation beds will be calculated by estimating the number of patients other than

those injured in traffic accidents by subtracting the average number of patients injured in traffic accidents from the number of emergency patients.

- The number of emergency patients for 2020 will be calculated using the population growth rate of 107.54%.
- According to the traffic demand predictions from the Preparatory Survey on the Project for the Construction of Neak Loeung Bridge in Cambodia (March 2009), it was reported that traffic volume on National Highway 1 will increase 1.33-fold from the time the Neak Loeung Bridge is completed in 2015 to 2020. The increase in the number of patients injured in traffic accidents is also assumed to increase 1.33-fold in 2020.
- Patients can be stay in observation beds for up to 24 hours.
- The planned bed occupancy rate is 90%.

From these results, the number of observation beds will be set at 8. Of these 8 beds, 1 will placed in a special observation room partitioned by a wall for use by patients in critical condition. A door will be installed in this room giving direct access to the corridor.

Table 2-8 Calculations for the Number of Observation Beds

	No. of patients						Average No. of patient A	Population Growth Ax107.54%	Traffic accident increase Bx1.33	Predicted No. of Patients in 2020 E=C+D	No. of Patients per Day F=E÷90% ÷365 日	Planned No. of Beds
	2009	2010	2011	2012	2013	2014*						
Emergency patients	---	---	---	---	---	2,056	2,056			2,493	7.59	8
Traffic accident injuries	419	872	913	878	1,037	646	794	854 B	1,136 D			
Non-traffic accident	---	---	---	---	---	---	1,262	1,357 C	---			

Source: Svay Rieng Provincial Referral Hospital
**The values for 2014 were estimated by doubling the figures for the first half of the year.*

③-2) Calculating the number of obstetrics and gynecology beds

The number of beds is calculated using the following conditions.

- The number of beds for obstetrics and gynecology from 2014 to 2020 is calculated using the average number of total inpatients from 2009~2014 and applying the 2020 growth rate (107.54 %) and the 57.3% increase in patients flowing in from other provinces.
- The planned bed occupancy rate is 90%.

Table 2-9 Calculations for the Number of OB/GY Beds

	Nominal No. of Beds	Total No. of Inpatients							Predicted No. of Patients for 2020 B=A×164.8%	No. of Inpatients per Day C=B÷90% ÷365 days	Planned No. of Beds
		2009	2010	2011	2012	2013	2014*	Average A			
OB	18	6,626	4,681	5,929	6,519	6,582	7,530	6,311	10,400	31.7	32
GY	6	2,078	2,392	2,365	2,616	2,317	1,826	2,266	3,734	11.4	12

Source: Svay Rieng Provincial Referral Hospital
**The values for 2014 were estimated by doubling the figures for the first half of the year.*

④ Calculating the number of operation theaters

As shown in Table 2-10, the average annual number of operations from 2009~2014 was 1,103. Applying the 2020 population growth rate of 7.54% and the 57.3% increase in patients flowing in from other provinces, it is projected the number of operations will increase to 1,818 in 2020. The planned number of operations per day is 7.77. This is calculated by using 234 days in a year, excluding holidays (public holidays, Saturdays, and Sundays). The time for each operation is estimated at 3 hours, which includes the preparation and clean-up before and afterwards. If 3 operations are performed per room per day, 3 rooms are necessary. Also, the number of operations performed on infectious patients is very low at 1.14 per day. Therefore, a dedicated operation theater will not be built, and UV-light sterilization procedures will be conducted after operations, as is done currently. However, in order to prevent hospital-acquired infection, the plan will enable personnel to enter and exit directly from the operation theater to external areas.

Table 2-10 Calculations for the Number of Operation Theaters

Type of Operation	No. of Operations							Predicted No. of Patients in 2020 B=A×164.8%	No. of Operations per Day C=B÷234 days	Planned No. of Operation Theaters D=C÷3
	2009	2010	2011	2012	2013	2014*	Average A			
OB/GYN	442	448	462	551	556	432	482			
Limbs	319	309	290	272	349	440	330			
Abdominal	159	191	214	225	260	216	211			
Fallopian tubes		39	173	52	77	60	80			
Total	920	987	1,139	1,100	1,242	1,148	1,103	1,818	7.77	3

Source: Svay Rieng Provincial Referral Hospital
**The values for 2014 were estimated by doubling the figures for the first half of the year.*

Table 2-11 Number of Operations on Patients with Infectious Diseases

	2009	2010	2011	2012	2013	Average A	No. of Operations per Day A÷234 days
No. of Operations on Patients with Infectious Diseases	250	192	311	271	315	268	1.14

Source: Svay Rieng Provincial Referral Hospital

⑤ Calculating the number of delivery beds

As shown in Table 2-12, the number of deliveries performed on delivery beds is 1,824 on average, excluding caesarean sections. By multiplying this number by the 2020 average population growth rate of 7.54% and the 57.2% growth rate of patients flowing in from other provinces, the number of deliveries for 2020 can be estimated at 3,006. The number of hospital deliveries shows a growing trend, and considering difficult deliveries and the large number of deliveries taking place in pre-dawn hours, the average time for delivery is 1.5 hours. Estimating that one delivery bed will used 4 times per day, the number of delivery beds can be calculated as 3 beds.

Table 2-12 Calculations for the Number of Delivery Beds

	Number of Deliveries							Predicted No. of Deliveries in 2020 B=A×164.8%	No. of Deliveries per Day C=B÷365 days	Planed No. of Delivery Beds D=C÷4
	2009	2010	2011	2012	2013	2014*	Average A			
Normal deliveries	995	803	1,473	1,665	2,032	1,996	1,494			
Abnormal deliveries	328	189	293	281	272	618	330			
Total	1,323	992	1,766	1,946	2,304	2,614	1,824	3,006	8.24	3

Source: Svay Rieng Provincial Referral Hospital
**The values for 2014 were estimated by doubling the figures for the first half of the year.*

⑥ Accommodating the medium to long term outlook

The SEZ outside on the outskirts of Bavet was established in 2005 when the SEZ ordinance came into effect. It is the oldest SEZ. The development of infrastructure such as electrical power is currently in progress, and the number of workers at SEZ factories has gradually increased thus far.

In the future, the EDC plans to complete work by 2016 on 115 kV power transmission lines between Phnom Penh and Bavet and the construction of a new substation on the west side of Bavet. The Government of Cambodia wants to develop power distribution lines from the substation to the SEZ, and although there is currently a plan for such, there are no prospects for securing financing. However, if this project is realized, power shortages in the Bavet-region SEZ will be resolved over the medium to long term. Thus, the number factories opening in the area will also move closer to the scale expected in the initial plan.

Due to these conditions, it is highly unlikely that the SEZ will grow dramatically by 2020, which is the year for which targets are set for this Project. Therefore, provincial population growth due to SEZ development will not be taken into account for setting the scale of the Project.

However, it is thought that power transmission lines will be built from the substation to the SEZ in the future. With the resolution of problems related to electrical power noted above, it is highly probable that the SEZ will develop further. Therefore, the Project spares future expansion ward in existing building C to accommodate the possible increase of patients.

3) Floor Plans

[Main Building]

① Outpatient Department

- The entrance will be separated from the Emergency Department to ensure the traffic paths with regular outpatients do not cross.
- Two consultation rooms will be built for conducting screening tests. Additionally, two shared staff preparation halls will be built to shorten walking distances for staff members, which makes considerations for increasing efficiency in personal allocations.
- A pharmacy and counseling rooms, etc. will be built in the Outpatient Department. By placing the Imagery Department adjacently, walking distances for patients will be shortened. Additionally, centralized personnel placement will allow for more efficient operations.
- By planning a large waiting room integrated with the entrance, considerations can be made for improving the current situation of patients waiting at the pharmacy or accounting overflowing into the Outpatient Department.
- The air conditioned areas and natural ventilation areas will be clearly separated in consideration of decreasing running costs.

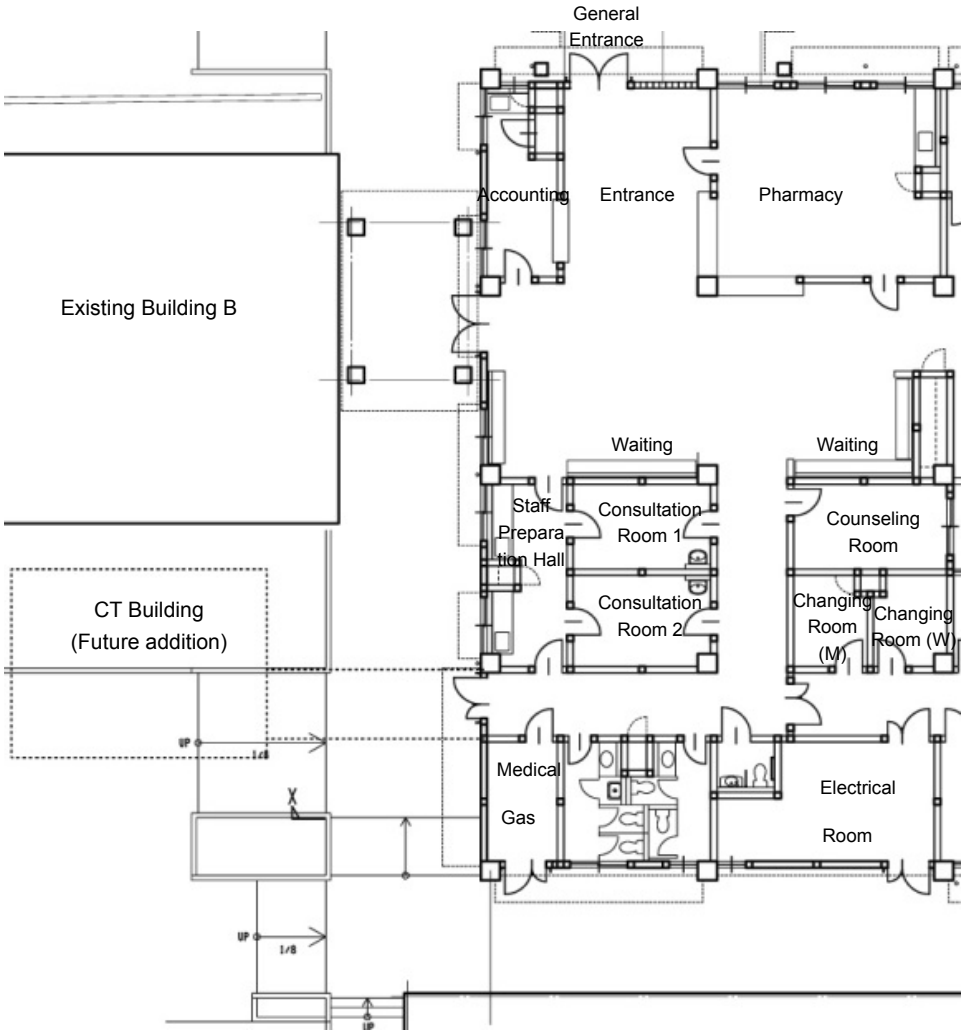


Figure 2-3 Outpatient Department Plan

② Emergency Department

- The entrance will be separated from the Outpatient Department to ensure the traffic paths with regular outpatients do not cross.
- A shower room will be installed near the entrance for conducting treatment in front of the Treatment/Consultation Room, which was not given consideration in the existing facility. Additionally, the creation of a family waiting room will ensure that families do not enter the Treatment/Consultation Room more than necessary.
- By separating the Treatment/Consultation Room and the Observation Rooms (One room is a Special Observation Room), the role of each emergency room will be made clear. This was unclear in the existing facility.
- By placing the Imagery Department adjacently, X-rays and other necessary imaging can be conducted by walking only a short distance.
- By installing an elevator for stretchers nearby to access to the Operation Department on the upper floor, considerations are made for transporting patients to the Operation Department using the shortest possible path.
- Air conditioning facilities will be installed in the Special Observation Room, while ceiling fans will be installed in the Treatment/Consultation Room and Observation Room. Thus, facilities will be installed depending on room usage to avoid an excess or shortage of equipment.
- By creating a Doctor's Duty Room and Nurse Duty Room, the work environment for medical personnel will be improved.

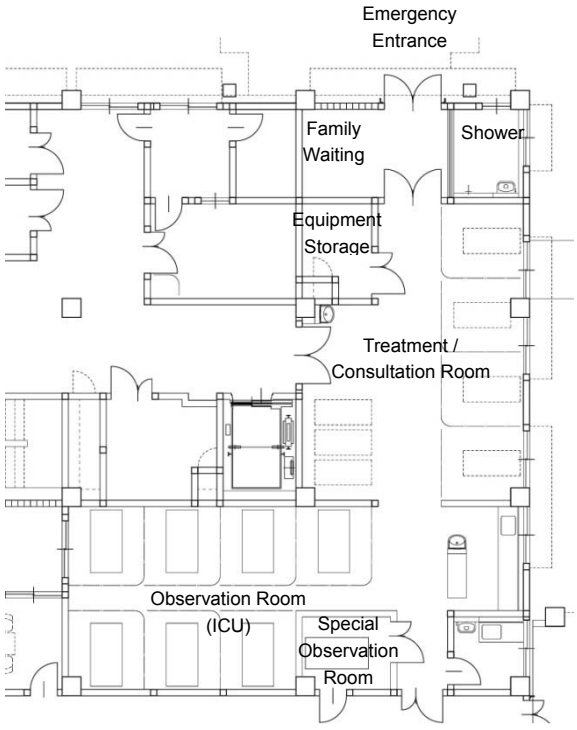


Figure 2-4 Emergency Department Plan

③ Imagery Department

- The Imagery Department will be places between the Outpatient Department and the Emergency Department. This shortens the walking distances for outpatients and improves efficiency for consultations focusing on imagery.
- In order to accurately manage records and collect fees from patients receiving imaging services, a reception desk for imaging will be established for more efficient management.
- A control room will be built in the general x-ray room to protect the operator from radiation exposure.
- X-ray apparatus in the Imagery Department will be digitalized. Therefore, although the need for developing films will be basically eliminated, a dark room will be installed for use in case the digital equipment malfunctions.
- Considering the possibility that the Cambodian side may install a CT scan machine in the future, space for adding a CT imaging room will be secured. (See Figure 2-3)
- A duty room for technicians will be built in consideration of improving the working environment and creating an advantage in terms of securing hospital personnel.

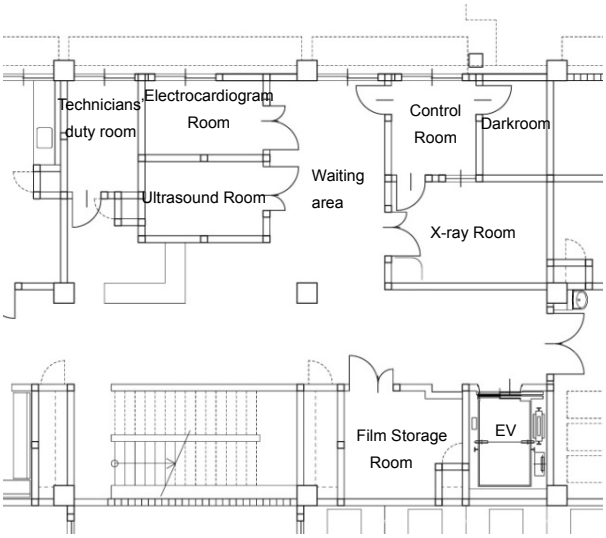


Figure 2-5 Imagery Department Plan

④ Operation Department/Central Sterilization Department

- By making the entire 1st floor the Operation Department, including staff rooms and various service rooms, increased efficiency for employee traffic and hospital operations will be made possible.
- Installation of an elevator connects the department with each floor, making more efficient communication with the Emergency Department and Obstetrics Department possible.
- As mentioned previously, 3 operation theaters will be built. One of these can be used for accommodating infectious patients.
- In the central sterilization area, a flow consisting of recovery, cleaning/sterilization, and assembly/storage will be established.
- A dedicated corridor connects the operation theaters and the cleaning room of the Sterilization Department. This makes it so the paths for transporting post-operative patients and equipment do not cross those of general patients or family members.
- Changing rooms and anterooms are placed at the entrance of the Operation Department to clearly designate the clean and semi-clean zones.
- The ICU is placed next to the operation theaters to allow concentrated post-operative observation.
- A Recovery Room will be built separately from the ICU, securing a space where personnel can check if the patient is stable before being transported to a hospital room.
- A staff station will be placed next to the ICU and Recovery Room, which shortens walking distances for staff members.
- Staff rooms (Chief Doctor's Office, Doctor's Office, duty rooms, and conference rooms, etc.) will be enhanced in consideration of improving the working environment and creating an advantage in terms of securing hospital personnel.

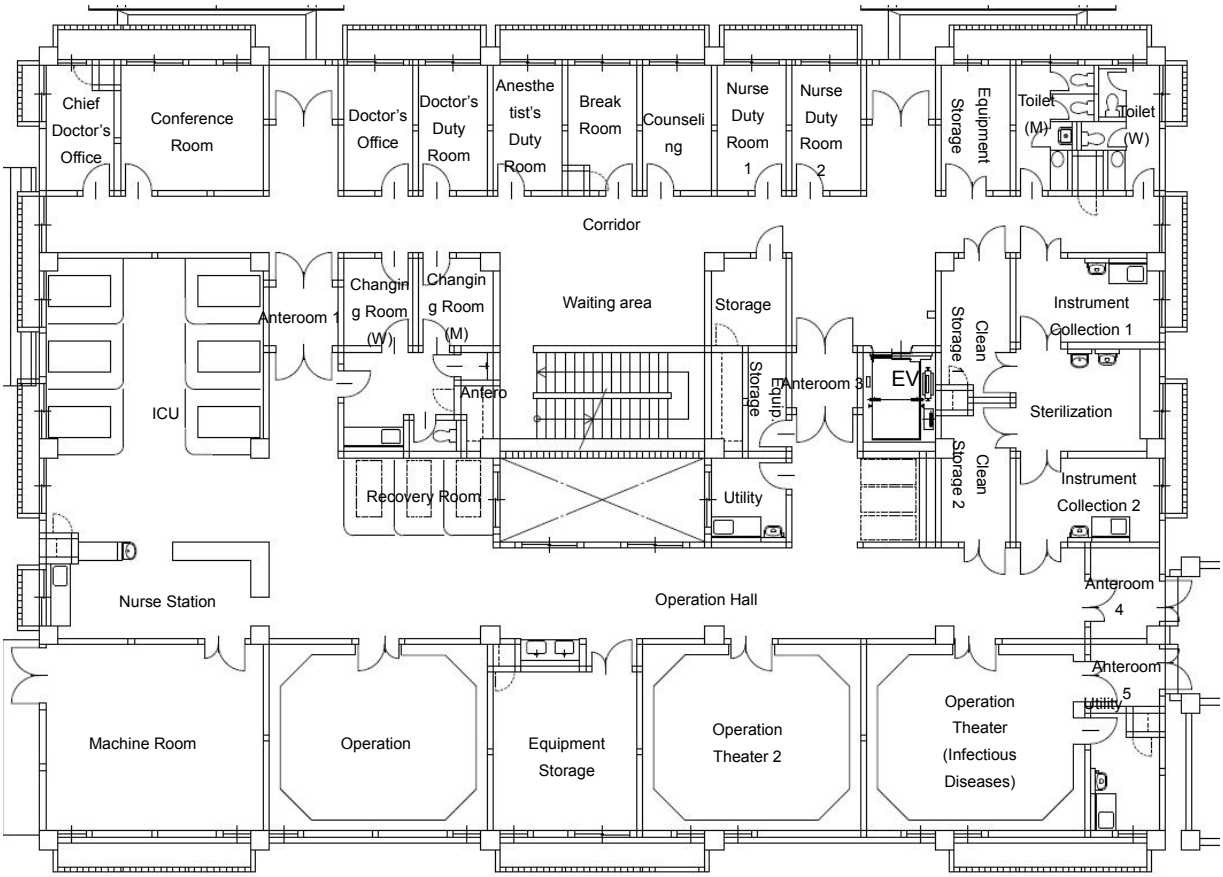


Figure 2-6 Operation Department/Central Sterilization Department Plan

⑤ Obstetrics Department

- The Obstetrics Department and Gynecology Department will be placed on the 2nd floor, but considerations will be made so that the traffic paths for each department will not cross. Additionally, by enhancing the Doctor's Office and other staff rooms in each department, the working environment will be improved.
- The Obstetrics Department includes delivery rooms with 3 delivery beds, as mentioned previously in the scale calculations. Additionally, by sharing the Preparation Hall, the walking distances for staff members will be shortened and medical equipment can be operated more efficiently.
- The Preparation Hall will double as an anteroom to secure privacy in delivery rooms.
- By building a Labor Room separately from the hospital rooms, the environment for handling hospital rooms will be made clear. This was unclear in the existing facilities.
- In addition to the Obstetrics Ward rooms with 8 beds and 6 beds, private rooms will be built, which will contribute to improving hospital revenue.

⑥ Gynecology Department

- By building an independent Counseling Room, Consultation Room, and Treatment Room in the Gynecology Department, the paths of patients here will not cross those of patients in the Obstetrics Department.
- By installing a door at the entrance of the Gynecology Department, the division of areas with the Obstetrics Department is made clear.

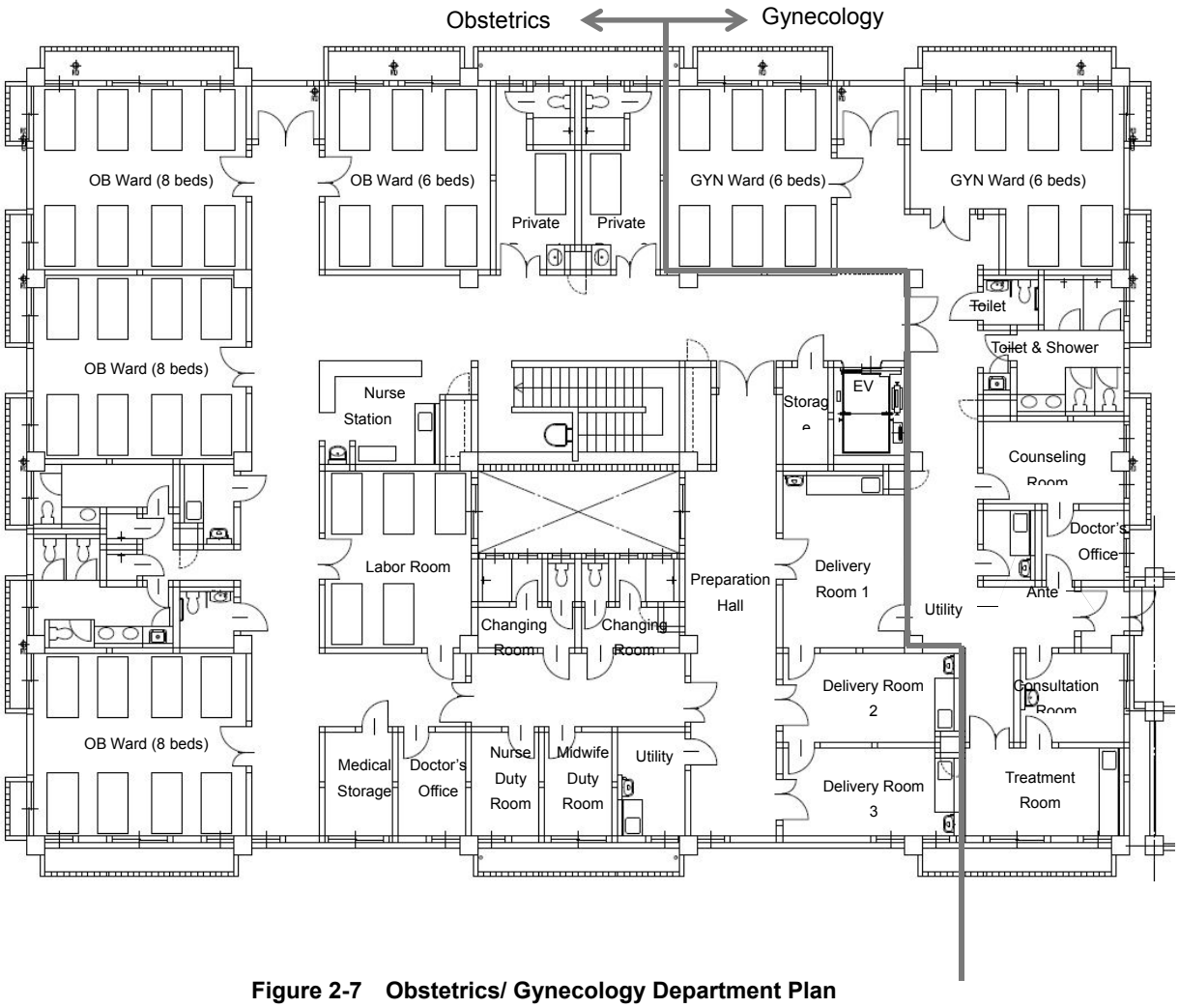


Figure 2-7 Obstetrics/ Gynecology Department Plan

⑦ Slopes/Walkways

- In the existing building (3 floors), patients currently either walk on their own or are transported up and down the stairs. However, with the installation of a new slope, patients can be transported on stretchers to the Operation Department and OB/GYN Department in the new main building of the hospital.
- By installing an elevated water tank using the structural frame of the slope building, construction costs will be reduced.
- A roof will be placed over the slope and walkway, which will allow people to move from the existing buildings to the new main building without getting rained on.

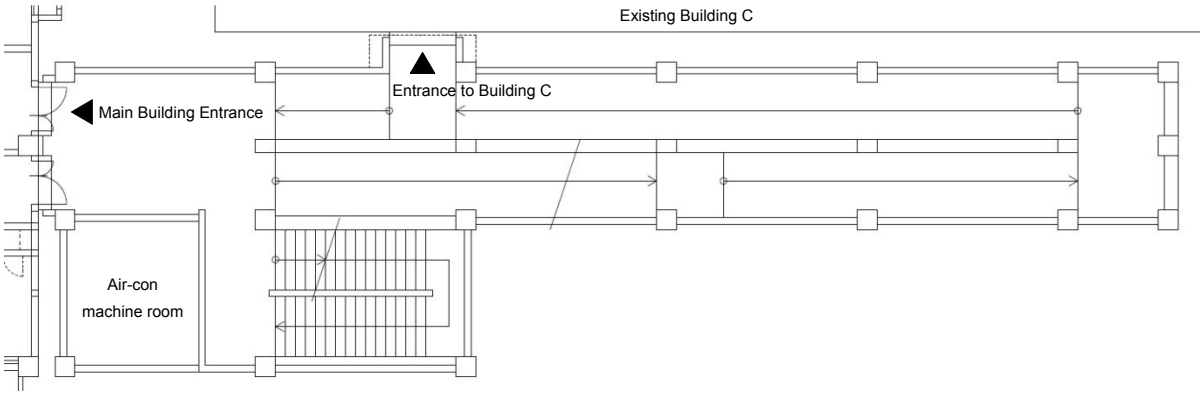


Figure 2-8 Slope 1st Floor Plan

4) Floor size table

Table 2-13 Floor Area of Each Building

Building	Department	Room	No. of Rooms	Area per Room (m^2)	Total Area (m^2)
Main Building	Outpatient Dept. 134.47m^2	Pharmacy	1	14.88	14.88
		Patient Waiting	1	17.00	17.00
		Counseling Room	1	14.50	14.50
		Consultation Room 1-3	3	13.95	41.85
		Staff Room	1	24.27	24.27
		Toilet for Handicapped	1	3.60	3.60
		Toilet (M)	1	8.90	8.90
		Toilet (W)	1	9.47	9.47
	Emergency Dept. 174.93m^2	Shower Room	1	7.20	7.20
		Family Waiting	1	6.87	6.87
		Consultation & Treatment Room	1	53.28	53.28
		Equipment Storage	1	8.16	8.16
		Observation Room	1	44.40	44.40
		Special Observation Room	1	7.50	7.50
		Nurse Station	1	8.40	8.40
		Utility	1	6.00	6.00
		Doctor's Office	1	9.60	9.60
		Nurse Duty Room	2	9.60	19.20
		Staff Toilet 1 & 2	2	2.16	4.32
	Imagery Dept. 121.42m^2	Reception	1	7.55	7.55
		Staff Duty Room	1	8.05	8.05
		ECG Room	2	8.88	17.76
		Ultrasound Room	1	8.88	8.88
		Patient Waiting	1	22.32	22.32
		Control Room	1	8.10	8.10
		Dark Room	1	6.30	6.30
		X-ray Room	2	15.36	30.72
		Film Storage	1	11.74	11.74

Building	Department	Room	No. of Rooms	Area per Room (m^2)	Total Area (m^2)
	Operation Dept. (CSSD) 816.64m^2	Chief Doctor's Office	1	10.08	10.08
		Conference Room	1	20.16	20.16
		Doctor's Office	1	10.08	10.08
		Doctor's Duty Room	1	10.08	10.08
		Anesthetist's Duty Room	1	10.08	10.08
		Rest Room	1	10.08	10.08
		Counseling Room	1	10.08	10.08
		Nurse Duty Room1, 2	2	10.08	20.16
		Equipment Storage	1	10.08	10.08
		Toilet (M)	1	9.87	9.87
		Toilet (W)	1	9.24	9.24
		Corridor 4	1	99.60	99.60
		ICU	1	64.80	64.80
		Recovery Room	1	14.50	14.50
		Nurse Station	1	24.48	24.48
		Anteroom 1	1	5.04	5.04
		Anteroom 2	1	10.77	10.77
		Changing Room (M)	1	7.20	7.20
		Changing Room (W)	1	7.80	7.80
		Toilet 3	1	2.22	2.22
		Shower Room	1	1.37	1.37
		Family Waiting	1	20.40	20.40
		Storage	1	7.80	7.80
		Equipment Storage	1	4.76	4.76
		Utility	1	7.54	7.54
		Anteroom 3	1	4.60	4.60
		Sterilization Room	1	11.16	11.16
		Instrument Collection Room	2	13.92	27.84
		Clean Storage	2	10.74	21.48
		Operation Hall	1	116.97	116.97
		Anteroom 4	1	7.44	7.44
		Anteroom 5	1	5.28	5.28
		Machine Room	1	44.64	44.64
		Operation Theater 1-3	3	44.64	133.92
		Equipment Storage	1	25.44	25.44
		Utility	1	9.60	9.60
	Obstetrics Dept. 607.56m^2	OB Ward (8 beds)	3	44.64	133.92
		OB Ward (6 beds)	1	34.72	34.72
		Private Room 1 & 2	2	17.08	34.16
		Nurse Station	1	14.58	14.58
		Utility	1	5.60	5.60
		Toilet (M)	1	9.36	9.36
		Toilet (W)	1	14.64	14.64
		Toilet for Handicapped	1	4.40	4.40
		Shower Room 1 & 2	2	1.44	2.88
		Labor Room	1	30.00	30.00
		Medical Storage	1	8.64	8.64
		Doctor's Office	1	8.64	8.64
		Anteroom	1	18.72	18.72
		Changing Room 1&2	2	5.10	10.20
		Shower Room 1 & 2	2	3.68	7.36
		Toilet 1&2	2	1.76	3.52
		Nurse Duty Room	1	8.64	8.64
		Midwife Duty Room	1	8.64	8.64
		Utility	1	8.64	8.64
		Preparation Hall	1	43.17	43.17
		Delivery Room 1	1	25.20	25.20
		Delivery Room 2&3	2	18.60	37.20
		Corridor 5	1	75.20	75.20
		Corridor 6	1	59.53	59.53

Building	Department	Room	No. of Rooms	Area per Room (m^2)	Total Area (m^2)
	Gynecology Dept. 212.44m^2	GY Ward (6 Beds)	1	34.72	34.72
		GY Ward (6 Beds)	1	38.39	38.39
		Toilet & Shower Room	1	16.14	16.14
		Toilet for Handicapped	1	3.60	3.60
		Counseling Room	1	13.92	13.92
		Utility	1	4.75	4.75
		Doctor's Office	1	7.25	7.25
		Anteroom	1	3.52	3.52
		Consultation Room	1	11.16	11.16
		Treatment Room	1	16.74	16.74
		Corridor 7	1	62.25	62.25
	Administration Dept. 156.50m^2	Administration Office	1	44.64	44.64
		Public Address	1	3.24	3.24
		Laundry	1	19.20	19.20
		Pump Room	1	9.00	9.00
		Meeting Room	1	21.08	21.08
		Changing Room (M)	1	7.75	7.75
		Changing Room (W)	1	7.75	7.75
		Storage	1	9.84	9.84
		Electrical Room	1	24.40	24.40
		Manifold	1	9.60	9.60
	Others	Entrance, Corridor, Stair, etc.			394.29
				Total	2618.25
Slope					556.70
				Grand Total	3174.95

5) Cross-Section Plan

① The exterior will adhere to Cambodian traditions and feature a sloped roof as the focal point of the design. Figure 2-9 is a standard cross-section drawing.

② The floor level of the ground floor will be approximately 500 mm above the ground level to prevent flooding from heavy rains. Thus, slopes will be built accordingly around the building in order to secure smooth passage for wheelchairs and stretchers, and for the loading and unloading of supplies. Furthermore, a flood barrier will be installed at the entrance of the ground floor, which will prevent rain from seeping into the building even in the unlikely case that flood levels exceed 500 mm.

③ Ceilings will be raised in patient rooms designed to take advantage of natural wind passage to ensure an air volume.

④ Eaves will be built to block direct sunlight from entering rooms and prevent rainwater from seeping into the walls.

⑤ Ceiling heights in each department will be determined based on the following ceiling heights:

- Ceiling height will be 2.7m in air-conditioned rooms.
- Ceiling height will be 4.0m in rooms that take advantage of natural wind passage in line with CPA standards.
- Ceiling height will be 3.2m in non-air-conditioned rooms other than patient rooms to account for clearance from ceiling fans which hangs 350 ~ 450mm from ceiling.
- Ceiling height in corridors will be 3.0m to take advantage of natural wind passage.

⑥ An underground pit will be established so that the worker can directly access to the underground pit for pipe maintenance.

⑦ Glass wool will be installed in the ceiling of the Machine Room on the top floor to improve cooling efficiency.

⑧ In order to reduce heat radiated from the sun in the attic, cemented excelsior board will be used for the roof substrate since it has a higher level of thermal insulation than plywood. Louvers will also be installed in the attic for ventilation.

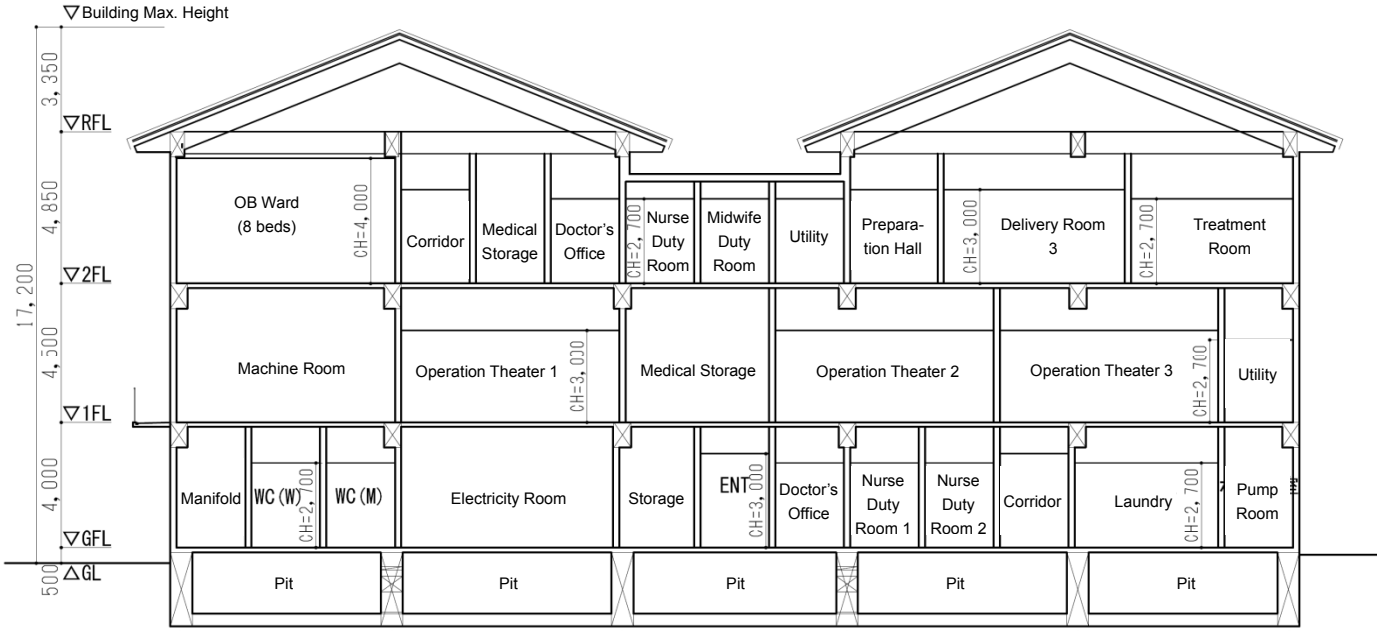


Figure 2-9 Typical Building Section

6) Structure Plans

① Structure plan conditions

- Earthquakes: Cambodia is located far away from the zone in which earthquakes originate in the Pacific Rim, and there are no records of damage from past earthquakes.
- Typhoons: There has been no damage from typhoons in Cambodia, but there are many floods and strong winds. In August 2000, there was large-scale damage in Svay Rieng Province due to flooding. Since then, an embankment has been built and there is currently almost no risk of flooding. Additionally, since past wind speed records from the Svay Rieng Weather Bureau records suggest that wind pressure is at about the same level as Japan, this data will be used to formulate the structure plan.
- Soil properties: From data from geological surveys conducted at the Project site, the strata is composed almost entirely of silt-like clay, with organic soil found in some parts. The N-value is 0~3 at approximately 1.0 m from the ground surface, 8~13 at approximately 2.0 m, and 10~14 at approximately 3.0 m. Since the ground contains organic soil, it is necessary to consider soil stabilization by mixing and compounding the original soil and uneven settlements.

② Structure plans

- Structure type: Principal structures are made of reinforced concrete based on the ease of procuring locally, cost, and performance.
- Frame: In principle, and in areas other than the X-ray Room and some staircases, rigid frame structures will be built rather than concrete walls because there are no earthquakes at the site and because mold precision is poor. The sloped roof will consist of reinforced concrete pillars and beams. The standard roof will have a steel substrate. Due to the condition of the ground, the floor on the ground floor will be of structural concrete slab.

③ Foundation plans

- A mat foundation will be built because the small N-value of the surface soil does not have much bearing capacity, and because of the uneven settling of the soft ground containing organic soil.
- Taking the N-value and embedment effects into account, soil bearing capacity will be evaluated and designed using a bearing capacity formula. Bearing capacity testing will also be conducted after construction begins to confirm safety.

④ Design Load

- Earthquake load: There is no past record of earthquake in Cambodia, but main frames other than brick walls will be built to withstand small to minor earthquakes according to the Japanese Building Standards Act. The earthquake load is half the seismic force used for designs in Japan.
- Wind load: There is no past record of typhoon damage in Cambodia, but main frames other than brick walls will be built according to the Japanese Building Standards Act with regard to wind speed records. They will be the same as Tokyo (reference wind speed V0=34 m, roughness class III).
- Movable load: Refer to Table 2-14 for enforcement orders of the Japanese Building Standards Act.

Table 2-14 Main Movable Load Capacity

Room Usage	Movable Load (N/m^2)			Remarks
	For Floor	For Frames	For Earthquake	
Ward Room	1800	1300	600	
Treatment Room-Related	2900	1800	800	
Consultation Room, Corridor	3500	3200	2100	
Operation Theater, ICU	3900	2400	1600	
Machine Room	4900	2400	1300	Dependent on weight of equipment
Storage	7800	6900	4900	

Based on National Building Code of Japan, etc.

⑤ Materials

- Concrete: From the results of field surveys, it was determined that concrete will be fabricated using aggregate and cement within Cambodia. Since the concrete cannot be fabricated at a plant, it will be mixed on site. However, appropriate mix proportioning and test mixing will be performed to confirm design strength.
- Reinforcement bar: Deformed reinforcement bar made in Vietnam can be procured in Cambodia and will be used. Truck cranes (25t) will be used to haul materials on site. Fabrication will occur at an on-site fabrication facility. For quality control, an official examination agency from Phnom Penh will conduct tensile strength testing and bend testing on the reinforcement bar before it is transported to the site in Svay Rieng.
- Structural steel: Imported structural steel from Vietnam can be procured in Cambodia and will be used, and they will be processed at a plant in Phnom Penh before being transported to the site. A truck crane (25t) will be used to erect the structural steel.

7) Electrical and Mechanical Facility Plans

① Electrical facility plans

a) Substation facilities

- Since electric company EDC has 22 kV high-voltage lines on the road adjacent to the west side of the site, electrical power will be tapped through a leading-in pole on the west side of the hospital grounds. Within the site, power will be received through buried cables leading to the substation facilities.
- New substation facilities will be installed inside the building, with power stepped down to 380V/220V and distributed within the new hospital building.
- For the division of the construction work, EDC on the Cambodian side will handle work for bringing power to the site, and the Japanese side will handle the rest of the construction work including installation of the substation facilities.
- Only facilities newly constructed for the Project will be supplied with power resulting from this construction. Supplying power to existing facilities will not be considered.

b) Trunk line facilities

- An electrical room will be placed within the building, and an electricity diverter panel will be installed. From there, electricity will be supplied and distributed at 220V.

- Power supply specifications will be planned as 1φ220V and 3φ380V.

c) Emergency generator facilities

- Since power outages occur very frequently under present conditions, emergency power generator facilities will be installed so that medical activities will not be impeded in important rooms such as the operation theaters, ICU, emergency, and delivery rooms. The supply equipment on the generator circuit will be thoroughly inspected to ensure that the generator capacity is not excessive.
- The electric system to supply power to medical equipment requiring a stable power supply will be separated and a power supply stabilizer will be installed.

d) Lighting/outlet facilities

- A lighting plan will be followed, setting the lighting intensity in each room at approximately 100~200 lx.
- Lighting fixtures will primarily use fluorescent bulbs since they can be replaced locally at low cost. Additionally, in locations where it is difficult to change the fixtures, low-maintenance, long-life LED lighting will be used.
- Allocation of outlets will follow a plan of approximately 1 outlet for every 1 or 2 beds, which is also the current allocation.

e) Communications facilities

- Telephone-type intercoms will be installed in rooms where they are required for medical activity and in rooms where staff members are stationed.
- Wi-Fi equipment will be installed on each floor for internet connectivity, as is currently done in existing Buildings A and C. Since routers depend on local lines, the hospital will install these as separate construction work.
- In staff rooms and in spaces where patient families are waiting, televisions with individual antennas will be installed.
- Only facilities newly constructed for the Project will be connected to communication facilities resulting from this construction. Connection to existing facilities will not be considered.

f) Disaster management facilities

- Fire alarm equipment and broadcasting equipment for evacuation guidance will be installed as disaster management facilities. Sensors will not be installed because maintenance is difficult for the hospital side. Instead, push-button fire alarm equipment will be used.
- Spotlights with built-in batteries will be installed as emergency lighting.

g) Lightning protection facilities

- Since there are no lighting protection facilities anywhere in the surrounding area, including the existing buildings, lighting rods will be installed on the new building to provide lighting protection.
- The lightning conductor rod will be placed on the elevated water tank of the new building, which is the highest part of the hospital facilities.

② Mechanical Facility Plan

a) Water supply facilities

- Since the water source can supply a sufficient amount of water and the water quality is satisfactory, the Svay Rieng Province public water supply will be used.

- There is a water main near the hospital grounds, and new piping will be installed for the exclusive use of the new hospital building.
- For the division of construction work, the waterworks bureau on the Cambodian side will handle work up to the water supply lead-in, and the Japanese side will handle the construction from the newly installed water meter.
- Water will be supplied through an elevated water tank method to accommodate power outages and water shut-offs. The water receiving tank is constructed of highly safe stainless steel panels that enable inspections from 6 directions. The elevated water tank will also be made of stainless steel, which can easily be procured locally.
- Only facilities newly constructed for the Project will be supplied with water as a result of this construction. Supplying water to existing facilities will not be considered.

b) Hot water facilities

- Hot water will be provided through a localized system, with wall-mounted electric instantaneous water heaters installed in necessary places.
- Hot water will be supplied in the shower room of the Emergency Department, the delivery rooms, and the central sterilization room.

c) Sewage facilities

- Sewage and miscellaneous wastewater from inside buildings leaves the buildings in separate pipes, merges together in the first sump outside the building, and is carried via a natural slope to a simple septic tank.
- For the division of construction work, the hospital side will handle construction up to the final sump on the grounds, and the waterworks bureau will handle construction from there to the connection to the main sewer line.
- In principle, rainwater and drainage from air conditioners will be drained naturally through the ground.
- A sump pump will be installed the pit as a measure against seeping ground water.
- Only facilities newly constructed for the Project will benefit from this wastewater facility construction. Wastewater for existing facilities will not be considered.

d) Sanitary equipment

- Toilet basins, wash basins, utility sinks, and other sanitary equipment will be installed in the toilets.
- All toilet basins will be Western-style with attached handheld showers.
- A low tank system will be used, as is with the existing facilities.

e) Fire control facilities

- There is no fire department in Cambodia. When a fire occurs, firefighting activities are performed under the direction of the police. Although a fire code was established in 2013, there are no specific regulations. Fire control facilities required for small-scale buildings of 3 stories or less are determined upon discussions with the provincial police. For this Project, it is being confirmed with the Svay Rieng Provincial Police Department that there are no objections to the fire control facilities planned by the Japanese side.
- Fire extinguishers and indoor fire hydrants will be installed as fire control facilities that can be maintained locally.

- Only wards newly constructed for the Project will benefit from construction of these fire control facilities. No such cautions will be considered for existing wards.

f) Septic tank facilities

- Septic tanks will be installed with a trickling filter system as this structure is simple with low maintenance costs.
- Only the wards newly constructed for the Project will benefit from this septic tank facility construction. Waste treatment for existing wards will not be considered.

g) Medical gas facilities

- A central supply of oxygen will be available for the emergency treatment room, observation room, ICU, operation theaters, recovery rooms, labor room, and delivery rooms.
- Oxygen cylinders will be installed in the manifold rooms, and oxygen will be delivered through outlets in rooms that require oxygen. Two banks will be installed for the cylinders, and switching between cylinders will be automatic.
- In principle, the number of outlets will be 1 for every bed.

h) Air conditioning facilities

- Air conditioners will be installed in operation theaters, ICU, delivery rooms, room with hospital beds, x-ray room, ultrasound room, pharmacy, accounting, conference rooms, and break rooms, etc.
- For operation theaters, a dedicated machine room will be built and packaged air-cooled floor units that blow through ducts will control air temperature.
- Split air-cooled units will be installed in rooms other than operation theaters. Taking maintainability into consideration, mechanically complicated multi-split type units will not be used.
- Ceiling fans will be installed in rooms used by people where air conditioners are not installed.

i) Ventilation facilities

- In order to reduce initial costs and running costs, natural ventilation is planned for non-air conditioned rooms and air-conditioned rooms with windows.
- Exhaust ventilation-type facilities will be installed in air-conditioned rooms without windows, rooms requiring a degree of cleanliness, and rooms without windows requiring ventilation. One ventilation system per room will be installed so that it can be turned on and off with simple manual controls.
- Positive pressure will be ensured in operation theaters and the ICU. Negative pressure will be maintained in the operation theater for infectious patients so that exhaust can be blown out from inside the room.

8) Construction Materials Plans

General construction materials and methods used locally that are easy to maintain will be used as the standard specifications. Construction specifications will be examined taking into the account the following cautionary points.

- The site is located inland, and no salt damage was observed, but the use of steel will be avoided as much as possible. If steel is used, it is to be coated with rust proofing. Fittings (doors and windows) will consist mainly of aluminum sash and aluminum doors.
- Damage to lumber caused by termites is seen occasionally in Svay Rieng Provincial Hospital. The use of lumber will be avoided as much as possible. If lumber is used, it is to be treated with termite repellent.

Based on the above, standard specifications are as shown in Table 2-15 and Table 2-16.

Table 2-15 Exterior Finish

Parts	Finishing
Roof	Cement roof tile on steel beam and purlin, fiber cement board with asphalt roofing
Exterior Wall	Emulsion paint on mortar trowel (below GL+400), Washed gravel finish (above GL+400)
Doors & Windows	Colored Aluminum Sash

Table 2-16 Interior Finish

Rooms	Finishing			
	Floor	Base board	Wall	Ceiling
Entrance Hall	Non-slip ceramic tile	Ceramic tile	Ceramic tile	EP
Consultation Room, Treatment Room, etc.	Ditto	Ditto	Ceramic tile, EP above cross bar	Acoustic rockwool board
Offices, Wards, Nurse Station, etc.	Ditto	Ditto	Ditto	Ditto
Corridors, Stairs	Ditto	Ditto	EP	Ditto
Operation Theater, Minor Operation Theater, Delivery Room	Ditto	Ditto	Ceramic tile	EP
Utility, Toilet, Shower Room, etc.	Ditto	Ditto	Ceramic tile, EP above cross bar	Ditto
Medical Record Storage, Film Storage	Ditto	Ditto	EP	Acoustic rockwool board
Machine Room, Generator Room, Electric Room	Dust preventive resin	Dust preventive resin	Glasswool mat	Glasswool mat
Water Tank Room	Ditto	Ditto	Mortar trowel	Exposed ceiling

(3) Equipment Plan

1) Investigating Request Details

Final request equipment organized through field surveys will be selected according to the CPA Guideline Standard Equipment List put forth by the MOH, and, in general, the details are relevant. However, another investigation of relevance was performed within the country by setting the following selection criteria and adding investigations for each piece of equipment.

[Equipment Selection Criteria]

① Conformity to the content of activities
Verification will be made on whether the equipment is necessary for medical care that is currently implemented at the hospital, is planned for implementation in the future, and is guaranteed to be implemented.

② Evaluation of cost-effectiveness (frequency of use, priority level, etc.)
Although it conforms to the nature of activities, the level of necessity will be evaluated in terms of if the equipment is very expensive but used very infrequently, or if it falls within the scope of targeted medical care but has a very low priority, etc.

③ Relevance in terms of overlap with existing equipment or equipment planned for procurement
Verification will be made regarding the necessity of equipment upgrades or additions if the equipment requested has the same functions as existing equipment and can be procured.

④ Conformity to the skill level of users
Verification will be made on whether the requested equipment is currently in use, if the hospital has experience in using it, and that there are no problems in its operation.

⑤ Relevance in terms of costs related to operations
Even if relevance is recognized for other items, it is sometimes the case that adequate operation of equipment is difficult after its installation if it is expensive to do so. From this viewpoint, verification will be made on whether the costs necessary to operate the requested equipment can be covered by the hospital's operational budget.

⑥ Conformity to Japanese grant aid schemes
There are pre-set standards for Japanese grant aid projects such as the exclusion of general-use furniture and equipment provided for personal use. It will be confirmed that none of these standards are applicable to the equipment provided.

⑦ Conformity to facilities
Verification will be made on whether there is a suitable location for placing the requested equipment, and if a suitable environment and necessary utilities have been maintained.

Evaluations regarding the evaluation items above are made using the following three levels.

Evaluation criteria

3: No problems

2: Relevance is recognized, but there some concerns

1: Many points for concern

For the overall evaluation for each piece of equipment, the score for all of the above items will be totaled. Equipment with less than 20 points will be judged to have a low level of relevance, and will not be included in the planned equipment.

The evaluation results for all of the equipment are as shown in Table 2-17.

Table 2-17 Evaluation Chart for Equipment Relevance

Code No.	Description of Medical Equipment	Evaluation Criteria								Remarks (Special Notations)	Planned Quantity
		①	②	③	④	⑤	⑥	⑦	Overall Evaluation		
1. Outpatients Consultations											
OD-01	Sterilizing Drum	3	3	3	3	3	3	3	21	Planned as requested due to relevance.	2
OD-02	Film Viewer	3	3	3	3	3	3	3	21	Ditto	1
OD-03	Diagnostic Set	3	3	3	3	3	3	3	21	Ditto	1
OD-04	Weighing Scale (Adult)	3	3	3	3	3	3	3	21	Ditto	1
OD-05	Instrument Tray Stand	3	3	3	3	3	3	3	21	Ditto	1
OD-06	Stretcher	3	3	3	3	3	3	3	21	Ditto	2
OD-07	Examination Bed	3	3	3	3	3	3	3	21	Ditto	3
OD-08	Doctor's Desk & Chair	3	3	3	3	3	3	3	21	Ditto	3
OD-09	Examination Light	3	3	3	3	3	3	3	21	Ditto	2
OD-10	Patient Stool	3	3	3	3	3	3	3	21	Ditto	3
2. E.N.T Unit											
EN-01	Tonsillectomy and Adenoidectomy Set	3	3	3	3	3	3	3	21	Planned as requested due to relevance.	2
EN-02	Examination Instrument Set for ENT	3	3	3	3	3	3	3	21	Ditto	1
EN-03	ENT Surgical Unit	3	3	3	3	3	3	3	21	Ditto	1
EN-04	Instrument Tray Stand	3	3	3	3	3	3	3	21	Ditto	2
EN-05	ENT Chair w/ENT Unit	3	3	3	3	3	3	3	21	Ditto	1
EN-06	Film Viewer	3	3	3	3	3	3	3	21	Ditto	1
EN-07	Irrigation Stand	-	-	-	-	-	-	-	-	Removed from request due to duplication.	-
EN-08	Head Light	3	3	3	3	3	3	3	21	Planned as requested due to relevance.	1
3. Dental Unit											
DT-01	Hand Instrument Set for Dental	3	3	3	3	3	3	3	21	Planned as requested due to relevance.	1
DT-02	Dental Chair Unit	3	3	3	3	3	3	3	21	Ditto	2
DT-03	Micro Motor	3	3	3	3	3	3	3	21	Equipment is relevant. However, it will be removed as an item since it is planned for inclusion as an accessory in the Dental Consultation Unit.	-
DT-04	Ultrasonic Scaler	3	3	3	3	3	3	3	21	Ditto	-
DT-05	Light Cure Machine	3	3	3	3	3	3	3	21	Ditto	-
DT-06	Dental X- ray Machine	3	3	3	3	3	3	3	21	Planned as requested due to relevance.	1
DT-07	Autoclave	3	3	3	3	3	3	3	21	Ditto	1
4. Emergency Services Department & ICU											
EM-01	Suction Machine (Electric)	3	3	3	3	3	3	3	21	Planned as requested due to relevance.	3
EM-02	Suction Machine (Foot operating)	3	2	3	3	3	3	3	20	Ditto	1
EM-03	Wash Hand Bowl Stand	3	3	3	3	3	3	3	21	Ditto	2
EM-04	Dressing Cart	3	3	3	3	3	3	3	21	Ditto	3
EM-05	Denudating Set	3	3	3	3	3	3	3	21	Ditto	2
EM-06	ICU Bed	3	3	2	3	3	3	3	20	There are normal ward beds in good condition, but since they are unsuitable for ICU patients, this will be upgraded.	6

Code No.	Description of Medical Equipment	Evaluation Criteria								Remarks (Special Notations)	Planned Quantity
		①	②	③	④	⑤	⑥	⑦	Overall Evaluation		
EM-07	Film Viewer	3	3	3	3	3	3	3	21	Planned as requested due to relevance	1
EM-08	Irrigation Stand	3	3	3	3	3	3	3	21	Ditto	6
EM-09	Oxygen Cylinder Set	3	3	3	3	3	3	2	20	Content changed to oxygen inhaler set since a central oxygen line is planned for new facility. (Item will be deleted and added as new item.)	-
EM-10	Patient Monitor	3	3	2	3	3	3	3	20	4 are appropriate since there are 4 emergency beds.	4
EM-11	Ventilator	3	3	2	3	3	3	3	20	2 are appropriate since there is 1 existing ventilator in good condition and 4 emergency beds.	2
EM-12	Defibrillator	3	3	1	1	3	3	3	17	Excluded from plan since there is existing equipment in good condition.	-
EM-13	Operating Light (Mobile)	3	3	3	3	3	3	3	21	Planned as requested due to relevance	2
EM-14	ECG Unit	3	3	3	3	3	3	3	21	Ditto	1
EM-15	Ultrasonic Scanner	3	3	3	3	3	3	3	21	Ditto	1
EM-16	Stretcher	3	3	3	3	3	3	3	21	Ditto	2
EM-17	Nebulizer	3	3	3	2	3	3	3	20	1 is appropriate based on no. of patients.	1
EM-18	Syringe Pump	3	3	3	3	3	3	3	21	Planned as requested due to relevance	2
EM-19	Infusion Pump	3	3	3	3	3	3	3	21	Ditto	2
EM-20	Phototherapy Unit	3	2	3	3	3	3	3	20	Ditto	1
EM-21	Infant Incubator	3	3	3	3	3	3	3	21	Ditto	1
EM-22	Emergency Bed	3	3	3	3	3	3	3	21	Ditto	4
EM-23	Dressing Instrument Set With Cart	3	3	3	3	3	3	3	21	Ditto	3
EM-24	Instrument Tray Stand	3	3	3	3	3	3	3	21	Ditto	2
EM-25	Sterilizing Drum	3	3	3	3	3	3	3	21	Ditto	2
EM-26	Doctor's Desk & Chair	3	3	3	3	3	3	3	21	Ditto	2
EM-27	Patient Stool	3	3	3	3	3	3	3	21	Ditto	1
5. Operating Theater											
OT-01	Anesthesia Machine	3	3	3	3	3	3	2	20	Quantity will be 3 since there are 3 Operating Theaters.	3
OT-02	Suction Machine (Electric)	3	3	3	3	3	3	2	20	Ditto	3
OT-03	Suction Machine (Foot Operation Type)	3	2	3	3	3	3	3	20	Although frequency of use is low, will be planned as requested for use in emergencies.	1
OT-04	Dressing Cart	3	3	3	3	3	3	2	20	Quantity will be 3 since there are 3 Operating Theaters.	3
OT-05	Electro Surgical Unit	3	3	3	3	3	3	3	21	Planned as requested due to relevance	2
OT-06	Operating Light (Ceiling Mount Type)	3	3	3	3	3	3	2	20	Quantity will be 3 since there are 3 Operating Theaters.	3
OT-07	Film Viewer	3	3	3	3	3	3	3	21	Ditto	3
OT-08	Oxygen Cylinder Set	3	1	1	3	3	3	3	17	Unnecessary since the new facilities will have a central line.	-

Code No.	Description of Medical Equipment	Evaluation Criteria								Remarks (Special Notations)	Planned Quantity
		①	②	③	④	⑤	⑥	⑦	Overall Evaluation		
OT-09	Patient Monitor	3	3	2	3	3	3	3	20	4 monitors are appropriate since there are 2 existing monitors in good condition and 3 Operating Theaters.	4
OT-10	Stretcher	3	3	3	3	3	3	3	21	Planned as requested due to relevance	3
OT-11	Sterilizer System for CSSD	3	3	3	3	3	3	3	21	Ditto	1
OT-12	Anesthesia Table	3	3	3	3	3	3	2	20	Quantity will be 3 since there are 3 Operating Theaters.	3
OT-13	Operating Table	3	3	3	3	3	3	2	20	Ditto	3
OT-14	Orthopedic Accessories Set for Operating Table	3	3	3	3	3	3	3	21	Planned as requested due to relevance.	1
OT-15	Defibrillator	3	3	3	3	3	3	3	21	Ditto	1
OT-16	Ventilator	3	3	3	3	3	3	3	21	Ditto	2
OT-17	C-arm X-ray Unit	3	3	3	3	3	3	3	21	Ditto	1
OT-18	Infusion Pump	3	2	3	3	3	3	3	20	2 pumps are appropriate since frequency of use is low.	2
OT-19	Nebulizer	3	3	3	3	3	3	3	21	Planned as requested due to relevance.	2
OT-20	Washing Machine	3	3	3	3	3	3	3	21	Ditto	1
OT-21	Drying Machine	3	3	3	3	3	3	3	21	Ditto	1
OT-22	Arthroscope	2	1	3	3	3	3	3	18	Necessity is recognized, but in light of the hospital's activities and usage frequency, relevance is judged to be low.	-
OT-23	Urethroscope	2	1	3	3	3	3	3	18	Ditto	-
OT-24	Microsurgery Equipment Set	2	1	3	3	3	3	3	18	Ditto	-
OT-25	Dressing Instrument Set	3	3	3	3	3	3	2	20	Quantity will be 3 since there are 3 Operating Theaters.	3
OT-26	Instrument Tray Stand	3	3	3	3	3	3	2	20	Since there are 3 Operating Theaters, 6 will be planned, with 2 per room.	6
OT-27	Sterilizing Drum	3	3	3	3	3	3	2	20	Quantity will be 6 since there are 3 Operating Theaters.	6
OT-28	Wash Hand Bowl Stand	3	3	3	3	3	3	2	20	Quantity will be 3 since there are 3 Operating Theaters.	3
OT-29	Doctor's Stool for Anesthetists	3	3	3	3	3	3	2	20	Ditto	3
6. Surgical Service Department											
SG-01	Suction Machine (Electric)	3	3	3	3	3	3	3	21	Planned as requested due to relevance	1
SG-02	Dressing Cart	3	3	3	3	3	3	3	21	Ditto	3
SG-03	Minor Surgery Instrument Set	3	3	2	3	3	3	3	20	There is relevance, but the since the quantity is excessive, 20 sets will be planned.	20
SG-04	Sterilizing Drum	3	3	2	3	3	3	3	20	There is relevance, but the since the quantity is excessive, 3 sets will be planned.	3
SG-05	Film Viewer	3	3	3	3	3	3	3	21	Planned as requested due to relevance.	1
SG-06	Oxygen Cylinder Set	3	3	3	3	3	3	3	21	Ditto	4

Code No.	Description of Medical Equipment	Evaluation Criteria								Remarks (Special Notations)	Planned Quantity
		①	②	③	④	⑤	⑥	⑦	Overall Evaluation		
SG-07	Plaster Cutter (Electric)	3	3	3	3	3	3	3	21	Ditto	1
SG-08	Stretcher	3	3	3	3	3	3	3	21	Ditto	4
SG-09	Instrument Tray Stand	3	3	3	3	3	3	3	21	Ditto	4
SG-10	Examination Lamp	3	3	3	3	3	3	3	21	Ditto	2
SG-11	Dressing Instrument Set	3	3	3	3	3	3	3	21	Ditto	3
SG-12	Examination Bed	3	3	3	3	3	3	3	21	Ditto	2
SG-13	Doctor's Desk & Chair	3	3	3	3	3	3	3	21	Ditto	1
SG-14	Patient Stool	3	3	3	3	3	3	3	21	Ditto	1
7. Laboratory											
LB-01	Hematocrit Centrifuge	3	3	3	3	3	3	3	21	Planned as requested due to relevance.	1
LB-02	Centrifuge	3	3	2	3	3	3	3	20	Ditto	1
LB-03	Automatic Hematology Analyzer	3	3	3	3	3	3	3	21	Ditto	1
LB-04	Rotator	3	3	3	3	3	3	3	21	Ditto	1
LB-05	Spectrophotometer	3	3	3	3	3	3	3	21	Ditto	1
LB-06	Test tube mixer	3	3	3	3	3	3	3	21	Ditto	1
LB-07	Automatic pipette Set	3	3	3	3	3	3	3	21	Ditto	1
LB-08	Hemoglobin Meter	3	3	3	3	3	3	3	21	Ditto	1
LB-09	Hot Plate Stirrer	3	3	3	3	3	3	3	21	Ditto	1
LB-10	Incubator	3	3	3	3	3	3	3	21	Ditto	1
LB-11	Electrolyte Analyzer	3	3	3	3	3	3	3	21	Ditto	1
LB-12	Coagulation Analyzer	3	3	3	3	3	3	3	21	Ditto	1
LB-13	Urine Analyzer	3	3	3	3	3	3	3	21	Ditto	1
LB-14	Urine Gravity Analyzer	3	3	3	3	3	3	3	21	Ditto	1
LB-15	ELISA System	3	3	3	3	3	3	3	21	Ditto	1
LB-16	Dry Sterilizer	3	3	3	3	3	3	3	21	Ditto	1
LB-17	Autoclave	3	3	3	3	3	3	3	21	Ditto	1
LB-18	Microscope	3	3	3	3	3	3	3	21	Ditto	1
LB-19	Freezer	3	3	2	3	3	3	3	20	Ditto	2
LB-20	Refrigerator	3	3	2	3	3	3	3	20	Ditto	2
8. Imagery											
XR-01	Dosimeter	3	3	3	3	3	3	3	21	Planned as requested due to relevance	2
XR-02	Film Viewer	3	3	3	3	3	3	3	21	Ditto	1
XR-03	Ultrasonic Scanner	3	3	3	3	3	3	3	21	Ditto	1
XR-04	ECG Unit	3	3	3	3	3	3	3	21	Ditto	1
XR-05	CR System	3	3	3	3	3	3	3	21	Ditto	1
XR-06	Examination Bed	3	3	3	3	3	3	3	21	Ditto	2
XR-07	Couch for Waiting Space for Waiting Space	3	3	3	3	3	3	3	21	Planned as requested due to relevance.	1
XR-08	Doctor's Desk & Chair	3	3	3	3	3	3	3	21	Ditto	1
9. Pediatrics Department											
PD-01	Suction Machine (Foot operating)	3	3	3	3	3	3	3	21	Planned as requested due to relevance.	1
PD-02	Suction Machine (Electric)	3	3	3	3	3	3	3	21	Ditto	1
PD-03	Sterilizing Drum	3	3	3	3	3	3	3	21	Ditto	2

Code No.	Description of Medical Equipment	Evaluation Criteria								Remarks (Special Notations)	Planned Quantity
		①	②	③	④	⑤	⑥	⑦	Overall Evaluation		
PD-04	Diagnostic Set	3	3	3	3	3	3	3	21	Ditto	2
PD-05	Laryngoscope Set (for Infant)	3	3	2	3	3	3	3	20	1 is appropriate since the no. of patients is few and usage time per patient is short.	1
PD-06	Nebulizer	3	3	3	3	3	3	3	21	Ditto	4
PD-07	Film Viewer	3	3	3	3	3	3	3	21	Ditto	1
PD-08	Infusion Pump	3	3	2	3	3	3	3	20	2 are appropriate since the no. of patients is few and usage time per patient is short.	2
PD-09	Oxygen Cylinder Set	3	3	3	3	3	3	3	21	Ditto	2
PD-10	Resuscitation Bag (Infant)	3	3	3	3	3	3	3	21	Ditto	1
PD-11	Resuscitation Bag (Child)	3	3	3	3	3	3	3	21	Ditto	1
PD-12	Height & Weighing Scales Set for Infant	3	3	3	3	3	3	3	21	Ditto	1
PD-13	Height Scale	3	3	3	3	3	3	3	21	Ditto	1
PD-14	Weighing Scale (Hanging Type)	3	3	3	3	3	3	3	21	Ditto	1
PD-15	Sphygmomanometer (Aneroid, Infant)	3	3	3	3	3	3	3	21	Ditto	1
PD-16	Instrument Tray Stand	3	3	2	3	3	3	3	20	1 stand is appropriate based on number of beds.	1
PD-17	Infant Incubator	3	3	3	3	3	3	3	21	Planned as requested due to relevance.	1
PD-18	Phototherapy Unit	3	3	3	3	3	3	3	21	Ditto	1
PD-19	Patient Monitor	3	3	3	3	3	3	3	21	Ditto	2
PD-20	Dressing Cart	3	3	3	3	3	3	3	21	1 is appropriate based on number of beds.	1
PD-21	Dressing Instrument Set	3	3	2	3	3	3	3	20	Ditto	1
10. General Medicine Department											
MD-01	Suction Machine (Electric)	3	3	3	3	3	3	3	21	Planned as requested due to relevance.	2
MD-02	Dressing Cart	3	3	3	3	3	3	3	21	Ditto	2
MD-03	Denudating Set	3	3	3	3	3	3	3	21	Ditto	1
MD-04	Sterilizing Drum	3	3	3	3	3	3	3	21	Ditto	2
MD-05	Diagnostic Set	3	3	3	3	3	3	3	21	Ditto	1
MD-06	Film Viewer	3	3	3	3	3	3	3	21	Ditto	1
MD-07	Oxygen Cylinder Set	3	3	3	3	3	3	3	21	Ditto	2
MD-08	Weighing Scale (Adult)	3	3	3	3	3	3	3	21	Ditto	1
MD-09	Stretcher	3	3	3	3	3	3	3	21	Ditto	2
MD-10	Instrument Tray Stand	3	3	3	3	3	3	3	21	Ditto	3
MD-11	Trocar	3	3	3	3	3	3	3	21	Ditto	1
MD-12	Irrigation Stand	3	3	3	3	3	3	3	21	Ditto	2
MD-13	Patient Monitor	3	3	3	3	3	3	3	21	Ditto	2
MD-14	Dressing Cart	3	3	3	3	3	3	3	21	2 will be planned since they were omitted from request.	2
MD-15	Dressing Instrument Set	3	3	3	3	3	3	3	21	Ditto	2
MD-16	Examination Bed	3	3	3	3	3	3	3	21	Ditto	2
MD-17	Doctor's Desk & Chair	3	3	3	3	3	3	3	21	Ditto	2
MD-18	Patient Stool	3	3	3	3	3	3	3	21	Ditto	2
11- Obstetrics/Gynecology Department											

Code No.	Description of Medical Equipment	Evaluation Criteria								Remarks (Special Notations)	Planned Quantity
		①	②	③	④	⑤	⑥	⑦	Overall Evaluation		
OG-01	Suction Machine (Electric)	3	3	3	3	3	3	3	21	Planned as requested due to relevance.	2
OG-02	Delivery Bed	3	3	3	3	3	3	3	21	Ditto	3
OG-03	Gynecological Table	3	3	3	3	3	3	2	20	1 is appropriate since there is 1 OB/GYN consultation room.	1
OG-04	Fetal Doppler Detector	3	3	3	3	3	3	3	21	Planned as requested due to relevance.	1
OG-05	Dilatation & Curettage Set	3	3	3	3	3	3	3	21	Ditto	2
OG-06	Obstetric Forceps	3	3	3	3	3	3	3	21	Ditto	2
OG-07	Sterilizing Drum	3	3	3	3	3	3	3	21	Ditto	5
OG-08	Operating Light (Mobile)	3	3	3	3	3	3	3	21	Ditto	3
OG-09	Film Viewer	3	3	3	3	3	3	3	21	Ditto	1
OG-10	Oxygen Cylinder Set	3	3	3	3	3	3	3	21	Ditto	3
OG-11	Weighing Scale (Adult)	3	3	3	3	3	3	3	21	Ditto	1
OG-12	Weighing Scale (Infant)	3	3	3	3	3	3	3	21	Ditto	1
OG-13	Dressing Instrument Set,	3	3	3	3	3	3	3	21	Ditto	2
OG-14	Dressing Cart	3	3	3	3	3	3	3	21	Ditto	2
OG-15	Instrument Tray Stand	3	3	3	3	3	3	3	21	Ditto	3
OG-16	Vacuum-extractor	3	3	3	3	3	3	3	21	Ditto	1
OG-17	Caesarian Section Set	3	3	3	3	3	3	3	21	Ditto	2
OG-18	Caesarian Hysterectomy Set	3	3	3	3	3	3	3	21	Ditto	2
OG-19	Delivery Instrument Set	3	3	3	3	3	3	3	21	Ditto	5
OG-20	Denudating set	3	3	3	3	3	3	3	21	Ditto	1
OG-21	Cervical Reparation Set	3	3	3	3	3	3	3	21	Ditto	1
OG-22	Episiotomy and Perino Repair Set	3	3	3	3	3	3	3	21	Ditto	5
OG-23	Gynecology Examination Instrument Set	3	3	3	3	3	3	3	21	Ditto	2
OG-24	Consultation Obstetric Set	3	3	3	3	3	3	3	21	Ditto	1
OG-25	Patient Monitor	3	3	3	3	3	3	3	21	Ditto	2
OG-26	Fetal Monitor	3	3	3	3	3	3	3	21	Ditto	1
OG-27	Doctor's Desk & Chair	3	3	3	3	3	3	3	21	Ditto	1
OG-28	Patient Stool	3	3	3	3	3	3	3	21	Ditto	1
CG-29	Patient Bed	3	3	3	3	3	3	3	21	Ditto	51

2) Planned Equipment

The above investigation resulted in the 94 planned equipment items shown below in Table 2-18.

Table 2-18 Equipment Allocation List

Sr. No.	No.	Description of Medical Equipment	Q'ty	Outpatients Consultations	E.N.T Unit	Dental Unit	Emergency Services Department	ICU	Operating Theater	Surgical Service Department	Laboratory	Imagery	Pediatrics Department	General Medicine Department	Obstetrics / Gynecology Department
1	1	Anesthesia Machine	3 sets						3						
2	2	Anesthesia Table	3 sets						3						
3	4	Autoclave (Table Top Type)	2 sets			1					1				
4	5	Automatic Hematology Analyzer	1 set								1				
5	6	Automatic pipette Set	1 set								1				
6	7	Caesarian Hysterectomy Set	2 sets												2
7	8	Caesarian Section Set	2 sets												2
8	9	C-arm X-ray Unit	1 set						1						
9	10	Centrifuge	1 set								1				
10	11	Cervical Reparation Set	1 set												1
11	12	Coagulation Analyzer	1 set								1				
12	13	Consultation Obstetric Set	1 set												1
13	14	Couch for Waiting Space	1 set									5			
14	15	CR System	1 set									1			
15	16	Defibrillator	1 set						1						
16	17	Delivery Bed	3 sets												3
17	18	Delivery Instrument Set	5 sets												5
18	19	Dental Chair Unit	1 sets			1									
19	20	Dental X- ray Machine	1 set			1									
20	21	Denudating Set	4 sets				1	1						1	1
21	22	Diagnostic Set	4 sets	1									2	1	
22	23	Dilatation & Curettage Set	2 sets												2
23	24	Doctor's Desk & Chair	10 sets	3			1	1		1		1		2	1
24	25	Dosimeter	2 sets									2			
25	26	Dressing Cart	14 sets				2	1	3	3			1	2	2
26	27	Dressing Instrument Set	14 sets				2	1	3	3			1	2	2
27	28	Dry Sterilizer	1 set								1				
28	29	Dryer Machine	1 set						1						
29	30	ECG Unit	2 sets				1					1			
30	31	Electro Surgical Unit	2 sets						2						
31	32	Electrolyte Analyzer	1 set								1				
32	33	ELISA System	1 set								1				
33	34	Emergency Bed	4 sets				4								

Sr. No.	No.	Description of Medical Equipment	Q'ty	Outpatients Consultations	E.N.T Unit	Dental Unit	Emergency Services Department	ICU	Operating Theater	Surgical Service Department	Laboratory	Imagery	Pediatrics Department	General Medicine Department	Obstetrics / Gynecology Department
34	35	ENT Chair w/ENT Unit	1 set		1										
35	36	ENT Surgical Unit	1 set		1										
36	37	Episiotomy and Perino Repair Set	5 sets												5
37	38	Examination Bed	9 sets	3						2		2		2	
38	39	Examination Instrument Set for ENT	1 set		1										
39	40	Examination Lamp	4 sets	2						2					
40	41	Fetal Doppler Detector	1 set												1
41	42	Fetal Monitor	1 set												1
42	43	Film Viewer	11 sets	1	1		1		3	1		1	1	1	1
43	44	Freezer	2 sets								2				
44	45	Gynecological Table	1 set												1
45	46	Gynecology Examination Instrument Set	2 sets												2
46	47	Hand Instrument Set for Dental	1 set			1									
47	48	Head Light	1 set		1										
48	49	Height & Weighing Scales Set for Infant	1 set										1		
49	50	Hematocrit Centrifuge	1 set								1				
50	51	Hemoglobin Meter	1 set								1				
51	52	Hot Plate Stirrer	1 set								1				
52	53	ICU Bed	6 sets					6							
53	54	Incubator	1 set								1				
54	55	Infant Incubator	2 sets				1						1		
55	56	Infusion Pump	6 sets				1	1	2				2		
56	57	Instrument Tray Stand	22 sets	1	2		1	1	6	4			1	3	3
57	58	Irrigation Stand	8 sets				3	3						2	
58	59	Laryngoscope Set (for Infant)	1 set										1		
59	60	Microscope	1 set								1				
60	61	Minor Surgery Instrument Set	20 sets							20					
61	62	Nebulizer	7 sets				1		2				4		
62	63	Obstetric Forceps	2 sets												2
63	64	Operating Light (Ceiling Mount Type)	3 sets						3						
64	65	Operating Light (Mobile)	5 sets				2								3
65	66	Operating Table	1 set						1						
66	67	Oxygen Cylinder Set	11 sets							4			2	2	3
67	68	Patient Bed	51 sets				2								49
68	69	Patient Monitor	14 sets				2	2	4				2	2	2

Sr. No.	No.	Description of Medical Equipment	Q'ty	Outpatients Consultations	E.N.T Unit	Dental Unit	Emergency Services Department	ICU	Operating Theater	Surgical Service Department	Laboratory	Imagery	Pediatrics Department	General Medicine Department	Obstetrics / Gynecology Department
69	70	Patient Stool	8 sets	3			1			1				2	1
70	71	Phototherapy Unit	2 sets				1						1		
71	72	Plaster Cutter (Electric)	1 set							1					
72	73	Refrigerator	2 sets								2				
73	74	Resuscitation Bag (Child)	1 set										1		
74	75	Resuscitation Bag (Infant)	1 set										1		
75	76	Rotator	1 set								1				
76	77	Spectrophotometer	1 set								1				
77	78	Sphygmomanometer (Aneroid, Infant)	1 set										1		
78	79	Sterilizer System for CSSD	1 set						1						
79	80	Sterilizing Drum	22 sets	2			1	1	6	3			2	2	5
80	81	Stretcher	13 sets	2			2		3	4				2	
81	82	Suction Machine (Electric)	12 sets				2	1	3	1			1	2	2
82	83	Suction Machine (Foot operating)	3 sets				1		1				1		
83	84	Syringe Pump	2 sets				2								
84	85	Test tube mixer	1 set								1				
85	86	Tonsillectomy and Adenoidectomy Set	2 sets		2										
86	87	Trocar	1 set											1	
87	88	Ultrasonic Scanner	2 sets				1					1			
88	90	Urine Analyzer	1 set								1				
89	91	Urine Gravity Analyzer	1 set								1				
90	92	Vacuum-extractor	1 set												1
91	93	Ventilator	4 set				1	1	2						
92	94	Wash Hand Bowl Stand	5 sets				1	1	3						
93	95	Washing Machine	1 sets						1						
94	96	Weighing Height Scale (Adult)	4 set	1									1	1	1

3) Maintenance Services for 3 years

[Selection of Target Equipment for Maintenance Services]

Among the planned equipment, for some equipment which will strongly affect the medical activities when there is a fault or the equipment which tends to fail often, both periodic inspection service for 3 years after handover and on-call service for 2 years after 1 year guarantee period shall be included in the works to be done by the Project. Such equipment were preliminarily selected based on the following criteria:

1- Equipment which may cause fatal accident if there is a fault
2- Expensive equipment
3- Equipment which frequently fails considering the past experience

Among the selected equipment following the above criteria, the final target equipment which requires maintenance services are refined as follows, through the interview to several manufacturers. It is noted that the following target equipment are confirmed to have agents who can implement the maintenance services through the interview to manufarcurers and site survey.

[Preliminarily Selected Equipment and Study Result]

1- Anesthesia Machine : may cause serious trouble if there is a fault
2- Automatic Hematology Analyzer : frequently fails
3- C-arm X-ray Unit : frequently used
4- Coagulation Analyzer : frequently fails
5- CR System : frequently used
6- Defibrillator : may cause serious trouble if there is a fault
7- Dental Chair Unit : frequently used
8- Dental X-ray Unit : there are no special mechanism of failure → excluded
9- EGC Unit : frequently used
10- Electro Surgical Unit : frequently used
11- Electrolyte Analizer : frequently fails
12- ELISA System : there are no special mechanism of failure → excluded
13- ICU Bed : No need if the bed is not electrically powered → excluded
14- Infant Incubator : may cause serious trouble if there is a fault
15- Infusion Pump : may cause serious trouble if there is a fault
16- Operating Table : may cause serious trouble if there is a fault
17- Patient Monitor : may cause serious trouble if there is a fault
18- Spectrophotometer : frequently fails
19- Sterilizer System for CSSD : may cause serious trouble if there is a fault
20- Syringe Pump : may cause serious trouble if there is a fault
21- Urine Analyzer : dry chemical type is adopted → excluded
22- Ventilator : may cause serious trouble if there is a fault

[Contents of Maintenance Services]

According to the interviews to various manufacturers, the contents of the maintenance services differ by

each manufacturer. Also, it was found out difficult to assume the necessary replacement parts beforehand. Therefore, the contents of the maintenance services are set as shown below:

1- Periodic inspection for 3 years

2- On-call service for 2 years (first year after handover is already included as a warranty period)

3- Replacement parts shall be borne by the user (expenses for replacement parts during the first year after handover shall be borne by manufacturer)

[Monitoring on Maintenance Services]

Consultant will monitor the progress of the maintenance services and confirm whether the maintenance services are carried out adequetly or not for three years after the handover. Consultant will visit the hospital and equipment agency every year to check the status of implementation and to report the progress to MOH, hospital and JICA.

[Target Equipment for Maintenance Services]

The said equipment are as shown in Table 2-19 with necessary number of times to visit under maintenance services. It is noted that the expense for replacement parts including any associated costs charged by maintenance service provider after the 1 year guarantee period shall be borne by Cambodia side.

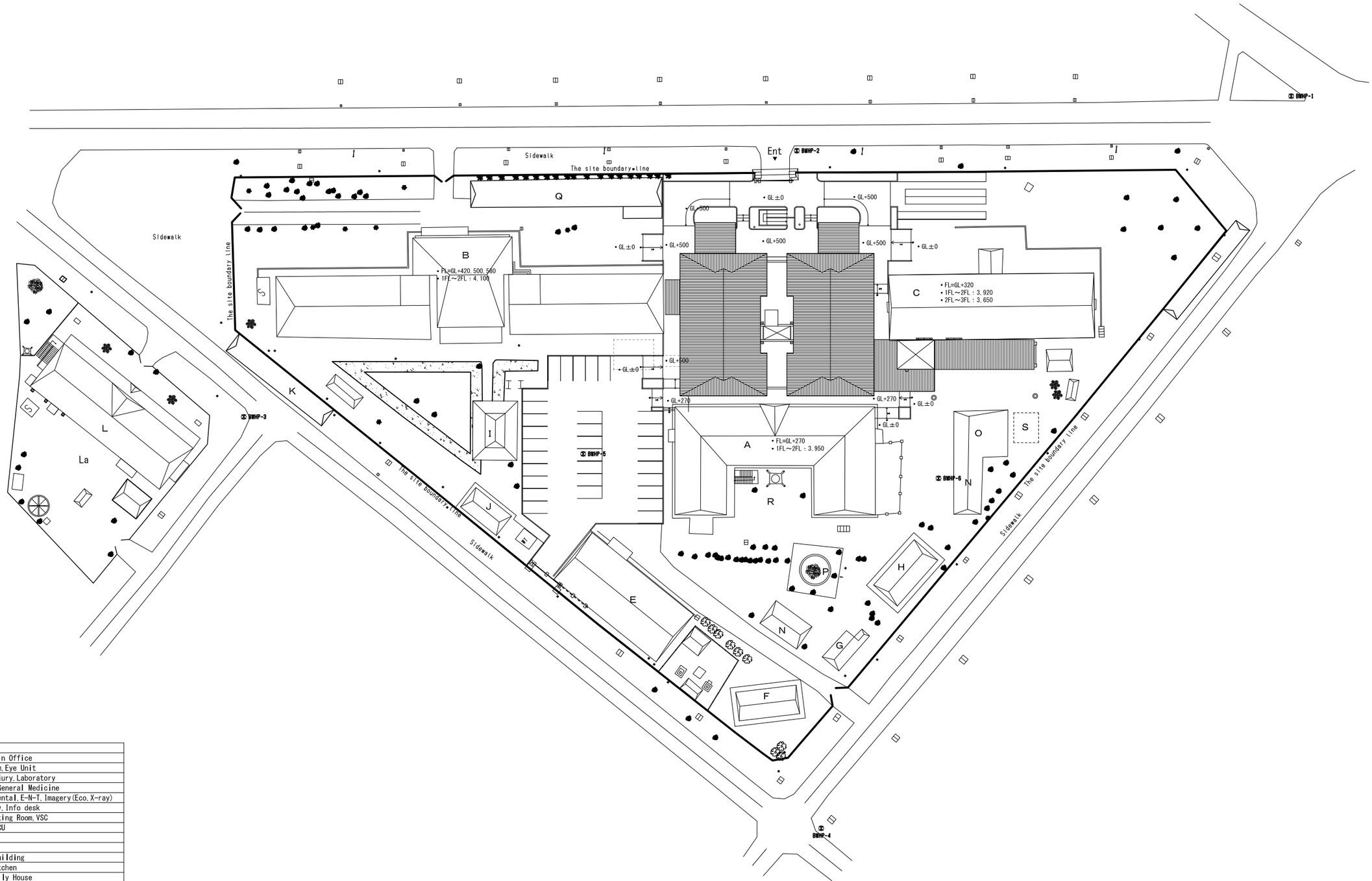
Table 2-19 List of Equipment Requires 3 Years Maintenance Service

No.	Code No.	Equipment Name	Quantity		Periodic Inspection (times per year)	On Call Service (times per year)
			Q'ty	Unit		
1	1	Anesthesia Machine	3	Units	2	3
2	5	Automatic Hematology Analyzer	1	Unit	4	3
3	9	C-arm X-ray Unit	1	Units	2	4
4	12	Coagulation Analyzer	1	Unit	4	3
5	15	CR System	1	Set	1	3
6	16	Defibrillator	1	Unit	2	3
7	19	Dental Chair Unit	1	Set	1	3
8	30	ECG Unit	2	Sets	1	2
9	31	Electro Surgical Unit	2	Sets	0	2
10	32	Electrolyte Analyzer	1	Unit	3	3
11	55	Infant Incubator	2	Unit	1	3
12	56	Infusion Pump	6	Units	1	4
13	66	Operating Table	1	Set	2	3
14	69	Patient Monitor	14	Units	2	3
15	77	Spectrophotometer	1	Unit	2	3
16	79	Sterilizer System for CSSD	1	Set	1	3
17	84	Syringe Pump	2	Units	1	4
18	93	Ventilator	4	Units	2	3

2-2-3 Outline Design Drawing

Table 2-20 Outline Design Drawing List

No.	Building Name	Drawing Name	Scale
A1-001	Entire Hospital	Site Plan	1/3,000
A1-002	Main Building/Slope	Ground Floor Plan	1/300
A1-003	Main Building/Slope	First Floor Plan	1/300
A1-004	Main Building/Slope	Second Floor Plan	1/300
A1-005	Main Building/Slope	Elevation	1/300
A1-006	Main Building	Section	1/300



Building List	
A :	Mgt and admin Office
	Meeting Room, Eye Unit
	Surgical&Injury, Laboratory
B :	Outpatient, General Medicine
	Pediatric, Dental, E-N-T, Imagery (Eco, X-ray)
	STD, Pharmacy, Info desk
C :	OBGY/OT, Meeting Room, VSC
D :	Emergency&ICU
E :	OD Pharmacy
F :	Mortuary
G :	Generator Building
H :	Workshop, Kitchen
I :	Patient Family House
J :	Kitchen for Patients Family
K :	Latrine
L :	TB & HIV/AIDS Ward
	Physiotherapy, Pharmacy
M :	Playground
N :	Storage
O :	Ambulance Carage
P :	Big Tree
Q :	Canteen
R :	Elevated Water tank
S :	Septic tank

N

PROJECT	The Project for Improvement of Svay Rieng Provincial Referral Hospital	DWG TITLE	Site Plan				
SITE	Svay Rieng Provincial Referral Hospital	SCALE	A3: 1/800	DATE ・02・2015	PROJECT No.	DWG No. A1 — 001	

Ent

Q

B

C

A

OUTPATIENT ENTRANCE

EMERGENCY ENTRANCE

IMAGERY DEPT.

EMERGENCY DEPT. (ER)

OUTPATIENT DEPT. (OU)

ADMINISTRATIVE DEPT. (AD)

CT-SCAN (FUTURE EXPANSION)

0U-01 ENTRANCE
0U-02 ADMINISTRATION OFFICE
0U-04 PA ROOM
0U-05 PHARMACY
0U-06 PATIENT WAITING
0U-07 COUNSELING ROOM
0U-08 CONSULTATION ROOM(1)
0U-09 CONSULTATION ROOM(2)
0U-11 STAFF PREPA-RATION

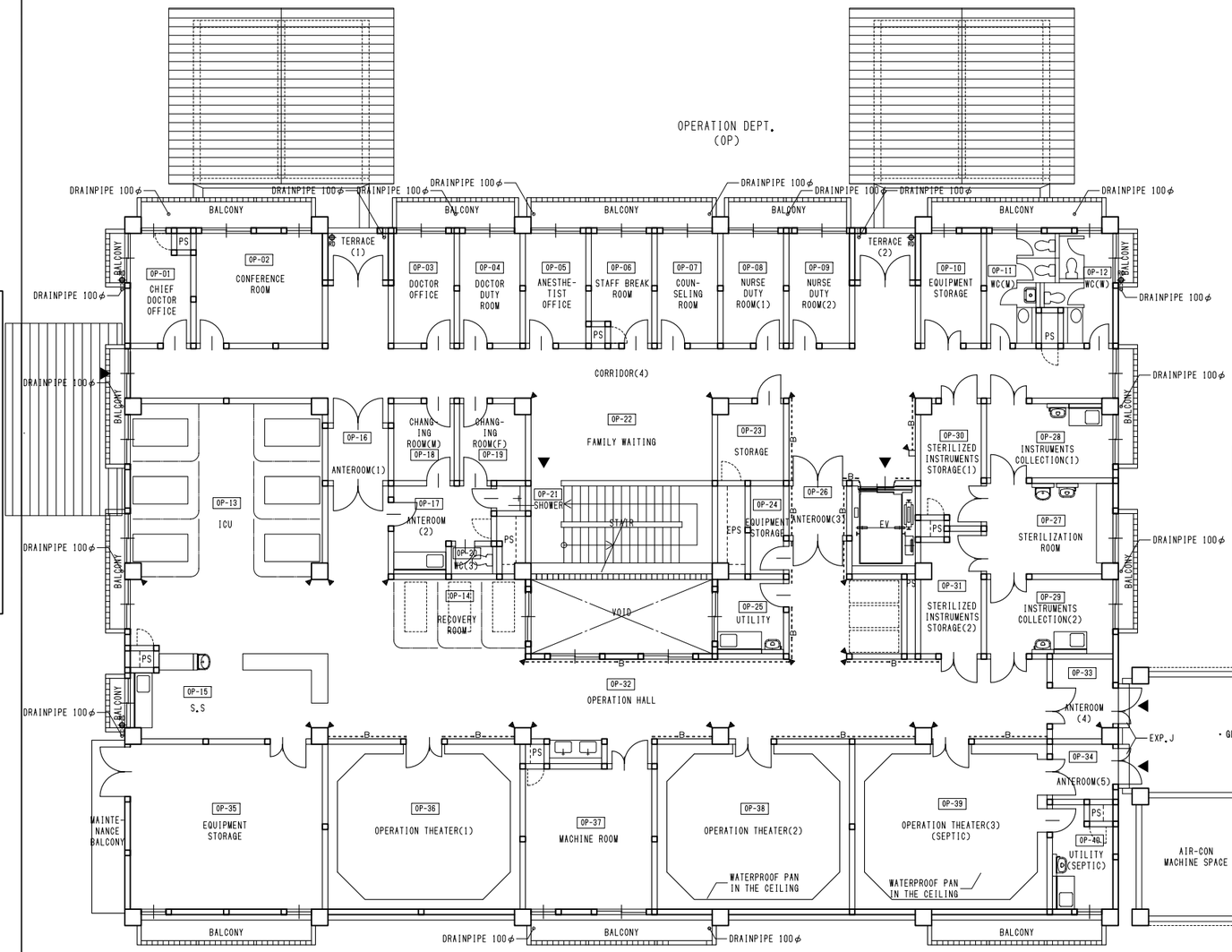
IM-01 RECEPTION
IM-02 PATIENT WAITING
IM-03 CONTROL ROOM
IM-04 DARK ROOM
IM-05 X-RAY ROOM
IM-06 ECG ROOM
IM-07 ULTRASOUND ROOM
IM-08 STAFF DUTY ROOM
IM-09 FILM STORAGE

ER-01 ENTRANCE
ER-02 FAMILY WAITING
ER-03 SHOWER ROOM
ER-04 TREATMENT & CONSULTATION ROOM
ER-05 EQUIPMENT STORAGE
ER-06 S.S
ER-07 OBSERVATION ROOM
ER-08 SPECIAL OBSERVATION ROOM
ER-09 UTILITY

AD-01 DOCTOR DUTY ROOM
AD-02 NURSE DUTY ROOM(1)
AD-03 NURSE DUTY ROOM(2)
AD-04 STAFF WC(1)
AD-05 STAFF WC(2)
AD-06 LAUNDRY
AD-07 PUMP ROOM
AD-08 MEETING (CONFERENCE) ROOM
AD-09 CHANG-ING ROOM(M)
AD-10 CHANG-ING ROOM(F)
AD-11 STORAGE
AD-12 ELECTRICAL ROOM
AD-13 WC(M)
AD-14 WC(W)
AD-15 MANIFOLD
AD-16 H.WC

CORRIDOR(1)
CORRIDOR(2)
CORRIDOR(3)
COURTYARD
STAIR
EV
EPS
PS
WOODEN BENCH
DRAINPIPE 100φ
UP
1/8
Planting
WATER RECEIVING TANK PUMP YARD
WATER RECEIVING TANK
GENERATOR STORAGE
GL±0
GL+500
GL+270
GL+320
FL=GL+500

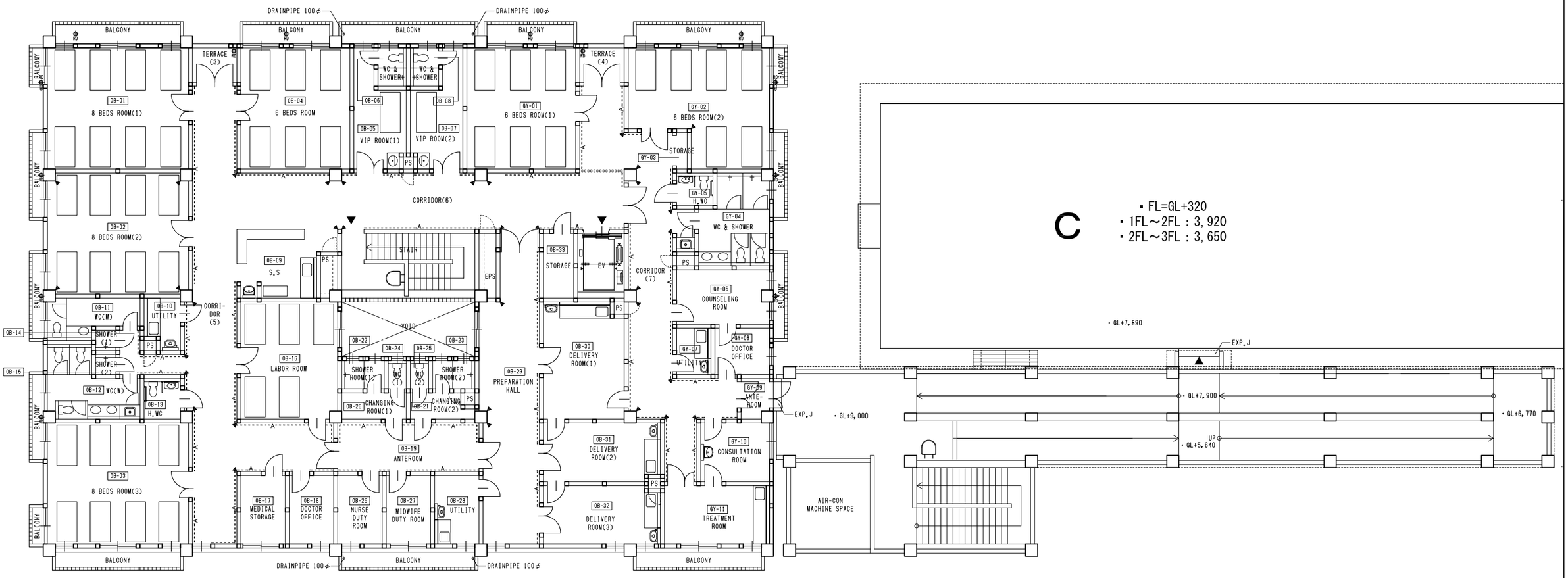
PROJECT	The Project for Improvement of Svay Rieng Provincial Referral Hospital	DWG TITLE	Ground Floor Plan				
SITE	Svay Rieng Provincial Referral Hospital	SCALE	A3: 1/200	DATE ·02·2015	PROJECT No.	DWG No. A1 — 002	



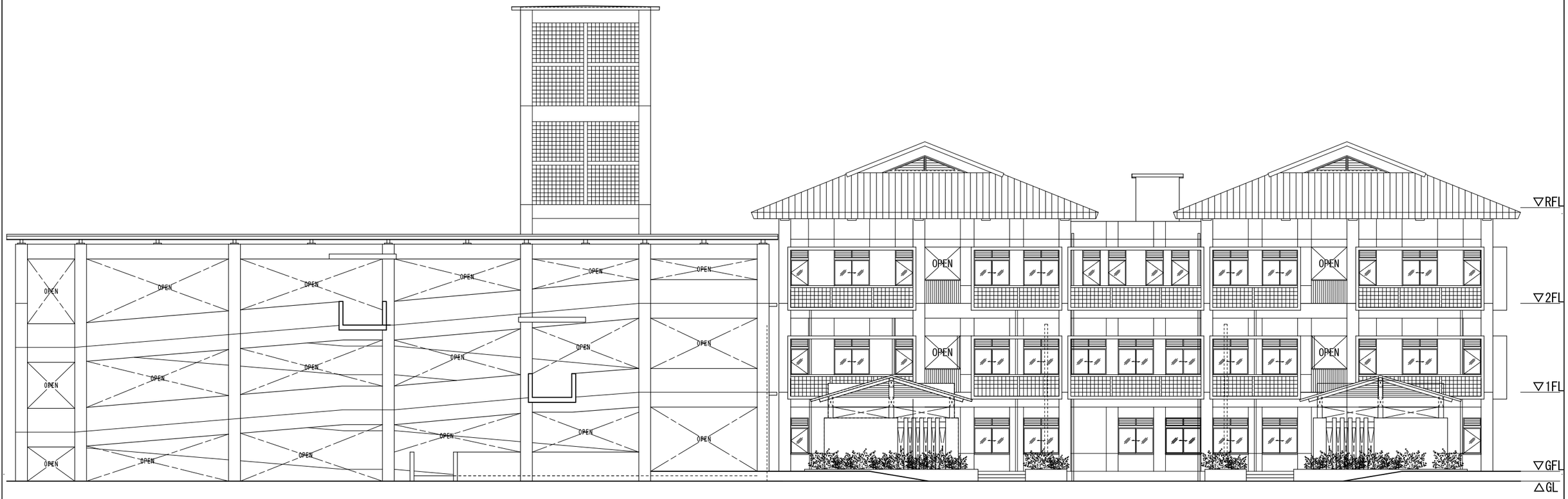
PROJECT	The Project for Improvement of Svay Rieng Provincial Referral Hospital	DWG TITLE	1st Floor Plan			
SITE	Svay Rieng Provincial Referral Hospital	SCALE	A3: 1/200	DATE · 02 · 2015	PROJECT No.	DWG No. A1 — 003

OBSTETRICS DEPT.
(OB)

GYNECOLOGY DEPT.
(GY)



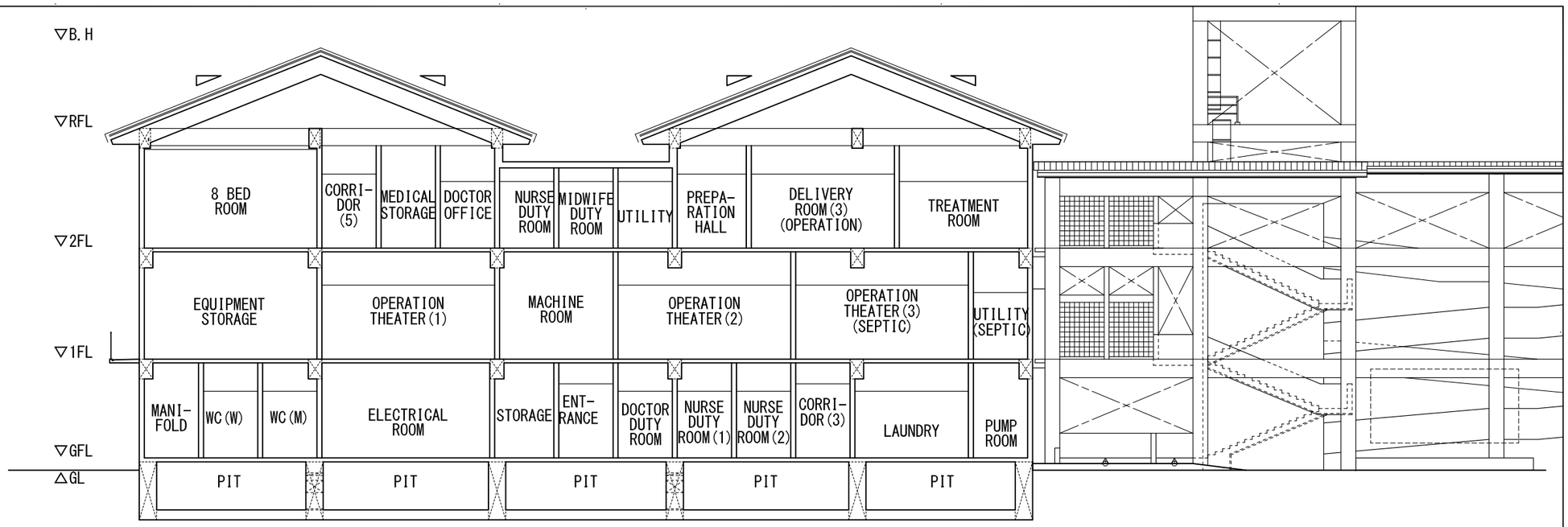
PROJECT	The Project for Improvement of Svay Rieng Provincial Referral Hospital	DWG TITLE	2nd Floor Plan			
SITE	Svay Rieng Provincial Referral Hospital	SCALE	A3: 1/200	DATE · 02 · 2015	PROJECT No.	DWG No. A1 — 004



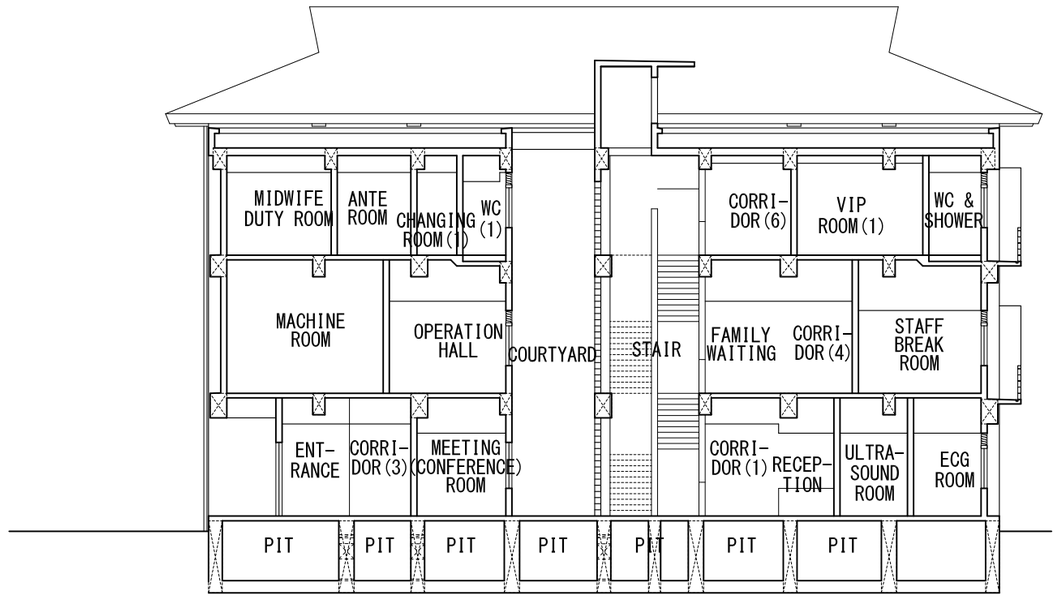
Northeast Elevation

Northwest Elevation

PROJECT	The Project for Improvement of Svay Rieng Provincial Referral Hospital	DWG TITLE	Elevation – 5			
SITE	Svay Rieng Provincial Referral Hospital	SCALE	A3: 1/200	DATE ·02·2015	PROJECT No.	DWG No. A1 — 005



X-X Section



Y-Y Section

PROJECT	The Project for Improvement of Svay Rieng Provincial Referral Hospital	DWG TITLE	Section				
SITE	Svay Rieng Provincial Referral Hospital	SCALE	A3: 1/200	DATE	・02・2015	PROJECT No.	DWG No. A1 — 006

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

The elements of this project include facility construction work, supply and installation of equipment, and the scope of cooperation regarding to the project will be implemented according to the framework of grant aid by Japan. Implementation of this plan shall be initiated officially only after it is approved by the Governments of both countries and the exchange of notes (E/N) and the grant agreement (G/A) is signed. Immediately after signing of the E/N and the G/A, the Cambodian organization that is responsible for implementation of this project and the Japanese consultant firms shall enter a contract and initiate the detail design work of the project. When the design is completed, the Japanese construction companies and equipment supply and installation companies participate in the tender for their works. The successful tenderers for construction of facilities and supply and installation of the equipment proceed to their work. The basic principles and items to be proposed for implementation of this project are described below.

1) Implementing Organizations

The implementing organization in the project is the Ministry of Health (MOH) in Cambodia, and the Svay Rieng Provincial Health Department (PHD) and the Svay Rieng Provincial Referral Hospital will be responsible for operation and maintenance of the facilities and the equipment provided by Japan.

2) Consultant

After signing of the E/N and the G/A, the Japanese consultant firm and the Cambodian implementing organization enter a consultant contract according to the formal procedure for the grant aid system of the government of Japan. This consultant firm executes the following activities under this Contract.

① Implementation design of the project:	To prepare the design documents (specifications and technical reference materials on the facilities and equipment included in the project).
② Tender:	To cooperate in selection of the contractor(s) and supplier(s) through the tender and in transaction of procedures required under the contract.
③ Construction supervision:	To supervise the instructions for the construction of the facilities and delivery, installation, operation and maintenance of the equipment.

In the detail design stage, the consultant determines the construction plan and the equipment supply plan in detail based on the Preparatory Survey of the project, and prepares the tender documents which include specifications of the plans, tender terms and conditions, and draft of the contracts regarding construction work and procurement of equipment.

Cooperation to the tender procedure means to observe selection of the contractor(s) and the supplier(s) through the tender conducted by the implementing organization and to help them transact the formal procedures required for execution of their contracts and preparation of the reports to be submitted to the government of Japan.

Construction supervision means to check whether or not the contractor and the supplier implement their works as specified in their contracts to make sure that the contents of their contracts are implemented

appropriately. In addition, to promote smooth implementation of the project, the consultant shall, in the neutral position, provide related parties with advice and guidance and serve as a coordinator among them. Listed below are major items in the scope of the construction supervision work.

① Procedures required for verification and approval of the work implementation plan, implementation drawings, equipment specifications and other documents submitted by the contractor(s) and supplier(s).

② Inspection and approval prior to shipment of qualities and performances of the construction materials and equipment to be supplied.

③ Confirmation of instructions for supply, installation and handling of the construction materials and equipment.

④ Checking and reporting the progress of the construction.

⑤ Observation of handing over the completed facilities and equipment.

The consultant shall execute above items and report to the related authorities of the government of Japan about the progress of this project, the payment procedure and handover.

3) Contractor(s) and Supplier(s)

The contractor(s) and the supplier(s) shall be selected through the open tender for the Japanese corporations that are qualified to the specific requirements. In principal, contracts will be made between the MOH and the contractor(s) and the supplier(s) that proposed the lowest price and succeed in the subsequent negotiations.

The contractor(s) and the supplier(s) shall construct the facilities, supply, deliver and install necessary construction materials and equipment according to the contracts, as well as provide technical guidance for operation, maintenance and management of the procured equipment to the Cambodian side. In addition to the 1 year guarantee period, the Project will require the suppliers, manufacturers and agents to include the periodic inspection for 3 years after the handover, and on-call service for 2 years after 1 year guarantee period so that the hospital can continuously utilize the procured equipment. Furthermore, the contractor(s) and supplier(s) provide guidance for securing a supply system where suppliers, manufacturers and agencies supply spare parts and consumables needed for continuous use of the equipment after procured, as well as support to make it possible to receive services such as paid repair after the period of guarantee and technical guidance, etc. even after the above maintenance service period expired.

4) Japan International Cooperation Agency

The Japan International Cooperation Agency shall give due advice to the consultant so that the project is implemented in conformity with the grant aid system. Also, it shall hold consultations with the implementing organizations of this project as necessary for untroubled implementation of the project.

5) Preparation for Implementation Plan

The representatives of the implementing organization on the Cambodian side and the consultant shall review the implementation plan during the detail design period. They shall make clear the scopes of the construction work of which Japanese and Cambodian sides take charge, confirm through consultations the starting time and the method of each work and discuss so that all the works will be carried out smoothly according to the implementation schedule in this report. In particular, attention should be paid to some works which must be carried out by the Cambodian side at its own expense before commencement of the

facility construction work, such as to secure and prepare the land, to demolish the existing buildings.

2-2-4-2 Implementation Conditions

Described below are those items to be noted for implementation of the project. They should be fully taken into consideration when making the implementation plan.

1) Schedule Management

Since the project site is in a region where it rains frequently in the wet season of May to November, a schedule will be planned with sufficient time should be allocated to excavation and foundation work, avoiding the wet season to the extent possible. Also, allocating enough curing time for each finishing task will ensure finish quality of the buildings. Therefore, the project will fully take the construction schedule into consideration.

2) Dispatch of Technicians for Equipment Installation

It is extremely important to impart knowledge and skills regarding appropriate operation and maintenance of the equipment so as to contribute to medical services through continuous proper operation of the procured equipment after implementation of the project. That being the case, technicians who are thoroughly familiar with the operation of the each piece of equipment will be selected as the equipment installation technicians, and sufficient time will be allotted for them to explain operation thereof (operation techniques, simple repair techniques, inspection methods, etc.) and to make sure that those concerned on the receiving side acquire sufficient understanding concerning its operation and maintenance.

3) Safety Control

Taking into consideration the character of the project that construction will be implemented in the site of an operating hospital, great attention shall be paid to safety control which includes installing temporary enclosures on the border of the hospital and allocating guides at the site.

2-2-4-3 Scope of Works

It is mutual cooperation between Japan and Cambodia that makes implementation of this project successful. If this project is implemented under the Japan's grand aid, the scopes of works undertaken by the governments of both countries shall be as described below.

1) Undertakings Borne by the Government of Japan

The government of Japan bears cost to undertake consultation of this project and the works related to construction of the facilities, procurement and installation of equipment as described below.

① Consultation

i To prepare detail design documents for the facilities and equipment subject for this project and their tender terms documents.

ii To cooperate in selecting the contractor(s) and supplier(s) as well as executing contracts for the project.

iii To supervise the instructions for the construction of the facilities and delivery, installation, operation

and maintenance of the equipment.

② Construction of facilities, supply and installation of the equipment

i To construct facilities subject to this project.

ii To procure construction materials and equipment subject to this project, transport and deliver them to the site.

iii To instruct installation of the equipment subject to this project, conduct a trial run and make adjustments.

iv To explain and instruct operation and maintenance methods for the equipment subject to this project.

2) Undertakings Borne by the Cambodian Side

The Cambodian side will bear and implement the following tasks concerning land development of the construction site, clearance of the existing facilities, wiring and equipment installation needed for power supply into the construction site, procedures for tax exemption, etc.

① Preparation of the Construction Site

i To secure and prepare the land for the construction and the temporal works

ii To clear the existing facilities and trees at the project site

iii To secure and prepare the project site

iv To draw electricity into the project site, set up a leading-in pole, and make applications

② Exterior Works

i Construction of the Boundary Fence

ii Planting

③ Renovation Work

i Renovation work in existing Buildings A, B, and C; and the relocation of the Surgical Department and Pediatrics Department to Building C.

④ To purchase or transfer medical equipment, furniture and appurtenances to be procured by the Cambodian side

⑤ To exempt customs duties, internal taxes and other fiscal levies which may be imposed in Cambodia with respect to the supply of the products, services, and equipment necessary for the Project.

⑥ To ensure prompt unloading and customs clearance at the points of disembarkation and internal transportation for the equipment and materials to be exported from Japan and other foreign countries according to the approved contracts

⑦ To provide arrangements necessary for entrance and stay to those Japanese who enter and stay in Cambodia to carry out their roles for the project

⑧ To issue approvals and permissions required for implementation of this project

⑨ To pay all the necessary expenses other than those borne by the government of Japan

2-2-4-4 Consultant Supervision

1) Construction Supervision Policy

Under the grant aid policy of the government of Japan, the consultant forms, based on the concept of the outline design, a team that is consistently responsible to execute the project including preparation of the

detail design to achieve smooth and successful implementation. The construction supervision policy for this project is outlined below.

① To keep close contact with those who are in charge of the project representing related organizations of both countries so that construction of the facilities and installation of equipment will be completed without delay.

② To provide quick and appropriate advice and suggestions from the neutral standpoint to the contractor(s), supplier(s) and others concerned.

③ To provide appropriate guidance and suggestions regarding suitable equipment layout and adjustment of tie-in with facilities as well as operation and management after handing over. And to confirm that construction has been completed and terms of each contract are fulfilled, to observe handing over the facilities and equipment and obtain an approval of receipt from the Cambodian side.

2) Construction Supervision Plan

As the types of construction works involved in this project are versatile, a resident supervisor (in charge of construction) is appointed and the following engineers are dispatched from time to time, keeping step with the progress of the construction works.

① Manager of general affairs (Overall coordination, process control)

② Engineer in charge of construction (Confirmation of construction methods, design concept, construction drawings, specifications of materials, etc.)

③ Engineer in charge of structure (Confirmation of the ground conditions, foundation work, framework)

④ Engineer in charge of electrical installation (Power supply and distribution equipment, power receiving and transforming equipment, etc.)

⑤ Engineer in charge of mechanical installation (Utility supply and processing system, air conditioning, water supply, drainage and hygiene system, etc.)

⑥ Engineer in charge of equipment (Supervision of equipment installation, adjustment with the facility, confirmation of operation instructions, etc.)

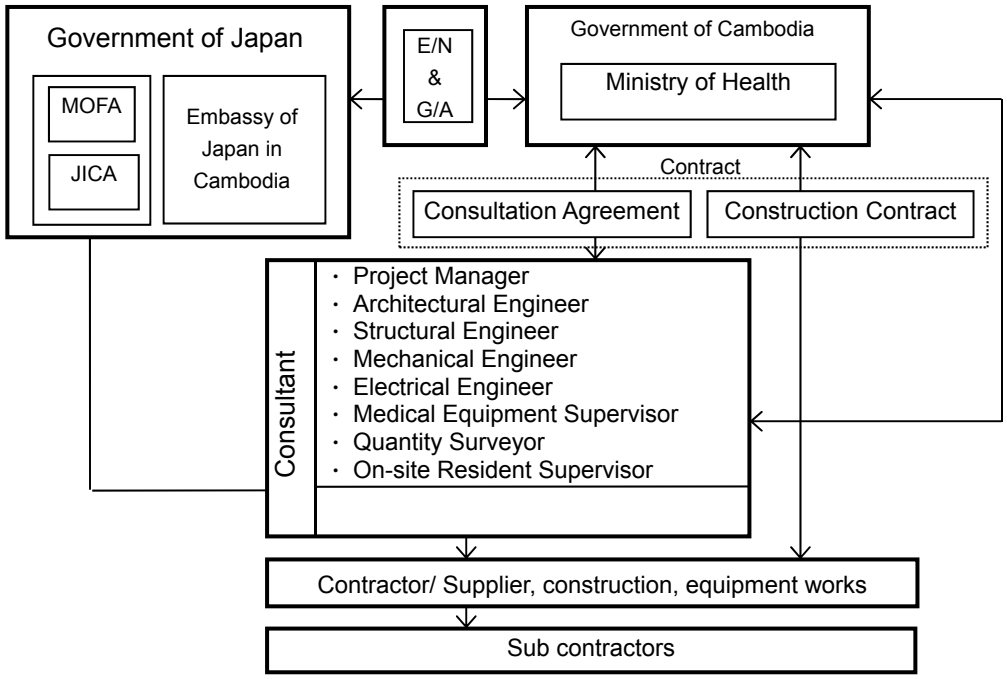


Figure 2-10 Construction Supervision System

3) Monitoring of Maintenance Service by Supplier after Handover

Consultant will monitor the progress of the maintenance services and confirm whether the maintenance services are carried out adequetly or not for three years after the handover. Consultant will visit the hospital and equipment agency every year to check the status of implementation and to report the progress to MOH, hospital and JICA.

2-2-4-5 Quality Control Plan

1) Quality Control Plan of the Facilities

The Contractor(s) will submit the documents of construction plans in advance to the consultant according to the construction contract (drawings, specifications, etc.). The consultant will, prior to the commencement of construction, verify the adequacy of the construction plan by specifically setting inspection items and frequency to secure high level of quality control.

Major items to supervise are listed below.

① Material

On-site resident supervisor will implement the inspection of receiving construction materials.

i Reinforcing mill sheets, results of tension strength tests and manufacturers names

ii Analysis tables of cement material identification, tables of test results and manufacturers names

iii Analysis of salt components in sands/gravels, size distributions, specific gravities and percentages of absorption

iv Reinforced concrete

iv-1 Verification of Mixing Plans

Confirmation and determination of the sands/gravels quantity, slump, cement-water ratio, air quantity and salt components through test mixings

iv-2 Compression Tests

Determination of the standard control values from analysis of result tables

iv-3 Control of material quantity measures and complete control of material storage

iv-4 Prior submittals of concrete casting plans

② Standards of Control

The consultant will carry out the construction supervision with certain standards of control based on the approved construction schedule plans. The standards of control will be basically governed by the standards of Japan.

③ Soil Bearing Capacity

Confirmation of the soil bearing capacity will be carried out with the presence of on-site resident supervisor on the site by implementing plane table loading tests.

2) Quality Control Plan of Equipment

Ready-made medical equipment to be procured for this project will be selected from the equipment that complies with JIS, UL, IEC, ISO and other international standards. The consistencies between the equipment to be procured and the contents of the contract will be confirmed at the inspections carried out before shipment together with the inspections carried out by the third agencies for the components of shipment and containers.

2-2-4-6 Procurement Plan

1) Construction Materials

It is not easy to obtain quality construction materials around Svay Rieng. All of the materials including aggregates such as and gravel will need to be brought from the capital Phnom Penh. For the selection of materials, it is essential to comprehensively examine usage purpose, durability, economic efficiency, etc., and conduct detail planning with full consideration of the maintenance necessary for primary structures, as well as finishings and facility equipment. For this reason, the project should procure as many materials capable of local maintenance as possible.

Taking into account that Svay Rieng Province has few Cambodian engineers, and skilled engineers need to be dispatched from Phnom Penh, the labor situation is not good. It is therefore essential to dispatch Japanese staff to supervise the site in accordance with the progress of the project.

Table 2-21 Procurement of Construction Materials

Materials	Procurement from			
	Phnom Penh	Near the site	Japan	Remarks
Cement	○			
Sands/ Gravels	○			
Plywood form	○			
Brick	○			
Reinforcement Bar	○			
Structural Steel	○			
Lumber	○			
Roofing materials	○			
Ceramic tile	○			
Paintings	○			
Heat insulation materials	○			
Aluminum D&W frames	○			
Steel D&W frames	○			
Glass	○			
D&W hardwares	○			
Wooden furniture	○			
Distribution panels	○			
Lighting equipment	○			
Electricity wirings	○			
Wiring accessories	○			
Incoming panel	○			
Transformer	○			
Light electrical appliances	○			
PVC pipe	○			
Plumbing fixtures	○			
Pump	○			
Water receiving tank	○			

2) Equipment

According to the market research, it was found that none of the planned equipment can be procured in Cambodia. Therefore, the planned equipment needs to be the product of Japan or the third countries, and the manufacturer should have an local representative who can provide maintenance service in Cambodia.

If the origin of a planned equipment is limited to Japan only, there may not be enough manufacturers to

acquire competitive bids. In order to maintain the fairness of the tender, the origin of the product needs to be diversified. The key criteria to select products from third countries shall include the popularity and the availability of maintenance services in Cambodia, and the product price should not be the only decision factor. Also, the quality of products shall be secured by purchasing from the countries such as DAC or OECD member countries.

2-2-4-7 Operational Guidance Plan

Given that the planned equipment is basically consistent with the activities of the hospital concerned, and that the hospital personnel have enough operational experience, initial usage and operational guidance will be specific to procured equipment. Also, since equipment will be procured, in principle, from manufacturers that have distributors in Cambodia, technicians of these distributors will provide installation/initial usage/operational guidance.

2-2-4-8 Soft Component (Technical Assistance) Plan

It is assumed that any problems regarding operation and maintenance will not occur. However, for the which have not used in the hospital before or have necessity of building system for operation, the both side of Japan and Cambodia confirmed the necessity of technical assistance with soft component as described below in this project to promote more effective utilization of procured equipment during field survey.

- CR system (component of general X-ray machine)

Initial usage instruction and operational guidance by the supplier(s) will be enough for use. Guidance of digital process technology will, however, enable more effective operation as well as provide effectiveness in maintenance aspect including troubleshooting.

- Central sterilization equipment

This project calls for the sterilization department currently managed in the operation department to be strengthened to reorganize it as the central sterilization department. The target hospital, however, does not have enough operational experience for centralization. It is anticipated that technical guidance with soft component will improve the central sterilization department in terms of operation system and maintenance technique.

- Training of clinical techniques (OB/GY, orthopedic departments)

Medical personnel in the target hospital, with enough education taken through training processes as well as experience of basic use of equipment procured in this project, are anticipated to obtain capacity to effectively and efficiently operate equipment to be installed in this project by reeducation of clinical knowledge, which will lead to increased effectiveness of the project. Especially medical personnel involved with the departments with extremely high priority, that is OB/GY, and orthopedic departments, will receive technical guidance with the purpose of reeducation of clinical techniques.

2-2-4-9 Implementation Schedule

1) Project Implementation Schedule

Following the tendering and contract signing concerning construction and equipment procurement after the exchange of notes (E/N) and the grant agreement (G/A), which were signed between the two countries for implementation of the project under the grant aid system of the government of Japan, facility construction, equipment procurement and installation will be implemented within a single fiscal year. The following shows approximate time needed for detail design, tendering and construction/ procurement/ installation:

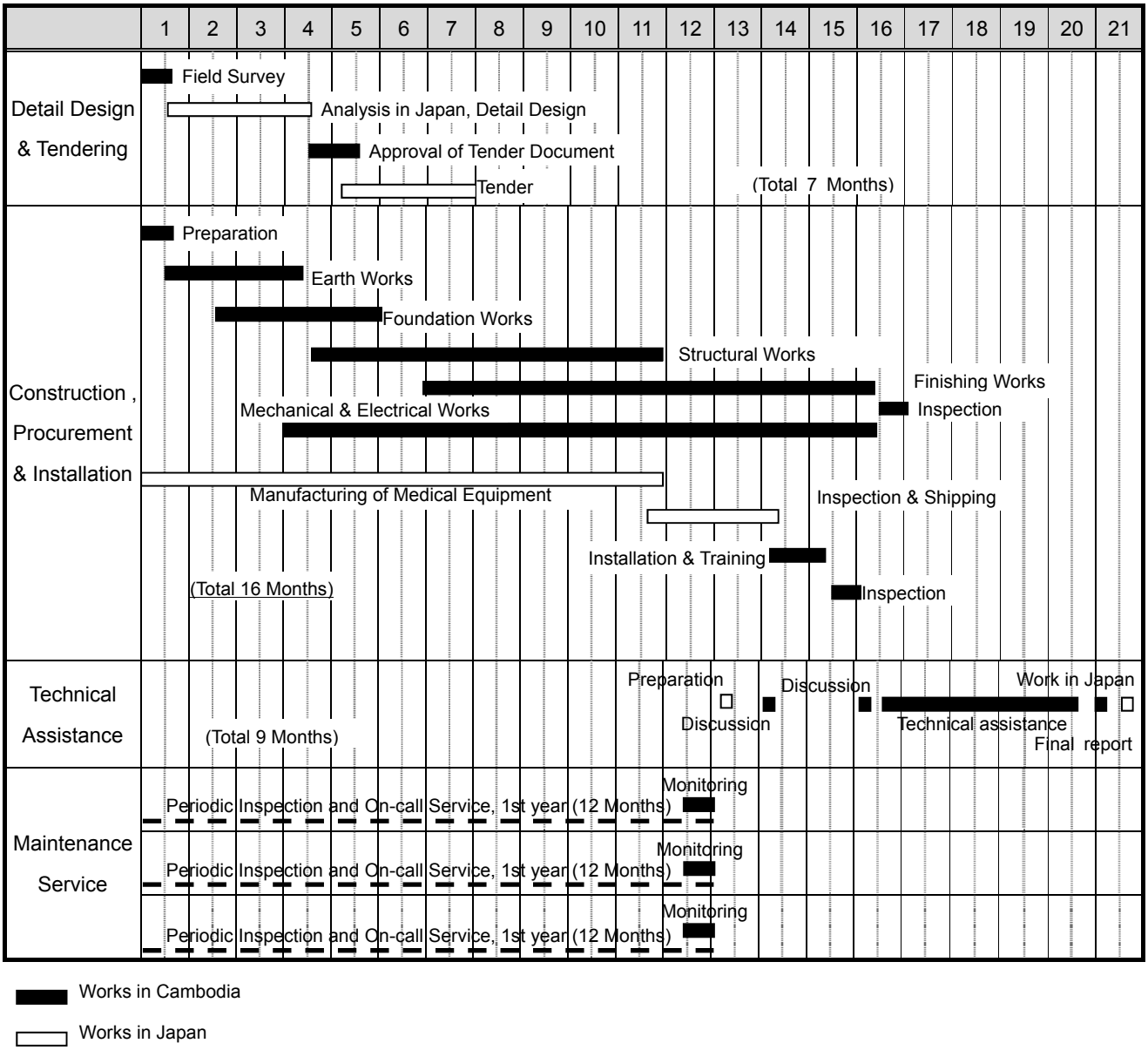
Table 2-22 Project Implementation Schedule

	Time Period	
Detail Design Stage (including field survey)	4.0 months	23.0 months
Tender Stage	3.0 months	
Construction/ Procurement & Installation Stage	16.0 months	
Technical Assistance (soft component)	9.0 months	9.0 months

2) Implementation Schedule

Table 2-23 shows the implementation schedule of this project.

Table 2-23 Implementation Schedule



2-3 Obligations of Recipient Country

The scope of work under the plan is described in "2-4-3 Scope of Works." The following describes overview of work borne by Cambodia.

(1) Process-Related

1) Land acquisition

The Project site is under the property of MOH of Cambodia.

2) Tax exemption

If Japanese firm(s) and construction firm(s) engaged in the project procure construction materials and equipment inside Cambodia during the construction period to implement the project, or import them from overseas, it is necessary to make an arrangement to exempt from Japanese firm(s) and construction firm(s) customs, consumption tax, other tax-inclusive pricing or charges. An arrangement for unloading procedure involved with swift import clearance is also required.

3) Arrangements for equipment/materials imported from Japan or third countries

MOH shall make arrangements which will be needed for swift clearance and inland transportation procedures for materials and equipment imported from Japan or third countries.

4) Acquisition of land use permission

There is no need to undergo procedures to apply for building permits regarding the project, but required documents must be submitted to the Ministry of Land Management, Urban Planning and Construction through the MOH and land use permission must be granted. Additionally, the MOH must report the fire control facility plan, which are to include facility plan drawings to the Svay Rieng Provincial Police Department.

5) Banking Arrangement and issuance of Authorization to Pay

MOH will become a contact institution for this plan to promptly handle Banking Arrangement and issue Authorization to Pay based on the consultant agreement and contractor/suppliers' contracts.

(2) Work Borne by the Cambodian Side

The following is an overview of the Cambodian scope of work, which is essential for smooth implementation of the plan.

1) Clearance of obstacles and land development at the project site

The Cambodian side will remove the following existing buildings and structures on the site planned for construction of the main building. The land must be prepared, including the removal of trees and buried structures. This is to be completed before facility construction tendering.

- Emergency Department (Existing Building D)

- Outpatient/HC, General Medicine, Pediatric, Dental, ENT, Imagery, STD, Pharmacy (Existing Building B) South end addition portion
- Administration Department, Meeting Room, Eye Unit, Surgical & Injury, Laboratory (Existing Building A) Balcony at entrance
- Canteen (Existing Building Q) South end portion
- Bicycle parking on south side of existing Building Q

None of the work above will be expensive, nor are special skills necessary for the work. Therefore, this can be adequately handled by the Cambodian side.

Although there will be no Emergency Department during the period of construction, it was agreed upon through discussions with the hospital side that emergency patients will be accepted in each department during the construction period.

2) Infrastructure improvement

① Electric Power

Since electric company EDC has 22 kV high-voltage lines on the road adjacent to the west side of the site, electrical power will be tapped through a leading-in pole on the west side of the hospital grounds. Within the site, power will be received through buried cables leading to the substation. New substation facilities will be installed inside the building, with power stepped down to 380V/220V and distributed within the new hospital building. For the division of the construction work, EDC on the Cambodian side will handle work for bringing power to the lead-in pole on the site, and the Japanese side will handle the rest of the construction work including installation of the substation facilities.

② Water supply

There is a water main near the hospital grounds, and new piping will be installed for the exclusive use of the new hospital building. For the division of construction work, the Cambodian side will handle pipe-laying work from the water main to the water meter installed near the road border, and the Japanese side will handle the construction from the newly installed lead-in water meter.

③ Drainage

Sewage and miscellaneous wastewater from inside buildings leaves the buildings in separate pipes, merges together in the first sump outside the building, and is carried via a natural slope to a simple septic tank. There is a public sewer main on the south side of the grounds. The Cambodian side will handle construction on the grounds for connecting the final sump to the main sewer line on the south side.

Since the existing septic tank connected to the existing buildings is not functioning due to being clogged with debris, the Cambodian side will be responsible for cleaning and restoring functionality to the existing septic tank.

④ Medical gas

The Cambodian side must supply oxygen tanks regularly in the manifold rooms in order to supply oxygen to the operation theaters, ICU, minor operation room, observations room, and delivery room.

3) Renovation of existing buildings and change of intended usage

After the completion of construction for the Project and relocation of the hospital functions to the new Main Building, renovation work in the rooms that are vacated from the existing buildings shall be

conducted by the hospital. The intended use of these rooms will be changed and they will continue to be used. The usage plan for the existing buildings after completion of construction is proposed as follows.

Existing Building A

- The Surgical Ward will be relocated to the ground floor of existing Building C. The rooms vacated by the existing Surgical Ward will be used as lodgings for nurse and midwife trainees and as classrooms for training.

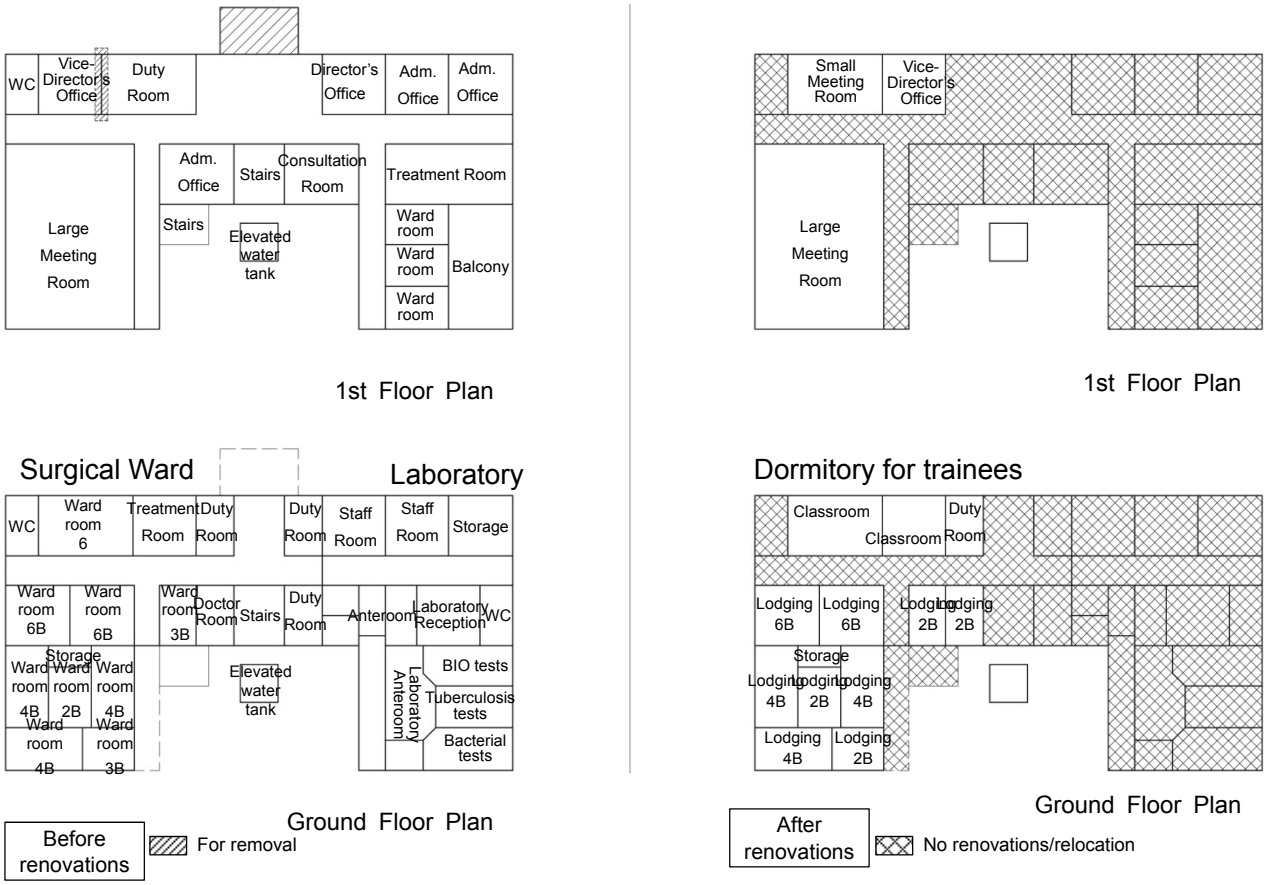


Figure 2-11 Post-Project Renovation and Relocation Plan for Existing Building A

Existing Building B

- The Pediatrics Ward will be relocated to the 1st floor of existing Building C. The existing Pediatrics Ward will be used as lodgings for nurses and midwives.
- The Outpatient Department will be relocated to the new Main Building. The current problem of intermingling with the Health Center will be resolved.
- The Imagery Department will be relocated to the new Main Building. The Cambodian side will move the X-ray machinery. The current X-ray room and dark room will be used for storage, etc.

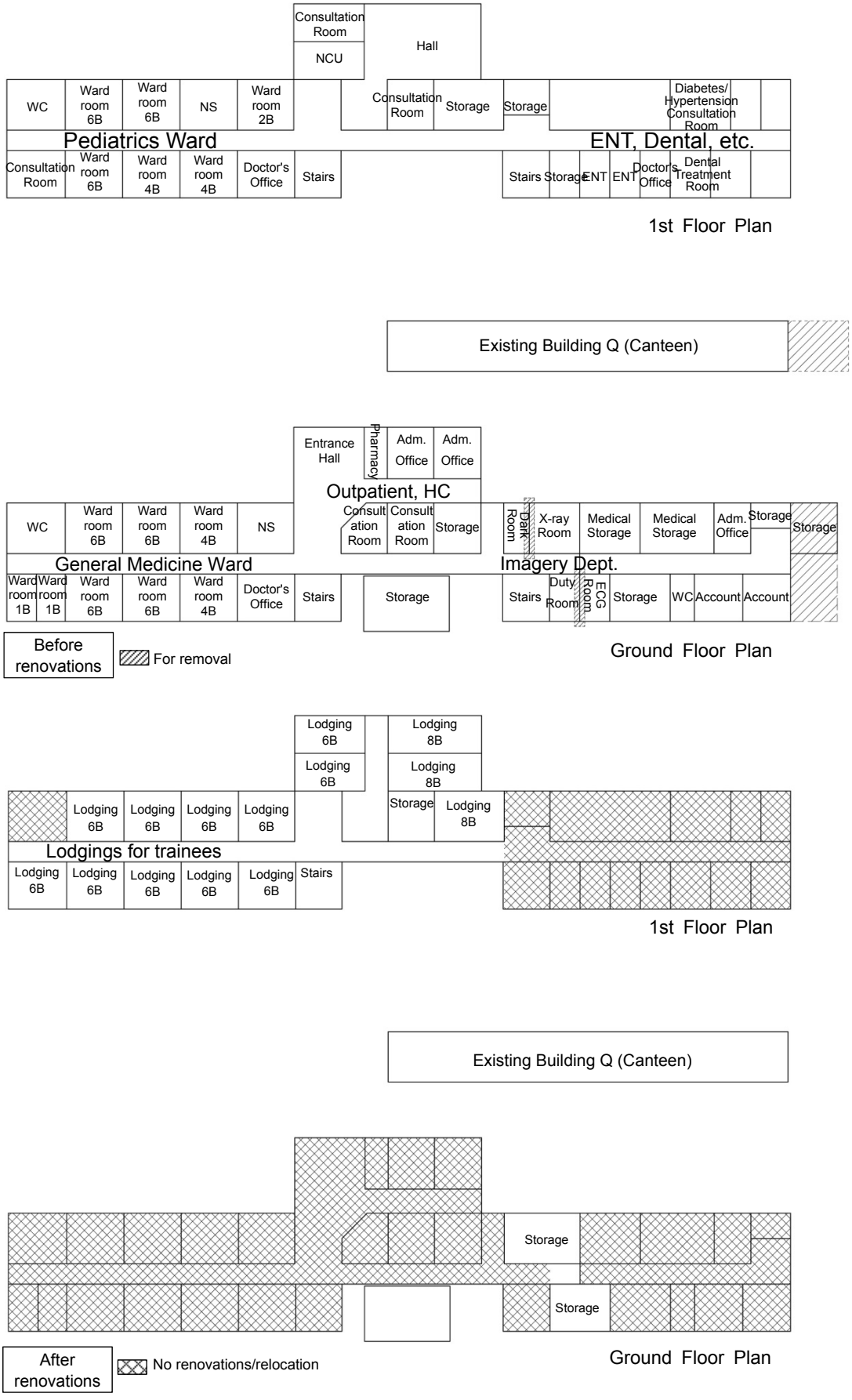


Figure 2-12 Post-Project Renovation and Relocation Plan for Existing Building B

Existing Building C

- The ground floor Operation Department will be relocated to the new Main Building. The ground floor will be used as the Surgical Ward.
- The 1st floor Obstetrics Department will be relocated to the new Main Building. The 1st floor will be used as the Pediatrics Ward.
- The 2nd floor Gynecology Department will be relocated to the new Main Building. The 2nd floor will used to secure hospital room space for departments that do not have enough beds due to future patient increase.

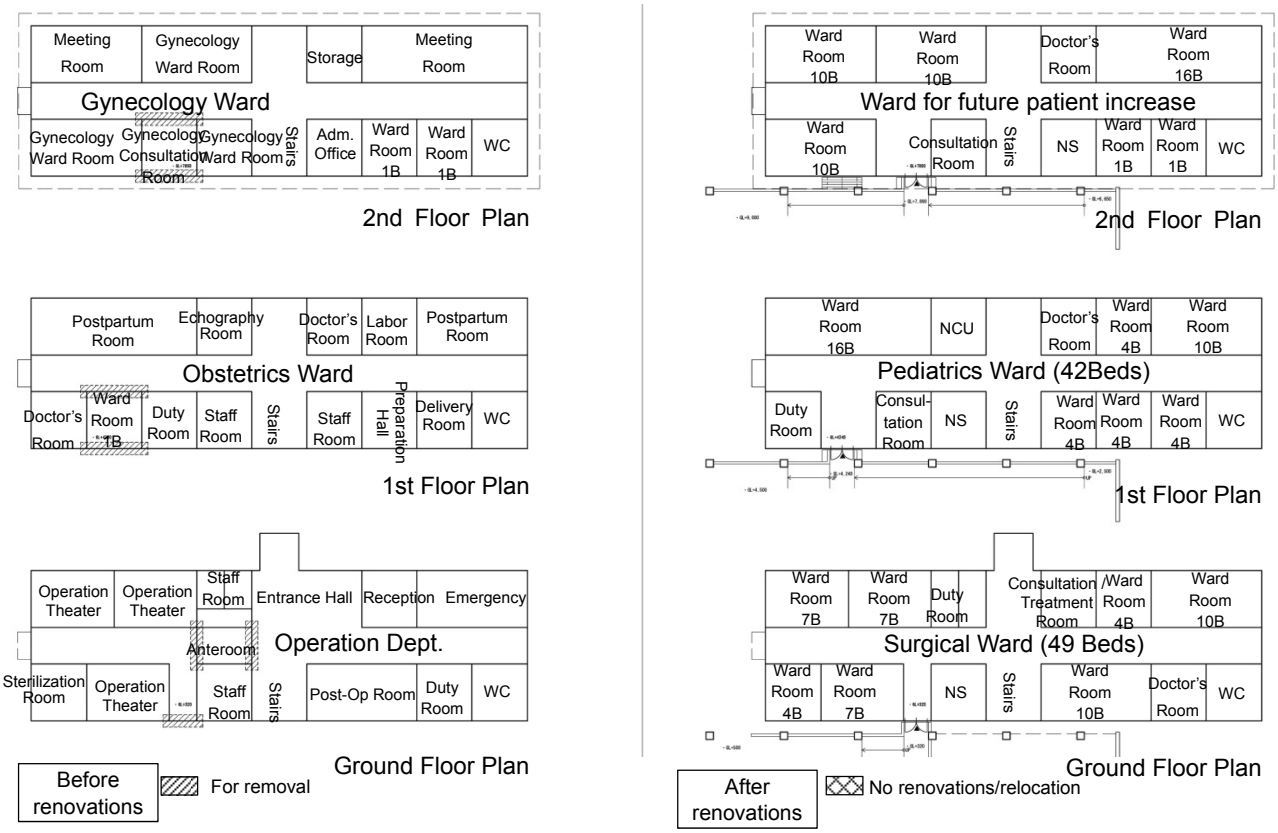


Figure 2-13 Post-Project Renovation and Relocation Plan for Existing Building C

4) Relocation of existing furniture and equipment

The Cambodian side is responsible for the relocation of current equipment and furniture in the existing facilities, and for the purchase of necessary equipment. Hospital staff can move the existing equipment and furniture piece by piece. Therefore, since it is not necessary to request the services of a professional company, no additional costs will be incurred. However, it will be necessary to contract the services of a company to relocate from existing Building B to the new building of the existing X-ray machine which was procured through "the Project for Improvement of Medical Equipment in National, Municipal and Provincial Referral Hospitals" under Japan's Grant Aid. The cost will be borne by the Cambodia side. Likewise, the X-ray protection box procured under the said project shall be relocated to Chiphu Hospital, and the cost shall be borne by Cambodia side as well.

The timing of the relocation will depend on progress conditions of construction work, but will be done immediately after the completion of construction.

2-4 Project Operation Plan

2-4-1 Operation Plan

(1) Operational Structure and Organization

Although the Cambodian MOH is the supervisory and executing body of the Project, the PHD of Svay Rieng Province and the Svay Rieng Provincial Hospital are responsible for its operation and maintenance after delivery. The purpose of the Project is to improve the medical services of the hospital, the health care services of which are declining both qualitatively and quantitatively. However, because the current departments will be maintained without establishing new departments, the operational structure can continue without changing the organizational system.

(2) Personnel Plan

The OB/GYN Ward is targeted for the Project, with a planned increase in the nominal number of beds from 18 to 32 in Obstetrics and from 6 to 12 in Gynecology. Furthermore, as an item for which the Cambodian side is responsible, the Surgical Ward and Pediatrics Ward will be relocated to existing Building C. The number of beds there will be increased by 40 beds each from the original 28 and 22 beds, respectively. The nominal number of beds in the entire hospital will be increased by 50, from 168 beds to 218 beds. New functions are not included in the Project, thereby making it unnecessary to greatly increase the skill level or number of employees. Since the scale of the Project is set to allow for operations to continue with the current number of staff members, there will be no difficulties in hospital operations after the final delivery. However, as of 2014, the number of doctors (19), nurses (70), and pharmacists (1) at Svay Rieng Provincial Hospital has not met the CPA3 criteria (23-25 doctors, 78-103 nurses, 3-4 pharmacists). Therefore, it is desirable to increase the number of personnel to meet the numbers prescribed for each guideline.

As shown below, it is necessary to conduct activities under an appropriate organizational structure for the maintenance management system.

2-4-2 Maintenance Plan

(1) Facilities

1) Maintenance Management System

There is no department within the MOH to manage the maintenance of hospitals across the country, with each hospital conducting their own maintenance management of facilities and equipment independently. The maintenance management system at Svay Rieng Provincial Hospital has not been organized, with only one anesthetist serving concurrently as the Maintenance Manager. No technicians have been allocated. If facility repairs are necessary, the hospital director will apply for budget from the PHD following a report from the Maintenance Manager. Currently, even simple repairs work is outsourced. The expenses related to maintenance and repairs at the provincial hospital from 2010 to 2013 are shown below. These expenses account for 2~2.5% of the total hospital expenditures. The breakdown of maintenance expenses is not managed appropriately, and it is unclear how much was spent on what type of maintenance activities.

Table 2-24 Svay Rieng Provincial Hospital Facility Maintenance Management Costs

Unit: Riel

	2010	2011	2012	2013
Building maintenance/repair costs	74,810,000	83,406,200	74,651,100	86,998,026
Total hospital expenditure	3,027,319,240	3,437,479,418	3,776,178,300	4,081,293,256
Percentage of overall hospital expenditure	2.5%	2.4%	2.0%	2.1%

As shown above, since the current maintenance management system is inadequate, it is essential to enhance it before Project implementation is completed.

2) Maintenance Plan

The planned facilities have a design for easy maintenance, eliminating high-level systems and complicated specifications. However, in order to maintain satisfactory building conditions over the long term, it is necessary to implement regular cleaning/inspections, and to swiftly respond to problems caused by wear, damage, or deterioration due to age.

- Periodic cleaning: A cleaning schedule will be established by frequency (i.e. daily, weekly, quarterly), and periodic cleaning by cleaning staff will be implemented.
- Periodic facility repairs: In terms of repairs for facility wear, damage or deterioration, the following is necessary: fixture inspections/adjustments (once per year), repair of painted areas (once every 3 years), repainting (once every 10-15 years).
- Building facility maintenance management: For building facilities, it is important to conduct daily preventative maintenance before malfunction repairs or part replacements are required. In addition to the length of operation start-up time, the lifespan of facility apparatus can also be extended through normal operation and regular inspections, lubrication, adjustments, cleaning, and repairs.
- Establishment of a maintenance management system: A maintenance management team will be formed, and a manager will be designated to implement the above items. Additionally, systematic maintenance management will be executed by formulating a yearly maintenance management activities plan and keeping a maintenance record. The structure and the activities of the maintenance management team are summarized in Figure 2-14.

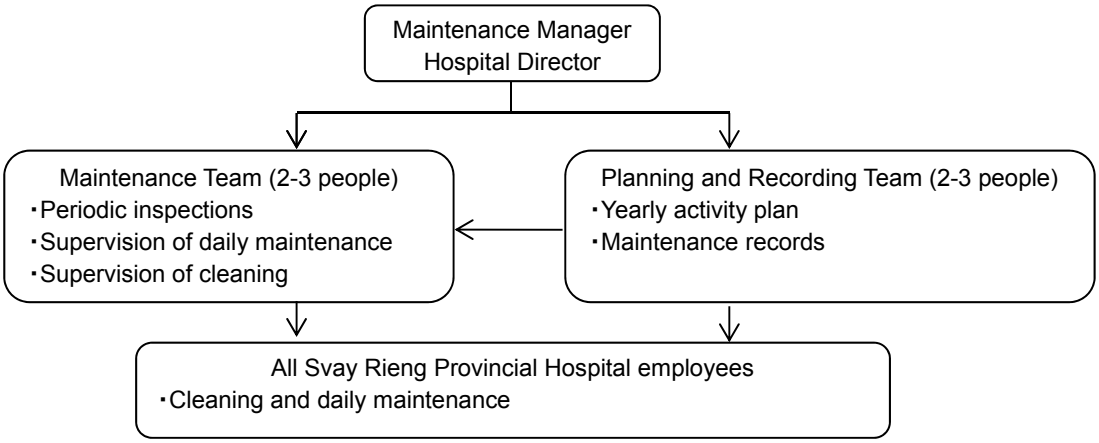


Figure 2-14 Proposed Facility Maintenance Management Structure

The following work items are necessary for building maintenance on the facilities side.

Table 2-25 Building Maintenance Items

Item	Frequency	Details
Power receiving and transforming equipment	Daily	Visual inspection
	Annually	Inspection and maintenance by a technician
Generator	Daily	Visual inspection
	Annually	Inspection and maintenance by a technician
Lighting fixture	When needed	Bulb replacement
Guidance lighting/ emergency light equipment	Weekly	Lighting test
Air-conditioner	Weekly	Visual inspection
	Quarterly	Filter cleaning/ replacement
	Annually	Air vent cleaning
Ventilation equipment	Monthly	Visual inspection, Fan belt adjustment
	Annually	Air vent cleaning
Water receiving tank	Weekly	Visual inspection
	Annually	Inner tank cleaning
Elevated water tank	Weekly	Visual inspection
	Annually	Inner tank cleaning
Feed-water pump	Daily	Visual inspection of the equipment
Chlorine sterilization	Weekly	Inspection of the amount of the remaining solution
Drainage equipment	Daily	Visual inspection of the drainage equipment
Sanitary equipment	Weekly	Water flow inspection
Fire hydrant pump	Daily	Visual inspection of the equipment
	Bimonthly	Hydrant flow testing
Septic tank	Daily	Visual inspection of inner tank, garbage cleaning, disinfectant replenishment
	Every 4 months	Sludge extraction
Oxygen supply equipment	Daily	Visual inspection of the manifold and alarm system
	When needed	Oxygen cylinder replacement
	Annually	Inspection and maintenance by a technician

(2) Equipment

The medical equipment requires the following maintenance activities. The following work procedures are necessary as part of the maintenance operations for medical equipment. Currently, an equipment management team consisting for 4 members trained at MEDEM has been assigned to the hospital. These members oversee these operations, but they are all medical professionals who do not possess engineering skills. Therefore, the services of the National Workshop Team or a local equipment agency must be requested to handle repairs in the event of machinery failure, with the exception of light repairs. In the future, it would be desirable to allocated engineers within the hospital.

1) Start-up inspection

Currently, equipment is inspected by the staff responsible for each of the items at any given time, and minor failures are also handled by the responsible staff. However, given that inspection is expected to be done on a daily basis, it is now recommended that the staff inspect the equipment at the beginning of work every day.

2) After-work cleaning/inspection

Although the hospital staff does not currently conduct regular cleaning and inspection for the medical equipment, it is important to clean each of the equipment at the end of work and to inspect failures to keep it in a good condition. Hence, if this plan is implemented, it will be recommended that a technician for installation of the equipment provide the staff with cleaning/inspection instructions at the time of the delivery.

3) Calibration

For measurement accuracy, measurement devices need to be calibrated at a certain interval. For a period of 3 years after delivery of the equipment in the Project, equipment will be calibrating during the periodic inspections included in the maintenance contracts concluded by the Japanese side for equipment that needs regular maintenance inspections. However, after the 3 years of said maintenance contracts have ended, the recipient side must conduct this calibration work. An engineer from the manufacturer will provide and explanation on equipment components and operations at the time of equipment delivery or during period inspections.

4) Repair in the event of failure

Currently, there is no section or engineer with the capacity to repair medical equipment at PHD or the hospital. As a result, the National Workshop Team (NWT) of the National Maternal and Child Health Centre (NMCHC) or representative offices are requested for the repair work under the supervision of the MOH. We shall propose the establishment of a system that enables quick response to failures as well as the use of operation manual (in English and Khmer) to provide technical education to perform repair work.

5) Inventory management of supplies

Implemented on an as-needed basis, current procurement of supplies cannot effectively respond to urgent shortages. Hence, it will be recommended that, after the above maintenance department is established, the department carry a certain stock of supplies to ensure adequate inventory management.

2-4-3 Financial planning

(1) MOH and Svay Rieng Province PHD Budgets

Table 2-26 shows the MOH budget and the Svay Rieng Province PHD Budgets. Excluding 2011, the MOH budget increased at a rate of approximately 13~16%. Although there was a slight decrease in 2011, the budget has increased steadily, with an increase of more than 1,100% in the 13 years between 2000 (81 billion riel) and 2013.

The Svay Rieng Province PHD budget decreased in 2012, but has risen 7~11% every year. Additionally, the Svay Rieng Province PHD budget accounts for approximately 1.0% of the MOH budget. From the Svay Rieng Province PHD budget, allocations are made to the budgets of Svay Rieng Provincial Hospital, health centers, and health posts.

Table 2-26 MOH and Svay Rieng PHD Budgets

	2009	2010	2011	2012	2013
MOH budget (million riel)	554,180.0	645,211.5	694,331.4	794,213.5	901,500.8
Rate of increase (%)	-	16.4	7.6	14.4	13.5
Svay Rieng Province PHD budget (million riel)	6,628.9	7,367.9	8,038.0	7,970.0	8,534.0
Rate of increase (%)	-	11.1	9.1	-0.8	7.1
Percentage of MOH budget accounted for by the Svay Rieng PHD budget (%)	1.2	1.1	1.2	1.0	1.0

Source: Svay Rieng PHD

(2) Operating Conditions of Svay Rieng Provincial Hospital

Hospital income has risen approximately 10% in the last 5 years. Of this, budget allocated from the MOH through the Svay Rieng Province PHD has risen at a rate of 5.5~8% every year. Income from user fees has risen at a rate of 12~19% every year. This is due to the yearly increase in the number of patients, as well as the unit price for treatment being raised every 2 years. The treatment unit price is decided through discussions with relevant personnel in the region. The ratio of the allocation from the MOH and the income from user fees is approximately 6:4. With the implementation of this Project, the number of patients is expected to rise even further. Therefore, an increase in income from user fees can also be expected. Incidentally, income from user fees include income from health equity funds (HEF), accounting for 25~30% of the overall income from user fees.

Staff salaries and bonuses combined currently account for approximately 50% of all expenditures. After salaries, other expenditure items include transportation costs for business trips and pharmaceuticals, respectively accounting for 15% and 10% of all expenditures. Of the transportation expenses for business trips, approximately 10% consists of ambulance fuel costs. Increasing every year, these costs are straining the financial situation of the hospital. Since pharmaceuticals supplied by the CMS alone are not sufficient to accommodate the increase in patients, expenditures to supplement the shortfall are mounting. Of the total expenditures at Svay Rieng Hospital, facility maintenance accounts for 2~3%, equipment maintenance accounts for more than 1%, and electricity and water fees account for 5~6%. After the Project is implemented, it will be necessary to secure budget to accommodate an increase in these expenses.

Table 2-27 Income and Expenditure of Svay Rieng Provincial Hospital

(Unit: Riel (1USD=4,000 Riel))

	2010		2011		2012		2013	
	Amount	%	Amount	%	Amount	%	Amount	%
Income:								
Budget from MOH	1,814,389,240	65.7	1,913,750,255	63.4	2,067,133,700	62.5	2,180,494,656	59.7
Compared to previous year			5.5%		8.0%		5.5%	
From Treatment Fees (user fees)	946,319,000	34.3	1,105,221,900	36.6	1,238,084,600	37.5	1,474,448,000	40.3
Compared to previous year			16.8%		12.0%		19.1%	
Total income	2,760,708,240	100.0	3,018,972,155	100.0	3,305,218,300	100.0	3,654,942,656	100.0
Compared to previous year			9.4%		9.5%		10.6%	
Expenditure:								
Salary	784,442,290	28.4	791,529,992	26.2	812,226,300	24.6	997,430,530	27.4
Compared to previous year			0.9%		2.6%		22.8%	
Bonuses (60% of user fees)	567,788,000	20.6	663,132,000	22.0	684,736,000	20.7	884,668,800	24.3
Compared to previous year			16.8%		3.3%		29.2%	
Pharmaceuticals	239,787,600	8.7	369,733,000	12.3	397,040,900	12.0	350,172,500	9.6
Compared to previous year			54.2%		7.4%		-11.8%	
Food expenses	27,986,000	1.0	15,541,500	0.5	16,713,000	0.5	17,781,200	0.5
Compared to previous year			-44.5%		7.5%		6.4%	
Medical Equipment	48,000,000	1.7	13,149,800	0.4	51,538,900	1.6	25,414,900	0.7
Compared to previous year			-72.6%		291.9%		-50.7%	
Equipment Maintenance	35,515,000	1.3	29,944,300	1.0	36,138,000	1.1	40,228,300	1.1
Compared to previous year			-15.7%		20.7%		11.3%	
Facility Maintenance	74,810,000	2.7	83,406,200	2.8	74,651,100	2.3	86,998,026	2.4
Compared to previous year			11.5%		-10.5%		16.5%	
Electricity and Water	162,439,300	5.9	168,297,300	5.6	188,423,000	5.7	193,227,600	5.3
Compared to previous year			3.6%		12.0%		2.6%	
Gas and Fuel	282,638,000	10.2	351,470,000	11.7	375,502,000	11.4	350,943,600	9.6
Compared to previous year			24.4%		6.8%		-6.5%	
Administrative	25,455,000	0.9	19,258,000	0.6	24,540,000	0.7	28,366,300	0.8
Compared to previous year			-24.3%		27.4%		15.6%	
Misc.	133,311,250	4.8	71,420,163	2.4	90,360,500	2.7	89,882,100	2.5
Compared to previous year			-46.4%		26.5%		-0.5%	
Government Payments (1% of user fees)	7,300,000	0.3	8,872,000	0.3	8,036,000	0.2	14,744,000	0.4
Compared to previous year			21.5%		-9.4%		83.5%	
Transportation Expenses for Business Trips	369,204,000	13.4	430,220,000	14.3	542,312,600	16.4	560,154,400	15.4
Compared to previous year			16.5%		26.1%		3.3%	
Total Expenditure	2,758,676,440	100.0	3,015,974,255	100.0	3,302,218,300	100.0	3,640,012,256	100.0
Compared to previous year			8.3%		9.5%		10.2%	
Balance	2,031,800		2,997,900		3,000,000		14,930,400	

Source: Questionnaire Answer Sheet

(3) Financial Plan

1) Income estimates

- Budget allocation from MOH

The Svay Rieng Provincial Hospital budget allocated from the MOH has increased 5.5~8% annually, as mentioned above. An average increase of 6.3% per year is projected. Therefore, the budget allocation from

MOH in 2020 is expected to be as shown below.

2,180,495,000 riel×106.3%[7]＝3,344,167,000 riel

- Income from treatment fees (user fees)

A comparison of the movement in outpatient/inpatient numbers and income from user fees from 2010 to 2013 is shown in Table 2-28. It can be seen that the rate of increase for the total number of patients and that for income from user fees is nearly equivalent. (Since treatment unit prices were raised in 2013, the rate of increase for income from user fees is higher compared to the patient number rate of increase.)

Table 2-28 Svay Rieng Provincial Hospital Patient Number and Income from User Fees

	2010	2011	2012	2013	2020 (projected)
No. of outpatients	11,492	11,685	12,847	13,279	19,372
Compared to previous year		1.7%	9.9%	3.4%	
No. of inpatients	6,274	8,956	10,944	10,706	14,687
Compared to previous year		42.8%	22.2%	-2.2%	
Total	17,766	20,641	23,791	23,985	34,059
Compared to previous year		16.2%	15.3%	0.8%	
Income from user fees (thousand riels)	946,319	1,105,222	1,238,085	1,474,448	2,093,716
Compared to previous year		16.8%	12.0%	19.1%	

In 2020, which is the target year set for the Project, the forecast number of patients is 42.0% more than the number in 2013. Therefore, income from user fees is also expected to increase 42.0%.

1,474,448,000 riel ×142%＝2,093,716,000 riel

2) Expenditure projections

The projections for income at Svay Rieng Provincial Hospital are shown in the previous item, while details on expected expenditure items are described in section 5-2 Operation and Maintenance Plan. As a summary of these items, the projected expenditures for 2020 are shown in Table 2-29. The balance is in the black, and with the Cambodian MOH's budget increasing 6.3% annually, and if the number of patients increases as projected, adequate operation and maintenance is possible.

Table 2-29 Projected Income and Expenditure for 2020

Items	2013 Expenditures (thousand riel)	2020 Projections (thousand riel)	Rate of increase (%)
MOH budget	2,180,495	3,344,167	153.4
Income from user fees	1,474,448	2,093,716	142.0
Total income	3,654,943	5,437,883	148.8
Salary	997,431	1,327,775	133.1
Bonuses	884,669	1,256,230	142.0
Pharmaceuticals	350,173	425,337	121.5
Food	17,781	24,459	137.6
Medical Equipment	25,415	43,296	170.4
Equipment Maintenance	40,228	198,462	493.3
Facility Maintenance Expenses	86,998	149,208	171.5
Electricity and Water	193,228	468,074	242.2
Gas	350,944	482,996	137.6
Administrative	28,366	30,604	107.9
Business Trip Transportation	560,154	647,077	115.5
Government Payments	14,744	20,394	138.3
Misc.	89,882	120,690	134.3
Total Expenditure	3,640,013	5,194,602	142.7
Balance	14,930	441,743	

2-5 Project Cost Estimation

2-5-1 Initial Cost Estimation

With the conditions of expenditure projection in (2) below, breakdowns of the expenditures borne by Cambodia under the said classification can be estimated as follows:

(1) Projection of Expenditures to be Borne by Cambodian Side

Table 2-30 Initial Cost Estimation to be Borne by Cambodian Side

Items	Draft Cost Estimation	
	(US$)	Converted amount (thousand JPY)
1) Demolition of Existing Buildings	30,335	3,121
2) Backfilling of Soil, Land Preparation	5,613	577
3) Infrastructure Lead-in and Connection Work	8,450	869
4) Existing Facility Renovations	14,923	1,535
5) Relocation and Procurement of Equipment/Furniture	28,000	2,880
6) Planting of Trees	3,800	391
7) Banking Commissions	10,401	1,070
Total	101,522	10,443

(2) Condition of Expenditure Projection

1) Period of Cost Estimation

August 2014

2) Exchange Rate

US$ 1 = 102.87 JPY (Average from May 2014 to July 2012)

3) Construction Period

It is estimated that the project would be implemented in a single fiscal year, and the period of detailed design, construction and procurement of equipment is identified in the implementation schedule.

4) Others

This project will be implemented through the system of the grant aid by the government of Japan.

2-5-2 Operation and Maintenance Costs

Here, each expenditure item of the hospital will be examined, and the expenditures for 3 years after delivery of the Project (2020) will be estimated. Price increase rates are estimated based on Table 2-31. Furthermore, since the reply received from the Cambodian side consisted of the actual values from half of 2014, estimations will be made using 2013 as a base. It is expected that prices will rise 25.4% over 2013 prices by 2020.

Table 2-31 Price Increase Projections for Cambodia

	2013	2014	2015	2016	2017	2018	2019	2020
Price increase rate		4.512%	3.545%	3.042%	3.042%	3.042%	2.918%	2.918%
Compared to 2013	100.0%	104.5%	108.2%	111.5%	114.9%	118.4%	121.9%	125.4%

Source: IMF World Economic Outlook Database, October 2014

(1) Salary

The trends in the number of staff members at Svay Rieng Provincial Hospital are shown in Table 2-32. With the increasing number of patients in recent year, approximately 10 new people are hired every year. There is a particularly pronounced increase in the number of Primary Nurses and Primary Midwives. However, if using the number of staff members that should be allocated at a CPA3 hospital as described in CPA Guidelines, it is necessary to hire at least 1 additional doctor and 11 additional nurses.

Table 2-32 Staff Number Trends at Svay Rieng Provincial Hospital (by Position)

	2009	2010	2011	2012	2013	2014		CPA3 Standard No. of Employees
						Actual	Planned	
Doctor	16	19	20	20	18	19	23	23-40
Medical Assistant	3	3	4	4	4	3	3	
Dentist	1	1	1	1	1	1	2	2-3
Dental Assistant	1	1	1	1	1	1	1	
Pharmacist	1	1	1	1	2	1	2	
Primary Nurse	23	24	31	36	37	41	45	86-132
Secondary Nurse	28	29	27	27	28	29	30	
Primary Midwife	8	8	9	14	16	19	19	16-22
Secondary Midwife	8	8	7	7	5	5	5	
Lab Technician	2	2	3	3	4	3	5	
Physiotherapist	2	2	2	2	2	2	2	
Administration/Accounting	9	9	8	8	9	9	9	
Misc.	24	24	29	29	38	45	43	
Total	126	131	143	153	165	178	189	

The average salaries at Svay Rieng Provincial Hospital are shown by position in Table 2-33. Thus, adding the total of the unit price multiplied by the number of additionally hired people to the expenditures, the expenditures for salary using 2013 as a base is as follows:

997,430,530 riel＋Doctor 9,934,800 riel×1 person＋Nurse 4,678,800 riel×11 persons＝
1,058,832,130 riel.

Taking the increase in prices into account, the projection for 2020 is as follows:

1,058,832,000 riel×125.4%＝1,327,775,000 riel

Table 2-33 Staff Salaries at Svay Rieng Provincial Hospital (by Position)

Position	2010	2011	2012	2013
Doctor, Pharmacist	6,538,800	7,033,200	8,274,000	9,934,800
Medical Assistant	4,364,400	5,796,600	6,651,360	7,659,120
Physiotherapist, Lab Technician, Primary Nurse, Primary Midwife	3,670,200	4,316,400	4,982,640	5,800,080
Secondary Nurse, Secondary Midwife, Administration/ Accounting	2,728 ,320	2,829,600	3,227,760	4,678,800
Driver	2,160,000	2,160,000	2,496,000	2,496,000

(2) Bonuses

Since 60% of the income from user fees is allotted for bonuses, using the aforementioned user fee income estimates, the projection for 2020 is as follows:

2,093,716,000 riel×60%＝1,256,230,000 riel

(3) Pharmaceutical Expenses

Although the total amount of pharmaceutical expenses has decreased since its peak in 2012, it still accounts for around 10% of expenditures. Using the 2010~2013 average of 339,184,000 riel as a base, and considering price increases, the 2020 pharmaceutical expenses are estimated.

339,184,000 riel×125.4%＝425,337,000 riel

(4) Food Expenses

Food expenses refer to the cost of meals for patients. It accounts for only a small percent of total expenditures at less than 1%, which rises and falls depending on the year. No definite trends can be observed. This is likely due to the custom of patients' families preparing meals for them in the hospital, causing the percentage to change depending on such variations. Therefore, using the 2010~2013 food expense average of 19,505,000 riel as a base, and considering the rate of price increases, the 2020 food expenses are estimated.

19,505,000 riel×125.4%＝24,459,000 riel

(5) Medical Equipment Expenses

Medical equipment expenses are the costs for the small, basic medical instruments that are used daily such as stethoscopes and scalpels. These expenses fluctuate depending on the amount of small medical instruments purchased that year. In 2010 and 2012, the amount of medical equipment purchased was likely

relatively large, but in 2011 and 2013, the expenses were less than half that of the previous years. This expense tends to account for less than 2.0% of all expenditures. Using the 2010~2013 medical equipment expense average of 34,526,000 riel as a base, and considering the rate of price increases, the 2020 medical equipment expenses are estimated.

34,526,000 riel×125.4%＝43,296,000 riel

(6) Equipment Maintenance Expenses

Fees for maintenance contracts with agents are necessary as part of the maintenance expenses for medical equipment. For the Project, maintenance contract fees for important equipment will be borne by the Japanese side for 3 years after implementation. The hospital side will be responsible for the necessary equipment maintenance expenses from the 4th year after the equipment is procured. Using current calculations, the yearly maintenance contract fees are estimated at approximately US$38,500. These expenses must be included in the budget in the 3rd year after implementation.

USD38,500 × 4,000 riel/USD = 154,000,000 riel

The maintenance expenses for the existing equipment is 30,000,000 riel~40,000,000 riel annually. Using the 2010~2013 average of 35,456,000 riel as a base, and considering the rate of price increases, the maintenance expenses for existing equipment are estimated.

35,456,000 riel × 125.4% = 44,462,000 riel

Therefore, the total maintenance expenses for equipment are estimated as follows:

44,462,000 riel + 154,000,000 riel = 198,462,000 riel

(7) Facility Maintenance Expenses

The maintenance expenses for the existing facilities is 75,000,000 riel~87,000,000 riel annually. Using the 2010~2013 average of 79,966,000 riel as a base, and considering the rate of price increases, the maintenance expenses for existing facilities are estimated.

79,966,000 riel×125.4%＝100,277,000 riel

In addition to the above, the estimated maintenance expenses for facilities built under the Project are as shown in Table 2-34.

Table 2-34 Facility Maintenance Expense Estimates (Facilities Targeted in the Project)

Type	Item	Work content / Method of estimation	Frequency	Approx. amount (riel)
Buildings	Inspection and adjustments for doors and windows	Inspections by employees	Once/year	
	Repairing painted areas	Work by professional company, Estimated as 5% of painted areas	Once/3 years	5,835,000/year
	Repainting painted areas	Work by professional company, Estimated from painting costs	Once/15 years	23,340,000/year
Facilities	Substation facilities	Inspections by employees	Once/month	
	Generator facilities	Inspections by employees	Once/month	
	Water receiving tank cleaning	Cleaning by professional company	Once/year	439,000/year
	Elevated water tank cleaning	Cleaning by professional company	Once/year	152,000/year
	Septic tank sludge removal	Work by professional company	3 times/year	747,000/year
Consumables	Lighting fixtures	20% of fluorescent bulbs replaced annually	As needed	2,286,000/year
	Filters	Filter replacement, Estimated by number of filters	Once/year	6,221,000/year
Total				39,020,000/year

Therefore, considering the increase in prices, the facility maintenance expenses for 2020 are estimated as follows:

100,277,000 riel＋39,020,000 riel×125.4%＝149,208,000 riel.

(8) Electricity and Water

Using the 2010~2013 electricity and water fees for the existing facilities average of 178,097,000 riel as a base, and considering the rate of price increases, the electricity and water fees for the existing facilities are estimated.

178,097,000 riel×125.4%＝223,334,000 riel

In addition to the above, the electricity and water fees for facilities built under the Project are estimated below.

Electricity fees:

Estimated electricity usage quantity of 29,640kWh/month×650 riel/kWh×12 months＝231,192,000 riel

Water fees:

Estimated water usage quantity of 940m^3/month×1,200 riel/m^3×12 months＝13,548,000 riel

From the above, the electricity and water fees for 2020 are projected as follows:

223,334,000 riel＋231,192,000 riel＋13,548,000 riel＝468,074,000 riel.

(9) Gas

Expenses for purchasing medical gas (oxygen) account for a large portion of the gas fees, accounting for approximately 10% of all expenditures. Using the 2010~2013 average of 340,138,000 riel as a base, and considering the rate of increase accompanying an increase in patient numbers, the 2020 gas fees are estimated. In 2020, the forecast number of patients is 42.0% more than the number in 2013. Therefore, medical gas expenses are also expected to increase 42.0%.

340,138,000 riel×142.0%＝482,996,000 riel

(10) Administrative Expenses

Hospital administrative expenses consist of the costs of office supplies, cleaning, and other consumables, etc. However, this expense accounts for less than 1% of total hospital expenditures. Fluctuating every year, no definite trends can be observed. Using the 2010~2013 administrative expense average of 24,405,000 riel as a base, and considering the rate of price increase, the 2020 administrative expenses are estimated.

24,405,000 riel×125.4%＝30,604,000 riel

(11) Transportation Expenses for Business Trips

Transportation expenses for business trips include fuel costs for the ambulance, accounting for approximately 22% of transportation expenses. Transportation expenses account for approximately 15% of total expenditures, making it the next highest after labor costs. Using the 2010~2013 transportation expense average of 475,473,000 riel as a base, and considering the rate of price increases, the 2020 transportation expenses are estimated.

475,473,000 riel×125.4%＝596,243,000 riel

Of this, the fuel costs for the ambulance are shown below. After the Neak Loeung Bridge is completed in 2015, it is projected that traffic accidents will increase 1.33-fold. Since ambulance dispatches will likely increase similarly, fuel costs are also increased 1.33-fold.

596,243,000 riel＋30,710USD×4,000 riel×125.4%×0.33＝647,077,000 riel

Table 2-35 Ambulance Fuel Expenses (Unit: USD)

	2010	2011	2012	2013	2014*
Ambulance fuel expenses	15,928	23,443	29,212	30,710	23,162
Compared to previous year		147%	125%	105%	

Source: Svay Rieng Hospital

**The values for 2014 are from the first half of the year.*

(12) Government Payments

Since 1% of the income from user fees is allotted for payments to the government, using the user fee income estimates shown in Chapter 4, Section 3-1(3)1), the projection for 2020 is as follows:

2,093,716,000 riel×1%＝20,394,000 riel.

(13) Miscellaneous

Using the 2010~2013 average of 96,244,000 riel as a base, and considering the rate of price increases, the miscellaneous expenses for 2020 are estimated.

96,244,000 riel,000 riel×125.4%＝120,690,000 riel

Chapter 3 Project Evaluation

Chapter 3 Project Evaluation

3-1 Preconditions

This project involves the removal of part of the existing facilities on the property of Svay Rieng Provincial Hospital, the construction of a central examination and treatment department for the surgery, emergency, radiology, and OB/GYN departments, which are aging and difficult to keep sterile, and the procurement of required medical equipment to replace aging and inadequate existing equipment. The acquisition of a building site is not a prerequisite, as the Ministry of Health owns the hospital property. However, a prerequisite of implementing the project is that the Cambodian side performs the following required procedures as stated in "Obligations of Recipient Country" in Chapter 2 without delay so that no hindrances to the project arise: tax-exemption measures, provision of access to imported materials and equipment, land usage authorization, banking arrangements/issuance of authorization to pay, and the removal of obstructions from the planned construction site, land maintenance work, infrastructural improvement, and relocation of existing equipment and furniture.

3-2 Necessary Inputs by Recipient Country

In order for overall aims of the project to be achieved, the Cambodian side must implement the following items or carry out preparations accordingly:

- Implement the aforementioned items that are the counterpart nation's responsibility in "Obligations of Recipient Country" in Chapter 2. The Cambodian side's implementation of its obligation to improve existing facilities after Japan completes the construction of new buildings under the project is especially crucial for allowing the hospital to fulfill its functions.
- Secure the necessary equipment to be used in and procured for the facilities to be built, and the necessary personnel and budget to maintain those facilities.

3-3 Important Assumptions

The project calls for the construction of facilities and procurement of medical equipment required by Svay Rieng Provincial Hospital. Ideally, hospital staff will utilize these facilities and equipment effectively, strengthening the medical referral system and improving medical services. The project also calls for the soft component of in relation to assistance in improving the operating frameworks and maintenance skills of the CR system, technical guidance and assistance in improving the operating frameworks and maintenance skills of the central sterilization department, as well as clinical skills guidance for departments such as OB/GYN and orthopedic surgery. Ideally, when this is complete, hospital staff will be able to continually provide training at this hospital and in the National Hospitals in Phnom Penh.

3-4 Project Evaluation

In light of the following points, this project is considered relevant as a target project implemented with Japanese grant aid.

3-4-1 Relevance

(1) Focus of the project's benefits

The focus region of the project is Svay Rieng Province, in which the project site of Svay Rieng Provincial Hospital is located. The province has a population of 573,000 people (2013) who are the direct beneficiaries. The Neak Loeung Bridge, a Japanese grant aid project on which National Route 1 will cross the Mekong River, is scheduled for completion in 2015, and Svay Rieng Province is set to become a hub of the Southern Economic Corridor in which Route 1 links National Route 5, which runs from the Cambodian border with Thailand through Northwest Cambodia, to Vietnam. Thus, traffic is expected to increase, and with it the number of traffic casualties should also increase. The population of Svay Rieng Province grew steadily at an average rate of 1.2% from 2009 to 2014, but the mid- to long-term development of the SEZ could cause the population to increase dramatically, which would further increase the province's health and medical needs. The project will enhance the medical care referral system and greatly improve medical care services in Svay Rieng Province, therefore it is deemed to be highly relevant.

(2) From a Human Security standpoint

The project aims to enhance the healthcare services in remote area such as Svay Rieng Province, which is one of the important province to the country from the economic point of view, through the improvement of Svay Rieng Provincial Hospital to serve as a top referral hospital in the province. The project objective is in line with Japan's Strategy on Global Health Diplomacy (May 2013) and the needs of human security of the habitants of project target province. Therefore, it is highly necessary and relevant to implement the project under Japan's Grant Aid.

(3) Contribution to achieving Cambodia's targets for its mid- to long-term development plan

This project exists to help strengthen the health care system (which covers the five areas of health service delivery, health care financing, human resources for health, health information systems and health system governance) illustrated in HSP2, an implementation plan that is part of the NSDP of Cambodia. Scaling up provision of CPA at referral hospitals such as Svay Rieng Provincial Hospital, and strengthening medical care services and referral systems are a part of the Health Service Delivery Strategy Components. Therefore the project is deemed to be highly relevant.

(4) Consistency with Japan's Assistance Policy

Section (2) Promotion of Social Development, (b) Enhancement of Health and Medical Care of the Country Assistance Strategy for Cambodia (2011) established by the Japanese Ministry of Foreign

Affairs sets forth the "investigation, maintenance and improvement of key regional hospitals through grant aid" as a priority area (central target). As the top referral hospital of Svay Rieng Province, Svay Rieng Provincial Hospital qualifies as a key regional hospital. Therefore, the project is sufficiently consistent with Japan's assistance policy.

3-4-2 Effectiveness

Below are the expected target indicators of implementing this project.

(1) Quantitative Effects

Table 3-1 Outcome Indicators for Quantitative Effects

Indicators	Current Value (2013)	Target Value (2020, three years after project completion)
Total Length of Stay for OB/GY (people-days/year)	8,899	14,281
No. of Emergency Patients (people/year)	2,056 (estimated value of 2014; 2013 data not available)	2,483
No. of Deliveries (cases/year)	2,304	3,037
No. of Outpatient Surgeries (cases/year)	609	892
No. of Outpatients in Four Key Departments (Surgical, Internal Medicine, OB/GYN, Pediatrics) (people/year)	9,736	15,994

(2) Qualitative Effects

(i) The quality medical service is provided to the patients including OB/GY, Emergency and Outpatient Departments.

(ii) The referral system of the Svay Rieng Province is enhanced.