Ministry of Health and Medical Services
Solomon Islands

No.

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR RECONSTRUCTION
OF
GIZO HOSPITAL
IN
SOLOMON ISLANDS

November 2008

JAPAN INTERNATIONAL COOPERATION AGENCY

Nihon Sekkei, Inc.

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PREFACE

In response to a request from the Government of Solomon Islands, the Government of Japan decided to conduct a basic design study on the Project for Reconstruction of Gizo Hospital and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Solomon Islands a study team from October 1st to October 25th, 2008.

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

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

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

November 2008

Eiji Hashimoto
Vice President
Japan International Cooperation Agency

November 2008

Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Reconstruction of Gizo Hospital in the Solomon Islands.

This study was conducted by Nihon Sekkei, Inc. under a contract to JICA, during the period from September 2007 to November 2008. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Solomon Islands and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

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

Very truly yours,

Masahiro Ikawa
Project Manager

Basic Design Study Team on
the Project for Reconstruction of Gizo Hospital

Nihon Sekkei, Inc.

Summary

The Solomon Islands is an island nation consisting of nearly 1,000 small and large islands located in the Pacific Ocean and adopts a republican form of government. It gained its independence from Great Britain in 1978. It is made up of nine provinces and one capital territory, Honiara City. It encompasses an area of 28,900km^2 with a population of about 534,000 (in 2006). Its per-capita GNI is US$680 (World Bank, 2006).

The maternal mortality rate in the Solomon Islands was 220 per 100,000 births (2005) and the infant mortality rate was 54.9 per 1,000 births (2006). Thus, health indicators are very low even in comparison to other Oceanian countries. A typical characteristic of island countries is the disparity between the main island and the isolated islands in the quality and quantity of available basic health services. Of the diseases in the country, malaria is a major disease and the primary cause of death, accounting for 80% of the infant mortality rate.

The health sector suffers constantly from such problems as a shortage of medical professionals, inappropriate budget allocation and antiquated facilities. Moreover, the ethnic conflicts, which continued from 1999 to 2003, imposed an added serious impact on the delivery of health and medical care services by causing functional failure to budgetary measures and by the large number of refugees fleeing from the capital city, Honiara. The budget for improving the medical care environment is greatly restricted particularly in local areas, and immediate countermeasures are required.

Gizo Hospital, which is the target of this project, is the largest hospital in Western Province with a population of approximately 72,000 people, the second largest province in the country. Of the hospitals in the Solomon Islands, it ranks fourth for the number of beds that it has. It is a referral hospital that provides medical services to a total of approximately 130,000 people from Western Province, Choiseul Province and a segment of the population of Isabel Province. Built in 1959, the hospital has been repeatedly expanded and modified on a small scale, but it has devolved into dysfunctional space that impedes even the lowest minimum of required activities such as smooth movement of patients. The hospital is faced with the problem of the shortage of space also caused by the growing number of patients in conjunction with increasing population. It is no longer possible for the hospital to remedy this problem with simply expanding and remodeling the old facilities. As a result, the Solomon government formulated a plan to construct and transfer the hospital to the adjacent lot and requested the Japanese government for grant aid in August 2006.

On April 2, 2007, after the request had been made, an earthquake with a magnitude of 8.1 hit the western region of the Solomon Islands. As a result of the subsequent tsunami, Gizo Hospital facilities were seriously damaged. From April 9 to 13 of the same year, a study team was dispatched to conduct the “Emergency Field Study on Earthquake and Tsunami in the Solomon Islands” to assess the scope of damages mainly focusing on Gizo Island that was hit the hardest with support from the Tsunami Research Center of the Port and Airport Research Institute, an independent administrative institution. Subsequently, from April 18 to May 2, a study team was dispatched to carry out the “Project Formulation Study for Reconstruction/Rehabilitation of Damages by Earthquake and Tsunami in the Solomon Islands” with support from the Japan International Cooperation Agency. The tsunami caused by the earthquake destroyed the houses of medical staff members vital to the medical services on the isolated island, thereby making it difficult for them to provide medical services. At the same time, hospitalized patients were transferred to other hospitals in Honiara City and other places together with a portion of the undamaged medical equipment. As a result, the functions of Gizo Hospital were greatly impaired. Although its medical service delivery system has been rehabilitated gradually, it continues to be difficult to solve the fundamental problems that existed prior to the disaster. In order for the hospital to be able to provide medical services required as a secondary medical institution, it has become essential for the hospital to transfer to the new facility as quickly as possible.

The purposes of this project are twofold: first, to improve the quality and quantity of the medical services of Gizo Hospital, a secondary medical institution of the Solomon Islands, by constructing a new hospital building and procuring medical equipment so that it will be able to deliver appropriate health and medical care services required for the hospital; second, to establish the central delivery point of regional medical services as the referral hospital and medical services in times of disaster.

Implementing this project with Japan's grant aid will directly enable Gizo Hospital to function more appropriately as a secondary medical institution and provide proper health and medical services as a secondary medical institution to approximately 130,000 residents in the western region of the country. At the same time, it will establish the central delivery point of regional medical services as the referral hospital and medical services in times of disasters. In addition, a greater number of residents in Western, Choiseul and Isabel Provinces will be able to receive the health and medical services provided by this hospital, thus improving various health indicators.

In response to the request from the Solomon government, the Japanese government decided to implement a basic design study. JICA dispatched a basic design study team in October 2007. The study team held discussions with relevant officers of the Solomon government, surveyed related facilities, collected necessary data and materials, and conducted a survey of the planned construction site. Subsequently, analysis was carried out in Japan and a briefing on the summary of the basic study was given in the Solomon Islands in August 2008. Then, the final report on the basic design study was compiled.

The results of the study confirmed the necessity of reconstructing the building of Gizo Hospital. To meet this need, it was concluded that it would be necessary to construct a new Gizo hospital building at the planned construction site in Gizo City and procure and install relevant equipment and materials in the new hospital. Overall remodeling and renewal of facilities and equipment including support functions such as staff houses would be necessary in the requested project. At the same time, proper components had to be selected as a framework of grant aid in the tide of medium and long-term reconstruction including aid from other donors. Hence, the scope of the cooperation project was established based on perspectives such as providing "facilities where a direct effect can be anticipated on improving secondary medical services," "facilities that require a relatively high construction technology which is not locally available without difficulty," and "departments vital to a regional health and medical network."

A summary of the Gizo Hospital reconstruction plan is as follows.

Responsible Agency: Ministry of Health and Medical Services, Solomon Islands

Implementing Agency: Ministry of Health and Medical Services, Solomon Islands

Overall schedule: About 25 months including detailed design and period of tender

Planned construction site: Gizo City

Constructed structure: Two-storied, reinforced concrete structure (new construction)

Content of the plan: As shown in the table below.

Major project breakdown (Number of stories / total floor area)	Composition of Facilities
Gizo Hospital (Two storied building / 3,792.08 m^2)	First floor: Outpatient: General, Emergency, Special Clinic (Internal medicine, Surgical, OB/Gy, ophthalmology, dental clinic, physiotherapy and traveling clinic) Medical Image: X-ray, Ultrasonic Medical Test: Laboratories, Blood bank Administration: Pharmacy, Office, Duty Service: Communication Center for Disaster
	Second floor: Operation: Operation rooms (one room each for major and minor operations) Central sterilizing and supply: Washing room, Sterilization room Delivery: Labor, Delivery (2), Nursery Ward: Male, Female, Pediatrics, Maternity, HDU, Isolation (total 62 beds) Service: Electrical Room
	Ancillary facility Sewage Treatment Plant Generator Water Reservoir Tank
Medical Equipment	The equipment necessary for the Project facilities and some existing facilities (Mobile X-ray unit, Ultrasonic diagnostic unit, etc.)

Approximate estimates of the costs borne by the Solomon side are SBD3,880,000 before the start of the project in November 2009, SBD900,000 for the 18-month period of the construction by April 2011, and SBD85,000 thereafter. These amounts will be appropriated from the budgets of the Ministry of Health and Medical Services for 2009, 2010 and 2011 respectively. If these estimated amounts are compared with the budgets discussed below for each year, they account for approximately 1.63%, 0.37% and 0.03% respectively. Thus, they are within the payment capacity of the Solomon government, and the Ministry of Health and Medical Services has promised to secure these budgets.

On the other hand, the operating budget of Gizo Hospital has been allocated in the health budget of Western Province and accounts for nearly 60% of the health budget of the province. Of the 2007 budget of Gizo Hospital, which was SBD3,289,000, the operation and maintenance costs accounted for about 18% of the entire budget, that is, SBD602,000. For the second year following the completion of the project (2012), the Hospital's operation and maintenance budget is estimated to be SBD618,000. On the other hand, if the budget of the Ministry of Health and Medical Services continues to grow by about 2% to 3%, as it did from 2004 to 2007, the health budget of Western Province will reach SBD6,195,000 in 2012. The operation and maintenance budget of the new Gizo Hospital is estimated to be SBD670,000. The ratio of the operation and maintenance costs will be 18% of the new Gizo Hospital's overall budget for 2012, which is nearly the same as the current ratio. The Ministry of Health and Medical Services has expressed a commitment to take budgetary measures to cover increased operation and maintenance costs of Gizo Hospital in the master plan for medium-term health financial expenditure (2006 to 2011) formulated based on the sector-wide approach (SWAps). Hence, it can be safely judged that necessary budgetary measures will be taken for the operation and maintenance costs.

As of October 2007, Gizo Hospital has 84 staff members and its personnel costs amount to SBD3,730,000. In the abovementioned master plan, Gizo Hospital plans to increase the staff by 25 members in order to strengthen the functions of medical departments such as operation rooms, outpatient services, obstetrics and pediatrics to be newly established as well as the operation and maintenance after the cooperation project has been completed. The total personnel cost for the new staff is calculated to be SBD1,520,000, which accounts for about 41% of the current personnel costs. The Ministry of Health and Medical Services of the Solomon Islands has promised to secure the personnel and allocate a budget to cover the increased personnel cost. Since this increase of SBD1,520,000 is equivalent to 0.61% of the Ministry's 2011 estimated budget for the newly built hospital, it is obviously the amount that can be borne by the Solomon government.

The following direct effects are anticipated when this project (the cooperation project by the Japan side and the project to be borne by the Solomon government) is implemented.

①Restoration of functions that were impaired by the tsunami and improved secondary medical services

The medical services that were reduced by the tsunami following the earthquake would be restored and facilities that were antiquated before the disaster would be renewed. Then, the health indicators of 2006 such as the median number of patients per month (2,312 persons), the number of hospitalized patients (151 persons), the number of surgeries (74 cases) and the number of births (49 cases) will rise, and the quality of medical care and the service delivery functions of the hospital as a secondary medical institution will improve.

②Improved operation and maintenance capacity of Gizo Hospital

Through the technical guidance provided under the soft component system, the Ministry of Health and Medical Services, the Operation and Maintenance Department of the National Referral Hospital, the Health Department of Western Province and Gizo Hospital will be able to have a better understanding of the system for and significance of the operation and maintenance of facilities/equipment from the standpoint of each organization. By thus ensuring the stable operations of facilities/equipment, hygienic and safe services will be provided.

With the implementation of this project, the following indirect effects are expected.

①Improved medical care services for about 130,000 people living in the western region

As the provincial hospital, Gizo Hospital will contribute to improvements in medical care services for approximately 130,000 people living in the western region including the neighboring area in need of a secondary medical institution as well as Western Province, which is the target area of this project.

②Reduced disparity in basic health and medical care services between the main island and the isolated islands

By improving the basic health services of Western Province, an isolated island region with the highest population, the disparity in medical care services between the main island and the isolated island, which is a typical problem of island countries, will be reduced.

③Improving health indicators of Solomon Islands

Easier access to appropriate facilities in isolated islands will contribute to improving health indicators such as the mortality rate due to malaria, the infant mortality rate and the maternal mortality rate.

④Strengthened base point for disaster management in Western Province

The raised, reinforced concrete structure of the new hospital will function as an aid center in times of disasters, thereby making it possible to collect information and carrying out relief activities smoothly.

Based on the above, implementing this project through Japan's grant-aid program will enable Gizo Hospital to function appropriately as a secondary medical institution in the western region of the Solomon Islands and directly contribute to improving the level of medical care service in the Western Province. Furthermore, the beneficial effects for the 130,000 residents in the western region of the country are anticipated. Hence, it is of great significance to implement this project with Japan's grant aid, and its relevance and need are extremely high.

In undertaking this cooperation project, it is important that the construction works which will be carried out by the Solomon government are implemented at the appropriate time. The following issues must be taken into consideration so that Gizo Hospital, which is to be improved under this project, will be managed more smoothly and effectively to yield the above-stated direct and indirect effects.

(1) Despite high rainfall on Gizo Island, its water supply conditions are poor with frequent disruptions in the water supply due to inadequate water pressure caused by minimal difference in elevation in addition to the old water supply facilities of Gizo City. A project to expand and improve the water distribution network of Gizo in Western Province has been approved by the Solomon government and is currently underway. In order for the new hospital that will be constructed in this project to function effectively, it is important that the water supply improvement project by the Solomon government is completed as planed in May 2010.

(2) The Gizo power plant operated by the Solomon Islands Electricity Authority (SIEA), which supplies electricity throughout the Gizo area, is located about 4km from the center of the city, and the high voltage transformer installed by the road in front of the southeastern section of the hospital supplies low-voltage power to the hospital and the surrounding area. However, the electric power supply has been unable to meet the growing demand of the rapidly developing Gizo City. As a result, power outages occur several times a month, and the capacity of he transformer that supplies electricity to the current hospital will not be sufficient to supply electricity to the new hospital. At present, SIEA has been implementing an electricity supply system improvement project with its own budget that will be completed by the end of 2008. In order for the new hospital to carry out its functions efficiently, it will be essential that the Solomon government sees to it that this project is completed as planned.

(3) The jetty that provides access to the hospital by patients, especially patients transported for emergency, was destroyed by the tsunami. In addition, the access road running in front of the hospital is unpaved. For the safety of the patient who is transported to the hospital. It is important that both the jetty and the access road in front of the hospital are renovated for patients and others who utilize the hospital. The jetty will be repaired with Japan's grassroots grant aid, whereas the road in front of the hospital will be improved with the assistance of the Taiwanese government. It is essential that both of these projects are implemented and completed on schedule.

(4) One of the direct major causes that impaired medical activities due to the disaster was the total destruction of the medical staff residences. Although they have been living temporarily in tents in the elevated areas on the island, the number of available staff members has decreased and the situation is unstable. The Solomon government has plans to increase staff members, secure a budget and construct a staff dormitory. Of the plans, 18 blocks will be completed in 2009. In conjunction with the opening of the new hospital and its expanded activities, it is necessary that the staff dormitory will be reconstructed as planned.

(5) To improve the operation and maintenance technology of the Gizo Hospital facilities, a technical guidance plan utilizing the soft component system is under preparation. Hence, it will be required that relevant persons in the Ministry of Health and Medical Services and the National Referral Hospital as well as persons working in the fields of construction, machinery and electric equipment of Gizo Hospital will make preparations in synchrony with the time when technical guidance will be provided.

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Chapter 2

ABBREVIATIONS

A/P	Authorization to Pay
AHC	Area Health Center
AusAID	Australian Agency for International Development
B/A	Banking Arrangement
CSSD	Central Sterilizing and Supply Department
E/N	Exchange of Notes
GDP	Gross Domestic Product
GNI	Gross National Income
HDU	High Dependent Unit
JASS	Japanese Architectural Standard Specification
JICA	Japan International Cooperation Agency
JIS	Japan Industrial Standard
LDC	Least Developed Countries
MDF	Main Distribution Frame
MHMS	Ministry of Health and Medical Services
NGO	Non-Governmental Organization
NRH	National Referral Hospital
PABX	Private Automatic Branch Exchange
PHC	Primary Healthcare
SBD	Solomon Islands Dollar
SIEA	Solomon Islands Electric Authority
SIWA	Solomon Islands Water Authority
SWAps	Sector-Wide Approaches
TOR	Terms of Reference
UNFPA	UN Population Fund
UNICEF	United Nations Children's Fund
WHO	World Health Organization

Chapter 1. Background of the Project

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Gizo Hospital, which is the target of this project, is the largest hospital in Western Province with a population of approximately 72,000 people, the second largest province in the country. Of the hospitals in the Solomon Islands, it ranks fourth for the number of beds that it has. It is a referral hospital that provides medical services to a total of approximately 130,000 people from Western Province, Choiseul Province and a segment of the population of Isabel Province. Built in 1959, the hospital has been repeatedly expanded and modified on a small scale, but it has devolved into dysfunctional space that impedes even the lowest minimum of required activities such as smooth movement of patients. The hospital is faced with the problem of the shortage of space also caused by the growing number of patients in conjunction with increasing population. It is no longer possible for the hospital to remedy this problem with simply expanding and remodeling the old facilities. As a result, the Solomon government formulated a plan to construct and transfer the hospital to the adjacent lot and requested the Japanese government for grant aid in August 2006.

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Chapter 2. Contents of the Project

CHAPTER 2. CONTENTS OF THE PROJECT

2-1 Basic Concept of the Project

(1) Overall Goal and Project Objective

Among the development projects of the healthcare sector of Solomon Islands, the government has established the National Health Strategic Plan (2006 - 2010), with the primary healthcare (PHC) service network as an important task, and thereby keenly promotes preventive healthcare, aiming to establish a healthcare system that can produce the maximum impact at the minimum cost.

The medical institutions in Solomon Islands form a network, with National Referral Hospital in Honiara, the capital city, serving as the top medical institution, seven provincial hospitals serving as secondary medical institutions and more than 300 primary medical institutions distributed throughout the country. These medical institutions are generally insufficiently staffed and their facilities are obsolescent, representing a major factor hindering effective provision of medical services. As a core institution in the Western Province, the second largest province in terms of population, Gizo Hospital suffers seriously from obsolescence of facilities. Therefore, the need for reconstruction of the hospital is very high.

Implementation of this project as Japan' grant aid program will, first and directly, make Gizo Hospital function properly as a secondary medical institution that can provide about 130 thousand people in the Western Province with healthcare and medical services appropriate as a secondary medical institution, and second, secure a local core hospital for regional medical services and also a center for provision of emergency medical services in case of disasters. Further, implementation of this project will increase the number of people having access to healthcare and medical services not only in the Western Province, the project's subject area, but in the Choiseul and Isabel Provinces, with the result that various health indicators will be improved.

(2) Basic Concept of the Project

This project is to implement reconstruction of Gizo Hospital facilities and provision of medical equipment necessary for improving the medical service function of the hospital. The tsunami associated with the earthquake of April 2008, which followed the project request filed with the government of Japan, inundated certain facilities and damaged residences for the hospital staff members, and thereby incapacitated some of the hospital functions. Under such a condition, implementation of this project was considered all the more urgently needed. The government of Japan therefore dispatched an emergency field survey team and the Project Formulation Study for Rehabilitation and Reconstruction of the Earthquake and Tsunami Stricken Areas in Solomon Islands, to confirm the state of damage, and consequently re-confirmed the relevance of implementation of this project within the context of reconstruction from the damage.
The basic concept of the project is construction of the facilities listed in Table 2-1 and provision of the medical equipment needed for medical services there but not presently provided.

Table 2-1 Outline of the Cooperation Project for Gizo Hospital

Major project breakdown (Number of stories / total floor area)	Composition of Facilities
Gizo Hospital (Two storied building / 3,792.08 m^2)	First floor: Outpatient: General, Emergency, Special Clinic (Internal medicine, Surgical, OB/Gy, ophthalmology, dental clinic, physiotherapy and traveling clinic) Medical Image: X-ray, Ultrasonic Medical Test: Laboratories, Blood bank Administration: Pharmacy, Office, Duty Service: Communication Center for Disaster
	Second floor: Operation: Operation rooms (major and minor) Central sterilizing and supply: Washing room, Sterilization room Delivery: Labor, Delivery (2), Nursery Ward: Male, Female, Pediatrics, Maternity, HDU, Isolation (total 62 beds) Service: Electrical Room
	Ancillary facility Sewage Treatment Plant Generator Water Reservoir Tank
Medical Equipment	The equipment necessary for the Project facilities and some existing facilities (Mobile X-ray unit, Ultrasonic diagnostic unit, etc.)

2-2 Basic Design of the Requested Japanese Assistance

2-2-1 Design Policy

(1) Basic Policy

① The hospital function of Gizo Hospital will be recovered from the disaster and improved to the level enabling Gizo Hospital to perform the roles of the secondary medical institution of the Western Province, which Gizo Hospital ought to perform.

② The hospital function of Gizo Hospital will be improved as the de facto secondary medical institution of the western region of Solomon Islands, given the fact that the improvement of the secondary medical institutions of the Choiseul and Isabel Provinces is delayed.

③ Development of the facility plan and equipment plan will give due consideration to the managerial capacities of the Ministry of Health and Medical Services (MHMS) and existing hospitals (number of medical and healthcare professionals, technological level, financial affordability, state of procurement of consumables and spareparts, etc.), which will certainly develop to promote their technological and financial sustainability and self-reliance.

④ Formulation of the architectural plan will consider the items listed below and will realize a sustainable facility plan.

- The architectural plan will include a “Facility Master Plan” which incorporates a proper provision to enable the hospital to expand its facilities without sacrificing its medical services, commensurate with forecast increases of patients associated with the long- and medium-range population increases. For this purpose the Master Plan includes a future plan of the hospital, including studies on traffic lines of persons and materials, zoning plan by function of the hospital.
- The sizes of the facilities will be determined based on the present and past diagnosis and treatment performances, while considering forecast population increases, operation rates of existing hospitals in the geographic areas the hospital’s diagnosis and treatment should cover.
- While making use of the natural lighting and natural ventilation, or realizing effective utilization of the natural energy, proper control of the natural energy will be done by such means as heat shielding and light shielding. Through such means the architectural plan intends to reduce the maintenance and managerial cost, and to realize a “safe and secured, bright and clean” hospital both to the patients and hospital staff members.
- Because of the planned site being an area afflicted by the tsunami, the architectural plan will consider the natural conditions of this area, including such incidents as earthquakes, tsunamis, cyclones so that the medical services may not be easily hindered even in the case of disasters or similar events. By securing a plan to strengthen safeguards against the recent tsunami and similar disasters, it enables the hospital to function as an assistance center during times of disaster.
- Since provincial hospitals in the country are generally staffed with only general physicians and a few specialists, and a traveling clinic consisting of specialists from the national hospitals make the rounds of provincial hospitals, the project includes an effective facility placement plan that will allow the team of specialists to carry out their work.

- Regarding the selection of construction materials and equipment, materials that can be easily repaired or replaced locally and durable, robust materials will be selected as much as possible; and the processing treatment of the structure needed to withstand salt damage, repel ants, and other natural conditions of the site will be carried out.

- The plan will give to consideration to the environmental conservation of the existing hospitals and their surroundings.

⑤ The equipment plan intends basically to supplement such pieces of medical equipment which are obsolescent and insufficient in procurement or in number. Further, the equipment selection will consider the subject hospital being a secondary medical institution and the necessity of restoring the hospital function to the pre-tsunami state.

⑥ It gives priority to the model that its reagent can be prepared by the targeted hospital in case of analysers and the model that can obtain the consumable in the local market or neighbouring countries in order to minimize an increase of maintenance and operation cost as much as possible.

⑦ The present maintenance method consists of requesting repair service to NRH and receiving the maintenance round service of the equipment agents. Judging from the current state where out-of-order equipment has been left the present maintenance system does not function satisfactorily, and thus there seem to be a decrease in the quality of the medical service, and danger of nosocomial infections. Therefore, it is necessary to strengthen the present maintenance system by technical assistance through a soft component. Technical guidance will be conducted to build up sustainable maintenance system since MHMS recognized above-mentioned problems and requested the technical assistance in the light of sustainability, taking into consideration assistance to NRH and provincial health department.

(2) Policy toward natural conditions

1) Temperature and humidity

The climate of Solomon Islands is one of high temperatures and high humidities throughout the year, with the monthly maximum mean temperature ranging from about 30°C to 32°C. The maximum temperature in summer sometimes exceeds 34°C.
The roof exposed to the direct sunlight becomes the hottest heat source; therefore, a structure with enhanced heat insulation will be planned. Sections whose functions, medical practices for example, need air conditioning will have independent air conditioners. The architectural structure calls for sufficient heat insulation of the roof, enhanced airtight structure for air-conditioned rooms as a measure for preventing dew condensation. The general rooms with natural ventilation need a consideration to realize effective natural ventilation; in other words, they will have high ceilings to accommodate air spaces large enough to induce effective upward natural draft -- air being supplied from beneath and allowed to exit from the above -- even on windless days.

2) Precipitation

Solomon Islands has a very high precipitation, with the annual precipitation being about 4,000mm. Therefore, a portion of stormwater from the roof will be stored in an uncovered FRP reservoir tank installed outdoor, to be used for outdoor sprinkling. It is also necessary to study the gradients of roofs, sizes of rainwater pipes, installation of overflow devices in case of emergency. Stormwater measures in the premises also demand a prudent study.

3) Wind direction and wind speed

Strong southwest wind prevails from November to April. The southeast trade wind blows from the end of April to November. The architectural plan will make use of such wind characteristics for natural draft and natural ventilation by properly laying out facilities and openings of the building. Natural draft and ventilation by ceiling fans are planned for all wards and general diagnosis and treatment rooms. In Solomon Islands, elevated-floor buildings are a norm; therefore, the architectural plan will call for a building of good natural draft with piloti type elevated-floors.

4) Sunlight and salt damage

Because of Solomon Island being situated on the equator, the sun's angle of elevation is high, and sunshine from the directly above is intense. The plan calls for installation of louvers, wide eaves, sunlight shielding glass, sunlight shielding screen doors, etc. to shield the sunlight coming through windows. It is necessary to select materials and finishing methods resistant to deterioration for exterior finishing for portions exposed to direct sunlight.
In the Gizo Island, there are cases where steel tanks were destroyed by rust. In this project the building is close to seashore; therefore, salt damage will be considered in the selection of building materials facing the external walls. Parts of exterior-facing facilities or equipment include fins, fans, fixing metal parts of air conditioners, outdoor lamps, electric panels, etc. These need countermeasures against salt damage. Consideration against salt damage will also be given to those which are not parts of facilities or equipment. It is necessary that due caution be exercised in material selection, in the use materials made of steel plates, in particular.

5) Earthquake, cyclone and other disasters

Tropical cyclones occur mainly in the southeastern part of Solomon Islands. Although the tropical cyclone did not occur near Gizo in recent years, the plan should consider possible attacks by tropical cyclones. The plan will call for using goods of sufficient impact resistance for important glass parts, such as toplight.
Earthquakes also occur frequently in the area of Solomon Islands. A number of active faults are identified on the Gizo Island. However, these active faults on the Gizo Island are of low activities and possibility of strong local earthquakes needs not be considered.
Regarding plate boundary type earthquakes, earthquakes stronger than magnitude 6 occurred 15 times during the past 20 years in the area within a radius of 200km. Of which worthy of particular attention is the giant earthquake of Magnitude 8.1 that occurred in April 2007 50km southeastward off the Gizo Island. This giant earthquake damaged roads and buildings on the bay area on the western part of the island. In and around Gizo City, the accompanying tsunami was more damaging than the earthquake itself. The reconstruction work was underway as of October 2007. Like reconstruction works, this project should be planned with due consideration given to both earthquakes and tsunamis.

(3) Policy toward socioeconomic conditions

The construction industry in Honiara City, the capital of Solomon Island, on the Guadalcanal Island is now booming, particularly for construction of military facilities for the peace keeping corps (Australian Army) after settling down of the ethnic conflict around 2006 and reconstruction of the tsunami damages. The home construction index is rising 10% every year. Not being industrialized, Solomon Islands depends on import for the supply of almost all materials. Against such a background, price index of domestic products and that of imported products rise 5 to 10% in terms of three-month average. Unit prices of materials and equipment, including construction materials, conceivably tend to rise for some time. The progress of construction works now underway in Solomon Islands is not generally smooth. It is necessary to confirm market information as often as necessary.

(4) Policy toward Construction Business Condition, Procurement Conditions or Particular Business Conditions, Trade Practices

There are only few major construction companies in Honiara and some companies just offering manpower. Australia, a major country belonging to the same economic zone, is also in construction boom. The construction business in Australia seems to be able to procure materials on schedule but their prices have risen and do not fall. Therefore the conditions surrounding architectural works are not stable from the viewpoints of both manpower and materials.
In the Gizo Islands where the planned construction site is, the construction business is less developed than in Honiara, the capital city. In the Gizo Island where the provincial capital of the Western Province is situated, buildings are generally small in scale, and almost all one- or two-stories wooden ones. The concept of building held by the people of the Gizo Island and surrounding islands is different from that of people in Honiara who built a city. Historically, the people there are in the habit of doing thing bit by bit over time. Since the population is small, a large-scale construction needs manpower from other places. Procurement of manpower from other islands would need understanding of the people there to avoid conflicts among different ethnic groups. In addition, preparatory works are important for procurement of materials, construction manpower. Introduction of manpower from other islands and from abroad is indispensable to smooth implementation of this project, and successful procurement and management of the manpower are the key to construction of a high-quality building.
There exists a habit related to land ownership peculiar to Solomon Islands. When a site construction work begins, there appear suddenly persons who claim ownership of the site. Some of such incidents have developed into monetary issues. Re-examination of the site with respect to such a habit is necessary.
Regarding the working hour, it is customary not to work on Saturday afternoon.

(5) Policy toward Employing Local Contractors

This project is to install hospital facilities; therefore, the degree of difficulty of the construction work is relatively high. Therefore, construction companies of sufficient technological experience can only perform the construction work. There are only few major construction companies in Solomon Islands, and construction companies with experience in construction works related to Japan's ODA are only two as far as this study has been able to confirm. Therefore, a selected Japanese construction contractor, a juridical person registered in Japan, is to use local contractors as subcontractors. However, it is difficult to secure good subcontractors locally. It is up to the selected construction contractor to use local labors while establishing good relations with the local labors, to enhance and keep their incentive to work in a very hot climate. Considering the bitter memories and experiences of the ethnic conflict, conceivably it is better to use foreign human resources than to use human resources of other ethnic group in other islands, and activate them in good exchanges with the local people, and thereby to endeavor to shorten the construction period and to secure quality of the facilities.

(6) Policy toward Executing Agency's Managing and Maintenance Ability

It is most important that the effects to be realized by such a component of this project, namely, the construction and procurement of the facilities and equipment, be sustained by continual maintenance efforts by the Solomon Side.
Gizo Hospital, being in the Western Province, is situated in a remote place about 400km apart from Honiara, the capital city. Therefore it is difficult to establish a managing and maintenance system capable of employing excellent maintenance staff, executing education, conducting training and other necessary acts. In addition, an organized managing and maintenance system intensified by the soft component is considered necessary to maintain the new hospital in good conditions under the severe climatic condition, namely, high temperatures, high humidities and copious precipitations.

1) Facility plan

The troubles of medical facilities and equipment, and those of air conditioning and ventilation facilities caused by the present defective managing and maintenance system, which is characterized by insufficient staff and their insufficient awareness and skills, have not only lowered the levels of medical services of the existing hospital but deteriorated the conditions of the operation rooms, tuberculosis test room and others to such an extent that the risk of nosocomial infection is feared. Regarding treatment of medical and general wastewater and medical wastes, there is no maintenance and operation manual. As a result, these are handled untreated, and adverse impacts upon the environment are feared.

In planning this project the most important issues are easiness of maintenance and reduction of running cost; therefore, facilities and equipment of proper qualities will be selected to realize while considering a system that will facilitate proper maintenance. Along this policy, facilities and equipment procurable from neighboring countries are considered from the viewpoint of facilitating maintenance. However, it was feared that Australian goods that were traded most locally could be very expensive. Based on the result of the further study, it has been decided that products of New Zealand, Thailand and Japan will be procured.

2) Equipment plan

The maintenance of equipment is under the authority of Gizo Hospital Secretary. An assistant engineer and two carpenters are assigned to the division in charge of maintenance to execute repair and maintenance works of facilities and equipment of the entire hospital. The division conducts maintenance and inspection of such facilities as engines of boats to transport patients, and the incinerator. Regarding the medical equipment, on the other hand, the hospital does not have an attending engineer, and the Hospital Secretary asks National Referral Hospital's Maintenance Department to execute the maintenance work. This is the hospital's maintenance system. Notwithstanding, National Referral Hospital has no engineer of sufficient maintenance skill. Such facilities and equipment used for diagnostic imaging of which the degree of difficulty of maintenance is high receive maintenance service when they become out of order and periodical maintenance and inspection services at an interval of about once a year, based on contracts sealed between MHMS and agents of such facilities and equipment stationed in Australia, New Zealand, etc. Other facilities and equipment do not receive enough maintenance services.

The expense for maintenance of facilities and equipment is covered by the budget provided by the MHMS. The expenditure for 2006 was 10,000SBD (about 170 thousand yen), spent for purchase of replacement parts, etc. The maintenance expense is expected to increase with the implementation of this project. MHMS has assured that the operation budget for the subject hospital will be increased to cope with the expected increase of the maintenance expense.

The plan will preferentially select such models of facilities and equipment of which consumables, notably chemical agents, are preparable by the subject hospital, or procurable at the domestic or neighboring country markets, in order to hold down the increase of the maintenance cost to the extent possible. Facilities and equipment requiring the manufacturers' particular consumables or spareparts will be limited to the products of those manufacturers which have an agent in Solomon Islands or a neighboring country.

(7) Policy toward Setting of Grades of Facilities, Equipment, etc

1) Facility plan

The design of the hospital building will be the one that can pass approval procedures enforced in Solomon Islands, and can satisfy functions required of the provincial medical facility as secondary medical institution. Other considerations include various functions needed for properly responding to environmental consideration, prevention of nosocomial infection, consideration to the disabled, disasters that may be caused by earthquakes,

tsunamis, typhoons, etc. For this purpose, in addition to the construction approval of Solomon Islands, standards of such other countries as Australia, the major source of import of Solomon Islands and Papua New Guinea, an earthquake prone country, of which the data on seismic zoning coefficients cover Solomon Islands, will be referred to as indicated below.

- Roads, evacuation plan, etc. quality of construction materials ← Australia's architectural standard
  of which the earthquake resistance performance ← Papua New Guinea's architectural standards

- Barrier free, measures for the disabled ← Japan's building code and JIS standard

The grade will be set to meet the required functions of each department and room, while referring to the departmental organizations and function levels of similar secondary medical institutions of Solomon Islands, etc., and also considering the grade that should be appropriate from the viewpoint of role sharing with National Referral Hospital, the tertiary medical institution, thereby realizing facility and equipment deployment that should maximize the cost effectiveness in the beneficiary area of the hospital.

2) Equipment plan

The grade of equipment will be set to the level of corresponding equipment used by the subject hospital or the medical institution of the same level according to the basic policy. Further, the grade of equipment should conform to the technological level of the medical and healthcare professionals and the contents of diagnosis and treatment services required of each division, and should consider prevention of rise of the management and maintenance budget.

(8) Policy toward Method of Construction and Procurement, and Construction Period

1) Policy toward method of construction

There is no particular modern construction method popular in Solomon Islands. Therefore, procurement of various construction materials is no easier than that in other beneficiary countries of Japan' ODA related construction works. Regarding such concrete works as skeleton work, there is no ready-mixed concrete plant; therefore, the hand mixing method with crane lifting must be relied upon for pouring of concrete by employing a large number of labors. Caution must be exercised very minutely to procurement of construction materials, mobilization and input of manpower, etc. to realize planned construction period. Regarding works that require functional precision such as sturdiness, airtightness, as are the case with the sash work, Japan's construction method will be referred to satisfy specific standards.

2) Policy toward method of procurement

After the one procured by Japan and the third countries, for example, New Zealand and Southeast Asia, etc. is unloaded in the Honiara port once, and it clears the customs, it will be transported to the Gizo Island by ship among the material used for the facilities construction work and the medical equipment of this project. The freight will be taken out of the container in the Honiara port and will be transported to the Gizo island by small ship as no lift for the container is equipped in the Gizo port the container is resolved. It takes the whole day to transport it from the Honiara port to the Gizo port. The distance From the Gizo port to the Gizo hospital is about 300m, and it will be possible to transport the freight by truck in a short time. The cost for the transportation is included in this project cost.
Medical institutions of Solomon Islands use many of US, European and Japanese products. Products of Australia and New Zealand are rarely seen except for a certain type of facilities and equipment, like oxygen generator, because medical equipment manufacturers are

virtually absent there. None of medical equipment manufacturers has appointed an agent in Solomon Islands; however, many of them, including Japanese ones, have agents in neighboring countries, Australia, New Zealand or Papua New Guinea. And, these agents have systems to conduct after-sale service in Solomon Islands.
X-ray equipment that requires periodic maintenance or analyzers that require supply of consumables is desirably a product of a manufacturer that has an agent in any of the neighboring countries mentioned above. In view of the importance of presence of agents, limiting manufacturers to Japanese ones only would narrow the option. Therefore, regarding such equipment, sources of procurement will be expanded to include third countries, and this would be better also from the standpoint of securing competitive bidding in tendering.

3) Policy toward construction schedule

The planned construction site of this project is situated to the west of the existing hospital across the road; therefore, the construction can be done without directly disrupting the operation of the existing hospital.
The critical point regarding the construction period and implementation schedule is securing manpower for construction works. Securing of excellent human resources from overseas covering domestic shortage and establishment of mutual understanding between the workforce from abroad and the local people, and acquisition of skills by local people for future development of the local area are the keys and must be promoted without knots, with the cooperation among the government of Solomon Islands, the government of the Western Province, and all concerned with the construction works.

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

2-2-2-1 Overall Project Description (Study on the Request)

(1) Development of the Content of the Request

1) Initial request and items to be studied

The background of the request and items to be studied before the basic design study team was dispatched (previous request) were as per shown in the table below.

Table 2-2 Background of the Initial Request from Gizo Hospital (Facility)

Previous request / items to be studies	Time of request	Background
Initial request	August 2006 (before the earthquake disaster)	The government of Solomon Islands filed the request, because the basic medical services have become deteriorated and disrupted as a result of obsolescence of the facilities and prolonged disorganized additions and modifications of facilities.
Additional request	May 2007 (immediately after the earthquake disaster)	The mission of the Project Formulation Study for Rehabilitation and Reconstruction of the Earthquake and Tsunami Stricken Areas in Solomon Islands made a recommendation of strengthening of disaster prevention functions, and the government of Solomon Islands accepted the recommendation, and hence filed the additional request.
Items to be studied	July 2007 (TOR for Basic Design Study)	In the initial request the government of Solomon Islands plans to modify the damaged existing hospital and to continue to use it as a nation's public sanitation and health center. The tsunami more than partially destroyed the existing hospital and totally destroyed the staff's residences. This study therefore will examine the relevance of including the issues of public sanitation and health center and the staff's residences in the requested Japanese assistance, in case the hospital cannot be used any longer.

2) Major revisions confirmed by the field survey

The requested Japanese assistance will support the strengthening of disaster prevention functions recommended by the mission of the Project Formulation Study for Rehabilitation and Reconstruction of the Earthquake and Tsunami Stricken Areas in Solomon Islands dispatched in May 2007. It also aims to restore the hospital function of Gizo Hospital as the secondary medical institution to the pre-tsunami state. Therefore, comprehensive discussions were held from the following viewpoints and the agreement thus reached between the Solomon side and the study team is given in the "Content of the Previous and Final Request" of Table 2-2.

① Separation of the functions as the public sanitation and health center of the Western Province (primary medical institution)

② Facilities that can be expected to have a direct impact upon improvement of the secondary medical institution

③ Effectiveness of the measures for strengthening of disaster prevention functions

④ Avoidance of duplication with other donors

3) Contents of the final request for facilities

The basic design study field survey was done during the period from September 30, 2007 to October 28 of the same year. The final request reached between the study team and the Solomon side is as per given below.

Table 2-3 Content of the Previous and Final Request (for Facility)

PREVIOUS REQUEST (prior to TSUNAMI)		FINAL REQUEST (on M/D)	
	Component	Priority	Component
1.	**CLINICAL AREAS**	**1.**	**CLINICAL AREAS**
	Out patient department	A	Out patient department
	Emergency department		Emergency department
	Inpatient department (total 84 beds) · Medical ward (for 22 beds) · Surgical ward (for 22 beds) · Obstetric ward (for 18 beds) · Pediatrics ward (for 18 beds) · TB/Psychiatrics ward (for 4 beds)		Inpatient department · Medical ward · Surgical ward · Obstetric ward · Pediatrics ward · TB/Psychiatrics ward
	Delivery and Nursery department		Delivery and Nursery department
	Operation department		Operation department
2.	**CLINICAL SUPPORT UNITS**	**2.**	**CLINICAL SUPPORT UNITS**
	Medical Imaging department	A	Medical Imaging department
	Pathology department		Pathology department
	Pharmacy		Pharmacy
	Provincial drug storage	C	Provincial drug storage
	Medical records	A	Medical records
	Central sterilizing and supply department		Central sterilizing and supply department
3.	**ADMINISTRATIVE SUPPORT UNITS**	**3.**	**ADMINISTRATIVE SUPPORT UNITS**
	General administration	A	General administration
	Executive offices	C	Executive offices
4.	**PUBLIC AMENITIES**	**4.**	**PUBLIC AMENITIES**
	Public toilets	C	Public toilets
	Guardian laundry and wash area for "wantoks"		Guardian laundry and wash area for "wantoks"
5.	**GENERAL SUPPORT SERVICES**	**5.**	**GENERAL SUPPORT SERVICES**
	Kitchen	A	Kitchen
	Laundry		Laundry
	Workshop	B	Workshop
	Hospital stores	C	Hospital stores
	Mortuary		Mortuary
	Fuel and Flammable store		Fuel and Flammable store
	Provincial stores		Provincial stores
6.	**ENGINEERING UNITS**	**6.**	**ENGINEERING UNITS**
	Emergency Generator	A	Emergency Generator
	Water supply		Water supply
	Waste Incinerator	C	Waste Incinerator
	Solar power		Solar power
7.	**ACCESS**	**7.**	**ACCESS**
	Ambulance bay	A	Ambulance bay
	Parking for maintenance		Parking for maintenance vehicle
	Boat wharf	C	Boat wharf
ADDITIONAL REQUEST after TSUNAMI Disaster			
8.	**DISASTER PREVENTION FUNCTION**	**8.**	**DISASTER PREVENTION FUNCTION**
	Wireless communication center	A	Wireless communication center (space)
	Accommodation for traveling clinic teams	C	Accommodation for traveling clinic teams
	Water reservoir tank	A	Water reservoir tank
	Sea fence	C	Sea fence
ADDITIONAL ITEMS			
9.	**PUBLIC HEALTH FACILITIES**	**9.**	**PUBLIC HEALTH FACILITIES** C
10.	**STAFF HOUSING**	**10.**	**STAFF HOUSING** C

A: Essential B: Necessary C: Least priority

4) Contents of the final request for medical equipment

① Contents of items previous requested

A series of discussions revised some items previous requested as follows.

Table 2-4 Revised Items against the Previous Request

Clinical depts	Revisals
OPD	The related items are rated as lower priority since ENT specialist doctor is not confirmed to post. Basic items necessary for Cataract operation are added.
Wards	The related items of highly dependent patients are moved to HDU.
Physiotherapy	Basic items are added to the project since the department is functioning though they are not requested.
Radiology	The related diagnosis items are rated as lower priority since the hospital does not undertake laparotomy.
Operation theater	The related items of laparoscopy and endoscopy are rated as lower priority since the hospital has no function for such activities.
Laboratory	The related items are rated as lower priority since biopsy and cytology are not included in the hospital activities.
ICU (Intensive Care Unit)	The related items are excluded since the hospital has no ICU function and has no anesthetist who can control respiration. Instead, items for HDU, which care serious patients temporally are included in the project.
Services	O_2generator is rated as lower priority since the targeted hospital has no function of O_2 generation and it is rather difficult to maintain it properly and so on.

② Contents of items finally requested

The basic design study confirmed present activity and function of clinical departments and contents of the request respectively through a series of discussions with those concerned of the targeted hospital. Shown as Table 2-5 are the function that each clinical department should accomplish and major items of requested equipment. Each item of equipment was prioritized and finally requested equipment was confirmed as the final requested equipment list in the minutes of discussions. In addition, the said study discussed to justify quantity of equipment with the Solomon side according to the said equipment list.

Table 2-5 Function of clinical departments and contents of requested equipment

Department	Major equipment	Function
OPD	Examination light, examination couch, slit lamp, dental chair etc.	To treat outpatients for surgery, internal medicine, Ob/Gy, pediatrics, dental, ophthalmology etc.
Ward	Ward beds, nebulizers etc.	To care inpatients for surgery, internal medicine, Ob/Gy, pediatrics
Physiotherapy	Hot pack heater, examination couch	To rehabilitate patients who have functional disorder by bone fractures
X-ray	Mobile X-ray machine, ultrasound machine, etc.	General X-ray, ultrasound diagnosis, dental X-ray etc.
Laboratory	Spectrophotometer, autoclave for laboratory etc.	Clinical examination(biochemistry, hematology, malaria, tuberculosis etc.)
Pharmacy	Automatic water distillation unit	To store drugs, distribute tablets, and prepare internal medicine

Department	Major equipment	Function
Operating suite/Treatment room	Anesthesia machine with ventilator, electrosurgical unit, operating table, operating room light, autoclave etc.	・major operations (caesarian section, cataract, appendectomy), intermediate operations (tubal ligation), and minor operations(incision of abscess, suturing) ・to perform emergency measures to and nurse serious cases ・washing, sterilizing, and preparation of operating material
HDU	Gatch beds, suction units etc.	To nurse serious cases until transferred to NRH
Obstetrics	Delivery tables, phototherapy unit, incubators, etc.	To nurse labor, delivery and nurse newborns
Emergency	Examination couch, stretcher troll etc.	To conduct first aid to emergency cases
Maintenance	Maintenance set	To perform daily maintenance for facilities and medical equipment, inventory of spare parts

(2) Study of the Request

The results of the final request by the Solomon side are as explained below.

1) Facility plan

① Background for selecting Gizo Hospital to request Japanese Assistance

Solomon Islands indicates eight flagship items in the “National Health Strategic Plan, 2006 - 2010” in its development plan. One of these eight items is strengthening of the medical and healthcare service. Of which, the facility plan aims to upgrade National Referral Hospital and provincial hospitals (see Figure 2-1, 2-2 below) to the levels meeting their minimum required levels. Also, it was indicated that Solomon Islands National Health Review Report (MOH/JTA International 2006) practically sorts out medical institutions in need of improvement.

Gizo Hospital falls under the category of medical institution designated as priority subject by the government of Solomon Islands for infrastructure development. Gizo Hospital is also the only hospital in the provincial level where doctors are stationed all the time, and bears the responsibility of medical services for 65 thousand people of the Western Province, the second largest province of the country in terms of population. Therefore, the facility improvement of this hospital is the priority theme of all facility improvement plans that should be addressed.

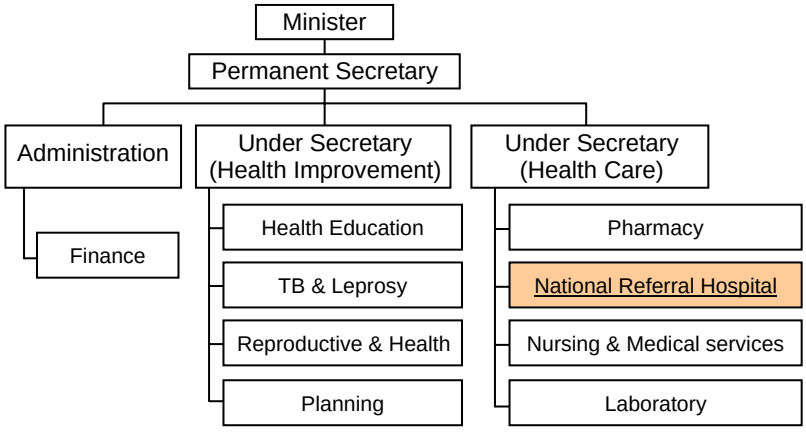


Figure 2-1 Organization Chart of HMHS

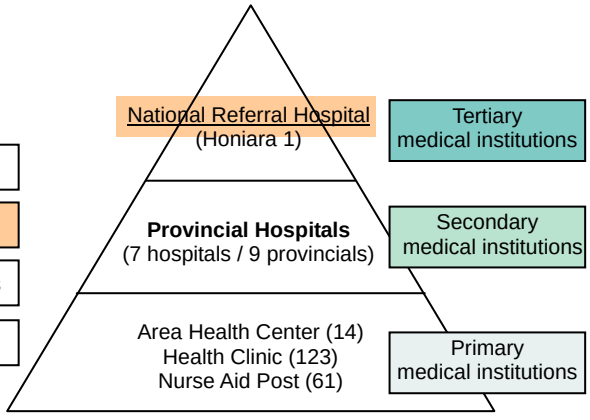


Figure 2-2 Referral System Chart

② Roles as the core hospital in the wide area

Gizo Hospital covers not only the Western Province, but portions of the Choiseul and Isabel Provinces where there is no provincial hospital. Further, the hospital receives patients from Papua New Guinea and the Bougainville Island. The beneficiary population of the hospital exceeds 130 thousand, and patients are expected to increase further in the future along with the population increase.

There is urgency to recovery and strengthening of the functions of Gizo Hospital in this period of recovery from the damages by the earthquake and associated tsunami.

Figure 2-3 Beneficial Area of Gizo Hospital

③ Dysfunctional allocation of facilities resulting from disordered additions

Since 1959 when Gizo Hospital was built, a large number of small-scale additions and modifications have been repeatedly done. This has resulted in dysfunctional structures of buildings. Above all, such service department facilities as kitchens and laundry rooms are surrounded by divisions used by patients and community people; therefore, access from the street to these facilities is crossing the patients traffic. Further, spaces to which the existing facilities may be expanded are not sufficiently left. In addition, buildings are not physically in same level, connected with uneaven corridors. Traffic lines of patients and those of staff and for hospital operation are not separable. With all these problems, now it is not possible to expand the existing facilities, and the hospital has come to a stage where a new facility plan is necessary.

④ Roles as a hospital that conducts traveling clinic

Doctors stationed in provincial hospitals, including Gizo Hospital, are mostly general practitioners. These hospitals have not yet developed to a stage where specialist doctors routinely conduct diagnosis and treatment in their respective professional fields. To supplement such a condition, four teams of specialist doctors of National Referral Hospital in Honiara, the capital city, come to provincial hospitals to stay there for a week once a month to conduct diagnosis and treatment. The present Gizo Hospital is not sufficiently equipped with a space and conditions to permit these specialist doctors to conduct diagnosis and treatment.

⑤ Relevant projects done by Japan

Regarding Gizo Hospital facilities, a Japan's Grassroots Grant Aid Project was proposed to install hospital's jetty to meet a need for short-term recovery work from the earthquake damage. The grant aid was approved in February 2008, with the completion scheduled for around March 2009. In 2008, American made incinerator with its fuel cost raised, was relocated from Gizo Hospital to National Referral Hospital. Instead, Gizo Hospital received new incinerator donated by Japan Rotary Club, and it is about to be installed. Regarding equipment, by the same token, a Japan's Grassroots Grant Aid Project was extended to procure a solar refrigerator that has been installed in 2008 via Gizo Hospital in the hospital's area of diagnosis and treatment, as part of the cold chain equipment project of AMDA, an NGO of Japan, for vaccines.

In the past, Japan's assistance in the Grassroots Grant Aid Project was used to construct a jetty of the Airport Island where the Gizo Airport was situated. After the earthquake there was a need to repair the jetty. Airplanes are used for emergency transportation of patients to National Referral Hospital and for receiving traveling clinic teams. The

jetty is an important facility to connect Gizo Hospital to the aerial routes.
Besides, Japan now promotes malaria countermeasures and technical cooperation in primary healthcare in the healthcare and medical service sector of Solomon Islands. Now, Japan is executing the "The Project for Strengthening of Malaria Control in Solomon Islands" (April 2006 to March 2009). Also, Japan is implementing a project for intensifying vaccination for a period from 2005 to 2010, with particular emphasis on capacity building and system development in the Oceania Area including Solomon Islands. For facilitating activities of these projects and promoting their spreading effects in the Western Province, a better equipped Gizo Hospital will have positive impacts.

⑥ Cooperation with other development partners

The most decisive factor that caused Gizo Hospital to decrease its activities after the tsunami is the fact that staff's residences, an indispensable element particularly in an isolated island like this, were totally washed away by the tsunami. Regarding the staff's residences, the government project to reconstruct public officers' residences is underway. As the first step, six residences, representing a part of the residence reconstruction, will be constructed by the AusAID.
This hospital had its facilities along the shore, not limited to the staff's residences, seriously affected by the tsunami. The Rotary Club of Sydney Cove Area, Australia, which has been assisting Gizo Hospital for recent several years, visited to Gizo Hospital in January 2008. At that occasion, restoration of the boat house for canoes to transport patients and the storehouse for the outboard engines that were destroyed by the tsunami was discussed.

⑦ Project scope of work for Japan's grant aid cooperation

In order for Gizo Hospital to become able to perform the roles expected of the hospital within the medical and healthcare service system of Solomon Islands, comprehensive repair and renewal of its facilities and equipment, including such support functions as staff's residences, are necessary. However, it was necessary to sort out practical portions in the framework of Japan' grant aid program against the background of medium- and long-range plans for reconstruction including those done by assistance of other donors. Consequently, the study team exercised judgment on the need and relevance of Japan's grant aid from such viewpoints as "facilities and equipment which may be expected to have direct impact upon improvement of the secondary medical services," "facilities and equipment which require relatively high skills for installation beyond the skills locally available," "improvement of facilities and equipment which are indispensable to the local healthcare and medical service network." The study team studied possibility of inclusion in the scope of work for cooperation the portions of medical services which the existing facilities can no longer provide, namely, wards, the medical test (including X-ray test) and diagnosis and treatment divisions (general outpatient, special outpatient, emergency rescue, operation room, delivery room) and portions of the Medical Office, Administration and Service Department matters (pharmacy, medical matter, accounting, kitchen, laundry, etc.) directly concerned with the formers. Viewed from the total framework of the grant aid, kitchen and laundry are not places of medical services, and the existing facilities are still sufficiently functional and are not in need of expansion, because the construction of the new hospital building will not significantly increase the number of beds. Therefore the plan excluding the kitchen and laundry is considered to be relevant.

⑧ Hospital facilities that can continue without disruption medical activities in case of disasters

Solomon Islands is a country of tropical island climate and also a quake-prone country; therefore, due consideration should be given to earthquakes, tsunami, and storms as natural disaster. Regarding countermeasures for earthquakes, the building will be more earthquake resistant by adopting elevated floor structures that successfully prevented buildings from collapsing by the April 2008 earthquake, and adopting reinforced concrete structure that should be stronger than existing local buildings. Regarding storms, luckily, cyclones pass on routes remote from the Gizo Island recently; nevertheless, the Gizo Island gets copious rainfalls, accompanied by strong winds, during the rainy season. Glass of enough strength should be used to secure safety of users against wind. Further, to prevent leaks of water through sheet metal roofing, concrete slab substrates will be adopted. The operation rooms will have windows to enable ongoing surgeries to be continued in case of disaster when failure of air conditioning or electric power is expected. Thus, a regional disaster communication center will be planned with the hospital playing the role of a disaster support core facility.

⑨ Technical and fiscal sustainability

The construction materials are selected from those meeting the following criteria, namely, preferably sturdy ones, near maintenance-free ones, locally available and easy-to-replace or easy-to-repair ones. Selection of such construction materials will help the hospital provide stable medical services even in an unfavorable condition in material supply common to isolated islands. This also helps reduce the fiscal burden of maintenance, and eventually helps the hospital maintain its medical services highly reliable.

⑩ Measures to prevent nosocomial and community infections (environmental consideration)

The layout of rooms and facilities in the hospital will be designed to permit avoidance of crossings of traffic lines of patients and those of medical and healthcare professionals and equipment for operation, etc., from the viewpoint of avoiding nosocomial infection. Exhaust air from rooms related with tuberculosis will be vented to a place exposed to direct sunlight, and the exit will be remote from other air intake and exhaust facilities, taking advantage of susceptibility of tuberculosis bacterial to the sunlight. All rooms that may be used by patients are equipped with a wash hand basin to allow them to wash their hands any time. Also, the method for treating medical wastes and design of water supply and drainage facilities will be planned to enable prevention of nosocomial and community infections.

⑪ Construction plan not interrupting continual medical service processes

The planned construction site of this requested Japanese assistance is situated close to the existing Gizo Hospital across the road. This road will be used to transport facilities and equipment. The temporary houses for labors for the construction work will be installed adjacent to the existing hospital buildings. The stockyard for construction materials and equipment will use the area for expansion of the new hospital building. It is rather easy to separate these three zones, namely, the construction site, stockyard for construction materials and the site for temporary houses, from the area of the existing hospital that should keep operating during the construction period. It is nevertheless important to exercise extreme caution to the traffic lines in planning these areas, around the inlets to and outlets from these areas in particular, so that hospital users and hospital staff may not be endangered. In addition, the front road passing though these areas is the only trunk road that connects Gizo central part to eastern coastal area severely afflicted by the tsunami and is conceivably busy with traffic of construction vehicles for reconstruction of the afflicted area. Therefore, due attention will be given to the traffic condition at all times during the construction period, in order to be able to properly cope with ever-changing conditions.

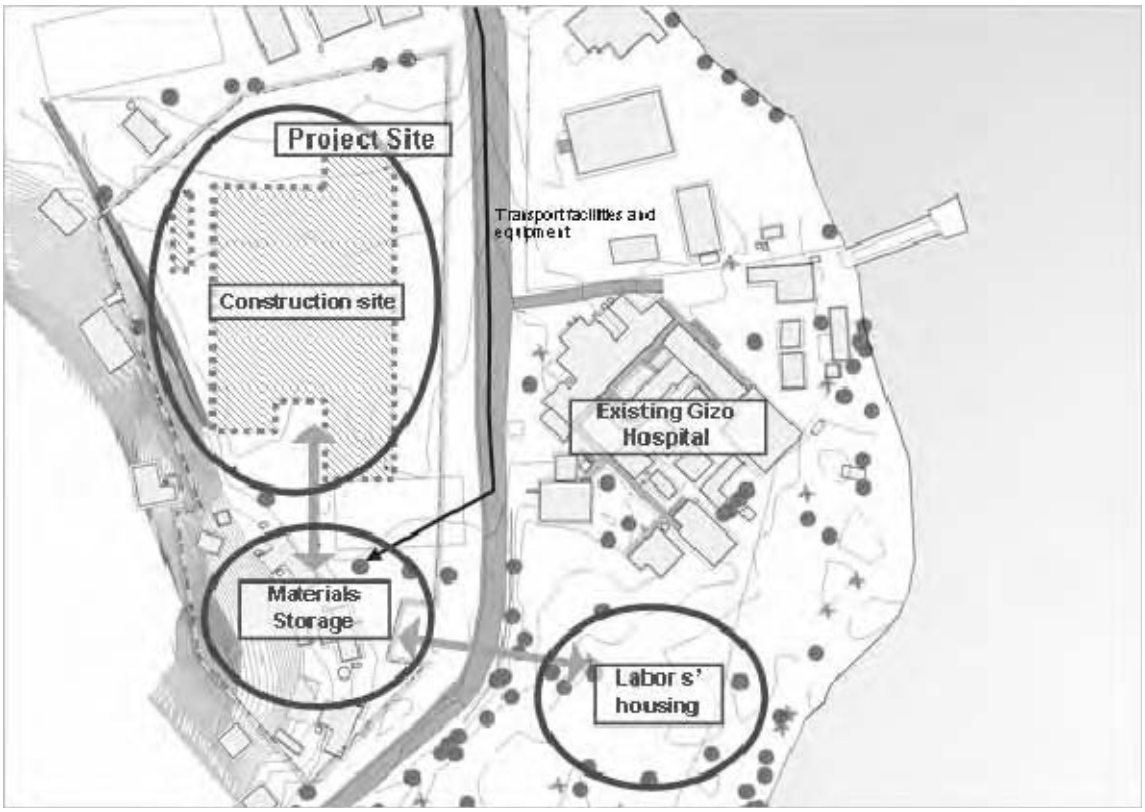


Figure 2-4 Construction Zoning

2) Equipment plan

① Assistance range for medical equipment procurement

Solomon Islands agreed in the field survey that medical equipment plan will target the following 11 departments of the new hospital building as shown in Table 2-6.

Table 2-6 Equipment Procurement Plan

Targeted departments	
1. Outpatient department (OPD)	6. Pharmacy
1.1 Consulting room	7. Operation/Treatment
1.2 Dental clinic	7.1 Operation room
1.3 Ward	8. HDU
2. Physiotherapy	9. Obstetrics
3. CSSD	9.1 Delivery room
4. Radiology	9.2 Labor room
5. Laboratory	9.3 Nursery
5.1 Biochemistry	10. Emergency
5.2 Immunology	11. Maintenance section

② Basic policy of equipment selection

Because diagnosis and treatment space is narrow in addition to wide catchments area, a present targeted hospital is very crowded with patients. In addition, it is judged that most of existing medical equipment are superannuated and are limited in kind and number, which cannot satisfy current demand for medical service. This project attempts functional enhancement for existing clinical departments of the targeted hospital that has been superannuated by means of construction of new hospital building and procurement of medical equipment. Therefore, the policy of medical equipment plan is to conceive the plan for the above-mentioned new building. The existing equipment in a working condition shall be transferred to laboratory, radiology, and dental clinic, etc. in the new building.

③ Summary of equipment planning

The result of examination of the requested equipment to each section in the targeted hospital is described as follows:

a) Outpatient department (OPD)

To improve basic diagnosis and treatment service, procurement shall be an X-ray film viewer, an examination light, and an examination couch to consultation rooms (surgery, internal medicine, obstetrics and gynecology, pediatrics, ophthalmology, and dental clinic). For the ophthalmology and the dental clinic, the diagnosis and treatment equipment, corresponding to specialties of each department, such as a slit lamp and a dental chair is arranged, and thus improvement of medical service is aimed at.

b) Ward

As the ward equipment, planned is procurement of superannuated or insufficient beds and bed-side cabinets in numbers for nursing of in-patients. The specifications of patient-beds are proposed as the one which has backrest function for medical treatment as the targeted hospital undertakes comparatively severe cases as the secondary medical institution. Moreover, as numbers of the beds are quite many, and the grade is determined as that of medical treatment, thus they cost MHMS too much to bear, and exceed the range of self-reliant efforts of Solomon side. Therefore, it is judged appropriate to include the beds in the project.

c) Physiotherapy

For strengthening of function recovery of patients, planned are procurement of an examination couch on which a physiotherapist in charge perform treatment, and replenishment of a hot-pack heater as there are a lot of service demand for hot-pack treatment.

d) CSSD

Arranged is replenishment of vertical type autoclaves to sterilize operation material and linens to Central Sterilization Supply Department (CSSD).

e) X-ray

Will be transferred to the new hospital an existing general X-ray unit that can continue to use and other existing items such as an X-ray film automatic processing unit. Procurement of one ultrasound machine is planned instead of the existing one that is almost condemned.

f) Laboratory

The hospital has already procured most of items of laboratory equipment necessary for the activity by assistance of Australia (2006), and thus plans transfer of such items to the new Gizo hospital. In this project, procurement is a colorimeter which lost measurement accuracy and a high-pressure steam sterilizer which is superannuated.

g) Pharmacy

Planned is procurement of an automatic water distillation unit necessary for preparation of internal medicine, and a refrigerator to keep medicine and reagent that should be refrigerated.

h) Operating suite /Treatment room

The operation department is composed of major operating room (one room), minor operating room (one room), highly dependant unit (six alcoves), and CSSD (Central Sterilization Supply Department). Doctor's resignation has stopped the activity of this department though medical operations were used to perform with an existing operating room. In the said operating room, as they have a lot of such obstetric emergency cases as caesarean section and such abdominal operations as appendectomy, the hospital should have its operating function restored immediately. Planned are procurement of such basic items as an operating table, an operation light, an anesthesia machine, an electro-surgical unit, and an operation monitor, etc. in a new operating room. In addition, planned are procurement of instruments for appendectomy and surgery corresponding to appendectomy and hernia and instruments for Obstetrics corresponding to normal delivery, caesarean section, induced abortion, and cervical reparation and so on.

i) HDU (Highly Dependent Unit)

Arranged are Gatch beds and nebulizers, which are necessary to care seriously ill patients until they are transferred.

j) Obstetrics

To meet the demand for delivery service that exists in the increasing tendency, planned are necessary equipment for delivery room (two alcoves), labor room (three alcoves), and recovery room (three alcoves). Planned are to procure labor beds for delivery standby for labor room, operating light-stand type, delivery beds

and suction extractor for delivery room, recovery beds used after delivery to recovery room, and a phototherapy unit for treatment of infant jaundice, baby cots, incubators, and an infant warmer for treatment, to the nursery.

k) Emergency

In Emergency section, a treatment room and a patient observation room will be set up. In the treatment room, planned are an examination couch and a suction unit to make such treatment as suturing of injury, stopping bleeding and incision of abscess etc. In patient observation room, planned to procure are patient beds to keep patients under observation while receiving such treatment as dripping.

l) Maintenance section

The hospital plans to establish newly a maintenance section which will undertake repairing building and facilities, and medical equipment maintenance. In this project, a higher priority should be provided to rather prevention of breakdown than repairing as proper maintenance service is not available. The MHMS decided to assign an electrical technician in order to strengthen maintenance ability of the hospital. Planned to procure are electronic and electric measurement devices for daily function check of medical equipment and building facilities for this section.

④ Revisal of equipment plan

Home analysis revised draft equipment plan conceived during the field survey as follows:

Table 2-7 Revisal done in home analysis

Dept/Room	Item no. & equipment name in Examination table	Item no. In basic design list	before	after	Justification
1.1 Consulting room	1-1 X-ray viewers	1-1	Qty(2)	Qty(5)	Adjusted to building planning.
	1-4Otoscopes/Ophthalmoscopes	1-4	Qty(2)	Qty(3)	-ditto-
	1-13 Examination couches	1-6	Qty(13)	Qty(9)	-ditto-
1.4 Ward	1-19 Beds, bedside cabinets	1-10	Qty(62)	Qty(56)	Reduced quantity due to overlapping with Maternity.
3. CSSD	3-1 Sterilizer loading trolley	―	Qty(1)	Deleted	Not used for vertical type autoclave
7.1 Operating room	7-10 Instrument sets for surgery	7-10	Qty(3)	Qty(1)	Considering operation frequency, the quantity is adjusted.
	7-13 Instrument sets for appendectomy	7-11	Qty(3)	Qty(2)	Appendectomy set is planned for laparotomy.
	7-14 Instrument sets for Obstetrics	7-13	Qty(3)	Qty(1)	Obstetrics related items are added.
	7-28 Gatch beds	7-12	-	Qty(2)	Adjusted to follow building plan
8. HDU	8-8 Gatch beds	8-3	Qty(9)	Qty(6)	-ditto-
	8-9 X-ray viewers	8-4	Qty(9)	Qty(6)	-ditto-

Dept/Room	Item no. & equipment name in Examination table	Item no. In basic design list	before	after	Justification
9.2 Labor room	9-7 Labor beds	9-4, 9-5	Qty(6)	Qty (each 3)	Changed from Gatch beds
9.3 Nursery	9-15 Oxygen monitor	—	Qty(2)	Deleted	Included in facility plan
	Examination couch	9-13	—	Qty(1)	Adjusted to follow the building plan
10. Emergency	10-1 Examination couches	10-1	Qty(1)	Qty(2)	-ditto-

⑤ Equipment examination

Equipment selection is conducted based upon equipment selection criteria shown in Table 2-8. The criteria satisfied are marked "1". When all the criteria are satisfied, this specific item is marked with "1", and selected as planned equipment. However, if all the criteria are not satisfied then the item is marked with "0", or failed. Based upon result of the field survey, items which do not meet the criteria are to be excluded. The examination result is shown in Table 2-9.

Table 2-8 Equipment selection criteria

1. Maintenance	Passed: Solomon side can maintain sufficiently both in technical and financial aspect Failed: Solomon side cannot meet the above.
2. Present status of existing equipment	Passed: items to procure as they are superannuated, or to supplements they are insufficient in numbers Failed: existing one is working well or will be procured by other donors
3. Manpower disposition	Passed: skilled operators are already assigned. Failed: skilled operators are not available.
4. Function and activities	Passed: items to meet function and activity of the hospital Failed: items to fail the above
5. Principles of Japan's Grant in Aid	Passed: items to contribute directly to restoration of medical services of the targeted hospital and that is not consumable. Failed: items not to contribute directly to medical service, consumable, items that Solomon side can procure easily.

Table 2-9 Equipment examination

No.	Description	Existing no.	Requested no.	Criteria ①	②	③	④	⑤	Judgment	Priority	Location	Purpose replace	supplement	newly	Planned no.
1	OPD														
1.1	Consulting room														
1-1	X-ray viewer	1	2	1	1	1	1	1	1	A	Cnsltg rm	1	4	0	5
1-2	Suction machine	1	2	1	1	1	1	1	1	A	-do-	1	1	0	2
1-3	Exam light - mobile	1	2	1	1	1	1	1	1	A	-do-	1	1	0	2
1-4	Otoscope / Ophthalmoscope	0	2	1	1	1	1	1	1	A	-do-	0	0	3	3
1-5	Spiro meter	0	1	1	0	1	1	1	0	C	-	0	0	0	0
1-6	BP mobile	3	2	1	0	1	1	1	0	B	-	0	0	0	0
1-7	BP wall mounted	0	1	1	0	1	1	1	0	C	-	0	0	0	0
1-8	Patient scales - adult	1	1	1	0	1	1	1	0	C	-	0	0	0	0

No.	Description	Existing no.	Requested no.	Criteria					Judgment	Priority	Location	Purpose			Planned no.
				①	②	③	④	⑤				replace	supplement	newly	
1-9	Patient scales - baby (sliding weight)	1	1	1	0	1	1	1	0	C	-	0	0	0	0
1-10	Height scale for infant	0	1	1	0	1	1	1	0	C	-	0	0	0	0
1-11	Height scale for pediatric	0	1	1	0	1	1	1	0	C	-	0	0	0	0
1-12	Operating light	0	1	1	1	1	1	1	1	A	Cnsltg rm	0	0	1	1
1-13	Examination couch	2	13	1	1	1	1	1	1	B	-do-	2	7	0	9
1-14	Slit lamp (eye)	0	1	1	1	1	1	1	1	B	-do-	0	0	1	1
1.2	Dental clinic														
1-15	Dental chair	2	1	1	1	1	1	1	1	A	Dental clinic	1	0	0	1
1-16	Dental instrument set	2	2	1	1	1	1	1	1	B	-do-	2	1	0	3
1.3	ENT clinic														
1-17	ENT chair	0	1	1	1	0	0	1	0	C	-	0	0	0	0
1-18	Endoscope (Laryngoscope)	0	1	1	1	0	0	1	0	C	-	0	0	0	0
1.4	Ward														
1-19	Ward bed & bedside cabinet	25	62	1	1	1	1	1	1	B		25	31	0	56
1-20	Pediatric cot	0	3	1	1	1	1	1	1	B	Ward	0	0	8	8
1-21	Emergency stretcher	3	2	1	0	1	1	1	0	B	-do-	0	0	0	0
1-22	Oxygen flow meter	0	1	1	0	1	0	1	0	C	-	0	0	0	0
1-23	Nebulizers	3	3	1	1	1	1	1	1	B	Ward	3	0	0	3
1-24	Pulse oxymeter	1	1	1	0	1	1	1	0	C	-	0	0	0	0
1-25	Infusion pump	0	1	0	1	1	0	1	0	C	-	0	0	0	0
1-26	IV stand	2	1	1	0	1	1	1	0	C	-	0	0	0	0
1-27	Pan washer	0	1	1	1	1	0	1	0	C	-	0	0	0	0
1-28	Pulse oxymeter	0	1	1	0	1	1	1	0	C	-	0	0	0	0
1-29	Syringe pump	0	1	0	1	1	0	1	0	C	-	0	0	0	0
1-30	Examination couch	0	3	1	1	1	1	1	1	B	Ward	0	0	3	3
2	Physiotherapy														
2-1	Hot pack heater	1	1	1	1	1	1	1	1	B	Physio-therapy	0	1	0	1
2-2	Treatment table	1	4	1	1	1	1	1	1	B	Physio-therapy	1	3	0	4
3	CSSD equipment														
3-1	Sterilizer loading trolley	1	1	1	0	1	1	1	0	A	-	0	0	0	0
3-2	High pressure steam sterilizer	2	1	1	1	1	1	1	1	A	CSSD	1	1	0	2
3-3	Sterilization work unit	0	1	1	0	1	1	1	0	C	CSSD	0	0	0	0
4	X-ray department														
4-1	Mobile X-ray machine	0	1	1	1	1	1	1	1	A	Store	0	0	1	1
4-2	Ultrasound machine	1	1	1	1	1	1	1	1	A	Ultra Sound rm	1	0	0	1
4-3	General X-ray machine	1	1	1	0	1	1	1	0	C	-	0	0	0	0
4-4	X-ray film refrigerator	0	1	1	0	1	1	1	0	C	-	0	0	0	0
4-5	X-ray viewer - 2film	0	1	1	1	1	1	1	1	A	office	1	0	0	1
4-6	Dental X-ray unit	0	1	1	1	1	1	1	1	A	X-ray rm	0	0	1	1
4-7	Processing equipment	1	1	1	0	1	1	1	0	C	-	0	0	0	0
4-8	X-ray accessories: lead aprons, films, viewing boxes	1	1	1	0	1	1	1	0	C	-	0	0	0	0
4-9	X-ray fluoroscopy	0	1	1	1	0	0	1	0	C	-	0	0	0	0

No.	Description	Existing no.	Requested no.	Criteria					Judgment	Priority	Location	Purpose			Planned no.
				①	②	③	④	⑤				replace	supplement	newly	
5.	Laboratory														
5.1	Hematology														
5-1	Hematocrit autoclave (centrifuge)	1	1	1	0	1	1	1	0	C	-	0	0	0	0
5-2	Medical microscope	1	1	1	0	1	1	1	0	C	-	0	0	0	0
5-3	Hemoglobin meter	0	1	1	0	1	1	1	0	C	-	0	0	0	0
5-4	Rotary shaker	1	1	1	0	1	1	1	0	C	-	0	0	0	0
5-5	Blood cell counter	1	1	1	0	1	1	1	0	C	-	0	0	0	0
5-6	Blood sedimentation test apparatus	0	1	1	0	1	1	1	0	C	-	0	0	0	0
5-7	Instrument cabinet	5	1	1	1	1	1	1	1	C	-	0	0	0	0
5-8	Refrigerator	2	1	1	0	1	1	1	0	C	-	0	0	0	0
5.2	Biochemistry														
5-9	Spectrometer	1	1	1	1	1	1	1	1	B	Biochemistry	1	0	0	1
5-10	Automatic water distillation unit	1	1	1	1	1	1	1	1	A	Biochemistry	1	0	0	1
5-11	Water bath	0	1	1	1	1	0	1	0	C	-	0	0	0	0
5-12	Electric balance	0	1	1	0	1	1	1	0	C	-	0	0	0	0
5-13	Table top steam sterilization	0	1	1	0	1	1	1	0	C	-	0	0	0	0
5-14	Stirrer	1	1	1	0	1	1	1	0	C	-	0	0	0	0
5-15	Magnetic stirrer	0	1	1	0	1	1	1	0	C	-	0	0	0	0
5-16	Hot plate	0	1	1	0	1	1	1	0	C	-	0	0	0	0
5-17	Labo glass wares	1	1	1	0	1	1	1	0	C	-	0	0	0	0
5.3	Immunology														
5-18	Autoclave for laboratory	1	1	1	1	1	1	1	1	B	Immunology	1	0	0	1
5-19	Incubator	2	1	1	0	1	1	1	0	C	-	0	0	0	0
5-20	Plate mixer	0	1	1	0	1	1	1	0	C	-	0	0	0	0
5.4	Pathology														
5-21	Paraffin melting apparatus Paraffin stretcher (Semi-automatic)	0	1	1	1	0	1	0	0	C	-	0	0	0	0
5-22	Microtome	0	1	1	1	0	1	0	0	C	-	0	0	0	0
5.5	Malaria laboratory														
5-23	Electric balance	1	1	1	1	1	1	1	1	A	Malaria Lab	1	0	0	1
6	Pharmacy														
6-1	Electric balance	0	1	1	1	1	1	1	1	A	Pharmacy	0	0	1	1
6-2	Automatic water distillation unit	0	1	1	1	1	1	1	1	A	-do-	0	0	1	1
6-3	Refrigerator (drug - full sized)	1	2	1	1	1	1	1	1	B	-do-	1	0	0	1
7	Operating suite / Treatment room														
7.1	Operating theater														
7-1	Operating room light	1	2	1	1	1	1	1	1	A	O/T	1	0	0	1
7-2	Treatment room light	1	1	1	1	1	1	1	1	A	-do-	1	0	0	1
7-3	Operating table	2	2	1	1	1	1	1	1	A	-do-	2	0	0	2
7-4	Anesthetic machine with ventilator	1	1	1	1	1	1	1	1	A	-do-	1	0	0	1
7-5	Suction unit	1	1	1	1	1	1	1	1	A	-do-	0	1	0	1
7-6	Bedside monitor	0	1	1	1	1	1	1	1	A	-do-	1	0	0	1

No.	Description	Existing no.	Requested no.	Criteria					Judgment	Priority	Location	Purpose			Planned no.
				①	②	③	④	⑤				replace	supplement	newly	
7-7	Defibrillator	0	1	1	1	1	1	1	1	A	-do-	0	0	1	1
7-8	Hand washing water sterilizer	0	1	1	1	1	1	1	1	A	-do-	1	0	0	1
7-9	Electro surgical unit	0	1	1	1	1	1	1	1	A	-do-	0	0	1	1
7-10	Instruments for general surgery	0	3	1	1	1	1	1	1	A	-do-	0	0	1	1
7-11	Stretcher	3	1	1	1	1	1	1	1	B	-do-	0	0	0	0
7-12	Infusion pump	0	1	0	1	1	0	1	0	C	-	0	0	0	0
7-13	Instruments for Laparotomy	2	3	1	1	1	1	1	1	B	-do-	2	0	0	2
7-14	Instruments for Obstetrics	3	3	1	1	1	1	1	1	B	O/T Dlvry rm	1	0	0	1
7-15	X-ray viewer - 2film (built in-operating theatre)	1	1	1	1	1	1	1	1	C	-	0	0	0	0
7-16	Anesthetic equipment trolley	1	1	1	1	1	1	1	1	C	-	0	0	0	0
7-17	Blood warmer	0	1	1	1	1	0	1	0	C	-	0	0	0	0
7-18	Instrument trolley	3	1	1	1	1	1	1	1	C	-	0	0	0	0
7-19	Mayo table	0	1	1	1	1	1	1	1	C	-	0	0	0	0
7-20	Bowl stand	0	1	1	1	1	1	1	1	C	-	0	0	0	0
7-21	Washing basin	0	1	1	1	1	1	1	1	C	-	0	0	0	0
7-22	Gastrointestinal fiberscope	0	1	1	1	0	0	1	0	C	-	0	0	0	0
7-23	Oxygen set	0	1	1	0	1	1	1	0	C	-	0	0	0	0
7-24	Patient scales - adult	0	1	1	0	1	1	1	0	C	-	0	0	0	0
7-25	Patient scales - baby (sliding weight)	0	1	1	1	1	1	1	1	C	-	0	0	0	0
7-26	Instrument cabinet	3	1	1	1	1	1	1	1	C	-	0	0	0	0
7-27	Kick bucket	0	1	1	0	1	1	1	0	C	-	0	0	0	0
7-28	Gatch beds	0	1	1	1	1	1	1	1	B	-	0	0	2	2
8	Critical care (HDU)														
8-1	Defibrillator	0	1	1	1	1	0	1	0	C	-	0	0	0	0
8-2	Patient monitor	0	1	1	1	1	0	1	0	C	-	0	0	0	0
8-3	Suction unit	0	1	1	1	1	1	1	1	B	HDU	0	0	1	1
8-4	Mobile resuscitation unit	0	1	1	1	1	0	1	0	C	-	0	0	0	0
8-5	Bag resuscitator with adult & ped masks	0	2	1	1	1	1	1	1	B	HDU	0	0	2	2
8-6	Ventilator	0	1	1	1	1	0	1	0	C	-	0	0	0	0
8-7	Stretcher	0	1	1	1	1	1	1	1	B	HDU	0	0	1	1
8-8	Gatch bed	0	9	1	1	1	1	1	1	B	-do-	0	0	6	6
8-9	X-ray viewer - 2film	0	3	1	1	1	1	1	1	B	-do-	0	0	2	2
8-10	Bag resuscitator with adult & ped masks	0	1	1	1	1	1	1	1	C	-	0	0	0	0
8-11	Laryngoscope set adult & ped	0	1	1	1	1	0	1	0	C	-	0	0	0	0
8-12	Refrigerator	0	1	1	1	1	1	1	1	C	-	0	0	0	0
8-13	IV stand	0	1	1	0	1	1	1	0	C	-	0	0	0	0
8-14	Refrigerator	0	1	1	1	1	1	1	1	C	-	0	0	0	0
8-15	Instrument cabinet	0	1	1	1	1	1	1	1	C	-	0	0	0	0
8-16	Low pressured constant suction unit	0	1	1	0	1	1	1	0	C	-	0	0	0	0
9	Obstetrics														
9.1	Delivery														
9-1	Pregnancy delivery table	2	2	1	1	1	1	1	1	A	Dlvry rm	2	0	0	2

No.	Description	Existing no.	Requested no.	Criteria					Judgment	Priority	Location	Purpose			Planned no.
				①	②	③	④	⑤				replace	supplement	newly	
9-2	Vacuum extractor w/soft vacuum cup	0	2	1	1	1	1	1	1	A	-do-	0	0	1	1
9-3	Operation light	0	2	1	1	1	1	1	1	A	-do-	0	0	2	2
9-4	Vacuum extractor unit	0	0	1	1	1	1	1	1	C	-	0	0	0	0
9-5	Cardiotocograph	0	1	0	1	0	1	1	0	B	-	0	0	0	0
9-6	Navel clamp and catheter set	-	1	1	1	1	1	1	1	C	-	0	0	0	0
9.2	Labour room														
9-7	Labour bed	0	8	1	1	1	1	1	1	A	Labor rm	6	0	0	6
9-8	Portable count doppler	1	2	0	1	1	1	1	0	C	-	0	0	0	0
9.3	Nursery														
9-9	Incubator	2	2	1	1	1	1	1	1	A	Nursery	2	0	0	2
9-10	Phototherapy unit	1	2	1	1	1	1	1	1	A	-do-	1	1	0	2
9-11	Infant warmer	1	2	1	1	1	1	1	1	A	-do-	1	1	0	2
9-12	Resuscitator bag set	1	2	1	1	1	1	1	1	A	-do-	1	1	0	2
9-13	Small type suction unit	3	2	1	1	1	1	1	1	A	-do-	2	0	0	2
9-14	Nebulizers	1	2	1	1	1	1	1	1	A	-do-	1	1	0	2
9-15	Oxygen monitor	0	2	1	0	1	1	1	0	B	-	0	0	0	0
9-16	Baby cot	3	3	1	1	1	1	1	1	B	-do-	3	0	0	3
9-17	Infant resus unit	0	1	1	1	1	0	1	0	C	-	0	0	0	0
9-18	Refrigerator	0	1	1	1	1	1	1	1	C	-	0	0	0	0
9-19	IV stand	2	3	1	0	1	1	1	0	C	-	0	0	0	0
9-20	Patient scales - baby (Sliding weight)	1	2	1	0	1	1	1	0	C	-	0	0	0	0
9-21	Oxygen set	0	2	1	1	1	0	1	0	C	-	0	0	0	0
9-22	Medicine trolley	0	2	1	1	1	1	1	1	C	-	0	0	0	0
9-23	Neonatal monitor	0	2	0	1	1	0	1	0	C	-	0	0	0	0
9-24	Pulse oxymeter	0	2	1	1	1	0	1	0	C	-	0	0	0	0
9-25	Pan washer	0	1	1	1	1	1	1	1	C	-	0	0	0	0
9-26	Emergency cart	0	1	1	1	1	1	1	1	C	-	0	0	0	0
9-27	Ice making machine	0	1	1	1	1	1	1	1	C	-	0	0	0	0
9-28	Baby resuscitation trolley	0	1	1	1	1	1	1	1	C	-	0	0	0	0
10	Emergency														
10-1	Treatment table	1	1	1	1	1	1	1	1	A	Treatmt rm	1	1	0	2
10-2	Operation light (stand type)	0	1	1	1	1	1	1	1	A	-do-	0	0	1	1
10-3	Suction unit	0	1	1	1	1	1	1	1	A	-do-	0	0	1	1
10-4	Defibrillator	0	1	1	1	1	1	1	1	B	-	0	0	0	0
10-5	Emergency instrument set	0	3	1	1	1	1	1	1	A	Treatmt rm	0	0	3	3
10-6	Boiling sterilizer	0	1	1	1	1	1	1	1	B	-do-	0	0	0	0
10-7	Emergency cart	1	1	1	1	1	1	1	1	C	-	0	0	0	0
10-8	Oxygen set	0	1	1	1	1	1	1	1	C	-	0	0	0	0
10-9	Resuscitator bag set	0	2	1	1	1	1	1	1	B	Treatmt rm	0	0	2	2
10-10	Observation bed	0	3	1	1	1	1	1	1	B	-do-	0	0	3	3
11	Others														
11-1	Oxygen plant	0	1	0	1	0	0	1	0	C	-	0	0	0	0
11-2	Maintenance set	0	1	1	1	1	1	1	0	A	Mainte-nance rm	0	0	1	1

2-2-2-2 Site Plan

(1) Site Shape and Soil Properties

The mountain on the west of the site encroaches the west end of the site, while on the east runs the trunk road of the Gizo Island. About 150 meters beyond is the seashore. The construction site is a nearly flat piece of land about 1.5 meters high above sea level.
The boring test result indicates that stratification differs between the mountain side and sea side within the construction site. There is a sign indicating that this land was developed by landfilling a marshy piece of land. The roadside of the site is on a relatively soft ground with the N-values ranging from 10 to 20 at GL−10m, while the mountain side is on a very rigid ground with the N-values at 50 or more at GL−2m.

(2) Surrounding Environment

Gizo Hospital is situated in the southeast part of Gizo City, about 600 meters apart from the commercial center. There are an array of Western Province Government's buildings around the hospital. The new hospital construction site is situated in front of the existing hospital which faces the sea, across the front road, a trunk road of the Gizo Island. The construction site is bordered by a mountain on the side opposite to the road.
Because of the location, one of the accesses to the hospital is by boat. There is a jetty at the coast to which are always moored several boats for transportation of patients. There is a malaria laboratory on the way from the jetty to the existing hospital, and the patients take a detour path to the hospital. The other access is from the front road. The road is yet to be paved and is not suited for access of emergency vehicles.
Along the foot of the mountain runs a stormwater gutter but its capacity is insufficient in case of downpour; therefore, the study team asked Solomon Islands for improvement. Also, a roadside stormwater gutter runs along the trunk road. The study team likewise asked Solomon Islands for improvement along with pavement of the trunk road. A plan to pave this road with the cooperation of Taiwan is being studied.

(3) State of Infrastructure

The infrastructure in Gizo City is generally obsolescent. Very old systems are used for the facilities. Supply of electric power and water can hardly catch up with the rapidly increasing Gizo's demands. Presently, plans to improve the systems for electric power and water supply are underway. Taking advantage of such a favorable condition, the study team asked Solomon Islands to expedite their completion in December 2008. Regarding wastewater, there is no sewerage plan. Presently, the only wastewater pump is the one attached to the Gizo wastewater tank. The present system, relying upon the only one pump, cannot be expected to maintain a reliable operation; therefore, the study team requested Solomon Islands to add another pump to realize two-pump wastewater pumping system. Also, general wastes are being dumped in the waste collection site situated 2km northwestward apart from the city center. The wastes are landfilled as they are except for a small portion which is incinerated. Landfilling of wastes without incineration poses sanitary problems, and the study team therefore asked Solomon Islands for improvement.
Infrastructure preparation, removal of the existing buildings are among the obligations of the Solomon Islands. Therefore, it is important to confirm the state of progress of the construction works falling under Solomon Islands. Solomon Islands has committed to complete the infrastructure preparation (stormwater gutters, road, etc.) by the start of construction of facilities of this requested Japanese assistance. Nevertheless, it is important to have close meetings to realize completion of these items before the start of construction so that any delay may not pose difficulties.

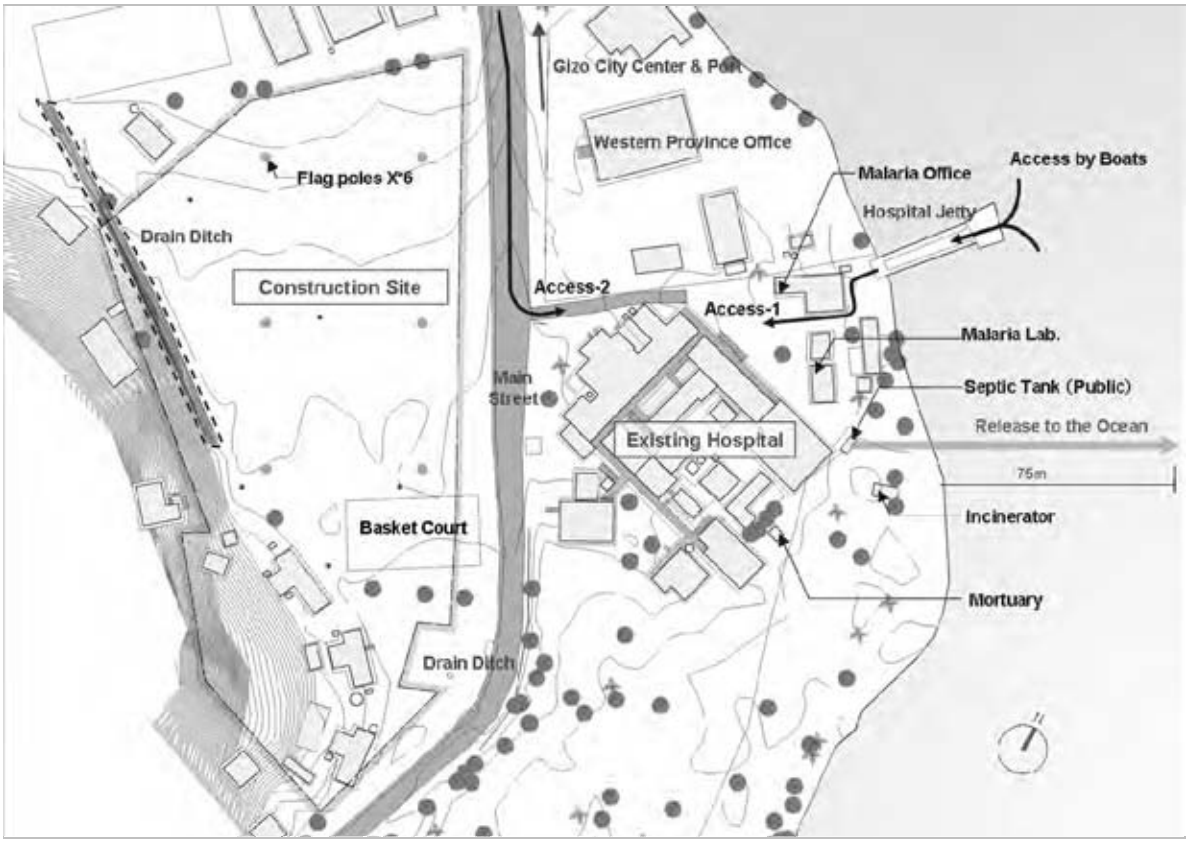


Figure 2-5 Surrounding Environment of Construction Site

(4) Facilities Layout Plan

It has been decided that, of all the items requested for Gizo Hospital improvement, facilities required for the medical activities as a secondary medical institution, infrastructure indispensable to such activities, and selected service divisions will be newly constructed in the selected site. The existing Gizo Hospital buildings are still usable for general purposes other than direct medical activities after rehabilitation; therefore, they will be used by the province's division for public sanitation and medicine, and as storage house, and for other purposes. Medical-activity-related facilities that will remain in the old site include the access road to the new hospital from the shore for emergency patients brought by boat, the mortuary to be situated at a place convenient for prompt transportation to other islands, the incinerator to be located at a place where effects on the community people may be avoided. These will be installed by Solomon Islands, their functions will be taken into consideration in working out layout of the facilities of the new hospital.

Patients who come to the hospital by themselves or accompanied by others, a family member for example, generally come via the front road from the direction to the Gizo City where the Gizo Port is located, irrespective of whether they are the island people or not. On the other hand, patients who are emergency transported from other islands by boat come to the hospital's emergency entrance via the hospital's jetty and road in the site of the existing hospital. Therefore, the gate to the new hospital will be located at a place where the front road and the road from the jetty meet, and the general reception desk will be located at a place visible from the gate, thereby enabling the patients to know whether they should go to the general outpatient reception desk or to the emergency entrance.

(5) Future Hospital Intensification Plan and Related Facility Layout Scheme

In this section an overall future scheme for improvement of Gizo Hospital is developed as a mater plan from the present state of the site and its surroundings and analysis of the requested plan for this project, thereby the process of realizing the functions of Gizo Hospital now considered necessary plus the functions of the Western Province's healthcare facility is confirmed.

Although the present Gizo Hospital is too obsolescent to be able to perform proper medical activities; nevertheless, Solomon Islands also confirms that the existing facilities may be used as province's healthcare bureau in charge of public sanitation, etc. Also, the new hospital will be laid out in such a way to permit addition of more buildings to be able to cope with increases in the numbers of inpatients, outpatients, associated with the increases in hospital staff and the budget. The scale of this project is too large for the construction site if the building is one-storied, but is adequate to leave some usable lots of free space if the building is a full two-storied one. Thus, the recommended horizontal layout plan is developed as shown below leaving a space on the south for expansions of the Outpatient Department and wards, and a space on the north for expansion of the functions of the Medical Test and Service Departments, in such a manner that they are easily connected.

Based on the policy mentioned above, the layout plan below represents the master plan of Gizo Hospital which contemplates the new hospital and a provision for future expansion.

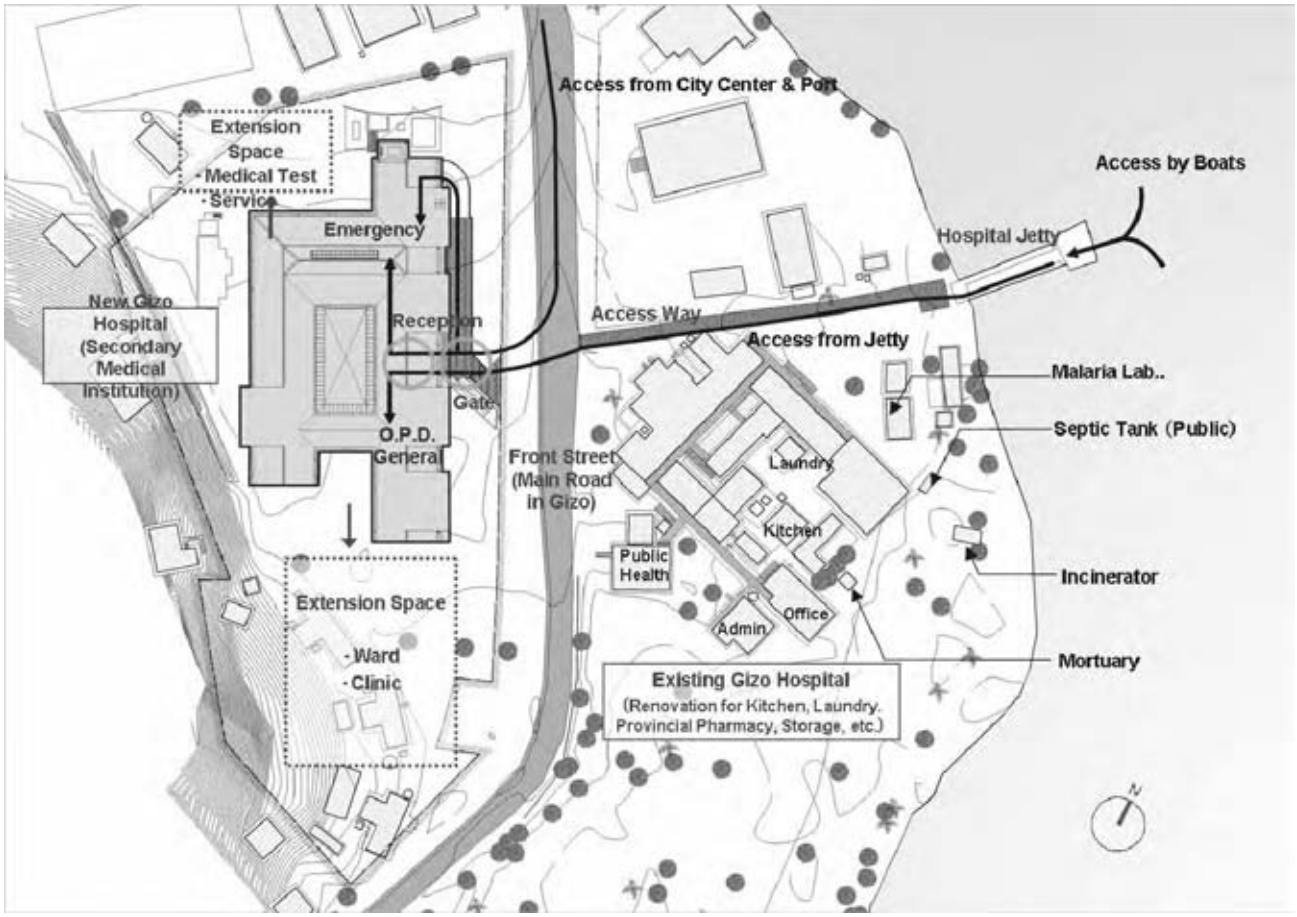


Figure 2-6 Existing Facilities of Gizo Hospital and Master Plan of Construction Site

2-2-2-3 Architectural Plan

(1) Condition of Facility Capacity

The number of rooms of each department subject to the design is determined using the assumptions explained below based on the number of patients forecast for 2016, or five years after completion and commissioning of this project. The number of patients in 2016 is forecast based on the past data (number of patients or that of operations, for example) of Gizo Hospital and on the rate of population increase in the Western Province, or the direct beneficiary area.

1) Forecast of population and number of patients for Western Province

The number of patients may be considered to increase in proportion to the population. At first, the population in the Western Province is forecast for 2016, and the population increase factor from 2006 is calculated. As shown in the table below, the average rate of population increase over the period from 2001 to 2006 is 2.49%. If the population is supposed in increase at the same rate in 2007 and onward, the population increase factor in 2016 to 2006 is 1.28 times. This number is therefore used in the forecast of the number of patients.

Table 2-10 Forecast Population of Western Province

					Existing Date ↓				Opening New GIZO Hospital ↓						5 years after Opening ↓	
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Actual no. of population	65,146	66,727	68,608	71,846	72,124	73,644										
Expected no. of population							75,479	77,360	79,288	81,264	83,289	85,364	87,492	89,672	91,906	94,197
Actual Increasing rate per year		2.43%	2.82%	4.72%	0.39%	2.11%										
Expected Increasing rate per year		2.49%					2.49%	2.49%	2.49%	2.49%	2.49%	2.49%	2.49%	2.49%	2.49%	
Increasing rate based on 2006						1.00	1.02	1.05	1.08	1.10	1.13	1.16	1.19	1.22	1.25	1.28

(Source: National Health Report 2005, except 2006 (interview survey)

2) Assumptions for medical activities of Gizo Hospital

① Annual working day

The medical activities of the Outpatient Department and other key departments are done on weekdays excepting Saturdays and Sundays, except for the Emergency Department, Delivery Department and similars.
The annual working days of each department is as shown below.

[Outpatient Department]	
General Consultation	260 days
Special Clinic	260 days
Emergency Department	365 days
[Other key departments]	
Delivery Department	365 days
Operation Department	
Scheduled operations	260 days
Emergency operations	365 days
Obstetrical operation	365 days

X-ray Test Division	260 days
Physiological / Pathological Test Division	260 days

② Opening hour of the Outpatient Department and other key departments

The opening hours on weekdays are from 8:00 am to 12:00 in the morning and from 13:00 pm to 16:30 pm, for a total of 7.5 hours.

③ Clinical hour of each department

The diagnosis hour, treatment hour, recovery hour after operation or delivery, etc. of each department are shown in the scale calculation table for each diagnosis and treatment item.

(2) Facility plan of Gizo Hospital

1) Study by department

① Number of patients

Since the hospital was afflicted by the earthquake in April 2007, the numbers of outpatients, inpatients, deliveries and operations during a period of five years from 2002 to May 2006, which should represent the state of hospital before it was afflicted, were surveyed. To avoid any effect of the ethnic conflict from 1999 to 2003, the three-year average data from 2004 to 2006 were used for development of the facility capacities.

・Outpatient departments

The number of outpatients excluding those of the Special Clinic is as per shown below. The rate of increase from 2003 to 2004 reflects the effects of ethnic conflict. Of the number of outpatients, data of breakdown into the general outpatient, the emergency outpatient (serious), emergency outpatient (not serious) is not available. The result of an interview survey indicates that the ratios are respectively 50%, 10% and 40%.
The diagnostic and treatment activities of the Special Clinic have been confirmed by the Basic Design Study to have been those falling under the dentistry, physicaltherapy, tuberculosis diagnosis and treatment, psychiatry, traveling clinic from the tertiary medical institution done every half year (surgery team and ophthalmology team).

Table 2-11 Number of General and Emergency Outpatients

		No. of rooms	Occupancy rate of General and Emergency Out-patient	Number of Patients					Last 3 years Average
				2002	2003	2004	2005	2006	
Total No. of Out-patients			100%	15,941	18,729	27,795	25,060	27,740	26,865
Rate of increase					17.5%	48.4%	-9.8%	10.7%	16.7%
1	General consultation	1	50%						13,433
2	Emergency (High injured)	2	10%						2,687
3	(Low injured)		40%						10,746

(Source: interview survey)

Table 2-12 Number of Special Clinic Outpatients

		No. of rooms	Number of Patients					Last 3 years Average
			2002	2003	2004	2005	2006	
1	Dental clinic	1	3,912	3,962	4,015	4,429	3,589	4,011
2	Physiotherapy	1	646	571	172	146	187	168
3	Ophthalmology	1	1,830	2,088	1,132	1,722	2,357	1,737
4	TB / Psychiatric	1	105	109	127	156	248	177

・Ward Department

Gizo Hospital adopts the general ward system; in other words, the hospital does separate the wards by medical department but the hospital has separates wards for males, females, pediatric patients, and maternity. The table 2-13 shows numbers of patients for each of these categories.

Table 2-13 Number of Admission Patients

		No. of beds	Number of Patients					Last 3 years Average
			2002	2003	2004	2005	2006	
1	Male ward TB	18	295	360	329	350	349 (12)	343
2	Female ward TB	15	379	426	530	472	475 (8)	492
3	Maternity ward	20	579	681	545	589	596	577
4	Pediatrics ward TB	13	313	309	474	432	392 (12)	433
	Total	66					1,812	1,844

(Source: interview survey)

・Delivery Department

In Solomon Islands 98% of deliveries are done in medical institutions, mostly at clinics or health centers which are primary medical institutions. Gizo Hospital takes care of pregnant women referred to by primary medical institutions and those living in and around Gizo City.

Table 2-14 Number of Deliveries

Delivery		No. of Delivery beds	2002	2003	2004	2005	2006	Last 3 years Average
1	Normal delivery	2	419	513	217	659	439	
2	Vacuum extracted		21	35	19	15	12	
3	Low birth weight		117	117	286	13	123	
4	Stillbirth		22	16	23	18	15	
Total No. of Deliveries			579	681	545	705	589	613
Rate of increase				17.6%	-20.0%	29.4%	-16.5%	2.6%

(Source: interview survey)

・Operation Department

The statistical data on number of operation from 2002 to 2006 survived the tsunami disaster; however, the data on breakdown into major operations, medium operations and small operations do not exist. For 2006, the data on the number of operations, by operation technique and also broken down into major operations, medium operations and small operations, exist. The ratios of operations for each fiscal year may be estimated from this data.

Table 2-15 Number of Operations

	No. of rooms	Rate of 2006	Number of Patients					Last 3 years Average
			2002	2003	2004	2005	2006	
Major Operation	1	12%	106	107	93	87	106	95
Moderate Operation		19%	168	170	147	137	168	151
Minor Operation		69%	610	617	535	497	610	547
Total No. of Operation			884	894	775	721	884	
Rate of increase				1%	-13%	-7%	23%	0.9%

(Source: interview survey)

・Medical Test Department

Gizo Hospital conducts blood tests, biochemical tests, microbiological tests and serological test. The tuberculosis biological test is done under a condition not particularly isolated, and hence the medical staff is exposed to a risk of infection. In recent years, the demand for the use of blood banks is seen to be increasing.

Table 2-16 Number of Laboratory Examination

	Laboratory Examination	No. of rooms	2002	2003	2004	2005	2006	Last 3 years Average
1	Hematology	1	6,885	4,930	8,763	5,959	6,006	6,909
2	Biochemistry		1,229	724	398	5,059	7,514	4,324
3	Micro-Biology Bacteriology (TB) Bacteriology (Culture)		1,857	1,147	2,948	4,034	2,782	3,255
4	Serology (incl. HIV)		1,881	3,114	3,099	3,354	2,137	2,863
5	Blood bank	1	1,443	2,419	1,651	2,024	3,350	2,342

(Source: interview survey)

② Scale calculation

Based on the above-mentioned design conditions, the number of rooms for the departments within the scope of work of this project for Gizo Hospital is calculated.

・Outpatient Department

The numbers of rooms for general outpatients and emergency outpatients are calculated as shown in the table below.

For special clinic, the hospital now has the functions of dentistry, physical therapy, tuberculosis diagnosis and treatment, psychiatry, traveling clinic. In addition, on

completion of the new hospital building, the hospital plans to add specialist doctors on the internal medicine, surgery, obstetrics and gynecology, and ophthalmology. Because of their unique characteristics of medical services, exclusive rooms will be provided for the dentistry and physical therapy. For other special medical services, a minimum of two multipurpose consultation rooms are provided, to be shared by different special medical services on different time zones.

Table 2-17 Required Number of Various Rooms for the General Consultation

							consultation room			
	Annual No. of Out-patients（p/year）	Annual working day（day/year）	Opning hour（min/day）	Average No. of daily patients （p/day）	Rate of increasing population	Expected No. of daily patients on 2016 （p/day）	Average of consultation time（min/p）	maximum No. of daily patients per room （p/day * room）	Required No. of consultation rooms	No. of rooms
	A	B	C	D=A/B	E	F=D*E	G	H=C/G	I=F/H	
General consultation	13,433	260	450	51.66	1.28	66.08	20	23	2.94	3

Table 2-18 Required Number of Various Rooms for Emergency Outpatient

							Filter clinic				treatment room				Observation room			
Emergency	Annual No. of Emergency patients （p/year）	Annual working day（day/year）	Opning hour（min/day）	Average No. of daily patients （p/day）	Rate of increasing population	Expected No. of daily patients on 2016 （p/day）	Average of Consultation time（min/p）	maximum No. of daily patients per room	Required No. of consultation rooms	No. of rooms	Average of Observation time （min/p）	maximum No. of daily patients per room	Required No. of Observation rooms	No. of rooms	Average of Observation time （min/p）	maximum No. of daily patients per room	Required No. of Observation rooms	No. of rooms
	A	B	C	D=A/B	E	F=D*E	G	H=C/G	I=F/H		J	K=C/J	L=F/K		M	N=C/M	O=F/N	
High injured	2,687	365	1,440	7.36	1.28	9.41	-	-	-		180	8	1.18	2	420	3	2.75	3
Low injured	10,746	365	540	29.44	1.28	37.66	20	27	1.39	2	-	-	-		-	-	-	

Table 2-19 Required Number of Various Rooms for Special Clinic

	Annual No. of Out-patients（p/year）	Annual working day（day/year）	Opning hour（min/day）	Average No. of daily patients （p/day）	Rate of increasing population	Expected No. of daily patients on 2016 （p/day）	consultation room			
							Average of consultation time （min/p）	maximum No. of daily patients per room （p/day * room）	Required No. of consultation rooms	No. of rooms
	A	B	C	D=A/B	E	F=D*E	G	H=C/G	I=F/H	
Dental clinic	4,011	260	450	15.43	1.26	19.44	40	11.25	1.73	2
Physiotherapy	168	260	450	0.65	1.26	0.81	60	7.50	0.11	1
Ophthalmology	1,737	260	450	6.68	1.26	8.42	30	15.00	0.56	1
TB / Psychiatrics	177	260	450	0.68	1.26	0.86	60	7.50	0.11	

・Ward Department

Regarding ward room configuration, the request was for ward room configuration by Medical, Surgical, Pediatrics, OB/Gy, TB/Psychiatrics. However, considering the capacities of the medical staff and smooth transition of hospital management from the existing hospital buildings to the new wards, the new hospital will adopt the general ward system now employed by the existing hospital. The number of beds required for each ward room will be determined as shown in the table below based on the past number of patients. Isolated wards are separately planned for patients of tuberculosis, infectious diseases, and patients of serious conditions.

Table 2-20 Required Number of Beds for the Ward Department

		Annual No. of Inpatients	Average No. of Admission days	Annual No. of Admission days	Rate of increasing population	Expected No. of Admission days on 2016	Expected No. of Admission days	Required No. of beds	Planning		Existing No. of beds	
							Bed occupancy rate		no. of beds			
							80%		Total	BOR	Total	BOR
		A	B	C=A*B	D	E=C*D	F＝E/80%	F/365				
1	Male ward (incl. HDU)	349	7.00	2,443	1.28	3125	3,906	10.70	11	77.8%	20	33.5%
2	Female ward (incl. HDU	492	7.00	3,446	1.28	4408	5,510	15.10	15	80.5%	15	62.9%
3	Maternity ward	577	6.00	3,460	1.28	4426	5,532	15.16	16	75.8%	18	52.7%
4	Pediatrics ward	433	6.00	2,596	1.28	3320	4,151	11.37	12	75.8%	13	54.7%
5	TB ward								4			
6	Isolation ward								4			
	Total								62	77.5%	66	50.9%

・Delivery Department

The numbers of labor beds and observation beds required will be set as shown in the table below based on the number of past deliveries. Two delivery rooms will be provided, in case the use of the room has to be temporarily suspended for sterilization of infected persons immediately after delivery.

Table 2-21 Required Number of Beds for the Delivery Department

	Annual No. of Deliveries (p/year)	Annual working day (day/year)	Average No. of daily Deliveries (p/day)	Rate of increasing population	Expected No. of daily patients on 2016 (p/day)	Labour			Delivery			Recovery		
						Average of Labour time (day/p)	Required No. of Labour beds (p/day)	No. of beds	Maximum No. of daily Deliveries (p/day)	Required No. of Delivery beds	No. of beds	Average of Recovery time (day/p)	Required No. of Recovery beds (p/day)	No. of beds
	A	B	C=A/B	D	E=C*D	F	G=E*F		H	I=E/H		J	K=E*J	
Delivery	613	365	1.68	1.28	2.15	1	2.15	3	3	0.72	2	1	2.15	3

・Operation Department

Two operation rooms will be provided considering the needs of emergency operations, occurrence of two or more obstetrical operations, temporary suspension of the use for sterilization after operation. These two operation rooms are one major operation room and one minor operation room, based on the data on the past operation techniques and numbers. Observation bed will not be provided, because these two beds may be used also for the purpose of observation.

Table 2-22 Required Number of Beds for the Operation Department

	Annual No. of Operations / Patients (p/year)	Annual working day (day/year)	Average No. of daily Operations / Patients (p/day)	Rate of increasing population	Expected No. of daily Operations / Patients on 2016 (p/day)	Major operation room			Minor operation room			Recovery		
						Maximum No. of daily Operations (p/day)	Required No. of operation room	No. of operation room	Maximum No. of daily Operations (p/day)	Required No. of operation room	No. of operaton room	Average of Recovery time (day/p)	Required No. of Recovery beds (p/day)	No. of beds
	A	B	C=A/B	D	E=C*D	F	G=E*F		F	G=E*F		H	I=E*H	
Major Operation	95	260	0.37	1.28	0.47	3	0.16					0.25	0.12	
Moderate Operation	151	365	0.41	1.28	0.53	3	0.18					0.25	0.13	
Minor Operation	547	365	1.50	1.28	1.92				5	0.38		0.25	0.48	
total	793		2.28		2.91		0.33	1		0.38	1		0.73	2

・X-ray Department

In order for the new hospital to be able to continue the examinations presently done and falling under this division, one general X-ray room and ultrasound test room will be provided.

・Medical Test Department

In order for the new hospital to be able to continue the examinations presently done, the spaces for the blood test, biochemical test, microbiological test, serological test are provided. Regarding the tuberculosis test, a separate room with an isolated ventilation system will be planned to prevent nosocomial infection. Also, a blood bank will be installed considering the recent increase of the demand.

2) Required floor area

From the numbers of rooms of different categories calculated as indicated above, the floor area required for the Architectural Plan will be calculated. Determination of the floor area of each rooms of this Requested Japanese Assistance will consider the state of the existing facilities, and refer to the standards for medical facilities in general use in Solomon Islands, and Japan's Standard for Floor Area of Medical Facilities (Architectural Institute of Japan). Further, determination of floor area of each room will be determined, with layouts of medical facilities and equipment contemplated for each room, numbers of patients and medical staff members in charge considered to be working, duly and comprehensively considered.

Table 2-23 Floor Area of Each Room of the Subject Facility

Floor	Dept.		Room	Floor Area (m^2)	Dimension
1	ADMINISTRATION	MEDICAL OFFICE	DR.ROOM	32.5	5.23 m × 6.23 m
			MEETING ROOM(1)	15.7	5.23 m × 3.00 m
			MEETING ROOM(2)	17.4	5.23 m × 3.33 m
			DUTY	10.4	3.23 m × 3.23 m
			WC(2)	2.7	1.65 m × 1.63 m
			SK(1)	2.9	1.58 m × 1.83 m
			SW	6.7	1.58 m × 4.23 m
			PANTRY	3.7	1.65 m × 2.23 m
			DR.HALL	25.4	1.78 m × 12.45 m
					1.65 m × 2.00 m
			Sub Total	117.2	
	OUT PATIENT DEPARTMENT	ADMINISTRATION	ADMIN HALL	8.0	4.00 m × 2.00 m
			ADMIN OFFICE	13.0	4.23 m × 3.08 m
			MEDICAL RECORD	21.7	4.00 m × 0.50 m
					5.30 m × 3.73 m
			ACCOUNT OFFICE	13.3	4.23 m × 3.15 m
			RECEPTION	16.4	3.23 m × 5.08 m
			ST.(2)	4.7	2.63 m × 1.78 m
			DRUG ST.	22.3	6.00 m × 3.38 m
					4.00 m × 0.50 m
			DRUG HALL	8.0	4.00 m × 2.00 m
			PHARMACY	26.3	4.23 m × 6.23 m
		EMERGENCY	DIRTY	10.5	3.50 m × 3.00 m
			STERILIZE.	11.3	3.50 m × 3.23 m
			RECOVERY (NS)	43.6	7.00 m × 6.23 m
			NURSE OFFICE	15.2	3.73 m × 4.08 m
			TREATMENT	74.6	3.50 m × 6.23 m
					3.73 m × 10.23 m
					2.28 m × 6.13 m
					2.38 m × 0.33 m
			ST.(1)	6.4	2.88 m × 2.23 m
		OUT PATIENT	PLASTER ROOM	19.0	3.00 m × 6.13 m
					2.00 m × 0.33 m
			MULTI CONS(1)	45.0	7.23 m × 6.23 m
			MULTI CONS(2)	45.0	7.23 m × 6.23 m
			PHYSIO.	18.2	3.00 m × 5.90 m
					1.40 m × 0.33 m
			NS	18.5	8.23 m × 1.98 m
					2.00 m × 1.15 m
			FILTER CLINIC(1)	12.8	3.00 m × 4.25 m
			FILTER CLINIC(2)	12.8	3.00 m × 4.25 m
			INJECTION ROOM	18.0	4.23 m × 4.25 m
			GENERAL CONSUL. ROOM(1)	12.6	3.00 m × 4.20 m
			GENERAL CONSUL. ROOM(2)	12.6	3.00 m × 4.20 m
			GENERAL CONSUL. ROOM(3)	26.1	4.23 m × 6.18 m
			NS	11.4	6.00 m × 1.15 m
					5.40 m × 0.83 m
			DENTAL	31.8	6.00 m × 4.98 m
					2.43 m × 0.80 m
			LAB	13.0	4.23 m × 3.08 m
			DENTAL OFFICE	13.3	4.23 m × 3.15 m
			DENTAL (CHILDREN)	16.4	6.00 m × 2.73 m
			Sub Total	621.2	

Floor	Dept.		Room	Floor Area (m^2)	Dimension
1	CENTRAL DIAGNOSIS AND TREATMENT DEPARTMENT	MEDICAL TEST DEPARTMENT	MALARIA	20.1	6.23 m × 3.23 m
			SEROLOGY/HEMATOLOGY	18.7	6.23 m × 3.00 m
			BIOCHEMISTRY	24.6	6.23 m × 3.00 m
					1.99 m × 3.00 m
			TECH. OFFICE(1)	12.7	4.24 m × 3.00 m
			BLOOD COLLECTION	12.7	3.00 m × 4.23 m
			WC(1)	4.5	3.00 m × 1.50 m
			BLOOD ST.	4.8	2.40 m × 2.00 m
			INSPEC.	6.0	3.00 m × 2.00 m
			BLOOD BANK	6.0	3.00 m × 2.00 m
			TB	23.2	3.73 m × 6.23 m
			SPUTA COLLECTION	8.0	3.73 m × 2.15 m
			X-RAY	24.0	5.98 m × 4.03 m
			PROCESSING ROOM	11.3	3.25 m × 3.46 m
			WORK SPACE	95.3	9.23 m × 2.15 m
					3.25 m × 0.56 m
					5.00 m × 13.75 m
					2.00 m × 2.45 m
			ST.(3)	11.9	4.23 m × 2.83 m
			TECH. OFFICE(2)	18.1	4.23 m × 3.23 m
					2.00 m × 2.23 m
			ULTRA SOUND	14.0	3.00 m × 4.68 m
			Sub Total	315.9	
	OTHERS		WC(2) (F)	19.1	3.00 m × 2.28 m
					2.78 m × 1.88 m
					1.40 m × 2.60 m
					1.55 m × 2.20 m
			WC(3) (M)	18.6	3.00 m × 2.28 m
					2.30 m × 1.48 m
					3.60 m × 1.45 m
					2.75 m × 1.15 m
			WC(4) (HC)	4.7	2.15 m × 2.20 m
			SK(2)	1.1	0.95 m × 1.15 m
			WAITING BAY(1)	50.0	9.00 m × 5.55 m
			WAITING BAY(2)	50.4	9.00 m × 5.60 m
			WAITING BAY(3)	74.5	11.85 m × 6.00 m
					1.90 m × 1.78 m
			CORRIDOR (1)	110.6	2.78 m × 6.00 m
					3.03 m × 29.55 m
					3.23 m × 24.45 m
					2.00 m × 2.00 m
					1.50 m × 2.35 m
					1.50 m × 2.35 m
					2.00 m × 2.00 m
			CORRIDOR (2)	194.9	2.28 m × 12.45 m
					3.23 m × 37.93 m
					3.23 m × 2.33 m
					9.23 m × 1.93 m
					1.83 m × 2.60 m
					1.83 m × 2.60 m
					3.23 m × 1.48 m
					3.23 m × 1.48 m
			CORRIDOR (3)	87.4	13.56 m × 6.45 m
			COMMUNICATION CENTER FOR DISASTER	7.9	2.85 m × 2.76 m
					m × m
			M/G MACHINE RM.	25.7	7.45 m × 3.24 m
					7.23 0.23
			M/G CYLINDERS RM.	11.4	4.00 m × 2.76 m
					0.50 m × 0.76 m
			PS , EPS	22.0	
			Sub Total	678.2	
			1st Floor Total	1732.5	

Floor	Dept.		Room	Floor Area (m^2)	Dimension
2	CENTRAL DIAGNOSIS AND TREATMENT DEPARTMENT	OPERATION DEPARTMENT	OP	39.2	6.08 m × 6.45 m
			OP (MINOR)	24.4	3.79 m × 6.45 m
			MR	25.7	3.98 m × 6.45 m
			RECOVERY	36.4	6.18 m × 5.18 m
					3.48 m × 1.28 m
			NS	19.4	3.00 m × 6.45 m
			OFFICE	10.4	3.23 m × 3.23 m
			ST.(3)	10.4	3.23 m × 3.23 m
			OP HALL	53.9	6.23 m × 2.31 m
					13.00 m × 2.78 m
					2.70 m × 1.28 m
			DIRTY (1)	27.1	2.78 m × 3.00 m
					6.78 m × 2.78 m
			DIRTY (2)	8.3	2.78 m × 3.00 m
			WASHING ROOM	24.0	4.00 m × 6.00 m
			STERIL. ROOM	24.0	4.00 m × 6.00 m
			STERIL.ST.	18.0	3.00 m × 6.00 m
			EPUIP.ST.	16.2	3.00 m × 4.60 m
					2.65 m × 0.90 m
			HOLDING BAY	13.8	3.00 m × 4.60 m
			CHANGING ROOM (1)	12.9	2.08 m × 4.42 m
					1.15 m × 3.22 m
			CHANGING ROOM (2)	11.9	1.86 m × 4.42 m
					1.15 m × 3.22 m
			SW(1)	2.5	2.08 m × 1.20 m
			SW(2)	2.2	1.86 m × 1.20 m
			WC(6)	2.7	2.08 m × 1.30 m
			SK	2.4	1.86 m × 1.30 m
			ANTE.	8.5	2.29 m × 3.70 m
			Sub Total	394.2	
		DELIVERY DEPARTMENT	DELIVARY (1)	20.8	6.45 m × 3.23 m
			DELIVARY (2)	20.8	6.45 m × 3.23 m
			EXAM.	15.0	3.23 m × 4.08 m
					1.38 m × 1.33 m
			WC(5)	2.5	1.85 m × 1.33 m
			OBSERVATION, LABOUR	84.9	2.78 m × 6.00 m
					6.45 m × 1.80 m
					6.00 m × 2.25 m
					4.55 m × 2.15 m
					6.45 m × 1.83 m
					4.55 m × 2.15 m
					3.65 m × 2.05 m
					2.35 m × 1.73 m
					0.95 m × 0.33 m
			NS	7.2	3.35 m × 2.15 m
			NURSERY	24.5	3.73 m × 2.00 m
					4.23 m × 4.03 m
			DIRTY(4)	5.5	2.73 m × 2.00 m
			MILK ROOM	9.0	2.23 m × 4.03 m
			Sub Total	190.0	
	WARD DEPARTMENT		4BEDS(1) (MALE)	44.5	7.45 m × 5.98 m
			4BEDS(2) (MALE)	44.5	7.45 m × 5.98 m
			4BEDS(3) (FEMALE)	44.5	7.45 m × 5.98 m
			4BEDS(4) (FEMALE)	44.7	7.45 m × 6.00 m
			4BEDS(5) (FEMALE)	44.7	7.45 m × 6.00 m
			6BEDS(1) (PEDI.)	44.5	7.45 m × 5.98 m
			6BEDS(2) (PEDI.)	44.5	7.45 m × 5.98 m
			6BEDS(3) (MATERNITY)	44.5	7.45 m × 5.98 m
			6BEDS(4) (MATERNITY)	44.7	7.45 m × 6.00 m
			2BEDS(1) (ISO.)	17.4	4.73 m × 3.05 m
					1.73 m × 1.73 m
			WC(1)	2.3	1.73 m × 1.33 m
			2BEDS(2) (ISO.)	17.4	4.73 m × 3.05 m
					1.73 m × 1.73 m
			WC(2)	2.3	1.73 m × 1.33 m
			2BEDS(3) (TB/PSYC.)	19.0	5.23 m × 3.00 m
					2.23 m × 1.50 m
			WC/SW(1)	3.3	2.23 m × 1.50 m
			2BEDS(4) (TB/PSYC.)	20.2	5.23 m × 3.23 m
					2.23 m × 1.50 m
			WC/SW(2)	3.8	2.23 m × 1.73 m
			2BEDS(5) (MATERNITY)	16.0	4.23 m × 3.00 m
					2.23 m × 1.50 m
			WC(3)	3.3	2.23 m × 1.50 m
			2BEDS(6) (MATERNITY)	17.0	4.23 m × 3.23 m
					2.23 m × 1.50 m
			WC(4)	3.8	2.23 m × 1.73 m
			HDU(1)	28.6	4.73 m × 6.05 m
			HDU(2)	28.6	4.73 m × 6.05 m
			Sub Total	584.1	

Floor	Dept.	Room	Floor Area (m^2)	Dimension
2	OTHERS	CORRIDOR (1)	264.7	2.78 m × 36.45 m
				2.80 m × 11.55 m
				2.78 m × 24.23 m
				3.23 m × 1.75 m
				3.23 m × 1.78 m
				3.23 m × 1.78 m
				3.23 m × 1.75 m
				1.65 m × 0.33 m
				3.23 m × 1.78 m
				0.66 m × 0.66 m
				3.23 m × 2.23 m
				3.23 m × 2.23 m
				3.23 m × 1.78 m
				0.66 m × 0.66 m
				3.23 m × 1.75 m
				3.23 m × 1.78 m
				0.45 m × 5.95 m
		CORRIDOR (2)	89.7	2.78 m × 24.00 m
				3.23 m × 1.78 m
				3.23 m × 1.75 m
				3.23 m × 1.75 m
				0.66 m × 0.66 m
				3.23 m × 1.75 m
		CORRIDOR (3)	79.6	6.23 m × 2.31 m
				3.00 m × 4.18 m
				3.23 m × 2.78 m
				13.55 m × 3.23 m
		CORRIDOR (4)	87.4	13.55 m × 6.45 m
		ISOLATION HALL	23.2	3.23 m × 1.83 m
				2.78 m × 6.23 m
		NS (1)	11.8	2.63 m × 2.26 m
				3.23 m × 1.30 m
				1.90 m × 0.66 m
				0.66 m × 0.66 m
		NS (2)	11.8	2.63 m × 2.26 m
				3.23 m × 1.30 m
				1.90 m × 0.66 m
				0.66 m × 0.66 m
		NS (3)	11.8	2.63 m × 2.26 m
				3.23 m × 1.30 m
				1.90 m × 0.66 m
				0.66 m × 0.66 m
		NURSE OFFICE (1)	9.7	3.23 m × 2.28 m
				1.58 m × 1.53 m
		NURSE OFFICE (2)	9.7	3.23 m × 2.28 m
				1.58 m × 1.53 m
		NURSE OFFICE (3)	11.2	3.23 m × 2.71 m
				1.58 m × 1.54 m
		SW (3)	13.7	3.23 m × 4.25 m
		SW (4)	13.7	3.23 m × 4.25 m
		TREAT (1)	12.7	3.00 m × 4.23 m
		TREAT (2)	13.5	3.23 m × 4.18 m
		TREAT (3)	13.6	3.23 m × 4.23 m
		ST.(1)	9.5	3.23 m × 2.18 m
				1.23 m × 2.05 m
		ST.(2)	7.3	1.73 m × 4.23 m
		DIRTY (3)	6.3	1.50 m × 4.23 m
		WC (7)	4.1	2.00 m × 2.05 m
		WC (8)	13.6	3.23 m × 4.23 m
		WC (9)	13.6	3.23 m × 4.23 m
		STAFF WC(1)	2.0	1.65 m × 1.20 m
		STAFF WC(2)	2.0	1.65 m × 1.20 m
		STAFF WC(3)	2.0	1.65 m × 1.22 m
		DAY ROOM(1)	13.7	6.00 m × 2.28 m
		DAY ROOM(2)	13.7	6.00 m × 2.28 m
		ELECTRICAL RM.	40.3	6.45 m × 6.25 m
				m × m
		PS , EPS	12.2	
		Sub Total	818.0	
		2nd Floor Total	1986.3	
	MACHINE ROOM		16.7	4.40 m × 3.80 m
	SEWAGE TREATMENT		62.5	4.40 m × 14.20 m
		Sub Total	79.2	
		Total Floor Area	3798.1	

3) Facility configuration (function)

The facility configuration of this project is explained below.

Table 2-24 Facility Configurations of the Department within the Scope of this Project

Major project breakdown (Number of stories / total floor area)	Facility
Gizo Hospital (Two storied building / 3,792.08 m^2)	First floor: Outpatient: General, Emergency, Special Clinic (Internal medicine, Surgical, OB/Gy, ophthalmology, dental clinic, physiotherapy and traveling clinic) Medical Image: X-ray, Ultrasonic Medical Test: Laboratories, Blood bank Administration: Pharmacy, Office, Duty Service: Communication Center for Disaster
	Second floor: Operation: Operation rooms (major and minor) Central sterilizing and supply: Washing room, Sterilization room Delivery: Labor, Delivery (2), Nursery Ward: Male, Female, Pediatrics, Maternity, HDU, Isolation (total 62 beds) Service: Electrical Room
	Ancillary facility Sewage Treatment Plant Generator Water Reservoir Tank

4) Floor planning

Being situated in an isolated island which represents an unfavorable condition for maintenance, the elevator is not adopted. Notwithstanding, a two-storied hospital building will be constructed to make the most of the limited site area. The hospital building is designed to minimize vertical movements associated with execution of medical services.

On the first floor are laid out functions used by outpatients to reduce the vertical movement of the patients. To facilitate movement of patients, all the functions of the Outpatient Department and the Medical Test Department are placed from the places adjacent to the first floor reception desk at the entrance through inner court and onward easily visible from the reception desk. On the second floor, the wards for inpatients, who do not need to move around very much, are arranged in a manner to allow the patients to secure necessary privacy and amenity. Also, the Operation Department and Delivery Department are placed on the second floor, because they are preferably placed apart from the ground level for sanitary reason, and the Delivery Department is placed next to the Operation Department so that unexpected emergency obstetrical operations may be properly coped with.

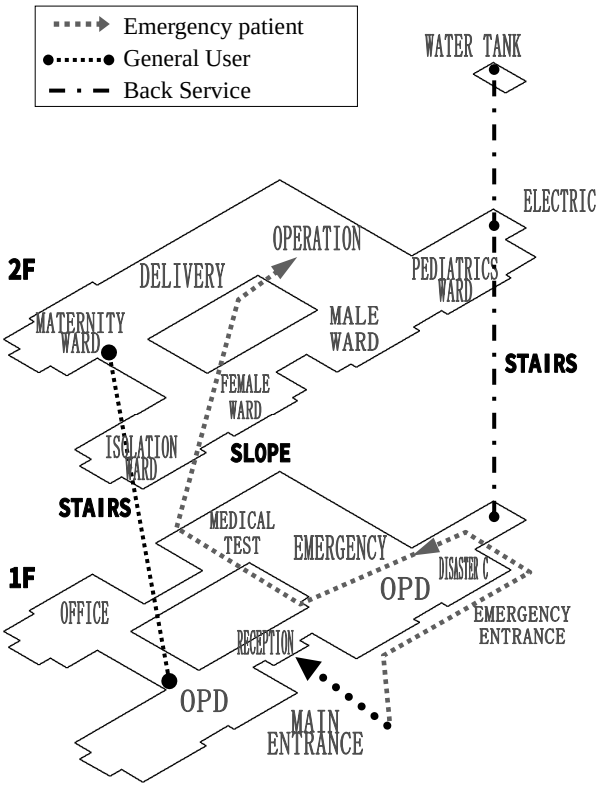


Figure 2-7 Floor Planning

The wheelchair slopes and stairs are used for movement between the first floor and the second floor. One of the wheelchair slopes is installed from the front of the emergency entrance to the operation room so that the emergency patients may be brought on a stretcher for an emergency operation. The operation rooms are on the second floor where wards are also placed; therefore, patients may be sent to an appropriate ward depending the conditions before and after the operation without the need for vertical movement. The stairway used by visitors to inpatients is placed on the route starting from behind the reception on the first floor to reach near the delivery and maternity wards, where mostly healthy people are hospitalized. Other wards are located to face the sea so that the patients may be able to see the sea to secure amenity of the patients.

Transportation of meals and materials from facilities to the wards uses the outer stairway behind the kitchen. Vertical movements of materials like linens will always use the service external stairways. Therefore, the use of the wheelchair slope and the inner stairways on the side of inner court will be limited to people engaged in medical activities and related persons, namely, those attending or visiting the patients and medical staff members.

The electric room, which is susceptible to flood damages, is placed on the second floor close to the external stairway, the second floor being safe from tsunami disasters. The Regional Disaster Center, which should become the center of relief activities in case of disaster, is placed on the first floor close the emergency entrance. Behind the center close to the back stairway are placed infrastructure-related service divisions including the elevated cistern, machine rooms, so that access to and exit from these facilities may be concentrated in this area. The ramp for vehicles is used by both general vehicles and emergency vehicles. The ramp will be wide enough to permit two vehicles to cross, and a parking space of a sufficient area will be placed near the ramp so that the traffic of emergency vehicles may not be hindered.

- Design concept for the Outpatient Department (general, special clinic, emergency)

  The Outpatient Department section consists of the reception desk, general outpatient, special outpatients, emergency outpatient, medical record management and accounting, and pharmacy.

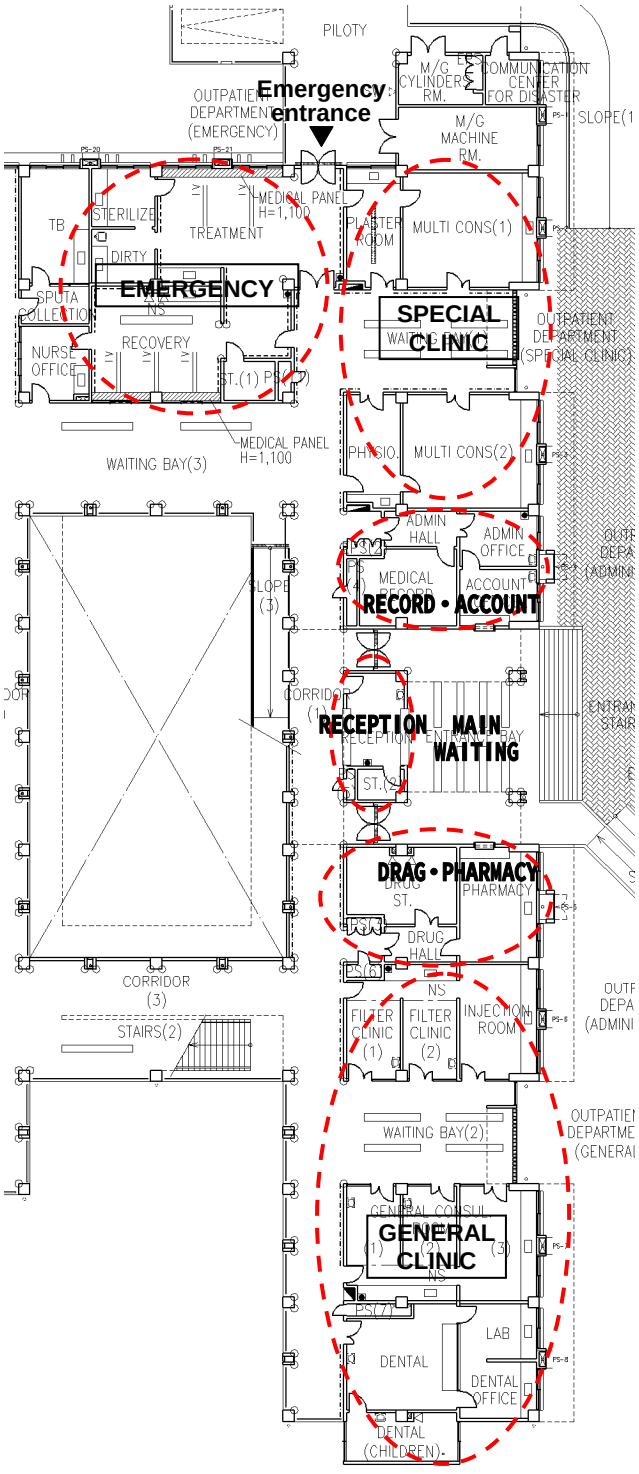


Figure 2-8 First Floor: Outpatient Department

The number of people admitted in the hospital is controlled by preparing an entrance bay in front of the entrance where persons attending the patients can comfortably wait. In this way, possible congestion within the hospital building is prevented. Also, to avoid possible troubles in emergency transportation by congestion, an exclusive entrance is provided for emergency outpatients, close to the X-ray Department and the Medical Test Department to permit prompt examination of emergency patients. Outpatients other than emergency outpatients first come to the reception desk where they confirm where they should proceed and enter the hospital. People who attend patients wait in the entrance bay. The patients wait at respective waiting bays depending upon the type of diagnosis and treatment they receive. Patients who have finished diagnoses and treatments come to the reception desk, and come to the entrance bay to clear their accounts and procedures at the pharmacy. Then, they can leave the hospital.

In Solomon Islands, provincial hospitals are generally staffed only by general practitioners and specialist doctors in certain limited fields. To cope with such a situation, National Referral Hospital forms several traveling clinic teams of special medical doctors and dispatch one of these teams once and month for traveling diagnosis and treatment to stay for a week at a provincial hospital. Gizo Hospital therefore needs diagnosis and treatment rooms equipped with medical facilities and equipment to enable such traveling clinic teams to conduct their medical activities, in addition to the general outpatient area for diagnosis and treatment of outpatients by the hospital's own medical staff. The specialized outpatient area, being equipped with advanced medical facilities and equipment, is placed near the emergency rescue area to consider possibility of joint use of the advanced medical facilities and equipment by the hospital's own staff and the traveling clinic teams, and also close to the service access to facilitate maintenance of the medical facilities and equipment.

Near the Waiting Bay (1) are placed facilities for diagnoses and treatments by specialist doctors and near the Waiting Bay (2) are placed consultation rooms for diagnoses and treatments by the hospital's own general practitioners and staff. The Waiting Bay (3) is the waiting space the Medical Test Department. Emergency patients are sorted out and instructed whether to use the emergency entrance or not at the reception desk in front of the entrance. From there they move to the emergency treatment rooms via the emergency entrance or general entrance.

- Design concept for the Medical Test Department

The Medical Test Department section consists of facilities for biochemical tests, the serology / hematology test, malaria test, tuberculosis test, X-ray test, ultrasound test and the blood bank.

The blood collection counter, the toilet for urea collection, the room for sputum collection, the blood bank, to which patients may access, are placed on the corridor side, and examination rooms are placed on the window side for the sake of hospital staff who work there long. To prevent nosocomial infection, the tuberculosis test room is placed on the opposite side of the corridor, and the exhaust air system is also separated from the air systems of other zones to isolate the tuberculosis test room air.

While on the other hand, rooms which patients need to enter to receive tests, such as the X-ray room or the ultrasound test room, are placed on the inner court side to secure good visibility. The X-ray room, in particular, will be used very often to examine the states of injuries of emergency patients; therefore, its entrance will be placed near the emergency rescue area. Traffic lines of staff for the diagnostic imaging, etc. are planned to be laid behind these rooms to avoid crossing with patients' traffic lines to improve working efficiency of the medical staff. The walls of the X-ray room is made of concrete walls for the purpose of radiation shielding, and the doors and the windows are of lead-shielded doors and leaded radiation shielding glass, respectively, for the sake of safety of the medical staff.

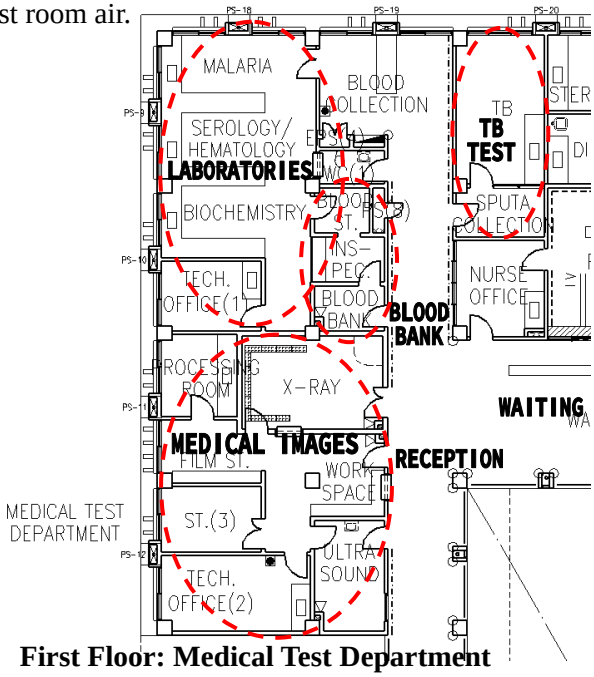


Figure 2-9 First Floor: Medical Test Department

- Design concept for the Operation Department

The Operation Department section consists of a major operation room, minor operation room, one each, and a recovery bed corner, sterilization area, staff's rooms. To ensure prevention of infections, the patient, medical staff, facilities and equipment are cleaned before entering the clean areas; traffic lines of contaminated facilities and equipment, materials, the medical staff and the patient are all distinctively separated. The recovery bed corner to be used after operations will be placed at a location easily visible from the nurses' station. After staying in the recovery corner, patients are moved to the High Dependency Unit (HDU) or general ward depending upon each patient's condition.

Both operation rooms have a window to allow natural lighting to enable minimum operations in case of complete power failure that may be caused by a disaster or others. By the same token, the operation hall is equipped with toplights. The design will also give consideration to reduction of stress on, and relaxation of, the medical staff engaged in an operation even in normal time so that medical malpractice may be prevented.

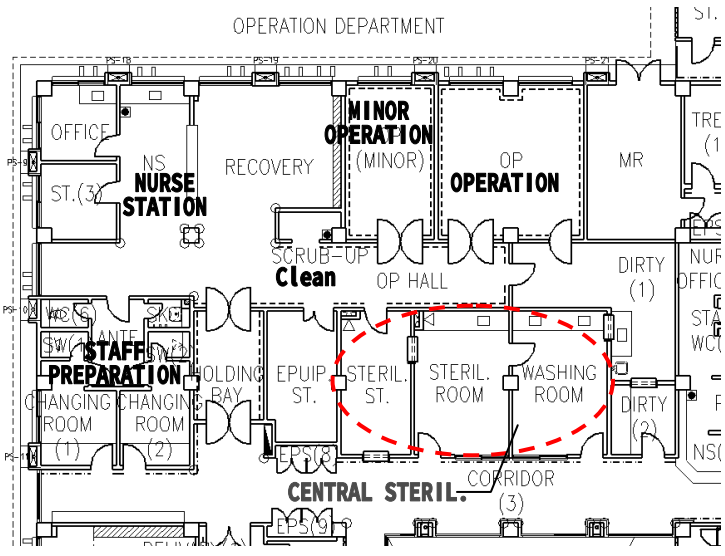


Figure 2-10 Second Floor: Operation Department

The central sterilization area should be able to properly respond to sterilization of facilities and equipment sent from the wards or the Outpatient Department; therefore, this area is designed to allow entrance both from the operation hall side and the corridor side.

- Design concept for the Delivery Department

The Delivery Department section consists of maternity wards, various delivery-related rooms, newborn nursery. In Solomon Islands, pregnant women tend to come to medical institutions immediately before delivery, and many deliveries are done in such primary medical institutions as health centers. Provincial hospitals, being secondary medical institutions, have to be prepared for cases where the cesarean operation is necessary in an emergency delivery. Therefore, the Delivery Department section is placed just in front of the Operation Department section to facilitate mutual communication.

For the sake of convenience in antenatal waiting, postpartum observation, the Delivery Department section is made easily communicable with the maternity wards, and the milk room and the newborn nursery are placed between them.

In view of the fact that patients in maternity wards are mostly healthy people in contract to other wards; therefore, they are placed near the stairway.

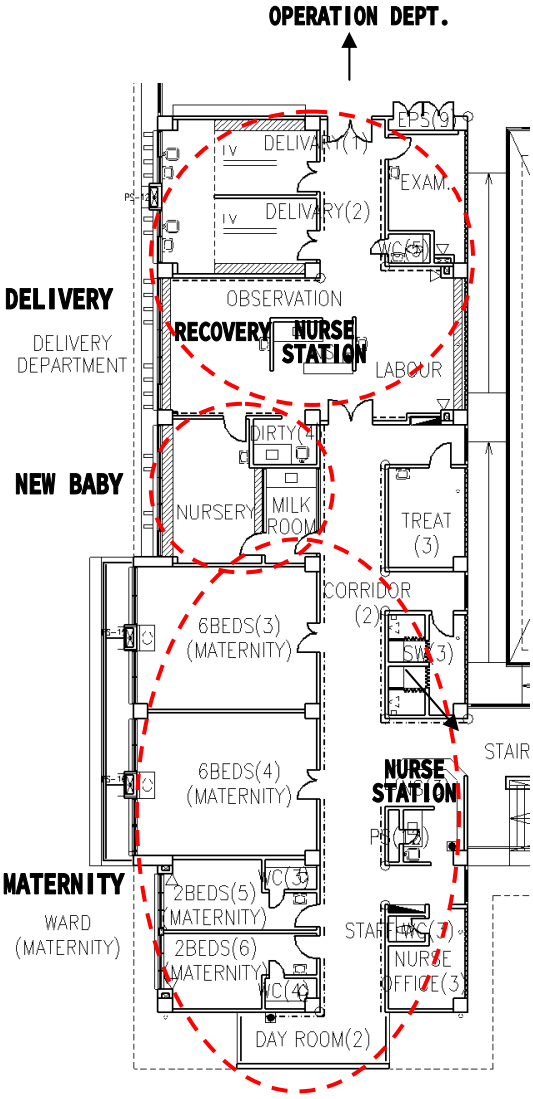


Figure 2-11 Second Floor: Delivery and Obstetrics Department

- Design concept for the Ward Department

  In consideration of medical practice in Solomon Islands, the interdisciplinary general ward system is adopted to classification of wards; and arrangement of the wards are such that they are pediatric patients wards, males wards and females wards from the north to the south. The southernmost part, a portion not to be passed by people, is isolated to house wards for the infectious diseases.

  When a visitor comes to a ward, the visitor's traffic line is planned to pass in front of each nurses' station, to facilitate security management of the wards. Also, two high dependency units (HDUs) for serious patients are placed in front of the nurses' station to allow intense observation of the serious patients in the HDUs.

  In consideration of the amenity of patients, all wards face the seaside. The nurses' stations, rooms for medical activities, like the treatment rooms, common toilets, shower rooms are placed on the side of the inner court to face the other departments. The open corridor between them is connected with the service stairs so that daily hospital meals may be smoothly distributed to patients.

  General wards are not equipped with cooling facilities and naturally ventilated. Therefore, two neighboring beds are laid out sufficiently apart from each other. The ceiling of the floor is made high enough to hold a sufficiently large air volume to hold down rise of the room temperatures, and open corridor is provided with transom windows to allow natural wind to enter. By such means, the winds which pass through the wards from the balcony side windows to the other side are used to move the air masses in the wards. Also, each ward is equipped with a wash hand basin to help keep the wards clean.

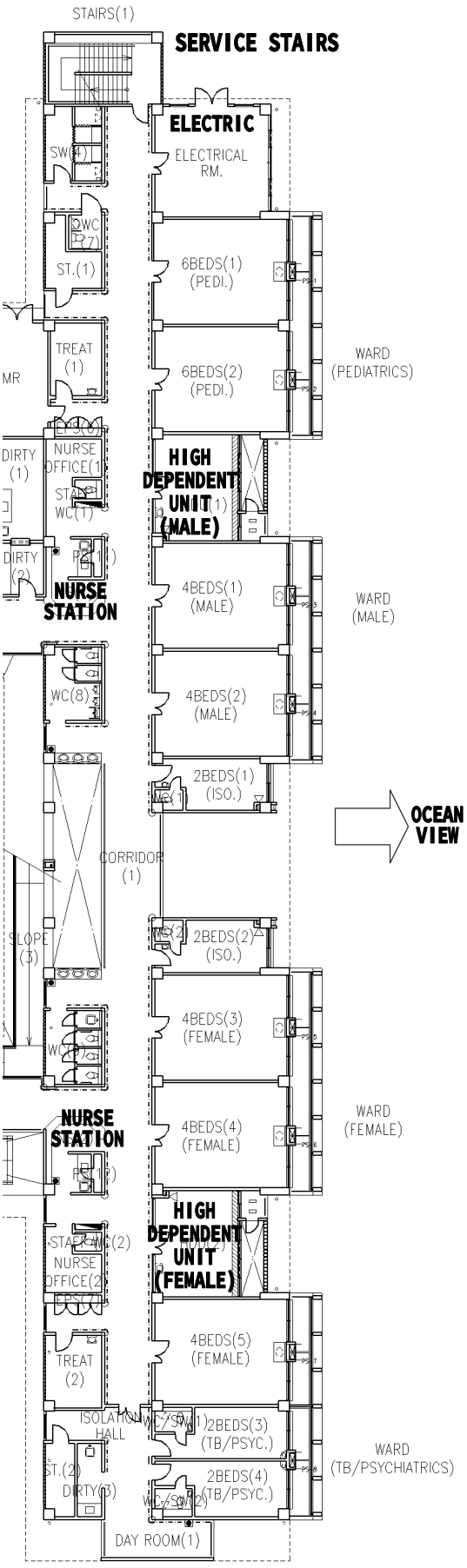


Figure 2-12 Second Floor: Ward Department

5) Section planning

The elevated-floor structure which proved to have evaded the tsunami's water pressure is adopted. An inner court and an open corridor are adopted to secure air flow. The building is so structured as to shield the sunlight by means of eaves and a heat-insulating concrete roof. The section plan that can hold the mechanical air conditioning to a minimum is realized by such means. Such common use spaces as corridor or patients' waiting space are designed to have sufficient openings by using such construction materials as perforated blocks to promote natural ventilation. During the time when the sunlight is intense, the air in the shade close to the ground is the coolest. Therefore, the building is so structured as to help induce the air beneath the elevated floor to the inner court, and thereby hold down temperature rise by natural ventilation.

Regarding the roof, the sloped roof of concrete slabs is adopted to maintain the water-proof function over an extended period. In addition, as a protection against ultraviolet rays, folded plates extensively adopted in Solomon Islands are used to cover the roof. Further, an insulating material locally used to folded roofs are inserted as external heat insulation of the concrete labs, thereby insulating effect is enhanced to prevent deterioration of the building frame. Since the ceiling of the wards is elevated to hold down the temperature rise in the wards, the wards have high walls. Taking advantage of the high walls, louvers are installed on the wall to assist intake and outflow of air. Also, since water is supplied at sufficiently high pressures, solar water heaters are installed.

Regarding the story height, there is a problem unique to remote places of isolated lands that periodic maintenance of elevators is difficult. Movement between the first and second floors has to be done by stretcher, etc. Considering such constraints, the story height of the first floor is set at as low as 3.75 meters, and the second floor secures a ceiling height of 2.8 meters by standard.

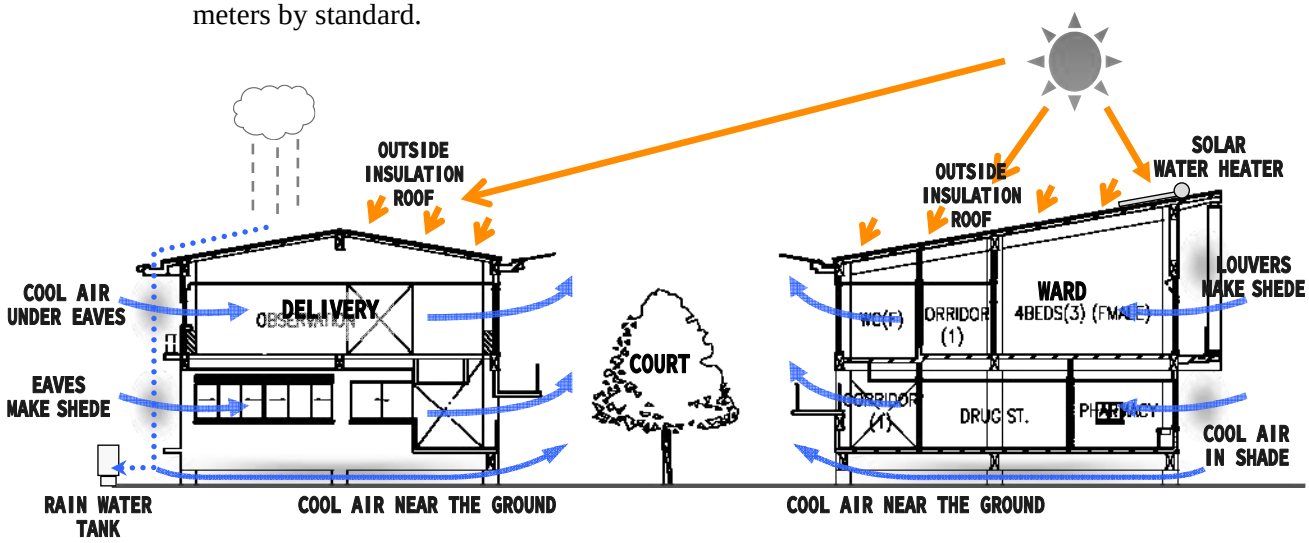


Figure 2-13 Cross Sectional View of the New Gizo Hospital

In order to enable the patients lying on bed to see the outdoor sceneries and also to allow sufficient air to enter the wards, the portions of windows to be opened are extended to lower levels. In addition to wide eaves extending long outward to reduce the effect of sunlight, vertical louvers are placed on the large openings on the side of balcony to shield west sunlight. The spacings between the window frame and exterior louvers are also used as spaces for piping or air-conditioners' outdoor machines.

To secure necessary hydraulic pressures on the 2nd floor, the elevated tank should be high enough to give the cistern an 8m-head above the highest shower. The cistern tower is so designed that the cistern is held together with other facilities, like the lightning arrester rod, in a tower-shaped portion with the tank and stairs, to make it easily recognizable in case of emergency, or a symbol of the Western Province.

6) Elevation planning

The principle for elevation planning is to build an open and clean hospital, easy to maintain, with simple and practical exterior finishing, with high facilities, like elevated tank, seen as a landmark of Gizo City's disaster prevention center to give the local people visible contract for safe and security.

Painting locally common is applied to the external wall. To minimize to the extent possible damages by water leaking from pipes on the insides of the building, pipe shafts for water supply and drainage of stormwater are installed on the external wall. The balconies of the sizes corresponding the sizes of the rooms are installed for the maintenance of the pipe shafts. Deep relieves are placed on the outer surface to harmonize the hospital building with the scales of surrounding buildings. The intake air and exhaust air are separated at the high spaces beneath the elevated ceiling of the multi-bed wards, and the vertical louvers installed on balconies gives the building a deep and rhythmical appearance, thereby avoiding an imposing appearance compared with the buildings in the surroundings.

The external stairway tower, including the elevated tank, is faced to the side of Gizo City, to make it appear as a landmark of the city, perceptual from the city side, and to show the good relationship between the hospital and the city.

2-2-2-4 Structural Plan

(1) Structural Plan

1) Building structural plan

This building is a two-storied one (with a penthouse), with a basic span of 6.0m × 6.0m, which is general among hospitals.
The building is of the pure rigid frame structure of reinforced concrete, which is earthquake resistant and durable. Both external and internal walls are made of concrete blocks. In Solomon Islands, pouring of mixed concrete to form a plate like a wall is seldom done; therefore, workability and work schedule would not be dependable if such a method is adopted. Therefore, concrete blocks are adopted.

2) Foundation structural plan

The spread foundation is possibly constructed and adopted, while pile foundation is difficult to procure its material and machinery to the site. The foundation of the two-story building is the continuous footing foundation. The mat foundation is adopted for the tower and heavy water tank portion because of the necessity to prevent differential settlement and to keep the contact pressure lower than the allowable limit.
The foundation is designed with the long-term load bearing strength of 80kN/m^2, based on the result of Ground Survey.

(2) Structural Design Policy

Solomon Islands does not have its own design standard, and in many cases buildings are designed based on the standards of Australia or New Zealand. However, according to the result of interview surveys, designers may set design standards for their designs in reality.
The seismic zoning coefficients indicated in the standard of New Zealand do not include Solomon Islands; therefore, the design is based on the PAPUA NEW GUINEA STANDARD, of which the seismic zoning coefficients may be applicable to Solomon Islands.
The Japanese design standard will be referred to as necessary.
The following are major standards and rules that will be conformed in the design work.

a. Earthquake resistant design standard
   PAPUA NEW GUINEA STANDARD
b. Standards of the Architectural Institute of Japan

(3) Structural design methods and combination of loads

Allowable stress design method is applied in the structural design for both permanent and temporary loading cases. Temporary loading cases include wind load and seismic load.

Combinations of the loads in each term are shown as below.

- Permanent load: $D + L_R$ Allowable stress design based on Japanese Codes (Allowable stress for Permanent Load)
- Temporary Load (Wind): $D + L_R + W$ Allowable stress design based on Japanese Codes (Allowable stress for Temporary Load)
- Temporary Load (Seismic): $D + L_R + 0.8E$ Allowable stress design based on Japanese Codes (Allowable stress for Temporary Load)

Where, D : Dead load
L_R : Live load
W : Wind load (Papua New Guinea Standards)
E : Seismic load (Papua New Guinea Standards)

(4) Load and external force

1) Dead load

The dead load is calculated from the weights of structural materials, finishing materials, pipes and ducts fixed to the building.

2) Live load

As live loads for the design, the numbers indicated in Papua New Guinea Standards will be used. Other than that, the design conditions will be set to meet the actual load conditions of use. The live loads of major rooms are shown below.

Table 2-25 Live Loads of Major Rooms

Room or area	Live load (N/m²)	Remark
Wards, wash room, toilet	2,000	
X-ray, operation	3,000	
Office, consultation, treatment	2,000	
Corridor, stairways	2,000	
Balcony	2,000	
Driveway, apron	5,400	
Machine room (including machine weight)	5,000	Heavy machines are separately treated
Roof	2,000	

3) Wind load

As wind load for the design, the numbers indicated in Papua New Guinea Standards will be used.
The wind load is given by the equations below.

$$V_z = 1.35V\left(\frac{z}{z_g}\right)^k \text{、} \quad q_z = 0.6V_z{}^2 \times 10^{-3} \text{、} \quad p_z = C_p \cdot q_z$$

$$F_p = \sum p_z \cdot A_z$$

Where,

V_z ：the design wind velocity at height z (m/s)

V ：the regional basic design wind velocity（=36m/s）

z ：a height or distance above the ground

z_g ：height of gradient wind

q_z ：the free-stream dynamic pressure resulting from the basic design wind velocity at any height z above the ground

p_z ：the wind pressure at height z

C_p ：a pressure coefficient

A_z ：an area at height z

F_p ：force on a building element

4) Seismic load

Seismic load is calculated by Papua New Guinea Standards
Gizo is considered in Zone-1 shown as Figure 2-14.
The seismic load is given by the equations below.

$$V = C \cdot I \cdot K \cdot W_t \text{、} \quad W_t = D + \frac{L}{3} \text{ (1.5 kPa＜L＜5 kPa)}$$

$$F_i = \frac{V \cdot W_i \cdot h_i}{\sum W_i \cdot h_i}$$

Where,

C ：basic seismic coefficient(=0.25：Zone1)
I ：importance factor of the building(=1.0)
K ：structural type factor (=1.0)
W_t ：total of the vertical loads above the level of lateral restraint
D ：design dead load
L ：design live load
W_i ：proportion of Wt contributed by level i
h_i ：height to the level designated as i from the level of lateral restraint

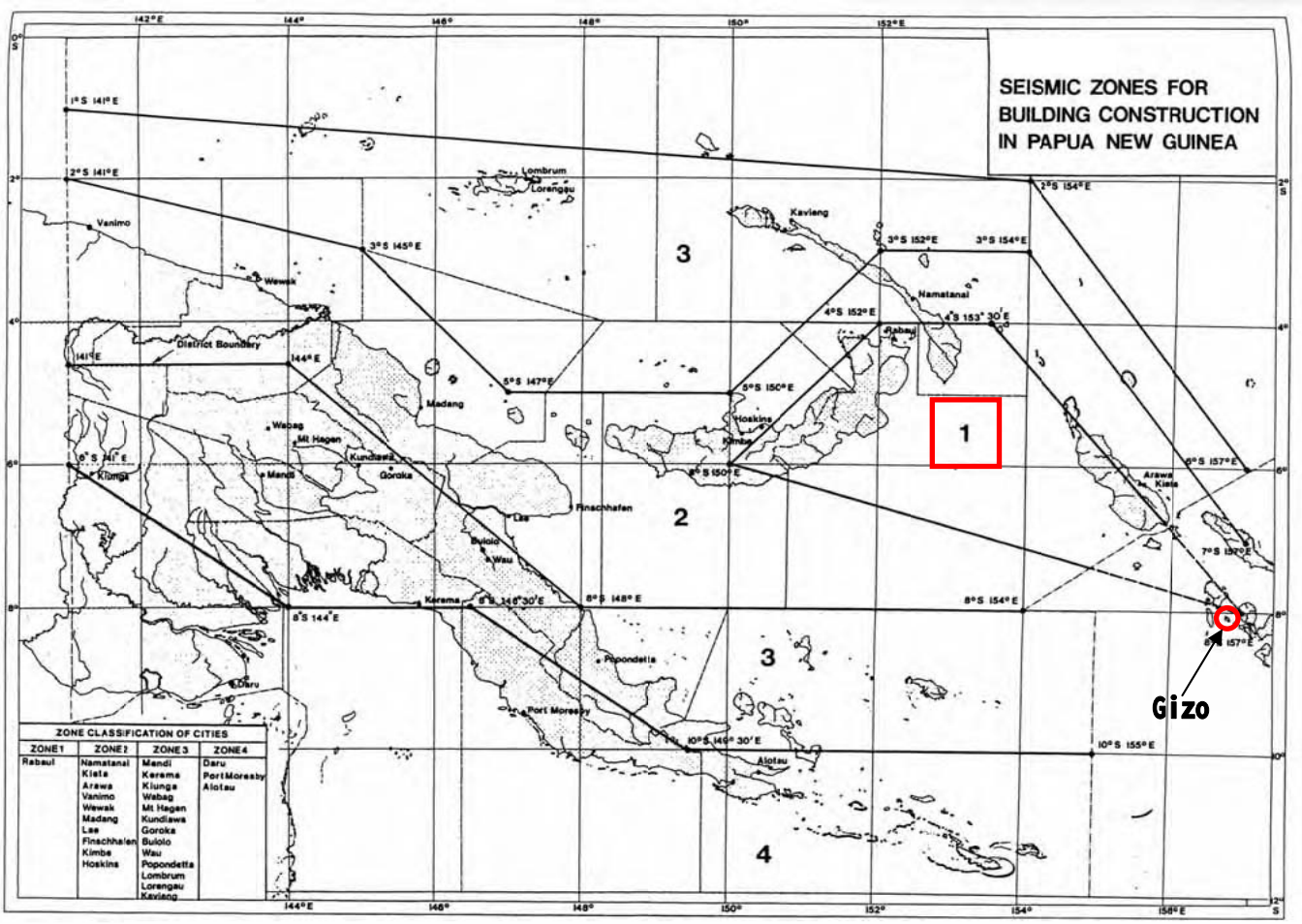


Figure 2-14　Seismic Zones for Building Construction

(5) Materials to be used and their strength

Structural members will be basically imported products in Solomon Islands. However, the following specifications are planned considering supply capacity, quality and workability of the product.

1) Concrete

Type: plain concrete
Strength：Fc=24 N/㎜^{2}(JIS)
Aggregate: The coarse aggregate should be crushed stones, and the fine aggregate should be river sands, pit sands and fine sands.

2) Reinforcing bar

High Yield Steel Bar： D10, D13, D16, D19, D22, D25 (JIS)

(6) Result of Ground Survey

Boring tests were done at locations shown in Figure 2-15 to confirm the depth of bearing grounds and their bearing strengths.
The result of boring test indicates that the construction site is a piece of marshy land landfilled with riparian limestone (with N-values ranging from 10 to 30), which is covered mainly by sand and gravel (with N-values at about 5), except for Location No. 7. The formation considered to be the bottom of the former march is a layer of volcanic breccia fragments, underneath of which exists a baserock. The filled earth is about 1 to 2 meters thick, and the old marsh bed level ranges from GL−7m to GL−14m, the top of the baserock slopes sharply down toward the sea, ranging from GL−7m to GL−14m.
The long-term load bearing strength obtained for about GL−1.5m from the Foundation Design Guideline of the Architectural Institute of Japan is about 100kN/m^2. However, the long-term load bearing strength is set at 80kN/m^2, taking safe side considering backfilled soil condition.

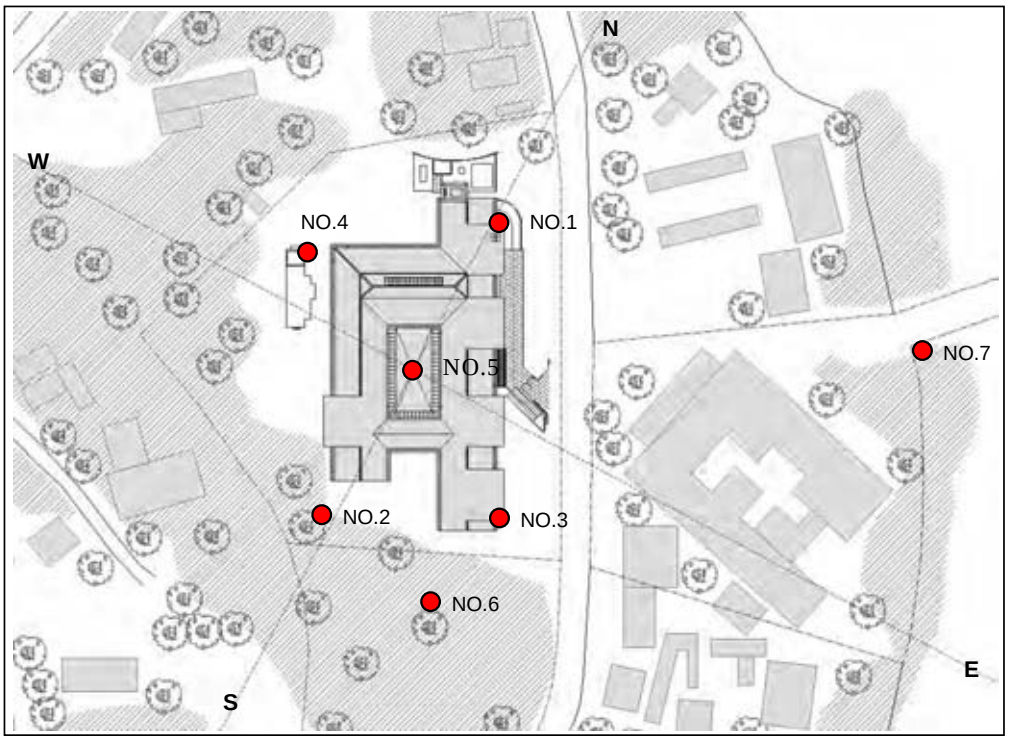


Figure 2-15 Location of Ground Examination

2-2-2-5 Mechanical and Electrical Plan

(1) Electrical System

The electrical system plan of this project may be summarized as follows:

1. In view of building being a hospital and the fact that the social infrastructure surrounding the building is underdeveloped, the first priority theme of the planning is to realize stable supply of electricity.

2. Also, in view of local procurement of materials being inconvenient, due consideration is given to simplification of maintenance.

1) Electric Power Supply System

The supply of electrical power to the planned facilities is done by making a branch to the electrical room on the second floor from the high voltage power line (3-phase, 3-wire, 11kV) to be newly installed on the north of the new hospital from the Gizo Power Station of the Solomon Islands Electric Authority (SIEA). The amount of electrical power required by this project is estimated at about 300kVA (75VA/m^2 × 4,000m^2 = 300kVA) for the new building only. The primary portion, or the construction work up to the switch (exclusive), on the electrical pole is the responsibility of the Solomon side, and the secondary portion, or the construction work from the switch (inclusive), namely, installation of high voltage trunk line, transformer, low voltage distribution board, and the wiring, is the responsibility of the Japanese side.

The electrical power supply capacity of the Gizo Island is not sufficient to meet the island's total demand. Power supply is suspended several times a month, each lasting for about an hour. To maintain the minimum hospital function active even in case of power failure or supply suspension, an emergency diesel-driven generator is installed. The emergency electric power demand is estimated at about 150kVA for this project.

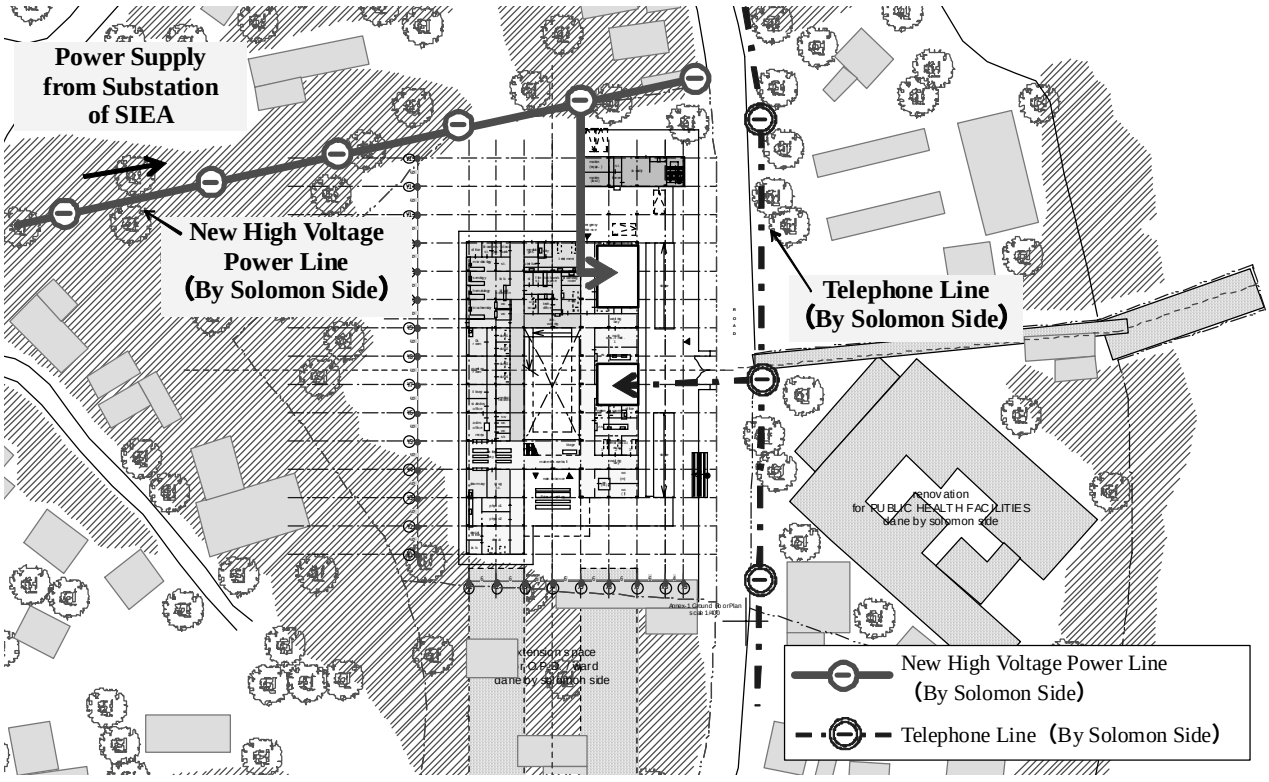


Figure 2-16 The Route of Electrical Power Supply

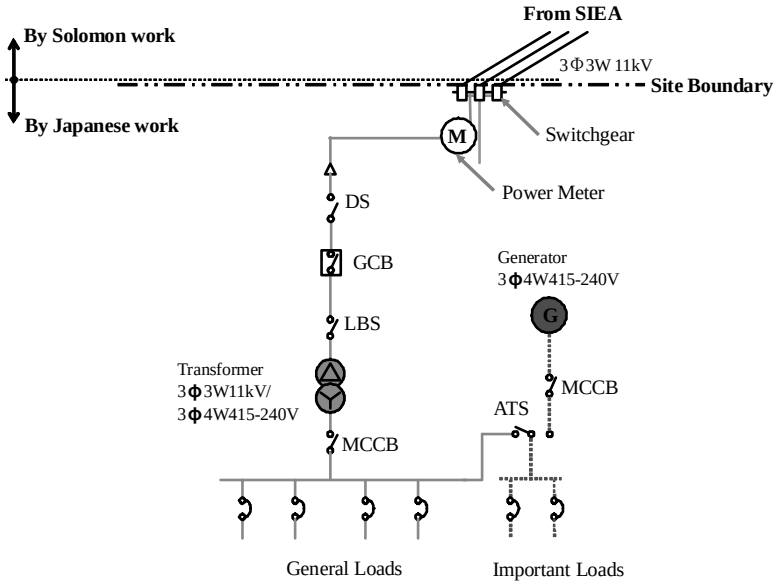


Figure 2-17 The Conceptual Diagram of Electrical Power Supply

The electrical power distribution system complies with the standard of Solomon Islands, which is 3 phase, 4 wire, 415V/240V. The result of the field survey indicates that the voltage fluctuation of commercial electrical power is about 10%; therefore, an automatic voltage regulator (AVR) is installed to medical equipments susceptible to voltage fluctuations as necessary.

The transformer is of the indoor specifications, cubicle type and oil insulation which is commonly used in Solomon Islands.

The emergency generator is of the outdoor specifications, packaged type, with a fuel tank mounted on the package due to easy maintenance. The fuel tank has a capacity of 3- to 4-hour operation enough to cover 1- to 2-hour power failure common in the Gizo Island. As a consideration to the surrounding environment, proper facilities for sound insulation and vibration prevention are installed.

2) Lighting and power outlet facility

In consideration of the present condition of Solomon Islands, the design illuminance is set at about 60% to 70% of the JIS standards set brighter for Japanese preference (see Table 2-26). As light source, fluorescent lamps of good illumination efficiency commonly used locally are planned mainly. The zoning of switch is designed to reduce the running cost by such means as adoption of the zigzag connection.

Receptacles will basically conform to the type generally used in Solomon Islands, namely, the receptacle to match a plug with 3 prongs including a grounding prong, arranged in a triangular shape. And their specifications and installed locations will be decided considering such factors as types of power source, capacities, connection methods of the facilities and equipments to be connected.

Table 2-26 The Lighting Plan of Main Rooms

Room Name	Illuminance[Lx]	Fixture Type	Remarks
Consultation Room	300	Recessed Type Fluorescent with Acrylic Cover	
Examination Room	300	Recessed Type Fluorescent with Acrylic Cover	
Operation Room	1000	Recessed Type Fluorescent with Acrylic Cover	Operating Light, Sterilization Lamp
Delivery Room	500	Recessed Type Fluorescent with Acrylic Cover	
Bedroom	100	Bracket Type Fluorescent	
Office	300	Recessed Type Fluorescent	
Corridor	100	Recessed Down Light	
WC	100	Recessed Down Light	

3) Lightning protection and grounding system

To protect the facilities from lightning, a lightning rod and roof conductors are installed. Electrical equipments and communication instruments will be equipped with a grounding device according to their specifications. The medical grounding system and ungrounded circuits are provided for medical equipments to secure safety in their use.

4) Telephone system

Solomon Telekom Company Ltd. will install a private automatic branch exchange (PABX), a main distribution frame (MDF), telephone handsets and the wiring. The required capacity is estimated to be 3 to 5 external lines and 50 internal lines. Terminal boards, outlets and the conduit piping will be installed as Japan side obligation.

5) Public address system

The public address system will be installed to enable the facilities to make business calls by the central control like paging of doctors, and emergency announcement to the entire building like escape guiding, in case of fire.

6) Interphone system

The areas, operation area for example, where the hot-line is necessary will be equipped with two-way interphone system. Also, an interphone system will be provided for mechanical rooms such as air-conditioner room, electrical room and so on for maintenance.

7) Automatic fire alarm system

Solomon Islands does not have organized laws, regulations, standards on fire prevention; therefore, automatic fire alarm system is installed referring to the International Standards (Australian for example) and the Japanese Standards that are used to supplement insufficient Solomon Islands' standards, thereby early detection of fire and prevention of spread of damages are planned.
Also, guide lights will be installed to make escape guiding safer.

8) Cable piping for computer network

Cable pipes and boxes will be installed from the electric pipe shaft (EPS) of each floor to necessary points for computer network. Installation of the instruments for computer network system, cables and circuit jackets will be the obligation of the Solomon side.

(2) Mechanical Systems

The mechanical systems for this project will be planned based on the principles shown below.

1. In view of the fact that the subject building is a hospital and that the social infrastructure of surroundings is undeveloped, the building's machine system should be safe and stable which enables the hospital to operate for a certain period in case of the collapse of infrastructure.

2. Given by the fact that procurement of materials at the site is inconvenient, the machine system should be planned simple, with consideration for maintenances of equipments.

3. The system will make the best of the local natural environment in the planned site and give consideration to environmental conservation. The extensive methods such as natural ventilation, effective use of rainwater and installation of solar water heaters, etc will be adopted.

1) Water Supply System

The water supply will newly installed from the Gizo Waterworks trunk line under the ground on the west side of the hospital. The water reservoir tank have a capacity of 50m^3, equivalent to one day's consumption of the entire hospital demanding amount to prepare for a possible water failure for several hours. And the material of the water tank will be FRP which is ideal for preventing the contamination of water. The system of supplying water is an elevated cistern that the tank installed on the top of service stairs and supplies water by the natural gravity flow. This system can provide stable water supply while city water outage or pump suspended for some time. Water in Solomon Islands has high hardness in general. Therefore, the installation of the water softener is planned. Also, some of rainwater fall on the roof will be collected to be used for outdoor sprinkling.
The water supply facilities within the site of this project fall under the Japan side obligation. However, the tap line from the town's trunk line to the boundary of the site is the obligation of the Solomon side. By the way, the Gizo City Waterworks Improvement Plan is scheduled for completion by the end of 2008.

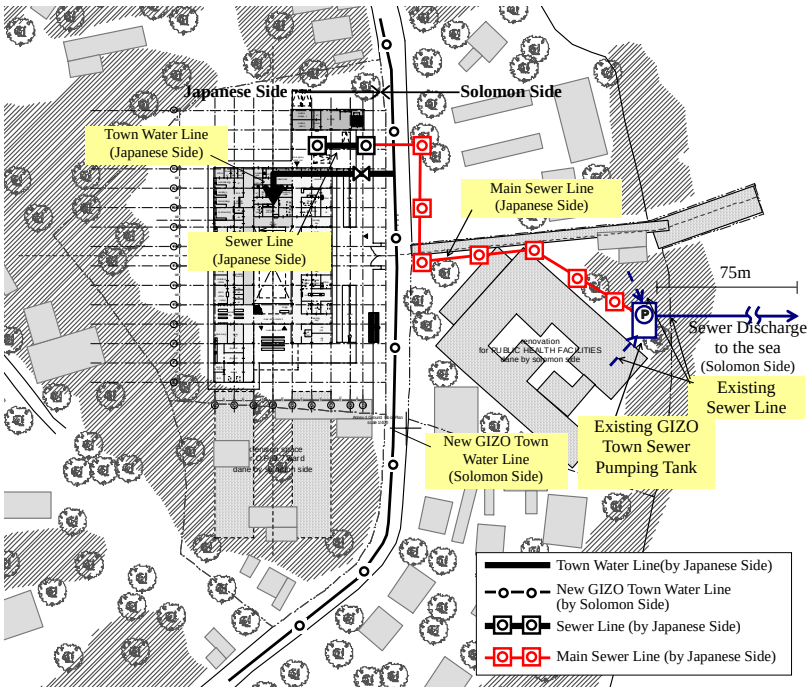


Figure 2-18 Water Supply and Drainage Piping Plan

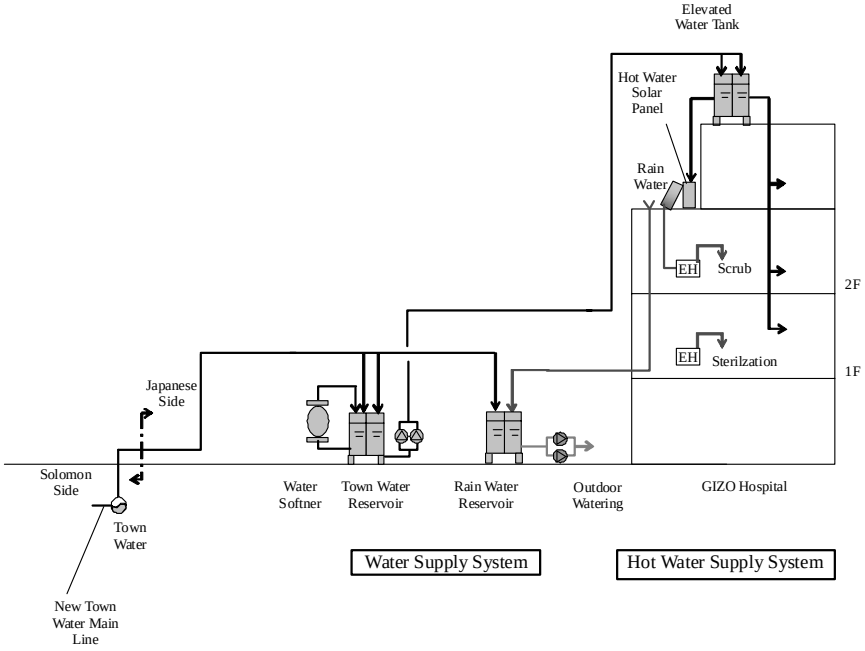


Figure 2-19 Water supply and Hot Water Supply System

2) Wastewater System

The general wastewater of this project is drained to the wastewater treating system for treatment. The infectious disease related special wastewater is first subjected to sterilization and drained to the wastewater treating system. Rainwater and wastewater are collected to the rainwater roadside gutters installed in surrounding of the hospital building and finally discharged to the roadside rainwater gutter which are newly installed by the Solomon side.

The wastewater system will be installed in the construction site, including the wastewater treating system and special wastewater treating system under the Japan side obligation. However, the wastewater facility reaching to the existing Gizo wastewater pumping tank outside the site boundary is the obligation of the Japanese side. The wastewater treating system is designed to treat the wastewater to BOD level at 30ppm according to the environmental standard of Solomon Islands, and the simple system is also designed for facilitate maintenance.

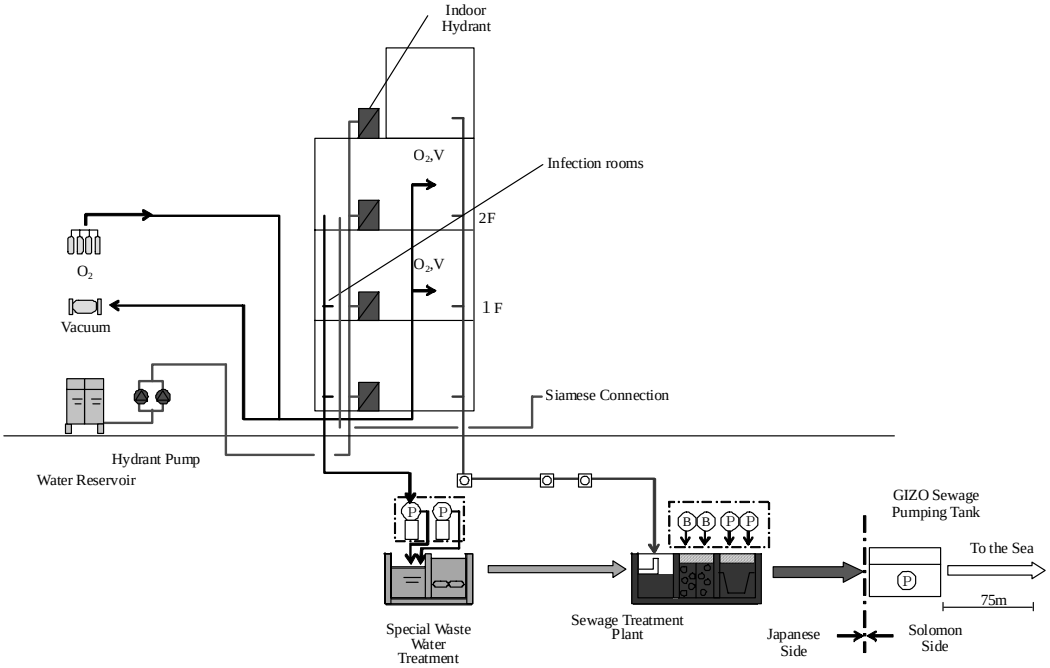


Figure 2-20 Drainage System, Fire Protection System, Medical Gas Supply System Flow

3) Hot water supply system

Hot water will be supplied in principle by separate system to minimum zones where hot water is functionally required. Hand washer disinfectors for operation will be supplied with hot water heated by solar water heater system backed up by electric water heaters. Hot water supplied to the sterilization room is heated by the electric water heater.

4) Sanitary fixture

Water closet bowls of the toilets will be of the Western style, attached with a roll paper holder. The flushing units for the water closet bowl will be the durable flush valve type. The urinals will be a wall hung type principally, though urinals for small boys will be of floor standing type attached with a flush valve. The delivery room is equipped with a baby bath system.

5) Firefighting facility

The decision for firefighting facilities were made by a result of a meeting with the Honiara Fire Brigade that the firefighting system will basically conform to the installation standard of Solomon Islands but Australian and Japanese standards may supplementally applicated with Solomon Island's standard as necessary. Indoor hydrant facilities (with hose reels), portable fire extinguishers will be installed in the new hospital building. In addition, siamese connections will be installed in response to the request by the Honiara Fire Brigade exclusively for the fire engines the brigade has.

6) Medical gas facility

A medical gas system will be installed for this project. The elements required are oxygen supply, vacuum suction, compressed air supply and laughing gas supply. The central system is adopted limitedly: for oxygen supply and vacuum suction only from the view of safety, operability, and maintenance. The compressed air and laughing gas systems will be planned by the Solomon side using portable equipment. The outlets of medical gas system will be of the BS type, with the Australian specifications to be considered. The numbers of oxygen humidifier units and vacuum suction units will be 30% of the numbers of the outlets, at a reasonable rate of use. The rooms that receives medical gases will be selected to a minimum, namely, listed in the table below.

Table 2-27 Rooms requiring medical gas supply

Room	O_2	Vacuum	Remarks
Operation Room	○	○	Ceiling & Wall type
Recovery Room	○	○	Wall type
HDU	○		Wall type
Emergency	○	○	Wall type
Miner Operation	○	○	Wall type
Delivery	○		Wall type

7) Waste treatment facility

Presently, general wastes are collected by the Gizo Waste Treatment Site. The medical wastes are incinerated by the existing incinerator. Therefore, the Japanese side will not install an incinerator. Sorted collection of wastes seems essential to realization of the effective collection and incineration.

8) Air conditioning and ventilation facility

The consultation rooms, wards, general offices and waiting bays are basically ventilated naturally by the effective use of windows. And the fanlights are installed above the windows. These rooms are equipped with ceiling fans.

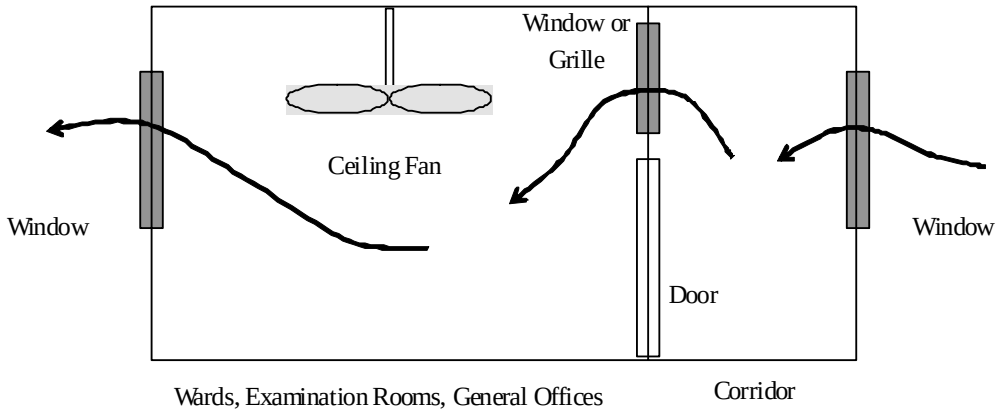


Figure 2-21 Ventilation System for Wards, Examination Rooms

The operation room, minor operation room, operation room hall, laboratories and delivery section where air conditioning is necessary as medical practice are separately equipped with air conditioners. Ceiling suspended cassette type air conditioners equipped with filters are used for rooms where cleanliness is demanded. Rooms which needs general-type air conditioners are equipped with wall type or ceiling suspended type air conditioners with the regenerable filters inside. In addition, this filter is a long-life wide area type to decrease the number of cleaning.

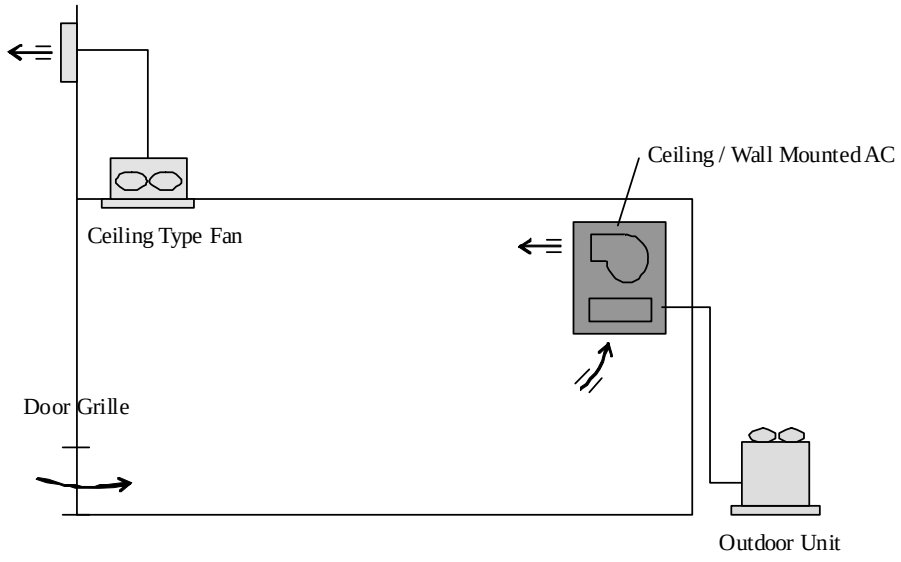


Figure 2-22 Individual Air-Conditioning System except Operation Hall & Rooms

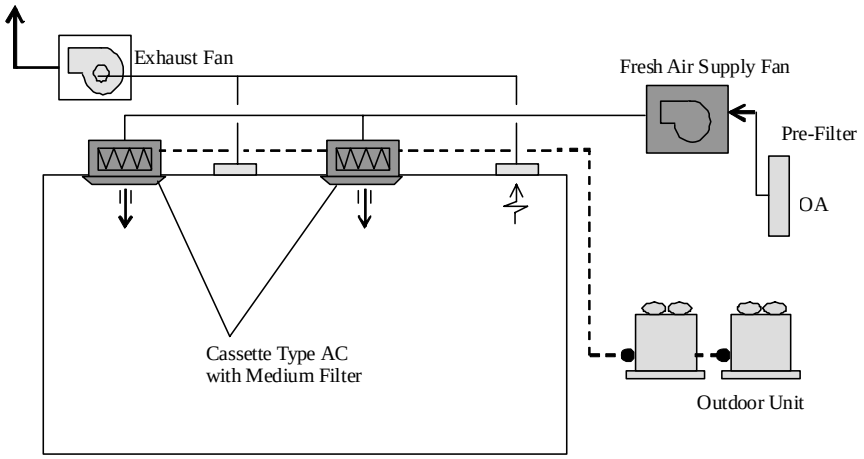


Figure 2-23 Individual Air-Conditioning System for Operation Room and Hall

The table below shows the type of air conditioning for various rooms.

Table 2-28 Rooms and Air-Conditioning System

Room	AC 1)	Room pressure 2)	Filter 3)	Remarks 4)
Operation Room	F	P	M	＊
Miner Operation	C	E	M	＊
Recovery Room	W	E	L	＊
HDU	W	E	L	＊
CSSD(Clean Zone)	W	E	L	
Delivery	W	E	L	＊
X-Ray Room	W	E	L	
Laboratory	W	E	L	
Emergency	W	E	L	＊

Note: 1. Air Conditioner; F: Floor mounted with duct type, C: Ceiling cassette type, W: Wall mounted type (or Ceiling mounted type)
2. Room Pressure; P: Positive, N: Negative, E: Equal
3. Air Filter; H: High efficiency, M: Middle efficiency, L: Low efficiency
4. ＊：Electric Supply by Generator

2-2-2-6 Construction Material Plan

In selecting construction materials, in order not to make sustainable maintenance difficult, materials for which fixtures or replacement parts may be procured, or construction methods are available, in Solomon Islands, or which are simple and practical enough not to take time in maintenance will be selected. Major construction materials and precautions to be taken about them are as explained below.

(1) Exterior Finishing Material

1) Roof

The factor which promotes the most deterioration of buildings in places of copious rainfall is water leaks. To prevent water leaks, the sloped roof of concrete slabs is covered with metal folded plates extensively used locally. A heat insulating material is inserted between the folded plates and the slabs to realize external heat insulation, thereby enhancing the heat insulating effect of the roof, and consequently checking the temperature rise of air masses in the building as well as reducing the load on air conditioning.

2) External wall

To make the maintenance, which is inherently difficult locally because of the difficulty of procurement, more practical, painting which is common locally is adopted to the external wall of the building. Also, from the viewpoint of environmental conservation, glass blocks will be used for places where natural lighting is desired, which should also contribute to crime prevention and facilitating maintenance.

Table 2-29 Exterior Finishing Material and Construction Method

Building element		Existing material and local construction method	Adopted construction method	Rationale for adoption
Exterior	Roof	Sloped roof (folded plate)	Sloped concrete slab roof (asphalt roofing, local roof heat insulating material covered with folded plates)	Maintenance is relatively easy. Concrete slab was adopted as countermeasure against water leaks. The external heat insulation enhances the insulation effect, and consequently reduces the air conditioning load.
			Concrete slab roof (asphalt roofing, rigid polyurethane foam, concrete overlay)	The flat roof is partially adopted to place outdoor facilities. Heap up concrete is necessary to protect the asphalt waterproofing against the ultraviolet rays.
	External wall	Painting	Painting	Maintenance is rather easy, including procurement in the isolated island.
	Ceiling	Exposed: no roof material	Calcium silicate plate	It has good weatherability; therefore, the maintenance is easy. It helps improve security of wiring and piping.
	Fixture	Aluminum door, galvanized steel jalousie window	Aluminum door and window	They are rigid and durable, and water resistant.
			Stainless steel door (main entrance and exit, entrance and exit of the operation room, etc.)	They are durable and easy to clean; therefore, they are used where traffic load is heavy or cleanliness is important.

(2) Interior Finishing Material

1) Floor

The floors of the corridors exposed to outdoor air are finished with non-slip tiles so that people may walk easily even if the floors are a little bit wet. The floors of the rooms separated from outdoor air are finished with the materials listed below depending upon their uses and required performances.

① Outpatient Department, rooms of the Medical Office, toilets: these are areas which are used by patients and staff members who contact patients, floors are finished with tiles easy to clean, easy to keep clean and durable.

② Clean areas of the Operation Department and Delivery Department: these are areas prone to be contaminated, and which require high levels of cleanliness. The floors will be covered by easy-to-clean polyvinyl chloride sheet flooring material, from the viewpoint of preventing nosocomial infection.

2) Interior wall

For general areas, cement mortar substrate is finished by painting. Such portions of the walls of toilets, rooms where wastes are handled, shower rooms and similars where water is used and susceptible to staining of contaminated substances, and walls relatively prone to become dirty are covered with tiles easy to be cleaned by wiping.
The walls of corridors, rooms, projected corners of pillars which stretchers or carts can hit are equipped with a stretcher guard or corner guard, exclusively for protection or serving also as a handrail.
The X-ray room is contained by reinforced concrete wall, or iron or lead materials, that can shield radioactive rays.

3) Ceiling

The ceiling parts of the main entrance and the ceiling which serves as a canopy of the area where emergency vehicles, etc. come are directly exposed to winds. These ceilings will be made of calcium silicate plates which excel in weathering resistance, water resistance, crime prevention of piping and wiring. The corridors and underside of the overhanging eaves that are exposed to outdoor air will be of painted concrete. Those portions which are used by patients and those portions of which protection of wiring and piping is necessary adopt calcium silicate plates that excel in antibacterial property in addition to other merits.
The clean areas of the Operation Department and the Delivery Department use easy-to-clean and easy-to-be-kept-clean calcium silicate plates to which are applied an inorganic paint, because these areas require a high level of cleanliness and are apt to be contaminated.
The Outpatient Department and those areas which patients use adopt the rock wool sound insulation board. Rooms belonging to the Medical Office use less expensive T-bar shaped light steel frame supported system ceilings, which also use rock wool sound insulation board.

4) Fixture, etc.

Aluminum sashes are adopted for external fixtures which are exposed directly to rains and winds, for their weatherability. Durable and easy-to-clean stainless steel doors are used for busy entrances, and the operation room and delivery room doors which are often hit by stretchers or likes.
General fixtures placed indoors are of light steel made. Steel fixtures of enhanced sound insulation and durability are used for the X-ray room and the Machine Room. Further, the X-ray room which requires protection against radioactive rays uses fixtures with lead lining.

Table 2-30 Interior Finishing Material and Construction Method

Building element		Existing material and local construction method	Adopted construction method	Rationale for adoption
Interior	Floor	Porcelain tile, Polyvinyl Chloride tile	Porcelain tile	They are durable and easy to clean.
			Polyvinyl chloride floor sheet	They facilitate cleaning and maintenance of the operation rooms and delivery rooms which require high level of cleanliness.
	Interior wall	Painting, tiles	Painting (various rooms)	These are locally common and easy to maintain.
			Calcium silicate plate	It excels in antibacterial property, and facilitates maintenance of high levels of cleanliness for the operation room, which require highest levels of cleanliness.
			Porcelain tiles (places where water is used)	These are locally common. They facilitate maintenance of the portions on which water droplets fall.
	Ceiling	Rock wool sound insulation board, plaster board	Rock wool sound insulation board	It is locally common and facilitates maintenance.
			Calcium silicate plate	It excels in antibacterial property, and facilitates maintenance of high levels of cleanliness for the operation rooms and delivery rooms, which require high levels of cleanliness.
	Fixture	Wooden door	Light steel door	It excels in operability and is easy to maintain by repainting.
			Steel door	It excels in sound proofing property, and is adopted for Machine Room, etc.

(3) Facility and Equipment for Construction

The usable lives of many of facilities and equipment for construction are usually from 7 to 13 years, shorter than those of construction materials and equipment. Therefore, products of third countries or Japan of quality meeting a certain required level, with demonstrated performances in Solomon Islands, will be procured to the extent possible, so that the Solomon side may smoothly execute maintenance of the facility and equipment after commissioning and transfer to the Solomon side.

2-2-2-7 Equipment Plan

Equipment list and its specifications, and use of the major equipment are shown as follows:

Table 2-31 Equipment list

No.	Equipment name	Qty
1	Outpatient department	
1.1	Consulting room	
1-1	X-ray viewers	5
1-2	Suction machines	2
1-3	Examination lights	2
1-4	Otoscope / Ophthalmoscopes	3
1-5	Operating light	1
1-6	Examination couches	9
1-7	Slit Lamp	1
1.2	Dental clinic	
1-8	Dental chair	1
1-9	Dental instruments	3
1.3	Ward	
1-10	Ward beds, bedside cabinets	56
1-11	Baby cots	8
1-12	Nebulizers	3
1-13	Examination couches	3
2	Physiotherapy	
2-1	Hot pack heater	1
2-2	Examination tables	4
3	CSSD	
3-1	Autoclaves	2
4	X-ray department	
4-1	Mobile X-ray machine	1
4-2	Ultrasound machine	1
4-3	X-ray viewer	1
4-4	Dental X-ray unit	1
5	Laboratory	
5.1	Biochemistry	
5-1	Spectrophotometer	1
5-2	Automatic water distillation unit	1
5.2	Immunology	
5-3	Autoclave for laboratory	1
5.3	Malaria laboratory	
5-4	Electric balance	1
6	Pharmacy	
6-1	Electric balance	1
6-2	Automatic water distillation unit	1
6-3	Refrigerator	1
7	Operating suite/Treatment room	
7-1	Operating room light	1
7-2	Operating light	1
7-3	Operation tables	2
7-4	Anesthesia machine with Ventilator	1
7-5	Suction machine	1
7-6	Bedside monitor	1
7-7	Defibrillator	1
7-8	Hand washing water sterilizer	1
7-9	Electro surgical unit	1
7-10	Instruments for general surgery	1
7-11	Instruments for appendectomy	2
7-12	Instruments for Obstetrics	1
7-13	Gatch Beds	2
8	Critical care (HDU)	
8-1	Suction machine	1
8-2	Bag resuscitators with adult & child masks	2
8-3	Stretcher trolley	1
8-4	Gatch Beds	6
8-5	X-ray viewers	2

No.	Equipment name	Qty
9	Obstetrics	
9.1	Delivery room	
9-1	Pregnancy delivery tables	2
9-2	Vacuum extractor	1
9-3	Operating lights	2
9.2	Labour room	
9-4	Labour beds	3
9-5	Gatch Beds	3
9.3	Nursery	
9-6	Incubators	2
9-7	Phototherapy units	2
9-8	Infant warmers	2
9-9	Bag resuscitators with infant mask	2

No.	Equipment name	Qty
9-10	Small type suction units	2
9-11	Nebulizers	2
9-12	Baby cots	3
9-13	Examination couch	1
10	Emergency	
10-1	Examination couches	2
10-2	Operating light	1
10-3	Suction machine	1
10-4	Emergency instrument	3
10-5	Bag resuscitators with adult & child masks	2
10-6	Gatch Beds	3
11	Maintenance section	
11-1	Maintenance set	1

Table 2-32 Specifications of Major Equipment

No.	Equipment name	Qty	Specifications	Use
1-8	Dental chair	1	-Components : dental chair, compressor, & doctor-chair -Dental chair: electrically adjustable: up & down and back rest -Light source : halogen , ≧15,000 lux	To make a dental treatment.
4-1	Mobile X-ray machine	1	-Type: mobile, inverter -Tube voltage : to cover range of 40 to 125 KV -Tube current:≧160mA	To take an X-ray photo for emergency cases or serious patients who cannot move.
4-2	Ultrasound machine	1	-Mode: Linear, convex -Image mode: B, B/M, M -Depth: ≧ 20cm -Monitor size: ≧9 inches	For diagnosis of abdomen of patients and diagnosis of pregnant women.
7-1	Operating room light	1	-Ceiling type -Twin light(main + minor) -Bulb : Halogen	For light for general operation
7-3	Operation tables	2	-Positioning: Operation by hydraulic foot pump or hydraulic pump and handle -Trendelenburg, Reverse trendelenburg, Lateral tilt, Back section, Leg section, Table top rotation	For general operations in operation theater
7-4	Anesthesia machine with Ventilator	1	-Flow meter: O_2, N_2O, and Air -Vaporizer: Halothane, -Tidal volume: to cover range of 100 to 900 mls -Respiration: to cover range of 6 to 40 times/min.	To keep a patient under general anesthesia for medical operations

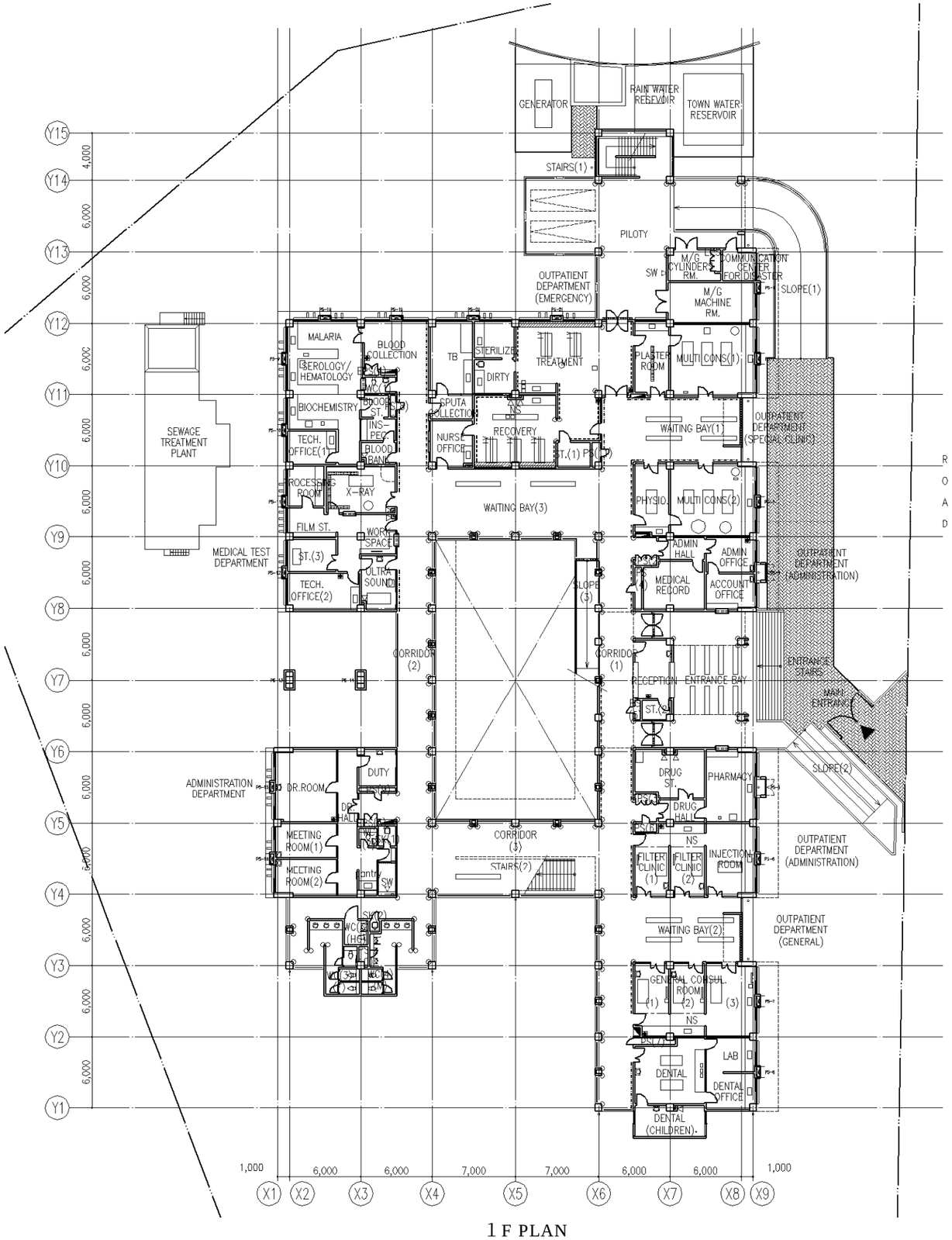
No.	Equipment name	Qty	Specifications	Use
7-6	Bed side monitor	1	-Display: 8 inches -Parameters: ECG, and Respiration -Printer provided	Monitoring of vital signs of patients under medial operations
7-8	Hand washing water sterilizer	1	-Type: 2 sinks or 1 sink for 2 persons -Material : Stainless steel -Flow rate: ≧4 liters/min.	For operators to wash hands prior to operations.
7-9	Electro surgical unit	1	-Function : cutting, coagulation, bipolar -Out put ; Cutting ; 250W approx. : Coagulation ; 120W approx. : Bipolar ; 18W approx. -Electrode, safety device equipped	For incision and coagulation to lessen bleeding in general operations
9-6	Incubators	2	-Type: Manual or manual & servo control -Temperatures : to cover range of 25 to 37 ^{o}C -Skin temperature control : to cover range of 35 to 37 ^{o}C -Oxygen supply system provided	To nurse a premature baby under the environment of proper oxygenation, humidity and temperatures

2-2-3 Basic Design Drawings

Table 2-33 List of Drawings

Drawing		Scale	Page
1	Site Plan	1/600	69
2	1st Floor / 2nd Floor Plan	1/400	71
3	Pit / Roof Plan	1/400	73
4	Elevation / Section	1/400	75

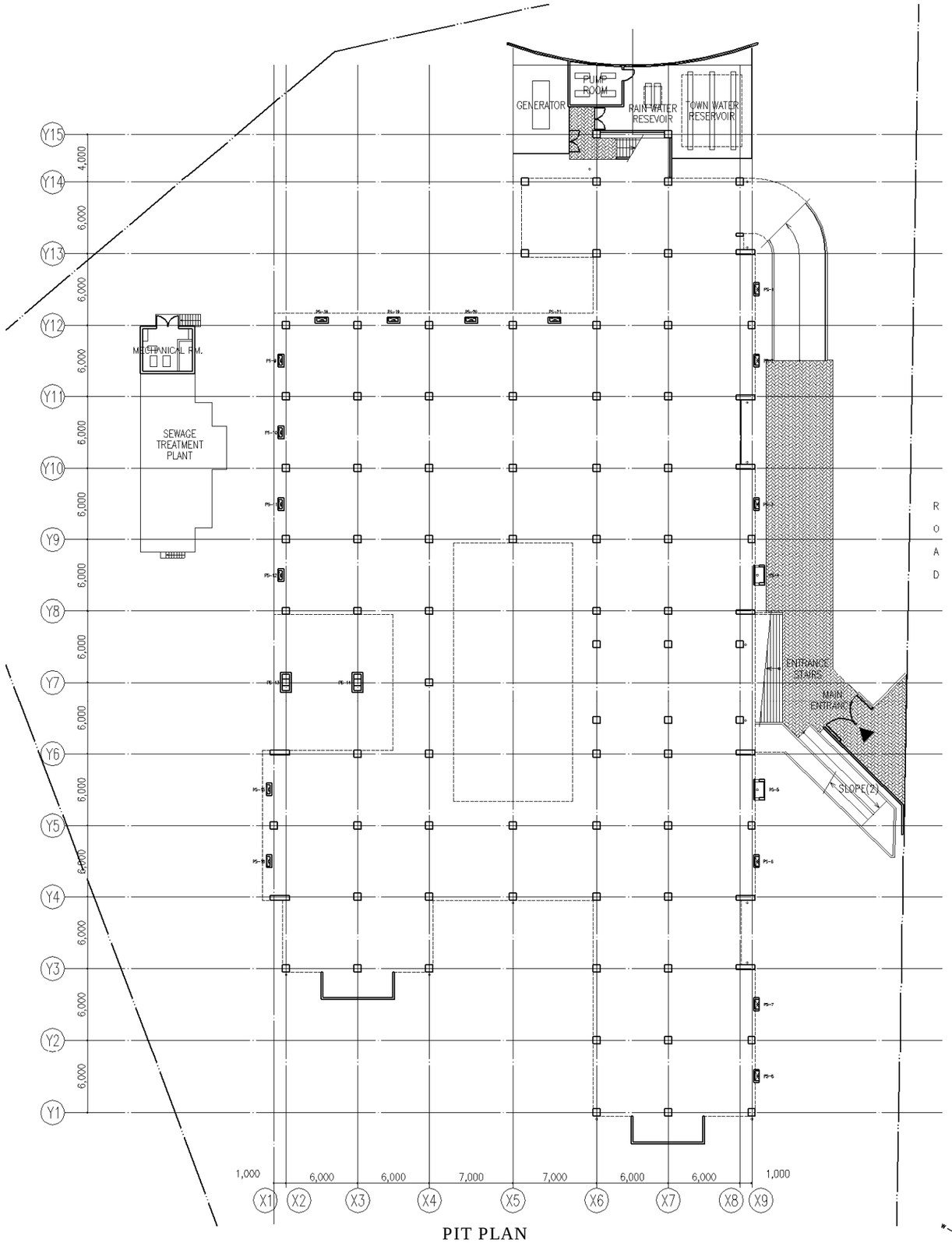
SITE PLAN 1/600



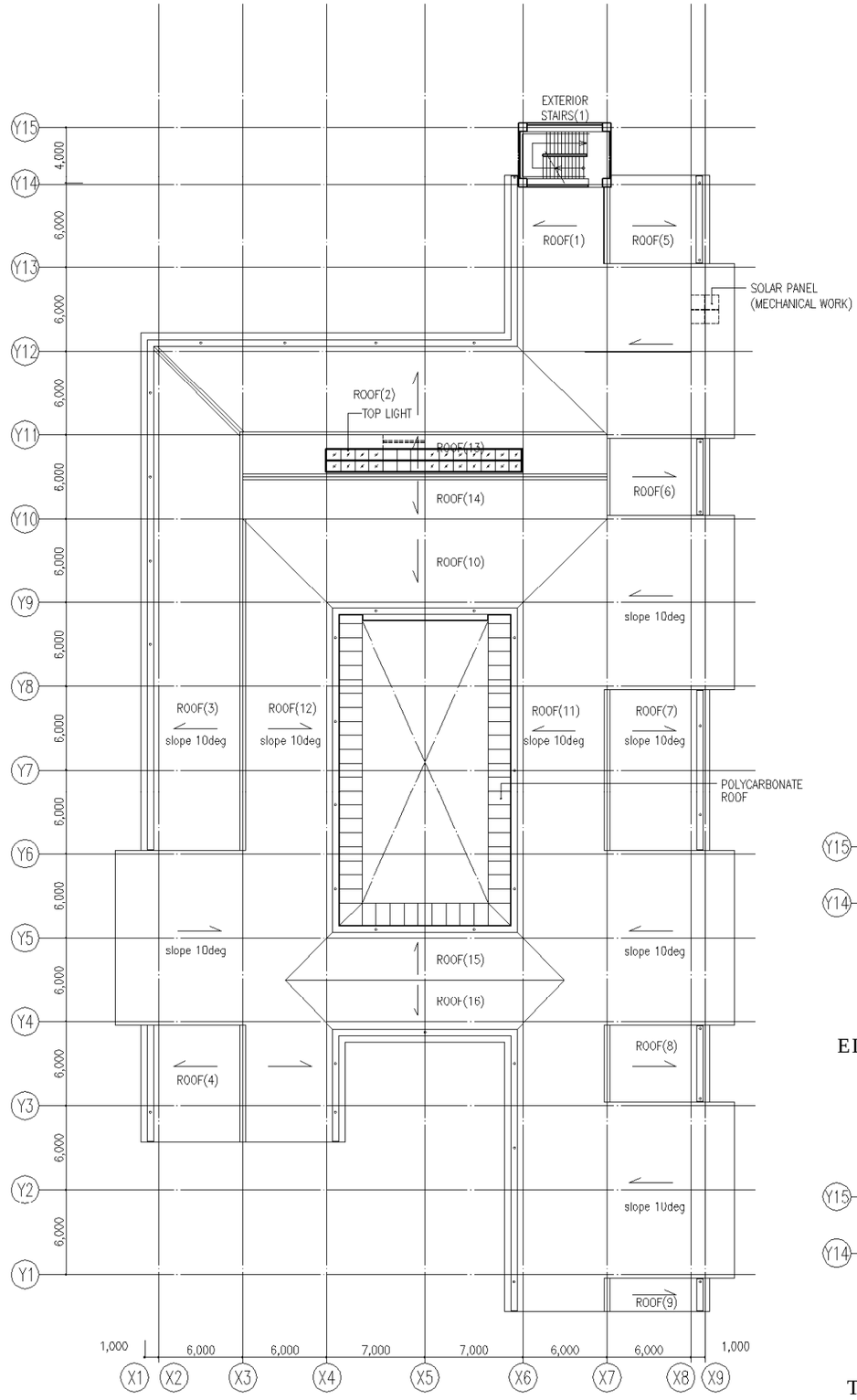
1 F PLAN

2 F PLAN

1 F/2F PLAN 1/400



PIT PLAN

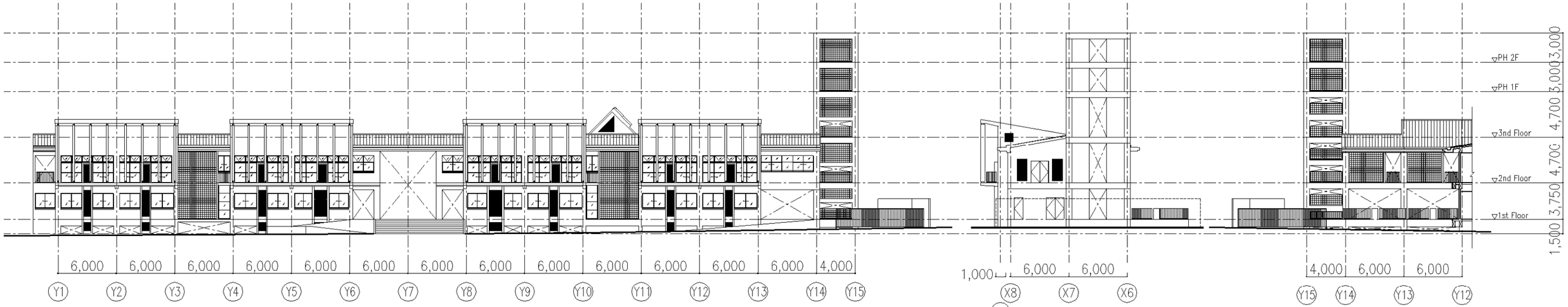


ROOL PLAN

ELEVATED TANK F.

TANK MACHINE F.

PIT/RPPF PLAN 1/400



EAST ELEVATION

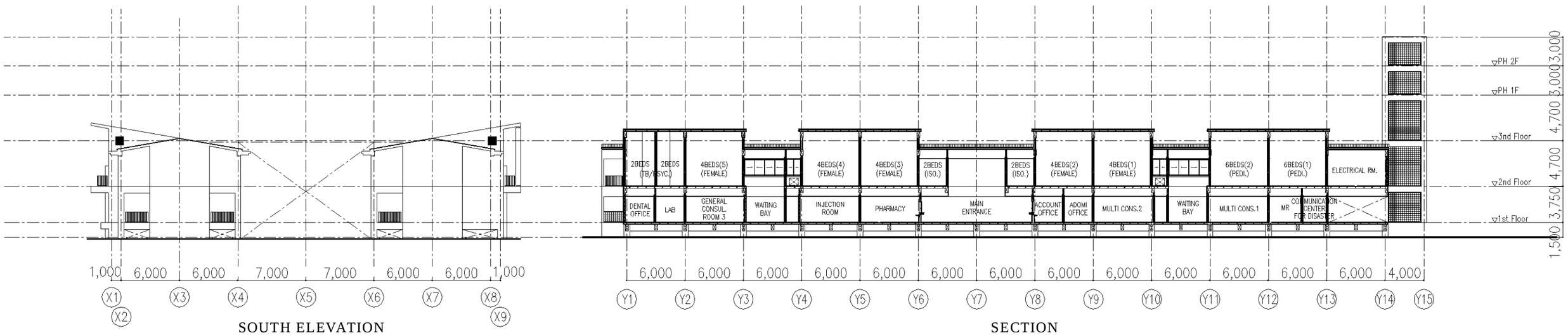
NORTH ELEVATION

WEST ELEVATION

SOUTH ELEVATION

NORTH ELEVATION

WEST ELEVATION



SOUTH ELEVATION

SECTION

ELEVATION/SECTION 1/400

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

(1) Organization for project implementation

This project will be implemented according to the system of Japan's grant aid program; firstly cabinet approval of the government of Japan, and after the exchange of notes (E/N) and the signing of the grant agreement (G/A) on this project have been effected between the government of Solomon Islands and the Japanese side: the government of Japan and JICA.
The responsible agency and the implementing agency of the Solomon side concerning implementation of this project is the Ministry of Health and Medical Services (MHMS). The party of contract of the Solomon side is also MHMS, which will seal the consultant agreement and the construction / equipment contract regarding this project. MHMS will also execute obligations of the Solomon side of this project.

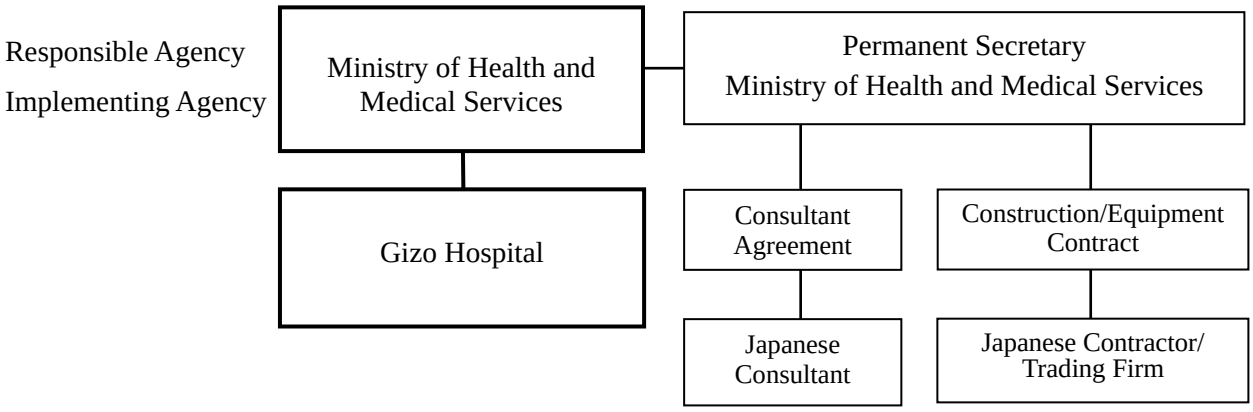


Figure 2-24 Relation among Project Executing Organizations

1) Establishment of a committee for project promotion

The Project Management Committee was established was established participated mainly by the beneficiary areas and subject organizations to smoothly promote this project, with the Premier of the Western Province serving as the chairperson. Also, and the Provincial Secretary is the management head. Other members are persons concerned with the hospital and province's health related persons, infrastructure related persons, and land management related persons.

(2) Exemption of duty and tax

Japan's grant aid program is extended in principle on condition of exemption of duties and taxes. MHMS of Solomon has agreed to take necessary measures to concerned authorities to ensure that Japanese juridical persons, Japanese nationals, construction materials, equipment, etc. related to this project are exempted from various duties and taxes. They impose 10% as customs duty and15 to 19% as whole sales tax on imported goods in Solomon. Procedures for exemption of duties and taxes in Solomon are shown as the figure below. It is compulsory to apply tax exemption to IRDEC, Inland Revenue Division Exemption Committee before exporting goods and material to Solomon. It takes around 2 months to obtain approval of finance minister and then the tax exemption will come into effect officially. The decision of the said committee needs participation of all 24 members and the committee meeting is held almost once a month. It is desirable to obtain the approval before proceeding to customs clearance.

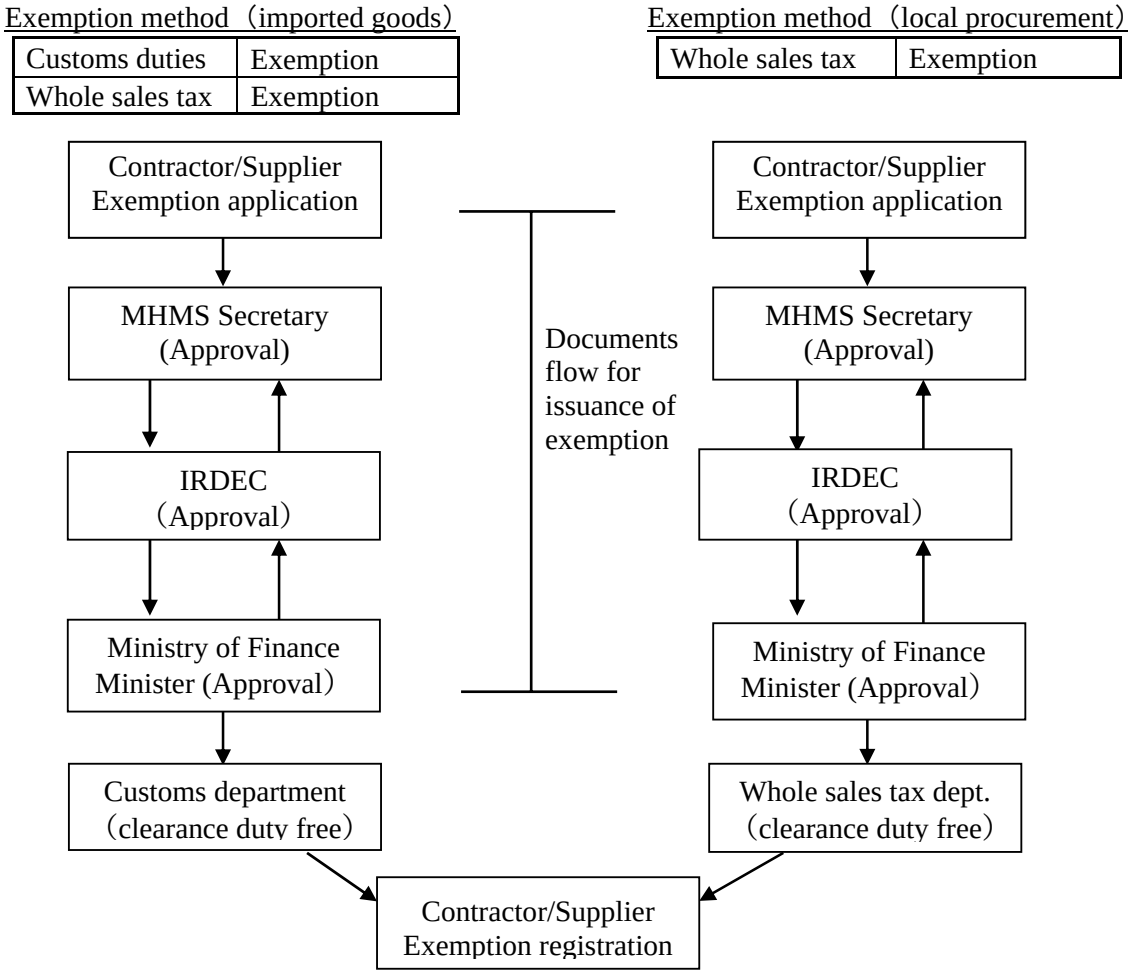


Figure 2-25 Outline of Duty and Tax exemption Procedure

(3) Consultants

After the grant agreement having been effected, MHMS shall seal an agreement (contract) with a consultant, having a status of Japanese juridical person, on development of the detail design and consultant supervision on project implementation. The agreement becomes effective after verification by JICA. In order to promote this project smoothly, it is important that the agreement with the consultant be sealed as quickly as possible after the grant agreement has been effected. The consultant, after the agreement has been sealed, is required to prepare the tender document (detailed design drawings, specification document, etc.) based on this basic design study report, in consultation with MHMS, and to obtain the confirmation of contents of such documents by the Solomon side according to the above-mentioned procedure for approval. The tender work and the consultant supervision will be executed according to the contents of the tender document.

(4) Contract of Construction Work / Facility and Equipment Procurement

The construction work of the requested Japanese assistance consists of the construction work per se in which the facilities are constructed, and facility and equipment procurement work in which medical facilities and equipment are procured, installed and test operated. The eligible candidates for the contractor are limited to Japanese juridical persons meeting certain qualifications. The contractor will be selected by the general competitive bidding with limited qualifications.

MHMS shall seal a contracting contract with each of the contractors for construction and those for procurement duly selected by bidding, and receive verification of the contract document from JICA. Thereafter, the contractors shall begin their respective works without delay, and shall complete their works according to the contract.

(5) Commissioning of Local Consultant

Regarding supervision of construction works, there are only few engineers locally who have been engaged in construction of concrete structures. It is necessary to retain local architectural engineers from within and outside the island other than the Japanese supervisors who are stationed at the site. The requested Japanese assistance concerns a medical facility; therefore, the building construction has higher ratios of works on machine facilities and on electrical facilities than ordinary building construction works. The building also requires a high level of cleanliness; therefore, facility engineers will be employed.

(6) Commissioning of Local Architectural Engineers and Dispatch of Japanese specialists

The state of construction business in Solomon Islands is such that there are only two major construction companies, (with experience in Japan's ODA related work). Construction works there called large-scale work are assistance works of such countries as Australia, Japan or investment projects by foreign capitals. The morale of local labors is not very high. It is difficult to secure human resources of good quality under such a condition. Assistance projects use many expatriate engineers.

The contractor, a Japanese juridical person, is to employ local architectural engineers under the supervision of the Japanese engineers to promote the works. However, it is necessary to employ expatriate architectural engineers to cover the portions which the local architectural engineers cannot, thereby to minutely execute checks on schedule, quality, and safety managements in particular, and technical instructions.

This requested Japanese assistance represents provision of the latest medical facilities and equipment to Solomon Islands. The operation rooms and medical test rooms involve construction works requiring relatively high levels of quality control. Therefore, technical instruction and construction management by Japanese professional specialists of experience in these fields are indispensable. Regarding such special fields as medical equipment, dispatch of professional specialists from Japan or similar countries should be planned.

2-2-4-2 Implementation Conditions

(1) Employment of Expatriate Skilled Labors and Awareness Enhancement of the Local Construction Labors

There are few reinforced concrete buildings in the Gizo Island. The island conceivably has had no experience in constructing a building similar to that of this project. In Honiara, the capital city, in the Guadalcanal Island, the largest island of Solomon Islands, there are large-scale buildings, notably hotels for foreigners, the parliament building, In addition, stationing of the multi-national peace keeping force for maintenance of public order, with Australian Army playing the central role, has promoted development, thereby promoting construction of modern buildings bit by bit. However, the number of such buildings and construction methods are limited.
Lack of experience in construction methods naturally results in lowering of work efficiency. To prevent such inefficiency from becoming reality, and also to prevent the tropical climate from adversely affecting the work, lowering of the work efficiency in particular, about one third of craft workers of various trades will be employed from neighboring foreign countries to work for the construction, in expectation of better schedule control, technology transfer of higher levels, and other merits.
Further, skilled workers (capable of instructing schedule, quality, safety managements in major trades) will be invited from foreign countries to let them instruct the craft workers and labors from the preparatory stage to the initial stage in their respective trades.

(2) Temporary Work Plan

The planned construction site of this requested Japanese Assistance is situated on the opposite side of the existing hospital across the road in Gizo City of the Gizo Island (capital city of the Western Province). The road is not particularly busy (because the population of the city is as small as about 4,000); however, during the morning and evening when the hospital staff members and patients come to or leave the hospital, the road is rather busy. The construction material and people engaged in construction use the same road, which will complicate the traffic. It is therefore necessary to take measures to ensure safety of the hospital staff, patients and visitors who come to see patients. The hoarding of the construction site will be of corrugated galvanized steel sheet to protect third persons from accidents, etc. to secure safety with respect to guarding and security. The temporary construction office, construction shed, construction material stockyard, assembly yard will be placed in the site close to the building site.
Since a sufficient number of labors are not obtainable form Gizo City, or even from the Gizo Island, it is planned to secure labors from outside the island, outside the province or foreign countries. Temporary houses for these labors are necessary. These temporary houses are planned to be sited at the former site of hospital staff residences next to the existing hospital building, and construction of these temporary houses considers measures for crime prevention, environmental landscaping. etc.

(3) Material Procurement

Construction material that may be procured in Gizo City is almost none. Materials for temporary facilities and hospital construction are procured outside the island. Procurement of construction materials in Honiara, the capital city (the Guadalcanal Island), now in construction boom, is not easy. There are a couple of agents dealing in reinforcing bars, fixtures, metal parts, but these agents cannot meet a large-scale construction work. The states of other construction sites seem to indicate that they procure temporary materials and construction materials from abroad as needed (temporary materials being returned after use). This project has to rely on overseas procurement for supply of a large number of materials. Procurement from Australia, one of neighboring countries which is also in construction boom, cannot expect low unit prices. Expanded sources of procurement including Australia, Southeast Asian countries and Japan have been studied. The result of a past survey indicates a number of cases where procurement is done from Japan.

Regardless of whether a material is procured domestically or from overseas, the transportation mode is the marine transportation. Because of the Gizo Island lacking a large port, materials are reembarked on small freight boat at Noro and Honiara where the customs exists. Procurement and transportation to the site must be minutely planned not to adversely affect the construction schedule.

(4) Special Construction Method

In the Gizo Island, there are few reinforced concrete buildings. Here, buildings are mostly one-storied or two-storied wooden ones. There is no ready-mixed concrete plant. Therefore, job-mixed concrete by rotary mixer at the construction site must be used. The concrete pouring method will either be by bucket relay, or by cart, or by crane, depending upon the scale. In this background the amount of concrete to be poured in a day is limited; therefore, the construction schedule must have a sufficient allowance.

In Solomon Islands, as a method for concrete pouring for the building frame, a two-step pouring method whereby concrete is poured to columns beneath the beam level first and thereafter concrete is poured to the beams and slabs is commonly adopted. Local construction companies are skilled in this method but not accustomed to the monolithic pouring common in Japan whereby columns, beams and slabs are poured in an integrated manner. Therefore, this requested Japanese assistance adopts the two-step pouring method.

The anti-termite measure is necessary for materials concerning carpentry works. The anti-termite treatments will be applied to the planes where floors are fixed, and to wooden products. Anti-termite agents are importable to the site but require a permission before use.

(5) Equipment procurement

The consultant should make adjustment to works between equipment supplier and building contractor and provide proper instructions to them since the medical equipment plan includes some items which need preparation works to the new building in such works as fixing anchor bolt to ceiling for an operating light, and laying water supply and drainage for autoclaves. The installation works are expected to proceed so as not to disturb daily activity of the targeted hospital. The project includes transfer of existing equipment to the new hospital, and it is necessary for the consultant to discuss the transfer process and method with the hospital for smooth execution.

2-2-4-3 Scope of Works

Responsibility for various facets of construction is delineated below to ensure smooth cooperation between Japan and Solomon Islands.

Table 2-34 Construction and Installation Responsibility Chart

To be covered by Japanese Side	To be covered by Solomon Side
	To secure and prepare land
	To get building permission
	To clear, level and reclaim the site when needed 1) Dismantle unnecessary structures. 2) Dismantle existing building within the site 3) Relocate existing electrical power cable crossing the site 4) Relocate existing telephone line crossing the site 5) Relocate existing water pipe crossing the site 6) Dismantle existing sewage catch basins and sewage pipe crossing the site
	To construct gates and fences in and around the site
	To construct the parking lot 1) Outside the site
To construct roads 1) Within the site	To construct roads 1) Outside the site
To construct Exterior Work within the site 1) Security Lighting, Planting	To perform Landscaping 1) Landscape and planting (except the inner courts)
To construct the building 1) Architectural Work including fixed furniture, fit up 2) Electrical Work Power Supply, Lighting and Receptacle, Piping for Telephone, Piping for LAN, Public Address, Intercom, Fire Alarm System, Lightning Protection, Grounding 3) Mechanical Work Water Supply, Drainage, Hot Water Supply, Sanitary Fixture, Fire Fighting, Air Conditioning and Ventilation, Rain Water Utilization 4) Other Work Generator, Medical Gas Supply, Sewage Treatment System	
To provide facilities for the distribution of electrical power, water supply, drainage and others 1) Electricity a. Manhole, piping and cabling for electrical power incoming line within the site b. Substation including switchgear and transformer, main distribution board	To provide facilities for the distribution of electricity power, water supply, drainage and others 1) Electricity a. High voltage power supply to new substation and metering devices for the site
2) Water Supply a. Water supply system within the site b. Rain water collection and supply system	2) Water Supply a. City water distribution main to the site
3) Drainage a. Drainage system within the site b. Wastewater facility to the existing Gizo wastewater pumping tank outside the site boundary	3) Drainage a. Drainage pump in town sewer pumping tank b. Waste water discharge to the ocean
4) Telephone system a. Telephone piping and outlets b. Manhole and piping for telephone incoming line in the site	4) Telephone system a. MDF, PABX, cabling and telephones b. Telephone incoming line to the main distribution frame (MDF) for the site
5) Other System a. Generator b. Electrical power supply for HF wireless communication system	5) Other System a. Relocation of antenna, solar panel, battery and cabling for HF wireless communication system
6)Furniture and Equipment a. Curtain Rail b. Project furniture c. Supply and installation of Medical Equipment	6) Furniture and Equipment a. Curtain and Blind b. General furniture c. Removal and installation of existing Equipment

One of important factors essential to smooth promotion of this project is schedule control between various construction works for buildings, electric and mechanical facilities and installation works of facilities and equipment. Persons concerned either with the construction or with the installation should have a good understanding of the conditions and details necessary for installation of medical equipment, and should coordinate their respective schedules.

2-2-4-4 Consultant Supervision

The Japanese consulting firm should conclude a consultancy contract with the Ministry of Health and Medical Services and conduct work related to detailed design (e.g. creation of tender documents), bidding, and construction management of this Cooperation Project.
The purpose of the construction management is to ensure appropriate fulfillment of the contents of the construction contract including the judgment of whether the construction is executed in accordance with the design drawing and specification. The consultant should ensure quality and control the construction schedule during the construction period while giving instructions and advice, and making coordination. This construction management consists of the following work:

(1) Support for Tendering and Contracts

The consultant should conduct work related to tendering; create tender documents which are necessary to determine the contractors of construction and machinery constructions, announce the tender, accept applications for the participation in the tendering, examine the qualifications of the tenderers, hold explanation meetings for tendering, distribute tender documents, accept proposal tender documents, evaluate tendering results, and others. Additionally, they should give advice and support concerning the conclusion of the construction contract between the winning contractors and the Ministry of Health and Medical Services of the Government of Solomon Islands.

(2) Guidance, Advice and Coordination for Contractors

The consultant should examine work execution process, construction planning, construction material procurement plan, machinery procurement/installation schedule, and others, and give instruction and advice to and make coordination with the contractors.

(3) Inspection and Approval of Working and Production Drawings

The consultant should examine execution drawings, manufacture drawings, documents, and others submitted by the contractors and approve them giving necessary instructions.

(4) Confirmation of Construction Materials and Equipment

The consultant should check consistency between the construction materials/machinery which the contractors are going to procure and the construction contract documents, and approve the adoption.

(5) Inspection

The consultant should inspect the construction materials and machinery in the manufacturing plants, observe construction tests, and conduct checks concerning the securing of quality and performance according to need.

(6) Reporting on Progress of Work

The consultant should understand the work execution process and construction site conditions, and report the construction progress to the relevant organizations of both countries.

(7) Completion Inspection and Trial Run

The consultant should inspect the completion and trial run of the building, relevant equipment, and machinery to confirm that the performances described in the construction contract documents are secured and submit the check report to the Ministry of Health and Medical Services.

(8) Consultant Supervision System

The consultant should place a resident supervisor to perform the work described above. They should also dispatch engineers of each specialized field in accordance with the progress in the construction to give necessary consultation, check, instruction, and coordination. At the same time, they should place representative engineers in Japan, too, to have them have technical study and do a lot of liaison work with the local site. In addition, they should report the necessary items concerning the progress in this Cooperation Project, payment procedures, completion/delivery, and others to the Japanese government agencies.

The construction management system is as follows:

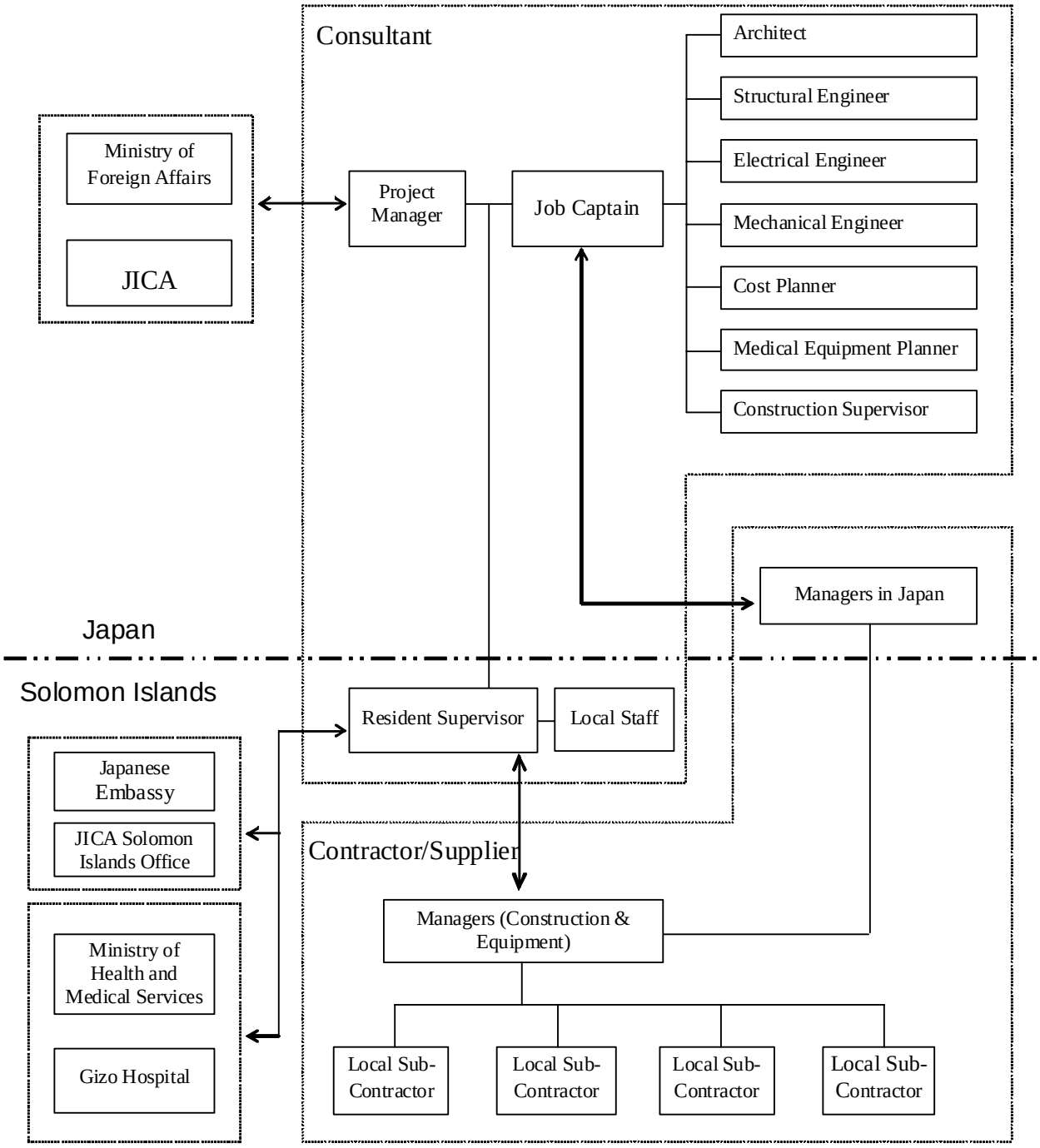


Figure 2-26 Consultant Supervision System

2-2-4-5 Quality Control Plan

(1) Materials used

- Cement

  In Solomon Islands, cement is not produced but imported. In general, portland cement and equivalent is used as the materials.

- Aggregate

  Both quality and quantity of aggregate is insufficient in Solomon Islands. Since a problem in grain size distribution is observed, it cannot be used for high-strength concrete. Fine aggregate to be used should be crushed stone or sand. When sea sand is used, chloride content should be adjusted within the values designated by JASS5. In addition, coarse aggregate should be river gravel or crushed stone, and the maximum dimension should be 20 mm. Concerning aggregate, alkali-silica reactive tests should be conducted as a countermeasure against alkali-aggregate reaction.

- Additives

  In principle, concrete is mixed on site and additives should not be used in Solomon Islands.

- Water

  The water quality should be equivalent to public water supply quality and the recovered water should not be used as a rule.

(2) Mixing schedule

Since there is no ready-mixed concrete plant in the Gizo Island, the materials should be mixed by a rotary mixer on site as a rule. Since weight mixing is used, it is important to manage weight and specific gravity as well as to cure cement and aggregate. It is necessary to secure appropriate mixing time taking local weather conditions and others into consideration.

(3) Concrete placing

Concrete is placed generally by cart or bucket. Judging from the local weather conditions, workability is not good because it has much drying shrinkage and is mixed on site. For this reason, it is necessary to pay careful attention to concrete repletion and plan a placing of solid concrete using a vibrator or other tools. To prevent cracks caused by drying shrinkage, it is important to cure concrete after it is placed.
In Solomon Islands, concrete is generally placed after columns are placed, and beams and floor frameworks are assembled and laid out.

(4) Strength

Most of the buildings in Solomon Islands are two stories or lower and it is said that concrete with strength of about 20 N/mm^2 is used to the structural members. Assuming aggregate conditions and building scale, the strength should be planned with 20 to 30 N/mm^2 specifications (equivalent to JIS standard). The strength control shall be performed when the strength on the 7th day is 0.65 Fc and that on the 28th day is 1.0 Fc.

(5) Quality control of concrete

Solomon has no control method for quality control of concrete, and the method of Japanese Architectural Standard Specification for Reinforced Concrete Work (JASS5) should be incorporated.
Since strength of test specimen and structure after standard curing is different, the quality standard strength should be “specified concrete strength + 3 N/mm^2” in accordance with JASS5. Mix proportioning strength should be set by conducting trial mixing. It should be confirmed that

the strength exceeds quality standard strength from a compressive strength test using test pieces by managing them for 28 days. An X-R control chart should be created during this test.
Since no third-party test institutes exist in the Gizo Island, test facilities should be established in the local site and a water tank which can cure concrete underwater on site in a shaded area should be set up. Compression tests using test specimens should be basically conducted by a third-party institute, and tests should be conducted every placing day and once per 150 m^3. It is estimated that concrete is placed more frequently taking local construction conditions into consideration, hence it would be appropriate that the tests are conducted by a third-party institute at around every 50 m^3.
It should be confirmed that chloride content in fresh concrete is 0.3 kg/m^3 or below during its test using a method commonly used in Japan.

(6) Concept of waterproofing of roofs

General roofs of buildings in Solomon Islands use profiled metal sheets. However, stronger structures are demanded to play a role as a shelter in a time of disaster, hence sloped roof slabs should be placed with concrete. However, construction precision at a position which is not used widely in the local site can be insufficient, hence reliability of waterproof performance should be strengthened by placing commonly used profiled metal sheets on it. At the same time, by adopting heat insulators mainly consisting of aluminum foil and hemp which are commonly used for metal roofs in the local site, it will be an external insulation system when seen from concrete slabs, which can improve heat insulation properties and reduce energy burdens as an environmental measure. Moreover, external insulation can suppress increase in the temperature of concrete which constructs building frames and improve durability of concrete.

2-2-4-6 Procurement Plan

(1) Procurement of construction materials and equipment

Since the purpose of this Cooperation Project is to build hospital facilities, robust materials and equipment which keep clean and are easy to clean should be selected when procuring them to comply with the applications of the facilities. The standard of the materials and equipment should comply with Australian standards (Building Code of Australia and Standards Australia: AS) which are commonly adopted in the local site, and for those that don't have any standard, appropriate ones should be selected in accordance with JIS. The procurement policy is as follows:

1) Local procurement

It is preferable to locally procure materials and equipment to be used, but this is difficult due to the situation in the country (most of the supplies are dependent on imports). However, to make repair works and maintenance after the completion of the facilities easier, materials and equipment to be used should be versatile as much as possible. When selecting them, check their quality level and the procurement quantity so that they won't exert a negative influence on the construction schedule.

The Gizo Town (Gizo Island), a site to build the facilities, is located about 400 km northwest of Honiara City (Guadalcanal Island), the capital of Solomon Islands. A delay in materials and equipment will affect the construction schedule greatly, hence careful attention should be paid to their procurement. Further considerations are necessary to materials procured from abroad.

Concerning the nonuse of materials mixed with asbestos, they are imported from member countries of ISO, hence no materials mixed with asbestos are not used. It is possible to collect MSDS (Material Safety Data Sheet).

2) Imported procurement

Since it is estimated to be difficult to procure most of the construction materials and equipment locally, they should be imported from Japan or third-party countries (e.g. Australia, Southeast Asia). In this case, the contractors need to take smooth procedures for import and customs clearance keeping in touch with the Ministry of Health and Medical Services.

Solomon Islands' major trading port is Honiara Port, but it takes 3.5 days to load and unload goods between Honiara and Gizo. If freight can be brought together, Noro can be used as the arrival port via Honiara. It takes about three hours between Noro and Gizo. A container vessel travels between Japan and Honiara once a month, and it takes about one month. The transportation between Australia and Gizo goes through Papua New Guinea and Noro, and it takes about three weeks.

3) Transportation plan

The Gizo Island has its own trunk road from Gizo Port to the site to build the facilities though it is unpaved, and the distance is about 300 m. The road surface condition is not good, but this would not cause a problem for the transportation for its short distance.

Functions of some materials/machinery may deteriorate due to shocks, humidity, and high temperatures, hence a packing method which makes them endure long-term transportation should be adopted.

The number of days required for the import is affected by circumstances of the suppliers, hence it must be noted sufficiently that it cannot be fixed, like "about one month to two months."

4) Procurement Plan

Based on above background conditions, major construction materials and equipment are selected shown as Table 2-35, broken down into local procurement, procurement from Japan and procurement from third countries, and reasons for selecting the procurement source.

Table 2-35 Procurement Plan for Major Construction Materials and Equipment

Type of work	Material and equipment	Procurement			Remark
		Local	Japan	Third country	
Reinforced concrete work	Portland cement	○			Local products are satisfactory.
	Fine aggregate	○			Crushed sand, pit sand is in general use.
	Coarse aggregate	○			Crushed stones are in general use.
	Deformed bar	○	○		Procured locally or in Japan depending on the cost.
	Form	○			Local products are satisfactory.
Steel work	Steel frame (small and ordinary steel members)	○			No local product. Local procurement of Australian manufacture except large size.
Masonry	Pre-cast window sill, Precast parapet flashing	○			Manufacturable with available local material.
	Concrete block	○			Local products are satisfactory.
	brick	○			Local products are satisfactory.
Waterproofing work	RC eave gutter, Polyurethane liquid-applied membrane water proofing	○			No local product. Local procurement of import manufacture.
	Epoxy liquid-applied membrane water proofing w/glass fiber reinforcement	○			No local product. Local procurement of import manufacture.
	Polysulfide sealing around joinery jambs		○		Not available in local market.
	Silicon sealing material (for pane and sash peripheral sealing)	○			No local product. Local procurement of import manufacture.
Plastering work	Cement mortar	○			Local products are satisfactory.
Tile work	Homogeneous ceramic tiles (295 × 295, 195 × 195, 95 × 95)	○			No local product. Local procurement of imported manufacture
Masonry and stone surfacing work	Stone material			○ THI	Procured in Thailand to ensure cost and quality.
Carpentry	Wood for fittings	○			Local products are satisfactory.
Roofing work	Steel folded plate	○			Local products are satisfactory.
Metal work	Light-weight ceiling substrate (T bar)	○			No local product. Local procurement of import manufacture.
	Light-weight ceiling substrate (double tier)		○		Procured in Japan to ensure cost and quality.
	Decorated metalware, handrail	○			Manufacturable with available local material.
	Curtain rails for ward, roof drain, etc.		○		Procured in Japan to ensure cost and quality.
Metal fixture work	Aluminum fixtures			○ THI	Procured in Thailand to ensure cost and quality.
	Steel fixture (airtight)			○ THI	Procured in Thailand to ensure cost and quality.
	X-ray shielding door, window		○		Procured in Japan to ensure cost, quality, and insurance.
	Metal parts for fixture	○			Local products are satisfactory.
Glass work	Ordinary sheet glass, 5mm	○			Local products are satisfactory.

Type of work	Material and equipment	Procurement			Remark
		Local	Japan	Third country	
Paining work	Interior painting	○			Local products are satisfactory.
	Exterior painting	○			Local products are satisfactory.
Interior finish work	Plaster board	○			No local product. Local procurement of import manufacture.
Finishing unit work	Sink	○			Local products are satisfactory.
	Wooden furniture	○			Local products are satisfactory.
	Doorplate, guide plate, etc., building plaque	○			Local products are satisfactory.
Exterior work	Curb	○			Local products are satisfactory.
	Galvanized grating	○			Local products are satisfactory.
Machine facility, installation	Air conditioner		○		No local product. Procured in Japan to ensure cost and quality.
	Ventilation fan		○		No local product. Procured in Japan to ensure cost and quality.
	Air intake and outlet		○		No local product. Procured in Japan to ensure cost and quality.
	Duct material			○ NZL	No local product. Procured in New Zealand due to cost. The quality to be checked.
	Refrigerant pipe, drain pipe		○		No local product. Procured in Japan to ensure cost and quality.
	Air filter		○		No local product. Procured in Japan to ensure cost and quality.
	Pump		○		No local product. Procured in Japan to ensure cost and quality.
	Sanitary ware			○ NZL	No local product. Procured in New Zealand due to cost. The quality to be checked.
	FRP panel tank		○		No local product. Procured in Japan to ensure cost and quality.
	Hot water solar panel			○ NZL	No local product. Procured in New Zealand due to cost. The quality to be checked.
	Electric water heater			○ NZL	No local product. Procured in New Zealand due to cost. The quality to be checked.
	Piping material		○		No local product. Procured in Japan to ensure cost and quality.
	Thermal insulating material			○ NZL	No local product. Procured in New Zealand due to cost. The quality to be checked.
	Fire protection equipment			○ NZL	No local product. Procured in New Zealand due to cost. The quality to be checked.
	Automatic control equipment		○		No local product. Procured in Japan to ensure cost and quality.
	Sewage treatment plant		○		No local product. Procured in Japan to ensure cost and quality.
	Medical gas facility		○		No local product. Procured in Japan to ensure cost and quality.

Type of work	Material and equipment	Procurement			Remark
		Local	Japan	Third country	
Electric facility work	Substation		○		No local product. Procured in Japan to ensure cost and quality.
	Transformer		○		No local product. Procured in Japan to ensure cost and quality.
	Emergency generator		○		No local product. Procured in Japan to ensure cost and quality.
	Distribution boards		○		No local product. Procured in Japan to ensure cost and quality.
	Cabling pipe		○		No local product. Procured in Japan to ensure cost and quality.
	Cable		○		No local product. Procured in Japan to ensure cost and quality.
	Lighting fixture		○	○ NZL	No local product. Procured in Japan or New Zealand depending on properties.
	Wiring device		○	○ NZL	No local product. Procured in Japan or New Zealand depending on properties.
	Public address system		○		No local product. Procured in Japan to ensure cost and quality.
	Interphone system		○		No local product. Procured in Japan to ensure cost and quality.
	Fire alarm system		○		No local product. Procured in Japan to ensure cost and quality.
	Lighting protection		○		No local product. Procured in Japan to ensure cost and quality.

Third country procurement

THI: Thailand NZL: New Zealand

(2) Procurement of Medical Equipment

Solomon islands depend upon importation from abroad in medical equipment procurement as it is not produced in the country. The medical equipment of this project will be procured from Japan as a rule, because majority of the equipment are basic and of easy maintenance. However, the procurement of the third country product is also considered considering after-sales services by agents of manufacturers should be available for operation related items and X-ray items and so on, and limitation of procurement to Japanese products would hinder proper competition to secure fairness in tendering. Moreover, procurement from the neighbouring countries should be acceptable for such items as beds, which cost very much transportation fee.

The procurement equipment plan is shown as below:

Table 2-36 Origin of medical equipment procurement

Equipment	Procurement country		
	Solomon	Japan	Third countries
Anesthetic machine with ventilator, bedside monitor, defibrillator, mobile X-ray machine Beds and so on.	–	✔	✔
Slit lump, dental chair, autoclave, spectrophotometer, automatic water distillation unit, electric balance, operating light, operating table, hand washing water sterilizer, Instruments for general surgery, incubator, phototherapy unit, infant warmer and so on.	–	✔	–

2-2-4-7 Soft Component (Technical Assistance) Plan

(1) Background of Soft Component Planning

The health sector of Solomon Islands has set the goal of strengthening the healthcare service system in the National Health Strategic Plan 2008 to 2010 and in Solomon Islands National Health Review Report (MOH/JTA International 2006), it has placed priority on reconstruction of Gizo Hospital granted its favors to west district of Solomon Islands in the improvement of medical infrastructure. This project is to implement the reconstruction of the facilities and the improvement of equipment in order to improve the medical service in Gizo Hospital. It is planed to reconstruct the 2nd medical facilities and to provide of medical equipment required in this component of construction of facilities and procurement of equipment.

The investigation team has, through its local investigation from September 28 to October 28, 2007, explained the importance of continuance of the effectiveness arising from this component of construction of facilities and procurement of equipment and the necessity of long-lasting certain-level maintenance to sustain the effectiveness for this purpose. Ministry of Health and Medical Services (MHMS) has, after recognized the following problems in the present state of the management and the maintenance, from the perspective of self-sustaining development, seeked the assistance from Japan regarding the operation and maintenance of the facilities and the equipment.

[Present State and Problems Regarding Operation and Maintenance]

1) Operational Problems

Existing structure of maintenance of the hospital consisted of the Secretary of Hospital and a total of 7 staff comprising 3 carpenters, 1 plumber, 1 motorboat/motorcycle mechanic and 1 incinerator operator, and its main purpose is the maintenance of the facilities. In maintenance workroom, there are simple tools and they are performing the repairs of carrier boat for emergency cases etc., cars and the facilities including simple equipment such as pumps and plumbing. As for the repairs of electric wiring and others, it requests for electricians of the state government.

As for complicated repairs, e.g. equipment such as air-conditioner or medical equipment, the general manager of hospital is to request the repairs for the person in charge of Maintenance Department of National Referral Hospital (NRH), which bears the function of maintenance in the Ministry of Health and Medical Services, and it will enjoy the routine service of maintenance from the agencies of the equipment in New Zealand or in Solomon Islands. However, it seems this system does not function well, since the faulty equipment are left unattended in present circumstances. Hence, not only the medical service has decreased because of the failures of the medical equipment but there are elements of danger of in-hospital infections in Operating Rooms or the Tuberculosis Bacteria Laboratory because of the failures of air-conditioners and ventilating apparatuses.

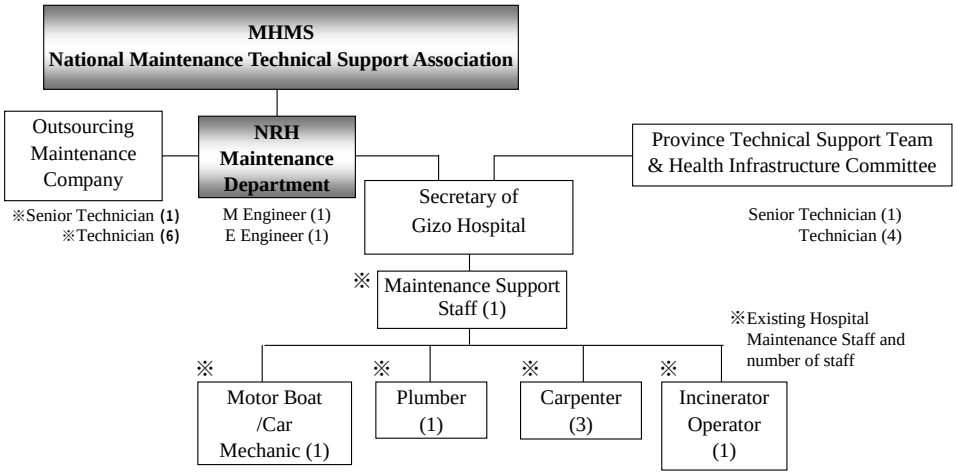


Figure 2-27 Current Maintenance Organization of Gizo Hospital

When the completion of the new hospital, it is planned to introduce new equipment and systems in order to provide necessary medical services. For maintaining sustainably the facility functions including these of existing systems, it is considerable that of considerable importance are; rethinking and improvement in technical abilities of each staff persons, strengthening the cooperation in the functions between the Secretary of Hospital and the person in charge of Medical Department of National Referral Hospital (NRH), employment of mechanic technicians and electric technicians in Gizo Hospital, utilization of tools complementing the maintenance activities having preventive maintenance in mind and preparation of annual budget and a maintenance plan ensuring thereof.

2) Technical Problems (Drainage Processing）

As for processing of medical drainage and general drainage, although there is a maintenance staff person of plumber, there is no operational manual for maintenance now. And further, since the pump of existing purifier tank has broken down, untreated drainage is discharged to ocean and the environment degradation is concerned.
To complete the new hospital, in order to install the new purifier tank complying with the environmental requirements of Solomon Islands, the technical support regarding the drainage processing system from the person responsible is required.

3) Technical Problems (Processing of Hospital Waste)

As for the processing of medical wastes, although a maintenance staff person of incinerator operator is collecting the wastes, separate collection is not sufficiently performed because of deficient knowledge of waste collection and medical wastes are left untreated in the backyard of the hospital site, despite of a medical incinerator is installed. There is the operational manual for incinerator in National Referral Hospital, but there is nothing in Gizo Hospital.
Upon the completion of the new hospital, since the improvement of medical service is prospected, the medical wastes will increase and further deteriorations of in-house infection and environment pollution are concerned.
Technical support regarding collecting and treating system of medical wastes in hospitals based on the waste segregation method recommended by WHO (color coding) to the persons in charge is required.

(2) Objectives of Soft Component

For the medium-term objective, there is nothing other than continuing the direct effect listing in the following section, and to achieve this objective, Ministry of Health and Medical Services is required to sustain the maintenance system and to perform the maintenance developmentally through its independent efforts after the completion of this Project.

Because of newly employed mechanic and electric technicians in Gizo Hospital, chain of support for maintenance (Figure 2-28) shall be clear through strengthening the cooperation between Gizo Hospital and National Referral Hospital (NRH). Maintenance System shall be established, and small troubles can be solved by the staff in Gizo Hospital. (Objective of this Project)

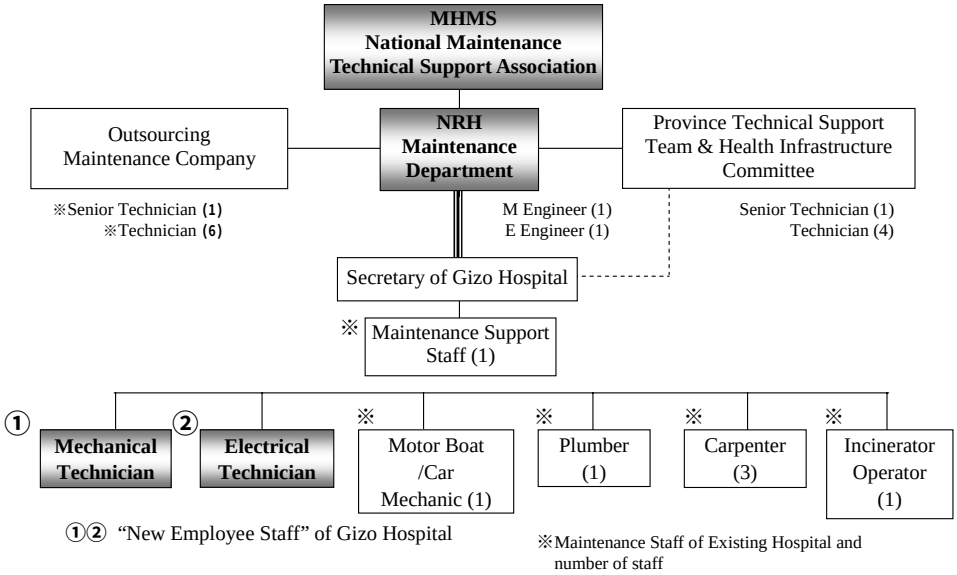


Figure 2-28 Maintenance Organization of Gizo Hospital (After Completion of Soft Component)

(3) Accomplishments of Soft-Component (Direct Effect)

The accomplishments to be achieved at the completion of soft-component are described in the following table.

Table 2-37 Direct Effect of Soft-Component

Contents of Technical Assistance	Direct Effects
Education on sustaining maintenance system	・Each staff person recognizes the importance of strengthening the maintenance system.
Formation of sustaining maintenance system	・By providing a flow of maintenance system, exchange for backup supplies, maintenance and renewal become smoothen in the case of failures of facilities and medical equipment. ・The cooperation between Gizo Hospital and National Referral Hospital (NRH) has been strengthened. ・Small equipment troubles can be solved by the staff in Gizo Hospital.
Preparation of tools for sustaining maintenance system	・By preparing the tools complementing the maintenance activities having preventive maintenance in mind, numbers of consumable goods and backup supplies required in next fiscal year and conditions of each facilities and medical equipment will be grasped. This makes enable to perform the periodic checkouts and act promptly in case of failures. ・By preparing the annual maintenance plan, budgeting becomes possible to enable smooth maintenance and renewal.

Contents of Technical Assistance	Direct Effects
Technical assistance for drainage processing system	・Elevate awareness of in-house infection and environment deterioration from drainage processing among maintenance and medical service staff to deal infected drainage properly.
Technical assistance for collecting and treating system of medical waste	・Elevate awareness of in-house infection and environment deterioration from waste processing among maintenance and medical service staff to ensure the separate collection and processing of infectious wastes.

(4) Method for Confirming the Degrees of Achievement

Items for confirmation of degrees of achievements that should be accomplished at the completion of Soft-Component are indicated are described in the following table.

Table 2-38 Method for Confirming the Degrees of Achievement

Items	Confirmatory Method
Education on sustaining maintenance system	・Elevation of awareness and establishment of the following techniques has confirmed.
Formation of sustaining maintenance system	・Flow of maintenance system has been made. ・The cooperation in functions between Gizo Hospital and the person in charge of Maintenance Department of National Referral Hospital has been strengthened. ・Mechanic technicians and electric technicians are employed for Gizo Hospital.
Preparation of tools for sustaining maintenance system	・Ledger of facilities and equipment has been prepared. ・Maintenance record has been prepared. ・Annual maintenance plan has been prepared. ・Budget planning for maintenance of next year has been prepared.
Technical assistance for drainage processing system	・Drainage processing manual has been prepared. ・Drainage has met the standards of Solomon Islands.
Technical assistance for collecting and treating system of medical waste	・Integrated manual of maintenance from the perspective of separate collection and treatment of medical wastes has been prepared based on the incinerator operation manual of National Referral Hospital.

(5) Activities of Soft Component (Input Plan)

Table 2-39 Activity of the Soft Component

Items	Content of Activities	Target Dept.	Deliverables	
			Japan	Solomon
Strengthening on sustaining maintenance system	・Hold workshops with administrations and maintenance department separately for educating the importance of maintenance in view of sustaining medical services, ambient surroundings and in-house infection. [technical level] Technical level higher than technologists and technicians is required. The person in charge of administrative department is up to the mark. As for maintenance department, the General Manager of Gizo Hospital and the person in charge of Maintenance Department of NRH are up to the mark. However, technician-level person is required for Maintenance Department of Gizo Hospital.	MHMS Health Service Bureau in Western State the Director of Gizo Hospital the General Manager of Gizo Hospital Maintenance Department of NRH Maintenance Department of Gizo Hospital	Guidance for Maintenance	-

Items	Content of Activities	Target Dept.	Deliverables	
			Japan	Solomon
Formation of sustaining maintenance system	・Introduce the maintenance system in Japan and prepare the outline of maintenance system draft and skeleton workflow. ・Confirm the cooperation strengthening system between Maintenance Department of NRH which bears the function of maintenance in MHMS and Gizo Hospital ・Hold workshops with physician and nurses of the Hospital and prepare the maintenance request format. [technical level] Technical level higher than technologists and technicians is required. Physicians and nurses of departments of Gizo Hospital are up to the marks. As for Maintenance Department, the General Manager of Gizo Hospital and the person in charge of Maintenance Department of NRH are up to the marks. However, technician-level person is required for Maintenance Department of Gizo Hospital.	Each Dept. of Gizo Hospital General Manager of Gizo Hospital Maintenance Department of NRH Maintenance Department of Gizo Hospital	Maintenance flow in Japan	・Plan of maintenance work
Preparation of tools for sustaining maintenance system	・Hold workshops to introduce the ledger of facilities and equipment and maintenance records and prepare the tools for maintenance system as practical training. ・Instruct the annual maintenance plan and prepare the budget planning for maintenance of next year. ・Instruct how to order the spare parts and how to control the inventory. [technical level] Technical level higher than technologists and technicians is required. Maintenance Department of Gizo Hospital is up to the mark. As for Maintenance Department, General Manager of Gizo Hospital and the person in charge of the Maintenance Department of NRH are up to the marks. However, technician-level person is required for Maintenance Department of Gizo Hospital.	General Manager of Gizo Hospital Maintenance Department of NRH Maintenance Department of Gizo Hospital Maintenance Department Accounting Department of Gizo Hospital	Tools for maintenance systems in Japan	・Ledger of facilities and equipment ・Maintenance record ・Annual maintenance plan ・Budget plan for maintenance of next year
Technical assistance for drainage processing system	・Hold workshops separately with other departments of the hospitals as users and maintenance departments to hold workshops for educating the importance of maintenance of drainage processing system in view of ambient surroundings and in-house infection. ・Establish and instruct the operational system of wastewater treatment tank and disinfection dank. [technical level] Technical level higher than technologists and technicians is required. Physicians and nurses of each department of Gizo Hospital are up to the marks. As for Maintenance Department, the General Manager of Gizo Hospital and the person in charge of Maintenance Department of NRH are up to the marks. However, technician-level person is required for Maintenance Department of Gizo Hospital.	Each Dept. of Gizo Hospital General Manager of Gizo Hospital Maintenance Department of NRH Maintenance Department of Gizo Hospital	・Drainage processing manual in Japan	・Drainage processing plan ・Purifier tank operation plan

Items	Content of Activities	Target Dept.	Deliverables	
			Japan	Solomon
Technical assistance for collecting and treating system of medical waste	・Split the other departments of the hospitals as users and maintenance departments to hold workshops for emphasizing the importance of maintenance of collecting and processing system of medical wastes in view of ambient surroundings and in-house infection. ・Choose the route of waste collection and establish and instruct the waste segregation (color coding) system based on the incinerator operation manual used in National Referral Hospital. [technical level] Same as above	Each Dept. of Gizo Hospital General Manager of Gizo Hospital Maintenance Department of NRH Maintenance Department of Gizo Hospital	・Medical wastes processing manual in Japan	・Collecting and processing plan for medical wastes ・Incinerator operation plan

(6) Method for procuring the implement resources of Soft-Component

This Soft-Component shall be the direct supporting type. There are no local consultants specialized in the maintenance of facilities and equipment or maintenance companies of facilities and equipment.

(7) Implementing Schedule of Soft-Component

The consultants who conducts assistance are, in first, to settle the contents of assistances and cooperation and set the overall schedule based on the agreement with Ministry of Health and Medical Services, Maintenance Department of National Referral Hospital, Healthcare Service Bureau in Western State and authorized people of Gizo Hospital. And thereafter they are to implement the technical assistances sequentially while evaluating the input and their results. The following are supposed overall flow.

1) Advance Preparation in Japan

In Japan, we will create a guidance document on maintenance for strengthening and further prepare explanatory materials, formats and workflows, etc. regarding maintenance system for supposed facilities and equipment, drainage processing system, collecting and processing system for medical wastes to indicate as examples at first workshop.

2) First On-Site Assistance

While educating the importance of maintenance from the point of view of sustainable medical services, ambient surroundings and in-house infections by holding workshops, we will dig up of the problems regarding the maintenance service in the present state and confirm the strengthening of cooperation between Gizo Hospital and National Referral Hospital (NRH) and instruct the creation of draft of input plan. Further, in order to grasp an appropriate perception of the quantity of work required for all process, introduce specific maintenance system flows and tools for maintenance systems used in Japan, etc. and instruct how to make the maintenance system flow, the ledger of facilities and equipment and format for maintenance records for existing hospitals through workshops. These tools to be made are for starting operations before the next assistance.
For conducting the education and assistance described above, we will dispatch an overall manager, who also takes maintenance technician for 9 days.

3) Second On-Site Assistance

Confirm the operation status of maintenance system flow, the ledger of facilities and equipment and maintenance records which are created on first on-site assistance and confirm the learning level of education of each person.
In this stage, the selection of facilities (such as air-conditioners, medical gas, drainage processing, power receiving, dynamos, and light electric appliance) and medical equipment intended in this Project has finished and a part of them have already installed on the site. On

that account, we will instruct how to create the annual maintenance plan and specific tools such as the ledger of equipment for the new hospital. Further, we will create the system operation plan for current drainage processing facility and incinerator and instruct how to create the countermeasure manual for in-hospital and out-hospital infections. As for the tools that is not able to be created in assistance period, continue the creations by technicians of the hospital after the assistant has returned home.
For conducting the education and assistance described above, we will dispatch an overall manager, who also takes maintenance technician for 15 days and a technician for maintenance of medical equipment and medical wastes for 12 days.

4) Works in Japan

We will combine results from the first and second technical assistance and carry out an adjustment for assistance content or flowcharts and their formats necessary for the last time. At this point, we will coordinate across the maintenance system and facilities and equipment to be installed.

5) Third On-Site Assistance

While conducting final confirmation and amendment for plans, tools and manuals created by second on-site assistance, we will instruct the creation of the final version of maintenance plan for new facilities and equipment according to the final assistance content prepared through the works in Japan. In addition, we will conduct the final technical assistance while confirming the facilities and equipment already installed in the new hospital in practice. Especially, we will assist the creation of annual maintenance plan, annual budget plan for maintenance and spare parts control plan and finalize the maintenance plan.
For conducting the education and assistance described above, we will dispatch an overall manager, who also takes maintenance technician and a technician for facility maintenance and a technician for maintenance of medical equipment and medical wastes for 9 days per head.

6) Works in Japan

We will combine results from the first, second and third technical assistances etc. and prepare a final written report.

We will dispatch following technicians as Japanese consultants to engage in technology transfer toward the hospital.

1. Overall manager, who also takes maintenance technician (1):
   deal with air-conditioning equipment, sanitary accommodations and special facilities
2. Technicians for facility maintenance (2):
   deal with power receiving equipment and dynamos
3. Technician for maintenance of medical equipment and medical wastes :
   deal with collecting system for equipment and medical wastes

Upon conducting the on-site technical assistances, we will make the hospital appoint a local technician having computer knowledge to serve as a mediator between Japanese consultants and maintenance staff of Gizo Hospital (including Maintenance Department of NRH) for assisting the technology transfer. By strengthening the cooperation between Gizo Hospital and Maintenance Department of National Referral Hospital (NRH) and further, the national-level reorganization of maintenance structure will realize more reliable and efficient technology transfer by allowing ongoing assistance during a certain period after Japanese consultants have returned home from the scene.

(8) Deliverables of Soft-Component

Table 2-40 Deliverables of Soft-Component

Items	Deliverables
Education on sustaining maintenance system	・Maintenance guidance
Formation of sustaining maintenance system	・Maintenance work Plan
Preparation of tools for sustaining maintenance system	・Ledger of facilities and equipment ・Maintenance records ・Annual maintenance plan ・Budget plan for maintenance
Technical assistance for drainage processing system	・Drainage processing plan ・Purifier tank operation plan
Technical assistance for collecting and treating system of medical waste	・Collecting and processing plan for medical wastes ・Incinerator operation plan

(9) Responsibility of Implementing Agencies of Partner Country

This soft-component will be conducted in order to assure the potential for self-sustaining development of Solomon Islands. Hence, it is required to adopt such method of encouraging the voluntary activities of Solomon Islands as far as feasible. Consequently, it is required full understanding and cooperation from the implementing agencies of Solomon Islands toward this soft-component.

Specifically, the first requirement is the understanding and consideration toward the objective and the course of this soft-component from Ministry of Health and Medical Services and responsible officials of Gizo Hospital. And what is the most important is appropriate staffing for this soft-component and the employment of technicians for facility maintenance and the addition of technicians for maintenance of medical equipment are required. Japan will provide the technical assistances and cooperation for these technicians through the implement of this soft-component. Also, Ministry of Health and Medical Services and responsible officials including the Director of Gizo Hospital, which are the implementing agencies, are required to continue the instruction and maintenance regarding the maintenance of facilities and medical equipment as supervisor of Gizo Hospital during the implementation period of this Soft-Component and even after its completion.

2-2-4-8 Implementation Schedule

The implementation schedule of the project after the grant agreement has been effected is as per shown in Figure 2-29. The work consists basically of the detailed design and the tender by the consultant, the construction by the contractor and the consultant supervision on the construction.

(1) Detailed design

The Ministry of Health and Medical Services of Solomon Islands and a Japanese consulting company, a Japanese juridical person, seal a consulting contract on the detailed design (preparation of tender documents) on this project, and the ministry has this contract verified by JICA. Thereafter, the consultant prepares the tender documents, in consultation with the Ministry of Health and Medical Services, based on the basic design study report, and has it approved by the Ministry of Health and Medical Services.

The detailed design (preparation of the tender documents) is expected to take four months.

(2) Tender work

The tender work is expected to take three months.

(3) Construction by contractor and consultant supervision

On completion of the contract for construction, the contractor begins construction work. Concurrently, the consultant begins the consultant supervision.

The construction is expected to take 18 months, of which details are shown below.

Table 2-41 Construction Detail of Gizo Hospital

Facility construction	<Hospital Building > Reinforced concrete structure with 2 stories, 3,792.08 m^2 First floor (above 1.5m piloti): Outpatient: General, Emergency, Special Clinic (Internal medicine, Surgical, OB/Gy, ophthalmology, dental clinic, physiotherapy and traveling clinic) Medical Image: X-ray, Ultrasonic Medical Test: Laboratories, Blood bank Administration: Pharmacy, Office, Duty Service: Communication Center for Disaster Second floor: Operation: Operation rooms (major and minor) Central sterilizing and supply: Washing room, Sterilization room Delivery: Labor, Delivery (2), Nursery Ward: Male, Female, Pediatrics, Maternity, HDU, Isolation (total 62 beds) Service: Electrical Room <Ancillary facility> Sewage &Treatment Plant, Generator, Water Reservoir Tank
Equipment procurement	The equipment necessary for the Project facilities and some existing facilities (Mobile X-ray unit, Ultrasonic diagnostic unit, etc.)

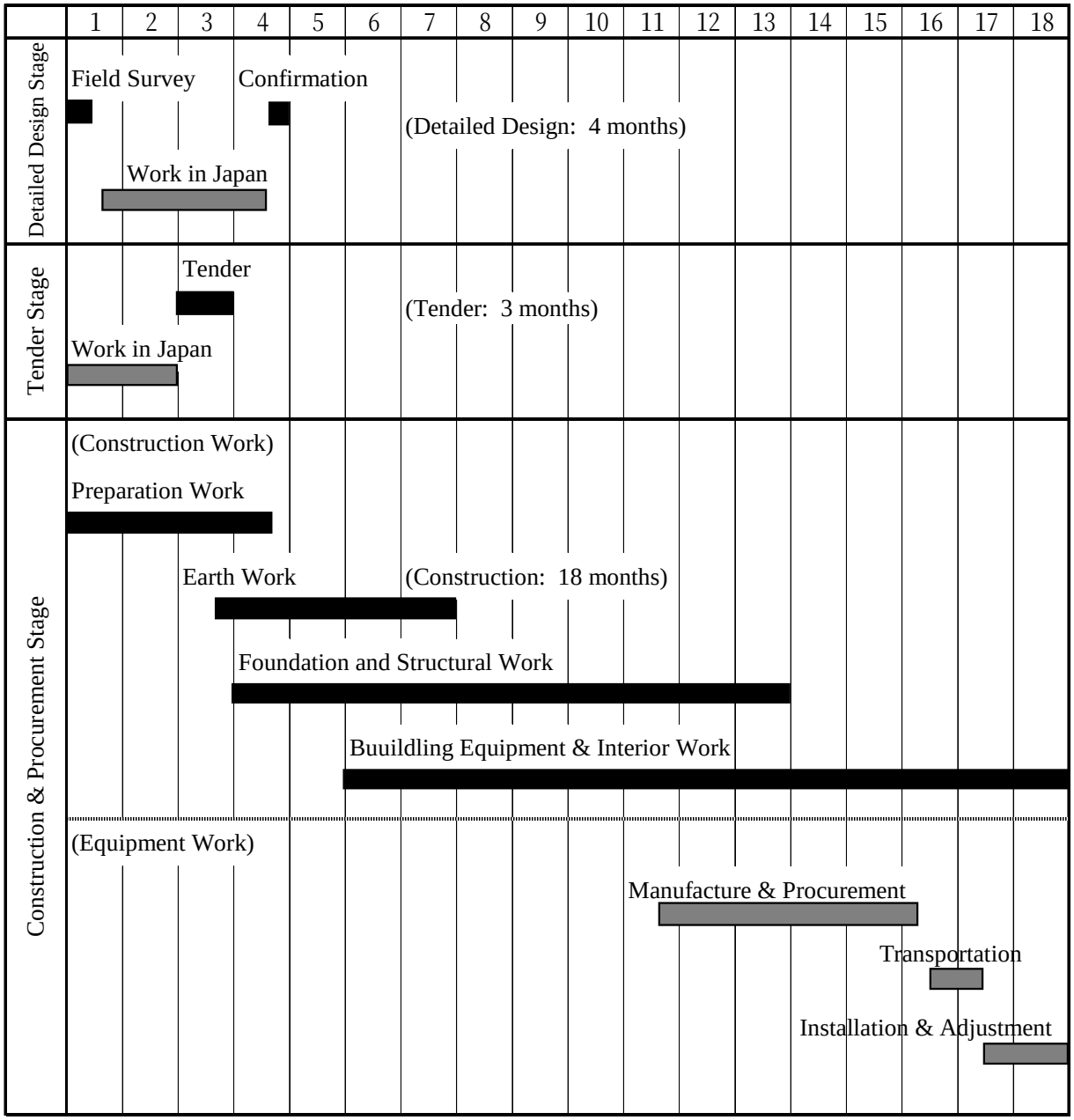


Figure 2-29 Project Schedule

(4) Procurement supervision

After concluding the equipment supply contract, a supplier starts the equipment procurement. The consultant begins procurement and implementation supervision services at the same time. The equipment procurement and installation is expected to take around eight months, and the contents are as shown in figure above.

2-3 Obligations of Recipient Country

The following are main items of the obligations of Solomon Islands.

(1) Procedure

1) Application for and acquisition of building permits regarding this cooperation project
2) Procedures for the bank arrangement (B/A) and for issuance of the authorization to pay (A/P) and bearing of commission fees associated with them
3) Prompt landing of imported facilities and equipment cargos at port, procedures for exemption of duties, customs clearance, and assurance thereof, and securing of prompt domestic transportation
4) Provision of convenience necessary for entry to and stay in Solomon Islands, to the Japanese nationals who intend to execute provision of facilities and equipment and execution of other works according to the verified contract
5) Exemption of all duties and all taxes in Solomon Islands, to the Japanese nationals who intend to execute provision of facilities and equipment and execution of other works according to the verified contract
6) Securing of the budget required for effective use and maintenance of the facilities and equipment constructed and procured by this grant aid program
7) Procedures, contracts and installation fees for power supply, telephone services, gas supply and sewage for the Project facilities.
8) Securing disposal area of waste soil from the Project and providing the land-use permission to the construction workers of the Project

(2) Related construction work prior to the Project start

1) Repairing Hospital Jetty
2) Demolition of the existing facilities in the Project site (6 flag poles, basket court, eg.)
3) Renovation of the existing drainage from the Project site to outside.
4) Site preparation of the Project
5) Demolition of existing malaria laboratory
6) Site preparation of temporary buildings of the Project
7) Construction of 6 blocks of medical staff housing
8) Construction of 12 blocks of medical staff housing by AusAID in Babylon
9) Construction of 31 blocks of medical staff housing

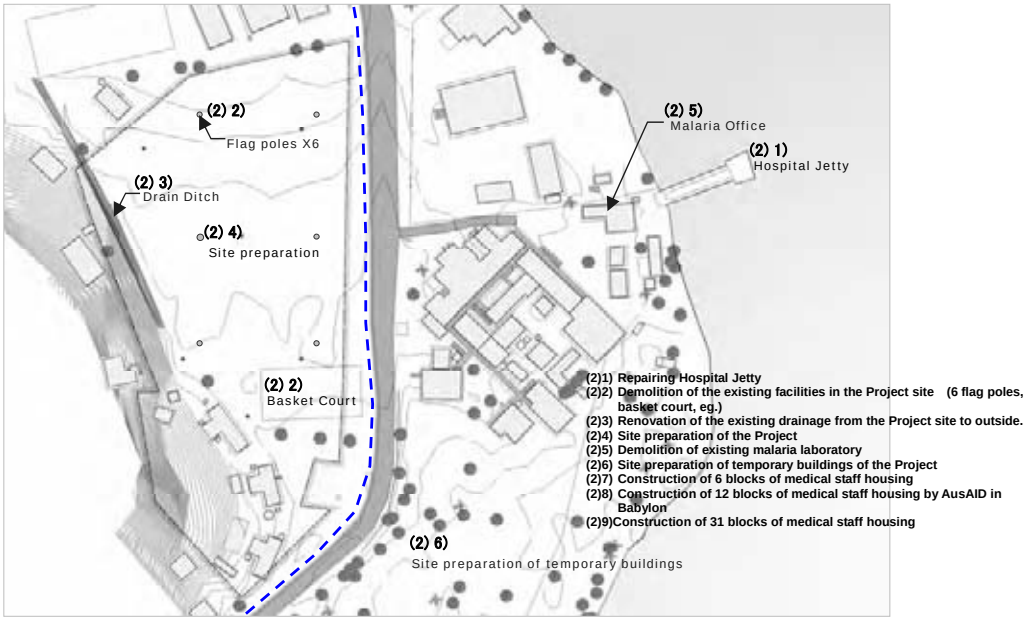


Figure 2-30 Related construction work prior to the Project start

(3) Related construction work to be done before completion of the Project

1) Implementation of public power supply project in Gizo
2) Implementation of public water supply project in Gizo
3) Provide a sewer pump in Public Septic Tank located in Gizo Hospital
4) Preparation of access street and drainage facilities in front of the Project site
5) Preparation of electricity wiring, telephone line and water supply piping connection to the Project site

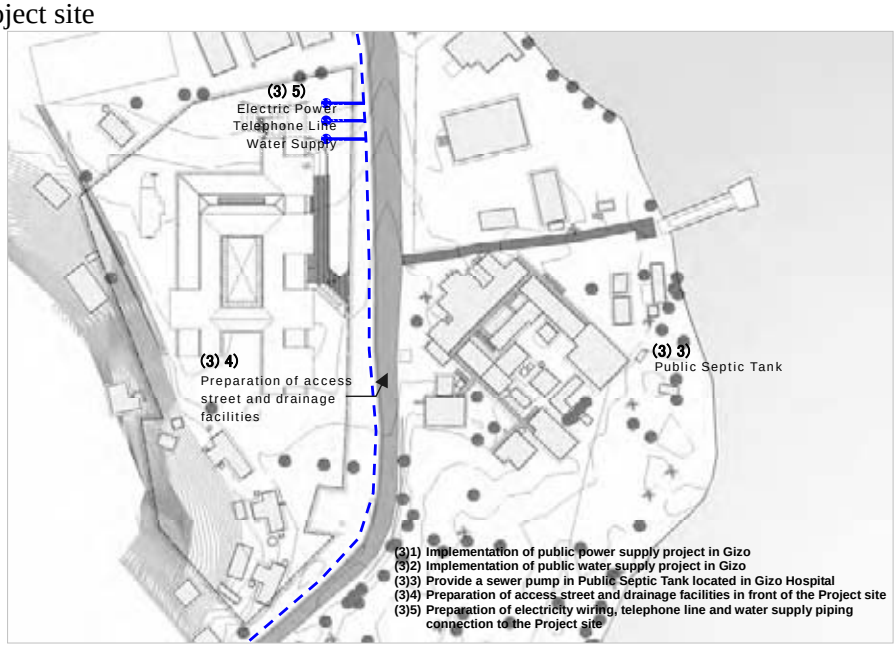


Figure 2-31 Related construction work to be done before completion of the Project

(4) Related construction work following to the completion of the Project

1) Purchase of furniture and supplies
2) Relocation of existing equipment (X-ray related)
3) Relocation and installation of part of existing equipment to the new Hospital (medical furniture and fixture, medical equipment, etc.)
4) Transfer of patients to new wards and Practical training of the hospital staff at the new Hospital
5) Construction of walls and fences surrounding the Project site

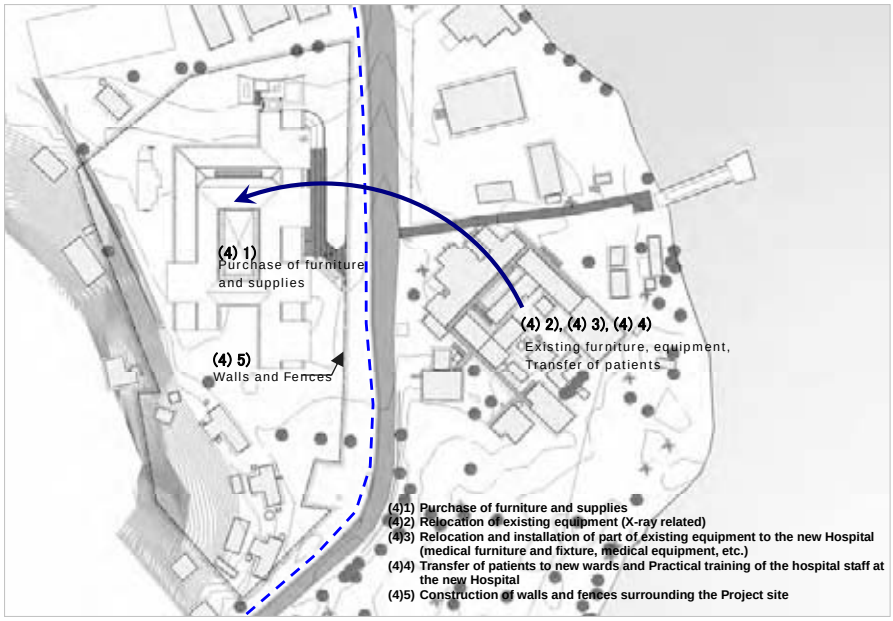


Figure 2-32 Related construction work following to the completion of the Project

(5) Modification of facilities

Gizo Hospital plans to modify septic tank and incinerator. All the related modification works are as follows.

1) Renovation of existing kitchen
2) Renovation of existing laundry

(6) Others

Bearing of costs for items not provided by the grant aid program Table 2-42 shows implementation schedule of Solomon Islands' obligation works.

Table 2-42 Schedule of Solomon Islands' Obligation Works

Category	Schedule
（1） Related construction work prior to the Project start	
1) Repairing Hospital Jetty	March 2009
2) Demolition of the existing facilities in the Project site (6 flag poles, basket court, eg.)	May 2009
3) Renovation of the existing drainage from the Project site to outside.	May 2009
4) Site preparation of the Project	September 2009
5) Demolition of existing malaria laboratory	September 2009
6) Site preparation of temporary buildings of the Project	September 2009
7) Construction of 6 blocks of medical staff housing	June 2009
8) Construction of 12 blocks of medical staff housing by AusAID in Babylon	March 2009
9) Construction of 31 blocks of medical staff housing	Under Planning
（2） Related construction work to be done before completion of the Project	
1) Implementation of public power supply project in Gizo	May 2010
2) Implementation of public water supply project in Gizo	December 2009
3) Provide a sewer pump in Public Septic Tank located in Gizo Hospital	May 2010
4) Preparation of access street and drainage facilities in front of the Project site	September 2010
5) Preparation of electricity wiring, telephone line and water supply piping connection to the Project site	December 2010
（3） Related construction work following to the completion of the Project	
1) Purchase of furniture and supplies	April 2011
2) Relocation of existing equipment (X-ray related)	May 2011
3) Relocation and installation of part of existing equipment to the new Hospital (medical furniture and fixture, medical equipment, etc.)	May 2011
4) Transfer of patients to new wards and Practical training of the hospital staff at the new Hospital	May 2011
5) Construction of walls and fences surrounding the Project site	May 2011

2-4 Project Operation Plan

(1) Manning plan

Gizo Hospital has 84 staff members in October 2007, and the labor cost mounts up to 3.73 million SBD. The hospital is planning staff increase of 25 people in this project completing this particular project to correspond to functional enhancement of clinical departments of newly established operating room, OPD, the obstetrics department, and the pediatrics department, etc. and maintenance section. The total wages is provisionally calculated as 1.52 million SBD that hits about 41% of the present wages. In Solomon Islands, provincial hospital labor cost has two methods that MHMS bears directly and that provincial government employs. The Committee, chaired by the Assistant Secretary in charge of medical services in MHMS, has the appointment right for the assignment of specialist doctors etc. The MHMS has positively agreed to secure increasing wages with manpower. The manning plan in the hospital by this project and present manpower disposition is shown as the following table.

Table 2-43 Manning plan of Gizo hospital

Medical staffer	Yearly income (SBD)	Present staffers		Reinforcement manning	
		Present no.	Present wages	Increased no.	Increased cost
Specialists	130,000	—	—	5	650,000
GPs	85,000	3	255,000	1	85,000
Dentists	85,000	1	85,000	1	85,000
Registered nurses	40,000	59	2,360,000	16	640,000
Statistician	40,000	1	40,000	—	—
Pharmacist	60,000	1	60,000	—	—
Lab technicians	60,000	2	120,000	—	—
X-ray technicians	60,000	2	120,000	—	—
Physiotherapist	60,000	1	60,000	—	—
Environmental health officer	60,000	1	60,000	—	—
Public health officers	60,000	6	360,000	—	—
Technicians	30,000	4	120,000	2	60,000
Office clerks	30,000	3	90,000	—	—
Total		84	3,730,000	25	1,520,000
				Increase by 41%	

(Source: Response to questionnaire to MHMS)

(2) Maintenance plan

1) Facility

To complete the new hospital, there are necessary equipment and systems in order to realize the necessary medical service and they require the maintenance staff with specialized knowledge. For maintaining sustainably the facilities functions including those of existing systems, it is considered that of considerable importance are; rethinking and improvement in technical abilities of each staff persons, strengthening the cooperation in the functions between the Secretary of Hospital and the person in charge of Maintenance Department of National Referral Hospital (NRH), employment of mechanical technicians and electrical technicians in Gizo Hospital, utilization of tools complementing the maintenance activities having preventive maintenance in mind and preparation of annual budget and a maintenance plan ensuring thereof. This is why the adoption of soft-component is planning.

① Engineers will deal with:

a) Operate the overall maintenance (coordination with Director of the hospital, the state government and Ministry of Health and Medical Services)
b) Manage the annual maintenance budget
c) Plan and perform the maintenance of hospital facilities and medical equipment
d) Educate and instruct the technician staff
e) Grasp the system of high-pressure power receiving equipment, air-conditioning system and drainage/water processing system

② Mechanical technicians will deal with:

a) Manage the operation of air-conditioners, pumps and fans
b) Manage the operation of medical gas system
c) Manage the operation of water processing system and drainage processing system
d) Manage the operation of solar hot water panels
e) Manage the maintenance of medical equipment (machineries)

③ Electrical technicians will deal with:

a) Manage the operation of transformer
b) Manage the operation of high voltage panels and low voltage panels
c) Manage the operation of dynamos
d) Manage the maintenance of medical equipment (electricities and electrons)
e) Manage the operation of communication facilities

Ministry of Health and Medical Services has expressed its intention to equalize the maintenance levels of medical facilities scattered over the nation (mainly state hospitals) by means of developing horizontally the maintenance system of cooperation between Gizo Hospital and National Referral Hospital (NRH) to be established in this Project.
Specifically, the process is following and finally, a national level organization for maintenance of facilities and equipment will be established.

1) To establish smooth and secured maintenance system for Gizo Hospital through strengthening the cooperation between Gizo Hospital and National Referral Hospital (NRH) (Objective of this Project)

2) In order to run the maintenance system established in above section 1) sustainably or developmentally, to establish the National Maintenance Technical Support Committee in the National Maintenance Technical Support Association consisted of Planning of Ministry of Health and Medical Services, National Referral Hospital and National Medical Stores. This committee is to scheme for improvements of maintenance technology and preventive maintenance and to investigate a circular maintenance system among 7 state hospitals.

3) To organize a technical support team in the National Maintenance Technical Support Committee in order to establish the circular maintenance system recurring 3 or 4 times a year and to start the support for maintenance for each 7 state hospitals including Gizo Hospital.

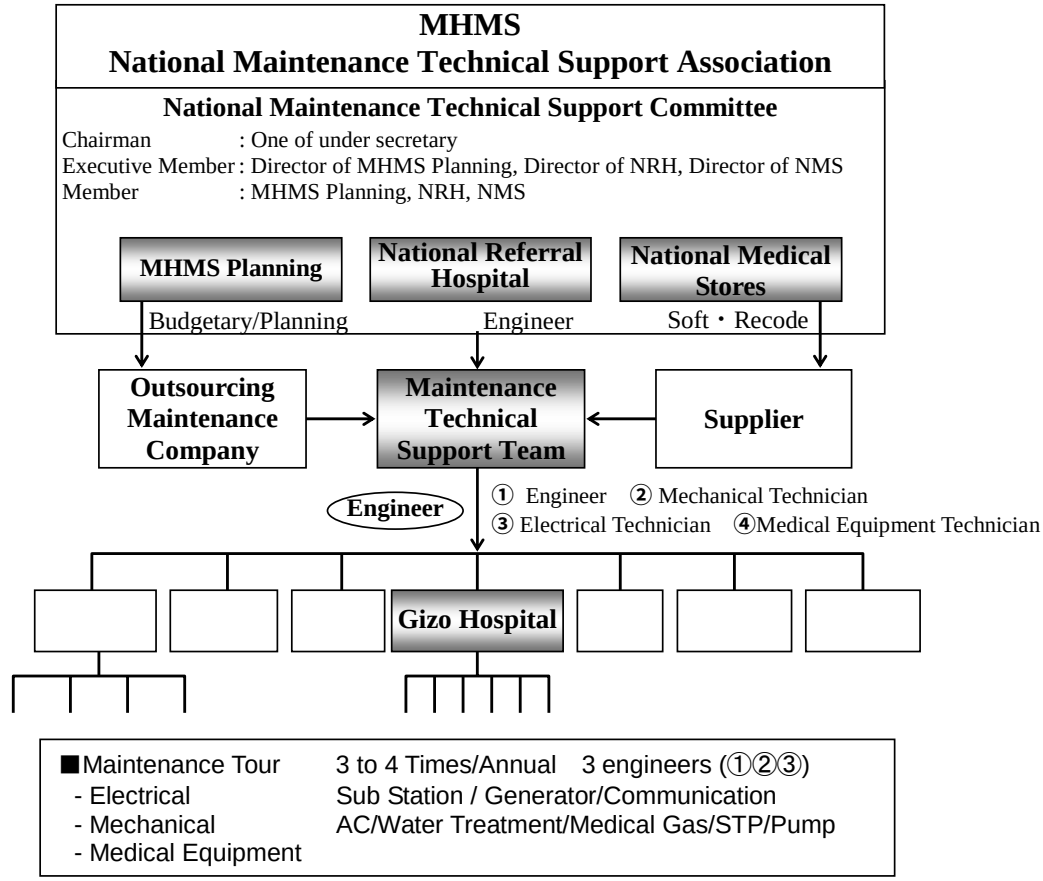


Figure 2-33 Maintenance Technical Support Team

2) Medical equipment

The targeted hospital has not properly performed maintenance control of medical equipment. In maintenance section of the hospital, one technician repairs engines of motorboats of the hospital, and three people such as carpenters and painters are taking charge of repairs of the building and facilities chiefly. The super intendment contacts maintenance section in a National Referral Hospital where is located in the capital city when breakdown in building or medical equipment occurs, and obtains advice or has received round maintenance service by engineers in equipment agents that exist in New Zealand by maintenance contract. The maintenance section of National Referral Hospital can make repairs to some items of equipment. However, it cannot undertake maintenance service for highly advanced precision equipment such as automatic chemical analyzers and image diagnosis equipment as it has no skilled engineer. There is a case of contract including maintenance service of three years when purchase contract is done for the said expensive precision equipment. For the spare parts supply for general equipment, the hospital can send an order to medical store, that keeps some spare parts, is the organization under MHMS and is located in the capital city, through the ministry. Because it is the above-mentioned situation, the maintenance section of the targeted hospital has not performed maintenance management by equipment registration and recording of maintenance service done. It is desirable to execute technical guidance of equipment maintenance management system to the targeted hospital, in addition to securing of a maintenance engineer to enable smooth equipment management and spare parts procurement.

2-5 Project Cost Estimation

2-5-1 Initial Cost Estimation

(1) Cost of Solomon Islands' Obligation Works

Approximate estimates of the costs borne by the Solomon side are SBD3,880,000 before the start of the project in November 2009, SBD900,000 for the 18-month period of the construction by April 2011, and SBD85,000 thereafter. These amounts will be appropriated from the budgets of the Ministry of Health and Medical Services for 2009, 2010 and 2011 respectively. If these estimated amounts are compared with the budgets for each year (Table 2-53 and Table 2-54), they account for approximately 1.63%, 0.37% and 0.03% respectively.

Table 2-44 Cost of Solomon Islands' Obligation Works

(SBD)

Category	Expense
(1) Related construction work prior to the Project start	
1) Demolition of the existing facilities in the Project site (6 flag poles, basket court, eg.)	100,000
2) Renovation of the existing drainage from the Project site to outside	100,000
3) Site preparation of the Project	500,000
4) Demolition of existing malaria laboratory	100,000
5) Site preparation of temporary buildings of the Project	80,000
6) Construction of 6 blocks of medical staff housing	3,000,000
(2) Related construction work to be done before completion of the Project	
1) Provide a sewer pump in Public Septic Tank located in Gizo Hospital	200,000
2) Preparation of access street and drainage facilities in front of the Project site	100,000
3) Preparation of electricity wiring, telephone line and water supply piping connection to the Project site	500,000
4) Bank charge	100,000
(3) Related construction work following to the completion of the Project	
1) Purchase of furniture and supplies	180,000
2) Relocation of existing equipment (X-ray related)	200,000
3) Relocation and installation of part of existing equipment to the new Hospital (medical furniture and fixture, medical equipment, etc.)	50,000
4) Transfer of patients to new wards and Practical training of the hospital staff at the new Hospital	55,000
5) Construction of walls and fences surrounding the Project site	500,000
Total	5,765,000

(2) Calculation Conditions

1) Current as of: July 2008

2) Exchange rate: 1 SBD = 13.86 Japanese Yen

3) Construction term: The period detailed design, construction and procurement of equipment is identified in the implementation schedule.

4) Other: This Project will be implemented though the system of the Grant Aid cooperation by the Government of Japan.

2-5-2 Operation and Maintenance Cost

(1) Maintenance Costs

The maintenance cost of the facilities and equipment of this project is as per shown in the table below, calculated incorporating the expected reduction of electric power cost by adoption of high-voltage power receiving and efficiency improvement of the air conditioning systems, and rational use of various filters corresponding to various degrees of cleanliness demanded by each room. The table below shows the maintenance cost for the initial year and the second year onward.

Table 2-45 Estimated Maintenance Costs

(Unit: SBD)

Item	Initial fiscal year	Following fiscal years
① Electricity charge	272,160	272,160
② Telephone charge	26,700	26,700
③ Fuel cost of generator	11,520	11,520
④ Water charge	38,880	38,880
⑤ LPG gas charge	13,200	13,200
⑥ Oxygen charge	31,290	31,290
⑦ Building maintenance cost	0	32,000
⑧ Replacement part (filter replacement)	0	12,800
⑨ Major facilities and equipment maintenance cost	0	56,000
Subtotal ① to ⑨ (facility maintenance cost)	393,750	494,550
⑩ Equipment maintenance cost	123,000	123,000
Total ① to ⑩	516,750	617,550

① Electric charge ..... 272,160 SBD/year

The contract demand of electric power of the planned facilities is presumed as shown below from the capacities and other details of the facilities.
The actual consumption is supposed to be about 40% of the contract demand on average.

Table 2-46 Presumed Electric Power Consumption

	Contract demand (kVA)	Actual consumption (kW)
Newly built facility	300	120

・Price structure

Electric power meter rate 2.7 SBD/kWh

・Electricity charge

	Charge (SBD)	Consumption (kW)	Used hour (h)	Day	Month	Load factor	Total
Newly built facility Meter rate	2.7	120	8	25	12	0.35	272,160

② Telephone charge …… .....26,700 SBD/year

The telephone charge varies depending upon how many times the services are used. The frequency of uses combined for each facility is supposed and the charge is calculated from the supposition.

・Price structure

Line charge

Domestic call	Gizo city call	1.0 SBD/time
	Long distance call	3.0 SBD/time
	Honiara	14.0 SBD/time

・Telephone charge

	Charge (SBD)	Number of lines	Used hour (min/each)	Frequency (times/day)	Day	Month	Load factor	Total (SBD)
City call	1.0	-	3	50	25	12	1.0	15,000
Long distance call	3.0	-	3	20	25	12	0.3	5,400
Honiara	14.0	-	3	5	25	12	0.3	6,300
Total								26,700

③ Fuel cost of generator…….....11,520 SBD/year

Power failures occur four times a month, each lasting about 1 hour on average. On this supposition, the fuel cost is calculated.
The project plans a 150 kVA power generator.

・Price structure

Generator fuel consumption	30	Liters/h
Fuel unit price	10.0	SBD/Liters

・Fuel cost

	Cost (SBD)	Consumption (liters)	Used hour (h)	Day	Month	Annual consumption (liters)	Load factor	Total (SBD)
Generator fuel Consumption	10.0	30	1	4	12	1,440	0.8	11,520

④ Water charge …….....38,880 SBD/year

The consumption of water from the city waterworks by the project facilities is as follows.

Table 2-47 Presumed Waterworks Water Consumption

	Water supply per day (m^3/day)
Newly built facility	40

・Price structure

Meter rate (average)	7.2	SBD/m^3

・Water charge

	Charge (SBD)	Water supply	Day	Month	Rate of city water consumption	Load factor	Total (SBD)
Newly built facility Meter rate	7.2	40	25	12	0.9	0.5	38,880

⑤ LPG charge……13,200 SBD/year

LPG is used in the examination room. Consumption by the facility is presumed as follows.

Table 2-48 LPG Consumption

Facility	Use	Consumption per day (kg/day)
Examination room	Test	5

・Price structure

LPG price 17.6 SBD/kg

・LPG charge

	Price (SBD)	Consumption (kg)	Day	Month	Annual consumption (kg)	Load factor	Total (SBD)
LPG price	17.6	5	25	12	1,500	0.5	13,200

⑥ Oxygen charge…… .....31,290 SBD/year

Oxygen is used in operation room, recovery rooms, etc., and its consumption is presumed as follows.

Table 2-49 Oxygen Consumption

Facility	Use	Consumption per day (m^3/day)
Newly built facility	Operation room, etc.	2

・Price structure

O_2 price 104.3 SBD/m^3

・Oxygen charge

	Charge (SBD)	Consumption (m^3)	Day	Month	Annual Consumption (m^3)	Load factor	Total (SBD)
O_2 charge	104.3	2	25	12	600	0.5	31,290

⑦ Building maintenance cost …….....32,000 SBD/year

The buildings of this project adopt exterior and interior finishing materials that are relatively easy to maintain. For this reason, the building maintenance cost required for exterior and interior finishing, electric facilities, water supply and drainage, purchase of replacement parts and spareparts for air conditioning facilities is presumed 1/3 to 1/2 of Japan's similar cases. However, the building maintenance cost is necessary from the second year and onward.

・Price structure 15 SBD/m^2/year

・Building maintenance cost

	Cost (SBD)	Area (m^2)	Day	Month	Load factor	Total (SBD)
Building maintenance cost	10	4,000	-	-	0.8	32,000

⑧ Replacement part (filter replacement)…… .....12,800 SBD/year

A high-performance filter and medium-performance filter are installed in the operation room and the associated facilities. Also, a pre-filter is installed on each air conditioner.
The frequencies of filter replacements are presumed as shown below. The pre-filter is of regenerative type and replacement cost is presumed not necessary.

・Price structure

Pre-filter	About twice/month	Cleaning
Medium-performance filter	About once/year	(2,000 SBD/piece)

・Filter replacement cost

	Cost (SBD)	Number	Load factor	Total (SBD)
Newly built facility Medium performance filter	2,000	8	0.8	12,800

⑨ Major facilities and equipment maintenance cost.....56,000 SBD/year

It is necessary to outsource the maintenance of major facilities and equipment of this project. The result of a preliminary calculation on the expense of outsourcing such maintenance work is shown below. This calculation is done referring to the results of meetings with local maintenance companies.

Table 2-50 Preliminary Calculation Result

Facility System	Maintenance Cost (SBD)	Number of times for Periodic Inspections
Air conditioning systems	22,000	2 times/year
Medical Gas supply systems	11,000	One time/year
Generator	12,000	One time/year
Drainage system, Sewage treatment plant	11,000	One time/year
Total	56,000	

⑩ Equipment maintenance cost ..... 123,000 SBD/year

Equipment plan is conceived to satisfy needs of medical services mainly by equipment procurement and to supplement equipment of shortage in number. The project scale is limited to such range of equipment as MHMS and the targeted hospital can maintain properly. Therefore, the hospital needs to secure budget to cover maintenance cost for the newly procured equipment. The project implementation will cost the hospital 123,000 SBD as maintenance fee and its breakdown is shown as follows:

Cost	Gizo hospital
Consumables cost	¥1,730,000.-
Spare parts cost	¥367,000.-
Total	¥2,097,000.- （123,000 SBD）

The breakdown of consumable items and spare parts cost is shown as the following tables:

Table 2-51 Equipment that need consumable items

No.	Equipment name	Qty	Consumable items	Unit price (¥1,000)	Cost (¥1,000)
1	Suction units	3	Catheter	210	630
2	Patient monitor	1	Chart paper	540	540
3	Phototherapy units	2	Eye mask	25	50
4	Defibrillator	1	Recording paper etc.	360	360
5	Nebulizers	5	Mask and others	30	150
	Sub-total				1,730

Table 2-52 Equipment that need spare parts

No.	Equipment name	Qty	Spare parts	Unit price (¥1,000)	Cost (¥1,000)
1	Autoclaves	2	Heater	15	30
2	Bedside monitor	1	Lead etc.	25	25
3	Operating light-ceiling type	1	Bulbs	60	60
4	Operating light-stand type	5	Bulbs	32	160
5	Examination lights	3	Bulbs	8	24
6	Phototherapy units	2	Bulbs	5	10
7	Defibrillator	1	ECG cable	8	8
8	Nebulizers	5	tubes	10	50
	Sub-total				367

(2) Financial situation and maintenance cost

The budget of Gizo hospital is summed up partially of Western province health budget, and said that it will account for almost 60% of this province health budget. 0.602 million SBD, that hits about 18% of the whole budget of Gizo hospital amounting to 3.289 million SBD, has been expended, as for maintenance expense in 2007. The maintenance expense in 2012, two years after this project is executed, is provisionally calculated as already stated as 618 thousand SBD (Table 2-45). It is expected that Western province health budget in 2012 reaches 6,195 thousand SBD (Table 2-54) if MHMS can maintain its budget increase by 2 to 3% annually as it is planned and 670 thousand SBD is summed up as for maintenance budget of new Gizo hospital. Similarly, it becomes 18% if proportion of the maintenance expense in the budget of the entire Gizo hospital in 2012 is provisionally calculated, and it is understood that it is a level almost equal to the

current state. It is judged that MHMS can take necessary measures to secure such maintenance expense increase smoothly for new Gizo hospital by the health SWAps medium term health expenditure framework (2006 to 2011). In the following tables shown are Transition of Western province health budget and of Gizo hospital (2004 to 2007) and the budget forecast in the future (2008 to 2012).

Table 2-53 Health expenditures of Western province and Gizo hospital (million SBD)

Fiscal year	2004	2005	2006	2007
Health care budget of Western Province	1.158	3.900	4.017	5.482
Maintenance budget of Western Province	0.212	0.713	0.735	1.003
Budget of Gizo hospital	0.690	2.340	2.410	3.289
Maintenance budget of Gizo hospital	0.126	0.428	0.441	0.602
MHMS Budget	150.20	172.98	190.73	221.34
MHMS Expenditures	139.10	160.20	167.40	194.27

（Source: MHMS）

Table 2-54 Provisional calculation of Western province and Gizo hospital budget (million SBD)

Fiscal year	2008	2009	2010	2011	2012
Health care budget of Western Province	5.646	5.780	5.920	6.056	6.195
Maintenance budget of Western Province	1.033	1.058	1.033	1.057	1.081
Budget of Gizo hospital	3.388	3.468	3.552	3.633	3.717
Maintenance budget of Gizo hospital	0.620	0.635	0.650	0.655	0.670
MHMS Budget	232.30	237.80	243.57	249.17	254.90

（Source: MHMS）

Note: Budget of Gizo hospital is provisionally calculated provided that the hospital beget accounts for the health care budget of Western Province for 60%

2-6 Other Relevant Issues

1) The New Gizo Hospital Task Force for the project was created by the Western provincial government and a framework was established. However, in order to implement the project efficiently, it is important that the Ministry of Health and Medical Services take the legal procedures required to start the construction works and to secure the budget needed to fund the works without delay.

2) It is important that the works, which the Solomon side is responsible for, are implemented in synch with the scheduled works of this project.

   ① Constantly check the content and progress of the works such as demolishing and clearing the existing structure and leveling the temporary site, etc.

   ② Constantly check the schedule and confirm the progress of the works for the Gizo City regional infrastructure improvement plan that includes the planned construction site, the improvement works of the road in front of the hospital, installation of the drainage conduit, and other infrastructure that will be installed for the facilities that are targeted in the cooperation.

   ③ Since the planned construction site lies between the existing Gizo Hospital and the road, care must be taken that the traffic and the flow of materials due to the construction works do not pose a risk to medical care activities. Furthermore, the road in front of the hospital is the only arterial road that runs from the center of Gizo City to the coastal area in the eastern region, which was greatly damaged by the tsunami. Since vehicles used in the restoration works will be using the road, it is important to carry out traffic control during the construction works period.

Chapter 3 Project Evaluation and Recommendations

CHAPTER 3. PROJECT EVALUATION AND RECOMMENDATIONS

3-1 Project Effect

(1) Direct Outcome that is expected

The following direct outcome is expected when the project is implemented.

1) Restoration of functions that were impaired by the tsunami and improved secondary medical services

The medical services that were reduced by the tsunami following the earthquake would be restored and facilities that were antiquated before the disaster would be renewed. Then, the health indicators of 2006 such as the median number of patients per month (2,312 persons), the number of hospitalized patients (151 persons), the number of surgeries (74 cases) and the number of births (49 cases) will rise, and the quality of medical care and the service delivery functions of the hospital as a secondary medical institution will improve.

2) Improved operation and maintenance capacity of Gizo Hospital

Through the technical guidance provided under the soft component system, the Ministry of Health and Medical Services, the Operation and Maintenance Department of the National Referral Hospital, the Health Department of Western Province and Gizo Hospital will be able to have a better understanding of the system for and significance of the operation and maintenance of facilities/equipment from the standpoint of each organization. By thus ensuring the stable operations of facilities/equipment, hygienic and safe services will be provided.

(2) Indirect Outcome that is expected

The following indirect outcome is expected when the project is implemented.

1) Improved medical care services for about 130,000 people living in the western region

As the provincial hospital, Gizo Hospital will contribute to improvements in medical care services for approximately 130,000 people living in the western region including the neighboring area in need of a secondary medical institution as well as Western Province, which is the target area of this project.

2) Reduced disparity in basic health and medical care services between the main island and the isolated islands

By improving the basic health services of Western Province, an isolated island region with the highest population, the disparity in medical care services between the main island and the isolated island, which is a typical problem of island countries, will be reduced.

3) Improving health indicators of Solomon Islands

Easier access to appropriate facilities in isolated islands will contribute to improving health indicators such as the mortality rate due to malaria, the infant mortality rate and the maternal mortality rate.

4) Strengthened base point for disaster management in Western Province

The raised, reinforced concrete structure of the new hospital will function as an aid center in times of disasters, thereby making it possible to collect information and carrying out relief activities smoothly.

(3) Formulating Indicators Showing Outcome

The indicators showing outcome and the achievement of project objectives are the figures given in 1) to 4) in the table below for Gizo Hospital targeted in the project. These indicators that fell due to the disaster that hit the country have risen back to pre-disaster levels; and through the reconstruction and renewal of depreciated hospital facilities, the indicators are expected to rise higher than pre-disaster levels.

Item	2006 (pre-disaster)	2007 (April, October post-disaster)	
1) Number of outpatients	2,312/month	1,083/month	975/month
2) Number of hospitalized patients	151/month	14/month	100/month
3) Number of surgery cases	74 cases/month	0 cases/monthh	21 cases/month
4) Number of births	49 cases/month	17 cases/month	30 cases/month

1) Recovery and Increase in the Number of Outpatients (2,312/month as of 2006)

The examination functions that had been reduced due to the disaster are expected to recover and increase due to the improved quality and efficiency of medical services when the outpatient clinic and laboratory are improved.

2) Recovery and Increase in the Number of Hospitalized Patients (151/month as of 2006)

With improved services stemming from an improved and a more efficient arrangement of the hospital ward, the number of hospitalized patients is expected to recover and increase to pre-disaster levels.

3) Recovery and Increase in the Number of Surgeries (74/month as of 2006)

The operating room will be increased to two rooms (presently there is only one room) and with the provision of surgical equipment related to general anaeasthesia, major operations will become possible and the number of surgeries is expected to recover and rise to pre-disaster levels.

4) Recovery and Increase in the Number of Births (49/month as of 2006)

With an improved maternity ward, delivery, and surgical facilities, the number of births is expected to recover and increase.

3-2 Recommendations

3-2-1 Issues and recommendations that should be addressed by the Solomon Side

For Gizo Hospital to be efficiently and effectively managed and the direct and indirect effects to be seen after it has been improved under this project, the following improvements must be made.

(1) Despite high rainfall on Gizo Island, its water supply conditions are poor with frequent disruptions in the water supply due to inadequate water pressure caused by minimal difference in elevation in addition to the old water supply facilities of Gizo City. A project to expand and improve the water distribution network of Gizo in Western Province has been approved by the Solomon government and is currently underway. In order for the new hospital that will be constructed in this project to function effectively, it is important that the water supply improvement project by the Solomon government is completed as planed in May 2010.

(2) The Gizo power plant operated by the Solomon Islands Electricity Authority (SIEA), which supplies electricity throughout the Gizo area, is located about 4km from the center of the city, and the high voltage transformer installed by the road in front of the southeastern section of the hospital supplies low-voltage power to the hospital and the surrounding area. However, the electric power supply has been unable to meet the growing demand of the rapidly developing Gizo City. As a result, power outages occur several times a month, and the capacity of he transformer that supplies electricity to the current hospital will not be sufficient to supply electricity to the new hospital. At present, SIEA has been implementing an electricity supply system improvement project with its own budget that will be completed by the end of 2008. In order for the new hospital to carry out its functions efficiently, it will be essential that the Solomon government sees to it that this project is completed as planned.

(3) The jetty that provides access to the hospital by patients, especially patients transported for emergency, was destroyed by the tsunami. In addition, the access road running in front of the hospital is unpaved. For the safety of the patient who is transported to the hospital. It is important that both the jetty and the access road in front of the hospital are renovated for patients and others who utilize the hospital. The jetty will be repaired with Japan's grassroots grant aid, whereas the road in front of the hospital will be improved with the assistance of the Taiwanese government. It is essential that both of these projects are implemented and completed on schedule.

(4) One of the direct major causes that impaired medical activities due to the disaster was the total destruction of the medical staff residences. Although they have been living temporarily in tents in the elevated areas on the island, the number of available staff members has decreased and the situation is unstable. The Solomon government has plans to increase staff members, secure a budget and construct a staff dormitory. Of the plans, 18 blocks will be completed in 2009. In conjunction with the opening of the new hospital and its expanded activities, it is necessary that the staff dormitory will be reconstructed as planned.

(5) To improve the operation and maintenance technology of the Gizo Hospital facilities, a technical guidance plan utilizing the soft component system is under preparation. Hence, it will be required that relevant persons in the Ministry of Health and Medical Services and the National Referral Hospital as well as persons working in the fields of construction, machinery and electric equipment of Gizo Hospital will make preparations in synchrony with the time when technical guidance will be provided.

3-2-2 Technical Cooperation and Coordination with Other Donors

Other donor activities with regard to related facilities and infrastructure will have some relevance on the effectiveness of the project, but technical cooperation and coordination with other donors will not occur during the implementation of the project.

Appendices

1. Member List of the Survey Team

Basic Design Survey (September 30 to October 28, 2007)

No.	Name	Assignment title	Organization
1	Mr. Shumon YOSHIARA	Leader	Team Director, Health Team, Project Management Group Ⅱ, Grant Aid Management Dept. JICA
2	Mr. Junichi INABA	Technical Advisor (Medical Service)	Technical Official Bureau of International Cooperation International Medical Center of Japan
3	Mr. Masahiro IKAWA	Project Manager / Architectural Planning	Nihon Sekkei, Inc.
4	Mr. Naoki TOMINAGA	Architectural Design/ System Design/ Disaster Prevention Planning	Nihon Sekkei, Inc.
5	Mr. Hiroshi TAKEDA	Construction Planning/ Cost Estimation 1 / Environment Survey	Nihon Sekkei, Inc.
6	Mr. Ryoji HARADA	Equipment Planning	Nihon Sekkei, Inc.
7	Mr. Yo TAKAHASHI	Procurement Planning/ Cost Estimation 2	Nihon Sekkei, Inc.
8	Ms Kuniko YOSHIZAWA	Disaster Prevention Planning (Assistant)	Nihon Sekkei, Inc.
9	Mr. Hiroyuki TAMURA	Structure Planning (Assistant)	Nihon Sekkei, Inc.
10	Mr. Takahisa ISOBE	Building System Design (Assistant)	Nihon Sekkei, Inc.

Explanation on Draft Report (August 2 to August 16, 2008)

No.	Name	Assignment title	Organization
1	Mr. Akihiko HOSHINO	Leader	Director, Grant Aid and Loan Support Department, JICA
2	Mr. Sei KONDO	Project Coordinator	Program Officer, Grant Aid and Loan Support Department, JICA
3	Mr. Masahiro IKAWA	Project Manager / Architectural Planner	Nihon Sekkei, Inc.
4	Mr. Ryoji HARADA	Equipment Planner	Nihon Sekkei, Inc.
5	Mr. Naoki TOMINAGA	Architectural Design / System Design / Disaster Prevention Planning (Assistant)	Nihon Sekkei, Inc.

2. Study Schedule

Basic Design Survey (September 30 to October 28, 2007)

	Team Member / Date	Government Team Members		Consultant Members							
		Leader	Technical Advisor	Project Manager/ Architectural Planning	Equipment Planning	Architect Design/System Design/Disaster Prevention Planning	Building System Design (Assistant)	Disaster Prevention Planning (Assistant)	Structure Planning (Assistant)	Construction Planning/Cost Estimation 1/Environment Survey	Procurement Planning/Cost Estimation 2
1	9/30/2007 Sun			Narita →							
2	10/1/2007 Mon			Brisbane → Honiara							
3	10/2 Tue			Courtesy call to JICA Office, Embassy of Japan Discussion at MHMS (Explanation of Implementation Report, Study Schedule)							
4	10/3 Wed			Honiara → Gizo Study of Gizo Hospital							
5	10/4 Thu			Study of Gizo Hospital							
6	10/5 Fri			Gizo → Munda Study of Hellene Goldie Hospital Munda → (Gizo) → Honiara							
7	10/6 Sat			Internal Discussions/Data Collation					Narita →		
8	10/7 Sun			Internal Discussions/Data Collation					Brisbane → Honiara Meeting Survey Contractors		Market Survey
9	10/8 Mon		Narita→	Discussion for Draft Facility and Equipment Plan					Meeting Survey Contractors		Market Survey
10	10/9 Tue		Brisbane → Honiara	Discussion for Draft Facility and Equipment Plan					Meeting Survey Contractors		Market Survey
11	10/10 Wed	Narita →	Discussion at MHMS						Honiara → Gizo Study of Gizo Hospital		
12	10/11 Thu	Brisbane→ Honiara	Discussion at MHMS Courtesy call to JICA Office, Embassy of Japan						Study of Gizo Hospital		
13	10/12 Fri	Honiara → Gizo Discussion at Gizo Hospital							Study of Gizo Hospital Gizo → Honiara		
14	10/13 Sat	Discussion at Gizo Hospital							Construction & Equipment Procurement Survey		Study of Gizo Hospital
15	10/14 Sun	Gizo → Honiara Internal Discussions/Data Collation							Construction & Equipment Procurement Survey Honiara→Brisbane		Gizo → Honiara
16	10/15 Mon	Discussion at MHMS on Minutes of Discussions							Brisbane → Narita	Construction & Equipment Procurement Survey	
17	10/16 Tue	Discussion at MHMS on Minutes of Discussions								Brisbane → Sydney Construction & Equipment Procurement Survey	
18	10/17 Wed	Signing of Minutes of Discussions Report to JICA Office & Embassy of Japan					Baseline survey for evaluation criteria & data collection			Construction & Equipment Procurement Survey	
19	10/18 Thu	Honiara → Brisbane		Visit to other donars Discussion (Draft Facility and Equipment Plan)						Construction & Equipment Procurement Survey	
20	10/19 Fri	Brisbane → Narita		Discussion at MHMS (Draft Facility and Equipment Plan)						Sydney → Narita	
21	10/20 Sat			Internal Discussions/Data Collation							
22	10/21 Sun			Internal Discussions/Data Collation							
23	10/22 Mon			Discussion at MHMS (Draft Facility and Equipment Plan)							
24	10/23 Tue			Discussion at MHMS (Draft Technical Memorandum)							
25	10/24 Wed			Signing of Technical Memorandum Report to JICA Office, Embassy of Japan							
26	10/25 Thu			Honiara → Brisbane							
27	10/26 Fri			Market Survey							
28	10/27 Sat			Market Survey							
29	10/28 Sun			Brisbane → Narita							

Explanation on Draft Report (August 2 to August 16, 2008)

Date		Government Team Members		Consultant Members		
		Leader	Project Supervisor	Project Manager / Architectural Planning	Equipment Planning	Architect Design/ System Design/ Disaster Prevention Planning
1	8/2(Sat)			Narita→		
2	3(Sun)			Brisbane→Honiara		
3	4(Mon)		Narita→	Discussion at JICA Office, Courtesy call to Embassy of Japan Discussion at MHMS （Explanation of Basic Design Study Report）		
4	5(Tue)		Brisbane→ Honiara	Discussion at MHMS (Explanation of Basic Design Study Report)		
5	6(Wed)	Narita→	Discussion at JICA Office			
6	7(Thu)	Brisbane→ Honiara	Honiara→Gizo Study and Discussion at Gizo Hospital Gizo→Honiara			
7	8(Fri)	Discussion at MHMS				
8	9(Sat)	Team Discussion for Minites of Discussion				
9	10(Sun)	Team Discussion				
10	11(Mon)	Discussion at MHMS on Minutes of Discussions Signing of Minutes of Discussions				
11	12(Tue)	Report to JICA Office & Embassy of Japan				
			Honiara→ Brisbane	Discussion at MHMS, Market Survey		
12	13(Wed)		→Narita	Discussion at MHMS, Market Survey		
13	14(Thu)			Discussion at MHMS, Market Survey Report to JICA Office & Embassy of Japan		
14	15(Fri)			Honiara→Brisbane		
15	16(Sat)			→ Narita		

3. List of Parties Concerned in the Recipient Countries

Solomon Islands Side

Ministry of Health and Medical Services

Dr. George Malefoasi	Permanent Secretary
Dr. Cedric Alependava	Under Secretary
Dr. Divi Ogaog	Under Secretary
Mr. Abraham Alamokari	Director, Health Policy and Planning
Mr. Robinson Fubui	Environment Health
Mr. Robert Maw	Procurement Officer, Policy and Planning
Ms. Lynette Oti	Project Architect, Planning Division
Mr. Rex Alex Alafa	National Health Facilities Manager
Ms. Joanne Boso	Tsunami Rehabilitation Program Coordinator
Mr. Aaron Sommerfield	Infrastructure Adviser (AusAID)

Ministry of Development Planning and Aid Coordination

Mrs. Jane Waetara	Permanent Secretary
Mr. Nigel Dudley Mazini	Director, Strategic Planning
Mr. Selwyn Takana	CPO, Strategic Planning

Ministry of Infrastructure and Development

Mr. Peter Hauia	Permanent Secretary

Ministry of Mines & Energy

Mr. Douglass Billy	Geological Survey Division
Mr. Bobby Kelly	Seismological Section

Ministry of Land

Mr. Jimmy Ikina	WAIC

National Referral Hospital

Dr. Tennetta Dalipanda	Chief Executive Officer, Medical Department

Western Province

Mr. Alex Lokopio	Premier, Western Province Government
Mr. Oliver Zupo	Deputy Premier, Western Province Government
Mr. Arnold Moveni	Provincial Secretary, Western Province Government
Mr. Philip Talasasa	Physical Planner, Western Province Government
Mr. Eddie Waneolofia	Lands Officer, Land Devision, WPG
Mr. Frank Jamakana	Ministry of Tourism & Culture activities, WPG
Mr. Roderick Terrykera	Ministry of Forest, Land & Physical Planning, WPG

Gizo

Mr. Andrew Duncan	Chief Engineer
Mr. Peter Lasa	Assistance Urban Water Supply Engineer

Gizo Hospital

Dr. Gregory Jilini	Director, Western Province Health Services Director, Gizo Hospital
Dr. Dickson Boara	Active Director, Gizo Hospital
Mr. Alfred Vilaka	Secretary, Gizo Hospital
Mr. Charles Sigoto	Director of Nursing, Gizo Hospital and Western Province Health Services
Ms. Niumally Tutuo	Nurse Head, Gizo Hospital
Mr. Fred Naptali	Environmental Health Officer

National Medical Store

Ms. Marianne Saemanea	Assistant Manager

Solomon Islands Electric Authority (SIEA)

Mr. Martin Sam	Distribution Manager, SIEA HQ
Mr. Isaiah Pitakaka	Station Manager, SIEA Gizo

Solomon Islands Water Authority (SIWA)

Mr. Ray Anderson	Divisional Manager

Solomon Meteorology Service

Mr. Llotd Tahani

Solomon Police Station

Mr. John Kolon	Director of Fire Service

Japan Side

Embassy of Japan

Mr. Hiroaki Fujiwara	First Secretary

JICA Solomon Islands Office

Mr. Tokuro Watanabe	Resident Representative
Mr. Yoshihiko Nishimura	Project Formulation Advisor
Ms. Nozomi HAKATA	JICA Expert for Aid Coordination, Ministry of Development Planning and Aid Coordination

4. MINUTES OF DISCUSSION (Basic Design Survey)

MINUTES OF DISCUSSIONS
ON THE BASIC DESIGN STUDY
ON THE PROJECT FOR RECONSTRUCTION OF GIZO HOSPITAL
IN SOLOMON ISLANDS

In response to a request from the Government of Solomon Islands, the Government of Japan decided to conduct a Basic Design Study on the Project for Reconstruction of Gizo Hospital (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Solomon Islands the Basic Design Study Team (hereinafter referred to as "the Team"), which is headed by Mr. Shumon Yoshiara, Team Director, Health Team, Project Management Group II, Grant Aid Management Department, JICA, and is scheduled to stay in the country from October 1st to October 24th, 2007.

The Team held discussions with the officials concerned of the Government of Solomon Islands and conducted a field survey at the study area.

In the course of discussions and field survey, both parties have confirmed the main items described on the attached sheets. The Team will proceed to further works and prepare the Basic Design Study Report.

Honiara, October 17th, 2007

Mr. Shumon Yoshiara
Leader
Basic Design Study Team
Japan International Cooperation Agency

Dr. George Malefoasi
Permanent Secretary
Ministry of Health and Medical Services (MHMS)
The Government of Solomon Islands

Mrs. Jane Waetara
Permanent Secretary
Ministry of Development Planning and Aid Coordination
The Government of Solomon Islands

Mr. Arnold Moveni
Provincial Secretary, Western Province

Witness

Mr. Peter Hauia
Permanent Secretary
Ministry of Infrastructure and Development
The Government of Solomon Islands

Dr. Gregory Jilini
Director of Western Province Health Services
Director of Gizo Hospital

ATTACHMENT

1 Objective of the Project

The objective of the Project is to recover and to improve the health and medical services provided by Gizo Hospital.

2 Project site

The site of the Project is the adjacent place of the existing Gizo Hospital, lot No.535 and 536 shown in Annex-7 in Gizo Island. The construction site is shown in Annex-1.

3 Responsible and Implementing Agency

3-1 The Responsible and Implementing Agency is the Ministry of Health and Medical Service, the Government of Solomon Islands.

3-2 Organization chart of above Agency and the New Gizo Hospital Task Force are shown in Annex-2.

4 Items requested by the Government of Solomon Islands

After discussion between MHMS and the Team, the items described in Annex-3 (for Facilities) and Annex-4 (for Equipment) were finally requested by the Government of Solomon Islands. The final components of the Project will be decided after further studies, and JICA will assess the appropriateness of the requests and will summarize them into the draft basic design study report.

5 Japan's Grant Aid Scheme

5-1 The Government of Solomon Islands understands the Japan's Grant Aid Scheme explained by the Team, as described in Annex-5.

5-2 The Government of Solomon Islands will take the necessary measures, as described in Annex-6, for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented.

6 Schedule of the Study

6-1 The consultants will proceed to further studies in the Solomon Islands until October 24th, 2007.

6-2 JICA will prepare the draft basic design study report in English and dispatch a mission in order to explain its contents.

6-3 In case that the contents of the report is accepted in principle by the Government of Solomon Islands, JICA will complete the final report and send it to the Government of Solomon Islands.

7 Other relevant issues

7-1 Land Title Deed of the Project Site

Both Solomon Islands and Japan sides confirmed that the land for the Project shown in Annex-1 is secured by Western Province Government. The location is officially shown as the copy of the estate register in Annex-7.

7-2 Sustainability of the Project

The Government of Solomon Islands agreed to allocate enough budget and manpower to manage Gizo Hospital, to operate the equipment and facilities supplied by the Project, and to

cover the provision of spare parts, consumables, reagents, and periodical maintenance contracts.

7-3 Soft Component

The Government of Solomon Islands requested technical support for facility (electrical, mechanical, and so on) and equipment maintenance. The Team would convey the request to the Government of Japan.

7-4 Tax Exemption for the Project

The Government of Solomon Islands shall take necessary measures to exempt Japanese nationals who will be engaged in the Project from all duties and related fiscal charges which may be imposed in the Solomon Islands with respect to the import and local procurement of equipment and services supplied under the verified contract.

7-5 Confidentiality of the Project

Both sides confirmed that the detailed specifications of the drawings, equipment and other technical information shall not be released, before the tender is held in the implementation stage of the Project.

7-6 Maintenance Organization and Staff of the Project

The Government of Solomon Islands shall ensure to deploy sufficient number of skilled staff for management and operation/maintenance services (electrical, mechanical, and equipment) as described in Annex-8.

7-7 Improvement of Infrastructure Work for the Project*

The Government of Solomon Islands agreed to complete necessary improvement of infrastructure work by the end of 2008, which is shown on Annex-9. The Government of Solomon Islands ensured to submit the document (1. Drawing and specifications, 2. Budget, 3. Schedule) through JICA Solomon Islands Office to the Team by the end of December 2007.

7-8 Staff Housing*

The Government of Solomon Islands agreed that the accommodations for the Hospital staff shall be constructed by the Government of Solomon Islands before the completion of the Project. The budget and implementation plan shall be submitted through JICA Solomon Islands Office to the Team by the end of December 2007. (Annex-10)

7-9 Hospital Jetty*

Both sides agreed that Jetty of the Hospital shall be renovated. The budget and implementation plan shall be submitted through JICA Solomon Islands Office to the Team by the end of December 2007.

7-10 Relocation and Installation of the Existing Equipment

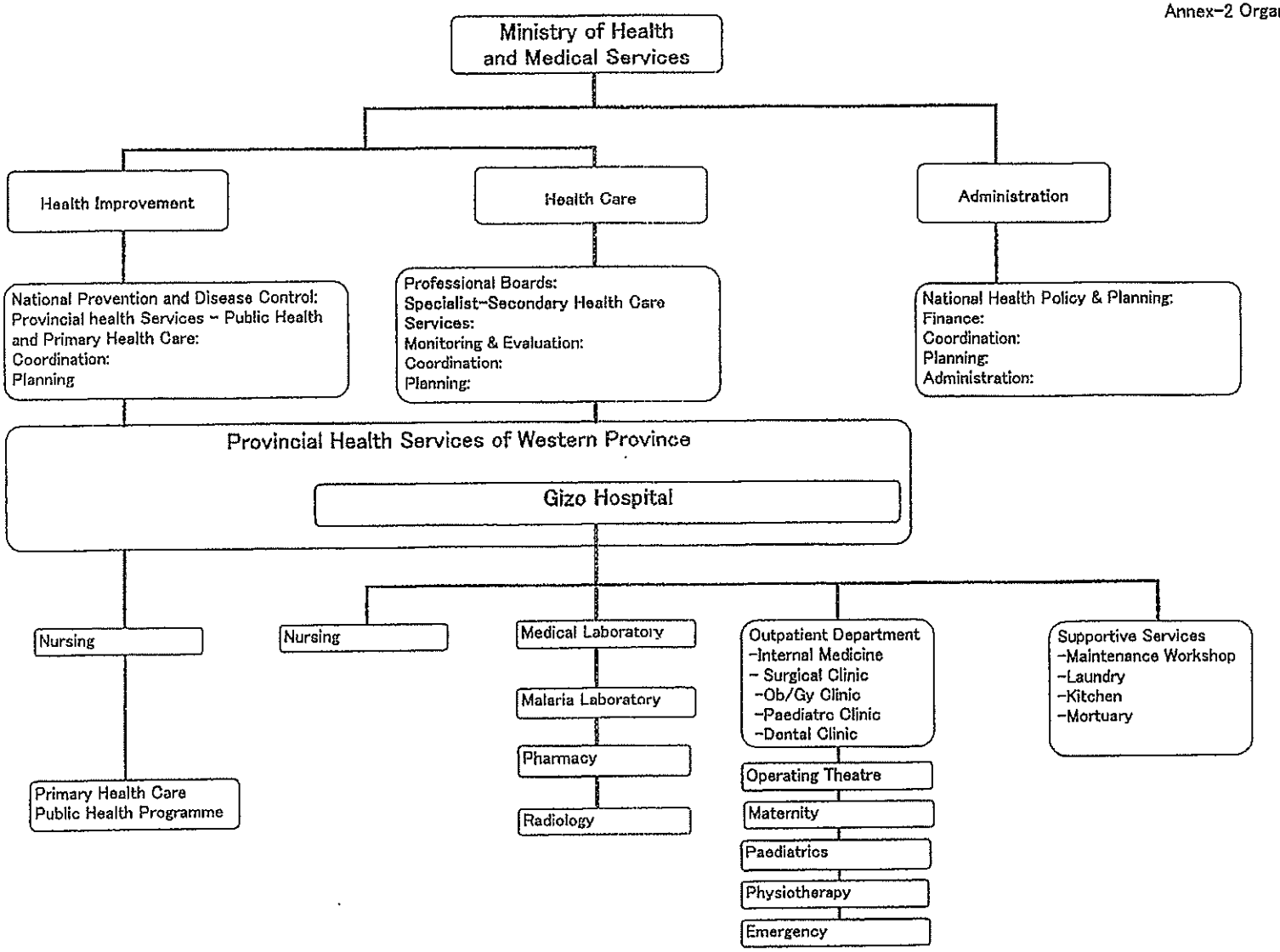
Both sides agreed that the Government of Solomon Islands shall relocate and install the existing equipment including General X-ray unit and autoclave to New Gizo hospital.

*Items are essential to obtain expected function of the Hospital.

Annex-1: Project Site Map
Annex-2: Organization Chart and the New Gizo Hospital Task Force
Annex-3: Requested Items (Facilities)
Annex-4: Requested Items (Equipment)
Annex-5: Japan's Grant Aid Scheme
Annex-6: Major Undertakings to be taken by Each Government
Annex-7: Land Register for the Project Site (Copy)
Annex-8: Recommended Maintenance Organization and National Maintenance Technical Support Committee
Annex-9: Improvement of Infrastructure Work
Annex-10: Construction Scheme of Staff Housing

Annex-1 Project Site Map
scale 1/1000

Annex-2 Organization Chart



WESTERN PROVINCIAL GOVERNMENT

P O Box 36
Gizo
Western Province
SOLOMON ISLANDS

Your Ref:
Our Ref: F 7/1/12

Tel:(677) 60860
Fax: (677) 60856

11th October 2007

Mr. Shumon Yoshiara
JICA Team Leader to the New Gizo Hospital
C\o. Gizo Hotel
Gizo
Western Province

Dear Mr. Yoshiara,

RE: APPOINTMENT OF THE NEW GIZO HOSPITAL TASK FORCE

Due to the urgent need to replace the Gizo Hospital which was badly damaged by the earthquake and the subsequent tsunami that followed on the 2nd April 2007, this letter serves to inform you that the Western Provincial Executive has appointed a so-called New Gizo Hospital Task Force in its meeting held on the 9th October 2007 to deal with matters that may have arisen in relation to the construction of the proposed new Gizo Hospital. The New Gizo Hospital Task Force comprise of the following members:

(1) Hon. Alex Lokopio, MPA (Premier) - Chairman
(2) Mr. Arnold Moveni (Provincial Secretary) - Project Manager
(3) Dr. Gregory Jilini (Director of Provincial Health Service) - Member
(4) Mr. Alfred Vilaka (Gizo Hospital Secretary) - Member
(5) Mr. Andrew Duncan (Provincial Civil Engineer)- Member
(6) Mr. Issaiah Pitakaka (SIEA Gizo Station Manager) - Member
(7) Mr. Eddie Waneolofia (Acting Chief Lands Officer)- Member

The term in office of the New Gizo Hospital Task Force depends on the completion of certain tasks and the provision of relevant information required by JICA. Consequently, the New Gizo Hospital Task Force is expected to be automatically dissolved only after it has completed its mandate.

Yours sincerely,

A. Moveni
Provincial Secretary
Western Province

FINAL REQUEST		
Priority		Component
1.	CLINICAL AREAS	
	A	Out patient department
		Emergency department
		Inpatient department · Medical ward · Surgical ward · Obstetric ward · Pediatrics ward · TB/Psychiatrics ward
		Delivery and Nursery department
		Operation department
2.	CLINICAL SUPPORT UNITS	
	A	Medical Imaging department
		Pathology department
		Pharmacy
	C	Provincal druge storage
	A	Medical records
		Central sterilizing and supply department
3.	ADINISTRATIVE SUPPORT UNITS	
	A	General administration
	C	Executive offices
4.	PUBLIC AMENITIES	
	C	Public toilets
		Guardian laundry and wash area for "wantoks"
5.	GENERAL SUPPORT SERVICES	
	A	Kitchen
		Laundry
	B	Workshop
	C	Hospital stores
		Mortuary
		Fuel and Flammable store
		Provincial stores
6.	ENGINEERING UNITS	
	A	Emergency Generator
		Water supply
	C	Waste Incinerator
		Solar power
7.	ACCESS	
	A	Ambulance bay
		Parking for maintenance
	C	Boat wharf
		Access road between new hospital and wharf
8.	DISASTER PREVENTION FUNCTION	
	A	Wireless communication center (space)
	C	Accomodation for traveling clinic teams
	A	Water reservoir tank
	C	Sea fence
9.	PUBLIC HEALTH FACILITIES	
	C	
10.	STAFF HOUSING	
	C	

A: Essential

B: Necessary

C: Least priority

Annex-4 Requested Items (Equipment)

	Description	Priority
1. Clinical equipment – General		
1.1	Consulting room (Surgery, Medicine, Ob/Gy, Paediatrics)	
1-1	X-ray viewer – 2film	A
1-2	Suction machine	A
1-3	Exam light – mobile	A
1-4	Otoscope / Ophthalmoscope	A
1-5	Spiro meter	C
1-6	BP mobile	B
1-7	BP wall mounted	C
1-8	Patient scales – adult	C
1-9	Patient scales – baby (sliding weight)	C
1-10	Height scale for infant	C
1-11	Height scale for paediatric	C
1-12	Operating light	A
1-13	Examination couch	B
1-14	Slit lamp (eye)	B
1.2	Dental clinic	
1-15	Dental chair	A
1-16	Dental instrument set	B
1.3	ENT clinic	
1-17	ENT chair	C
1-18	Endoscope (Laryngoscope)	C
1.4	Ward	
1-19	Ward bed & bedside cabinet	B
1-20	Paediatric cot	B
1-21	Emergency stretcher	B
1-22	Oxygen flow meter	C
1-23	Nebulizers	B
1-24	Pulse oximeter	C
1-25	Infusion pump	C
1-26	IV stand	C
1-27	Pan washer	C
1-28	Pulse oximeter	C
1-29	Syringe pump	C
1-30	Examination couch	B
2. Physiotherapy		
2-1	Hot pack heater	B
2-2	Treatment table	B
3. CSSD Equipment		
3-1	Sterilizer loading trolley	A
3-2	High pressure steam sterilizer	A
3-3	Sterilization work unit	C
4. X-ray department		
4-1	Mobile X-ray machine	A
4-2	Ultrasound machine	A
4-3	General X-ray machine	C
4-4	X-ray film refrigerator	C
4-5	X-ray viewer – 2film	A
4-6	Dental X-ray unit	A
4-7	Processing equipment	C
4-8	X-ray accessories: lead aprons, films, viewing boxes	C
4-9	X-ray fluoroscopy	C

	Description	Priority
5. Laboratory		
5.1 Haematology		
5-1	Hematocrit autoclave (centrifuge)	C
5-2	Medical microscope	C
5-3	Haemoglobin meter	C
5-4	Rotary shaker	C
5-5	Blood cell counter	C
5-6	Blood sedimentation test apparatus	C
5-7	Instrument cabinet	C
5-8	Refrigerator	C
5.2 Biochemistry		
5-9	Spectrometer	B
5-10	Automatic water distillation unit	A
5-11	Water bath	C
5-12	Electric balance	C
5-13	Table top steam sterilization	C
5-14	Stirrer	C
5-15	Magnetic stirrer	C
5-16	Hot plate	C
5-17	Labo glass wares	C
5.3	Immunology	
5-18	Autoclave for laboratory	B
5-19	Incubator	C
5-20	Plate mixer	C
5.4	Pathology	
5-21	Paraffin melting apparatus Paraffin stretcher (Semi-automatic)	C
5-22	Microtome	C
5.5 Malaria laboratory		
5-23	Electric balance	A
6. Pharmacy equipment		
6-1	Electric balance	A
6-2	Automatic water distillation unit	A
6-3	Refrigerator (drug – full sized)	B
7. Operating suite / Treatment room		
7.1	Operating theatre	
7-1	Operating room light	A
7-2	Treatment room light	A
7-3	Operating table	A
7-4	Anaesthetics machine with ventilator	A
7-5	Suction unit	A
7-6	Bedside monitor	A
7-7	Defibrillator	A
7-8	Hand washing water sterilizer	A
7-9	Electro surgical unit	A
7-10	Instruments for general surgery	A
7-11	Stretcher	B
7-12	Infusion pump	C
7-13	Instruments for laparotomy	B
7-14	Instruments for Caesarean	B
7-15	X-ray viewer – 2film (built in-operating theatre)	C
7-16	Anaesthetic equipment trolley	C
7-17	Blood warmer	C
7-18	Instrument trolley	C
7-19	Mayo table	C

	Description	Priority
7-20	Bowl stand	C
7-21	Washing basin	C
7-22	Gastrointestinal fiberscope	C
7-23	Oxygen set	C
7-24	Patient scales – adult	C
7-25	Patient scales – baby (sliding weight)	C
7-26	Instrument cabinet	C
7-27	Kick bucket	C
8. Critical care (HDU)		
8-1	Defibrillator	C
8-2	Patient monitor	C
8-3	Suction unit	B
8-4	Mobile resuscitation unit	C
8-5	Bag resuscitator with adult & paed masks	B
8-6	Ventilator	C
8-7	Stretcher	B
8-8	Gatch bed	B
8-9	X-ray viewer – 2film	B
8-10	Bag resuscitator with adult & paed masks	C
8-11	Laryngoscope set adult & paed	C
8-12	Refrigerator	C
8-13	IV stand	C
8-14	Refrigerator	C
8-15	Instrument cabinet	C
8-16	Low pressured constant suction unit	C
9. Obstetrics		
9.1	Delivery room	
9-1	Pregnancy delivery table	A
9-2	Vacuum extractor w/soft vacuum cup	A
9-3	Operation light	A
9-4	Vacuum extractor unit	C (duplicate)
9-5	Cardiotocograph	B
9-6	Navel clamp and catheter set	C
9.2	Labour room	
9-7	Labour bed	A
9-8	Portable count doppler	C
9.3	Nursery	
9-9	Incubator	A
9-10	Phototherapy unit	A
9-11	Infant warmer	A
9-12	Resuscitator bag set	A
9-13	Small type suction unit	A
9-14	Nebulizers	A
9-15	Oxygen monitor	B
9-16	Baby cot	B
9-17	Infant resus unit	C
9-18	Refrigerator	C
9-19	IV stand	C
9-20	Patient scales – baby (Sliding weight)	C
9-21	Oxygen set	C
9-22	Medicine trolley	C
9-23	Neonatal monitor	C
9-24	Pulse oxymeter	C
9-25	Pan washer	C

	Description	Priority
9-26	Emergency cart	C
9-27	Ice making machine	C
9-28	Baby resuscitation trolley	C
10. Emergency		
10-1	Treatment table	A
10-2	Operation light (stand type)	A
10-3	Suction unit	A
10-4	Defibrillator	B
10-5	Emergency instrument set	A
10-6	Boiling sterilizer	B
10-7	Emergency cart	C
10-8	Oxygen set	C
10-9	Resuscitator bag set	B
10-10	Observation bed	B
11. Others		
11-1	Oxygen plant	C
11-2	Maintenance set	A

A: Essential
B: Necessary
C: Least priority

5-1. Japan's Grant Aid System

The Grant Aid scheme provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

(1) Grant Aid Procedures

Japan's Grant Aid Scheme is executed through the following procedures.

Application	(Request made by a recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and Approval by Cabinet)
Determination of Implementation	(The Notes exchanged between the Governments of Japan and the recipient country)

Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for the Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm(s).

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Scheme, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes (E/N) signed by the Governments of Japan and the recipient country.

Finally, for the smooth implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

(2) Basic Design Study

1) Contents of the Study
The aim of the Basic Design Study (hereafter referred to as "the Study"), conducted by JICA on a requested project (hereafter referred to as "the Project")

is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:

- Confirmation of the background, objectives, and benefits of the requested Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.
- Confirmation of items agreed upon by both parties concerning the basic concept of the Project.
- Preparation of a Basic Design of the Project
- Estimation of cost of the Project

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For smooth implementation of the Study, JICA uses (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA.

The consulting firm(s) used for the Study is(are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency.

(3) Japan's Grant Aid Scheme

1) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

2) "The period of the Grant Aid" means the one fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consulting firm(s) and (a) contractor(s) and final payment to them must be completed.

However, in case of delays in delivery, installation or construction due to unforeseen factors such as natural disaster, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

3) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However, the prime contractors, namely, consulting constructing and procurement firms are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

4) Necessity of "Verification"
The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. The "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

5) Undertakings required to the Government of the Recipient Country
In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the following:

① To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction,

② To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites,

③ To secure buildings prior to the procurement in case the installation of the equipment,

④ To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid,

⑤ To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts,

⑥ To accord Japanese nationals, whose services may be required in connection with the supply of the products and services under the Verified contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

6) "Proper Use"
The recipient country is required to operate and maintain the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

7) "Re-export"
The products purchased under the Grant Aid should not be re-exported from the recipient country.

8) Banking Arrangements (B/A)

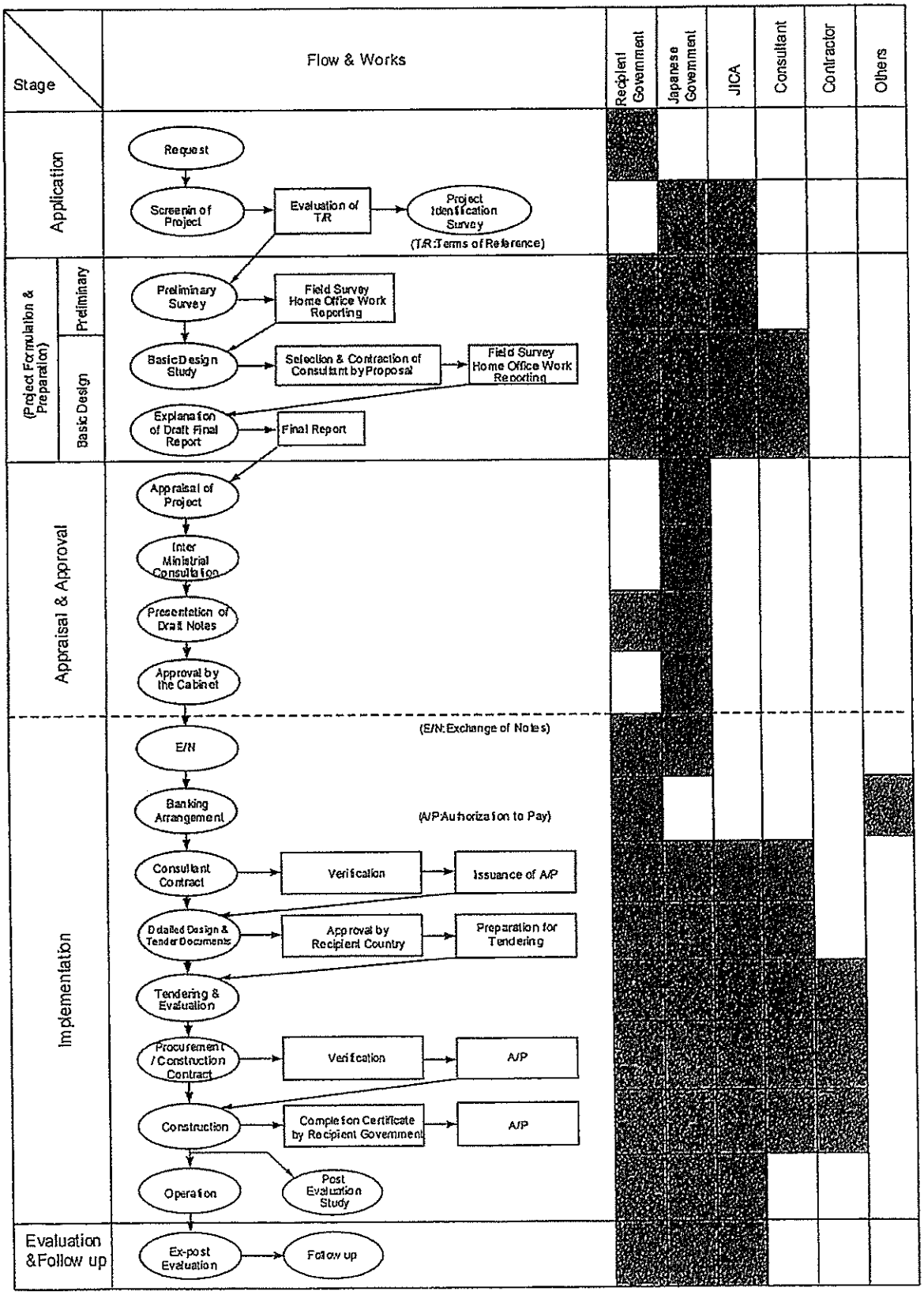
a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

9) Authorization to Pay (A/P)
The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions to the Bank.

5-2. Grant Aid Procedures

Flow Chart of Japan's Grant Aid Procedures



Annex-6

Major Undertakings to be taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	To secure land		●
2	To clear, level and reclaim the site when needed		●
3	To construct gates and fences in and around the site		●
4	To construct the parking lot	●	
5	To construct roads		
	1) Within the site	●	
	2) Outside the site		●
6	To construct the building	●	
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1) Electricity		
	a. The distributing line to the site		●
	b. The drop wiring and internal wiring within the site	●	
	c. The main circuit breaker and transformer	●	
	2) Water Supply		
	a. The city water distribution main to the site		●
	b. The supply system within the site (receiving and elevated tanks)	●	
	3) Drainage		
	a. The city drainage main (for storm, sewer and others to the site)		●
	b. The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	●	
	4) Gas Supply		
	a. The city gas main to the site		●
	b. The gas supply system within the site	●	
	5) Telephone System		
	a. The telephone trunk line to the main distribution frame/panel (MDF) of the building		●
	b. The MDF and the extension after the frame/panel	●	
	6) Furniture and Equipment		
	a. General furniture		●
	b. Project equipment	●	
8	To bear the following commissions to the Japanese bank for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
9	To ensure unloading and customs clearance at port of disembarkation in recipient country		
	1) Marine (Air) transportation of the products from Japan to the recipient	●	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	(●)	(●)
10	To accord Japanese nationals, whose services may be required in connection with the supply of the products and the services under the verified contact, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
11	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts		●
12	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant		●
13	To bear all the expenses, other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment		●

(B/A: Banking Arrangement, A/P: Authorization to pay)

Annex-7

Land Title Deed for the Project Site

- New Gizo Hospital Project in Lots 535 and 536
- Drawing of Registered Land Lots
- Estate Register 097-003-43, 097-003-44
  (Estate Register 097-003-44 will be submitted by the end of mission of basic design team in Solomon Islands)

SOLOMON ISLANDS GOVERNMENT
Regional Lands Centre
Western Region
PO Box 55
Gizo
WESTERN PROVINCE

Telephone: (677): 60533
Facsimile: (677) 60533

Lands

Your Ref:
Our Ref: AD/1/1

Permanent Secretary
Ministry of Health & Medical services
P.O. Box 349
Honiara

9/10/2007

Dear Sir/Madam,

RE: NEW GIZO HOSPITAL PROJECT IN LOTS 535 & 536.

Be advised that Lot 535 of parcel number 097-003-043 & lot 536 of parcel number 097-003-044 were approved by the provincial government executive to be developed for the hospital project which will be funded by the Japanese Government. A letter confirming this approval was already send by the provincial secretary to the permanent secretary of the Ministry of Health & Medical services dated 7th September 2007.

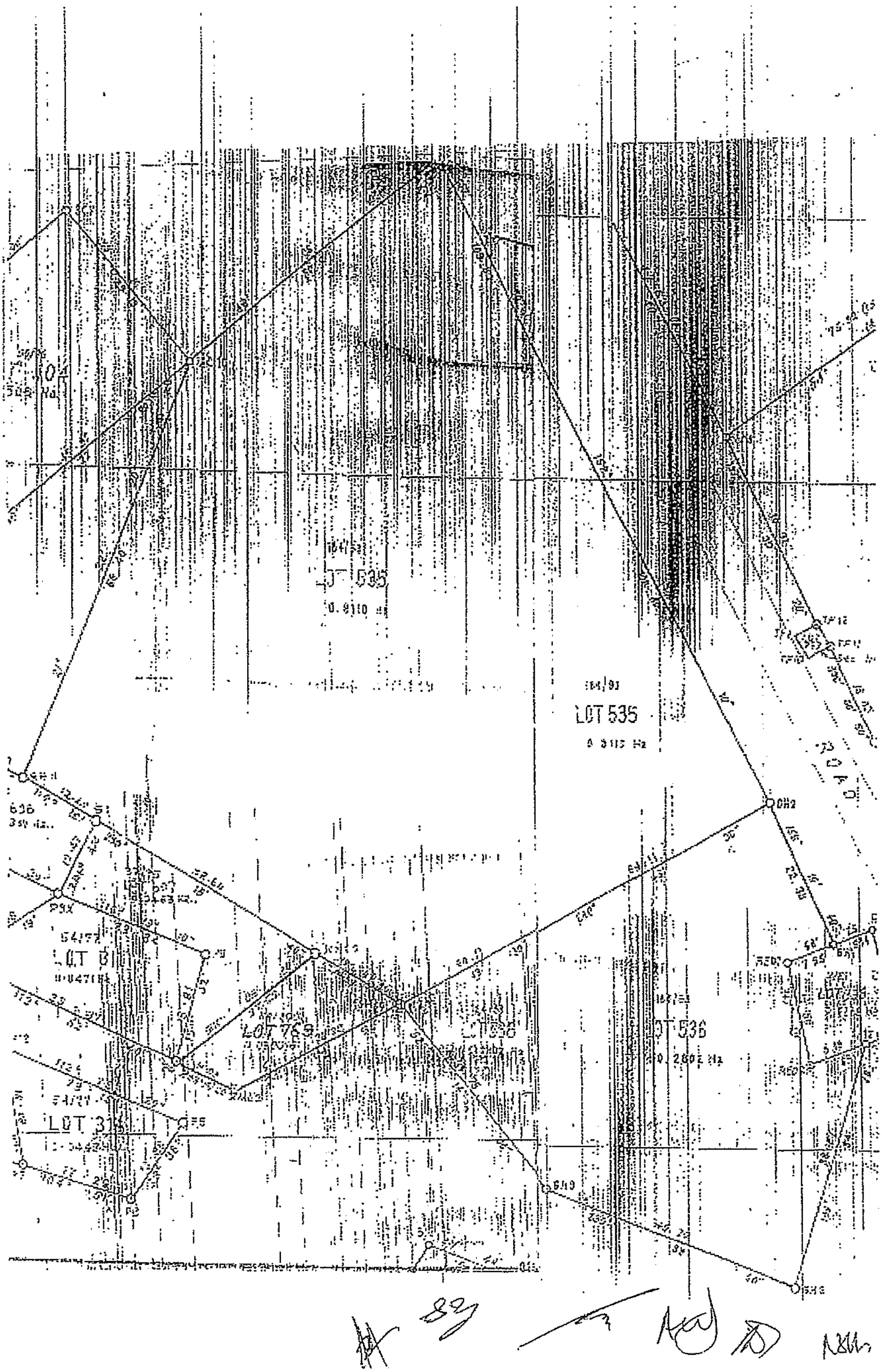
On behalf of the Western Regional lands office I would like to confirm that Fixed Term Estate for both lots were held by the premier of Western Province on behalf of the western provincial government. Legal ownership of the above lots can be obtained from Registrar of Titles in Honiara.

In this regard I firmly confirm that the above lots were held by the premier of western province and approved by the Western province executive for the new hospital development.

Thank you

Eddie Waneolofia
Lands Officer
For: Provincial Secretary
Western Province.

Cc. Gizo Hospital secretary
Cc. Commissioner of Lands
Cc. Premier Western Province
Cc. JICA


LOT 535
LOT 536
LOT 759

HONIARA LAND REGISTRY

FIXED - TERM ESTATE REGISTER

PARCEL NUMBER

Edition 1

Opened ... 11 '04

Number of pages in this Register: 2

PART A - PROPERTY SECTION

PARCEL NUMBER 097-003-43

Grantor: COMMISSIONER OF LANDS

Grantee: PREMIER

Term: 75 years From: 1/6/92 Rent:

Area (approx.) ... ha. Survey/Filed Plan No.:

Date of Grant: 7th September 1992

Mutation Number: 32/2004

Superseded Parcels: 097-003-41

Current Parcels: 097-003-42 & 097-003-43

EASEMENTS APPURTENANT ETC.

PART B - OWNERSHIP SECTION

Entry No.	Name, Description and Address of Owner and Restrictions affecting Right of Disposition	Application Number	Y	M	D	Observations (Nature of Instrument, Consideration, etc.)	Signature of Registrar
1.	RESTRICTION: No subdivision, lease, sublease, transfer or charge is to be registered without the written consent of the Grantor.	597/04	1992	9	10	Grant & s.132(3) of the L.T.Act. (Cap. 133).	
2.	PREMIER, for and on behalf of the Western Province.	427/04	2004	7	22	Mutation	

LANDS 6A

ANY ENTRIES STRUCK THROUGH IN RED ARE NO LONGER SUBSISTING

Page 2

PART C - INCUMBRANCES SECTION

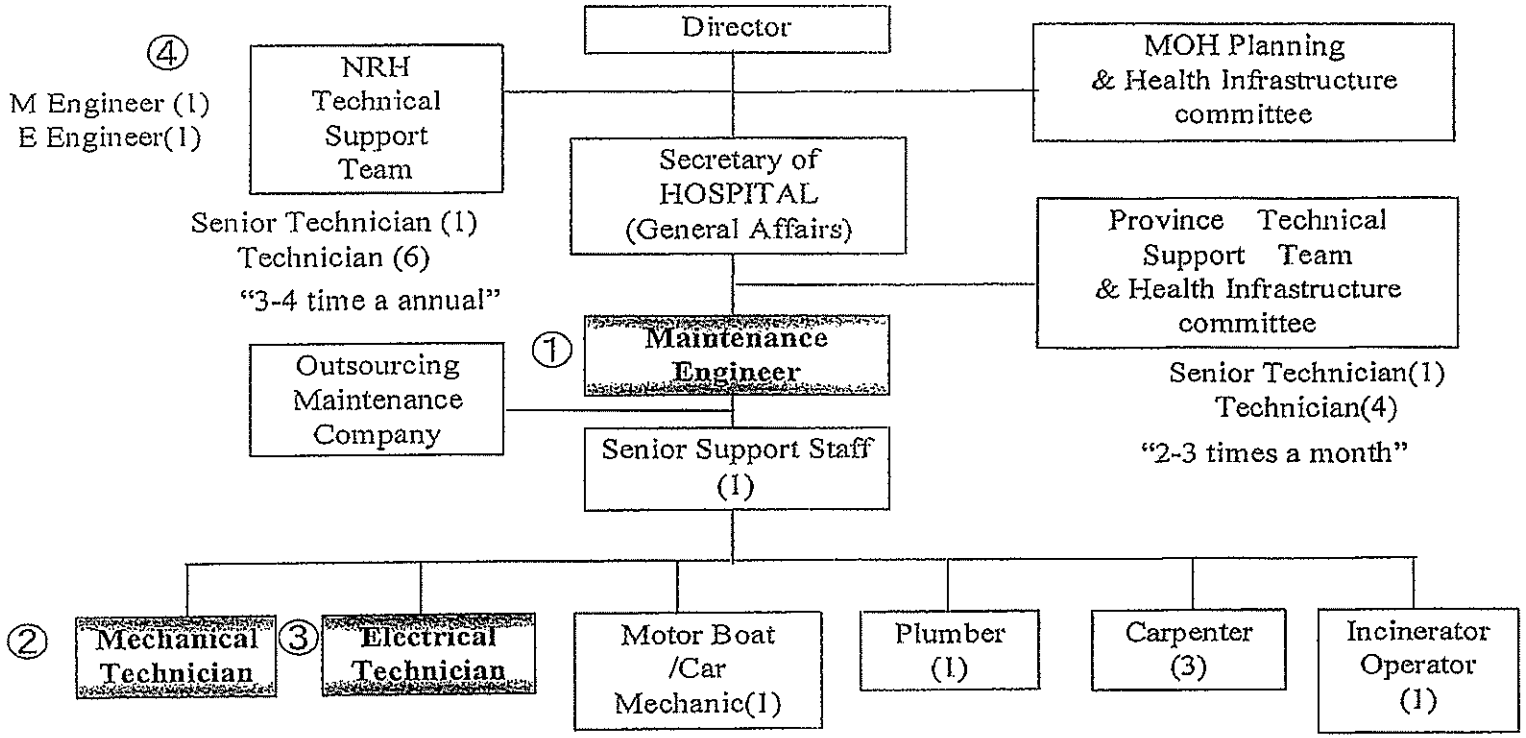
FIXED - TERM ESTATE REGISTER

PARCEL NUMBER .....

Entry No.	Nature of Incumbrance	Application Number and Date of Presentation Number	Y	M	D	FURTHER PARTICULARS	Signature of Registrar	Surrender, Cancellation etc.
1.	Obligations incident to estate	697/04	1992	9	10	The covenants, obligations, liabilities etc. contained or implied in the Instrument of Grant.		

ANY ENTRIES STRUCK THROUGH [illegible] ARE NO LONGER SUBSISTING

Recommended Maintenance Organization of Gizo Hospital (Case 1)



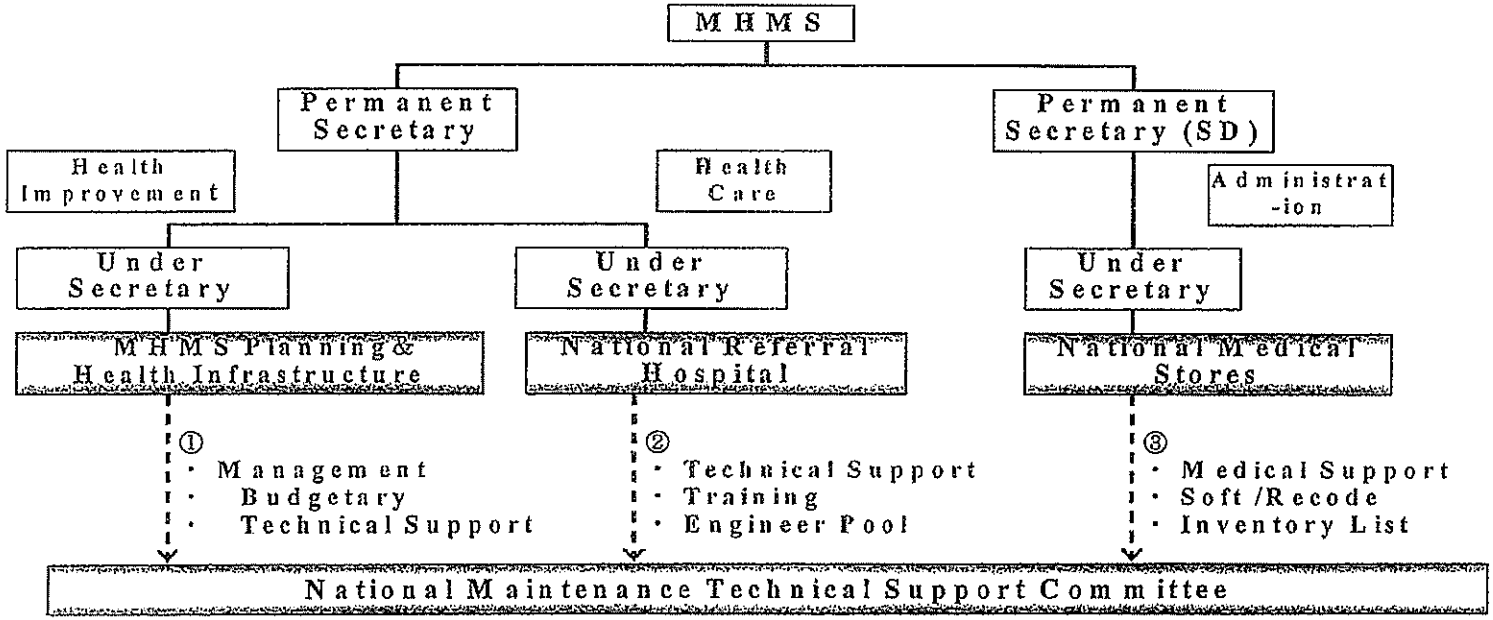
①②③ "New Employee Staff" of GIZO Hospital
④ "New Employee Staff" of NRH in Honiara

Annex-8

Recommended Maintenance Organization of Gizo Hospital (Case 2-1)

(Basically the Team recommends combination of Case 1 and 2.
In case, Case 1 is difficult, at least Case 2 is recommended)

National Maintenance Technical Support Committee For Building Facility and Medical Equipment

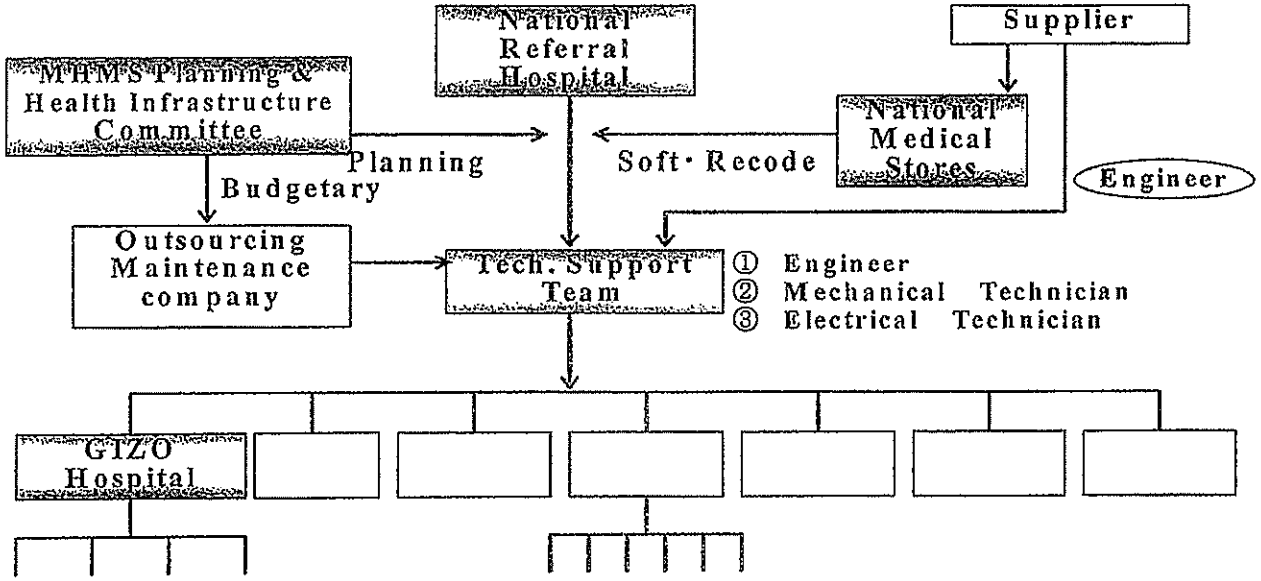


Chairman : One of under secretary (Dr. Divi or Dr. Cedric)
Executive Member : ①Director of Planning& Major committee member of Infrastructure
②Director of NRH ③、Director of NMS
Member : MHMS Planning
: NRH
: NMS

Recommended Maintenance Organization of Gizo Hospital (Case 2-2)

(Basically the Team recommends combination of Case 1 and 2.
In case, Case 1 is difficult, at least Case 2 is recommended)

National Maintenance Technical Support Plan



No.	Project Name	Implementing Agecy	Improvement of Infrastructure Work for the Project
1)	GizoTown WaterSupply System Rehabilitation	Urban Water Suuply & Works Department of Western Province	①Provide new water tanks at TISI(TC) water source which is water supply to Gizo Hospital ②Provide new piping from TC to Gizo Hospital
2)	Distribution/Transmissin and Generator Capacity Improvement Program	Solomon Islands Electricity Authority (SIEA) of Western Province	①Upgraiding and reroute the high tension (11KV)line and suupl the 11KV power to Gizo Hospital ②Install high tensin Generators in SIEA Gizo Sub-Staion
3)	Gizo Sewer Pumpimg System Improvement	Works Department of Western Province	①Peovide two sewer pumping system for one pumping at sewer storage tank of Gizo Town in existing Gizo Hospital ②Improve piping and control panel due to above

Staff Housing

Staff Housing

The Western Province requested 49 blocks of staff quarter for medical field. 12 of them were granted by AusAID, and the construction will start in February 2008. The rest of them (37) are currently under consideration by the Ministry of Health and Medical Services, which is on the process of estimation for budget claim of 2008.

Location in Gizo	No. of housing for medical staff	Descriptions
JAH Mountain	9	Under consideration by the Government
Malakerave 1	10	Under consideration by the Government
Babylon	16	AusAID will provide 12 blocks
Top Hill (Former care centre)	4	Under consideration by the Government
Remaining blocks required	10	Location to be found
Total	**49**	

(Explanation on Draft Report)

MINUTES OF DISCUSSIONS ON THE BASIC DESIGN STUDY ON THE PROJECT FOR RECONSTRUCTION OF GIZO HOSPITAL IN SOLOMON ISLANDS (EXPLANATION ON DRAFT REPORT)

In October 2007, Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Basic Design Study team on the Project for Reconstruction of Gizo Hospital (hereinafter referred to as "the Project") to Solomon Islands, and through discussion, field survey, and technical examination of the study results in Japan, JICA prepared a draft report of the study.

In order to explain and to consult the Solomon Islands side on the components of the draft report, JICA sent to Solomon Islands the Draft Report Explanation Team (hereinafter referred to as "Team"), which is headed by Mr. Akihiko Hoshino, Director, Project Management Division II, Loan and Grant Aid Support Department, JICA, and is scheduled to stay in the country from August 3rd to August 15th, 2008.

In the course of discussions, both parties have confirmed the main items described on the attached sheets. The Team will proceed to further works and prepare the Basic Design Study Report.

Honiala, August 11th, 2008

Mr. Akihiko Hoshino
Leader
Basic Design Study Team
Japan International Cooperation Agency

Dr. George Manimu
Permanent Secretary
Ministry of Health and Medical Service (MHMS)
The Government of Solomon Islands

Mrs. Jane Waetara
Permanent Secretary
Ministry of Development Planning and Aid Coordination
The Government of Solomon Islands

for Mr. Arnold Moveni (PS/MoPC)
Provincial Secretary
Western Province

Witness

Mr. John Ta'aru
Permanent Secretary
Ministry of Infrastructure and Development
The Government of Solomon Islands

Dr. Cedric Alependava
For Director of Western Province Health Services
Director of Gizo Hospital

ATTACHMENT

1. Components of the Draft Report

The Solomon Islands side agreed and accepted in principle the components of the draft report explained by the Team.

2. Japan's Grant Aid Scheme

The Solomon Islands side understands the Japan's Grant Aid Scheme and the necessary measures to be taken by the Government of Solomon Islands as explained by the Team and described in Annex-5 and 6 of the Minutes of Discussions signed by both parties on October 17th, 2007.

3. Schedule of the Study

JICA will complete the final report in accordance with the confirmed items and send it to the Government of Solomon Islands by December 2008.

4. Confidentiality of the Project

Both sides confirmed that all information related to the Project including detailed specifications of equipment and other technical information shall not be released to any outside parties before the signing of all the Contract(s) for the Project.

5. Other relevant issues

5-1. Confidentiality of the Project Cost Estimation

The Team explained the cost estimation of the Project as described in Annex-1. Both sides agreed that the Project Cost Estimation should never be duplicated or released to any outside parties before signing of all the Contract(s) for the Project. The Solomon Islands side understands that the Project Cost Estimation described in Annex-1 is not final and is subject to change.

5-2. Operation and Maintenance Cost

The Government of Solomon Islands agreed to secure and allocate necessary budget and personnel such as cost for operation and maintenance/repair works as described in Annex-2 to sustain facility and equipment supplied under the Project.

5-3. Improvement of Infrastructure and Construction Work by Solomon Islands side

The Government of Solomon Islands agreed to implement necessary infrastructure and construction work related to the Project by appropriate time as stipulated in Annex-3.

5-4. Sewage System

The Government of Solomon Islands requested that a sewage piping connection to the public septic tank and related works should be constructed by Japanese side for purposes of technical consistency of sewage system.

5-5. Water supply system

The Government of Solomon Islands agreed to implement the water supply system for Gizo town including Gizo hospital before the end of December, 2009.

Annex-1 Project Cost Estimation
Annex-2 Operation and Maintenance Cost for Facility and Equipment
Annex-3 Improvement of Infrastructure Work by Solomon Islands side
Annex-4 Tentative Schedule of the Project

Annex-2 Operation and Maintenance Cost for Facility and Equipment

(1) Operation Cost (Manning Plan) of Gizo Hospital

Note: Budget for additional staff will be incorporated in fiscal year 2011.

Medical staffer	Yearly income (SBD)	Present staff		Additional staff	
		Present no.	Present wages	Increased no.	Increased cost
Specialists	130,000	—	—	5	650,000
GPs	85,000	3	255,000	1	85,000
Dentists	85,000	1	85,000	1	85,000
Registered nurses	40,000	59	2,360,000	16	640,000
Statistician	40,000	1	40,000	—	—
Pharmacist	60,000	1	60,000	—	—
Lab technicians	60,000	2	120,000	—	—
X-ray technicians	60,000	2	120,000	—	—
Physiotherapist	60,000	1	60,000	—	—
Environmental health officer	60,000	1	60,000	—	—
Public health officers	60,000	6	360,000	—	—
Technicians	30,000	4	120,000	2	60,000
Office clerks	30,000	3	90,000	—	—
Total		84	3,730,000	25	1,520,000
				Increase by 41%	

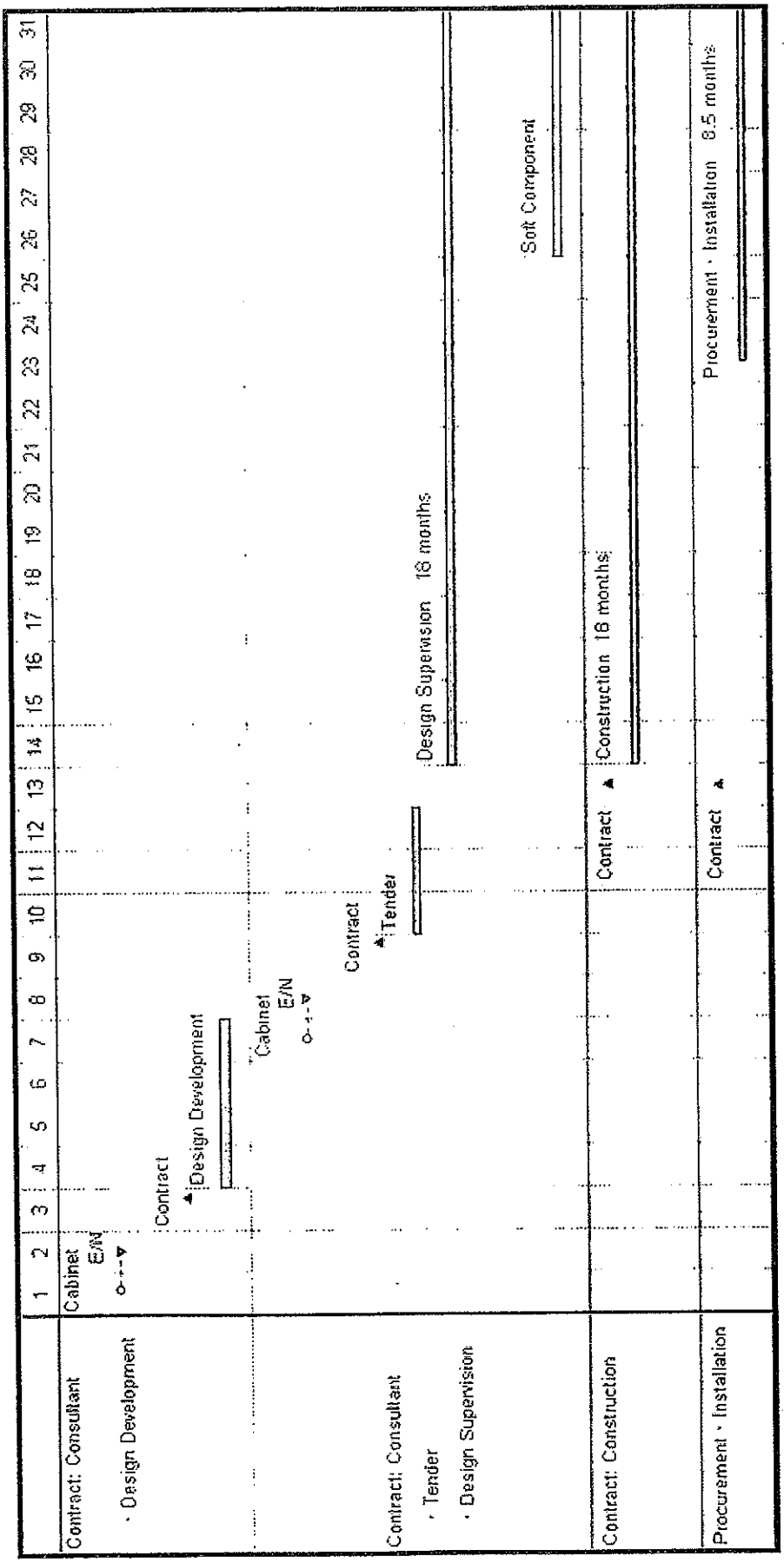
(2) Maintenance Cost of Gizo Hospital

Item	Initial fiscal year	Following fiscal years
① Electricity charge	272,160	272,160
② Telephone charge	26,700	26,700
③ Fuel cost of generator	11,520	11,520
④ Water charge	38,880	38,880
⑤ LPG gas charge	13,200	13,200
⑥ Oxygen charge	31,290	31,290
⑦ Building maintenance cost	0	32,000
⑧ Replacement part (filter replacement)	0	12,800
⑨ Major facilities and equipment maintenance cos	0	56,000
Subtotal ① to ⑨ (facility maintenance cost)	393,750	494,550
⑩ Equipment maintenance cost	123,000	123,000
Total ① to ⑩	516,750	617,550

Annex-3 Improvement of Infrastructure Work by Solomon Islands side

Category	Schedule	Expense (SBD)
(1) Related construction work prior to the Project start		
1) Repairing Hospital Jetty	Mar, 2009	In progress
2) Demolition of the existing facilities in the Project site (6 flag poles, basket court, eg.)	May, 2009	100,000
3) Renovation of the existing drainage from the Project site to outside.	May, 2009	100,000
4) Site preparation of the Project	Sep, 2009	500,000
5) Demolition of existing malaria laboratory	Sep, 2009	100,000
6) Site preparation of temporary buildings of the Project	Sep, 2009	80,000
7) Construction of 6 blocks of medical staff housing	Jun, 2009	3,000,000
8) Construction of 12 blocks of medical staff housing by AusAID in Babylon	Mar, 2009	In progress
9) Construction of 31 blocks of medical staff housing	Under Planning	
(2) Related construction work to be done before completion of the Project		
1) Implementation of public power supply project in Gizo	May, 2010	In progress
2) Implementation of public water supply project in Gizo	Dec, 2009	In progress
3) Provide a sewer pump in Public Septic Tank located in Gizo Hospital	May, 2010	200,000
4) Preparation of access street and drainage facilities in front of the Project site	Sep, 2010	100,000
5) Preparation of electricity wiring, telephone line and water supply piping connection to the Project site	Dec, 2010	500,000
(3) Related construction work following to the completion of the Project		
1) Purchase of furniture and supplies	Apr, 2011	180,000
2) Relocation of existing equipment (X-ray related)	May, 2011	200,000
3) Relocation and installation of part of existing equipment to the new Hospital (medical furniture and fixture, medical equipment, etc.)	May, 2011	50,000
4) Transfer of patients to new wards and Practical training of the hospital staff at the new Hospital	May, 2011	55,000
5) Construction of walls and fences surrounding the Project site	May, 2011	500,000

Annex-4 Tentative Schedule of the Project



THE PROJECT FOR RECONSTRUCTION
OF
GIZO HOSPITAL
IN
SOLOMON ISLANDS

Plan of Technical Assistance (Soft-Component)

INDEX

July 2008

Nihon Sekkei, Inc.

(1) Background of Soft Component Planning

The health sector of Solomon Islands has set the goal of strengthening the healthcare service system in the National Health Strategic Plan 2008 to 2010 and in Solomon Islands National Health Review Report (MOH/JTA International 2006), it has placed priority on reconstruction of Gizo Hospital granted its favors to west district of Solomon Islands in the improvement of medical infrastructure. This project is to implement the reconstruction of the facilities and the improvement of equipment in order to improve the medical service in Gizo Hospital. It is planed to reconstruct the 2nd medical facilities and to provide of medical equipment required in this component of construction of facilities and procurement of equipment.

The investigation team has, through its local investigation from September 28 to October 28, 2007, explained the importance of continuance of the effectiveness arising from this component of construction of facilities and procurement of equipment and the necessity of long-lasting certain-level maintenance to sustain the effectiveness for this purpose. Ministry of Health and Medical Services (MHMS) has, after recognized the following problems in the present state of the management and the maintenance, from the perspective of self-sustaining development, seeked the assistance from Japan regarding the operation and maintenance of the facilities and the equipment.

[Present State and Problems Regarding Operation and Maintenance]

1) Operational Problems

Existing structure of maintenance of the hospital consisted of the Secretary of Hospital and a total of 7 staff comprising 3 carpenters, 1 plumber, 1 motorboat/motorcycle mechanic and 1 incinerator operator, and its main purpose is the maintenance of the facilities. In maintenance workroom, there are simple tools and they are performing the repairs of carrier boat for emergency cases etc., cars and the facilities including simple equipment such as pumps and plumbing. As for the repairs of electric wiring and others, it requests for electricians of the state government.

As for complicated repairs, e.g. equipment such as air-conditioner or medical equipment, the general manager of hospital is to request the repairs for the person in charge of Maintenance Department of National Referral Hospital (NRH), which bears the function of maintenance in the Ministry of Health and Medical Services, and it will enjoy the routine service of maintenance from the agencies of the equipment in New Zealand or in Solomon Islands. However, it seems this system does not function well, since the faulty equipment are left unattended in present circumstances. Hence, not only the medical service has decreased because of the failures of the medical equipment but there are elements of danger of in-hospital infections in Operating Rooms or the Tuberculosis Bacteria Laboratory because of the failures of air-conditioners and ventilating apparatuses.

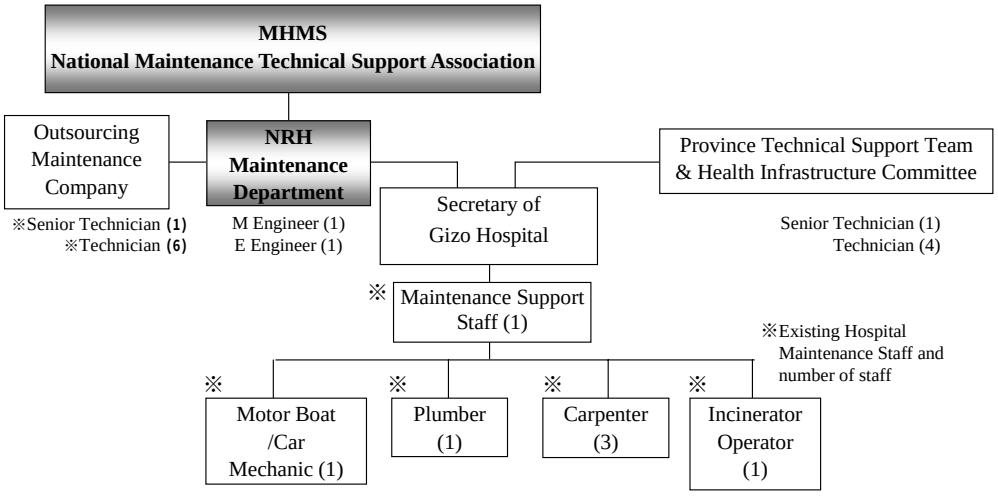


Figure 1 Current Maintenance Organization of Gizo Hospital

When the completion of the new hospital, it is planned to introduce new equipment and systems in order to provide necessary medical services. For maintaining sustainably the facility functions including these of existing systems, it is considerable that of considerable importance are; rethinking and improvement in technical abilities of each staff persons, strengthening the cooperation in the functions between the Secretary of Hospital and the person in charge of Medical Department of National Referral Hospital (NRH), employment of mechanic technicians and electric technicians in Gizo Hospital, utilization of tools complementing the maintenance activities having preventive maintenance in mind and preparation of annual budget and a maintenance plan ensuring thereof.

2) Technical Problems (Drainage Processing)

As for processing of medical drainage and general drainage, although there is a maintenance staff person of plumber, there is no operational manual for maintenance now. And further, since the pump of existing purifier tank has broken down, untreated drainage is discharged to ocean and the environment degradation is concerned.
To complete the new hospital, in order to install the new purifier tank complying with the environmental requirements of Solomon Islands, the technical support regarding the drainage processing system from the person responsible is required.

3) Technical Problems (Processing of Hospital Waste)

As for the processing of medical wastes, although a maintenance staff person of incinerator operator is collecting the wastes, separate collection is not sufficiently performed because of deficient knowledge of waste collection and medical wastes are left untreated in the backyard of the hospital site, despite of a medical incinerator is installed. There is the operational manual for incinerator in National Referral Hospital, but there is nothing in Gizo Hospital.
Upon the completion of the new hospital, since the improvement of medical service is prospected, the medical wastes will increase and further deteriorations of in-house infection and environment pollution are concerned.
Technical support regarding collecting and treating system of medical wastes in hospitals based on the waste segregation method recommended by WHO (color coding) to the persons in charge is required.

(2) Objectives of Soft Component

For the medium-term objective, there is nothing other than continuing the direct effect listing in the following section, and to achieve this objective, Ministry of Health and Medical Services is required to sustain the maintenance system and to perform the maintenance developmentally through its independent efforts after the completion of this Project.

Because of newly employed mechanic and electric technicians in Gizo Hospital, chain of support for maintenance (Figure 2) shall be clear through strengthening the cooperation between Gizo Hospital and National Referral Hospital (NRH). Maintenance System shall be established, and small troubles can be solved by the staff in Gizo Hospital. (Objective of this Project)

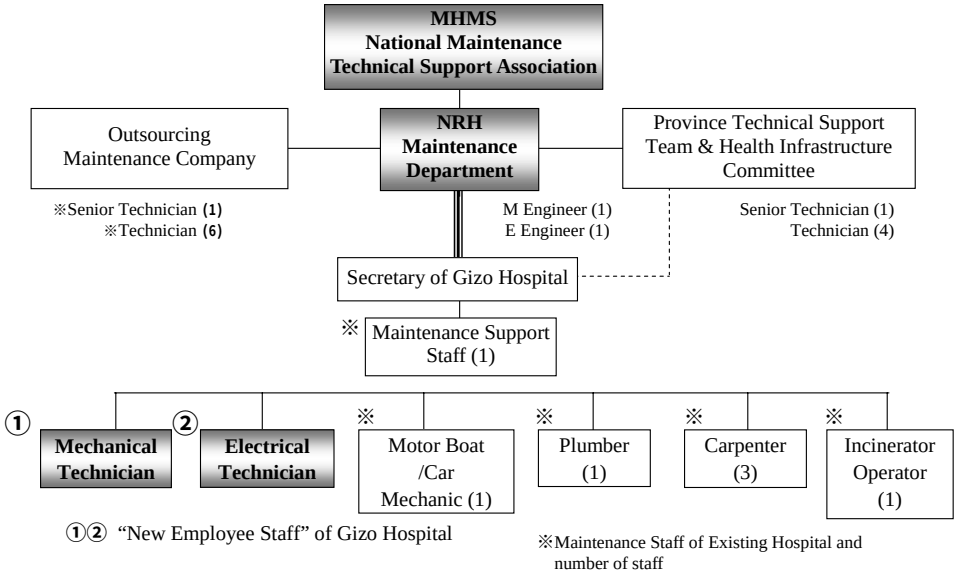


Figure 2 Maintenance Organization of Gizo Hospital (After Completion of Soft Component)

(3) Accomplishments of Soft-Component (Direct Effect)

The accomplishments to be achieved at the completion of soft-component are described in the following table.

Table 1 Direct Effect of Soft-Component

Contents of Technical Assistance	Direct Effects
Education on sustaining maintenance system	・Each staff person recognizes the importance of strengthening the maintenance system.
Formation of sustaining maintenance system	・By providing a flow of maintenance system, exchange for backup supplies, maintenance and renewal become smoothen in the case of failures of facilities and medical equipment. ・The cooperation between Gizo Hospital and National Referral Hospital (NRH) has been strengthened. ・Small equipment troubles can be solved by the staff in Gizo Hospital.
Preparation of tools for sustaining maintenance system	・By preparing the tools complementing the maintenance activities having preventive maintenance in mind, numbers of consumable goods and backup supplies required in next fiscal year and conditions of each facilities and medical equipment will be grasped. This makes enable to perform the periodic checkouts and act promptly in case of failures. ・By preparing the annual maintenance plan, budgeting becomes possible to enable smooth maintenance and renewal.
Technical assistance for drainage processing system	・Elevate awareness of in-house infection and environment deterioration from drainage processing among maintenance and medical service staff to deal infected drainage properly.
Technical assistance for collecting and treating system of medical waste	・Elevate awareness of in-house infection and environment deterioration from waste processing among maintenance and medical service staff to ensure the separate collection and processing of infectious wastes.

(4) Method for Confirming the Degrees of Achievement

Items for confirmation of degrees of achievements that should be accomplished at the completion of Soft-Component are indicated are described in the following table.

Table 2 Method for Confirming the Degrees of Achievement

Items	Confirmatory Method
Education on sustaining maintenance system	・Elevation of awareness and establishment of the following techniques has confirmed.
Formation of sustaining maintenance system	・Flow of maintenance system has been made. ・The cooperation in functions between Gizo Hospital and the person in charge of Maintenance Department of National Referral Hospital has been strengthened. ・Mechanic technicians and electric technicians are employed for Gizo Hospital.
Preparation of tools for sustaining maintenance system	・Ledger of facilities and equipment has been prepared. ・Maintenance record has been prepared. ・Annual maintenance plan has been prepared. ・Budget planning for maintenance of next year has been prepared.
Technical assistance for drainage processing system	・Drainage processing manual has been prepared. ・Drainage has met the standards of Solomon Islands.
Technical assistance for collecting and treating system of medical waste	・Integrated manual of maintenance from the perspective of separate collection and treatment of medical wastes has been prepared based on the incinerator operation manual of National Referral Hospital.

(5) Activities of Soft Component (Input Plan)

Table 3 Activity of the Soft Component

Items	Content of Activities	Target Dept.	Deliverables	
			Japan	Solomon
Strengthening on sustaining maintenance system	・Hold workshops with administrations and maintenance department separately for educating the importance of maintenance in view of sustaining medical services, ambient surroundings and in-house infection. [technical level] Technical level higher than technologists and technicians is required. The person in charge of administrative department is up to the mark. As for maintenance department, the General Manager of Gizo Hospital and the person in charge of Maintenance Department of NRH are up to the mark. However, technician-level person is required for Maintenance Department of Gizo Hospital.	MHMS Health Service Bureau in Western State the Director of Gizo Hospital the General Manager of Gizo Hospital Maintenance Department of NRH Maintenance Department of Gizo Hospital	Guidance for Maintenance	-

Items	Content of Activities	Target Dept.	Deliverables	
			Japan	Solomon
Formation of sustaining maintenance system	・Introduce the maintenance system in Japan and prepare the outline of maintenance system draft and skeleton workflow. ・Confirm the cooperation strengthening system between Maintenance Department of NRH which bears the function of maintenance in MHMS and Gizo Hospital ・Hold workshops with physician and nurses of the Hospital and prepare the maintenance request format. [technical level] Technical level higher than technologists and technicians is required. Physicians and nurses of departments of Gizo Hospital are up to the marks. As for Maintenance Department, the General Manager of Gizo Hospital and the person in charge of Maintenance Department of NRH are up to the marks. However, technician-level person is required for Maintenance Department of Gizo Hospital.	Each Dept. of Gizo Hospital General Manager of Gizo Hospital Maintenance Department of NRH Maintenance Department of Gizo Hospital	Maintenance flow in Japan	・Plan of maintenance work
Preparation of tools for sustaining maintenance system	・Hold workshops to introduce the ledger of facilities and equipment and maintenance records and prepare the tools for maintenance system as practical training. ・Instruct the annual maintenance plan and prepare the budget planning for maintenance of next year. ・Instruct how to order the spare parts and how to control the inventory. [technical level] Technical level higher than technologists and technicians is required. Maintenance Department of Gizo Hospital is up to the mark. As for Maintenance Department, General Manager of Gizo Hospital and the person in charge of the Maintenance Department of NRH are up to the marks. However, technician-level person is required for Maintenance Department of Gizo Hospital.	General Manager of Gizo Hospital Maintenance Department of NRH Maintenance Department of Gizo Hospital Maintenance Department Accounting Department of Gizo Hospital	Tools for maintenance systems in Japan	・Ledger of facilities and equipment ・Maintenance record ・Annual maintenance plan ・Budget plan for maintenance of next year
Technical assistance for drainage processing system	・Hold workshops separately with other departments of the hospitals as users and maintenance departments to hold workshops for educating the importance of maintenance of drainage processing system in view of ambient surroundings and in-house infection. ・Establish and instruct the operational system of wastewater treatment tank and disinfection dank. [technical level] Technical level higher than technologists and technicians is required. Physicians and nurses of each department of Gizo Hospital are up to the marks. As for Maintenance Department, the General Manager of Gizo Hospital and the person in charge of Maintenance Department of NRH are up to the marks. However, technician-level person is required for Maintenance Department of Gizo Hospital.	Each Dept. of Gizo Hospital General Manager of Gizo Hospital Maintenance Department of NRH Maintenance Department of Gizo Hospital	・Drainage processing manual in Japan	・Drainage processing plan ・Purifier tank operation plan

Items	Content of Activities	Target Dept.	Deliverables	
			Japan	Solomon
Technical assistance for collecting and treating system of medical waste	・Split the other departments of the hospitals as users and maintenance departments to hold workshops for emphasizing the importance of maintenance of collecting and processing system of medical wastes in view of ambient surroundings and in-house infection. ・Choose the route of waste collection and establish and instruct the waste segregation (color coding) system based on the incinerator operation manual used in National Referral Hospital. [technical level] Same as above	Each Dept. of Gizo Hospital General Manager of Gizo Hospital Maintenance Department of NRH Maintenance Department of Gizo Hospital	・Medical wastes processing manual in Japan	・Collecting and processing plan for medical wastes ・Incinerator operation plan

(6) Method for procuring the implement resources of Soft-Component

This Soft-Component shall be the direct supporting type. There are no local consultants specialized in the maintenance of facilities and equipment or maintenance companies of facilities and equipment.

(7) Implementing Schedule of Soft-Component

The consultants who conducts assistance are, in first, to settle the contents of assistances and cooperation and set the overall schedule based on the agreement with Ministry of Health and Medical Services, Maintenance Department of National Referral Hospital, Healthcare Service Bureau in Western State and authorized people of Gizo Hospital. And thereafter they are to implement the technical assistances sequentially while evaluating the input and their results. The following are supposed overall flow.

1) Advance Preparation in Japan

In Japan, we will create a guidance document on maintenance for strengthening and further prepare explanatory materials, formats and workflows, etc. regarding maintenance system for supposed facilities and equipment, drainage processing system, collecting and processing system for medical wastes to indicate as examples at first workshop.

2) First On-Site Assistance

While educating the importance of maintenance from the point of view of sustainable medical services, ambient surroundings and in-house infections by holding workshops, we will dig up of the problems regarding the maintenance service in the present state and confirm the strengthening of cooperation between Gizo Hospital and National Referral Hospital (NRH) and instruct the creation of draft of input plan. Further, in order to grasp an appropriate perception of the quantity of work required for all process, introduce specific maintenance system flows and tools for maintenance systems used in Japan, etc. and instruct how to make the maintenance system flow, the ledger of facilities and equipment and format for maintenance records for existing hospitals through workshops. These tools to be made are for starting operations before the next assistance.
For conducting the education and assistance described above, we will dispatch an overall manager, who also takes maintenance technician for 9 days.

3) Second On-Site Assistance

Confirm the operation status of maintenance system flow, the ledger of facilities and equipment and maintenance records which are created on first on-site assistance and confirm the learning level of education of each person.
In this stage, the selection of facilities (such as air-conditioners, medical gas, drainage processing, power receiving, dynamos, and light electric appliance) and medical equipment

intended in this Project has finished and a part of them have already installed on the site. On that account, we will instruct how to create the annual maintenance plan and specific tools such as the ledger of equipment for the new hospital. Further, we will create the system operation plan for current drainage processing facility and incinerator and instruct how to create the countermeasure manual for in-hospital and out-hospital infections. As for the tools that is not able to be created in assistance period, continue the creations by technicians of the hospital after the assistant has returned home.
For conducting the education and assistance described above, we will dispatch an overall manager, who also takes maintenance technician for 15 days and a technician for maintenance of medical equipment and medical wastes for 12 days.

4) Works in Japan

We will combine results from the first and second technical assistance and carry out an adjustment for assistance content or flowcharts and their formats necessary for the last time. At this point, we will coordinate across the maintenance system and facilities and equipment to be installed.

5) Third On-Site Assistance

While conducting final confirmation and amendment for plans, tools and manuals created by second on-site assistance, we will instruct the creation of the final version of maintenance plan for new facilities and equipment according to the final assistance content prepared through the works in Japan. In addition, we will conduct the final technical assistance while confirming the facilities and equipment already installed in the new hospital in practice. Especially, we will assist the creation of annual maintenance plan, annual budget plan for maintenance and spare parts control plan and finalize the maintenance plan.
For conducting the education and assistance described above, we will dispatch an overall manager, who also takes maintenance technician and a technician for facility maintenance and a technician for maintenance of medical equipment and medical wastes for 9 days per head.

6) Works in Japan

We will combine results from the first, second and third technical assistances etc. and prepare a final written report.

We will dispatch following technicians as Japanese consultants to engage in technology transfer toward the hospital.

1. Overall manager, who also takes maintenance technician (1):
   deal with air-conditioning equipment, sanitary accommodations and special facilities
2. Technicians for facility maintenance (2):
   deal with power receiving equipment and dynamos
3. Technician for maintenance of medical equipment and medical wastes :
   deal with collecting system for equipment and medical wastes

Upon conducting the on-site technical assistances, we will make the hospital appoint a local technician having computer knowledge to serve as a mediator between Japanese consultants and maintenance staff of Gizo Hospital (including Maintenance Department of NRH) for assisting the technology transfer. By strengthening the cooperation between Gizo Hospital and Maintenance Department of National Referral Hospital (NRH) and further, the national-level reorganization of maintenance structure will realize more reliable and efficient technology transfer by allowing ongoing assistance during a certain period after Japanese consultants have returned home from the scene.

(8) Deliverables of Soft-Component

Table 4 Deliverables of Soft-Component

Items	Deliverables
Education on sustaining maintenance system	・Maintenance guidance
Formation of sustaining maintenance system	・Maintenance work Plan
Preparation of tools for sustaining maintenance system	・Ledger of facilities and equipment ・Maintenance records ・Annual maintenance plan ・Budget plan for maintenance
Technical assistance for drainage processing system	・Drainage processing plan ・Purifier tank operation plan
Technical assistance for collecting and treating system of medical waste	・Collecting and processing plan for medical wastes ・Incinerator operation plan

(9) Approximate Project Cost for Soft-Component

See the attached document.

(10) Responsibility of Implementing Agencies of Partner Country

This soft-component will be conducted in order to assure the potential for self-sustaining development of Solomon Islands. Hence, it is required to adopt such method of encouraging the voluntary activities of Solomon Islands as far as feasible. Consequently, it is required full understanding and cooperation from the implementing agencies of Solomon Islands toward this soft-component.

Specifically, the first requirement is the understanding and consideration toward the objective and the course of this soft-component from Ministry of Health and Medical Services and responsible officials of Gizo Hospital. And what is the most important is appropriate staffing for this soft-component and the employment of technicians for facility maintenance and the addition of technicians for maintenance of medical equipment are required. Japan will provide the technical assistances and cooperation for these technicians through the implement of this soft-component. Also, Ministry of Health and Medical Services and responsible officials including the Director of Gizo Hospital, which are the implementing agencies, are required to continue the instruction and maintenance regarding the maintenance of facilities and medical equipment as supervisor of Gizo Hospital during the implementation period of this Soft-Component and even after its completion.