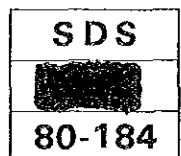


**BASIC DESIGN
FOR
SRI JAYAWARDENEPURA
GENERAL HOSPITAL
IN
THE DEMOCRATIC SOCIALIST REPUBLIC
OF
SRI LANKA**

**DECEMBER 1980
JAPAN INTERNATIONAL COOPERATION AGENCY**



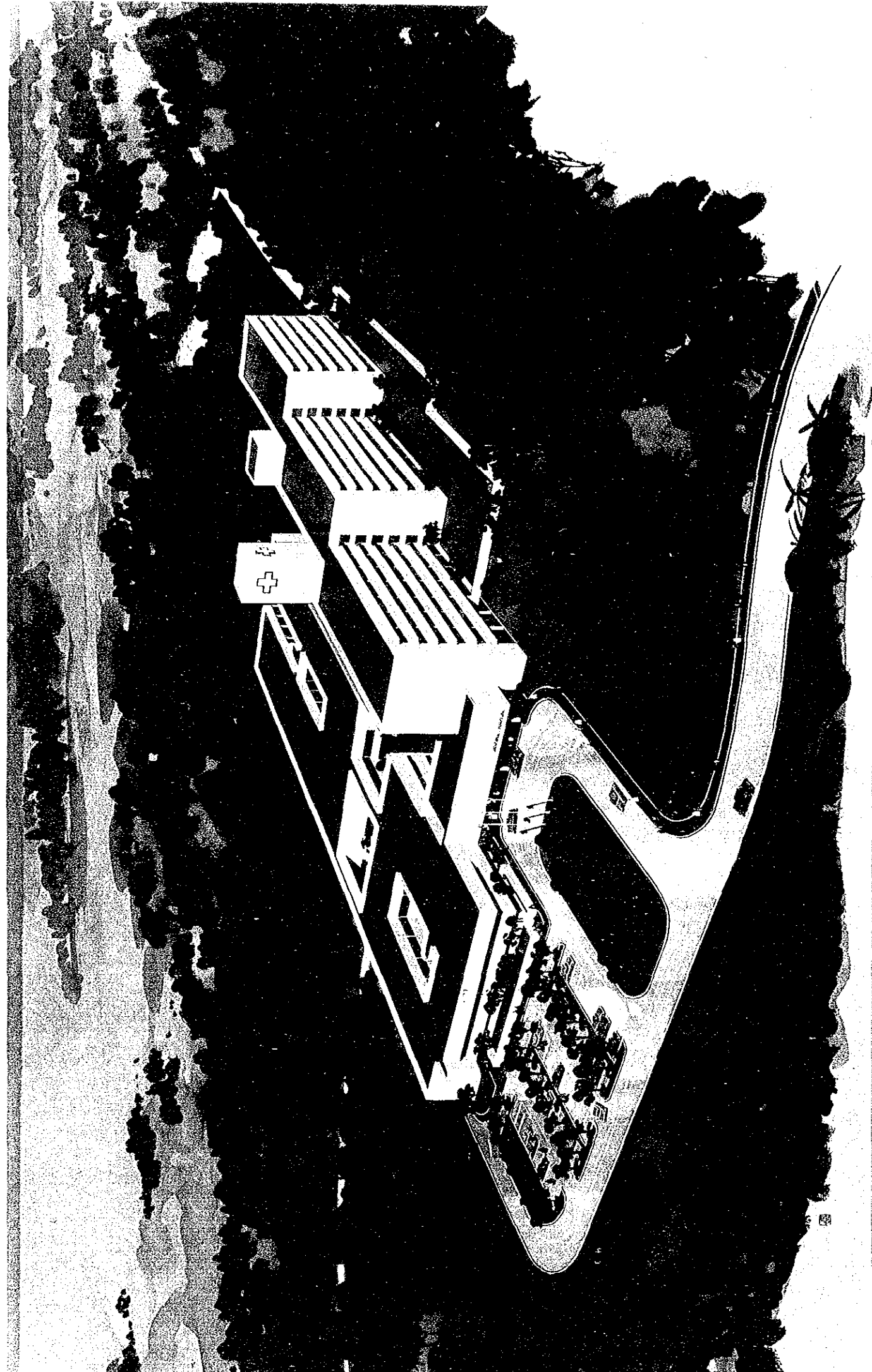
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**BASIC DESIGN
FOR
SRI JAYAWARDENEPURA
GENERAL HOSPITAL
IN
THE DEMOCRATIC SOCIALIST REPUBLIC
OF
SRI LANKA**

國際婦女事業團		
年	'84. 5. 16	120
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SRI JAYAWARDENEPURA GENERAL HOSPITAL, SRI LANKA

PREFACE

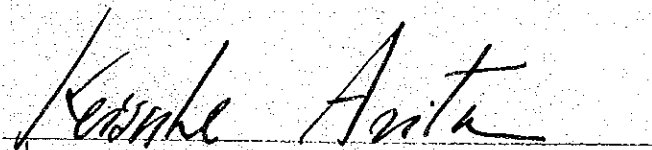
In response to the request of the Government of the Democratic Socialist Republic of Sri Lanka, the Japanese Government decided to conduct a survey on the Basic Design for Sri Jayawardenepura General Hospital Construction Project and entrusted to the Japan International Cooperation Agency with the survey. The J.I.C.A. sent to Sri Lanka a survey team headed by Prof. Mitsuo Homma three times in the period from June to December, 1980.

The team had discussions with the officials concerned of the Government of Sri Lanka and conducted a field survey. After the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of the Democratic Socialist Republic of Sri Lanka for their close cooperation extended to the team.

December, 1980



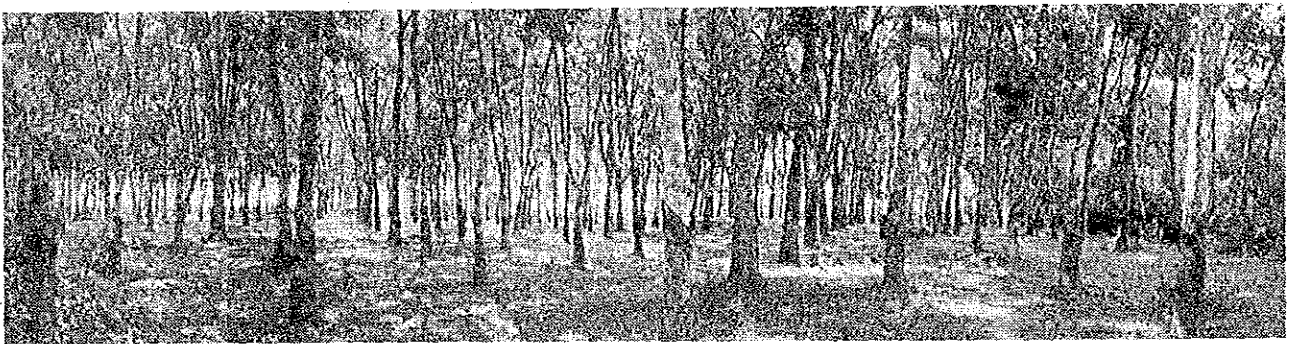
Keisuke Arita

President

Japan International Cooperation Agency



**Photo A: Central Ridge of the Hospital Site
View from Northeast**



**Photo C: Rubber Plant Plantation in the
Southeast Corner**

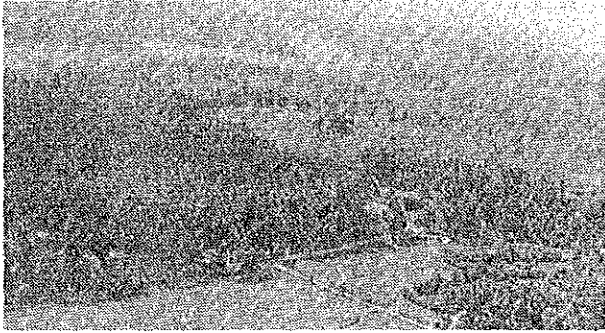
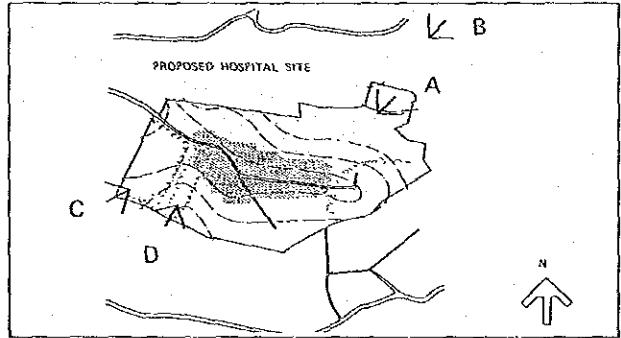


Photo B: Aerial View of the Site from Northeast

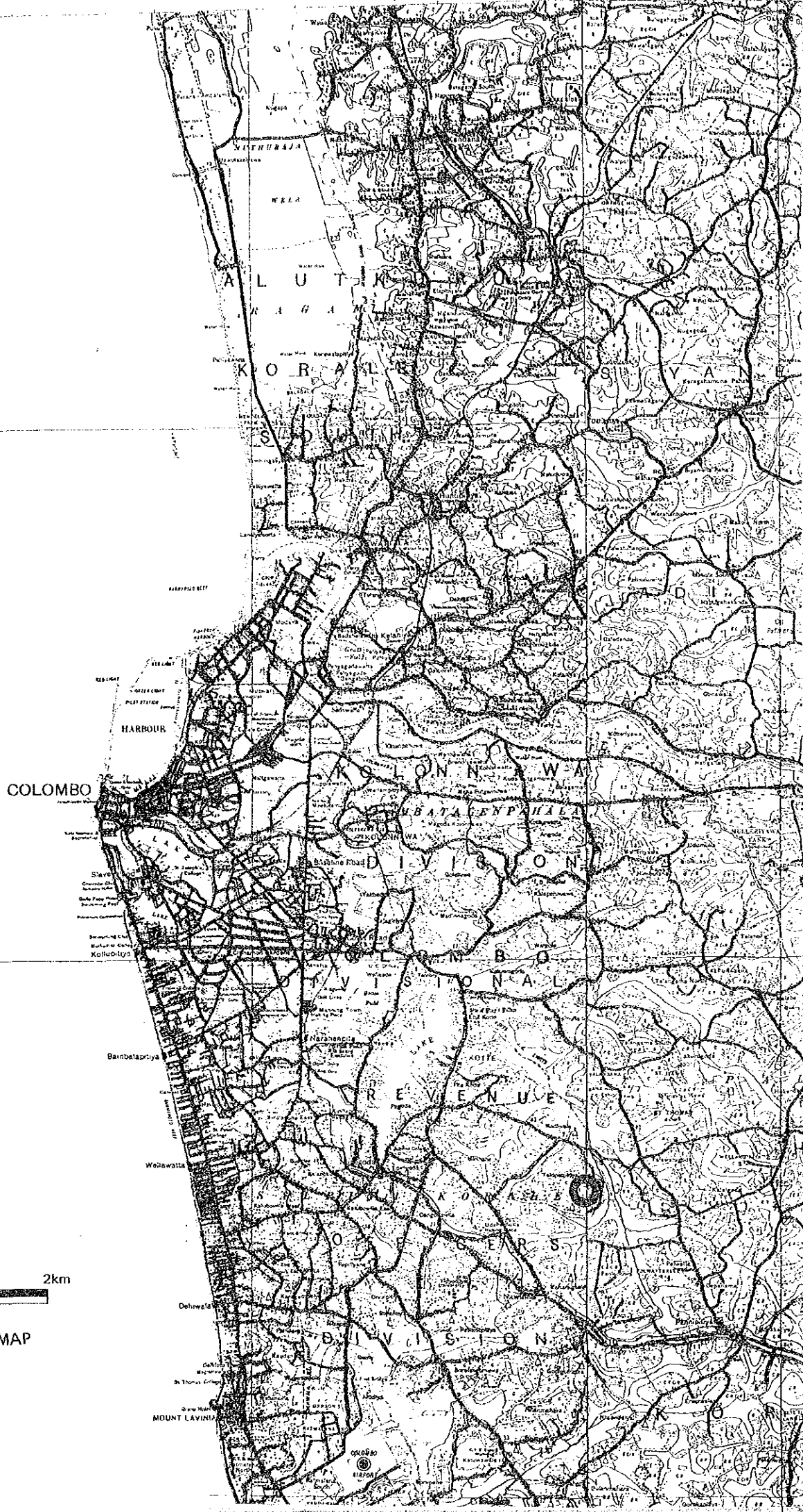


Guide Map to Photographs



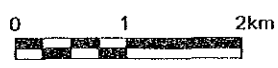
Photo D: Coconut Tree Garden next to the Rubber Plant Plantation View from South

View of the Site



COLOMBO

HARBOUR



LOCATION MAP

SUMMARY

■ Backgrounds and Details of the Project

The Government of Sri Lanka will transfer the major administrative functions from Colombo to Sri Jayawardhanapura in accordance with the New Capital Development Plan in which the construction of the new Parliament to be completed in February 1982 is the main program.

The Government in line with the Plan has schemed an opening of a new 1,000-bed hospital and has requested the Government of Japan to cooperate in the construction of the hospital in the manner of a grant aid.

In response to the request the Japanese Government has dispatched three survey teams starting from June 1980.

In Sri Lanka a nationwide medical service network has been established based on government medical facilities. But, difficulties of quantitative and qualitative shortage remain to be solved. The tendency for the patients to gather at larger and more equipped hospital is apparent, as the concentration to the General Hospital, Colombo.

To moderate the overwhelming load of the General Hospital, Colombo and to enhance the training of medical manpower, there are urgent necessities to open a new general hospital with the function of post graduate education.

■ Construction Site

The proposed site for the hospital is located at Talapatpitiya within the New Capital Development area. It is on a hill, an area of about 25 acres (about 100,000 m²). The surroundings are utilized as a housing zone, and in future a regional development including housings and commercial facilities will be carried out gradually. Also, the provision of adequate infra-structure, as roads, water supply, electricity, etc., is planned. The site is suitable for the hospital construction in views of surroundings, infra-structure, climate and soil conditions.

■ Design Concept

Based on the Sri Lanka request, "the enlargement and completeness of medical service", the hospital is characterized as a general hospital to provide adequate in-patient care to more patients and the ward size is considered important.

The hospital is designed to meet the future growth and change of facility resulting from the improvements of medical level and therapeutic methods. That is, the diagnostic and treatment units, as the pathological laboratory and the operating theatre unit are centralized and located in the low-rising building divided from the ward building, so that future extensions and alterations can be accomplished without great difficulties. The centralized system will enable the specialization of hospital staff, the common usage of instruments, and the efficient operation of installed devices as air conditioning facility. By realizing above items, the rationalization of hospital management and the retrenchment of maintenance expenses are expected.

■ Hospital Size

The facility scale of the hospital is as follows; Bed Strength 1,000, Nursing Units 17, Total Floor Area 282,000 sq.ft. (26,200 m²), Per Bed Hospital Floor Area about 282 sq.ft. (26 m²). The building is composed with 6-storey high ward block and other 2-storey high blocks.

■ Facility Contents

The hospital building consists of five departments; the Ward, the Out-Patient, the Administration, the Central Diagnostic and Treatment, and the Service.

O Ward

The department consists of 17 nursing units of 988 beds, namely Medical, Surgical, Obstetric & Gynaecology, Paediatric, Orthopaedic, Ear.Nose. Throat, Eye, Dermatology, Day Stay, and Paying. The total bed strength of the hospital is 1,000 beds, including the Intensive Care Unit (ICU) 6 beds and the Coronary Care Unit (CCU) 6 beds.

O Out-Patient Department

The department consists of the General Out-Patient Clinic which handles referred patients and follow-up patients in 6 clinics, namely Medical, Surgical, Orthopaedic, Obstetric & Gynaecology, Paediatric, and Eye, Ear-Nose.Throat, and the Emergency Clinic which offers 24-hour service to emergency cases.

O Administration Department

The admission office, the central record room, etc. are placed on the ground floor of ward building. The office of hospital superintendent, the doctors' room, the lecture room, the duty rooms, etc. are located in the out-patient building.

O Central Diagnostic and Treatment Department

The units for diagnosis are on the ground floor and those for treatment on the first floor. The diagnostic units are the X-Ray Unit, the Pathological Laboratory, the Physiological Laboratory, the Blood Bank, and the Indoor Dispensary. The treatment units are the Operating Theatre Unit, the Central Sterile Supply Division, the Intensive Care Unit, the Coronary Care Unit, the Delivery Unit, and the Physiotherapy Unit.

O Service Department

The department consists of service rooms as the Machinery Room, the Storage, the Laundry, the Kitchen, the Staff Dining Room, and the Staff Dressing Room.

In addition, staff quarters for the medical superintendent, single medical staff, married medical staff, and nursing staff are located within the site.

The medical equipments are provided following next principles. The fundamental equipments needed at the hospital opening are given top priority. Equipments of low maintenance expenses and easy to up keep are mainly provided. Among those needed in the pathological laboratory, the X-ray department, etc., the equipments with high maintenance expenses are limited to those with high educational or medical performances.

■ Schedule of the Project

The period required for the detailed design is estimated to be 6 months, for the tendering and contract 2 months, and for the construction 23 months.

■ Evaluation of the Project

To meet the urgent necessities in the health service of the country, there is a need to provide more and larger facilities for in-patient diagnosis and treatment. After examining the managing system of each facility and the entire hospital, the bed strength of 1,000-beds is appropriate and applicable.

The construction of the proposed general hospital will assist to improve the present medical service and in future will take the leading role not only as a national medical centre but also as the major core of the medical service in the new capital. The hospital construction will also be a contributing factor to enhance the 5-year Investment Plan presently under way and in broad sense the national development.

■ Suggestions

Toward the realization of the hospital construction and for the smooth management of the hospital, the cooperation in the construction on part of Sri Lanka side and the establishment of the management system toward the hospital opening are essential factors.

Highest considerations should be taken in the completion of leveling and reclamation of the hospital area, the provisions of necessary infrastructure, such as electricity, water, sewer, and road.

Also, the sufficient budget allocation for the maintenance and the management of buildings and equipments and the establishment of the recruitment and the training program for doctors, nurses, technicians and other hospital workers are requested.

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Perspective View of the Hospital

Preface

View of the Site

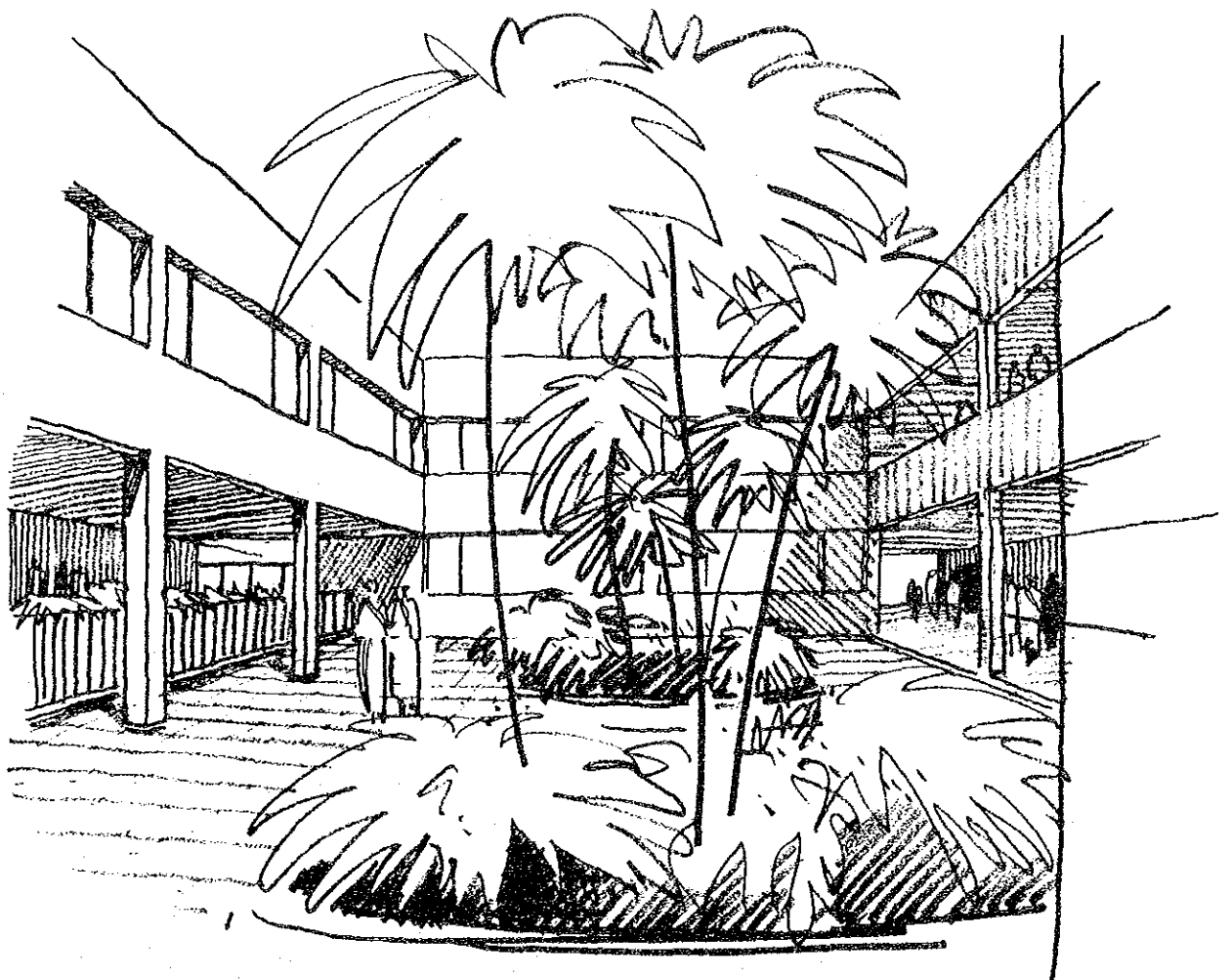
Location Map

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Chapter 1. Objectives of the Survey

The Government of Sri Lanka, in accordance with the New Capital Development Plan to transfer the major administrative functions from Colombo to Sri Jayawardhanapura, has planned an opening of a new hospital and requested the Government of Japan to cooperate in the construction of the hospital in the manner of a grant aid.

In response to the request the Japanese Government dispatched three survey teams* starting from June 1980.

In the present health situation, due to the not enough facilities in the rural area, almost all the patients in the rural area gather at the General Hospital, Colombo. This forces the General Hospital, Colombo to provide medical service to the people in the rural area, as well as 800,000 citizens in the city of Colombo. Consequently, the demand for medical service far outweighs the capability of the hospital and the confusion and the congestion is desperate. The statistics clarifies this, as the average daily inpatients is 2,700 - 3,000 where the bed-strength is only about 2,500.

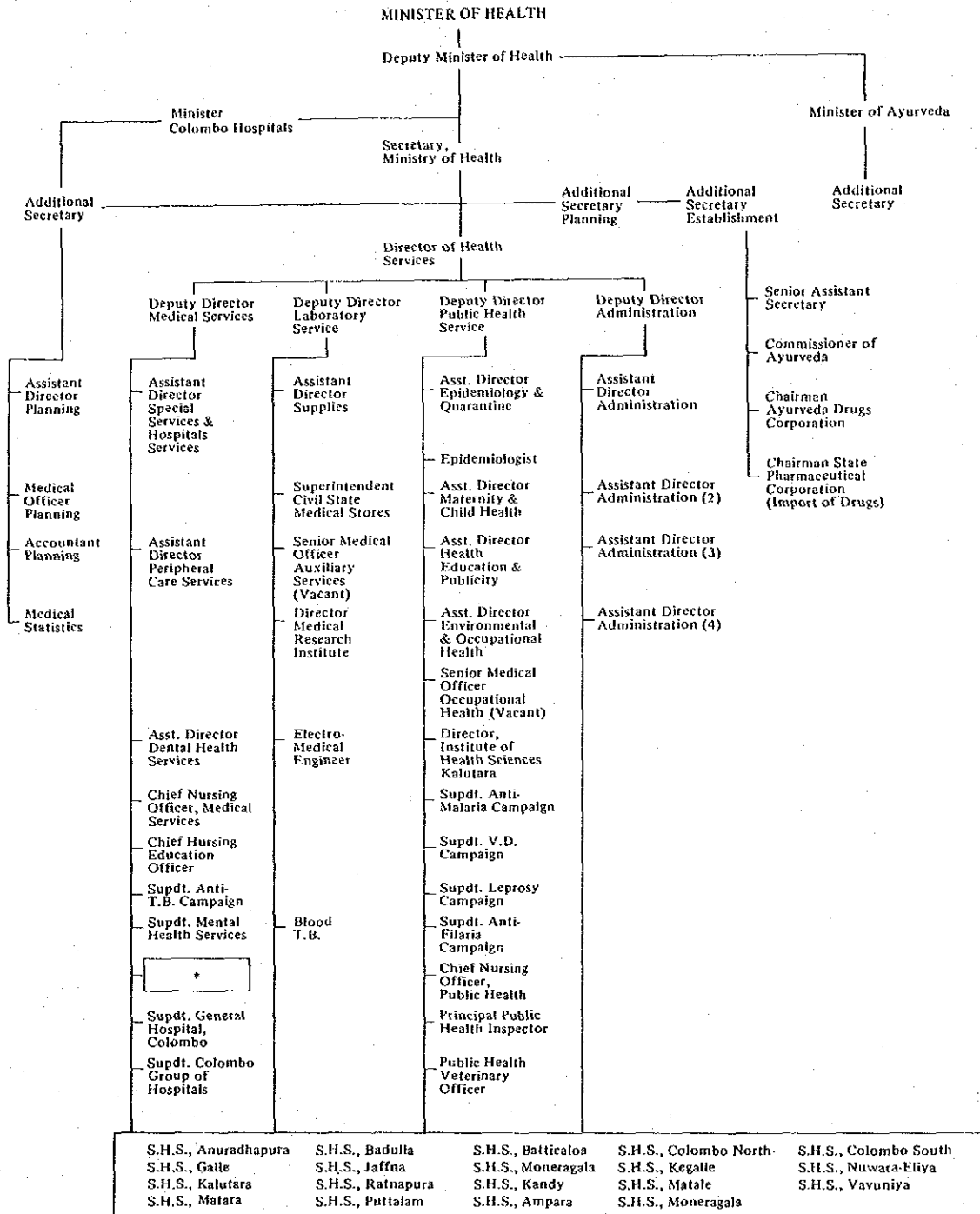
As an accomodation for a single hospital, the bed-strength of 2,500 is certainly out-scaled and also the present administrative system and the physical limitations will never withstand the further extension.

For above reasons, there is an urgent necessity to open a newly constructed and well equipped hospital to share the overwhelming load of the General Hospital, Colombo.

The objectives of the survey are to find out the background of the hospital and to collect and analyze the data and statistics concerning the health and medical situations in Sri Lanka. As the result, the basic design of the proposed hospital will be arranged.

* Kume Architects-Engineers participated in the survey teams.

Fig. 2.1 Ministry of Health Organization



- Director, Institute of Health Sciences
 - S.H.S.
 - Asst. Director
 - Supdt. General Hospital
 - Supdt. of the Concerned Hospital
 - Supdt. Peradeniya Hospital
- * Superintendent of the Concerned Hospital

Chapter 2. Background of the Hospital

2.1 Health Administration and Medical Situation

Organization of the Health Administration

The responsibility for the delivery of health care for the people lies in the Ministry of Health headed by the Minister of Health who is assisted by the Deputy Minister of Health, the Minister of Colombo Group of Hospitals, and the Minister of Ayurveda. (Fig.2.1)

The Minister of Colombo Group of Hospitals is in charge of six most highly equipped hospitals, namely General Hospital in Colombo, Lady Ridgeway Hospital for Children, De Soysa Maternity Hospital, Victoria Memorial Eye Hospital, Castle Street Maternity Hospital, Hospital in Colombo North (Ragama).

The Minister of Ayurveda is in charge of the Department of Ayurveda (Traditional System of Medicine). In the public sector, there are 5 Ayurvedic Hospitals and 3 Ayurvedic Dispensaries with about 1,000 beds and 70 doctors. In the private sector there are approximately 10,000 Ayurvedic Registered Practitioners.

The Department of Health is divided into four fields, which are Medical Service, Laboratory Service, Public Health, and Administration. For smooth implementation of Health Service activities the island has been divided into 19 health divisions with a superintendent of Health Service (SHS) in charge of each of such division. These 19 divisions are then divided into 109 health units with a medical officer of the health (MOF) in charge. The substantial service is carried out by a staff of public health inspectors, nurses, and midwives.

There are five specialized campaigns each concerned with the control of specific diseases, namely malaria, filariasis, tuberculosis, leprosy, venereal diseases.

Existing Medical Facilities and the Difficulties

The government expenditure on health service can be divided into two portions, that of the substantial health and medical service and that of the related services in other governmental offices. In 1978 the direct expenditure was 495 million Rs and the investment expenditure was 68 million Rs. These figures account respectively to 5% of the general expenditure and 1% of the investment expenditure in the national budget. The per capita general expenditure on health and medical service is about 35 Rs.

According to the 1969 - 70 Socio-Economic Survey, 70 - 80% of the demand for medical service is met by the Western system and about 20% by the Ayurvedic or indigeous system. The survey also showed that the government sector satisfied 53.7% of the demand for medical care (48.6% Western and 5.1% Ayurveda) and the private sector catered to 41.3% of the demand (24.8% Western and 16.5% Ayurveda).

Fig. 2.2 Facilities in Government Health Service

Facilities	Number	Remarks
Teaching Hospital	4	at colombo, Peradeniya, Jaffna, Galle
Colombo Hospital	6	
Special Hospital	22	for Cancer, Mental disease, Tuberculosis
Provincial Hospital	8	with over 500 beds
Base Hospital	15	with over 200 beds
Large District Hospital	4	
District Hospital	109	with under 50 beds
Peripheral Unit	106	
Rural Hospital	99	
Central Dispensaries	352	
Branch Dispensaries	345	
Visiting Stations	1019	

Fig. 2.3 Hospital Establishments and Health Personnel: Latest Available Year

Country or area	Hospital establishments			Health personnel							
	Year	Total	Beds	Population per bed	Year	Physicians	Population per physician	Dentists	Pharmacists	Nursing personnel	Midwifery personnel
ASIA											
Afghanistan	1976	55	2 914	5 879	1977	1 719	...	1 95	1 99	2 570	1 376
Bahrain	1977	10	1 040	270	1977	218	1 550	19	12	10 585	10 105
Bangladesh	1976	...	16 591	4 868	1976	5 723	14 178	109	196	1 548	...
Brunei	1976	4	534	360	1976	51	3 600	15	4	95	272
Burma	1976	1 486	27 403	1 125	1976	5 700	5 408	684	1 69	5 035	11 792
Cyprus ¹¹	1976	116	3 300	193	1976	500	1 230	190	220	1 374	362
Democratic Kampuchea	1971	94	7 500	893	1971	438	15 897	71	79	3 639	1 426
East Timor	1971	74	1 590	377	1973	20	32 000	...	2	23	2
Hong Kong	1976	91	18 832	236	1976	13 127	...	1 578	1 258	4 149	3 889
India	1973	15 265	392 000	1 465	1976	154 000	3 961	9 400	...	96 500	...
Indonesia	1975	1 115	83 696	1 685	1975	8 279	16 390	2 100	...	19 29 115	13 760
Iran	1974	535	49 194	650	1973	11 373	2 752	1 846	3 640	14 973	2 580
Iraq	1976	193	23 374	491	1976	4 547	2 555	771	1 456	3 817	1 737
Israel	1976	86	19 800	178	1973	9 143	351	1 789	2 012	...	663
Japan	1976	11 8 379	118 4737	95	1976	133 416	345	43 336	79 242	391 950	26 804
Jordan ¹¹	1976	39	2 226	896	1976	890	2 230	189	345	2 147	175
Korea, Republic of	1976	187	25 533	1 406	1976	17 848	...	2 744	20 718	16 4934	4 028
Kuwait	1976	27	4 382	240	1976	1 219	883	122	355	3 633	832
Lao P.D.R.	1975	38	3 232	401	1976	156	21 867	15	16	1 028	352
Lebanon	1970	143	10 727	260	1973	2 300	1 330	583	612	2 528	(...)
Macao	1974	6	1 275	209	1975	179	1 508	...	4	262	...
Malaysia											
Peninsular	1973	220	35 150	278	1976	1 576	...	1 301	...	8 424	...
Sabah	1976	15	2 309	...	1976	95	9 078	10	15	1 315	...
Sarawak	1976	75	2 758	415	1976	137	8 359	27	11	1 740	141
Maldives	1977	1	40	3 500	1977	9	15 655	1	...	34	...
Mongolia	1977	1 512	16 324	94	1977	3 184	498	67	186	6 152	720
Nepal	1975	57	1 881	6 826	1977	3 340	...	16	1	2 249	2 582
Oman	1976	23	1 236	658	1976	414	1 975	21	61	767	1 18
Pakistan	1977	...	39 512	1 908	1977	19 922	...	809	1 245	7 498	7 703
Philippines	1973	813	62 939	639	1975	13 480	3 154	4 241	4 685	8 519	10 866
Qatar	1973	...	1 661	150	1974	96	958	7	3	247	247
Saudi Arabia	1976	89	11 003	810	1976	4 161	2 200	224	1 191	7 969	...
Singapore	1976	14	8 609	265	1976	1 705	1 341	433	298	5 960	925
Sri Lanka	1976	461	41 051	334	1972	3 251	4 007	280	455	6 458	3 586
Syrian Arab Rep.	1977	113	8 131	956	1977	3 119	2 529	...	1 393	2 036	1 107
Thailand	1975	315	51 765	808	1975	5 000	3 374	652	1 913	21 432	6 277
Turkey	1976	881	86 205	476	1976	23 388	1 755	5 379	7 829	21 665	13 873
United Arab Emirates	1977	...	682	342	1976	975	280	62	95	1 582	124
Viet Nam	1976	...	159 088	292	1976	9 006	5 168	...	3 041	54 458	12 025
Yemen	1976	10 24	10 2 637	...	1976	366	17 175	71	41	951	149
Yemen, Democratic	1976	44	2 652	648	1976	190	8 750	8	6	1 062	178

SOURCE: United Nations, Statistical Yearbook 1978, P.895

The difficulties concerned with the accessibility of health care services, which is one of the basic health service problems in many developing countries, virtually does not exist in Sri Lanka. A health care delivery unit can be found, on the average, not further than 0.8 miles from any home in the country and free-of-charge western-type health care services are available within 3 miles of a patient's home. The hospital services are organized in a way that they would form for each region a single organized system consisting of a provincial hospital at the centre, or a base hospital or both and a number of district hospitals, each of which in turn is the centre for a number of peripheral units and rural hospitals. Though the regional self-sufficiency is provided by the above network, the smaller units are neglected by the patients in favour of the larger institutions. This tendency of the patients to by-pass certain medical care institutions has resulted in over utilization of some institutions and in an under-utilization of others.

According to the statistics obtained through the Preliminary Survey, types and numbers of the government medical facilities in Sri Lanka are as shown in Fig.2.2. From this figure, it should be noted that although the number of facilities is large, over a half of total facilities are of small size and provincial hospitals with over 500 beds and base hospitals with over 200 beds are very scarce.

A patient can receive indoor treatments in free-of-charge wards in government hospitals. Therefore, almost all of the demand for indoor treatments is fulfilled by the western type service in the government sector. According to the statistics of the Ministry of Health, in 1968 the bed utilization rate in provincial hospitals and base hospitals were 120%, while 60% of small-sized hospitals in the rural area marked the rate of about 50%, moreover about 100 hospitals are estimated to have had marked less than 50%.

The number of beds in western type medical facilities in the government sector has increased from 34,454 in 1964 to 41,051 in 1976 accordingly to the population increase. However, the population per bed is 334 and in Japan 95 per bed. (Fig.2.3)

The population per doctor is 4,007, while the figure is 845 in Japan. Including out-patients into calculation, every doctor or pharmacist has taken care of 11,876 patients annually in the period of 1964 - 65.

Existing Medical Facilities in Colombo

The population of the city of Colombo is about 800,000 and these people receive the medical service from the Colombo Group of Hospitals. However, as stated before, because the patients by-pass certain medical facilities to seek for better treatments, the patients gather to the above hospitals from all over the nation, and this results in a great confusion and over-crowdedness in these hospitals.

The number of beds in the Colombo Group of Hospitals at present is shown in Fig.2.4.

Fig. 2.4 Colombo Group of Hospitals

General Hospital, Colombo	2500 beds
Lady Ridgeway Hospital	614
De Soysa Maternity Hospital	347
Castle Street Maternity Hospital	353
Victoria Memorial Eye Hospital	471

Fig. 2.5 Health Manpower in Sri Lanka, 1978

Category of Health Manpower	In Government Service	Non-Government*	Total
<u>Western Type (Total)</u>	29,250	9,950	43,540
Doctors	2,229	1,033	3,262
Nurses	5,938	797	6,735
Midwives Hospital	1,388		
Field	2,141	3,529	3,721
Dental Surgeons	249	100	349
Asst. Medical Practitioners	1,051	143	1,194
Public Health Inspectors	998	129	1,127
Medical Laboratory Technologists	475	55	530
Radiographers	153	20	173
Physiotherpists	139	15	154
Dental Nurses	332	29	361
Pharmacists	442	49	491
Dispensers	735	96	831
Attendants Male	2,167		
Female	2,876	5,043	5,675
Other Workers	18,007	1,000	19,007
<u>Ayurveda (Total)</u>	983	4,290	10,933
Doctors	293	9,950	10,243
Other Workers	690	-	690

Source: Ministry of Health (Planning Units)

* Estimates.

Fig. 2.6 Population per Doctor in S.H.S. Divisions in Sri Lanka*

Superintendent of Health Services Division	Population (in thousand)	Number of Doctors	Population per Doctor (in thousand)
Sri Lanka		2,229	6.28
Anuradhapura	695	60	11.59
Badulla	920	77	11.94
Batticaloa	614	56	10.96
Colombo (s)	1,184	23	51.56
Colombo (n)	1,890	127	14.88
Galle	793	76	10.43
Jaffna	756	106	7.13
Kandy	1,762	199	8.85
Kalutara	790	66	11.97
Kegalle	702	39	18.00
Kurunegala	1,141	75	15.21
Matale	557	37	15.05
Matara	1,018	50	20.36
Puttalam	428	32	13.37
Ratnapura	737	50	14.74
Vavuniya	205	17	12.05

Source: Ministry of Health (Planning Unit)

* Figures are calculated on the basis of doctors in government service in 1978.

Although the full utilization of the nation wide medical network is one of the solutions to the present congestion, it can be achieved only after a long period of time because the phenomenon is based on the difficulties as the lack of doctors and the unpresence of specialists in the rural medical facilities. The extension of present facilities is also difficult to carry out immediately because as for the General Hospital, Colombo, its size is already beyond the optimum level and because for other hospitals, the sites too small.

Existing Health Manpower

The efficient and smooth functioning of the health system depends largely on the timely availability of appropriately trained manpower in adequate numbers. The health manpower of various categories and levels is needed, but not enough at present.

The situation in regard to health manpower, as doctors, nurses, midwives and dental nurses, at the beginning of 1978 is shown in Fig.2.5.

The ratio of population to each member of the categories has been improving annually and in 1978 is as follows, a medical doctor to 4,291 persons, a dental surgeon to 38,674 persons, a qualified nurse to 2,018 persons.

Compared to the ratio in other developing nations, that of medical doctor is on the higher side, while that of dental surgeon is on the lower side. The ratio, however, is not realistic in equity of distribution among regions, since there is a tendency of the medical and nursing staff to concentrate in the urban areas. (Fig.2.6 - Fig.2.10)

The recently held manpower study in Sri Lanka revealed that during the first ten years after the graduation, after registration nearly 41.3% of registered doctors are lost for various reasons, emigration being an important factor.

The government has tried to stop the loss of doctors due to emigration by introducing compulsory government services during the first six years after the graduation. The other step taken is awarding the scholarship or fellowship and the study leave for specialization after the compulsory service of five years following the registration, but before the age of 45 years.

Training Program for Manpower

The census of doctors during 1973 confirmed that the main suppliers of doctors in Sri Lanka have been the medical faculties in Colombo and Peradeniya; 76.9% of all doctors enumerated during the census were graduates of the Colombo Medical Faculty, 2.1% from India, and 1.9% who were belonging mainly to the older generation were graduates from the United Kingdom.

The demand for admission into the Medical Faculties is very high, but only 5 - 8% of the total applicants can be accommodated.

Although the optimum intake capacity on the basis of student-teacher ratio, library, laboratory and other facilities in Colombo Medical Faculty is 100, due to the pressure of demand, the intake of students have been 150 - 180 during past few years.

Fig. 2.7 Nurses in Sri Lanka (1978)

Types of Nurses	Number	Population per Nurse
In government service	5,938	2,357
All nurses	6,735	2,018

Source: Ministry of Health (Planning Unit)

Fig. 2.8 Number of Nurses in Government Health Services in Each Year for the Period 1975 to 1978

Year	Number	Cumulative Increase
1975	5,685	-
1976	5,782	97
1977	5,640	55
1978	5,938	253

Source: Ministry of Health (Planning Unit)

Fig. 2.9 Geographical Distribution to Nurses by S.H.S. Divisions

	Population (in thousand)	Number of Nurses	Population per one Nurse (in thousand)
Anuradhapura	695	207	3.35
Badulla	920	232	3.96
Batticaloa	614	117	5.24
Colombo (s)	1,186	514	2.34
Colombo (n)	1,890		
Galle	793	252	3.14
Jaffna	756	259	2.91
Kandy	1,762	661	2.66
Kalutara	790	282	2.80
Kegalle	702	212	3.31
Kurunagala	1,141	387	2.95
Matale	557	152	3.66
Matara	1,018	208	4.89
Puttalam	428	120	3.56
Ratnapura	737	249	2.95
Vavuniya	205	29	7.06

Source: Ministry of Health (Planning Unit)

Fig. 2.10 Auxiliary Health Workers in Health Services (1975~1978) in Sri Lanka

Year	Number in Government Service			
	1975	1976	1977	1978
Midwives	-	-	-	-
Hospital	1,411	1,411	NA	1,388
Field	1,800	1,794	2,035	2,141
Public Health Inspector	976	922	933	998
Pharmacist	465	459	459	442
Radiographer	190	144	141	153
Physiotherapist	125	135	131	139
Laboratory Technologist	394	470	956	475
Attendant: Male	4,751	NA	1,862	2,167
Female	NA	NA	2,691	2,876
Dispensers	776	776	668	735

Source: Ministry of Health (Planning Unit)

Due to the shortage of doctors, the government decided to start two medical faculties - one in Jaffna in 1978 and the other in Galle in 1980. These two campuses have capacity of training 75 doctors in each. (Fig.2.11)

Fig. 2.11 Number of Graduates (Medical School)

Year	Colombo	Peradeniya	Jaffna	Galle
1973	162	95		
1974	104	64		
1975	162	89		
1976	86	78		
Number of Entries (Medical School)				
1978	194	75	50	50
1979	150	75	75	75

There are eight schools of nursing administered by the Ministry of Health and providing three-year-basis courses in nursing. The demand for admission into these nursing school is also very high, but 5 - 6% of the total applicants can be accommodated. The total number of intake in 1978, 1979 was 1,200 each. (Fig.2.12)

Fig. 2.12 Number of Entries (Nursing School)

1974	400
1975	367
1976	385
1977	636
1978	1,200
1979	1,200

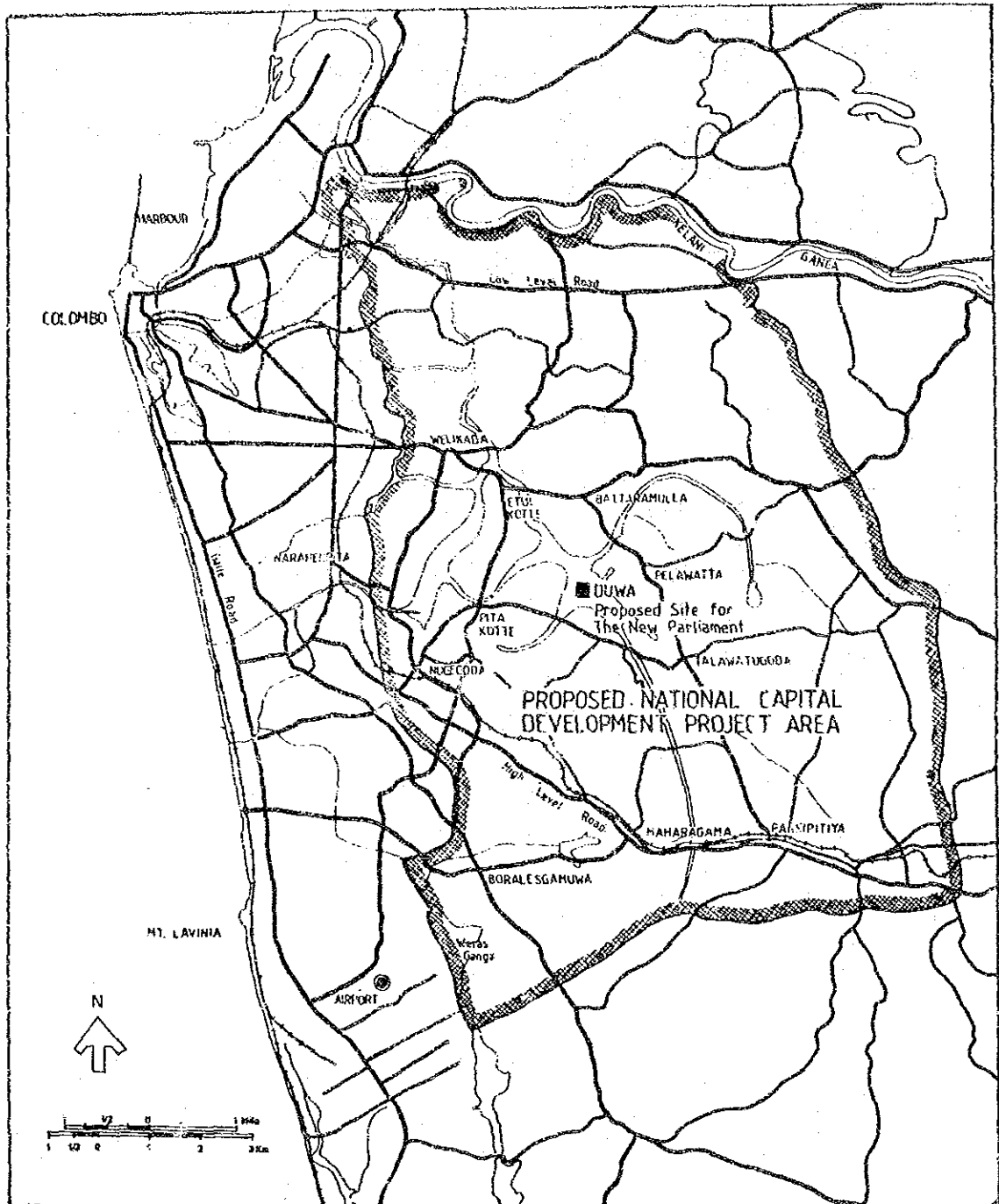


Fig. 2.13 Project Area of Sri Jayawardhanapura

2.2 New Capital Development Plan

The government of Sri Lanka is constructing a new parliament building in Kotte Region, about twelve kilometers southeast of Colombo (about an hour drive). The region surrounding the parliament, about a five-kilometer range from the parliament, is designated as Sri Jayawardhanapura New Capital Development Region. (Fig.2.13, Fig.2.14)

At present, 25 towns and villages exist in the region. According to the development plan, these bodies will be re-organized to 7 administrative units each with new city accommodations.

The first stage of the development plan is set to be completed by 1982 and consists of the construction of the new parliament building in the Duwa district and the provision of the infra-structure for the building, the construction of government offices of floor area of 45,000m² in the Pelawatta and Battaramulla districts, the construction of 1,200-unit housing in the Pelawatta district, etc. with the budget of about 2 billion Rs.

The second stage, although there is no concrete execution plan at present, is expected to be carried out according to the economic conditions in Sri Lanka.

The major reasons for the transfer of the capital are as follows; 1) Being already overcrowded, there is no room for the development in Colombo. 2) Due to the price-hike of the land in Colombo Region, the land for the development had to be found in the rural area. 3) By the provision of the infra-structure in the region following the construction of the capital, the stimulus will be given to the industries in the private sector.

To increase the number of seats in the parliament, the Government placed the new parliament building in the centre of the region and started the development plan.

The construction of the new parliament building is expected to be completed by the Independence Memorial Day in February, 1982, and the construction of the infra-structure of the building by the end of 1981.

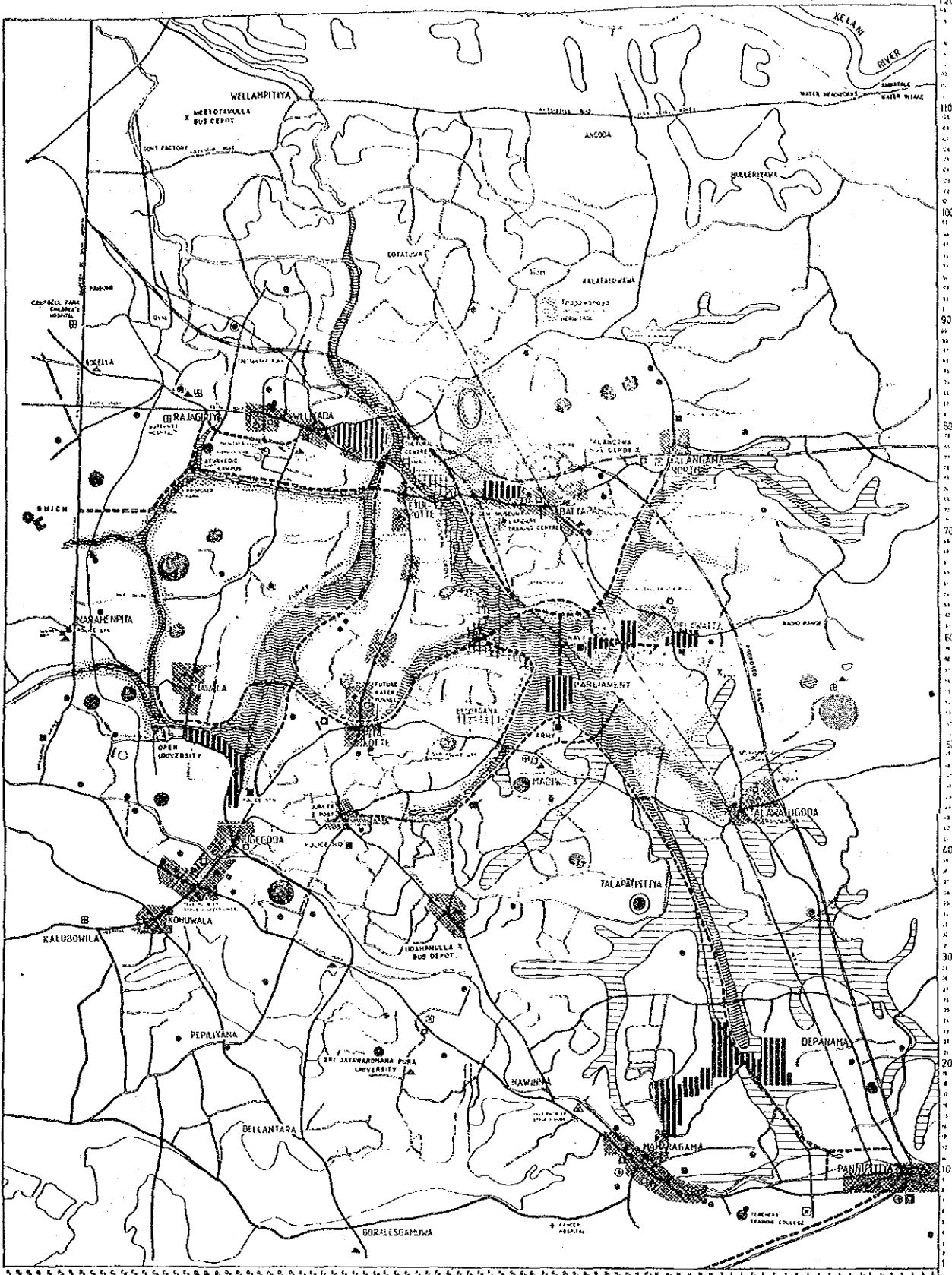


Fig. 2.14

HOSPITAL SITE

CONCEPTUAL DEVELOPMENT PLAN OF SRI JAYAWARDHANA PURA

- | | | |
|--------------------------|----------------------------|---------------------------------|
| PROPOSED RESIDENTIAL | SCHOOLS (EXISTING) | POST OFFICES (EXISTING) |
| CULTURAL | SCHOOLS TO BE UPGRADED | POST OFFICES (PROPOSED) |
| COMMERCIAL | SCHOOLS (PROPOSED) | TELECOM AUTO EXCHANGE |
| PROPOSED HOUSING SCHEMES | HOSPITALS (EXISTING) | ELECTRICITY SUB-STATION |
| LAKE | HOSPITALS TO BE UPGRADED | SEWERAGE PLANT |
| PARKLAND | HEALTH CENTRE (PROPOSED) | RESERVOIR |
| PADDY | POLICE & FOREST (EXISTING) | HIGH TENSION TRANSMISSION LINES |
| PROPOSED ROADS | POLICE & FOREST (PROPOSED) | BUS TERMINALS (EXISTING) |
| PROPOSED RAILLINE | BARS (EXISTING) | BUS TERMINALS (PROPOSED) |
| ADMINISTRATIVE | BARS (PROPOSED) | |
| TOURIST COMPLEX | | |

PROJECT DIRECTOR: *M. K. Jayaratne*
 PROJECT ARCHITECT: *W. M. M. M. M. M.*
 SCALE: *1:10,000*

UDA
 URBAN DEVELOPMENT AUTHORITY
 No. 21, DE WARDANE MAWATHA, COLOMBO 10

Chapter 3. Outline of the Hospital

3.1 Objectives of the Hospital

The proposed hospital is designated as a teaching hospital for the post-graduate level as well as a general hospital for the new capital. Although the new hospital is located in the new capital area in the Colombo Region, it will not join the Colombo Group of Hospitals and will not be under the Superintendent of Health Service placed in every province, but the hospital will be constituted of a new and independent organization.

Quite different from Japanese situations, in Sri Lanka the medical education is carried out under the Ministry of Higher Education, while a management of a teaching hospital of an university is executed through the Ministry of Health. Professors in a medical course of an university and working as medical staff in hospitals have responsible wards in teaching hospitals and hold their clinical lectures there. This system will also be adopted in the proposed hospital.

However, from the remarks by representatives of Sri Lanka that the priority should be put to the building itself, facilities for the daily usage and equipments for general needs, and that medical equipments for daily examinations and consultations are more in need than highly sophisticated devices for the medical education, it is quite clear that more importance is placed on the point that the hospital is aimed at the expansion and fulfillment of medical services than the development and enrichment of medical education.

As for the level of hospital services, the hospital shall cover mainly the secondary care, but also to a certain extent of the primary care as well as the tertiary care.

The estimates of population in the New Capital Development Area in the year of 2000 based on figures of 1971 and 1980 is shown in the chart below.

Fig. 3.1 Population of the Project Area

	1971	1980	GROWTH RATE	2001
KOTTE U.C.	93,680	122,640	3.43	226,098
KOLONNAWA U.C.	37,429	41,720	1.27	54,090
MAHARAGAMA T.C.	41,750	50,909	2.43	83,896
BATTARAMULLA T.C.	44,212	74,418	7.59	253,005
MULLERIYAMA T.C.	23,018	29,950	3.35	58,033
KOTIKAWATTA T.C.	43,795	57,200	3.40	91,975
ATHURUGIRIYA V.C.	26,195	37,547	4.82	94,240
KOTTE GALKISSA V.C.	48,218	67,168	4.36	153,335
KADUWELA V.C.	3,422	5,268	5.93	18,025
MAMPE KESBEWA V.C.	17,140	23,729	4.27	50,853
TOTAL	378,859	510,549	4.08 (AVERAGE)	1083,550

3.2 Facility Requirements

Facilities of the proposed hospital are classified into five departments, namely Ward, Out-Patient, Administration, Central Diagnostic and Treatment, and Service. In the following the requirements for each department are stated.

Wards

Considering the nationwide qualitative and quantitative need of medical facility, the congestion of patients in the wards of main hospitals, and the existence of floor patients, there is a serious need to increase the bed-strength as possible.

The size of nursing units should be decided on the basis of the capability of the consultant and the nursing team. 1 consultant can manage 80 patients at the maximum according to the Sri Lanka side. 1 nursing team can look after around 60 patients with improvements on the nursing efficiency such as shortening the walking distance by adopting the system of an open bay.

In hospitals of Sri Lanka, a ward will be managed by a certain consultant. This system will also be adopted in the new hospital to ensure the smooth management and appropriate treatment. To extinguish the floor patients the admittance of number of intakes will be restricted on the decisions of each consultant in charge.

The required nursing units and their bed-strength are listed below;

Fig. 3.2 Nursing Units and Bed-Strength

NURSING UNITS	NUMBER OF UNITS	BED-STRENGTH	REMARKS
Medical	3	186	
Surgical	3	186	
Obstetric & Gynaecology	2	122	
Paediatric	1	66	
Orthopaedic	2	124	
Ear, Nose, Throat	1	62	
Eye (Ophthalmology)	1	62	
Dermatology	1	46	
Day Stay	1	16	
Paying Beds	2	110	
ICU . CCU	-	12	
Premature Baby Beds	-	8	
TOTAL	17	1,000	

The day stay beds are for the 24-hour observation of patients who do not require the immediate admission to the hospital ward.

The paying beds are officially admitted to be provided upto the level of 15% of the total number of beds, and in the hospital concerned the requirement was made from the Ministry of Health.

Out-Patient Department

This department is divided into the General Out-Patient Clinic which offers services to general out-patients and the Emergency Clinic which handles emergency cases.

Out-Patient Clinic

The required types of clinics for the General Out-Patient Clinic are seven clinics. Eye Clinic and ENT Clinic are expected to use the same facilities. In the General Out-Patient Clinics of other large hospitals, the patients seeking better care and treatments gather early in the morning and the congestion is terrible. To remedy the situation in the General Out-Patient Clinic concerned, the patients are limited to the referred patients from other medical facilities or the follow-up patients under the continuous observation.

The services will be practiced by medical staff of the each clinic with 14 consultants in charge. Every consultant will hold three out-patient service day in a week, twice in the morning and once in the afternoon, and is expected to look after about 150 patients a day, of which 50 newly received and 100 under continuous observation.

Emergency Clinic

In the Emergency Clinic, the medical and surgical clinical services are provided 24 hours a day by the Medical Officers.

The facilities of the Central Diagnostic and Treatment Department, such as an operating theatre, a radiological diagnostic room, or a laboratory, may be required for an emergency case after the working hours of the central department. This calls for extra provisions of above facilities in the Emergency Clinic together with a few observation beds.

Administration Department

The required facilities are offices in general, a central record room, rooms for night duty, a lecture room, a library, and such.

Central Diagnostic and Treatment Department

Though the level may differ among the units, the principle to centralize the diagnostic and treatment units has been recognized in the discussion.

Laboratory

This unit is divided into the Pathological Lab. and the Physiological Lab. As for the Pathological Lab., four laboratories for the bacteriology and the microbiology, the biochemistry, the histology, and the hematology, and related rooms are requested.

As for the Physiological Lab., the electro-cardio-gram (ECG) room and related rooms are requested.

An autopsy room is also required, but this should be divided from the central laboratory and be set with a mortuary.

In the hematology lab., blood examinations needed in the Blood Bank will be carried out.

X-Ray Unit

The unit is divided into the diagnostic unit and the therapeutic unit. However, the facilities required for the proposed hospital are those for diagnosis. The facilities to be centralized are rooms for a radiographic system, a Fluroscopic system with T.V. screen, an Angio-graphic unit, and a Tomographic unit, and related rooms. As for the local facilities, a portable radiographic unit to be used in the wards and in the Out-Patient Department is requested.

Physiotherapy Unit

The facilities for the therapeutic exercise, the electro-therapy, and the heat therapy are requested.

Operating Theatre Unit

At present operating theatres of most hospitals are divided according to the type of medical division and set beside the related ward. This local system is advantageous in the efficiency of traffic between the operating theatre and the ward and the proficiency of staff. However, it is disadvantageous in the efficiency of air-conditioning, the effectiveness of staff allocation, the improvement of utilization rate, the full usage of common instruments, and the complete usage of the Central Sterile Supply Division. After a thorough discussion on this point, the principle to centralize operating theatres has been recognized. Eight operating theatres are requested, of which three theatres for General Surgery, two for Orthopaedic use, one for Eye, Ear, Nose, Throat, and two for casualty cases.

Most operations recorded in other hospitals are minor cases and cases as cancer operation are very rare, but the number of operations is quite large, as thirty cases in a week for a single nursing unit. The working hours of the unit are principally twelve sessions a week, those are from 8 to 12 o'clock in the morning and from 2 to 5 in the afternoon on every weekdays from Monday to Saturday.

Delivery Unit

The centralization of this unit is also agreed upon. The number of required delivery tables is more than three, with a notice that they need not be in independent rooms.

Dispensary

For this unit, the provision of out-patient and in-patient facilities is requested.

Blood Bank

In the present service only the whole blood transfusion is practiced. The requirements are a bleeding room, a blood refrigerator room, and related rooms. As stated before, the blood examinations will be carried out in the hematology room in the Pathological Laboratory.

Central Sterile Supply Division: CSSD

The division will basically wash and sterilize all the instruments and materials in the hospital, but the main service will be headed to the operating theatre unit. Small sterilization devices set at each nurses' station and the Out-Patient Department are also required and these facilities are for supplementary usage.

Intensive Care Unit (ICU) & Coronary Care Unit (CCU)

ICU 6 beds and CCU 6 beds separated from the ward are requested.

Service Department

Kitchen, Staff Dining Room, Staff Dressing Room, Laundry, Machinery Room, Electricity Room, Storage, and such are required.

Staff Quarters

Quarters for the hospital superintendent, for medical staff, and for nursing staff are needed. The sizes of each component are for the hospital superintendent a house of 280m², for single medical staff 30 single rooms of 15m² each, for married medical staff 20 units of 46.5m² each, for interns 20 single rooms of 15m² each, and for nursing staff 150 2-bed rooms of 15m² each.

3.3 Administrative Organization

The administration of the proposed hospital will be carried out under the Medical Superintendent, the General Matron, and the Hospital Secretary. (Fig. 3.3)

The number and classification of staff will be Medical Staff 81, Nursing Staff 1,124, Para Medical Staff 63, and General Staff 127, totaling 1,395. These staff will be allocated in the Ward, the Out-Patient Department, the Administration Department, the Central Diagnostic and Treatment Department, and the Service Department. The details are shown in Fig. 3.4.

Fig. 3.3 Hospital Organization

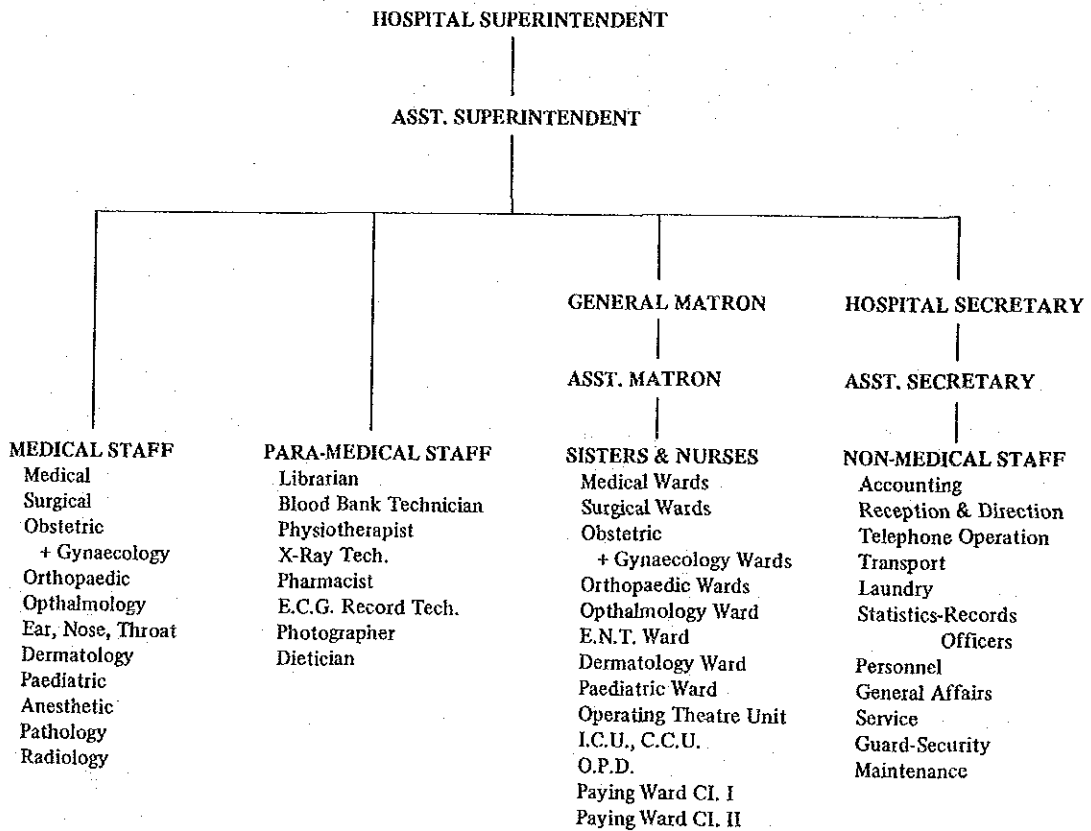
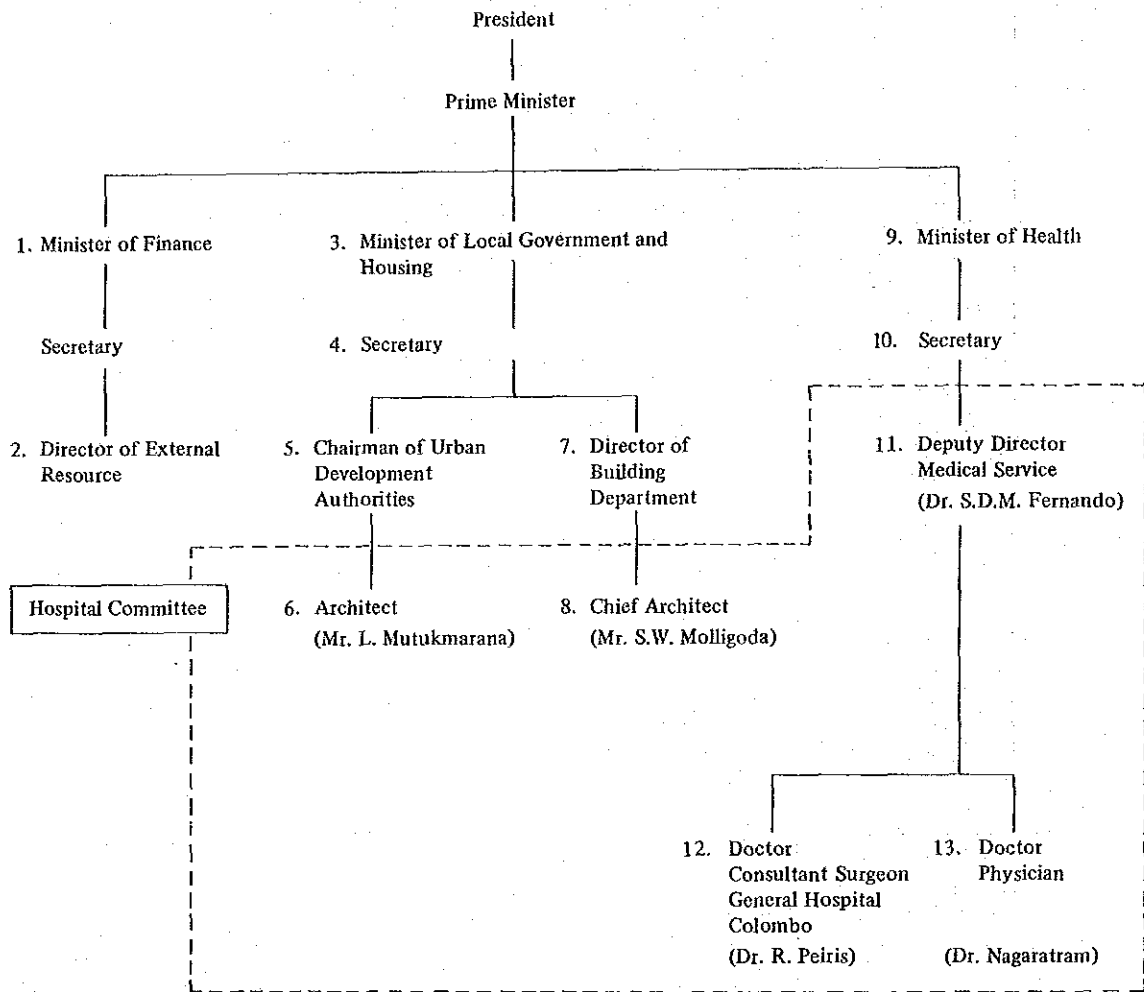


Fig. 3.4 Hospital Staff Allocation

Fig. 3.2 NEW HOSPITAL STAFF ALLOCATION		Medical Staff				Nursing Staff					Para Medical Staff					Remarks										
		Medical Superintendent	Asst. Superintendent	Consultant & Doctor	Medical Officer	Intern	Matron	Asst. Matron	Sister	Nurse	Nursing Orderlies	Hospital Orderlies	Sanitary Labourer	Lab. Technician	Radiologist		Radiographer	Photographer	S.C.C. Recorder	Physiotherapist	Pharmacist	Dietician	Librarian			
Ward	Medical		3	3	6		3	63	54	6	3															
	Surgical		3	3	6		3	63	54	6	3															
	Obs. & Gyn.		2	2	4		2	48	42	6	3															
	Paediatric		2	2	4		1	27	24	2	1															
	Orthopaedic		1	3	-		2	42	36	4	2															
	E.N.T.		1	3	-		1	21	18	2	1															
	Eye		1	3	-		1	21	18	2	1															
	Dermatology		1	2	-		1	16	18	2	1															
	Day Stay Beds		-	-	-		-	-	4																	
	Paying Beds		-	-	-		3	51	52	6	3															
O.P.D.	Clinic							19	16	3	2															
	Emergency			3				19	12	3																
	X-Ray		1	-				2	2																	
	Dispensary							-	6																	
Gen. Diag. & Treat	Admission							-																		
	Laboratory		3	3	-			-	12	2	25															
	X-Ray Unit		1	1	-			-	2	15	3		1	12	4	1										
	Physiotherapy Unit		1	1	-			-	2	4	1						15									
	Operating Theatre						3	76	64	4	1															
	Delivery Unit						1	15	14	2	-															
	ICU-CCU			6			1	40	12	2	1															
	C.S.S.D.						1	4	6	-	-															
	Blood Bank		1	3	-			-	4	6	2															
	Dispensary								-	0									3							
Ad. Service	Mortuary							-	0																	
	Kitchen																									
	Laundry																									
Ad.	Boiler & Machine										7															
	Subtotal	1	1	21	38	20	1	1	24	53	477	58	30	25	1	12	4	1	15	3	1	1				
Subtotal		61				1124					63															
Administration		Administration																				Remarks				
		Hospital Secretary	Asst. Hospital Secretary	Clerks	Bldg. & Grdn. Upkeep	Ov. seers	Bldg. & Grdn. Upkeep Labour	Diet Clerk	Kitchen Stewardess & Asst.	Almshouse	Medical Record	Matcher	Telephone Operator	Driver	Laundry	Electrical Foreman	Med. Equip. Foreman	Building Maintenance	Resident Engineer (J.T.O.)							
Ad.		1	1	15	5	35	20	3	1	1	15	6	4	5	5	7	3									
	Subtotal	1	1	15	5	35	20	3	1	1	15	6	4	5	5	7	3									
Subtotal		127															Total					1395				

Fig. 3.5 Organization of Hospital Committee



- | | |
|----------------------------------|------------------------------------|
| 1. Mr. R. D. Mel | 9. Mr. G. Jayasuriya |
| 2. Mr. S. Velayutham | 10. Mr. B.C. Perera |
| 3. Mr. R. Premadasa (Prime Min.) | 11. Chairman of Hospital Committee |
| 4. Mr. R. Paskaralingam | 12. Member of Hospital Committee |
| 5. Same as above | 13. Member of Hospital Committee |
| 6. Member of Hospital Committee | |
| 7. Mr. K.C. Samaraweera | |
| 8. Member of Hospital Committee | |

3.4 Hospital Construction Execution Committee

The Hospital Construction Execution Committee consists of the Deputy Director of Medical Service in the Ministry of Health as a chairman, and specialists of architecture from the Building Department and the Urban Development Authority in the Ministry of Local Government, Housing and Construction, and specialists of surgery and internal medicine from the General Hospital, Colombo.

The Committee, is an interministerial organization and the representative of the Government of Sri Lanka.

The competent authority of the hospital construction is the Ministry of Health. However, the construction to be carried out by the Sri Lanka side is divided into two parts, which are the construction executed within the budget of the Ministry of Health and that executed in relation to the New Capital Development Program under the Urban Development Authority in the Ministry of Local Government, Housing and Construction. The members of the Committee are listed below;

- Chairman Dr. S.D.M. Fernando
 Deputy Director, Dept. of Medical Service, MOH

- Member Mr. S.W. Molligoda
 Architect, Dept. of Buildings, MOLGHC
 A designer of hospitals constructed by the Ministry
 of Health
 In this hospital project, an adviser to the Ministry
 of Health

- Member Mr. L. Mutukmarana
 Architect, Urban Development Authority, MOLGHC
 A co-ordinator of the provision of infra-structure
 of the hospital concerned, since the hospital is
 in line with the New Capital Development Plan
 which is carried out by the U.D.A..

- Member Dr. R. Peiris
 Consultant of Orthopaedics, General Hospital, Colombo
 An adviser on the software of the hospital.

- Member Dr. N. Nagaratram
 Consultant of Internal Medicine, General Hospital,
 Colombo.
 An adviser on the software of the hospital.

The External Resource Division in the Ministry of Finance is responsible for the government to government agreement for the grant.

Chapter 4. Construction Site

4.1 Conditions of the Site

The construction site of the proposed hospital is located within the Sri Jayawardhanapura New Capital Development Area in the Kotte Region, southeast of the City of Colombo and is at Talapatpitiya, about 2 kilometers south of the new parliament complex.

The area of the site is about 25 acres (100,000m²) and the site is utilized as a rubber plant plantation, a coconut tree garden and a cinnamon field.

The difference of grade level in the site is about 12 meters and there is a quite steep slope. Considering an irregular shape of boundary lines, the land fit for the construction after reclamation is about 350 meters east-west by about 100 meters north-south at the ridge part of the hill. The main facilities of the hospital complex is expected to be fit in this area.

4.2 Surrounding Environment

There are some private houses near the boundary lines. By placing the hospital buildings a little apart from the boundary lines, there will be no obstacles to the construction of the hospital.

To the east and the south there is a marshland at present, and according to the New Capital Development Plan, this area will be utilized as a part of a Highway and park surrounding the new parliament.

There is an official limitation for the height of building to be under eight-stories in the area, a sight can be attained from the first floor and above. This factor will be taken into the considerations in the building arrangement.

4.3 Existing Infra-Structure and Future Provisions

The infra-structure, such as roads, water supply, drainage, electricity, and telephone, is not well provided in the present site for a large hospital. Since the site is located inside the New Capital Development Area, the provision of the above infra-structure is in line with the New Capital Development Plan.

The main project in the Stage I of the Development Plan is the construction of the parliament. The provision of the infra-structure for the hospital site is considered as an extension of the provision for the parliament.

Site Reclamation

The reclamation of the site will be carried out in accordance with the basic design. The range of reclamation is shown in Fig.4.1.

Access Road

At present a paved road connects the suburbs of Colombo City and Udahamulla Bus Manipulating Area, but beyond the Area to the site, the road is not well paved for about 800 meters, and the road is too narrow for a large vehicles to pass through.

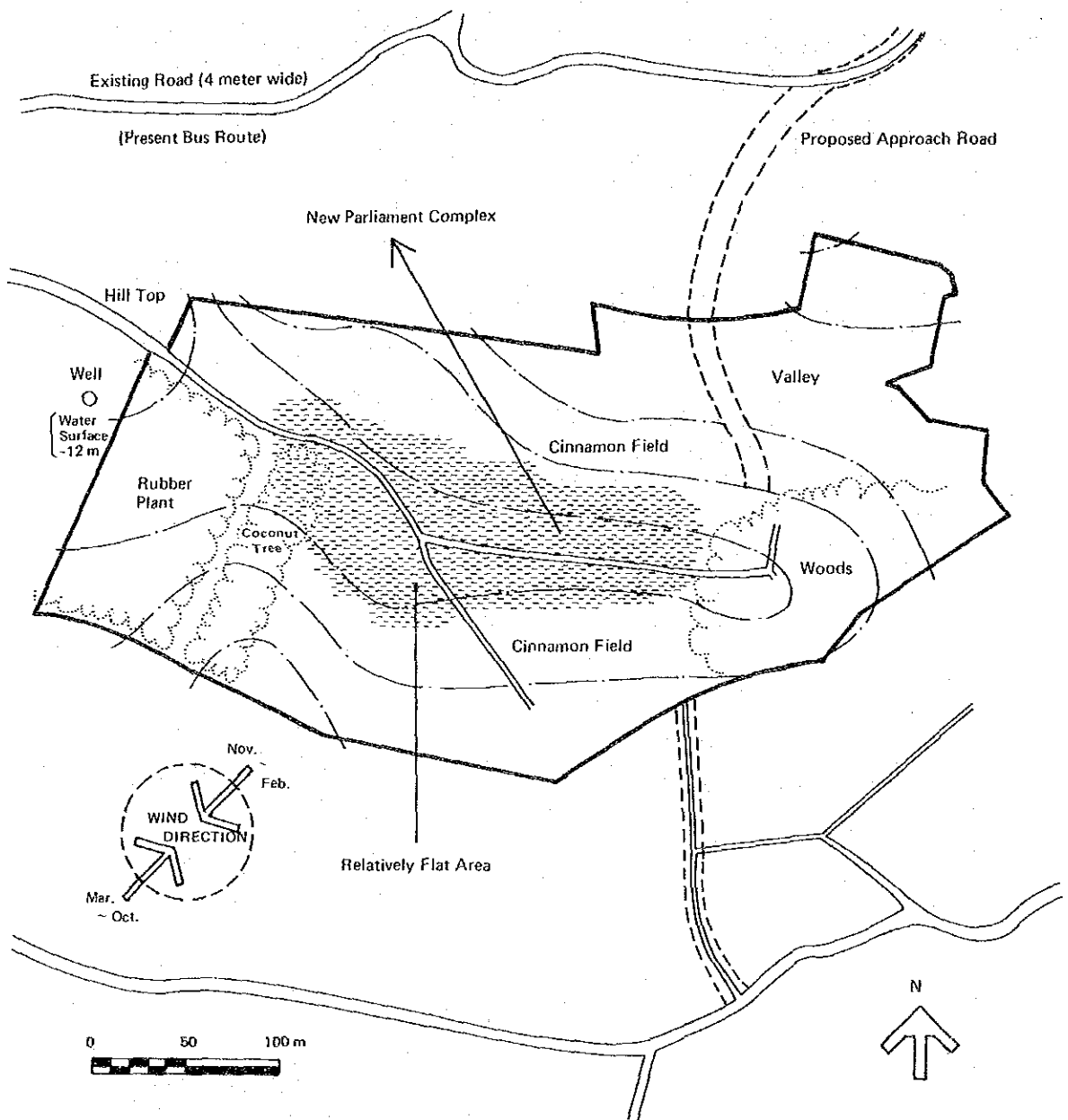


Fig. 4.2 Present Site Conditions

U.D.A. is planning an arterial road from the new parliament to Maharama and beyond. When this arterial is completed, the access road to the hospital will be constructed from the arterial road. The construction will be completed within 1982 and the cost will be covered by the special budget for the New Capital Development.

Water Supply

At present, private houses surrounding the site are using wells to acquire drinking water. In a well of a house on the western boundary of the site, the water surface is about 16 meters below the ground level in the rainy season and decline a little in the dry season. The water for the construction may be attained from the above well or newly bored wells.

Water supply to the new parliament is to be completed by the end of 1980. The extension of the supply pipe from the parliament to the hospital site is to be completed by the end of 1981. The supply of the pipe is 200,000 gallons per day (800 tons per day). The government of Sri Lanka is to appropriate 7 million Rs in the budget for fiscal year of 1981 & 82, and as for the temporary water supply for the construction, it has already appropriated 100,000 Rs in the 1981 budget and the construction will be completed by April, 1981.

Drainage

At present, there is no sewer nor rain water drains in the surroundings of the site. In the private houses the waste water is treated using the soak pit.

In the New Capital Development Plan in the long term the development area will be divided into two and each will be serviced by a sewage system with a central sewage treatment plant.

The amount of sewage water from the hospital facilities and the quarters is estimated to be 800 tons per day taking the site population of 2,000 into account.

The sewage water from the facilities will be sent to a sewage treatment plant at Wellawatte, about 9 kilometers East of the site. It will be treated there and then discharged into the ocean. A pump station is needed in the site to send sewage water.

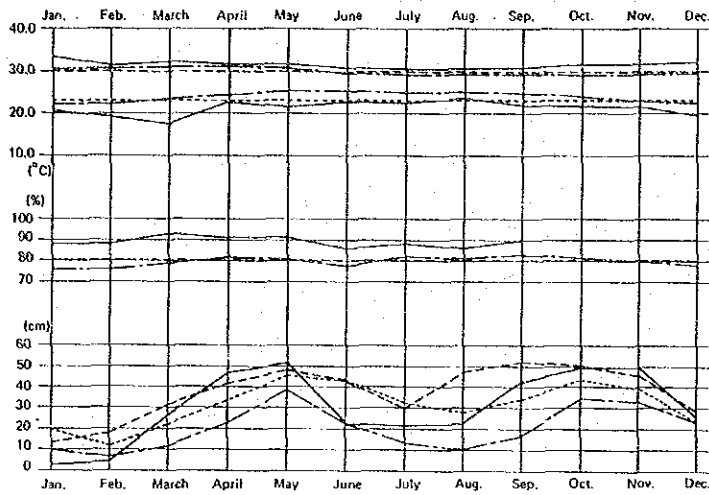
For the above scheme 15 million Rs is requested in the 1981 & 82 budget. The construction is expected to be completed by January 1982.

The rainwater will be discharged through a side-pit along the newly constructed road.

Power Supply

The temporary power supply for the hospital construction with the capacity of 200KVA will be drawn in from the nearby 33KV cable. 450,000 Rs is requested for this in the 1981 budget and the provision will be completed by April, 1981.

The permanent power supply with the capacity of 1,500KVA will be drawn from the 33KV cable. 8 million Rs is requested for this in the budgets for fiscal years of 1981, 82, and 83.



AIR TEMPERATURE IN COLOMBO

- Highest Maximum Air Temperature in each month of 1961
- Average Monthly Mean Maximum Temperature for the period of 1931~60
- Annual Average of Monthly Mean Maximum Temperature
- Annual Average of Monthly Mean Minimum Temperature
- Average Monthly Mean Minimum Temperature for the period of 1931~60
- Lowest Minimum Air Temperature in each month of 1961

NOTICE: Transition Formula $y (^{\circ}\text{C}) = \frac{5}{9} (x (^{\circ}\text{F}) - 32)$

RELATIVE HUMIDITY IN COLOMBO

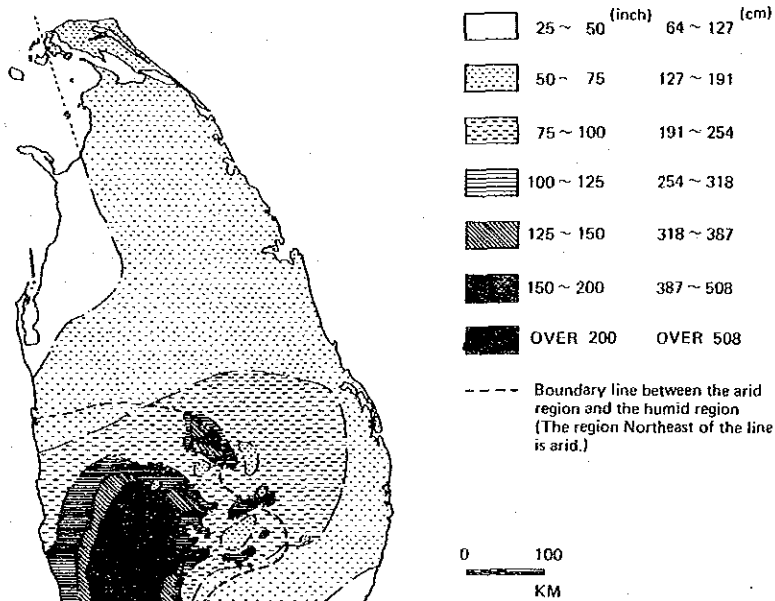
- Monthly Mean Relative Humidity obtained from the Minimum Dry and Wet-bulb readings during 1961
- Annual Monthly Mean Relative Humidity
- Monthly Mean Relative Humidity obtained from Dry and Wet-bulb readings at 08:30, 11:30, 14:30 and 17:30 hours.

RAINFALL IN COLOMBO

- Average Number of Rainy-days at Eighty-five selected stations representative of the Island during 1961
- Number of Rainy-days in Colombo during 1961
- Average Rainfall at Eighty-five selected stations representative of the Island during 1961
- Monthly Rainfall in Colombo during 1961

NOTICE: ● Rainy day is a day for which at least 0.01 inch = 0.254 mm is recorded.
● Greatest daily rainfall recorded during 1961 and over the whole period during which observations have been taken is in Colombo 13.5 cm on April 19, 1961 and among other stations 29.0 cm on May 18, 1936.

ANNUAL AVERAGE RAINFALL (1911 ~ 40)



SOURCE: The Ceylon Economic Atlas, Dept. of Census and Statistics

Fig. 4.3 Climate Conditions

Telephone

At present the telephone system in Kotte Region is in full use and the extension is under way.

To an exchange room of the hospital 30 lines will be drawn and then distributed to the hospital itself and to certain sections of quarters. Also for direct calls 70 lines will be drawn to the hospital and medical staff quarters.

For this provision 2 million Rs in the 1981 budget and 1 million Rs in the 1982 budget are requested.

4.4 Climate Conditions

Sunshine

The city of Colombo is located at 7° North Latitude. From March to September the sun radiates from South and from September to March from North. During the midst of daytime the solar radiation can be excluded by the eaves or horizontal louvers on the north and south sides of the building, but in early morning or late afternoon measures should be taken to cope with the radiation from East or West.

Temperature & Humidity

Sri Lanka is located near the equator belonging to the tropical region. The annual average temperature is 27°C with the fluctuations within 2 degrees, and the seasonal differences or the differences of day and night is small. The average relative humidity is quite high. (80 - 90%)

Wind Direction

As situated in the monsoon region, Sri Lanka receives the southwest monsoon winds from May to September and the northeast winds from November to next March.

It is rarely attacked by a cyclone.

Rainfall

The greatest daily rainfall recorded in Colombo was 135 millimeters in 1961.

4.5 Soil Conditions

Since the surface soil is shallow and underneath lies a rigid layer of laterite, the ground will form a suitable base.

The result of boring test is shown in Appendix B.

4.6 Ownership of the Land

The land is already purchased by the government and to the concerned personnel the free access to the land is guaranteed.

Chapter 5. Basic Planning

5.1 Basic Principles

Based on the Sri Lanka request, "the enlargement and completeness of medical service", the hospital is characterized as a general hospital to provide adequate in-patient care to more patients and the ward size is considered important.

The hospital is designed to meet the future growth and change of facility resulting from the improvements of medical level and therapeutic methods. That is, the diagnostic and treatment units, as the pathological laboratory and the operating theatre unit are centralized and located in the low-rising building divided from the ward building, so that future extensions and alterations can be accomplished without great difficulties. The centralized system will enable the specialization of hospital staff, the common usage of instruments, and the efficient operation of installed devices as air conditioning facility. By realizing above items, the rationalization of hospital management and the retrenchment of maintenance expenses are expected.

Among various factors decisive of building arrangements, the followings are considered to be of most importance.

Natural Conditions Radiation, Temperature, Wind Direction, Sight, etc.

The building is planned to adopt natural conditions. Special care is taken for the natural ventilation and the solar control.

Hospital Function

When rooms having close function with each other as a hospital are placed in the same block, benefits of smooth movements of people, goods and information can be expected.

Especially, by grouping the rooms require the mechanical air-conditioning, an extra merit will be produced in planning facility accommodations.

Approach

As the approach to the building the following three entrances should be provided independently. The entrance to the General Out-Patient Clinic and the Ward, the entrance to the Emergency Clinic, and the entrance to the Service Department. The entrance to the Emergency Clinic should be directly acknowledged from the main approach and that to the Service Department unnoticeable to the general public.

Construction Unit

The limitations of construction period mainly restricts the number of floors. The provision of basement is not advantageous when considering the cost, construction period and the soil conditions.

As for the construction cost, it will be more beneficial to stack identical floors. When using the direct foundation, 6 stories is the limit from the bearing capacity.

Taking the above items into consideration, the followings are chosen as basic principles of the hospital design.

1. The hospital should be composed of blocks of east-west axis with openings on the north and south sides.
2. The walls on the east and west sides should be of small surface area with non-residential space attached to them.
3. Along the main approach road, the Emergency Clinic, the General Out-Patient Clinic and the Administration Department should be placed.
4. The ward should be of 6-storey high, the remainings of 2-storey high.

5.2 Building Arrangement Planning

The site for the hospital concerned stretches about 500 meters to east-west and about 250 meters to north-south and has a complicated shape of intricate boundary lines. The western part of the site which lies on a ridge of a hill with an east-west axis at the centre measuring about 350 meters to east-west and about 100 meters to north-south will be leveled and utilized for the construction of major hospital facilities. The Urban Development Authority (UDA) is planning an access road to the site, passing through the east side of the site from north to south. The hospital facilities and quarters for medical and nursing staff will be located in the western side of the above road, and the entrances to the General Out-Patient Clinic, the Ward and the Emergency Clinic and the parking area will be set along this main road.

The major facilities to be constructed are divided into next seven blocks.

- | | | |
|---------|----------|--|
| A Block | 6-storey | Ward |
| B Block | 2-storey | Out-Patient Department (General-Emergency) and Administration Department |
| C Block | 2-storey | Central Diagnostic and Treatment Department and Service Department |
| D Block | 3-storey | Medical Staff Quarters |
| E Block | 4-storey | Nursing Staff Quarters |

5.3 Facility Floor Area

The floor area of each department.

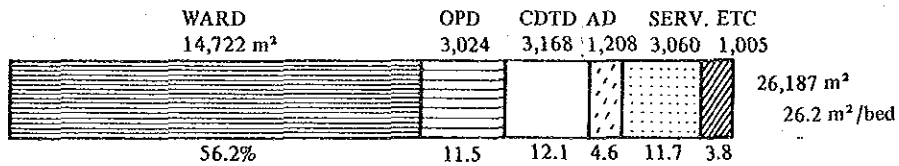
DEPARTMENT			FLOOR AREA	FLOOR AREA PERCENTAGE
A. WARD				
Medical	3 Units	186 Beds		
Surgical	3	186		
Obstetric & Gynecology	2	122		
Paediatric	1	66		
Orthopaedic	2	124		
Ear, Nose, Throat	1	62		
Eye (Ophthalmology)	1	62		
Dermatology	1	46		
Day Stay Beds	1	16		
Paying Beds	2	110		
Premature Baby Beds	-	8		
	17 Units	988 Beds	14,722 m ²	56.2%
B1. OUT PATIENT DEPARTMENT				
General Clinics				
Emergency				
			3,024 m ²	11.5%
B2. ADMINISTRATION				
In-patient area				
Out-patient area				
			1,208 m ²	4.6%
C1. CENTRAL DIAGNOSTIC & TREATMENT				
Pathological Laboratory				
Physiological Laboratory				
X-Ray Unit		4 Rms		
Physiotherapy Unit				
Operating Theatre Unit		8 Rms		
Delivery Unit				
ICU - CCU		12 Beds		
C.S.S.D.				
Dispensary				
Blood Bank				
			3,168 m ²	12.1%

DEPARTMENT	FLOOR AREA	FLOOR AREA PERCENTAGE
C2. SERVICE		
Kitchen		
Laundry		
Storage		
Machinery Room		
Staff Dressing Room		
Others		
	3,060 m ²	11.7%
CORRIDORS - PORCH		
	1,005 m ²	3.8%
TOTAL Hospital Proper A/C Block	1,000 Beds	26,187 m²
		100.0%

D.E. QUARTERS

Medical Superintendent's Quarters
 Medical Staff Quarters
 Nursing Staff Quarters

8,202 m²



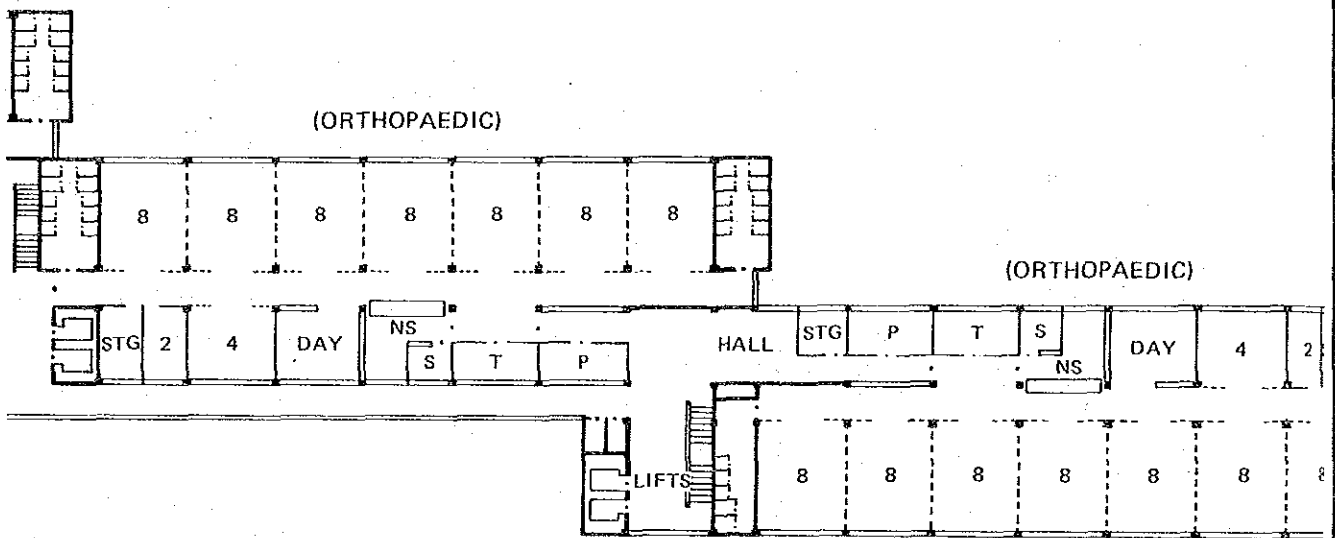


Fig. 5.1 Typical Ward Floor

5.4 Facility Planning

The facilities planned to compose the hospital concerned are as follows.

Ward

The ward building is of six-storey high with an east-west axis, and houses three nursing units (with a standard bed-strength of 62 beds for each nursing unit) on each floor.

As for the East ward, a pilotis or an open floor is planned on the ground floor to serve as a waiting hall for admission area and visitors, the first floor and above accommodate sick beds.

As for the Centre Ward and the West Ward, the whole building, from the ground floor to the fifth floor, is utilized as in-patient quarters.

Each nursing unit is housed in an open room with a nurses' station in the centre. The open room is divided into seven 8-bed bays and one or two smaller bays for seriously ill patients with low-rise partitions.

The unit is accommodated with a doctor's room, a treatment room, a pantry, and a shower and toilets for the required functions.

The adoption of the open room system is to improve the nursing efficiency and the indoor environment. The improvement of overall efficiency can be attained by reducing the walking distance and obtaining the better observability by placing the nurses' station in the midst of groups of sick beds. The improvement of indoor environment can be attained by introducing natural ventilation by taking enough ceiling height and space. Also, for the control of in-out movements the entrance and the nurses' station are put close together.

The average floor area per a bed is 13.2m² on the typical floor.

Fig. 5.2 Nursing Unit Allocation and Bed Strength

West Ward		Centre Ward		East Ward	
5F	Medical 62B	Medical 62B	Medical 62B	Medical 62B	62B
4F	Eye 62B	Orthopaedic 62B	Orthopaedic 62B	Orthopaedic 62B	62B
3F	Paying Beds (Class-1) 20B	Ear, Nose, Throat 62B	Surgical 62B	Surgical 62B	62B
2F	Paying Beds (Class-2) 48B	Surgical 62B	Surgical 62B	Surgical 62B	62B
1F	Paying Beds (Class-2) 48B	Obstetric & Gynaecology 62B	Obstetric & Premature 62B	Obstetric & Premature 8B	8B
GF	Paediatric 64B	Dermatology 48B	Day Stay Beds 12B	-----	-----
				Subtotal	988B
				ICU-CCU	12B
				Total	1,000B

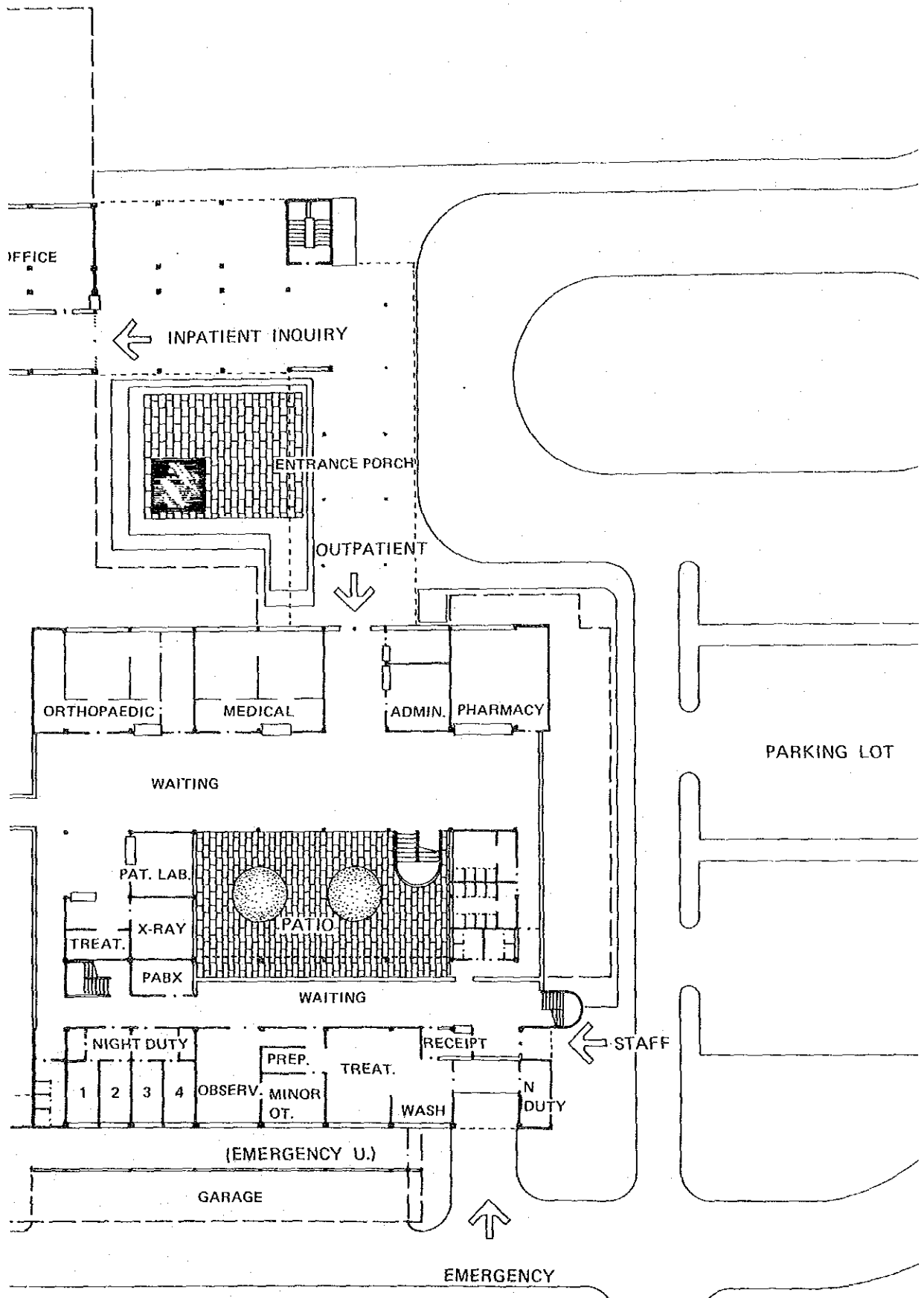


Fig. 5.3 Out-Patient Department Ground Floor

Out-Patient Department

The General Out-Patient Clinics and the Emergency Clinic are in the same block. The entrances to each division is separated.

General Out-Patient Clinics

The division is in the direct reach from the central entrance hall. Its clinical service is mainly targetted to the refered or follow-up patients. There are six clinical units, namely, Medical, Surgical, Orthopaedic, Obstetric & Gynaecology, Paediatric, and Eye-Ear-Nose-Throat.

The contents of each clinical unit are basically a reception room, a consultation & Examination room, a record room, and special facilities such as dark rooms and a limb room.

The division has tight relations with the Pathological Laboratory, the X-Ray Unit, and the Day Stay Ward, meaning these units are closely placed and two rooms, one for pathological inquiry and the other for X-Ray diagnosis, are provided within the division together with an out-patient dispensary.

The total number of out-patients of 6 clinics is estimated to be 600 in the morning and 150 in the afternoon at the maximum.

Emergency Clinic

The division is designed to offer clinical service to emergency cases. The division is in the same building block with the General Out-Patient Clinic for the full utilization of common facilities as Pathological Laboratory. The entrance to the division is divided to serve 24 hours a day and a porch is provided for arrivals of ambulances.

A patient brought by an ambulance or by other means is taken to the consultation & treatment room after checking in at the emergency reception and when needed cleaned at the wash room. According to the patient's conditions, taken to the minor surgery room or near by X-ray facilities.

A duty room combined with a rest room and a dressing room is planned for doctors and nurses on 24-hour duty. The patients requiring a 24-hour observation are kept in an observation room. A dirty utility room and a lavatory for patients are provided. The division will be air-conditioned partially.

Administration Department

Administrative facilities and medical offices are located on the ground floor of the ward block and on the ground and first floors of the out-patient block.

Facilities in the ward block are a ward admission office and a central record room, and in the out-patient block office rooms for medical superintendent, general matron and hospital secretary, lounge for consultants, doctors and nurses, a library, a conference room, a lecture room, a telephone-exchange room, and duty rooms.

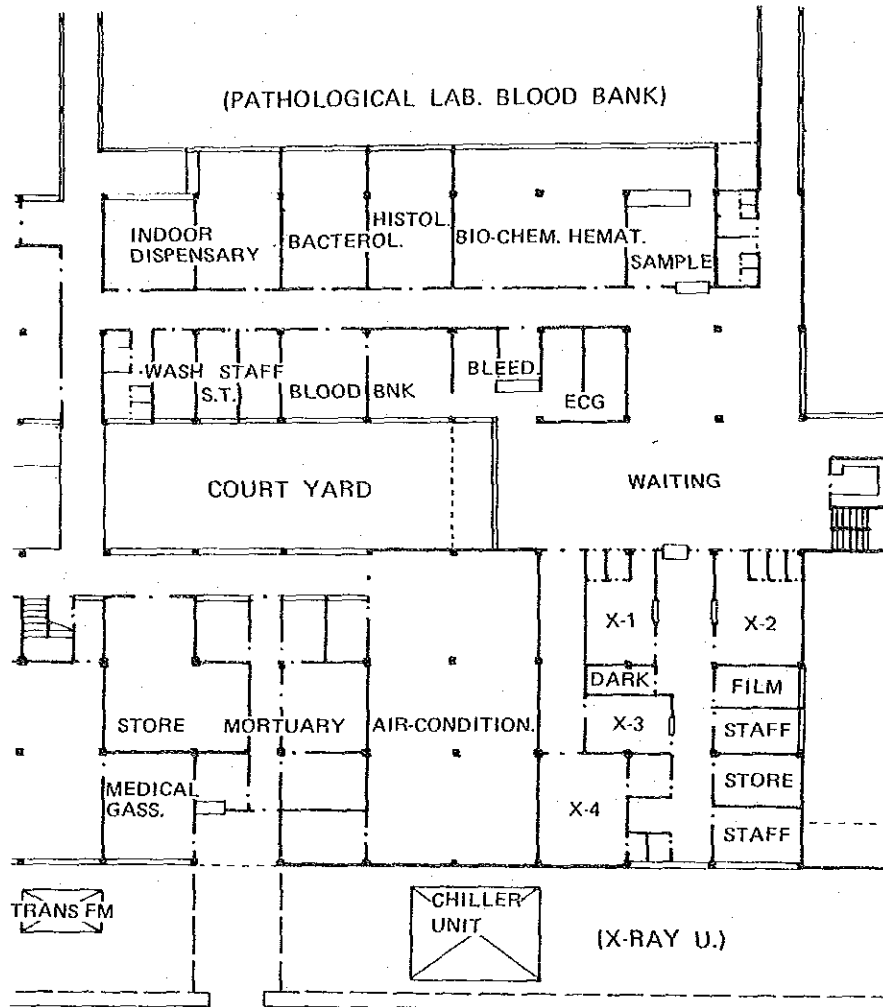


Fig. 5.4 Control Diagnostic and Treatment Department Ground Floor

Central Diagnostic and Treatment Department

The Department consists of diagnostic units on the ground floor and treatment units on the first floor.

The air-conditioning is accommodated in the department.

The diagnostic units on the ground floor are listed below.

X-Ray Unit

The unit consists of a reception room, waiting area, X-ray photography rooms and control rooms (four sets), patients' dressing rooms, a radiologists' room, a dark room, a film reading room, and storage for films and materials. The room for Angiographic unit is planned to meet the future provision.

Pathological Laboratory

The laboratory consists of examination rooms for Bacteriology, Microbiology, Biochemistry, Hematology, and Histology, a specimen collecting room to collect urine, blood and other body fluid, a reception room, and a wash-up room. These facilities will be shared by other departments to a certain extent, as the Blood Bank utilizing the examination room for Hematology. The estimated number of patients is about 400.

The autopsy unit is located in between the boiler room and the machinery room so that it will not attract public attention. The unit consists of a doctor's room, a coroner's room, a morgue, and a mortuary.

Physiological Laboratory

The laboratory consists of a reception room, a technicians' room, an examination room for electro-cardio-gram (E.C.G.).

Blood Bank

The unit is located near-by the Pathological Laboratory and consists of a reception room, a bleeding room, a preparation room, and a blood storage. Blood examinations will be carried out in the Pathological Laboratory.

Indoor Dispensary

The unit is planned independently from the out-patient dispensary and is to supply medicine to in-patient area.

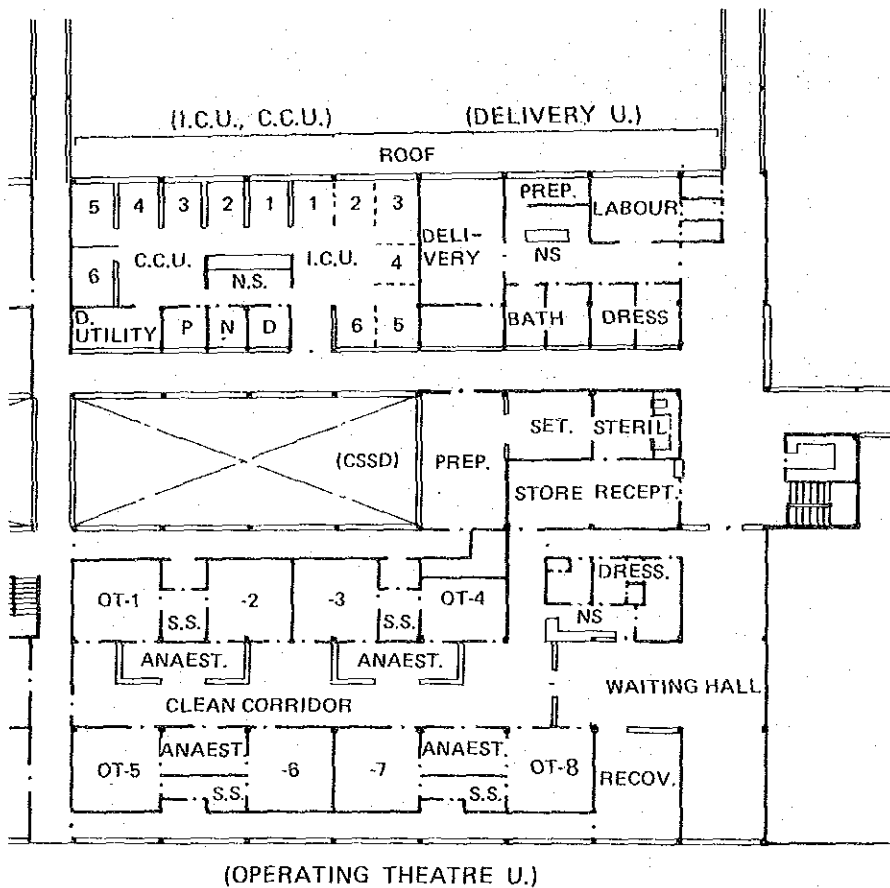


Fig. 5.5 Central Diagnostic and Treatment Department First Floor

The treatment facilities on the first floor are listed below.

Operating Theatre Unit

The unit is located near by the intensive care and coronary care unit (ICU-CCU), the central sterile supply division (CSSD) and the labour unit. Eight operating theatres are provided with anaesthetic rooms, sterilizing rooms, wash-up rooms, scrub areas, and a recovery room. The floor of an operating room will be planned for the dry treatment.

Among eight theatres, one for infectious disease is placed near the entrance to the unit.

Patients, doctors, and others entering the operating zone are checked and controlled at the nurses' station. A patient brought through the entrance is carried through the "semi-clean zone" and the "clean zone" to an anaesthetic room and then to an operating theatre. Dirty waste material is carried out from a back door of the theatre and taken through the "dirty corridor" to a sterilizing room.

Doctors, nurses, and nursing ancillary staff come from a regular corridor into dressing rooms and are lead to the "semi-clean zone".

Central Sterile Supply Division (CSSD)

CSSD is located next to the operating theatre unit to enable direct supply of sterile material to the unit, and also to ICU-CCU and the delivery unit. In the division a wash-up and assembling room, a sterilizing room, a sterile material hold are provided.

Intensive Care Unit (ICU) & Coronary Care Unit (CCU)

The units are near by the operating theatre unit for the immediate transfer of patients.

The nurses' station is placed in the centre of ICU 6 beds and CCU 6 beds in the unit and the unit is accomodated with a dirty utility room a doctors' and anaesthetists' room, a nurses' room, and a preparation room.

Delivery Unit

The unit is also guaranteed with immediate supply of sterile material from the CSSD. It consists of a nurses' station, a labour room, a delivery room, a baby bath room, an utility room, a dressing room, a dirty utility room, and a toilet.

Physiotherapy Unit

The unit consists of a reception room, waiting area, facilities for therapeutic exercise, electro-therapy and heat-therapy.

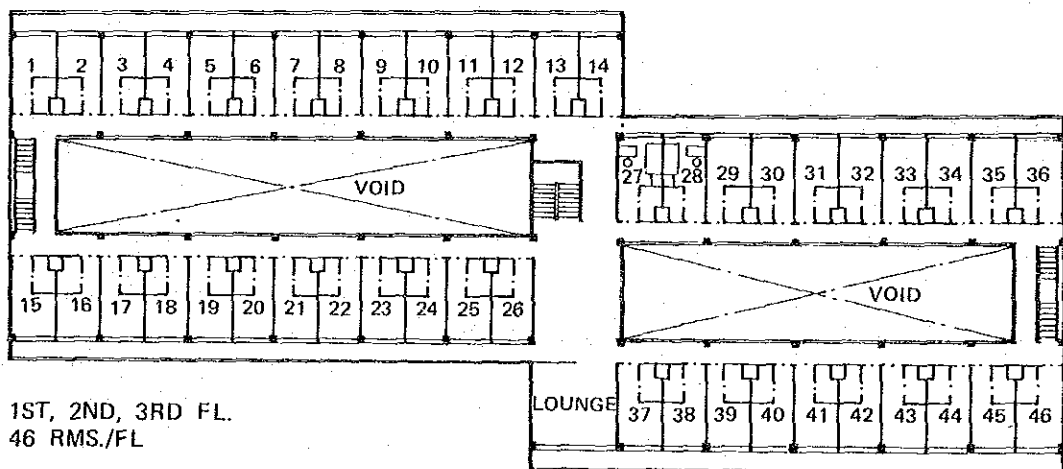
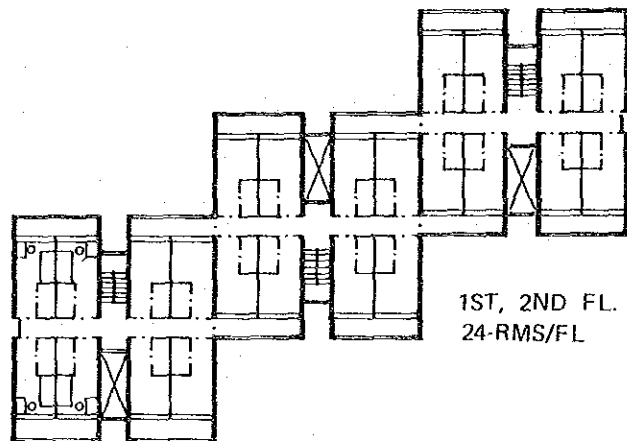
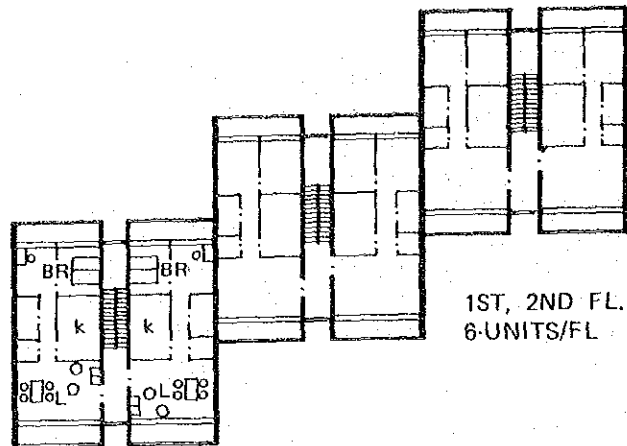


Fig. 5.6 Staff Quarters Top: Medical Staff Married Units
Med.: Medical Staff Single Rooms
Bottom: Nursing Staff Quarters

Service Department

As servicing facilities, a boiler room, an electricity control room, an electricity receiving and distributing room, a kitchen, a staff dining room, a laundry, a technicians' rest room, and duty rooms are planned. The kitchen and the laundry is housed in a single storey building to secure machinery high and to scatter heat, and as the heat source for the above the steam from the boiler is utilized.

Staff Quarters

Medical Superintendent Quarters

An independent dwelling is provided as medical superintendent quarters.

Medical Staff Quarters

As doctors quarters, 30 single rooms and 18 married units, and as interns quarters, 20 single rooms are provided together with a kitchen, a dining room, and a lounge.

Nursing Staff Quarters

Facilities for 300 sisters and nurses are provided together with a kitchen, a dining room, and a lounge.

5.5 External Work

Architecture from its nature increases its value when its environment is improved. This also is valid in a hospital, especially influential to the patients' mental aspects. And considering house medical and nursing staff, the site should also provide an adequate dwelling environment. The site, therefore, requires total landscaping.

In the early stage, sidewalks of the access road from Kanatta Road to the site should be turfed and furnished with lawns and trees. And at the same time, an orderly planning of the main hospital entrance and the surrounding including the parking area should be carried out to form adequate environment for an entrance of 1,000-bed hospital.

Lawns and trees should be turfed and planted in the surrounding of main hospital facilities, covered ways, and in court yards.

The surroundings of the staff quarters should be improved to form better dwelling conditions by utilizing existing plants and trees.

5.6 Material Planning

The main building materials are selected to be locally purchasable as possible. However, most of the material will be imported if there is time limitation.

Structural Material

The main structure is reinforced concrete, and the walls are of brick or concrete block construction.

Exterior Finish

Roofs are flat with a waterproof layer and corrugate slate covering. Exterior walls are of mortar paint finish. Sashes are of aluminum. Doors are mainly wooden with exceptions of steel made doors.

Interior Finish

Interior finish is planned according to the objectives of each provided room. Basically, floors are of vinyl tiles and terrazzo tiles walls are of paint finish on mortar base, and ceilings are of sprayed vermiculite plaster. In the Operating Theatre Unit, floors are of conductive finish, walls of semi-porcelain tile finish, and ceilings of acoustic panels.

5.7 Structure Planning

The country of Sri Lanka is located out of any seismic zone in the world. Thus, the seismic force can be neglected from the design. Whereas, the existance of monsoon seasons suggests the wind pressure to be taken into the consideration. As according to the British Standard Code (BS Code) the wind velocity is set to 75 miles per hour.

The column and beam frames of the main buildings are of the reinforced concrete structure. The smaller ancillary buildings are of the concrete block construction.

According to the soil investigation report, under the 50 cm thick top soil lies a layer of hard clay with gravel and a layer of hard reddish clay. For the building foundation, the individual footing, is adopted and the bearing strength of foundation bed is considered as 20 tons/m². This figure should be decreased at points of inclined soil layers, since the site is located at a ridge of a hill.

Structural Design

The structural design will be carried out according to Japanese standards and the BS Code.

Live Load

The live loads of principle rooms are shown below;

<u>Room</u>	<u>Floor Slab</u>	<u>Column, Beam, Foundation</u> (unit: Kg/m ²)
Bed Room	130	130
Office	180	180
Lecture Room	360	330
Stairs, Corridor	330	330
Roof	60	60

Structural Materials and Construction Methods

The types of structural material to be used will be determined by size, structure and usage of the building, the country's supplying capability of the materials, the construction methods, the transportation conditions from other countries, price, etc.

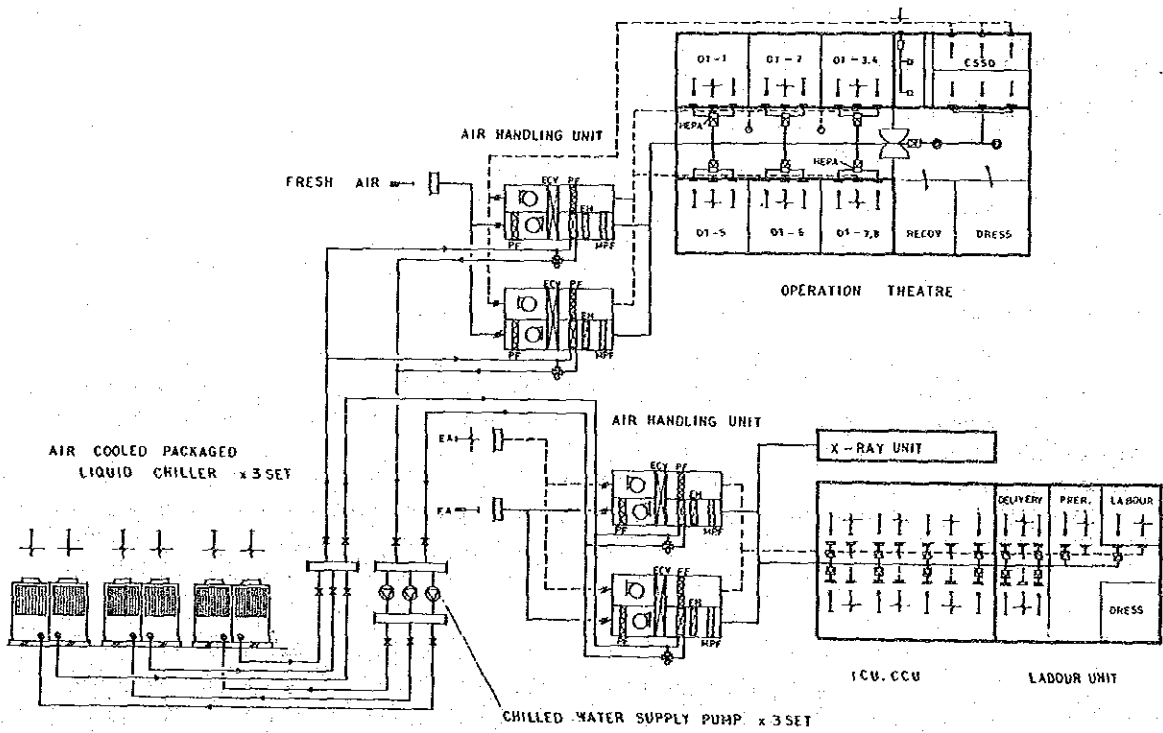
For the construction, the local method will be mainly abopted. But, for the part of concrete casting it will be planned as the usage of steel-pipe supports.

Concrete

As for cement, considering the local supply capability, the cement will be imported. Fine aggregate and coarse aggregate are available in local supply. A concrete batching plant will be provided at the construction site to weigh and mix the concrete materials. It is considered suitable to use the concrete with the 4-week strength at 210 Kg/m².

Also, because the project site is in the high temperature region, care must be taken in the curing of concrete.

Fig. 5.7 Chiller & Air Handling Unit Flow Diagram



Steel Bars

Due to the local costs, it is preferable to use imported steel. The deformed steel bar types SD30 and SD35 will be used.

As mentioned above, the most of the structural materials are made in Japan. Therefore, the allowable stress of the materials shall be as regulated in related codes of Architectural Institute of Japan.

5.8 Air Conditioning and Ventilation System Planning

The Operating Theater Unit, the delivery unit, ICU and other limited space are air-conditioned. From the aspects of hospital management, consideration has been taken for the low running cost in power, water, and fuel.

Design Conditions

In the area surrounding the city of Colombo, the temperature varies from 70°F (21°C) to 90°F (33°C) annually and the average is 80°F (27°C). The humidity is 80% on the average.

The indoor temperature and humidity conditions are planned as follows.

	Temperature	Humidity	Type of AC System
Operating Theatre	25 - 26°C	60%	Central System
Anaesthetic Room	"	"	"
Recovery Room	"	"	"
Delivery Room	25 - 27°C	60%	"
ICU-CCU	"	"	"
X-Ray Room	"	"	"
Blood Bank	25 - 27°C	60%	Individual System
Dark Room in E.E.N.T. Clinic	"	"	"
Pathological Laboratory, a part of	"	"	"
Minor Operating Theatre in Emerg.	"	"	"
Offices, a part of	"	"	"

System and Area of Air Conditioning

Rooms requiring the fresh air and the prevention of cross-infection as operating theatres, a recovery room, a delivery room, ICU·CCU and X-ray rooms are planned to be air-conditioned by the central air-conditioning system, while the Blood Bank, dark rooms in the Eye·Ear·Nose·Throat Clinic, and a-minor-operating theatre in the Emergency Clinic are planned with the individual type air-conditioning system.

In rooms not mentioned above, as nurses' stations and ward bed rooms, ceiling fans are provided.

The above central air conditioning system is divided into sub-systems of 24-hour air conditioning and of working hours.

Central System

In rooms to receive central air-conditioning, as operating theatres, a recovery room a delivery room, ICU·CCU, X-ray rooms, the indoor air pressure is kept positive by the total exterior fresh air system, and the air pressure difference in the clean and the non clean zone is maintained.

At the central machinery room two air-conditioning units are provided, and one unit is connected to the emergency power supply.

The total heat exchangers are provided to carry out heat recovery and reduce the running cost. As a source of chilled water, three units of air-cooled packaged liquid chillers are placed outdoors.

HEPA filters are set in supply outlets of operating theatres.

Individual Air Conditioning System

Separate type A-C Unit is adopted for the indivisual A-C System.

Boiler

Units of oil fired high pressure steam boilers are provided in the boiler room to supply minimum necessary steam to kitchen accommodations, autoclaves and others. The oil main tank is placed outdoors.

The type of oil to be used is Lanka Furnace Oil 500 (P-725), the least expensive boiler oil.

Ventilation Facility

For indivisual ventilation mechanical ventilation fans are provided in places where heat, orders, or gasses are produced and in rooms and laboratories where the interior air pressure should be in negative.

5.9 Plumbing and Sanitary System Planning

Water Supply System

The objective population of water supply is estimated to be about 2,000 and the daily amount of consumption 800m^3 (200,000 gallons). Two reservoir tanks of 200m^3 each is provided in the site, and after receiving water in these tanks, by water pumps the water is lifted to two elevated tanks of 40m^3 each, then to wards and other buildings the water is provided by the gravity water supply system.

Drainage System

Sewage, miscellaneous drainage, and rain-water drainage are individually planned. The sewage and miscellaneous drainage water is pumped to a sewage plant at Wellawatte. The rain-water is discharged out of the site through a pit.

Hot Water Supply System

Hot water is provided to the units, as the operating theatre unit and CSSD.

Sanitary Facilities

In the ward area, toilets for patients are of local type and for doctors western type. In dirty utility rooms dirty sinks and bed pan sterilizers are provided. In examination, consultation, and treatment rooms sinks with hospital type water taps are installed.

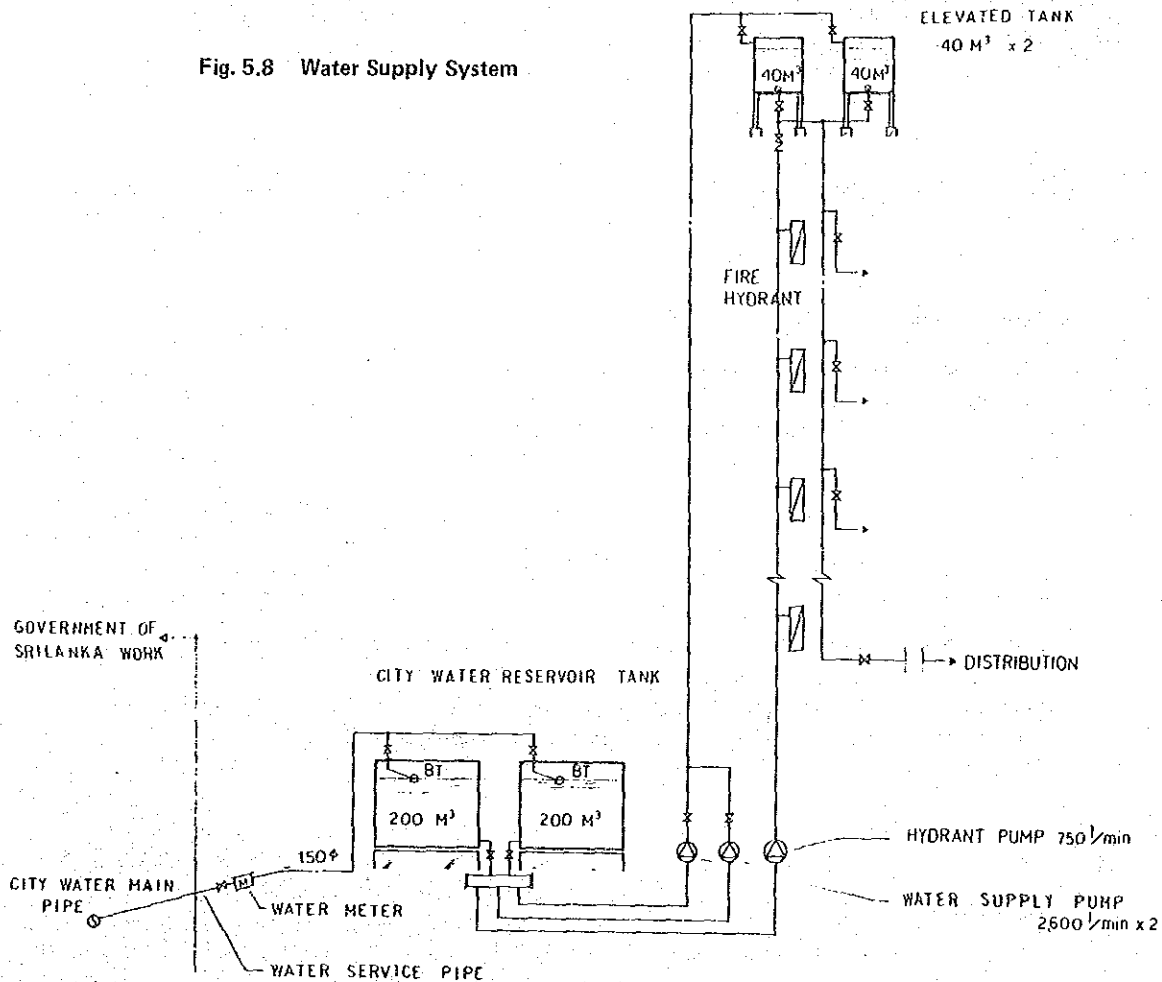
Fire Extinguishing Facilities

Indoors and outdoors fire hydrants are provided on each floor of each building to cope with every possibility of fire. Water from the two reservoir tanks mentioned above will be utilized in case of emergency. The supply pump is connected to the emergency power supply.

Kitchen Facilities

For in-patients, meals will be served in wards. In the kitchen, steam soup kettles, electronic oven sets, a refrigerator, cooking tables, wash-up sinks are provided. And the cooking space for special meals is planned. As the heat source, steam is used mainly and also the electricity and gas.

Fig. 5.8 Water Supply System



Laundry Facilities

Necessary washing machines, dehydrators, and dryers to wash and sterilize linen for surgical operations and treatments, uniforms for patients, doctors, and nurses, sheets and bed covers, diapers, etc. are provided. Laundry equipments, sinks, and iron tables needed to finish, fold, and adjust washed clothes are provided.

The sunshine is also used to dry clothes and linen.

Medical Gas Facilities

Medical gas piping of Oxygen, Nitrous Oxide, Compressed Air, and Vacuum. In case of emergency, alarms and shut-off valves are set at nurses' stations. For stable supply of gasses, 2 banks of cylinders are connected to automatic exchanging devices.

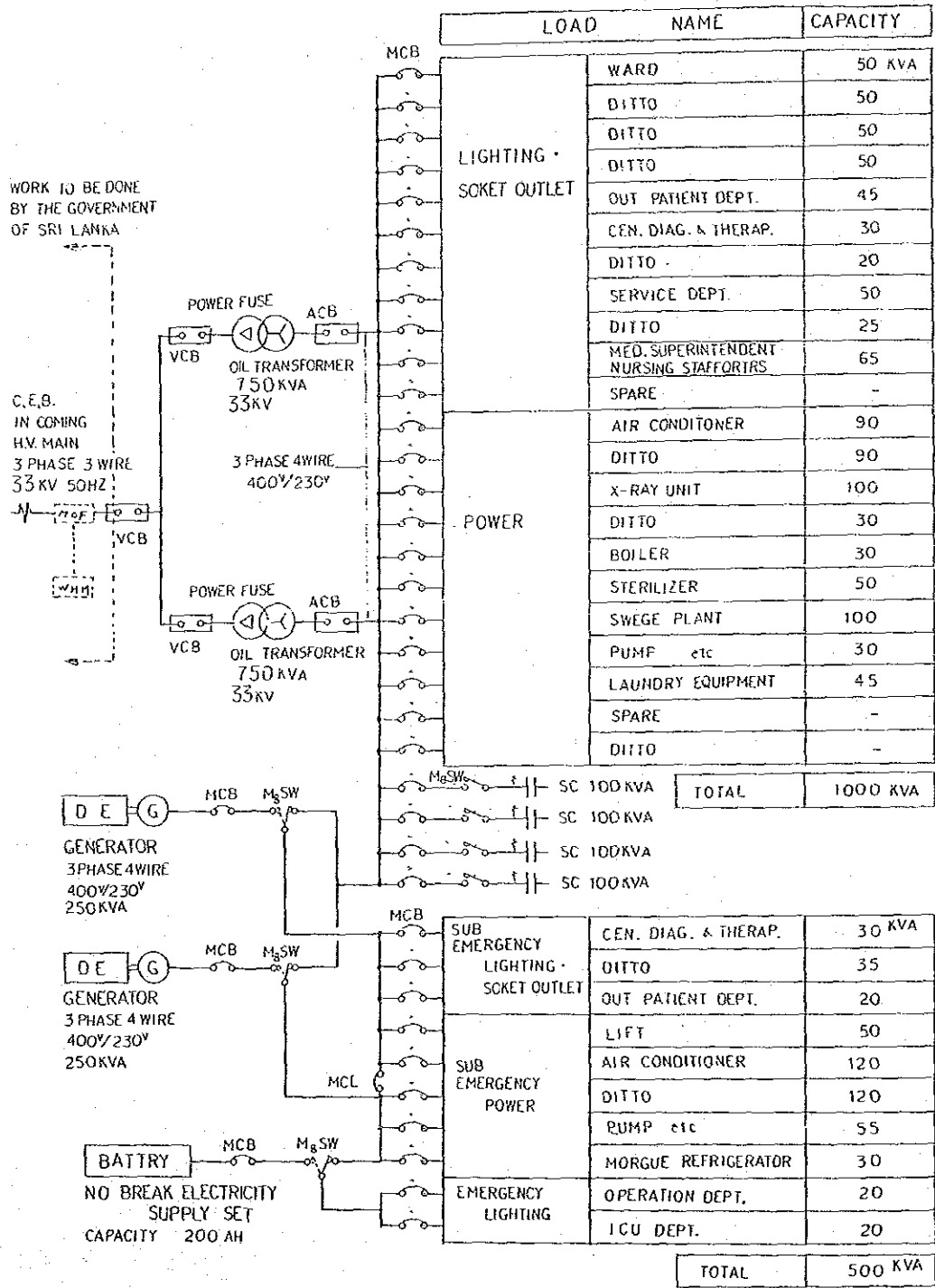
As for vacuum pumps and vacuum tanks, two units per each are provided.

Medical Gas Outlet Provisions

	Oxygen	Compressed Air	Vacuum Low	Vacuum High	Nitrous Oxide
Operating Theatre	*	*		*	*
Anaesthetic Room	*	*		*	*
Recovery Room	*		*		
Delivery Room	*	*			
ICU-CCU	*	*	*	*	

As for the premature baby room in the Ward and the minor operating theatre in the Emergency Clinic the portable type medical gas units are used.

Fig. 5.9 Electrical Skelton Diagram



5.10 Electricity System Planning

Power Supply System

The power line planned to be drawn overhead from the 33 kilovolt cable in the east side of the site.

Two outdoor type oil transformers of 750KVA each are provided and to distribute electricity the indoor cubical type panels are set in the electricity room.

Generator

As emergency power supply two generators with capacity of 250KVA each are set in the electricity room. In case of emergency the generators will supply electricity to lighting, medical equipments and air conditioning facilities in the Operating Theatre Unit, ICU-CCU and the Emergency Clinic, refrigerators and freezers in the Blood Bank, the Pathological Laboratory and the Mortuary, and elevators and water supply pumps.

Battery

Batteries are provided to secure electricity to vital units as the Operating Theatre Unit and ICU-CCU during the time lag of generators to start to supply electricity or the recovery at the time of sudden power failure.

Main Power Line

Main power lines in separate circuits are drawn from the main panel in the electricity room to every control boards or distribution boards in other machinery rooms.

The voltage is as follows.

Power Load	3 phase 3 lines 400V
Lighting Socket Load	3 phase 4 lines 400V/230V

Lighting System

The conduit system is taken in the secondary lines from the distribution board to the lighting equipments and switches and sockets. To reduce the running cost, the room lighting is divided so that switching can be done in small divisions, and as for lighting in halls and corridors, thinned switching is planned.

The ground terminals are set where medical equipments are used as in the operating theatres, ICU, X-ray rooms.

Lighting Fixtures

For the running cost reduction fluorescent tubes are mainly used, and according to requirements white glow lamps and ultra-violet lamps are used. In front of operating theatres, X-ray rooms and dark rooms under operation showing lamps, three-color lamps, and in necessary places emergency exit lamps with batteries are planned.

Illumination of main rooms are planned as follows;

Offices, Rest Rooms for Doctors and Nurses	200 luces
Laboratories, Consultation and Examination Rooms, Dispensaries	300 luces
Operating Theatres, ICU-CCU	500 luces
Entrance	200 luces
General Corridors, Waiting Area, Machinery Room	100 luces
Ward Bed Room, Ward Corridors, Storage	50 luces

Telephone System

30 lines for the hospital proper are drawn overhead. Telephone outlets are planned to meet future removals and extensions. In the office room for the medical superintendent and the emergency reception, outlets for direct calls are provided.

Telephone Exchange Device

A cabinet type electronic exchange device of 200 line capacity is set in the telephone exchange room to provide 150 extension telephones in needed places.

Public Address Facility

A public address facility is planned for hospital communications. An amplifier and a microphone is set in the telephone exchange room, loud-speakers are set in a hall, general corridors and ward corridors. Separate announcement facilities are set at the out-patient dispensary and the reception desk of the X-ray unit to call patients.

Battery Type Clock

Battery type clocks are set in main rooms.
Operating type clocks are set in the operating theatres.

Interphone Facility

Individual interphones are provided between operating theatres and preparation rooms, between X-ray rooms and control rooms, among an electricity room, a generator room, and an engineers' room.

Individual Call Facility

To call consultants and sisters in the hospital building, a wireless call system is provided. The transmitter for the system is set in the telephone exchange room.

Nurse Call Facility

A nurse call system is set among the ward nurses' station and isolation rooms.

Fire Alarm Facility

Fire sensors are set in the units, as the operating theatre unit, ICU-CCU, the X-ray unit, the pathological laboratory, and the storages. In the ward alarm bells, warning lamps, and warning push buttons are provided in needed places to notify the breakout of fire.

Lightning Arrester

A lightning arrester is set on the top of the building.

TV Community Receiving System

A master TV antenna is set on the top of the building. Outlets and television sets are provided in the day-rooms and waiting halls. Also, outlets are provided in other necessary places.

External Lighting

External lighting is installed around buildings.

Lifts

Five sets of hospital type lifts are installed, one in the Central Diagnostic and Treatment Department Building and four in the Ward

5.11 Protection from Damage

As measures to cope with natural disasters, the prevention of disasters by a stormy rain or a cyclone is planned. In the land reclamation the shape and amount of reclamation have been carefully decided. The discharge route of the rain-water should be thoroughly planned. To prevent a landslide or a soil washout, the surface of the reclaimed land is planned to be turfed.

As a danger unique to hospitals, measures are taken to prevent the cross-infections. In the architectural planning the dirty zone is spatially isolated. The clean zone is also highly isolated as in the Operating Theatre Unit and ICU-CCU. The air-conditioning facilities are planned to prevent the air-borne infections.

As difficulties common to developing countries, the unstableness of power and water supply is taken into account. In hospitals a sudden power failure or water shortage may lead to vital disasters. To cope with such situations ancillary facilities are provided in the supply systems.

5.12 Medical Equipments

A list of medical equipments essential at the hospital opening is shown in the Appendix C.

Considerations taken in the selection of medical equipments are the points that the Sri Lanka side places more importance on the increase of bed strength and the quantitative treatment of patients, and that the treatments and in-patient service is offered to the patients basically without any charge.

These factors have close relations with the problem of management fee after the hospital opening, the quality balance among the existing governmental hospitals, and the overall level of medical service in Sri Lanka.

On the other hand, the expectations follow, as the hospital will enhance the level of medical services at once by offering the adequate medical education and by renewing the country's hospital service.

Based upon above consideration, the following priorities in the selection have been decided;

1. Top priority is given to equipments essential to the diagnosis and treatment in the Out-Patient Department and the Ward at the hospital opening.
2. As for the Central Diagnostic and Treatment Department, basic equipments are chosen.
3. The equipments requiring expensive running costs are avoided as possible. Those with easy maintenance are mainly selected.
4. In the Pathological Laboratory and the X-Ray Diagnostic Unit, the equipments requiring expensive running costs but needed for the improvements in the medical education and the medical service are selected depending on the performances.
5. At the hospital opening the equipments of common use will be shared among departments.

The after care services are considered important. The maintenance system for periodical inspection and successive supply of spare parts should be established.

To use the equipments according to the initial purpose, it is needed to transfer maintenance technology to Sri Lanka and to confirm the operation conditions periodically after the completion of the hospital facilities. For the implementation of the above, it is necessary for the Sri Lanka side to prepare a technology receiving system during the construction, to carry out the technology transfer intentionally, and to attain enough spare parts.