Directorate General of Higher Education,
Ministry of Education and Culture,
Government of the Republic of Indonesia

BASIC DESIGN STUDY REPORT ON THE PROJECT FOR DEVELOPMENT OF TROPICAL DISEASE CENTER AT AIRLANGGA UNIVERSITY IN THE REPUBLIC OF INDONESIA

MARCH 1996

JAPAN INTERNATIONAL COOPERATION AGENCY

PACIFIC CONSULTANTS INTERNATIONAL

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PREFACE

In response to a request from the Government of the Republic of Indonesia, the Government of Japan decided to conduct a basic design study on the Project for Development of Tropical Disease Center at Airlangga University and entrusted the study to the Japan International Cooperation Agency (JICA).

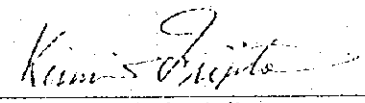
JICA sent to Indonesia a study team from 26 November to 23 December ,1995.

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

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

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

March, 1996



Kimio Fujita
President
Japan International Cooperation Agency

March, 1996

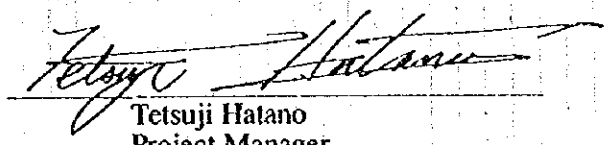
LETTER OF TRANSMITTAL

We are pleased to submit to you the basic design study report on the Project for Development of Tropical Disease Center at Airlangga University in the Republic of Indonesia.

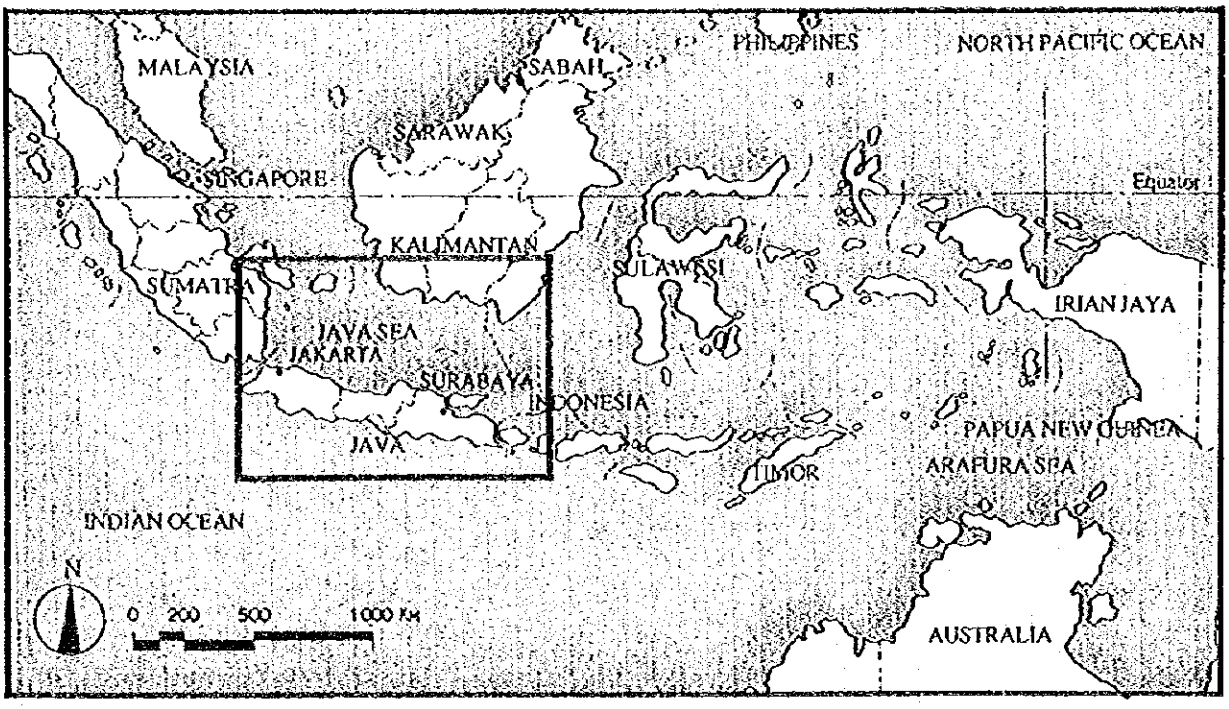
This study was conducted by Pacific Consultants International, under a contract to JICA, during the period from 21 November 1995 to 29 March 1996. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Indonesia and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

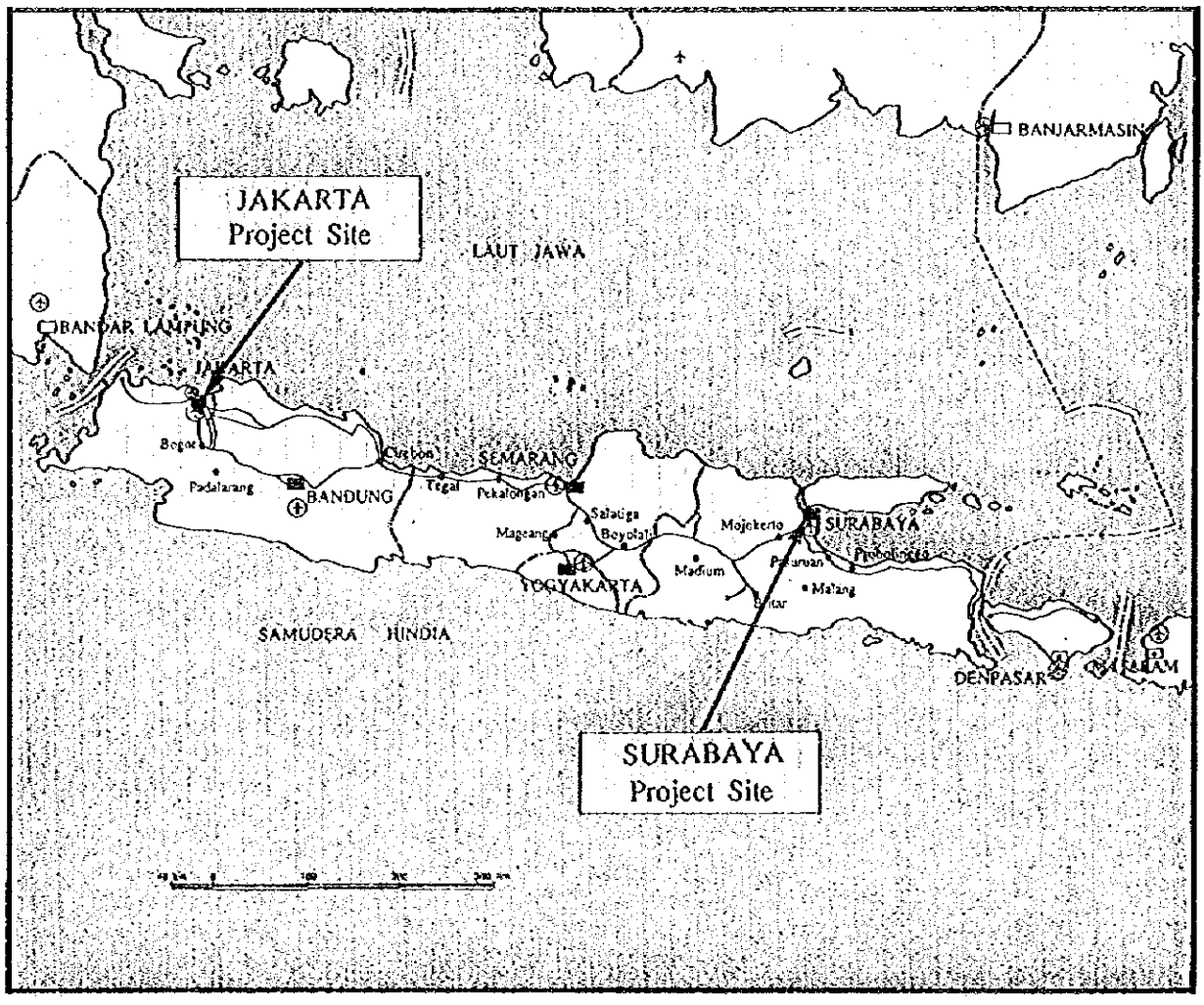
Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

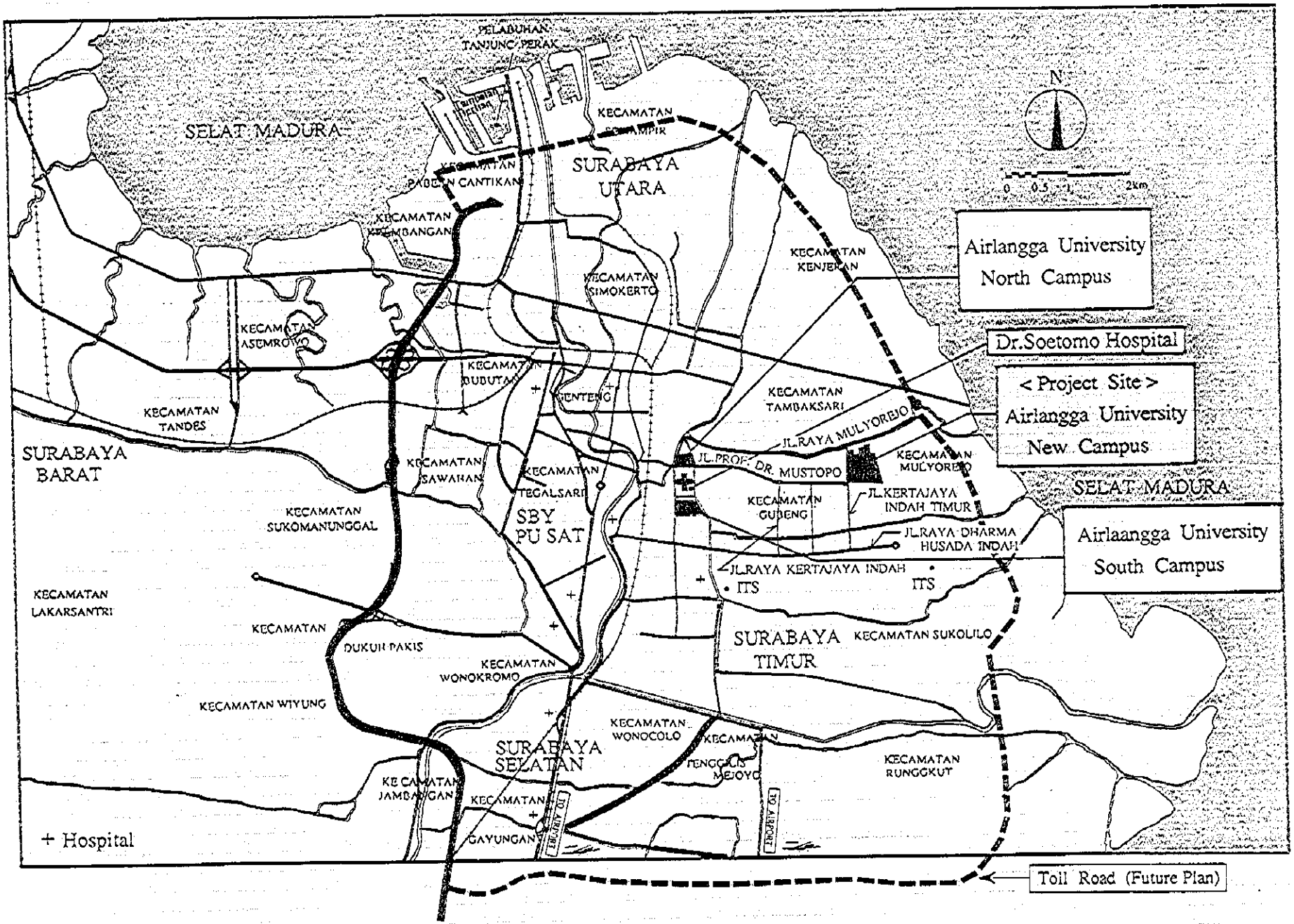


Tetsuji Hatano
Project Manager,
Basic design study team on
The Project for Development of
Tropical Disease Center at
Airlangga University
Pacific Consultants International

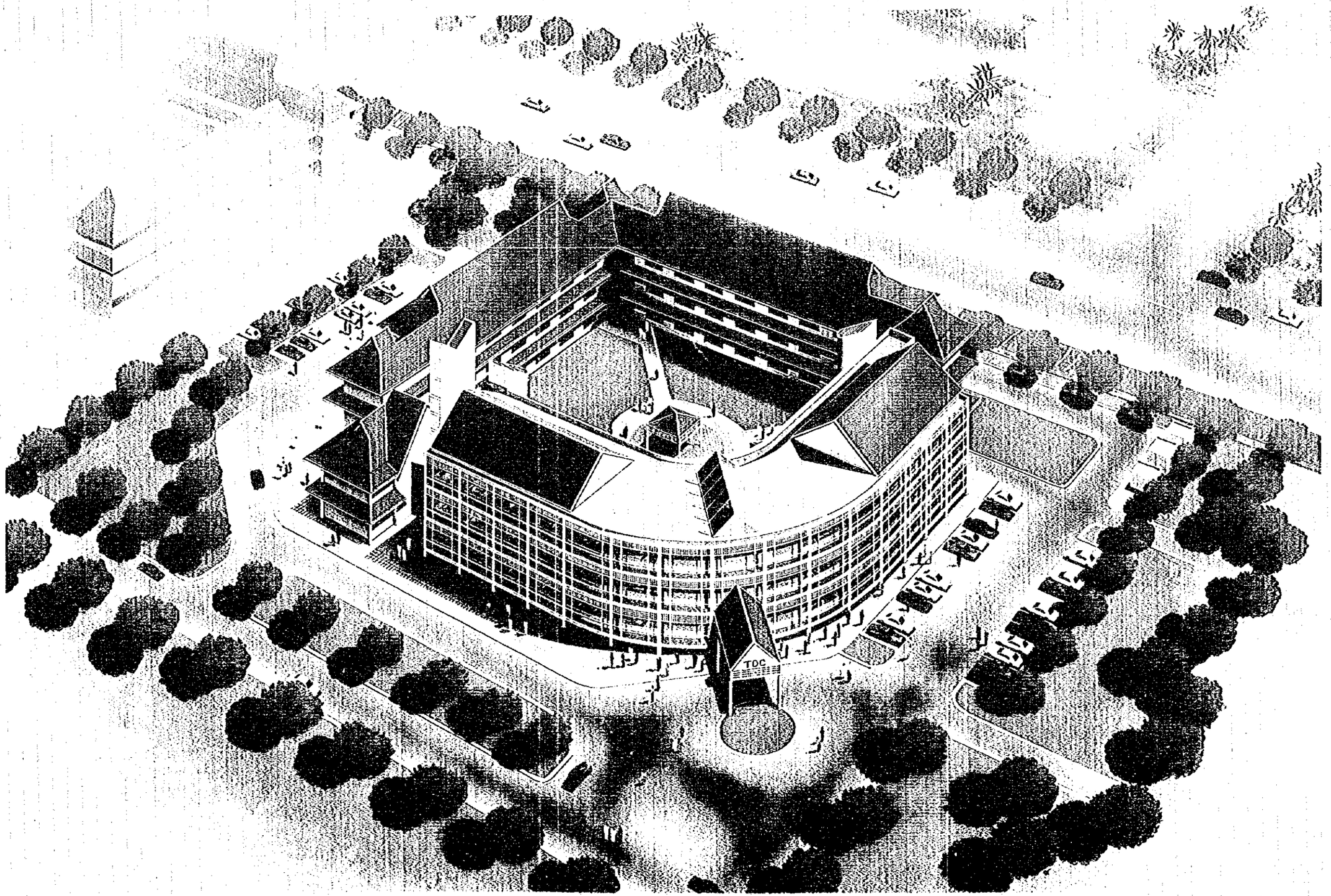




Location Map of Project Site - 1



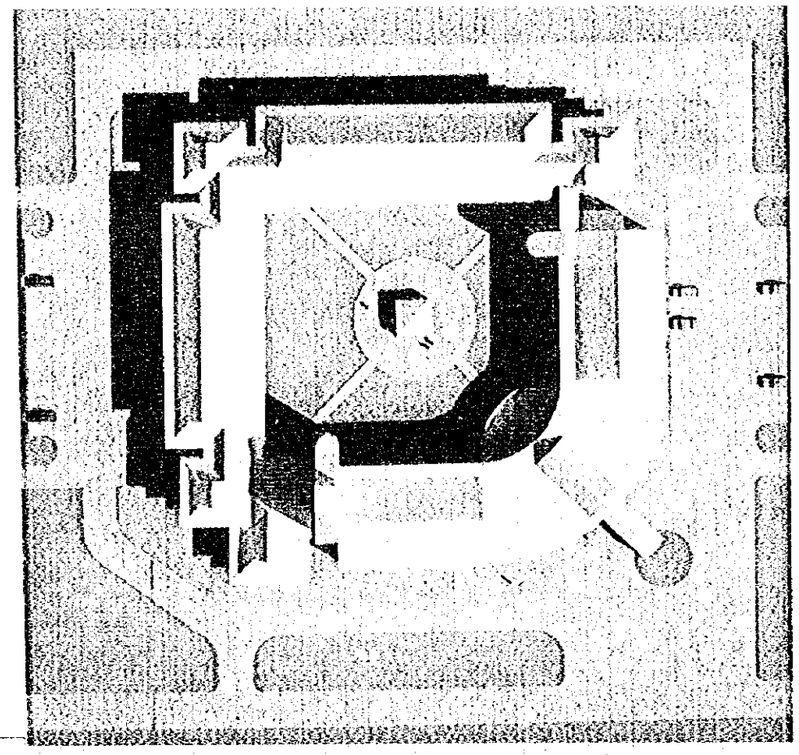
Location Map of Project Site – 2

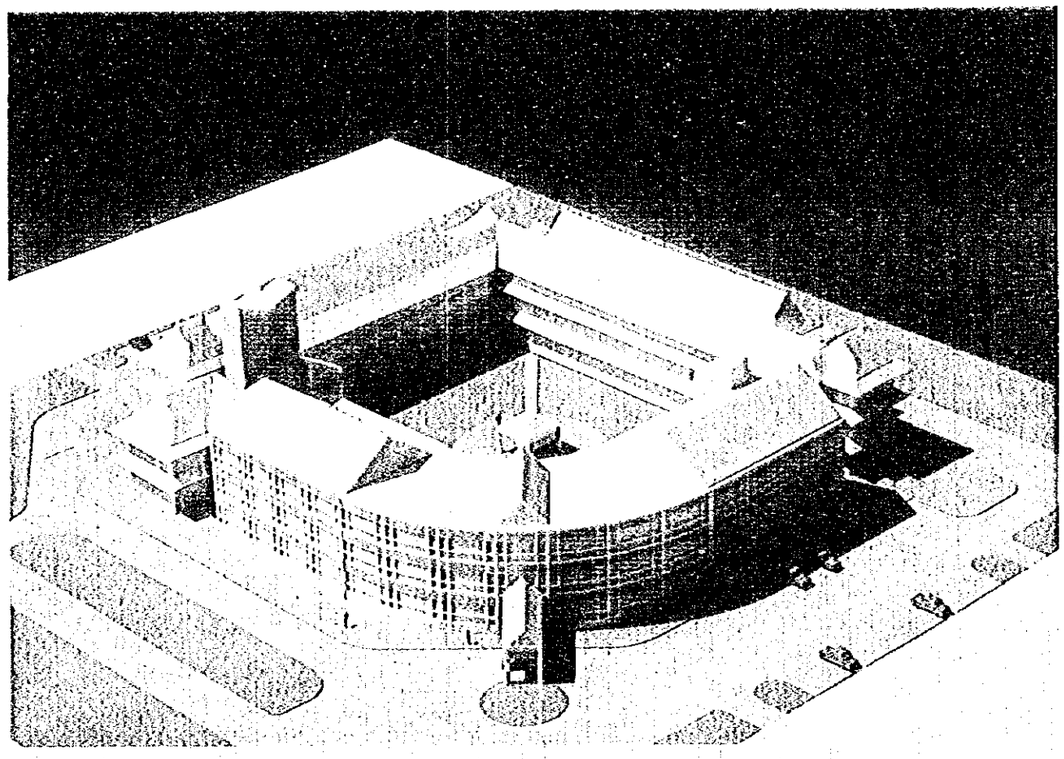


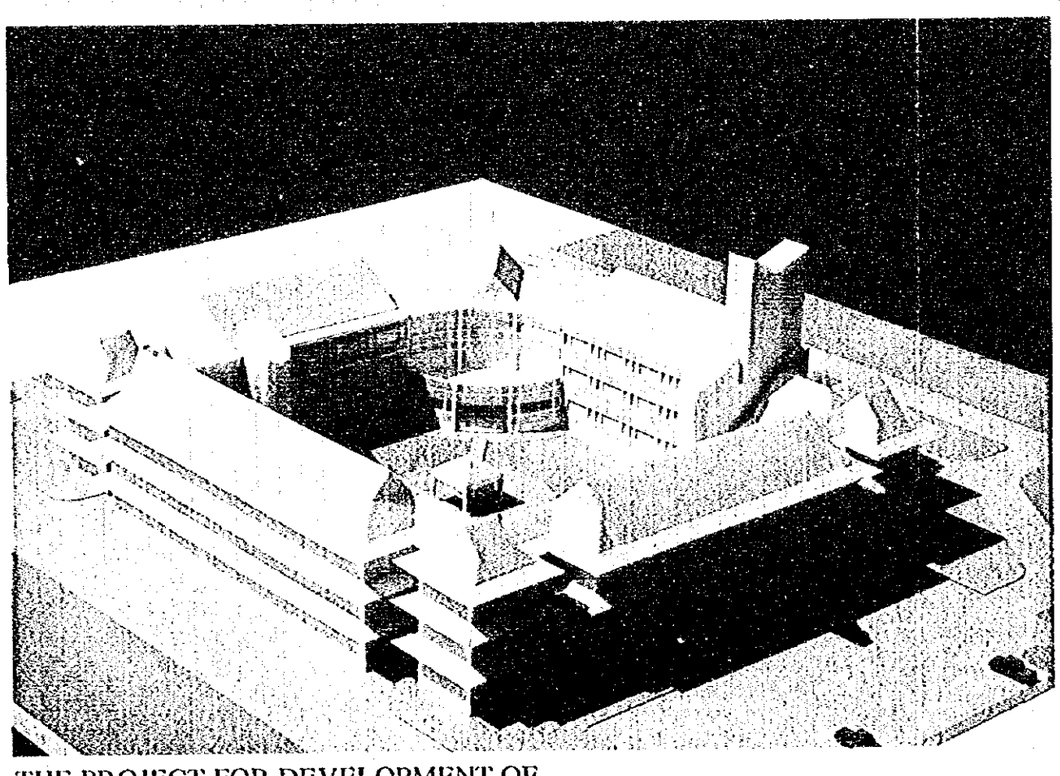
The Project for Development of Tropical Disease Center at Airlangga University

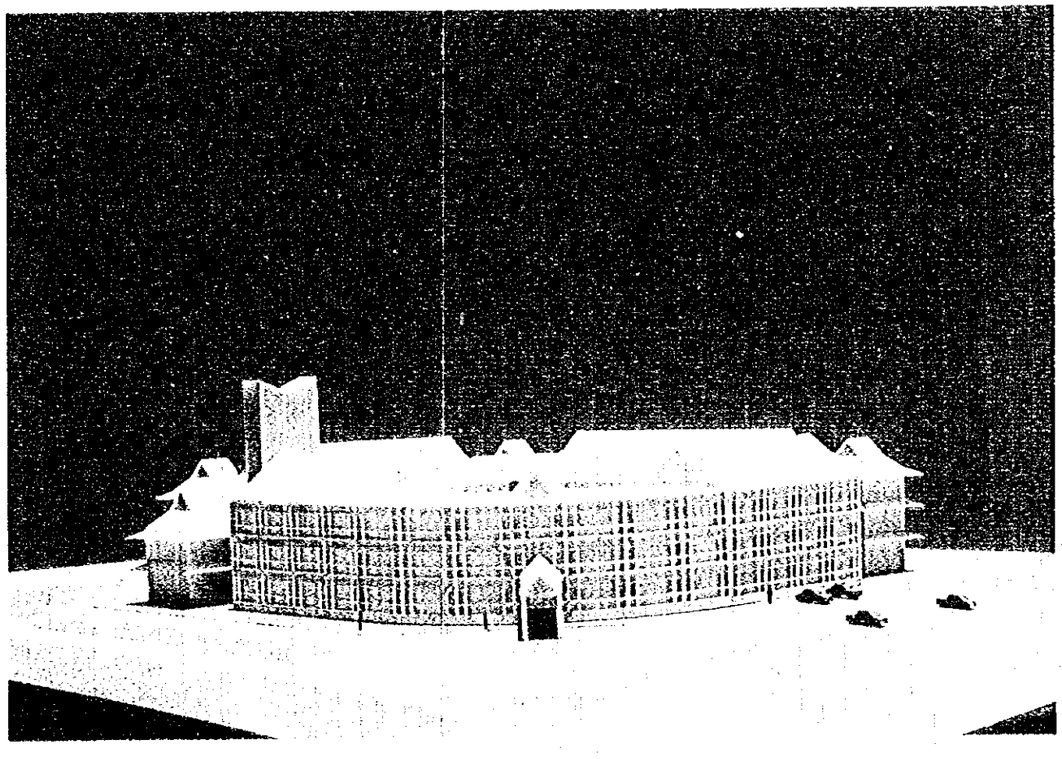
Pacific Consultants International

Perspective









THE PROJECT FOR DEVELOPMENT OF
TROPICAL DISEASE CENTRE AT AIRLANGGA
UNIVERSITY IN THE REPUBLIC OF INDONESIA

PACIFIC CONSULTANTS INTERNATIONAL

Model Photo

Abbreviations

ACI American Concrete Institute
ADB Asian Development Bank
AISC American Institute of Steel Construction
AMDAL Environmental Impact Assessment
(Analisa Mengenai Dampak Lingkungan)
ANDAL Environmental Impact Research
(Analisa Dampak Lingkungan)
Asmen Assistant Minister
(Asisten Menteri)
BAPEDAL Environmental Impact Management Agency
(Bandan Pengendalian Dampak Lingkungan)
BAPPEDA Provincial Development Planning Board
(Bandan Peren Canaan Pembangunan Daerah)
BAPPENAS National Development Planning Board
(Board Perecanaan Pembangunan National)
BKLH Provincial Government Officer for
Environmental and Population
(Biro Kependudukan dan Lingkungan Hidup)
BMG Meteorogical and Geophysics Agency
(Bandan Meteorologidan Geofisika)
BPPI Industrial Research & Development
Institute Ministry of Industry
(Balai Penelitian dan Pengenbangan Industri)
BPPT (Badan Penelitian dan Pengenbangan Technologi)
BTKL Environmental Technical Health Institute
(Balai Teknik Kesehatan Linkungan)
B3 Hazardous and Toxic Substance Management
(Bahan Beragun Dan Berbahaya)
DGHE Directorate General of Higher Education
Depkeu (Departemen Keuangan)
Dinas Service of Local Government
DKI Capital City Special Region
(Daerah Khusus Ibukota)
EKUIN (Menteri Koodinator Bidang Ekonomi
Keuangan dan Induetri & Pengawasan)
EMDI Environmental Management Development
Indonesia
E/N Exchange of Notes
GEMS Global Environmental Monitoring System
GOI Government of Indonesia
ICMR International Center for Medical Research, School of Medicine,
Kobe University

INPRES President Decree
(Instruksi Presiden)
JICA Japan International Cooperation Agency
JIS Japan Institute os Standards
JSPS Japan Society for the Promotion of Science
KLH Ministry of State for Population an Environment
(Menteri Negara Kependudukan dan Lingkungan Hidup)
LSCR Large Scale Collaborative Reasearch Project
MOEC Ministry of Education and Culture
MOH Ministry of Health
PDAM (Perusahan Dinas Air Minum)
PERIND (Departemen Perindustrian)
PHC Primary Health Care (WHO)
PLN (Perusahan Listik Negara)
PLTU Electrical Steam Power Plant
(Penbangkit Listrik Tenaga Uap)
PU (Departemen Pekerjan Umum)
PUSPIPTEK National Center for Research, Science and Technology
(Pusat Penelitian Ilmu Pengetahuan dan Teknologi)
REPELITA V The 5th Five Year Development Plan
(Rencana Pembangunan 5 Tahunz)
RKL Management Plan
RPL Monitoring Plan
SEKAB Secretary Cabinet
(Sekretariat Kabinet)
SEKNEG State Secretariat
(Sekretariat Negara)
SUCOFINDO State Run Survey Company
TDC Tropical Disease Centre
TDRC Tropical Disease Research Centre
TELKOM Indonesia Telecommunication Co. Ltd.
(PT. Telkom Indonesia)
UI University of Indonesia
UNDP United Nations Development Programme
WHO World Health Organization
WWF World Wildlife Fund for Nature

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CHAPTER 1

Background of the Project

CHAPTER 1 BACKGROUND OF THE PROJECT

1-1 Background of the Request

The Republic of Indonesia (hereinafter referred to as Indonesia) is the world's largest archipelago consisting of about 13,600 islands situated in a tropical climate. It is said that 50~80 % of the population are presently carrying one or more tropical diseases. At this present time the Government of Indonesia is implementing its 6th Five-year Development Plan (REPELITA VI). In this plan, the improvement of the health and medical sector is regarded as a vital part, particularly focusing on improving the quality and standards of health care services, bringing the nutrition standards to a higher level, and the introduction of a vaccination program and the eradication of infectious diseases peculiar to the tropics.

Although present efforts made in the health sector have shown encouraging results, the poverty alleviation impact from the health sector has been modest in absolute terms. This is reflected in Indonesia's high average mortality rate and the low utilization of health services due to differences in the degree of service practiced in rural and urban areas, and between income classes.

Another aspect of the issues concerning the health sector is the limited capability of health manpower to implement the Primary Health Care (PHC) approaches. The attitudes of those working in health institutions and universities, influenced by their education and training are often quite distant from what is needed for a community-based approach. Improvements to the PHC systems are necessary. This involves the retraining of health personnel to increase their awareness of the importance of PHC activities and to provide them with the supplemental skills necessary to carry out PHC tasks. In addition, once trained, staff of health institutions can provide an appropriate base for the regional training of outreach workers. The health institutions can thus be both a base and a source of skilled personnel for the continuing education and training of community health workers. The districts will benefit from the training, advice, and supervision that highly qualified health professionals from the health institutions can provide to PHC workers.

Under these circumstances, Airlangga University is currently operating a Tropical Diseases Research Center (TDRC) with the minimum essential equipment and facilities for a research base of tropical diseases. For the reinforcement and formulation of research programs of tropical diseases, the development of human resources of various universities and research centers, as well as the establishment of a communication network between the relevant authorities of the Ministry of Health are required.

Japanese universities have been collaborating with Indonesia on the study of tropical diseases since 1980 and with the school of medicine at Airlangga University through the exchange of scientists and researchers. From 1990 through the Japan Society for the Promotion of Science (JSPS), the Large Scale Collaborative Research Project (LSCR) on tropical diseases has been conducted in Indonesia with assistance to several universities from the International Center for Medical Research (ICMR) School of Medicine, Kobe University. In this LSCR project, the School of Medicine, Airlangga University has been playing a principal role as a coordinator of the Indonesian side, as a tropical disease research headquarters in Indonesia, and as a Regional Center for Tropical Diseases in Southeast Asia.

From 1991, JICA (Japan International Cooperation Agency) has implemented mini projects for TDRC. These mini projects from JICA have dispatched specialists and installed research equipment for 3 years. The accomplishments of their research have been written in International Medical Journals, and people working in this field in Indonesia have shown great interest in being a part of TDRC.

In view of these circumstances the Government of Indonesia has realized the importance of establishing a Center for improving the knowledge and technique of preventing and eradicating tropical diseases, especially in the Eastern region of Indonesia.

With the goals for improving and developing the activities in TDRC, the strengthening of human resources for all levels of health and medical personnel, as well as the eradication of tropical diseases, the Government of Indonesia has requested the Government of Japan for the establishment of a Tropical Disease Center (TDC) through Japan's Grant Aid.

In response to this request, the Japanese Government confirmed the necessity and urgency of the project and decided to conduct a Basic Design Study, and entrusted the study to the Japan International Cooperation Agency (JICA). JICA decided to dispatch a Basic Study team from 26 November to 23 December 1995 to formulate the Basic Design for the project.

Based on the result of the Basic Design Study, the propriety of the Project and the determination and evaluation as to the extent and contents of the Project were determined. The result of the study in detail is described in a Draft Report, with JICA dispatching a Study team for the explanation of the Draft Report, with JICA dispatching a Study team for the explanation of the Draft Report, and this result, the present report was finalized.

1-2 Components of the Request

The contents of the request in the Application Form Japan's Grant Aid (March 1995) by the Government of Indonesia to build a Tropical Disease Center (TDC) are as follows:

<Contents of the request based on the Application Form Japan's Grant Aid (March 1995)>

Tropical Disease Center

Construction of Facilities

a) Laboratory Division

-Viral Section	2 rooms
-Bacterial Section	2 rooms
-Parasite Section	1 room
-Microscope Room	1 room
-Common Training Division	2 rooms

b) Enlightenment Activities Division
2 rooms

c) Information Division

-Computer Room
1 room
-Library
1 room
-Exhibition Room
1 room

d) Administration Division
1 room

Equipment Supply

The activities of TDC are described in the Application Form Japan's Grant Aid (March 1995) as follows:

1) Administrative Training

2) Training Activities: Training doctors, researchers, scientists

- Viral/Rota Virus, Hepatitis, Dengue Fever, AIDS
- Bacterial/Gastroenteritis, Tuberculosis, Leprosy, Salmonellosis
- Parasite/Cryptosporadiasis, Giardiasis, Helminthiasis, Filariasis, Malaria, etc.
- Comprehensive/common for all tropical diseases

Staff Training

- Primary level- Minimally Experienced Scientists
- Intermediate level- Experienced Scientists
- Advanced level- Doctors and Researchers

3) Enlightenment Activities: In order to reinforce the understandings of the Primary Health Care, Patients, Community (NGO), Government Officials, Health Care Staffs, may be educated on tropical diseases.

- Individuals/individuals including patients
- Communities/NGO
- Government Officials/applicable government officials
- Health Care Staffs/personnel working at Health Care Services

4) Information Service: Information Service in order to support the above said Services

- Computer System/database, network, information gathering
- Library/books, journals and magazines with articles on tropical diseases
- Exhibit/basic knowledge and information services on tropical diseases

5) Applied Research: Research for training, knowledge and activity for the functions at TDC.

Note: Staff Training 2), there will be courses of training for each of the above listed levels;
1 week, 2 weeks, 8 weeks and 1 year courses (as shown on Table 2-2).

Taking the above mentioned request into consideration, the Basic Design Study Team and the Government of Indonesia have continued further studies and discussions in order to confirm the contents of the Project and to prepare the Basic Design.

The results are shown in the chapters hereinafter in this Draft Report.

1-3 Contents of the Request

The contents of the request from the Government of Indonesia to the Japanese Government have been carefully examined for its propriety and necessity by the Basic Design Study Team through the discussions with the Indonesian side.

As a result, the contents of the request concerning the Project have been mutually agreed upon between the Government of Indonesia and the Basic Design Study Team.

1) Constitution of the Tropical Disease Center as described in ANNEX-I (see table below).

2) Provision of the equipment as described in ANNEX-III (see the Minutes of Discussions, ANNEX-III, EQUIPMENT LIST).

<Minutes of Discussions dated on March 13, 1996-ANNEX-I>

REQUESTED FACILITIES FOR THE PROJECT

1) Laboratory Division
   a) Viral Section
      Laboratory for Rota Virus
      Laboratory for Hepatitis
      Laboratory for Dengue Fever
      Laboratory for AIDS
   b) Bacterial Section
      Laboratory for Gastroenteritis
      Laboratory for Tuberculosis/Leprosy
      Laboratory for Salmonellosis
   c) Parasite Section
      Laboratory for Cryptosporidiasis/Giardiasis
      Laboratory for Helminthiasis/Filariasis
      Laboratory for Malaria
   d) Microscope Room
2) Common Training Division
   a) Common Training Room
   b) Dark Room
3) Enlightenment Activities Division
   a) Enlightenment Activity Room
4) Information Division
   a) Computer Room
   b) Library
   c) Exhibition / Information Room
5) Administration Division
   a) Administration Office
   b) Chairman's Room
6) Others
   a) Meeting Room
   b) Staff Room
   c) Security Room
   d) Lecture Room
   e) Storage and Maintenance Shop

Note: Both sides confirm that each item mentioned above includes the necessary common spaces such as corridors, storage, toilets, machine room, the necessary utilities such as electricity, water supply, sewage, etc.. The details of such common spaces and utilities will be discussed further between the Japanese and the Indonesian side.

The Basic Design has been developed based on the above mentioned Contents of the Request and the results are described hereinafter in this Draft Report.

CHAPTER 2

Contents of the Project

CHAPTER 2 CONTENTS OF THE PROJECT

2-1 Objective of the Project

The objective of this Project is the construction of the facility and procurement and installation of medical and research equipment for the establishment of a Tropical Disease Center (TDC) at Airlangga University, which provides: 1) Development of management capability for related human resources of health service personnel; 2) Training for Doctors and Researchers; 3) Enlightening of knowledge and technical know-how for relevant people in the community; 4) Development of an information system to provide tropical disease information and 5) Provision of facilities for Applied research. The extent of the effects contributed by the Project is the eradication of tropical diseases to help improve the health and medical situation of Indonesia and Southeast Asia.

2-2 Basic Concept of the Project

In this Chapter, the contents of the request have been examined and the basic direction of the project has been formulated in order to establish the optimum plan. The basic concept of the project is focused particularly on the specific nature of Japan's Grant Aid program, assisting and enhancing the recipient country's self-effort.

2-2-1 Study of the Content

Understanding that the project is being funded by Japan's Grant Aid program, the contents of the request have been studied by the Basic Design Study Team and discussed with the Indonesian side. The contents of the discussions, with consideration of the final plan of the facility and the provision of equipment, have been based on the following viewpoints:

1) Functions of TDC and TDRC
2) Activity Plan of TDC
3) Establishment of the TDC Network
4) Securing of Staff
5) The Contents and Scale of the facility
6) Operation and Maintenance Plan

2-2-2 Study Result and Examination of the Contents of the Request

(1) Study of Design Conditions

1) Functions of TDC and TDRC

TDC will be connected with TDRC which is a research facility centered on basic research at the New Airlangga University Campus.

The relationship between TDC and TDRC has been explained by Airlangga University as follows: after the completion of TDC, TDRC will be integrated with TDC as a division of basic research and other divisions of TDC by Japan's Grant Aid with the functions for applied research, staff training and enlightenment activities. TDRC will be integrated with TDC effectively in terms of the facility plan and activity plan.
Each function of TDRC and TDC has been confirmed as shown in Table 2-1.

Table 2-1 Functions of TDRC and TDC

TDRC	TDC
1) Basics research on tropical diseases - Pathology - Epidemiology - Immunology 2) - Statistics of tropical diseases - Social Science - Medical Ecology	1) Applied research on tropical diseases - Virus - Bacteria - Parasite 2) Staff training 3) Enlightenment activity 4) Information services 5) Administration Office

As listed above, it is considered that there are no duplication of functions for each of the facilities (TDRC and TDC). For TDC and TDRC, the division of the basic and applied research of tropical diseases is defined as follows:

Basic Research: Biological research and analysis on disease and furthermore morphological, interdisciplinary/inclusionary research of diseases are intended.

Applied Research: Diagnosis and treatment of diseases as an objective, research of samples taken from patients at clinics and field are planned.

Furthermore the facility plan of TDC must bear in mind the integration of TDRC and TDC in the future. The Zoning of TDC and TDRC based on this concept is explained in Section 2-3-3-3).

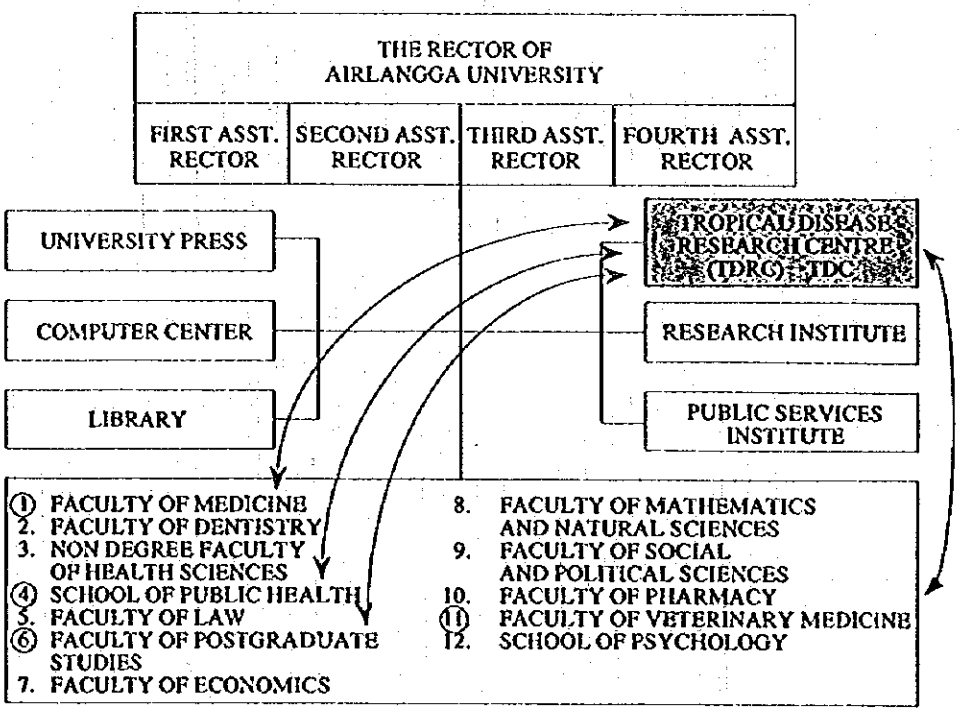


Figure 2-1 Airlangga University Organization Chart

2) Activity Plan of TDC

After reviewing the contents of the request of TDC by the Indonesian side, the following five activities were confirmed and detailed action programs for them are concretely under preparation by the Airlangga University:

a) Development of Management Capability
b) Training activities for Medical Doctors, Researchers and Technicians
c) Enlightenment Activities
d) Information Services
e) Applied Research

TDC for the improvement of the public health care situation in the tropical area, basic curriculums for the study of nutrition, family planning, perintology and acute respiratory infection (ARI) are also being planned. Research activities for these curriculums are being planned for TDRC. Training and enlightenment activity for these curriculums are being planned for TDC.

3) Establishment of the TDC Network

According to the provisions of Airlangga University stated as "TDC as a Gateway for HRD (Human Resource Development)", TDC will function in the future not only as a research center for tropical disease within Indonesia but also as a Regional Research Center in Southeast Asia.

Figure 2-2 shows the network planned for TDC with other international and domestic institutions. As shown in the figure, an international network which will exchange information with Kobe University in Japan, Institute of Tropical Medicine in the Philippines, National University of Singapore, Medical University of Thailand, and a domestic network, which will exchange information with major universities in Indonesia and related Government organizations, are planned.

TDRC which will be integrated with TDC in the future, is currently involved in LSCR under the assistance of JSPS. The external network of TDC will be established based on the existing TDRC's network.

TDRC is one of the departments of Airlangga University under the direct control of the rector having strong relations with the faculty of medicine, veterinary medicine, and postgraduate status, and the school of public health as an internal network. In this regard, it is expected that TDC can succeed with the network of TDRC as mentioned.

4) Staff Securing and Support of Staff from the Ministry of Health and the Ministry of Education and Culture

Instructors and researchers of TDC are scheduled to be dispatched from the departments of Airlangga University and the staff members are currently being nominated.

The exchanges of human resources and information with the Dr. Soetomo Hospital (65 % of the staff are from the Ministry of Health and other staff are from the Ministry of Education and Culture) is being created. A staff aid program is also being applied to NIHRD (National Institute of Health Research and Development), which is under the Ministry of Health. Furthermore, cooperation and support by the Ministry of Health is imperative, although Airlangga University is under the Department of Higher Education, the Ministry of Education and Culture.

Trainees of the enlightenment and training activities are mainly health personnel and doctors who work in local health care facilities and local government under the Ministry of Health and Ministry of Affairs. In order to smoothly succeed in these activities at TDC, the cooperation of the Ministry of Health and Ministry of Affairs are necessary. TDC has requested support to the three divisions, Directorate General of Community Health, Directorate General of C.D.C. & Environment Health and national Institute Health Research and Development (NIHRD).

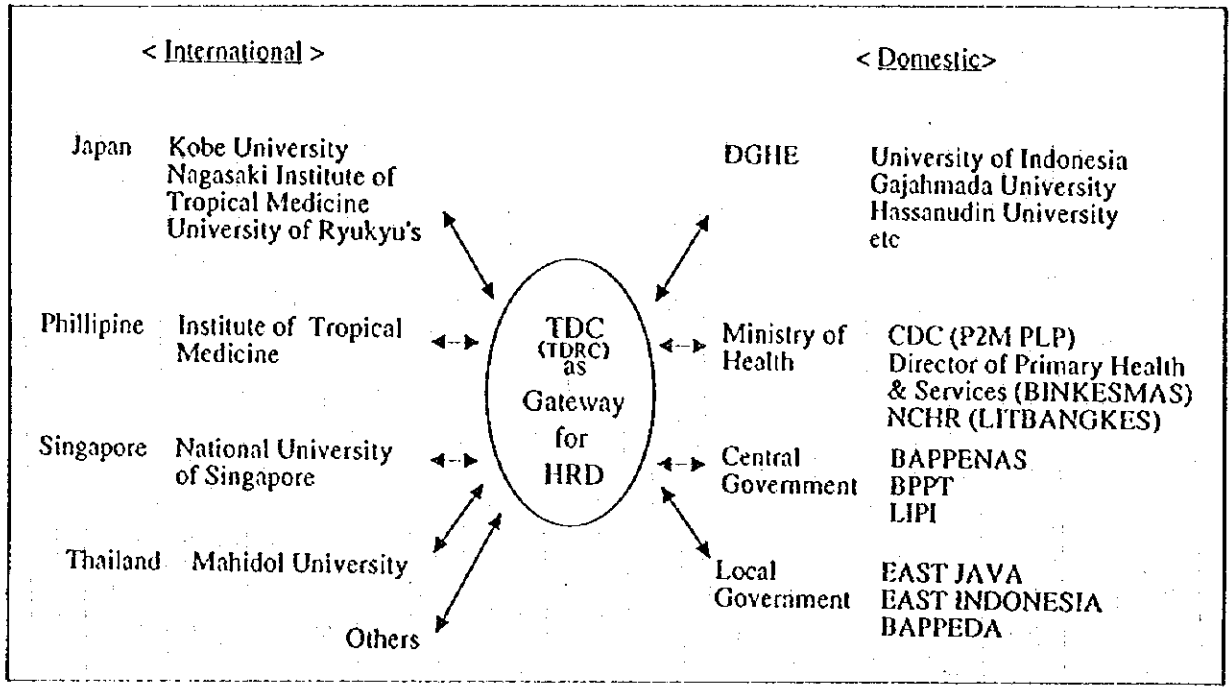


Figure 2-2 TDC External Network

* TDRC is currently involved as a part of LSCR in this network

Table 2-2 Training Activity Program

Type	Training								Enlightenment								Applied Research		
	Center Training						Clinic	Field	Individual		Community		Government Officials		Health Service		Institutional	Collaborative	Postgraduate/
Level	Primary		Intermediate		Advanced												Advanced	Advanced	Postdoc
Period	Short	Long	Short	Long	Short	Long			Short	Mid.	Short	Mid.	Short	Mid.	Short	Mid.	Yearly	Yearly	Yearly
1. Comprehensive	4		4		4				4		4		4		4		1		
2. Viral																	1		
Rotavirus	2		1		1		2	1	2		2		1		1	1		1	1
Hepatitis	1		1		1	1	1	1	1		1		1		1	1		1	1
Dengue	1		1		1				1		1		1		1	1		1	
AIDS									1		1		1		1	1			
3. Bacterial																	1		
Gastroenteritis		1		2	1	1	4	2	2		4		2		2	2		1	1
Tuberculosis	1				1		2	1	1		2		1		1	1			
Salmonellosis				1	1		2	1	1		2		1		1	1			
4. Parasite																	1		
Diarrhea	1	1	1		1	1	1	1	1		2		1		1	1		1	1
Helminthiasis/Filariasis	1		1		1	1	1	1	1		2		1		1	1			
Malaria	2	1	1	1	1	1	2	1	2		2		1		2	1		1	1
5. Others																			
1)Perinatology	5	2	5	3	4	4			5		8		4		4	4			
2)Nutirition	4		4		4				4		4		4		4	4			
3)Family Planning	1		1		1				1		1		1						
4)ARI	4		4		4				4		4		4		4	4			
Sub Total of Courses	27	5	24	7	26	9	15	9	31	0	40	0	28	0	28	23	4	6	5
No. of Participants	20	8	10	4	5	3			20	10	20	10	10	10	20	10	5	10	2
Sub Total of Participants	540	40	240	28	130	27			620	0	800	0	280	0	560	230	20	60	10

Total No. of Annual Training Participants 1,005 person

Total No. of Annual Enlightenment Participants 2,490 person

Total No. of Applied Research Participants 90 person

Note: Short Term Course: 1 week

Mid Term Course: 2 week

Long Term Course: 3 week

(2) Study and Examination of the Contents of the Request

1) Contents of the Facility

Space requirement and necessary facilities were confirmed by the Basic Design Study Team and the Indonesian side. Based on the results of the discussions, room arrangement is calculated as indicated in Table 2-3.

2) Contents of the Equipment

The equipment to be provided for the project is tentatively concluded as a minimum requirement for training activities and is shown on Table 2-5.

During the discussions, it was confirmed that an incinerator is to be provided for waste control measures aiming to solve environmental impacts to the area surrounding the project site.

2-3 Basic Design

2-3-1 Design Concept

The basic design of the facilities and equipment in the project is based on the following design policies: with due consideration of the results of the field survey, the environmental and social conditions of Indonesia, the construction and procurement conditions, the maintenance and management ability of the facility and equipment and the construction schedule under Japan's Grant Aid assistance.

(1) Clear distinction of each function of TDRC and TDC and a smooth functional relation between both facilities must be carefully considered for the design of TDC. Also the external design of TDRC and TDC must be well harmonized.

(2) In regards to the grade of laboratory, the laboratories of TDC will, in principle, be used as rooms at a P 2 level of contamination.

(3) The assurance of safety should take into account the risks involved in the facilities of the research center where bacteria and virus are treated. Also, for waste disposal and waste water treatment, adequate countermeasures must be considered to prevent environmental pollution to the surrounding area.

(4) The good design points of relevant facilities in Indonesia and Japan should become a reference for the design, while the existing problems of the building should be improved in the plan.

(5) The physical conditions of the space (affected by rain, sun and wind) and local customs (security, life style) should be taken into consideration.

(6) Considerations of design criteria's should be considered in regards to the facilities, mechanical and electrical design, and selection of equipment so as to ease the maintenance with a minimum cost.

(7) Local construction methods and local materials should be considered and used as much as possible. Costs should also be considered not only as initial costs, but overall long-term costs as well.

2-3-2 Study of Design Criteria

(1) Basic Concept for the Determination of the Facilities' Contents and Scale

The determination of the facilities' contents and scale (which will be confirmed by the study of the number of rooms and the scale of each room) is not only a condition of the function of the facilities, but it will have an important effect on the future operational budget as well as on the activities of TDC. Based on these considerations, the basic concepts for the determination of the facilities' contents and scale are established as follows:

1) The facility plan shall be established based on the contents of the Minutes of Discussions between the Indonesian side and the Basic Design Team from reasonable and economic points of view.

2) Although the necessary floor area of a room per person for research purposes (especially for the laboratory) has a wide range from an architectural planning point of view, the size of major rooms are to be confirmed based on studies of layout plans of the required minimum equipment and experiment tables on the drawings. The number of necessary rooms are to be minimized as much as possible. Optimum facility design is to be formulated through adequate studies of the New TDRC and other similar facilities as a reference for TDC.

3) The object of this project is to develop a Tropical Disease Center which has special functions and requirements as a research and educational facility, and therefore the determination method for the scale of each room is not the same as for other normal buildings. The "basic unit size for a laboratory" must be considered as a fundamental design criteria for the facility plan, and space design for utilities and equipment are to be made with deep consideration on safety and function as a research and educational center.

4) The flow line and zoning plan shall be studied taking into consideration that TDC and TDRC will be integrated as TDC in the future. The New TDRC is a facility for the basic research of tropical diseases and the TDC is a facility for applied research, staff training and enlightenment activities. Facility planning is made based on this demarcation of function.

5) The facility scale for staff training should be calculated on the basis of a staff training program confirmed during the basic design study.

6) The new staffing schedule and organization for the TDC have been prepared by the Indonesian side. Thus, the facilities' scale is also to be reasonably determined based on this schedule.

(2) Study for the Number of Rooms

The number of rooms indicated on the Application Form for Japan's Grant Aid in March 1995 were as follows;

{2 - Viral Laboratories, 2 - Bacterial Laboratories, 1 - Parasite Laboratory, 2 - Common Training Rooms, 1 - Workshop, 2 - Enlightenment Activities, 1 - Computer Room, 1 - Library, 1 - Museum, 1 - Administration Office.}

The number of the rooms for the Laboratory division were estimated based on the Training Activity Programs mentioned on Table 2-2. After the discussions regarding the activity programs for staff training, applied research and

enlightenment activities with the Indonesian side at the stage of basic design survey, the required number of the rooms was confirmed as follows;

4 - Viral Laboratories, 3 - Bacterial Laboratories, 3 - Parasite Laboratories, 1 - Preparation Room, 1 - Microscope Room, 2 - Common Training Rooms, 1 - Enlightenment Activity Rooms, 1 - Computer Room, 1 - Library, 1 - Exhibition Room, 2 - Office, 1 - Chairman's Room, 1 - Meeting Room, 1 - Staff Room, 1 - Security Room.

1) Laboratory Division

For the laboratory division, three types of courses for applied research and advanced staff training activities for medical doctors and researchers are being intended.

Based on the result of discussions with the staff of Airlangga University regarding the activities schedule and contents of applied research, the required number of Laboratories was decided to be 10 rooms(10 researchers per room).

Applied research is divided into three main categories: Institutional Course; Collaborative Research Course; and Postgraduate/Postdoc Research Course. Fifteen courses are intended consisting of 4 Institutional Courses, 6 Collaborative Research Courses, 6 Postgraduate/Postdoc Research Courses. These courses are provided for one year. The number of researchers per each course will be: 5 Institutional Researchers; 10 Collaborative Researchers; 2 Postgraduate/Postdoc Researchers. Therefore, the total number of researchers is calculated as 92 persons (5 researchers x 4 courses + 10 researchers x 6 courses + 2 researchers x 6 courses = 92 researchers).

Each laboratory is designed to accommodate 10 researchers and 10 laboratories are to be arranged as mentioned above. Therefore, the total capacity of the laboratories is calculated as 100 researchers. 90 researchers will be using the 10 laboratories when estimating the average use of a laboratory at 90%. 10 staff (researchers) of TDC are scheduled to be the researchers for applied research. Thus, the total number of researchers is 100.

The courses for advanced staff training of medical doctors and researchers are divided into 3 types of course: short-term course; middle-term course; long-term course corresponding to the level of the Trainee.

The courses encompass theoretical, practical and training for diseases such as Viral (Rota Virus, Hepatitis, Dengue Fever, AIDS), Bacterial (Gastroenteritis, Tuberculosis/Leprosy, Salmonellosis), Parasite (Cryptosporidiasis/ Giardiasis, Helminthiasis/Filariasis, Malaria).

The number of planned courses is 98 annually, and the number of training participants is expected to be 1005.

From the above mentioned matters, it is quite reasonable to consider that the utilization ratio of laboratory rooms is relatively high and the number of rooms are minimized.

2) Common Training Division

The rooms for the common training division are to be used for the purpose of development for training, enlightenment activity and applied research activities through experiments will be done for training and education.

A total of 98 staff training courses are scheduled per year (140 weeks) and there will be 1005 Training participants annually.

It is assumed there is to be 48 working weeks per year. On the assumption that each room will be used all through the day, the necessary number of common training room is calculated as 2.92 rooms (140 weeks/48 weeks = 2.92 rooms). Although three rooms are needed as a minimum from the above calculation, the number of common training rooms is to be two rooms considering the effective use.

3) Enlightenment Activity Division

Enlightenment activities are intended for professional people who are working in health care institutions of district or local governments, or organizations for municipal medical and health services, including private persons.

From the PHC (Primary Health Care) point of view, during the training period the enlightenment activity room is to be utilized for lectures or guidance in regard to scientific knowledge and preventive methods of Tropical diseases in the local community.

As shown on the Training Activity Program (Table2-2) prepared by Airlangga University, 127 short term courses (1week training period) and 23 middle term, courses are scheduled. A total of 173 weeks is currently scheduled for one year's activity programs. The assumed number of weeks in a one year school term is 48weeks. 2 rooms are calculated for the necessary number of rooms for Enlightenment Activities (173 weeks ÷ 48 weeks/room = 3.6 rooms).

As mentioned above, it seems to be most probable that the rooms are to be used for various purposes; staff training, lectures of applied research, guidance, and training. Therefore, one big room (216m2 floor area) will be allocated for these purposes, and a removable partitions are to be installed in the room so that the room can be used for 3 lecture spaces according to the number of lecture attendees.

(3) Computation of the Scale of Each Room

In accordance with the scale of the project mentioned in paragraph (1) Basic Concept for Determination of Facilities Scale, the floor area is to be designed based on the allotment of roles between TDC and TDRC, which divides the different specialties between them. Space planning is to be made in consideration of similar facilities in Indonesia, such as the New TDRC, Eijkman Institute, National Infectious Disease Center, Dr. Soetomo Hospital, PK4 and other projects undertaken by Japan's Grant Aid in Southeast Asia as well as the result of discussions with the Indonesian side.

1) Laboratory Division

As for the space planning of the laboratory, various factors are to be considered such as the content of research, number of trainees and its group size, effective working space for one person, length of table and its layout, location of equipment and services. Also, flexibility for future renovation and "module planning" should be taken into account in this planning.

Module size shall be decided based on the elements of the laboratory such as walls, doors, utilities, equipment. In general, the width of laboratory is considered to be 6.0m ~ 6.6m, and the module width is 3.0m ~ 3.3m. According to the Application Form for Japan's Grant Aid, 200 m^2 is requested for each laboratory. The floor area of laboratories in existing TDRC is 117m^2 and 182m^2 for the research of 2 ~ 3 diseases. The floor area of one laboratory for the research of 1 disease in the New TDRC is 6m x 9.6m = 57.6m^2.

The Basic Design Study Team discussed and studied together with the officials of Airlangga University the contents of research, methods of use, and methods of teaching . The facility size and the number of rooms are considered on the basis of all of the foregoing factors and the program of research activity. The floor area of a Laboratory is calculated as 6m x 12m = 72 m^2 for practical minimum space. The module of room width will be settled as 6m and the depth will be settled as 12m considering the layout of equipment and lab tables as well as space for anterooms (which are required in order to prevent the outflow of high risk pathogenic organisms). The effective floor area excluding anteroom and lab table spaces is calculated as 56m^2 and the area per person becomes approximately 5.6m^2.

Although a microscope is generally utilized for research activities in Indonesia, personnel in charge have little formal training in its use and maintenance. Therefore, one Microscope Room shall be provided for microscopic examination, and floor area is planned as about 50m^2 based on the layout of equipment, modular planning and the features of other similar facilities.

The Preparation Room is planned to be on the second floor in order to promote common use by sharing the equipment, but separating them for each work. The floor area of the Preparation Room is calculated as 6m x 12m = 72m^2. This room will be the common preparation room for the Viral Section and the Parasite Section.

Figure 2-3 shows a layout plan of a Laboratory.

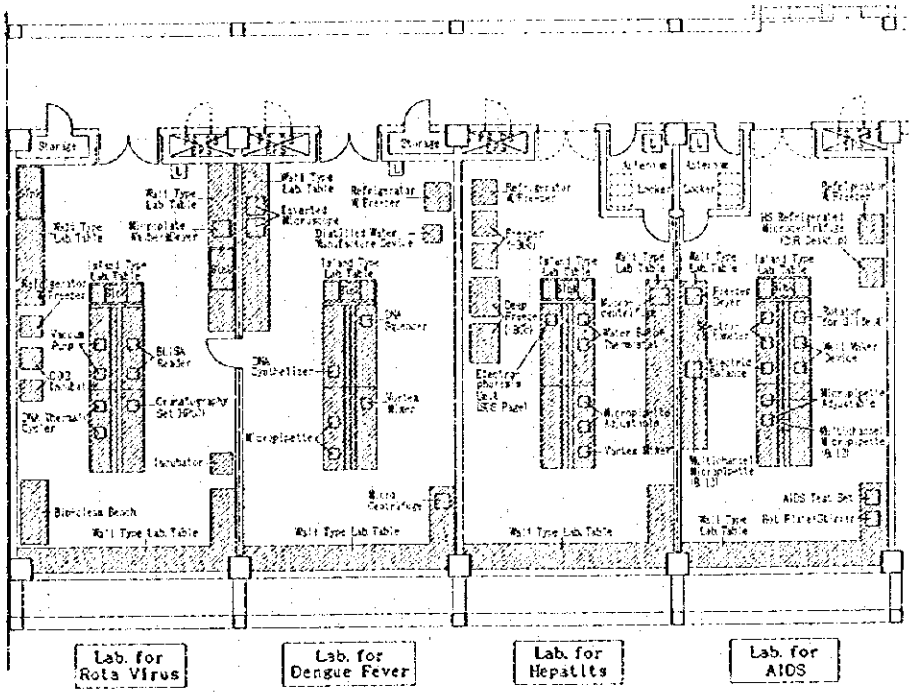


Figure 2-3 Laboratory

2) Common Training Division

The common training rooms are frequently used for the purpose of lectures, guidance and theoretical study as well as practical training such as experiments.

Therefore, at least 4 laboratory tables with a sink for 24 persons are to be installed in accordance with the training program.

Furthermore, two darkrooms to be used for common use (experiments and research with microscopes) are to be provided. The floor area of a darkroom is calculated as 3m x 6m = 18m^2.

The room size is decided based on similar facilities undertaken by Japan's Grant Aid program in Southeast Asia and other similar facilities as well as the layout of equipment and modules.

Common training is to be utilized mainly for lectures and guidance. Demonstration and experiments in practical work are also to be scheduled.

In this regard, four experiment tables for 24 trainees will be installed. The floor area is calculated as 100 square meters per room (4 m^2 per person).

Figure 2-4 shows the layout plan of the common training room.

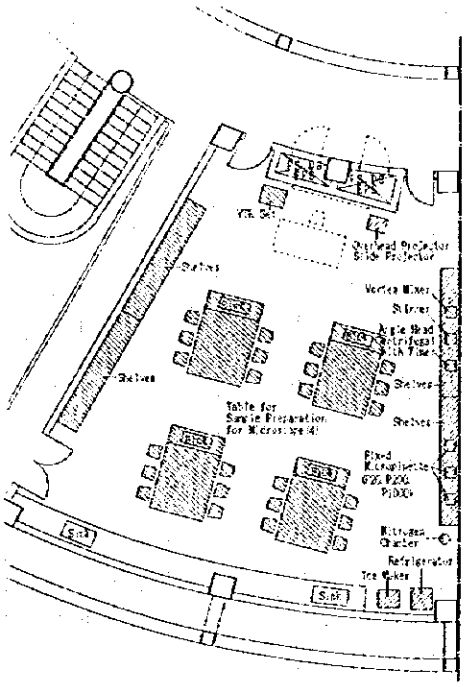


Figure 2-4 Common Training Room

3) Enlightenment Activity Division

Regarding the space planning, twenty (20) persons are assumed to be the maximum capacity based on the enlightenment activity program.

It was agreed upon at the time of the Basic Design Survey Mission that two (2) rooms with the capacity of forty persons were to be provided for enlightenment activities for the following reasons:

1) Combined classes consisting of the two different courses are scheduled in the Enlightenment Activity Program.

2) Seminars and schooling other than those noted above are planned as well. Their capacities are formulated as 40 persons per group.

However, it was decided that one large room (18m x 12m =216m2) is to be provided for enlightenment activity space based on the further discussions in Japan .

This large room can be divided into several rooms on the demand of schooling by providing removable partitions:

a) one small-size room (72 m^2) and one middle size room (144 m^2)

b) three small-size rooms (3 x 72 m^2 = 216 m^2)

The above reduces the necessary space and provides flexibility to the activity program.

Three of the four courses for the enlightenment activity program can be held at the same time by providing the separable space as well. Unit area per person is calculated as a minimum 1.8m^2 and as a maximum 3.6m^2.

Furthermore, the above space planning provides a possibility for large-scale activities of more than 100 attendees such as joint seminars with other universities and institutes, presentations for researchers, lectures, etc. although a large hall is not allocated in this family (Available attendance of 120 - 140 persons is calculated based on the unit area of 1.5 - 1.8 m^2 / person).

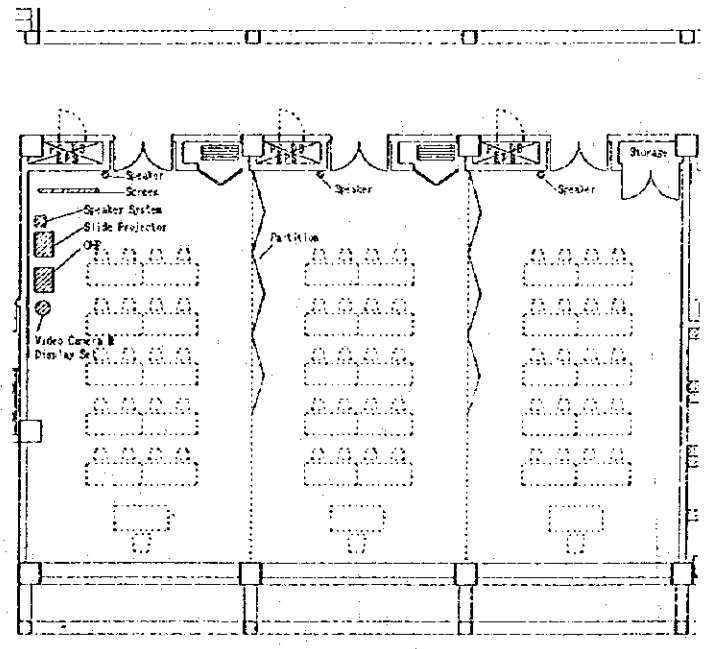


Figure 2-5 Enlightenment Activity Room

4) Information Division

The following three facilities are major functions of the Information Division, and were confirmed through discussions with officials of the Indonesian side.

a) Computer Room

The computer equipment and system attached to the network will be installed in the computer room. The creation and management of a data base is one of the major activities of TDC. The filing and collection of information will be handled by the computer. In particular, computer network systems with other research institutions through internet, and the possibility of interfacing with the computer center of Airlangga University or Dr. Soetomo Hospital by the LAN system should be considered. The floor area requirement was indicated as 200 square meters for the computer room. However, the floor area required is calculated as 50 square meters, when the space for the use and operation of the computer system is considered.

b) Library

Books, recent and current journals, and pamphlets on tropical diseases will be collected and displayed for use. Space for the open stack type for use by general visitors and the closed stack type for use by researchers are required so as to divide the area. The library is located adjacent to the computer room. The space for the library will be determined by the number of readers and books to be housed in this area (approximately 30 - 35 readers and 5,000 books for this project).

c) Exhibition / Information Room

A museum was requested in the content of Application Form for Japan's Grant Aid, but it was agreed upon through the discussions with the Indonesian side during the Basic Design Survey Mission to provide 2 spaces which have different functions (described below) aiming to enrich the general public's knowledge of tropical diseases.

1) Information Space
Major objectives of the Information Space are as follows:
- space to introduce the activities of TDC.
- space to hold guidance for the tropical diseases by utilizing audio visual equipment.

2) Exhibition Space
Major objectives of the Exhibition space are as follows:
- to display and to disclose the data and the information for tropical diseases by panels and cabinets.
- to hold the training activities by utilizing the exhibits.

However, after further discussions and studies in Japan, it was concluded that the two spaces mentioned above (approximately 250m^2) are to be integrated into one space which integrates the functions of those two spaces in order to reasonably decrease the facility volume. Namely, a room space of 100 m^2 is to be provided for the Exhibition/ Information space which allows display space on the walls and guidance space at the room center having the capability of seating 50.

5) Administration Division

TDC will be controlled directly by the Rector of Airlangga University and an Advisory Board which is formed by the Rector and the director of TDC in order to give advice for the operation and activity of TDC. The organization chart of the TDC is shown in Figure 3-3.

The Finance & Marketing and Executive Secretaries will be settled in the administration division of TDC. They will be engaged in the whole scope of business and office work. Each Executive Secretary will have some staff.

Determining the necessary arrangement of rooms (an office, the chairman's room, and others) which corresponds with the requests of the Indonesian side is to be considered.

According to the staff personnel plan prepared by the Indonesian side, the proposed number of staff is 20 persons. The floor area of the office should be calculated based on the floor area of the existing TDRC, similar projects undertaken by Japan's Grant Aid assistance, and local customs for the furniture layout.

It is calculated as 140 - 160 square meters for 20 people with 7 - 8 square meters per person.

In consideration of similar projects, the floor area of the chairman's room is calculated as approximately 70 square meters including the secretary's room.

As each Board Member is a part-timer and the frequency of usage of this room is limited, the Board Member Room is to be deleted.

Figure 2-6 shows the layout plan of the administration office.

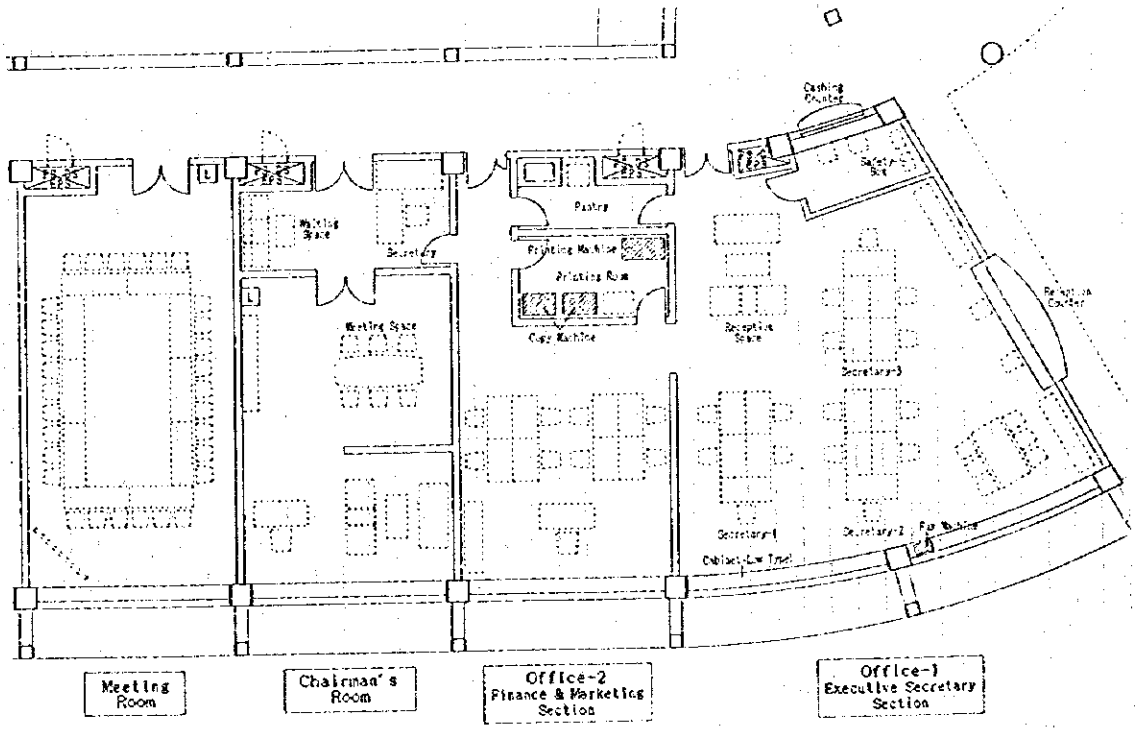


Figure 2-6 Administration Office

6) Other Rooms

According to the staffing plan and its organization chart, TDC's total staff will be 107 persons and will consist of the following:

a) 68 persons as core-staff under the control of Rector and 42 of the 68 staff are expected to be full-time staff (25-senior staff, 17-junior staff).

b) 65 persons as supporting staff (6-administrators, 14-administrational workers, 6-senior technicians, 14-junior technicians, 12-office boys, 3-drivers, 10-security guards).

Considering these conditions, two (2) staff rooms and one (1) security room (total floor area : 184m2) were required in the TDC building in the Basic Design Survey stage. However, after further studies in Japan, it was concluded that those are to be integrated into one room with a floor area of 144 m^2.for the use of 87 full time staff (42-staff, 20-technicians, 12-office boys, 3-drivers, 10-security guards). The staff room can be separated into several rooms by providing partitions on demand so that research staff rooms and security rooms can be maintained. Other necessary staff space must be prepared in the TDRC building which has 3 staff rooms (approximately 250m^2). Thus, the total staff space will be approximately 400m^2 (144m^2 +250m^2), the floor area for each staff will be approximately 4.6m^2. With predetermination of room use, furniture should be included in the calculation. Thus, the average local floor area with the furniture per person is 7 ~8m^2. The overflow of staff space will be accommodated in staff space of TDRC for the staff. Also, space for members of the Advisory Board should be taken into account.

7) Others

After further studies in Japan on the contents of the discussion with the Indonesian side during the Basic Design Survey stage, the following points have been revised regarding facility planning in comparison with the initial requests .

- Staff dining space (Cafeteria) is to be deleted.
- Only one toilet space will be arranged on each floor of the TDC considering common use of the toilet in TDRC.
- The Machine Room was allocated outside of the TDC building as an independent building. However, it can be allocated inside on the first floor of the TDC building as a result of space reduction of other rooms. Due to the above revisions, a reduction of construction costs and an increased efficiency of operation and maintenance will be realized.
- The necessity for a waiting room for use by visiting lecturers, researchers and Board Members has been confirmed. Therefore, one lecture room is to be provided as a waiting space and preparation space for them.

(4) Required Rooms and Their Floor Areas

Based on the discussions and study, the necessary rooms were mentioned in the previous clauses; their floor areas are listed below.

Table 2-3 Required Rooms and Their Floor Area

		The Application Form		Proposed Floor Area		Remarks
		No. of Rooms	Area (m²)	No. of Rooms	Area (m²)	
1)	Laboratory Division		1,000	12	842.7	
	a) Viral Section	2	400	4	288.0	
	Laboratory for Rota Virus			1	72.0	
	Laboratory for Hepatitis			1	72.0	
	Laboratory for Dengue Fever			1	72.0	
	Laboratory for AIDS			1	72.0	
	b) Bacterial Section	2	400	3	216.0	
	Laboratory for Gastroenteritis			1	72.0	
	Laboratory for Tuberculosis/ Leprosy			1	72.0	
	Laboratory for Salmonellosis			1	72.0	
	c) Parasite Section	1	200	3	216.0	
	Laboratory for Cryptosporidiasis/ Giardiasis			1	72.0	
	Laboratory for Helminthiasis/ Filariasis			1	72.0	
	Laboratory for Malaria			1	72.0	
	d) Microscope Room	1		1	50.7	
	e) Preparation Room			1	72.0	
2)	Common Training Division	2	400	3	274.6	
	a) Common Training Room			2	202.6	
	b) Darkroom 1, 2, Anteroom			1	72.0	
3)	Enlightenment Activity Division				216.0	
	a) Enlightenment Activity Room	2	300		216.0	
4)	Information Division			3	278.6	
	a) Computer Room	1	200	1	30.0	
	b) Library	1	200	1	143.3	
	c) Exhibition / Information Room	1	200	1	105.3	
5)	Administration Division	1	200	3	245.3	
	a) Administration Office			2	173.3	
	b) Chairman's Room			1	72.0	
6)	Other Room			5	338.6	
	a) Meeting Room			1	72.0	
	b) Staff Room			1	108.0	
	c) Security Room			1	36.0	
	d) Lecturer's Room			1	50.6	
	e) Storage & Maintenance Shop			1	72.0	
	Sub-Total	13	2,500	27	2,195.8	
7)	Other		1,300	3	1,468.5	
	a) Toilet			3	72.0	
	b) Hall, Staircases				1,228.5	
	c) M/E Room (PLN, Pump, Generator, Electrical)				168.0	
	Total	13	3,800	30	3,664.3	

2-3-3 Basic Design

(1) Site Layout Plan

The site layout plan of this project was planned focused on the following basic points which give full consideration to site conditions (environmental nature, site and location) in order to improve the previously mentioned problems. The zoning and flow line plan of the facilities is explained in the following Basic Policy:

1) Basic Policy

a) As a premise, it is important to make clear the distinction between the characteristics of the New TDRC and TDC, as well as to establish the integrated future relationship of both facilities so as to multiply the effects.

b) The site layout plan should be harmonized with other facilities, and the TDRC building constructed on the basis of the master plan of the new campus, and with the surrounding landscape.

c) The infrastructure of the new campus, the surrounding area and the master plan must be taken into consideration for the site layout plan of TDC.

d) It is necessary to examine how TDC will be connected with the New TDRC. The connection will be determined so that it will not interfere with its use, design, structure and environmental system planning.

e) Consider distances between buildings and their orientation in order to secure good ventilation, natural lighting and sound proofing without mechanical devices throughout the year.

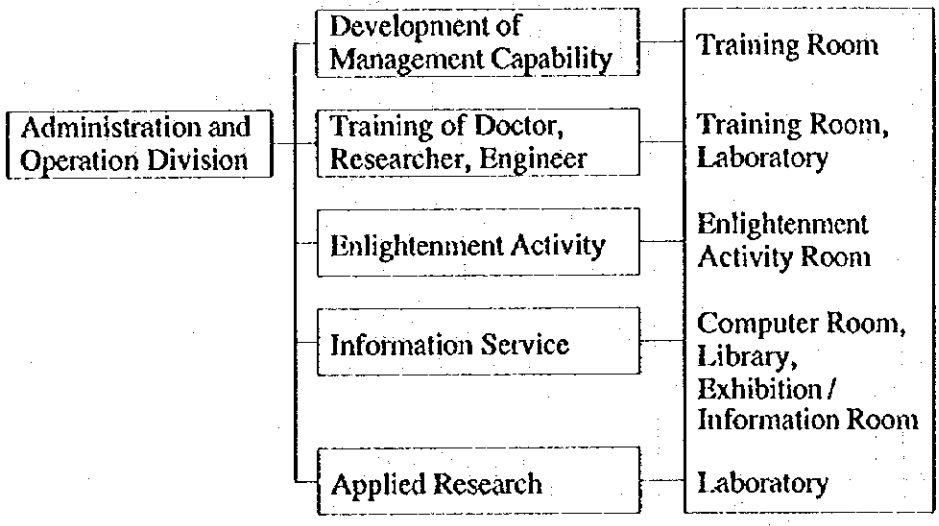
f) Safety and easy approaches for access and security check points from the main road of the campus as shown in the master plan should be considered in order to make a proper site layout plan.

g) Since TDC serves a large number of people, it should be located so that there will be no confusion of direction and traffic between the flow lines of trainees, researchers, doctors, and visitors.

h) It is important to consider the effective utilization of external spaces for the air circulation such as an inner garden and to ensure that the building and landscape have an attractive and tasteful appearance.

2) The Structure of Facilities and Flow Line Plan

The site plan should be studied in consideration of the structure of facilities, zoning, flow lines and similar projects based on the site analysis. The best plan shall be chosen based on the study of alternatives.
The following figure shows the Organization of the Facilities of TDC based on the 5 functions of each division mentioned in Chapter 3-2-2. The criteria of the zoning and flow line plan are summarized as shown in the following table. The site layout plan was formulated based on these matters.



<Organization of the Facilities>

Table 2-4 Criteria of the Zoning and Flow Line Plan

Zoning Plan	Flow Line Plan
a) Allotment of Function (mentioned above) on Educational Training and Research Field	a) Consider the flow lines of trainees, staff, customers, services and vehicles.
b) The structure of facilities should be safe, legible, functional and easy to manage.	b) Consider a good circulation of trainees and researchers (without confusion).
c) Zoning should be planned as the zoning will fall into five clear zones.	c) The flow lines should be as short and as convenient as possible by optimum layout of facilities.
d) Zoning should be planned based on the level of training and research and curriculum.	d) Flow line plan shall be considered to be easily approachable to the site and also for security.

3) Study conducted on TDRC Project under construction

The results of the study conducted on the New TDRC are as follows:

a) The existing TDRC and the New TDRC were designed, based on the Master plan, by local consultants (Master Plan by BINARKASA KUNSULTAN, and the Detail Design of TDRC by ADHICIPTA Engineering Consultant) with relation to the surrounding buildings on the university campus. Also, TDRC was planned with concerns to the weather and the surrounding nature of Indonesia, and as a result, an Inner Garden Gallery Plan was created. On the basis of these data a galleria type corridor was planned and put into construction.

b) The natural lighting and ventilation acquired by the inner garden are the main characteristics of the galleria type, which fits in with the surrounding nature of Indonesia. Through this concept, the distinct functions of facilities for each wing can be materialized. At the same time, expansion of the facilities is made possible.

c) In view of the disadvantages, the galleria type is centered by the inner garden by four wings, so the area of hallways for the research facility is not very efficient. The mean temperature of the east and west wings will be directly affected by sunlight during sunrise and sunset.

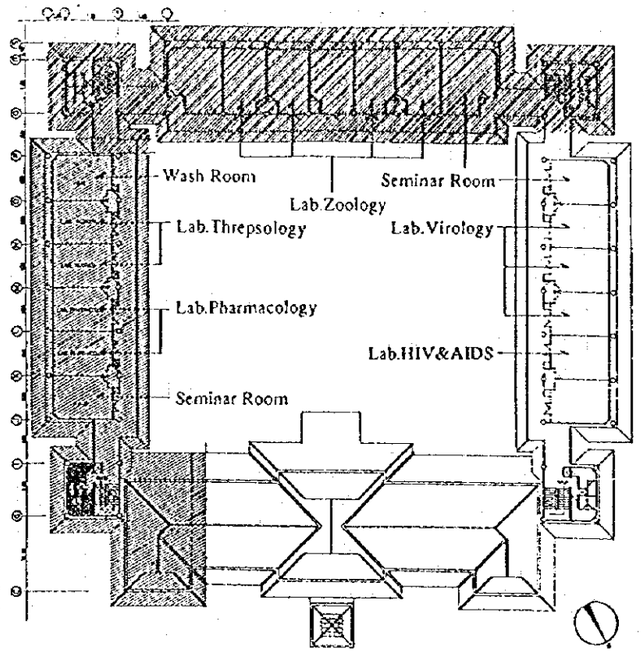
d) TDRC's design was planned so that it is centered around the administration facility, through facilities surrounding the inner garden, the east wing (completed TDRC) and the south wing (New TDRC). The TDC proposal which includes the north wing (administration facility) and the west wing must integrate its function with TDRC as a whole. Therefore, in order to make smooth functional relations, the common use of the staircase and a proper joint method between the TDRC and TDC buildings should be taken into consideration. Also, the external design must be matched well so as not to interfere with the design and master plan of the new campus.

e) The requested TDC will be considered as an extension to the new TDRC, so the planning of TDC will have several limits.

f) The plan of TDRC includes seminar rooms and wash rooms but Attachment 3 of the Application Form for Japan's Grant Aid (March 1995) did not include these rooms in the request.

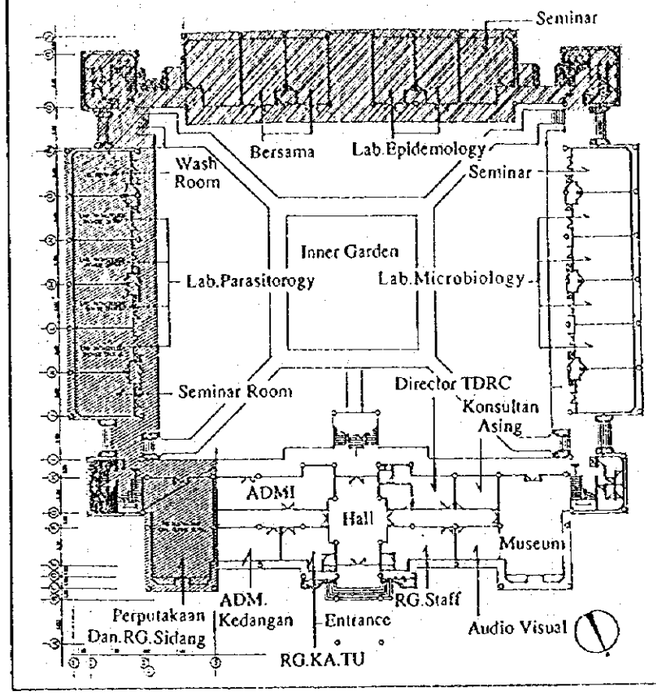
g) With the understanding that the TDC Project is a project under Japan's Grant Aid, the suitability, the construction cost efficiency and harmonization with the surrounding facilities and environment are to be put into the design criteria.

These are in the Study conducted on the TDRC Project under construction, Figure 2-7 shows the result of the Study of the New TDRC.



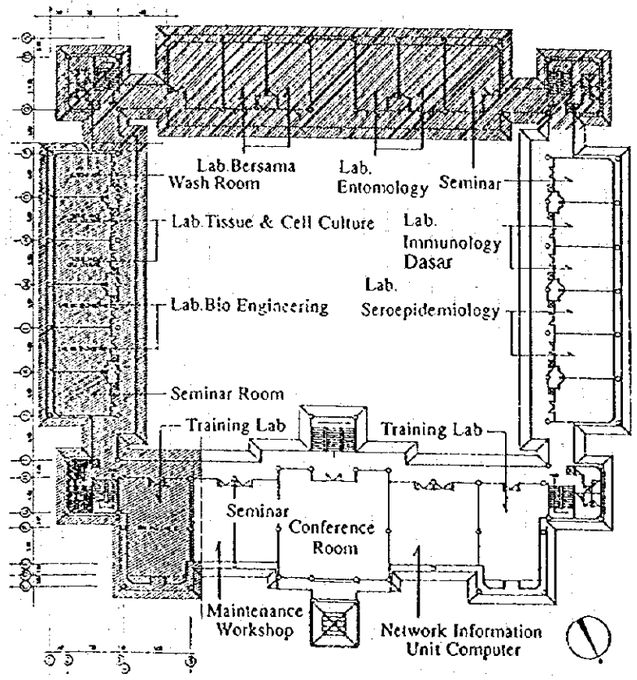
- The completed East Wing is planned for the laboratories of Threpsology (Nutris) and Pharmacology.
- The South Wing under construction is planned for the laboratories of Animal Husbandry.
- The West Wing is planned for the laboratories of Virology and HIV & AIDS. These laboratories were requested on the Application Form

Third Floor Plan (1/800)



- The completed East Wing (TDRC) is planned for the laboratories of parastitology. These laboratories were requested on the Application Form for TDC facilities, so the laboratories of parastitorogy are double counted.
- The North Wing is planned for the administration offices and a museum. The floor area of the museum is planned as approximately 135 square metres. (The floor area of the museum on the Application Form was 200 square metres.)
- The South Wing consists of the laboratories of Epidemiology.
- The West Wing consists of the laboratories of Microbiology.
- Each Wing consists of laboratories, a seminar room and a wash room.

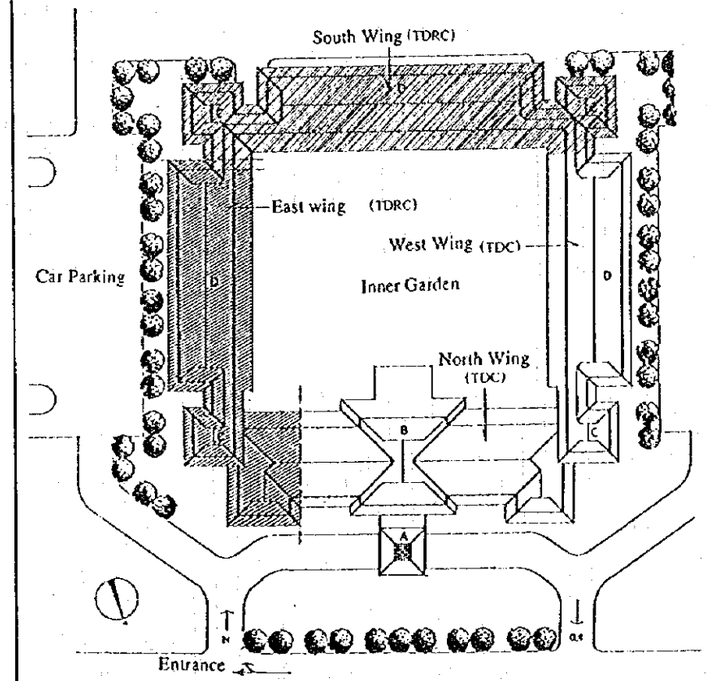
First Floor Plan (1/800)



- The completed TDRC (East Wing) is planned for the laboratories of Tissue & Cell Culture and Bio. Engineering. The completed TDRC (East Wing) is planned for the training laboratory.
- The South Wing under construction (TDRC) is planned for the laboratories of Entomology.
- The West Wing is planned for the laboratories of Immunology and Seroepidemiology. However, these laboratories were not requested on the Application Form.
- The North Wing consists of a Workshop, seminar room, conference room and training laboratory. However the conference room was not included on the Application Form, and the floor area of the conference room is planned as approximately 144 square metres.

Second Floor Plan (1/800)

: TDRC (Completed)



- The parts of oblique lines are the current TDRC buildings (completed and under construction).
- The parts of West Wing and North Wing are canceled, and this parts and land is planned for the TDC. Architectural design and detailed joint design are to be studied so as to harmonize with the current TDRC building by the Indonesian side.
- In the master plan of TDRC, car parking was planned on both sides of the building. Based on this, the approach shall be studied.
- It is easy to harmonize with the current TDRC building by the Indonesian side, however, design boundary by Japanese Grant Aid is to be studied based on the reasonable construction costs.

Site Plan (1/1000)

Figure 2-7

Study of New TDRC Drawings

4) Functional Distribution and Composition of TDC and TDRC

a) It is confirmed that the New TDRC will be the facility for basic research on tropical diseases and TDC for applied research, staff training and enlightenment activities.

Thus the function of each facility is clearly distributed. The composition of each facility was confirmed as in Figure 2-8 on the basis of this principle and alternative plan A selected.

b) In some cases, it is hard to make the distinction between basic and applied research. However, the functional distribution and composition of TDC and TDRC were studied clearly as follows:

TDRC deals with the investigative activities connected with pathology, epidemiology, immunology, including statistics on tropical disease, social science, and medical ecology.

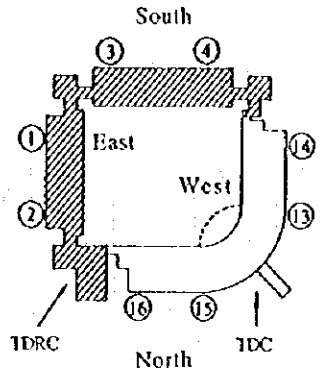
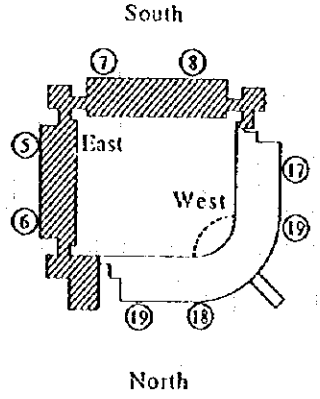
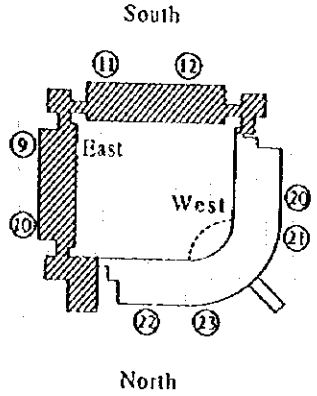
TDC will be composed of 3 sections such as Viral, Bacterial and Parasite including 1) applied research activities, 2) enlightenment activities, 3) training activities of staff on tropical disease research, 4) information services (provision of information), 5) administration which is responsible for the activities.

c) The facilities of TDC and TDRC will be integrated after the completion of TDC and TDRC will be a basic research division of TDC.

However, a functional distinction can be made between TDC and TDRC and the planning must be satisfied as a comprehensive facility (center) for tropical disease research as to its future function.

d) In Indonesia, the existing TDRC is the only specialized tropical disease research center. The commencement of TDC Project will dramatically help and develop the functions of TDRC. Many countries pin high hopes on TDC's positive role as a central facility in Indonesia with collaborating research activities on tropical diseases of East Asia in the future. Therefore TDC will play a key role in Indonesia.

Figure 2 -8 Proposed Zoning of the Function of TDRC & TDC

Plan			
Bldg.	1 FL.	2 FL.	3 FL.
TDRC			
East	1) Veterinary Medicine	5) Publication	9) Ecology
	2) Clinic	6) Statistics	10) Tropical Nutrition
South	3) Pathology	7) Pharmacology	11) LSCR
	4) Biochemistry	8) Immunology	12) Epidemiology
TDC			
West	13) Exhibition / Information Room	17) Parasite Laboratory	20) Viral Laboratory
	14) Staff Room		21) Common Training Room
North	15) Office	18) Library, Computer Room	22) Bacterial Laboratory
	16) Meeting Room	19) Enlightenment Activity Room	23) Common Training Room

(2) Architectural Design

The five main functions of TDC in the tropical disease research field are as follows:

1) development of management capability
2) training of doctors, researchers and engineers
3) enlightenment activities
4) information service
5) applied research

TDC will play a key role as a core research center in Indonesia. The high-pitched growth in the medical technical field requires the complexity of the needs in the research fields. Also, major trends in the medical fields require the expansion of medical knowledge, technology, and science. The training and research of doctors or technicians encompass many areas on tropical diseases from the basic primary level (beginners course) to the applied research activities which require professional knowledge. Therefore, the above mentioned matters are to be considered in the architectural design.

On the other hand, the design shall be harmonized effectively with the climate and customs in Indonesia. And, on the premise that this project is executed by Japan's Grant Aid program, the design and implementation method of the project should be rational and comply with the schedule and guidelines formulated under Japan's Grant Aid program.

1) Floor Plan

In terms of floor planning, the calculated areas and the layout plan as mentioned above were used and each facility was planned on the basis of the following criteria:

a) The floor plan should be harmonized with other facilities of the campus, and with the New TDRC as much as possible. In particular, consideration must be given to the facilities' contents and the allotment of roles in the function between TDC and TDRC, because TDRC will be integrated into TDC in the future.

b) The Enlightenment Activity Room or Exhibition Space can be considered as a public and open space (as a character of space), so that these spaces can be planned on the first floor. Upper floors, handling infectious diseases (laboratory zone), are to be limited areas for the specialists.

c) The Laboratory Division is divided into three sections; viral, bacterial and parasite. The common rooms, microscope room or darkroom are to be placed with the laboratories. Laboratories are to be separate rooms.

d) Since TDC contains laboratories for bacteria, parasites, and other dangerous viruses, appropriate safety measures against possible disasters which may occur in the laboratories must be considered together with emergency accesses.

e) The common facilities such as the administration office, library, and exhibition rooms should be located close to the main access along the campus road on the north side, considering the use by other faculties.

f) To provide greater flexibility, an appropriate module for the building and standardize the span required so as to promote the intensive arrangement of required rooms and equipment. The economical span and module in Indonesia shall be reviewed considering all possible equipment and apparatus relating to laboratory. In order to shorten the duration for the procurement of material and construction work, materials should be standardized.

g) Half of the area adjacent to each column between the room and corridor is a vertical shaft (DS, PS, EPS) in which laboratory services are distributed. The architectural design should be flexible considering any future changes such as an expansion of the facilities or services or change of training contents. The space allotted should be large enough so that additional services can be installed.

h) Building equipment to provide temperature and humidity control, illumination level required, vibration isolation and air purification is essential for much of the research. In order to minimize the costs, consideration must be given to construction cost, maintenance costs and also operation costs.

i) It is important to control the temperature, humidity, luminosity and vibration of the research rooms. A minimum air conditioning system should supply TDC building with clean, dust-free, dehumidified air and it should circulate the air efficiently.

j) Consideration must be given to air flow of the building and their orientation in order to secure good ventilation and minimum confusion caused by heavy rain.

k) The size and layout of equipment and furniture in each room are to be considered in space planning.

2) Elevation and Cross-Section Plan

For the planning of the elevation and cross-sections of buildings, local building styles, local construction methods, and the New TDRC should be considered on the basis of the following matters:

a) The cross-section plan should be considered in regard to the floor level or floor height of the existing TDRC buildings. The connection between TDC and TDRC should be given careful consideration and be matched well. Also, the TDC building should be coordinated with the floor level of TDRC by the floor height of 4.2 meters.

b) The level of the ground floor will be raised 1.2 m above the present ground level in order to prevent possible inundation during the rainy season and also from radiant ground heat.

c) The roof will be sloped in order to quickly discharge the rain water.

d) The deep louver can protect the rooms from direct sunlight and, rainfall.

e) Void block which can allow sunlight and wind to enter shall be installed in order to provide protection from rainwater.

f) Wall surfaces will have as large an opening as possible in order to enhance room ventilation and provide a balanced intake of sunlight.

g) The buildings should be harmonized with the existing building, keeping the originality of the construction.

3) The Measure of Cost Reduction

The various factors of cost reduction which have to be considered in the course of design works for TDC building are as follows. The cost performance and the maintenance cost must be taken into account in planning.

a) The standardization of space is necessary to give the flexibility to the laboratory building, so that the basic module is to be studied carefully taking into consideration, the combination of the basic module. Through extensive investigation, the economical span and standard module of Indonesia has been successfully realized for the Basic Design. This module (6 m x 12 m) allows considerable variation with minimum inconvenience. Based on our investigations, it is concluded that basic module is to be 6m x 12 m.

b) Reviews and investigations of planning and construction measures for the New TDRC are to be well matched and these results are to be considered in architectural planning for this project.

c) The whole size of facility is focused on the plan so as to enhance the utilization rate of rooms and to promote the effective use of rooms, utilities and equipment.

d) In the same manner as the New TDRC, the gallery type corridors are to be planned from the viewpoint of meteorological conditions in Indonesia in spite of being less efficient compared to the center corridor type.

e) Local construction materials of Indonesia should be effectively used so as to reduce the costs for construction and maintenance. Also, in the long-term view of the project, together with the consideration of the maintenance costs of the facilities, the finishing materials will be selected considering the long life and better maintenance characteristics of the materials.

f) Consideration is to be given to the introduction of high energy efficient equipment and insulation material in order to reduce expenses for light and fuel.

g) In principle, natural ventilation and lighting is to be applied as much as possible and mechanical ventilation and artificial lighting is to be minimized in order to reduce costs. However, laboratories will need mechanical systems. So, in this case, local and individual systems will be used in place of a central system.

h) As mentioned above, cost reduction measures are to be considered in, the course of design works. In case of the research facility designs flexibility to accommodate the future improvement and renovation is one of the important factors. Reduction of the initial cost shall be considered carefully so as not to cause a cost increase in operations and maintenance.

(3) Structural Plan

1) Basic Policy

The structural plan for the project should be formulated after a full review of the existing site conditions.

The structural design shall be designed not to cause such fatal defects as deflection, settlement, etc. In addition, the building shall have sufficient safety durability against earthquakes, strong winds, etc. Consideration should also be given to local construction and maintenance conditions.

2) Standard for Structural Design

Structural design shall conform to relevant codes, regulations and standards of Indonesia.

Other relevant standards, such as American Concrete Institute (ACI), American Institute of Steel Construction (AISC) and Architectural Institute of Japan (AIJ) are to be referred to in order to secure safety and rationality.

3) Methods and Material

The superstructure is to be of a concrete frame type with brick in the main parts, which is an economical and widely used method in Indonesia. A steel structure system is to be provided in some parts of the building to achieve the required strength. Reinforcing steel bars, concrete and steel are locally available and appropriate measures should be taken for quality control.

Concrete: Design strength (FC) = 210 kg/cm^2
(28 days Compressive Strength of Cylinder test piece)

4) Foundation

The site is located in a marshy area according to the results of the soil investigation. The N-value of the sand layer located below 14m in depth is 20 - 50.

PC-pile foundations were made at the New TDRC and at other buildings of the campus. The pile driving depth is approximately 28 - 34 meters at the site of the New TDRC.

Based on the above results, pile foundations will also be applied in this project.

In regards to the above mentioned method, the effects on the construction costs will be large, efforts should therefore be made to minimize the costs of the foundation work.

5) Design Load

Wind Load: Wind load is to be calculated in accordance with the Architectural Standards of Indonesia. Heavy wind which causes significant impact on the building are not recorded in the Surabaya area.

Seismic Force: Indonesia is located in the active volcanic zone of the Pacific Ocean where earthquakes occur frequently. According to the Indonesian zoning map of seismic scale, the surrounding area of the project site lies in the area of the fourth degree on the seismic scale. Perecanaan Katahanan Gempa Untuk Rumah dan Gedung is to be referred to for seismic load.

Dead Load: The structural members and finish materials can be calculated for dead load.

Live Load: Pedoman Perecanacan Pembebanan Untuk Rumah dan Bangunan of Indonesia can be introduced.

(4) Utilities and Building Facilities

1) Basic Design Concepts of Utilities Planning

The design concepts for the utilities and facilities' planning shall be based on the following:

a) One of the design criteria's for the laboratory facility is defined by the degree of danger for research. In this project, P2 level is applied. An anteroom is to be provided in front of the laboratories for the future flexibility, and is to be used as a changing room. Vertical service shafts provide easy access for changes and repairs without entering the laboratory.

There is a need to intensively study possible environmental impacts, thereby preventing environmental pollution beforehand. Therefore, treatment of exhaust air, waste water, liquid waste, and refuse should be taken into consideration for the assurance of safety.

b) Considering the future integration of TDC and TDRC, utilities must adjust with the existing TDRC for common use.

c) Considering the easiness of maintenance repair and procurement, materials equipment and spare parts which are available in Indonesia shall be selected in principle.

d) For the design of utilities, the codes and standards of Indonesia shall be referred to in principle. The design will be supplemented by the codes and standards of Japan.

e) An optimum air conditioning system will be provided in order to maintain relatively constant interior conditions and the performance of equipment. But the number of air conditioners is to be minimized.

f) Selection of the equipment shall be made considering efficient use of energy and cost saving.

2) Examining the Utilities of TDC and TDRC

Based on the previously mentioned policy, the compatibility of the environmental systems of TDRC and TDC, future integration of the facilities, the following results were made after the examination.

a) Electrical System

In regards to the electrical system, the problems stated below have come up. To solve these problems, it is best to plan an independent electrical system for TDC.

The existing transformer is 465 kVA. With this present capacity, it is impossible to accommodate TDC's electrical supply. If the transformer was upgraded, the dismantling and expansion of the substation will be necessary. Then, the connection with the existing transformer may become a serious problem.

To increase the capacity of the main feeder, the replacement of the old main feeder will be necessary.

Since TDRC's electrical pipeline work is already finished, danger may arise upon connecting new electrical pipelines.

b) Water Supply System

The water supply system has a similar problem. It is best to plan an independent water supply system.

The existing water supply system of TDRC is incapable of supplying TDC. If we add a new water supply tank and an elevated water tank to the existing tanks, then the removal and exchange of the water pump and other parts of the water supply system will be necessary.

Since the main water supply is at a higher elevation, the existing underground water supply tank may not be suitable for reasons of contamination by pollutants. If we connect the new water supply tank, which is an above ground type, the pollutants from the underground type may contaminate the above ground type.

Furthermore, the existing elevated water tank is at a low elevation (FL +5m), the amount of water pressure is inadequate. To change the existing conditions to suit the requirements, the existing elevated water tank must be elevated to a higher elevation for ideal water pressure.

c) Sewer System

Pertaining to the interconnection of the sewer system between TDRC and TDC, the following problems have arisen:

The existing sewage system of TDRC uses a combination of a septic tank and a soak pit which seeps the polluted water directly into the ground. The connection of the sewage system of TDC to TDRC's system will result in serious environmental problems in the future. And, if TDC's system was connected to TDRC's system, construction work for the connection will be necessary.

For internal sewage, TDRC has only one main drainpipe, but for the new TDC, there will be one for normal sewage and another for experimental contaminated sewage from the laboratories. For environmental reasons TDRC's experimental contaminated sewage of the laboratories should be connected to TDC's. For this process, some of the ceilings in TDRC will need to be replaced for the construction of vertical drain pipes.

These are some of the problems considered, putting in mind the effects to the environment, with the understanding of integrated operation, to make sure that TDRC and TDC will not have any environmental problems. In order to accomplish this, especially in regards to experimental contaminated water, with the understanding of the specialty of a tropical disease laboratory, TDRC shall have a new drain system for experimental contaminated water which will be connected to TDC's neutralization tank.

d) Incinerator

In regards to the incinerator, both TDC and TDRC shall use the incinerator to dispose experimental waste. After the study, we have estimated that 80 kg/day of waste will arise, approximately 4 hours of incinerator use per day, so the smallest incinerator which incinerates 20 kg/hour would be appropriate.

3) Receiving and Transformer System

The capacity of the existing transformer is approximately 465 kV and it is not large enough to meet the demands of TDC.

Thus, the new receiving and transformer system for the TDC building is to be provided as a substation of PLN. Intermediate voltage (three phase three wire system, 20 kV, 50 Hz), can be received at TDC through the substation of PLN. The one story house of PLN, and the substations are maintained by PLN. The electrical works to install high voltage cabling from the main line up to the substation are to be executed by Indonesian side. Other electrical works are to be executed by the Japanese side.

The supply meters of PLN includes demand meters and integrating watt meters. Power charge is divided into two categories as follows.

Regular hours : 22:00 - 18:00
Peak hours : 18:00 - 22:00.

The new electrical room should be located close to the PLN room to minimize the distance between both rooms making the laying of intermediate voltage cable most efficient.

It has been observed that there are power outages.

Considering the characteristics of these facilities, a transformer with a no-voltage tap changing device will be considered.

Furthermore, an emergency generator set and a constant voltage regulator will also be considered. This will constantly supply a stable amount of electricity at all times necessary. A vacuum circuit breaker

(VCB) will be provided for ease of maintenance and a VCB will be provided for increasing power demands in the future. The transformer will be of an oil filled type considering ease of maintenance. The capacity of the transformer is calculated as follows:

Lighting and socket outlets	
Laboratory area	ca. 2,600 m^2 x 45 VA/m^2 = 117 kVA
Administration area	ca. 1,100 m^2 x 35 VA/m^2 = 38.5 kVA
Others (Lab. Equipment)	400 kVA
Sub-total	555.5 kVA
Motor facilities	ca. 3,700 m^2 x 40 VA/m^2 =148 kVA
Total	= 703.5 kVA

The demand is assumed based on a demand factor of 0.85 for lighting/socket outlet and motor facilities system. The required capacity of the transformer is calculated as follows:

703.5 kVA x 0.85 = 598 kVA

Therefore, the required capacity of the transformer should be 598 kVA for the contract. In which a standard transformer available in Indonesia with a capacity of 630 kVA should be used.

4) Generator and Main Feeder Wiring

Power supply outages occur frequently during the rainy season (from November till next May) and several hours are required to restore power.

During thunderstorms, PLN will shut down the power supply by themselves. In light of the above, an emergency generator is to be provided.

Since the facility contains laboratories, it is important to maintain a minimum supply of electricity supply so that research work during a power outage may continue. Ten hours of generator operations is recommended.

The power demand is calculated as 240 kVA based on the statistical assumption of 65 VA/m^2 (65 VA/m^2 x 3,700 m^2 = 240 kVA). The generator should be of a diesel type, which is durable and economical. Feeder wiring is to be linked to each facility by four lines of 220/380 V 50 Hz from a switchboard, and then divided into each division which is divided by type of load and facility considering the effectiveness of the system.

The capacity of the feeder wiring should meet the capacity of the facilities connected based on safety, danger dispersion and workability. The method of installing the cables will be basically by cable trenches for the shafts and ceilings, and by a piping cable method for the others.

5) Lighting and Socket Outlets

Fluorescent lights which are mounted in flush to the ceiling will mainly be used, taking energy conservation into consideration. Incandescent lights will be used in the laboratories. The illumination level of each room will not comply with the IES (Illuminating Engineering Society) and/or JIS standards, but it will comply with the design standards which are commonly used in Indonesia as a result of discussions with the

Indonesian side.

The illumination levels of various rooms are as follows:

*lighting in the room with task light is about 500 lx Room

Room	Illumination Level	Room	Illumination Level
Laboratory	300lx *	Computer Room	300 lx
Library	500 lx	Storage & Maintenance Shop	300 lx
Lecture Room	300 lx	Corridor	100 lx
Meeting Room	300 lx	Toilet	100 lx
Chairman's Room	300 lx	Exhibition/Information Room	300 lx
Staff Room	300 lx	Storage	70 lx

Street lights will be provided in the area around the proposed facilities for security purposes. On/off switches for the street lights will be provided with a photocell switch and timer. The socket outlets for the Laboratories shall be 20 A sockets with grounders and 15 A sockets for other rooms. Otherwise, additional outlets will be provided according to need.

6) Telephone System

A telephone line is not connected to the project site. The Indonesian side will execute the cabling work, including the civil work, for the installation of 9 telephone line to MDF in the site. 7 of the 9 telephone lines will be connected to the PABX and the other 2 lines will be connected to a public pay telephone. PABX will be provided with a battery and battery charger to enable communication without any power supply in the case of emergencies, such as a power outage.

The telephones to be connected to the PABX will be:

1FL	Chairman's Room	1	
	Secretary Room	1	
	Office-1	2 (One in two, Facsimile personal circuit)	
	Office-2	1	
	Staff Room	1	
	Security Room	1	
	Meeting Room*	1	
	Exhibition/Information Room*	1	
	Storage & Maintenance Shop*	1	
	Electrical Room*	1	/11
2FL	Computer Room	3 (Two in three, Personal Circuit for computer communication)	
	Cryptosporidiasis / Giardiasis	1	
	Helminthiasis / Filariasis	1	
	Malaria	1	
	Microscope Room	1	
	Library*	1	

	Enlightenment Activity*	1	
	Preparation Room*	1	
	Lecture Room	1	/11
3FL	Anteroom for Darkroom	1	
	Salmonellosis	1	
	Tuberculosis/Leprosy	1	
	Gastroenteritis	1	
	AIDS	1	
	Hepatitis	1	
	Dengue fever	1	
	Rota virus	1	
	Common Training room*	1	
	Common Training room*	1	/10
			Total 32

Telephones	29 places	
Fax terminals	1 place	
Computer communication terminals	2 places	Total 32places 7 circuits

Telephone will be equipped with outside and inside call functions.
* Telephones in these rooms will have no outside call functions.
The two circuits for the public telephone will be provided in the entrance hall.

7) Public Address System

Since the facilities of TDC are utilized by a large number of people (trainers, doctors, researchers), a public address system is to be provided for communication and emergencies.

The main controller is to be provided at office-1. Speakers will be mounted. Ceiling mounted types speakers are to be installed in the laboratory and wall mounted type speakers are to be installed in other rooms.

A battery and battery charger will be provided for the amplifier so that any emergency status can be announced at the time of power outages.

8) Monitor

Closed-circuit television (CCTV) will be provided as the means of remotely observing and monitoring the use of areas both inside and outside of the TDC building. CCTV cameras (outdoor located) will also be provided on each floor of both wings. The screens are built into a console located in the security room and in office-1.

9) Clock

An electrically operated wall clock will be installed at the top of the external wall of the elevator shaft of the building. The control panel will be provided in the security room.

10) Fire Alarm System

The fire alarm system will be designed according to the Indonesian Fire Code Regulations "Dinas Pemadan Kebakaran." The fire system shall

provide sufficient time for the evacuation and initiation of appropriate countermeasures.

The fire alarm system will consist of a manual station (hand pulled station), fire alarms and a fire alarm panel. The main fire alarm panel will be located in the security room.

Batteries and battery charger will be provided as a back-up power supply in case of power failure affecting the fire alarm system.

11) Lightning Protection System

A lightning rod and roof conductors will be provided to protect the buildings against lightning.

The grounding resistance of the grounding terminals shall be less than 5 ohms. The indication posts and terminal boxes for testing shall be provided.

12) Water Supply System

The public water is stored in the water reservoir because the water pressure is too low (2.0 kg/cm^2). The stored water will be fed to the elevated water tank after sterilization and supplied to the various utilities by gravity.

The amount of residual chlorine is relatively small compared to the other qualities and, because these laboratories require clean water without bacteria, filters and chlorine sterilization equipment will be installed. Also, the water reservoir is a terrestrial type. Hot dip galvanized steel pipe will be used for the supply system considering the actual site conditions such as pressure tight, economy and ease of installation.

a) Water Demand

Staff : 107 persons x 250 l/day person = 26,750 l/day

Trainee : 100 persons x 100 l/day person = 10,000 l/day

Total 36,750 l/day = 37 m^3/day

b) Water Reservoir

Storage 50% of one day consumption:

37 m^3 x 0.5 = 18.5 m^3 (4m x 3m x 2mH, made of FRP)

c) Elevated Water Tank

Storage for 1/8 of one day consumption:

37 m^3 x 1/8 = 5 m^3 (3 m x 1.0 m x 2.5 mH, made of FRP)

d) Water Feed Pumps

Operation hours : 8 hours

Average hourly demand	:	37 m^2/8 hr ≒ 4.6 m^3/hr
Maximum hourly demand	:	4.6 m^3/hr x 2 = 9.2 m^3/hr
Peak hourly demand	:	4.6 m^3/hr x 3 ≒ 13.8 m^3/hr (230 l/min)
Capacity of water pump	:	230 l/min x 50 m x 5.5 KW (automatic alteration operation)

13) Fire Extinguishing System

The fire extinguishing system will be provided according to the Indonesian Fire Code Regulations "Dinas Pemadan Kebakaran." The fire extinguishing system will consist of an interior fire hydrant, and fire extinguishers (4kg/co_2 3.9kg). Electrical power for the water pump will be provided from the electric generator.

14) Drainage System

The waste water from the TDRC is planned so as to percolate directly into the ground by a soak pit after the soiled water is treated by a septic tank. For the rising of the ground water during the rainy season, the planning of the drainage-system shall be carefully made to prevent water pollution.

In order to consider the environmental impact on the surrounding area, a treatment plant will be installed. Effluent will be discharged when the water quality standard does not exceed 60 ppm (BOD). A combined treatment septic tank will be provided so as to be able to grapple with the environmental impact even more effectively. Furthermore, water containing acid and alkali from the laboratories will be diluted and neutralized in a neutralization tank and then flushed to the drainage ditch.

Furthermore, the Basic Design Study Team proposed that the Indonesian side should consider an additional drainage system for laboratories in TDRC for contaminated sewage from experiments which can be connected to the neutralization tank of TDC for environmental reasons.

15) Sanitary Fixtures

The sanitary fixtures shall be carefully selected considering the local conditions of Indonesia, hygienic precautions, and faucets in the Laboratories.

Western type water closets have been utilized in the existing toilet in the TDRC, and so the sanitary fixtures will be provided in the same manner as the TDRC. Also flush hand-held showers will be provided in each of the booths. The sanitary fixtures should be procured locally considering the quantities and delivery schedule of the fixtures.

As the manufacturers of the sanitary fixtures are available in the local market, spare parts for these can be supplied without any difficulties. In particular, an elbow operated tap will be used in the laboratories.

16) Air Conditioning and Ventilation System

Air conditioning systems were provided in the building of the Bijkman Institute, and TDRC medical facility, Airlangga University, are mainly installed in the Laboratories, director's room, offices and conference room of these facilities.

Considering the above fact and the climatic conditions in Indonesia, air conditioners are to be provided for similar rooms in the TDC, but the number of air conditioners shall be minimized.

Furthermore, as delicate electronic equipment such as computers needed for research will be donated, air conditioners are also required in the laboratories which can not be a room with natural ventilation for safety reasons and the computer room in order to maintain good operating conditions for the equipment.

The air conditioners will be selected based on a cooling load of 150 kcal/h·m^2. Ceiling cassette type air conditioner is to be provided in the following rooms:

(1 FL)	Meeting Room
	(Storage & Maintenance Shop)
	Chairman's Room · Secretary Room
	(Office-1)
	(Office-2)
	(Exhibition/ Information Room)
	(Staff Room)
	(Securing Room)
(2 FL)	(Enlightenment Activity Room)
	Computer Room
	Library for Public
	Library for Researcher
	Parasite Laboratories 3 Rooms *
	Microscope Room *
	Anteroom for Microscope Room *
	(Lecturer's Room)
(3 FL)	Bacterial Laboratories 3 Rooms *
	Darkroom-1 *
	Darkroom-2 *
	Anteroom for darkroom
	Viral Laboratories 4 Rooms *
	Common Training Room-1
	Common Training Room-2

Note: 1.* indicates that a ceiling cassette type air-conditioner with fresh air intake is to be provided.
2.A ceiling fan, with bracket is to be provided in the room. An air conditioner is not provided, but a sleeve and power outlet are to be provided for future installation of an air conditioner.

Natural ventilation is the basic scheme for all the rooms, but mechanical ventilation will be utilized in the Laboratories, preparation rooms, Electrical room, Pump room, Generator room and/or where the rooms are next to an outside wall such as a toilet.

(5) Building Material Plan

1) Basic Policy

The building material plan shall be formulated and based on the climatic conditions, the location of the site, the local construction situation, construction period, construction cost, and maintenance and operation costs. Particularly, the following matters shall be included:

a) The local procurement of construction materials shall be considered for a reduction of construction costs and the shortening of the construction period.

b) The maintenance and operation costs shall be reduced by considering the adaptation of local climate, resistance against climate and selection of the materials which are easy to maintain.

c) The materials shall be chosen effectively considering the safety and function of this Tropical Disease Center.

d) The New TDRC shall be studied for the purpose of local procurement.

2) Main Finishing Materials

The selection of the main finishing materials used for the building should take into consideration the local construction situation and construction period, as well as a reduction in operation and maintenance costs.

a) Structural Materials

In principle, the usual materials shall be reinforced concrete for the main frames with brick walls. It is necessary to consider the quality and supply of aggregate such as cements, gravel, and bricks. However, for the roof structure, it is necessary to consider a steel frame.

b) Exterior Finishing

For weather-proofing, bituminous membranes and sheet metal should be used as finishing materials. Exterior walls will be painted with weatherproof paint to last a long time without discoloration and deterioration.

c) Interior Finishing

Interior finishing materials will be selected to match with the function of the room and the use of space. Finishing materials should be resistant to most chemicals likely to be spilled in the laboratory. As there is a high risks of contamination, walls, ceilings and floors should be able to be washed down easily. A local cleaning routine will also be required in the Laboratories, and, so, the floors should be easy to wash.

External Finishing

Roof:	Roof tiles
External walls:	Mortar with paint (epoxy)
Fittings:	Aluminum windows, aluminum flush doors, aluminum louvers, steel fittings and aluminum fittings.

Internal Finishing

Ceilings:	Gypsum board with EP, 6 mm thick villa board
Internal walls:	Cement mortar with paint
Floors:	Ceramic tiles, cement mortar steel towel finish, carpet tiles

(6) Equipment Plan

In order to realize the ideal space for the activities of research, training and information / enlightenment, equipment planning is to proceed based on the following points by taking into account the natural, social and cultural conditions of Indonesia;

1) Policy for Equipment Planning

Since the project is focused on the research field of tropical disease, the following are to be considered in the course of equipment planning:

a) Beneficial and effective to the activities planned for TDC.

b) Reliable for the safety of the operation of the equipment.

c) Easy maintenance and procurement

d) Technical assistance from foreign countries must be avoided.

e) Lower costs for operation and maintenance.

f) Sufficient after service by the local supplier

g) Avoid any duplication of the equipment with TDRC

h) Consistent with the current TDRC and the New TDRC.

In this Project, the equipments procured for the laboratories will be for the use of research of viruses, parasites and bacterias for infectious diseases.

2) Equipment Plan

The equipment list requested by the Indonesian side in the begining, for applied research of tropical disease, was not for the research of microorganisms related to infectious disease, but for the research of the microorganisms causing the disease for countermeasures. Also in the begining for the Laboratory Division, the equipment requested was not sufficient. After the study we have added some of the necessary equipment.

The equipment plan for the TDC will be formed according to the TDC's activities in order to keep the level of the equipment's technical applications compatible with TDRC. Therefore, equipment which need special advanced training will not be included. Furthermore,

equipments with high maintenance cost are not to be included. And equipment normally available in Indonesia which may be prepared by the organization will not be included.

The equipment plan of TDC will be also formed on the premises that they will be for common use.

For staff training programs of the primary level, basic equipment's for training such as a microscope will be used. For research staff in the intermediate level, each laboratory will have laboratory equipment's for common use to be shared within the laboratory. For staff in the advanced level, the laboratory equipment for common use will also be used. Also equipment's in the Microscope Room and the Preparation Room will be for common use shared by the laboratories.

Discussions concerning the final placement of the equipment's in the laboratory was made with the Indonesian side.

With these precedents, the equipment's are planned for; a) Management Capability Training, b) Training Activity, c) Applied Research, d) Information Service, e) Enlightenment Activity.

Based on the above, the necessary equipment is nominated as listed in Table 2-5. Priorities of the equipment are as follows:

A: Equipment that must be provided.

B: Equipment that must be used, but, after further discussions, may be substituted.

C: Equipment that must be used, but, due to the budget, may be cut.

3) Consistency to the Building and the Utility Works

Design consistency to the building and utility works shall be maintained in order to secure the workability of the equipment. With regards to the equipment planning, the following are to be taken into account:

a) Research Laboratories will be categorized in the same division for smooth use.

b) Partitions with the proper safety requirements will be used since the laboratory will be experimenting with dangerous virus, bacteria and parasites. Partitions will be placed with safety considerations.

c) Rooms that must be air tight for safety reasons must have the proper heating, ventilation, and air conditioning (HVAC) systems.

d) Rooms will have the proper HVAC systems and lighting control systems since the equipment's being used are highly sensitive.

e) Necessary water pressure required for running the equipment's must be provided.

Table 2-5 EQUIPMENT LIST

1) Laboratory Division a) Viral Section	Equipment	Pty B	Qty
Lab. for Rota Virus	Chromatograph set (HPLC)	A	1
	DNA thermal cycler	A	2
	Bio clean bench	A	1
	CO2 incubator	A	2
	ELISA reader	A	2
	Microplate washer & dryer	B	1
	Vacuum pump	A	2
	Incubator	A	1
	Refrigerator w/Freezer	A	1
	Island type lab. table	A	1
	Wall type lab. table	A	1
Lab. for Hepatitis	Electrophoresis unit (SDS PAGE)	A	2
	Microcentrifuge	A	1
	Waterbath thermostat	A	2
	Vortex mixer	C	1
	Freezer (-30 degree C)	A	2
	Deep freezer (-80 degree C)	A	2
	Refrigerator w/Freezer	A	1
	Island type lab. table	A	1
	Wall type lab. table	A	1
Lab. for Dengue Fever	Inverted microscope	A	2
	DNA sequencer	A	1
	DNA synthesizer	B	1
	Distilled water manufacture device	A	1
	Vortex mixer	C	1
	Microcentrifuge	A	1
	Refrigerator w/Freezer	A	1
	Island type lab. table	A	1
	Wall type lab. table	A	1
Lab. for AIDS	Freezed dryer	A	1
	Spectrophotometer	A	2
	Rotator for slide	A	4
	AIDS test set	A	1
	Well maker device	C	2
	HS refrigerated microcentrifuge (20R desk top)	A	1
	Multichannel micropipette (8 &12)	A	2
	Micropipette adjustable (P20, P200, P1000)	A	2
	Electric balance, 1 & 0.1 mg division	A	1
	Refrigerator w/Freezer	A	1
	Island type lab. table	A	1
	Wall type lab. table	A	1

1) Laboratory Division b) Bacterial Section	Equipment	Pty B	Qty
Lab. for Gastroenteritis	Roller shaker	A	1
	Immunoviewer	A	5
	Column chromatograph	A	1
	Fraction collector	A	1
	Stereoscopic microscope	A	1
	PH meter	A	1
	Vacuum aspirator for gel dryer	A	1
	Distilled water manufacture device	A	1
	Binocular microscope	A	2
	Incubator	A	1
	Island type lab. table	A	1
	Wall type lab. table	A	1
	Disc dispenser	A	5
	Hot plate + stirrer	A	4
	Shaking waterbath	A	2
	HS refrigerated centrifuge swing type (10R)	A	1
	Binocular microscope	A	2
	Incubater	A	1
	Island type lab. table	A	1
	Wall type lab. table	A	1
Lab. for Sulmonelosis	Anaerobic box + gas pack	A	1
	Candle jar (Anaerobic jar)	A	2
	HS air cooled centrifuge (15R)	A	1
	Ultrasonic disintegrator	A	1
	Multichannel micropipette (8 & 12)	A	2
	Micropipette (P20, P200, P1000)	A	2
	Microplanter	A	1
	Photomicrography apparatus	A	1
	Binocular microscope	A	2
	Stereoscopic microscope	A	1
	Island type lab. table	A	1
	Wall type lab. table	A	1

1) Laboratory Division c) Parasite Section	Equipment	Pty B	Qty
Lab. for Cryptosporidiasis/Glardiasis	Inverted microscope	A	2
	CO2 incubator (20PR)	A	1
	Refrigerated centrifuge	A	1
	Distilled water manufacture device	A	1
	Multichannel micropipette (8 & 12)	A	2
	Micropipette	A	2
	Incubator	A	1
	Ultra centrifuge	A	1
	Island type lab. table	A	1
	Wall type lab. table	A	1
	Shelves	A	2
Lab. for Hemininth/Philatelisis	ELISA readers	A	1
	PCR/DNA thermal cycler	A	1
	SDS-Page Electrophoresis apparatus	A	2
	Western blot	A	1
	Spectrophotometer	A	1
	Analytical balance	A	1
	Bio-clean bench	A	2
	Nitrogen chamber	A	1
	Freezer (-30 degree C)	A	1
	Ice maker	A	1
	Island type lab. table	A	1
	Wall type lab. table	A	1
	Shelves	A	2
Lab. for Malaria	Phase contrast microscope	A	1
	Halogen lamp + holder	C	4
	QBC apparatus	A	1
	PH meter	A	2
	Salinity tester	A	1
	Stereo microscope (X20)	A	3
	Binocular microscope "A type"	A	3
	Deep freezer (-80 degree C)	A	1
	Ultrasonic disintegrator	A	1
	Micropipette Set (P10, P20, P200, P1000)	A	8
	Microchannel micropipette (8 & 12)	A	2
	Repeated pipette	A	2
	Vortex mixer	A	2
	Electric balance	A	1
	Stirrer	C	1
	Island type lab. table	A	1
	Wall type lab. table	A	1
	Shelves	A	2
d) Microscope Room	Binocular microscope "B type"	A	2
	Interperence microscope	A	1
	Photomicrographic attachment microplex	A	1
	Fluorescent microscope	A	1
	Fluorescent Microscope w/ PMG	A	1
	Polaroid camera complete unit	A	1
	Microscope	A	15
	Portable microscope (X20)	A	5
	Magnifying glass (X20)	A	5
	Shelves	A	2
e) Preparation Room	Autoclave	A	3
	Hot air sterilizer	A	2
	Drying oven	A	2
	Shelves	A	2
	Incubator room equipment	B	1

2) Common Training Division a-1) Common Training Room	Equipment	Pty B	Qty
	Ice maker	A	1
	Nitrogen chamber	A	1
	Fixed micropipette (P20, P200, P1000)	A	3
	Table for sample preparation for microscope	A	4
	Overhead projector	A	1
	Slide projector	A	1
	Refrigerator	A	1
	Vortex mixer	A	1
	Stirrer	A	1
	Angle head centrifugal with timer	B	1
	Shelves	A	4
a-2) Common Training Room	Fixed micropipette (P20, P200, P1000)	A	3
	Table for sample preparation for microscope	A	4
	Refrigerator	A	1
	Vortex mixer	A	1
	Stirrer	B	1
	VTR set	A	1
	Shelves	A	4
b) Dark Room 1, 2, Anteroom	Camera apparatus for dark room	A	1
	Transillumination for darkroom	A	1
3) Enlightenment Activity Division a) Enlightenment Activity Room	Overhead projector	A	1
	Slide projector	A	1
	Video camera & display set	A	1
	Screen	A	1
	Speaker system	A	1
4) Information Division a) Computer Room	Personal computer set	A	5
	Laser printer	A	1
	Software with "LAN"	A	1
b) Library	Library cabinet (2000-3000 vols.)	B	8
	Magazine rack	B	4
	Library furniture set	A	1
	Copying machine	A	1
c) Exhibition/Information Room	Display panel set	B	1
	Display cabinet set	B	1
	OHP set	A	1
	Slide projector	A	1
	Lecture desk	B	1
	Lecture chair	B	5
	Speaker system	A	1
	VTR set	A	1
	Chair for audience with small table	B	50
d) Storage and Maintenance Shop	Electrical maintenance tool	A	1
	Shelves	A	2
	Cold room equipment	A	1
5) Administration Division a) Administration Office	Fax machine	A	1
	Printing machine	A	1
	Copy machine	A	2
b) Others	Incinerator	A	1