

Basic Design Study
on
Vocational Training and Development Centre
for Thai People in The Far East Region
in
Kingdom of Thailand

January 1982

JAPAN INTERNATIONAL COOPERATION AGENCY

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PREFACE

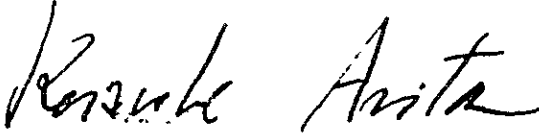
In response to the request of the Government of the Kingdom of Thailand, the Government of Japan decided to conduct a survey on the Basic Design for the Establishment of the Vocational Training and Development Centre and entrusted the survey to the Japan International Cooperation Agency (JICA). The JICA sent to Thailand a survey team headed by Mr. Hideki ABE, Head, Basic Design Division, Grant Aid Department, JICA from November 1 to November 15, 1981.

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

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

I wish to express my deep appreciation to the officials concerned of the Government of Thailand for their close cooperation extended to the team.

January, 1982



.....

Keisuke Arita

President

Japan International Cooperation Agency

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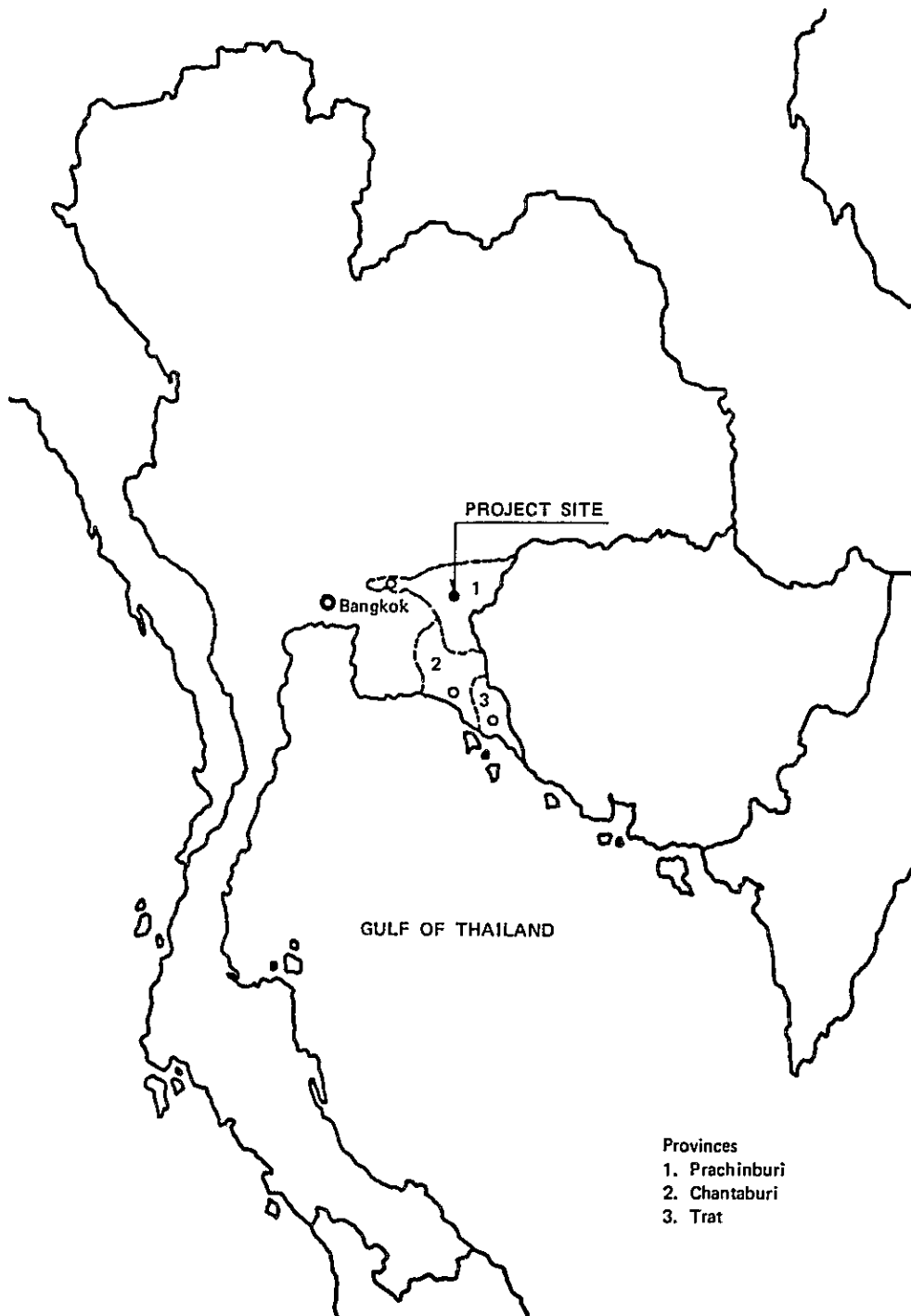
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MAP OF THAILAND

SUMMARY

The income gap between the rural and urban inhabitants in Thailand has become widened.

Under this circumstance, the Government of Thailand calls for urgent educational development of rural areas as a measure to solve the problem, and planned to establish the Vocational Training and Development Center (the VTD Center) for improving the living standards of the people in rural districts through the Non-formal Education Department of the Ministry of Education, and requested the Government of Japan to the grant aid for setting up of the Center.

In reply to this request, the Government of Japan determined to dispatch a basic design survey team, and the JICA conducted a field survey from November 1 to 15, 1981.

The Project calls for the construction of Non-formal Education Centers mainly to provide vocational training to the inhabitants in three provinces (Prachinburi, Chantaburi and Trat) on the east of Thailand, in conformity to particular requirements of these people; the Main Center will be established in Prachinburi and sub-centers in the other two provinces.

The training program for this Project places major emphasis on agriculture, which is the major industry of these areas. To make effective use of the rural resources, the program includes introduction of appropriate technology which will contribute to the development of the minor industries and home industries, and socially productivity. According to the program, long- and short-term training will be carried out at the Main Center and short-term training at the remote places through mobile units. The training program includes seven subjects; agriculture, industry, home economics, business, home industry, appropriate technology, and

related vocational courses and recreation. The curriculum includes various courses, i.e., short courses of about 3 to 5 hours, longer courses of about 30 to 300 hours, long course of 400 hours including practical training especially for agriculture, so that each trainee may select a course in conformity to his personnel convenience.

The Main Center plays a key role in fulfilling the aims of the Project, and the Sub-centers serve as bases for training by mobile units. This Project is under direct management of the Ministry of Education, and assisted by local universities, research institutions and organizations of various circles. One of the objectives of the Project plans is to establish a system so that the needs of the local inhabitants will be accurately informed to the Center and will be incorporated into the activities of the Center, through the cooperation of the development committees of provinces, districts and villages and the councils of sub-districts. The grant aid of the Japanese Government for this Project will be extended in the form of construction of the Main Center facilities and supply of equipment.

The Main Center will be located in Sa-Kaeo district alongside the national highway in Prachinburi province about 230 kilometers east of Bangkok. This construction site, measuring about 77 acres (308,000m²), was donated to the Ministry of Education by the Prachinburi province. in November 1981, and prepared for setting up of the Center.

The Main Center comprises central facilities consisting of Administration, Technical Service and related buildings, Workshops, Classrooms and practice fields for vocational training, housing facilities for staff members and instructors, and dormitories for trainees. The housing facilities except for two dormitories will be built by Thailand. Twelve buildings will be constructed by Japan, with the building area measuring 5,185m². The dormitories for trainees are essential to the achievement of the projected target; two additional dormitories for agricultural zone has been

incorporated in the program. These two buildings will accommodate 52 trainees, and will be open to other people than the agriculture-related trainees in the initial stage.

The construction program also includes well-water supply equipment (including well digging work and pumping facilities) and electric power supply equipment (including substation equipment) for buildings.

Since it is necessary to prepare and obtain sufficient budget and personnel for the effective maintenance and operation of the facilities, the local construction method shall be adopted to design the buildings, and the materials and equipment available locally applied whenever possible, thereby to reduce the construction cost. The buildings are designed in conformity to the climatic conditions of Thailand, so that the maintenance and operation of the buildings may be easy.

The maintenance and operation costs for the initial year is within the budget estimated by Thai side, so that the implementation of the Project will not overburden the budget of the Ministry of Education. The construction of the facilities for this Project will require about seven (7) months.

As to the social and economic benefits, the Project will provide local people with knowledge and technique along their needs, which contribute to increase their income, and improve their living standards. The number of trainees in the first three years will be for 23.8 percent of the total planned number. That is, the proposed project will generate their increased income and additional employment for a large number of people in the area.

The Project is technically sound and economically viable. It is suitable for the Government of Japan to provide the grand aid for the establishment of the Center.

CHAPTER 1. BACKGROUND OF THE PROJECT

1.1 Outline

It can be said that Thailand, in 1980's, is facing serious economic problems and social tensions. The political situation in Indochina is severe and secondary oil crisis started with the Iranian revolution has made a big impact to Thailand, one of non-oil-producing developing countries, which leads to serious economic problem such as worsening international balance of payments and inflation.

Under such worsening conditions, Thailand is considered to be in changing posture aiming at a sound and steady economic growth by reconsidering past economic policy in which the growth rate deemed to be most important. This is remarkably shown in recent efforts by the Government to rectify the income disparity between urban and rural areas, which is also the long pending subject for Thailand, and the 5th Socio-Economic Development Plan starting in October, 1981 particularly indicates that the biggest consideration should be given to solve the poverty problem in rural area.

The Vocational training and Development Center (VTD Center) Project can be deemed to have such Government's posture as its important background and the Non-Formal Education is attempted by the Government as one of its materializations. The Vocational Training and Development Center, selected as a concrete measure for regional development around the Thai-Cambodian border, can be well understood under such background. It can be deemed to aim at integrated lifelong education which is able to flexibly match various limitations expected to encounter in rural area, by grasping the human

being more comprehensively, beyond conventional vocational training directly linking to employment.

In addition to the above, this Project has another special background, which is the refugee problem from Indochina. Direct motivation of the request for the Project can be deemed to relieve the Thai people around Thai-Cambodian border suffering directly and indirectly from the influx of such refugees.

1.2 Development of Rural Area

Thailand has achieved the economical growth of yearly average 7% during past two decades, which is reported, however, to have prospered only the Bangkok-centered urban area, while the farmers have not been favoured with any benefit from it. Consequently, the income disparity between urban area and rural area becomes so widened that the per capita income in the poorest north-eastern district adversely decreases to 13.6% from 15.1 during past 10 years against 100 of the former in percentage comparison.

According to the study of the economic situation of Thailand 1975 - 1976 from the World Bank, the daily income of as many as 11 million people is less than 5 Bahts in spite of its national average being at 20 Bahts. Also it points out that 90% of these people dwell in the rural area. The Thai Government, being concerned of such situation, already shows an obvious sign of recognition to this problem in its Secondary Socio-Economic Development Plan (1966 - 71). It can be said, however, that the situation is adversely getting serious having had little results though the Government takes it up as an issue to be surmounted.

In the 5th Socio-Economic Development Plan (1982 - 86) to be started in October 1981, the main objective is to improve the life of rural people, especially those of "absolute-poverty" stricken area. It is stated that the Government, therefore, should introduce more competent personnel of the Government and more economic resource into undeveloped area and promote the participation of people into regional development process and further that the first priority should be given to accomplish the above objective. And, the following prospect and recognition of the present situation are indicated as the background of the above posture.

- (1) The yearly average growth rate of agriculture is estimated to lower to 3.1% during the coming five-year plan period from 4% during the period of the 4th plan.
- (2) It is expected that the employment expands at an annual rate of 2.5%, while the labor force increases at 3%, therefore, the unemployment figures, particularly increasing in rural area, is presumed to reach to approximately 60,000 at the end of the plan, 1986.
- (3) It is presumed that deterioration of land and resource bring about more hardship to the people of rural area who have actually shouldered inflationary burden.
- (4) It is estimated that the economy continues to monopolize and concentrate further to urban area unless some measure is provided for. However, the management capacity of development administration of the public sector is limited especially in the field of regional development and poverty improvement, and also the local government authorities have shared enough responsibility. Further the improvement has still to be made to the process of planning, budgetting and the implementation of rural development projects.

1.3 Non-Formal Education Plan

As indicated in the foregoing, the rural area development becomes more important subject to Thailand, which appears, in the education field, as the effort to reduce the gaps in the availability of educational services.

It is reported that Thailand has already established modernized education system, which is organized in four courses, i.e., the pre-school, elementary, middle and high school education. It can be said, however, that the opportunity of taking more than basic education such as reading, writing and calculation have not been provided to the rural people. The educational opportunity higher than compulsory education is considered to be so limited that those from rural area share less than 5% among total attendance in the middle and higher school. No opportunity is given in rural area to maintain and develop what have been learned in compulsory education. Furthermore, there still remain the problem to popularize compulsory education. (The attendance rate over whole country of 6-year grade is about 50%.)

In the National Education Plan of 1977 which is said to have drastically renovated the education system, the basic vision includes democratization and efficienciness of the system as well as equal educational opportunity, focusing on local areas, usefulness of learning based on experimentalism. One of materializations of the above is the Non-Formal Education being promoted by the Ministry of Education. As the name indicates, this, in pair with the Formal Education, aims at acquiring basic knowledge and practical skill, different from the Formal Education, by selecting from various ranges of shorter or longer term. Also, in the National Education Plan, the elementary and middle school education has been reformed, in accordance with the U.S. system, from 7(4:3) : 3 : 2(3) to 6 : 3 : 3 which is same as in Japan. At the same time, the term of

compulsory education system has been curtailed from 7 years to 6 years for complete effectuation and the Plan indicates that the close interlocking between Formal and Non-formal Education should be necessary as prerequisite to the above.

The Non-Formal Education has the origin in the Adult Education which the Government started as a countermeasure when they were shocked by the percentage of 68.8% illiteracy as revealed in the national census of 1937. The substance of the system has been changed and expanded as time went by and reached as it is at present, its diffusion rate is considered regrettably to be at lower level.

At present, however, it deals with the different needs from each region under the aforementioned background and is being established as an effective measure for materializing extensive educational development free from the framing of the Formal Education system.

Though the above education has the vocational training aspect in a way, its basic idea is brought about from much wider vision, which is to define the happiness to be found in the extent to harmonize the people and their environment on the principle that the ultimate purpose of the human life is to be happy, while admitting that there should be difference by people as to the happiness. And, the education and the development activities are, for such purpose, to be rendered to the people, which, in more concrete words, is to aim chiefly to foster the ability to solve the problems on any practical stage. The word to symbolize it in the Thai language is "Kitpen", which is taken up as a key word in this project. This word can be translated as critical thinking, rational thinking, problem solving or so on. It could be somewhat different in the way to upholding its object of fostering such mental ability from the conventional vocational training in the past linking directly to employment. In order to foster this

ability, the nonformal education has furthermore lines of activities other than the vocational training in the manner of on-the-job-training.

The activities so far comprise basically three programs, i.e., the skills training, general education and general information service, which, however, are not elaborated and adjusted enough because it is not long since it started. The general education is for illiteracies and those having had no educational opportunities and comprises the program to the extent of the middle school level of the formal education. This can be said to be one of the efforts for materializing equal educational opportunities by utilizing the mobility advantage of the nonformal education system, which also includes the correspondence education. The main program of the educational information service is to promote the library activity.

The concrete objects for the above include the following:

- (1) To foster good citizenship under democratic system
- (2) To foster the technique of "Kitpen"
- (3) Vocational training
- (4) To enhance educational opportunities
- (5) To foster adaptability against new development and situation
- (6) To provide the knowledge of assisting livelihood such as family planning, health and so on.

As an actual organization for materializing the above, there is the Department of Nonformal Education, the Ministry of Education coming to the top organ, under which the Regional Non-Formal Education Center and the Provincial Non-Formal Education Center are composed in a form of two layers.

(1) Regional Non-Formal Education Center

The whole country is divided into five regions and each region will have one Center respectively. The Center functions to cover various activities from preparation of training materials, curriculums and training of teachers to research, development and data collection for whole non-formal education; however, it does not make any direct activities for the regional people. The following four centers, except (5) Eastern Regional Center, have already established and started activities:

- (1) North Regional Center : Placed in Lampang and covers 15 provinces in the northern region.
- (2) Central Regional Center : Placed in Ratchaburi and covers 12 provinces in the central plain.
- (3) Southern Regional Center : Placed in Songkla and covers 14 provinces in the southern region.
- (4) North-eastern Regional Center : Placed in Ubol Ratchathani and covers 16 provinces in the north eastern region.
- (5) Eastern Regional Center : Under planning at present. To be placed in Rayong to cover 14 provinces in the eastern region.

(2) Provincial Non-Formal Education Center

The Center, the so called Life-Long Education Center, undertakes actual non-formal education activities for the provincial people. One Center is planned for every province and 24 provinces have so far completed Centers among total 72 provinces.

It can be said that the VTD Center under projecting this time is almost similar to the above in its substance. Taking into account that the Department of Non-Formal Education, the Ministry of Education is in the position as a principal administrator and also the present situation of the regional people, the similarity should be appropriate. Three provinces, i.e., Prachinburi, Trat and Chantaburi, to be covered by this project have neither the Life-Long Education Center nor such similar facility so far. From the abovementioned viewpoint, even though there is the special circumstances that the area along the border is under jurisdiction of the army and the people living there is the primary object for this project, the Center under the project should have in part the *raison d'être* to function as the Life-Long Education Center.

1.4 Refugee Problem

The communization of three states in Indochina in 1975 brought forth the influx of a huge number of the refugee forsaking their homeland. These people, including a lot from city dwellers and educated class who could not endure the change of social system and accompanying oppression and friction, came to looking for the place to lead new life. Thailand, adjacent geographically as well, is reported to have sponsored about 420,000 people corresponding to a half of total refugees except so called new Cambodian refugee as mentioned hereunder. About 300,000 people among them have found the place of resettlement in third countries, however, some 120,000 still remain as of March, 1981 in several camps under jurisdiction of the Ministry of Interior.

In addition, the Vietnam's invasion of Cambodia started in November, 1978 brought about newly a great number of Cambodian refugees who sought shelters in Thailand. They are mostly from rural villages, different from the abovementioned refugees and said to have intentions of going back to Cambodia once the

situation calms down. It was anyway an additional burden to Thailand, which took a stern measure in 1979 to send a half of them back to Cambodia and provoked international controversies. Since then, however, the Thai Government, from the humanitarian point of view, changed their policy and accepted incoming refugee temporarily on the condition that the international assistance be rendered. The Government accomodated these people in the camps under jurisdiction of the army, while, admitted the assistance activities by international organizations to the people, who gathered around the border and asked for assistance, escaping from the conflicts and accompanying shortage of foodstuff in Cambodia.

Although the situation seems somewhat calmed down these days, the refugee problem becomes a heavy burden to the Thai Government from the view points of social condition, economy and security. Further, there occurred a problem that the Thai people around the Thai-Cambodian border who were entangled with chaotic refugee influx suffered damages and driven out from their own home-places. The Thai Government is coping with the problem by setting up measures including the assistance plan for suffered people, which shall cover all together some 80,000 people dwelling in 90 villages of 7 provinces. This is, however, the number of the people who were directly exposed to disasters and those who suffered damaged indirectly amount to approximately 200,000

Considering that the 90 damaged villages are all rearranged or newly re-established, it could be a plan not only for complying with urgent need but in a way to materialize the regional development to have the people lead normal livelihood in these places. The objects of the plan include the following:

- (1) To provide the people with proper housing as well as services required for health and education.

- (2) To afford the people with ability to create income.
- (3) To strengthen social economical position of the area along the Thai-Cambodian border.
- (4) To introduce measures for self defence and self development.
- (5) To arrange for administrative and cooperative systems.

The Vocational Training Center under projecting this time shall shoulder a part of the above endeavors. The particulars of the suffered people of three provinces to be covered by the above are as follows:

Parachinburi	26 villages	23,348 people
Chanthaburi	5 villages	6,874 people
Trat	4 villages	3,163 people
Total	35 villages	33,385 people

CHAPTER 2. SUMMARY OF THE PROJECT

2.1 Outline

This project is to initiate the Vocational Training and Development Center (VTD Center) which carries out non-formal education focusing at vocational training covering three provinces; Prachinburi, Trat and Chantaburi by setting up a main center in Prachinburi and sub-centers in other two provinces. However, partly due to three provinces having no similar facilities, the scope to be covered and the task to be undertaken by the above centers are quite large and extensive. How to cope with the peculiarity of regional people in the three provinces depends entirely on the preparation of program to match their requirement and completion of cooperative management system for the above.

The Center shall conduct the programs of vocational skill training in various courses of longer or shorter period, which put emphasis in agriculture, the main industry in the region. In addition, the training for small scale industries is carried out to utilize local resources, which in a way aims at development of household industries as a side line. And, main subject of the program is the introduction of appropriate technology to enhance socio-economic productivity of the people.

The method of conducting the program is to provide training of either long or short period to the representatives selected from the region in the main center. Besides, short term training is conducted by three mobile training units. In carrying out the program, requirement and problem of regional people shall be properly responded and cooperative management system is schemed to work with various levels such as province, district and others in order to promote effective development,

along with policies on activities of the VTD Center, under cooperation with the plans of other regional development.

2.2 Objectives of the Project

The establishment of the VTD Center is planned to achieve the objectives as follows:

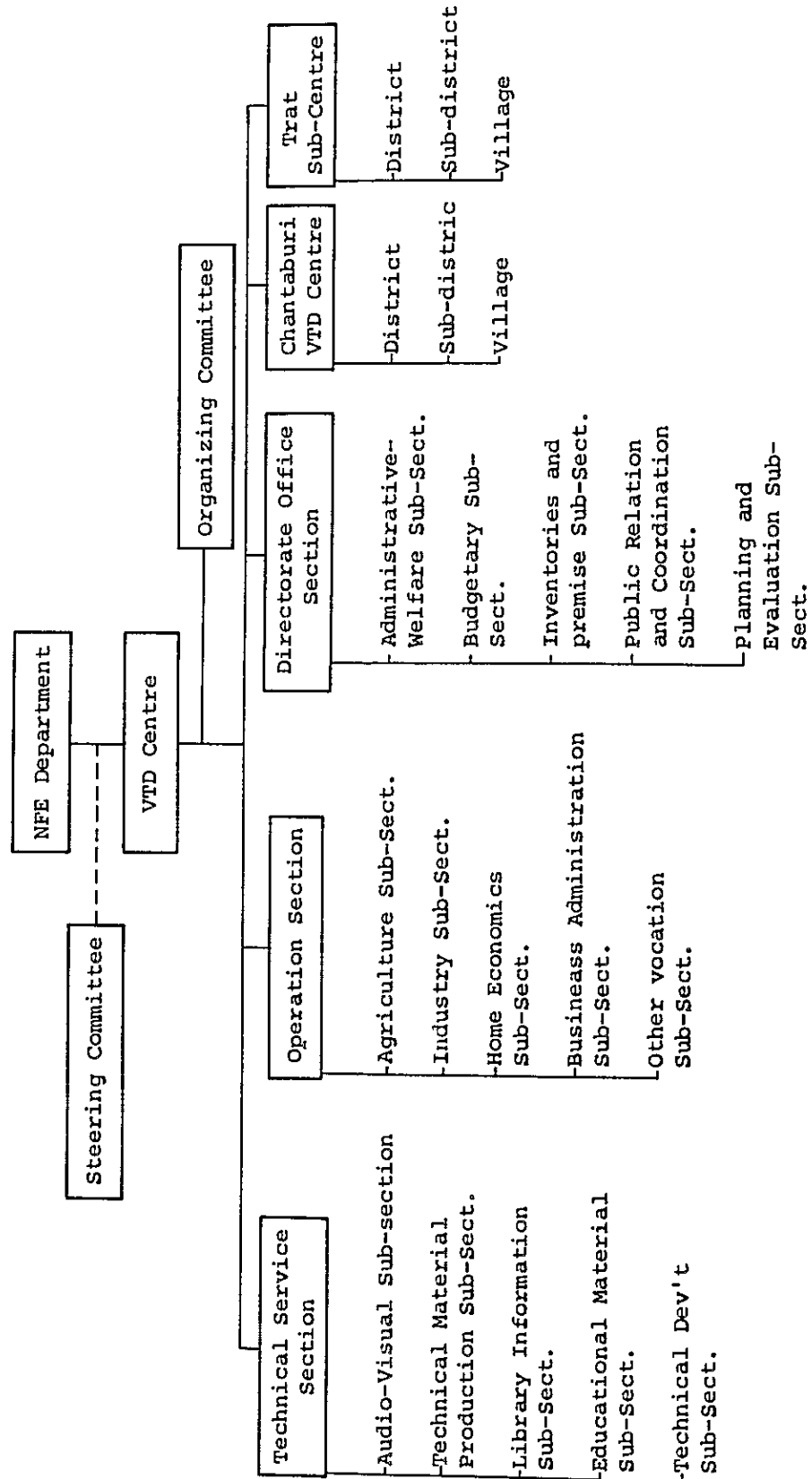
- (1) To provide the vocational skills to cope with the requirement and problem of the people around the Thai-Cambodian border.
- (2) To demonstrate modern agricultural productivity along with dissemination of the knowledge of various related fields.
- (3) To conduct experiment, development and promotion activity of appropriate technology to be effective under specific condition of the region.
- (4) To carry out the other non-formal education programs to be appropriate for improving livelihood of the people.

2.3 Organization and Functions of the VTD Center

2.3.1 Organization Chart of the VTD Center

The organization of the VTD Center is shown in the chart.

ORGANIZATION OF THE CENTRE



2.3.2 Functions

(1) Steering Committee

The committee, which is an advisory organ for administration and operation of the VTD Center, establishes the basic operation policy. It also makes various advices and suggestions to the Center and functions as well to evaluate the activities of the Center. The committee is composed of the Under-Secretary of State for Education as a chairman, Director General of Non-Formal Education Department, the Governors of three provinces under the project and representatives from various regional organization.

(2) Organizing Committee

The Committee, which is a central organ actually functioning to administrate and operate the Center, sets up the activity working plan having advices and policy from the Steering Committee. It also plans and promotes the cooperative activity with sub-Centers and related organizations. The Committee is composed of the Director of the Center as a chairman, chiefs of each section, representatives from related organizations and others.

(3) Directorate Office Section

The Section undertakes general administrative business of the Center such as welfare, finance, property administration and other office business.

It also undertakes, as secretariat for the abovementioned two committees, preparation of activity program, public relation and coordination of each section.

(4) Technical Service Section

The Section carries out technical services both inside and outside the Main Center as follows:

- Audio-visual and library services inside and outside the Main Center
- Development of curriculum
- Preparation of training materials, providing fixtures and so on

(5) Operation Section

The Section undertakes actual training activities inside and outside the Main Center.

(6) Sub-Center

- Chantaburi Sub-Center
- Trat Sub-Center

The Section functions as the base for mobile training units and promote non-formal education activities in each province. For that purpose, it prepares program to meet specific requirement of the region in cooperation with the province, district and the Main Center.

2.4 Operation

2.4.1 Cooperative Operation System

The organizations of various levels render cooperation for the whole operation of the VTD Center such as execution of training, drafting of a operation program and others. The cooperation particularly from such levels like the village (muban) and sub-district (tambon) has important significance in the sense that the activity of the Center can hold its root deeply in the region.

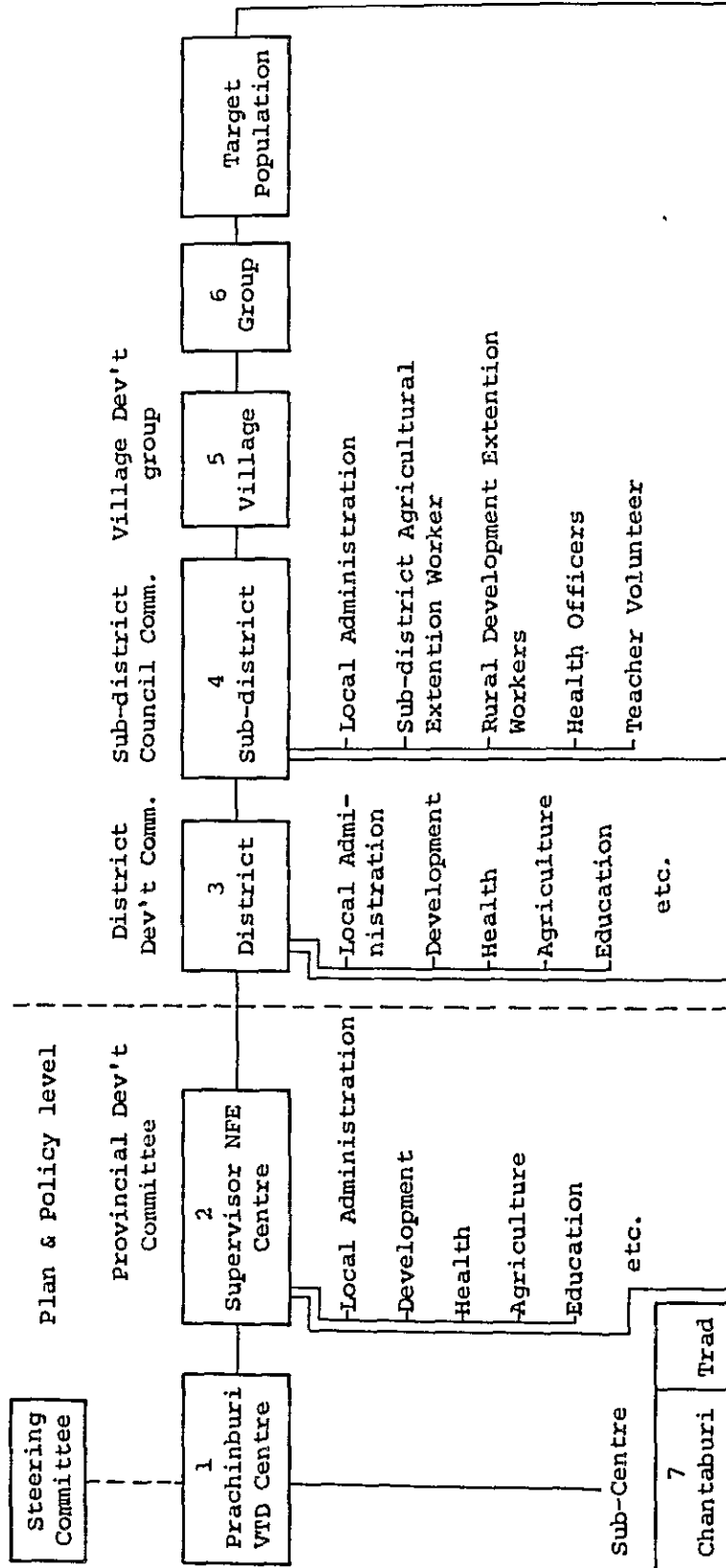
Sub-district Councils is to draft the Center's activity program based on the data collected by the Village Development Committee with regard to the problems and requirements that the residents are carrying. Also, the cooperative work and coordination with the efforts of other regional development are to be attempted by incorporating the above into the Sub-district Development Plan.

2.4.2 Operation Outside the Main Center

In general, the requests is sent to the VTD Center through the abovementioned cooperative system and the Center dispatches the mobile training unit in accordance with the Sub-district Development Plan. (The decision is made by the Organizing Committee.)

Although the Sub-district Development Plan does not indicate, the operation may be conducted, if deemed to be urgent need, by having cooperation from the province and district, upon request.

FORM OF OPERATION AND COORDINATION AT ALL LEVELS WITHIN AND OUTSIDE THE CENTRE



The District Operation Supporting Committee and other agencies of Sub-district level

2.5 Training Programs

2.5.1 Agriculture

The agriculture is deemed to be major industry in the region under the project and the most important program. The courses are classified by the training time into three and all the courses under (1) and (2) are conducted inside and outside the Main Center.

(1) Short courses (3 - 5 hours)

Compost making

Mushroom

Modern Farming

Beans

Corns

Tomato

Tamarind

Custard Apple

Cashew Nut

Bamboo etc.

(2) Short courses (30 - 150 hours)

Bee Raising

Rubber

Cotton

Casava

Sariculture

Animal Husbandry etc.

(3) Long term training courses

This is conducted only inside the Main Center and is the longest course among the programs with 400 hours of training. The period is estimated to require from 3 months to 4 months. The curriculum is composed of three fields assigning 70% (280 hours) of total training hours

for agricultural training, 20% (80 hours) to secondary vocational training and 10% (40 hours) for general education. The secondary vocational training consists of industrial engineering, home economics, office administration and others. The detail of the curriculum are so far undecided but mostly to be selected from the curriculum for the Center. Particularly, in the agricultural training, the practical training for comprehensive agricultural activity as well as operational administration in a group are to be carried out by allocating a space of 5 Rai (about 8,000 M²) each to an unit of 5 trainees.

- (4) In addition to the above, the correspondence course by radio broadcast is also under planning.

2.5.2 Vocational Training Other than Agriculture

Each of these trainings required approximately 30 to 30 hours and consists of the following 6 programs with 26 courses in total. The course within the Main Center is conducted three times a day for 20 trainees each in one class and two times per year for each course. (The number of trainees per each course will be yearly 120 in total.) The training by the mobile unit is totally 100 hours requiring about one month period. (Details of each course are undecided for the program of Appropriate Technology and Related Vocational Courses and Recreation.)

Program	Training Course	hours	
		Stationary	Mobile
Industry	Auto Repair (Car Body Repair, Painting etc.)	300	-
	Small Engine Repair (Water Pump, Small Generator, Motorcycle etc.)	-	100
	Radio Television	300	100
	Electricity (Air Condition, Refrigerator etc.)	300	100
	Welding (Gas and Electric)	300	-
	Soldering	-	100
	Construction (Carpentry, Masonry, Steel Work, Furniture etc.)	300	-
Home Economics	Dress Making	300	100
	Tailoring	300	100
	Hair Dressing (Cosmetics)	300	100
	Barbering	-	100
	Cooking (Nutrition)	300	100
Business	Typing and Accounting	150	-
	Cooperatives and Marketing	150	-
Home Industry	Handicraft (Pottery, Ceramic, Silk Screen etc.)	150	100
	Music	300	
Appropriate Technology	Modifying Sources		
	Mechanic Labour Saving		
	Herbal Medicine		
	Modern Farming Technology		
Related Vocational Courses and Recreation	Thai and Western Musics		
	Games		
	Village Lows		
	Principle of Rural Development		
	Moral and Discipline		
	Community Security		

2.5.3 Beneficiaries of Training

Prospective trainees of the abovementioned programs are the regional residents of the ages not less than 18 years.

The beneficiaries of agricultural training during the 3-year plan period are 6,420 in the Main Center, 63,200 outside the Main Center totalling to 69,620 persons. And, the beneficiary of other vocational training are 9,460 inside, 9,204 outside the Main Center totalling to 18,644 persons. The total of beneficiary during the period of 3-year plan is to be 88,284 persons in all.

CHAPTER 3. DISPATCH OF SURVEY TEAM

3.1 Purpose of Survey

The Thai Government has made the request to the Japanese Government for the grant aid with regard to the Project to establish the Vocational Training and Development Center for regional people in the eastern district of Thailand based on the policy as to the nonformal education under jurisdiction of the Ministry of Education. In compliance with the above request, a survey team* was dispatched for the purposes to apprehend the policy, function, scale, composition and others of this Project, based on integrated standpoints including society, economy and culture, also to effect appraisalment on suitability of the project and basic design for providing building and equipment.

The survey team, based on the abovementioned purposes, carried out the following surveys:

- (1) To apprehend present situation of the people dwelling in the villages around the Thai-Cambodian border and their interrelation with the Project.
- (2) To apprehend the situation of education mainly of vocational training and verify administrative policy. To make accurate positioning of the Project in these lines.
- (3) To verify present situation and policy with regard to rural area development.
- (4) To collect information and data required for basic design of the Project.
- (5) To make field investigation of the site of the Project.

* The Raymond Architectural Design Office, Inc. participated in the team.

3.2 Members of Team

- | | | |
|-------------------------|-------------|--|
| 1. Hideki, ABE | Team Leader | Head,
Basic Design Division,
Grant Aid Department,
Japan International
Cooperation Agency |
| 2. Senichi, KIMURA | Coordinator | Staff,
Basic Design Division,
Grant Aid Department,
Japan International
Cooperation Agency |
| 3. Yasuchika, NISHIJIMA | Architect | Chief Architect,
Architectural
Department,
Raymond Architectural
Design Office, Inc. |
| 4. Seiichi, MATSUDA | Equipment | Advisor,
Qualified Architect,
Architectural
Department,
Raymond Architectural
Design Office, Inc. |

3.3 Counterpart Staff of the Thai Side

° Department of Technical and Economic Cooperation - D.T.E.C.

Mr. Kasem Unahasuvan	Deputy Director-General
Mr. Pracha Chaowaslip	Director of Colombo Plan Sub-Division
Mr. Sutin Susila	Member
Mr. Jiroj Itharattana	- " -
Miss Poonsri Thongkaimuk	Director Volunteer Division

° Supreme Command

General. Riem Disthabanchong	Chief of Staff of the Royal Thai Armed Forces
Major General. Thonchai Pangspa	Senior Officer, Joint Operations Center, Supreme Command
Colonel. Sanan Kajomklan	Operations Officer, Joint Operations Center, Supreme Command
Major. Chamnong Mungkalasan	Operations Officers

° Ministry of Education

Dr. Sippanond Kettutat	Minister of Education
Mr. Somchai Wudhiprecha	Deputy Undersecretary of State for Education
Dr. Khunying Aree Kultan	Director General of Non-Formal Education Department
Dr. Boonlert Masang	Director, Planning & Research Division Non-Formal Education Department
Mr. Supakit Mulpramook	Architect, Non-Formal Education Department
Dr. Kla Samtrakool	Operation Division Non-Formal Education Department
Mr. Pawat Wasiksri	Deputy Director Central Regional Non-Formal Education Center, Ratchaburi
Mr. Prakiv Visespanich	Director, Life Long Education Center Nakon Savan

Dr. Patrada Yomnak

Secretary, Director General of
Non-Formal Education Department

Institute Skill Development - N.I.S.D.

Department of Labour Ministry of Interior

Mr. Prachid Pradabsook Director

Mr. Chalerm Attapisalsophon Coordinator

3.4 Survey Schedule

The basic design survey team has made local surveys for the period of 15 days in Thailand as follows:

Order of Day	Month Day	Day of Week	Schedule	Survey Activity
1	Nov. 1	Sun	Tokyo to Bangkok	Mr. Sakamaki, JICA Bangkok Office, attended airport
2	2	Mon	Embassy of Japan JICA Office DTEC SCH	Courtesy call to Embassy of Japan and JICA Office. Arranged survey program. Courtesy call. Briefed content of survey. Courtesy call.
3	3	Tue	Ministry of Education	Courtesy call to the Minister. Arranged survey plan, content and others.
4	4	Wed	Bangkok to Sakeo Nonyen	Visited Life Long Training Center at Chachongsao. Site survey. Visited camp of affected villages at Nonyen.

Order of Day	Month Day	Day of Week	Schedule	Survey Activity
5	Nov. 5	Thur	Site donation ceremony Sakeo to Chantaburi	Visited Sakeo Holding Center. Attended site donation ceremony. A part of members made site survey.
6	6	Fri	Chantaburi to Bangkok	Joined breakfast meeting by Governor of Chantabri Province. Visited Chonbri Agricultural High School.
7	7	Sat	Raj Buri	Visited RISD. Visited Central Regional Non-Formal Education Center and Life Long Education Center.
8	8	Sun	Bangkok	Arrangement among members. Prepared minutes. Reviewed data.

Order of Day	Month Day	Day of Week	Schedule	Survey Activity
9	9	Mon	Embassy (Meeting room) Ministry of Education	Arrangement among members. Discussions by each department. Joined dinner party by Ministry of Education.
10	10	Tue	Ministry of Education	Discussions about summariation, construction plan and training equipment. Discussed on content of minutes. Signed on minutes at DTEC. Held dinner party by survey team.
11	11	Wed	NISD	Visited NISD facilities. Collected data. Visited site of Thai-Japan Association School. Collected data.
12	12	Thur	NISD Siam Cement Co.	Discussed about training equipment. Market survey about construction. Market survey about construction.

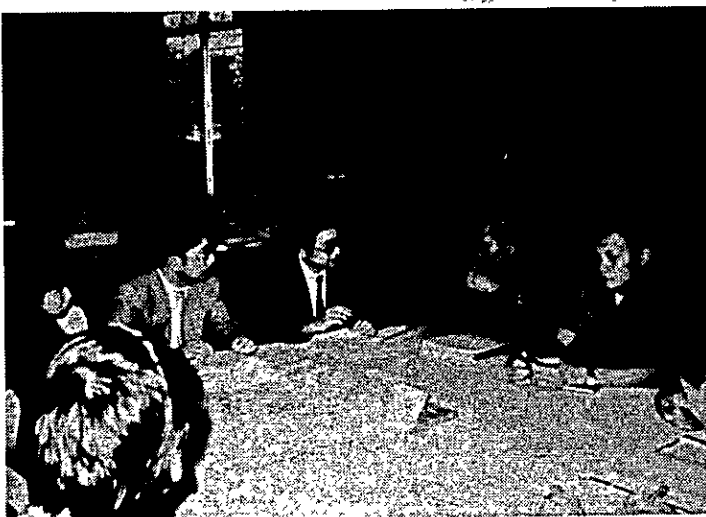
Order of Day	Month Day	Day of Week	Schedule	Survey Activity
13	13	Fri	Embassy of Japan JICA Bangkok Office Ministry of Education	Report of survey progress and greeting on returning home. Report of survey progress and greeting on returning home.
14	14	Sat		Reviewed data. Final discussions about building design and market survey of construction.
15	15	Sun	Bangkok to Tokyo	Survey team returned Tokyo.



Courtesy Call to D.T.E.C.
(Nov. 2, 1981)



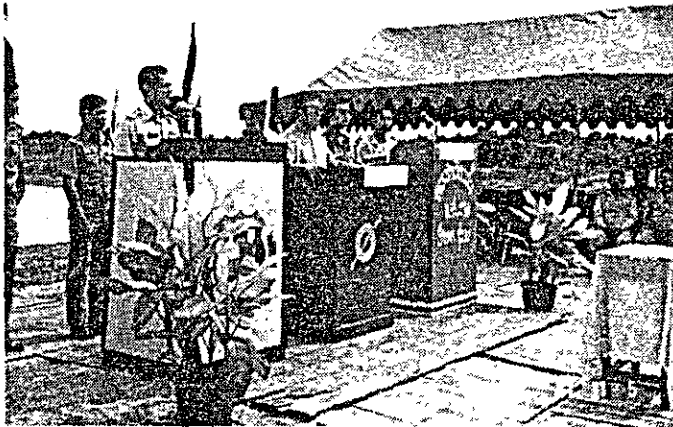
Courtesy Call to S.C.H.
(Nov. 2, 1981)



Discussion with S.C.H.
(Nov. 2, 1981)



Courtesy Call to the Minister
at the Ministry of Education
(Nov. 3, 1981)



Site Donation Ceremony
at the Project Site
(Nov. 5, 1981)



Signing of Minutes
at D.T.E.C.
(Nov. 10, 1981)

CHAPTER 4. SUMMARY OF THE SURVEY

4.1 Situation of Proposed Trainees

This Project is designed for the purpose of upgrading the living condition of the local people and developing the agricultural regional society in three provinces; Prachinburi, Chantaburi and Trat in the eastern district. What is most important in this Project is to improve the livelihood and stabilize the welfare for the Thai people of the rural area along the Cambodian border.

In order to develop agricultural area along the border, the Thai government is planning to reorganize existing villages or establishing new villages to settle the Thai people to their own land to be provided for their living and farming spaces.

According to the statistics from the Thai Supreme Commanders Headquarters (S.C.H.) with regard to the situation of the Thai people living around the abovementioned Cambodian border, the number of villages in 7 provinces are 90 in total, the population 88,433 and the families are 14,300. If limited to 3 provinces under this Project, the number will be 35 villages, 5,320 families and 33,385 people.

The S.C.H. statistics describes the village population around the Cambodian border at 472,000 in total including the abovementioned, of which about 226,000 in Prachinburi, about 118,000 in Chantaburi and about 88,000 are in Trat. These areas can be called agricultural zone and there are, as business activity, nothing more than tapioka processing factories and family-run automobile repair shops; therefore, major portion of the residents can be classified as farmers. They are not provided with middle and high school facilities and isolated from formal education system.

The population is presumed from the past statistics to be approximately 1 million for 3 provinces, Prachinburi, Chantaburi and Trat which this Project will cover. Except the towns and its suburbs, these areas are mostly agricultural, having no businesses of big scale and the major portion of the residents are engaged in agriculture. There are, however, regional gaps in their farming conditions and agricultural products as well as in their living conditions. Some of the towns have dense population, active commerce activities with quite many small scale business entities. Being in such situation, the vocational training program should be different according to their particular requirement. It must immediately link to the employment opportunities in the towns and suburbs, while, in the rural area, the improvement of living condition is essential.

4.2 Site Survey

4.2.1 Location of the Site and Its Surroundings

The Main Center site of this Project is located in Sa Kaeo district, Parachinburi Province and it was donated to the Ministry of Education from Prachinburi Province, where the donation ceremony was held on November 5th, 1981 under presence of the parties concerned.

The site is about 90 km far from Prachinburi city and at 9 km east to the Center of Sa Kaeo town, and situated to north of the national highway reaching to Aranyaprathet.

The site is surrounded by paddy field and shrubbery all around without much undulations having the human habitations sparsely spotted. The north of the site is adjacent to the yard of the railroad from Bangkok to Aranyaprathet and the south is alongside the national highway. The south boundary of the site is set up at the point 21 meters north to the Center line of the national highway.

The national highway alongside the south of the site is paved for 6.4 meter width and the shoulders of about 2 meter width are maintained at both sides. Access road to the site must not be wider than the highway. The traffic volume of the highway is as small as 4 to 5 vehicles per minute.

Sa Kaeo station is so far the nearest station to the site; however, a station is scheduled to be newly set up at the east of the site as the Center is constructed.

4.2.2 Outline of the Site

The site has roughly rectangular contour embraced by the national highway at the north and the railroad yard at the south. The perimeter of the site is 362.4 meters at east side, 409.5 meters at west side and the distance between the east-west direction is 796.5 meters. The area of the site is approximately 77 acres (308,000 m²). The surface of the site ground is almost flat with the level allowance of about +30 cm. There is the paddy field to the north for approximately 20% portion and the rest is occupied by shrubbery, the tallest growing for about 2 meters. At the southwest corner of the site, a square shaped irrigation pond with one side of 80 meters long is installed. At the Center of the site, there is an existing unpaved road running south to north, which divides the site area in two portions. This road is to be utilized for the in-remise traffic and a substitute road is to be newly constructed at the east side of the site.

The level of the site ground is in general below about 1.2 meters from the level of the national highway at the south side. Designing for the buildings, roads and drainages in the site must be carefully prepared taking the rainfall volume in rainy season.

The stratum, according to the obtained information, is from the surface, consisted of the sandy silt (about 20 cm), silty gravel (50 - 80 cm) and clayey gravel.

4.2.3 Public Utility Service

- (1) Water supply : There are no water supply works installed around the site area. The water supply to the Center has to depend on three alternatives, i.e., the piping to be laid from the water tower in Sa Kaeo at the west or from the water tower in army camp at the east, otherwise to bore a well in the site.
- (2) Drainage : There are no drainage works around the site area, therefore, all the waste water must be treated within the site.
- (3) Gas : There are no city gas service around the site area, therefore, LPG gas units must be installed at required points on the site.
- (4) Electricity : Electricity is supplied by PEA (Provincial Electrical Authority). Service line must be branched out from the trunk line along the national highway to south of the site.
High voltage is 22 kv, working voltage 3 p. 4 line system, power 3 p. 380 v and lighting is single p. 220 v. The frequency is 50 Hz.
- (5) Telephone : The telephone is operated by TOT (Telephone Organization of Thailand). The telephone line is installed along the nearby national highway south of and opposite side of the site.
- (6) Radio and TV broadcasting : The radio and TV broadcasting are both receivable. Aerial antenna for TV must be installed about 10 meter high.

4.2.4 Weather Condition

There is a meteorological observatory at about 51 km east of the site and the data obtained from the observatory is as follows. The tropical weather in the area is almost similar to Bangkok having rainy and dry season all around the year. In rainy season, however, the wind blows to west, and the wind from the east to west direction prevails all the year comparing to the south to north wind generally blowing in Thailand, which characterizes the weather condition of this area.

METEOROLOGICAL DATA IN ARANYAPRATHET (Lat. 13° 42'N, Log. 102° 35'E)

1. SUMMARY OF METEOROLOGICAL DATA : 1964~1974

Year	Mean atmospheric pressure + 1000 mb.	Temperature			Rainfall		Mean relative humidity %
		Mean max. °C	Mean °C	Mean min. °C	mm	No. of days	
1964	09.71	33.0	27.8	22.5	1,357.9	126	71.6
1965	09.92	32.9	27.9	22.8	1,603.5	141	77.0
1966	09.33	33.2	28.2	23.1	1,795.6	147	77.6
1967	09.82	32.8	27.5	22.2	1,243.8	135	74.3
1968	09.92	33.3	27.8	22.4	1,358.3	124	76.2
1969	10.03	33.4	28.0	22.5	1,518.4	127	76.6
1970	09.33	33.0	27.8	22.6	1,594.7	143	78.6
1971	09.71	32.1	26.9	21.6	1,483.9	137	76.1
1972	09.81	32.9	27.6	22.2	1,581.5	134	76.7
1973	09.73	33.3	28.0	22.7	1,312.7	121	76.8
1974	09.27	32.4	27.4	20.3	1,477.9	126	75.4

2. AIR PRESSURE AND WIND: 1973~1974

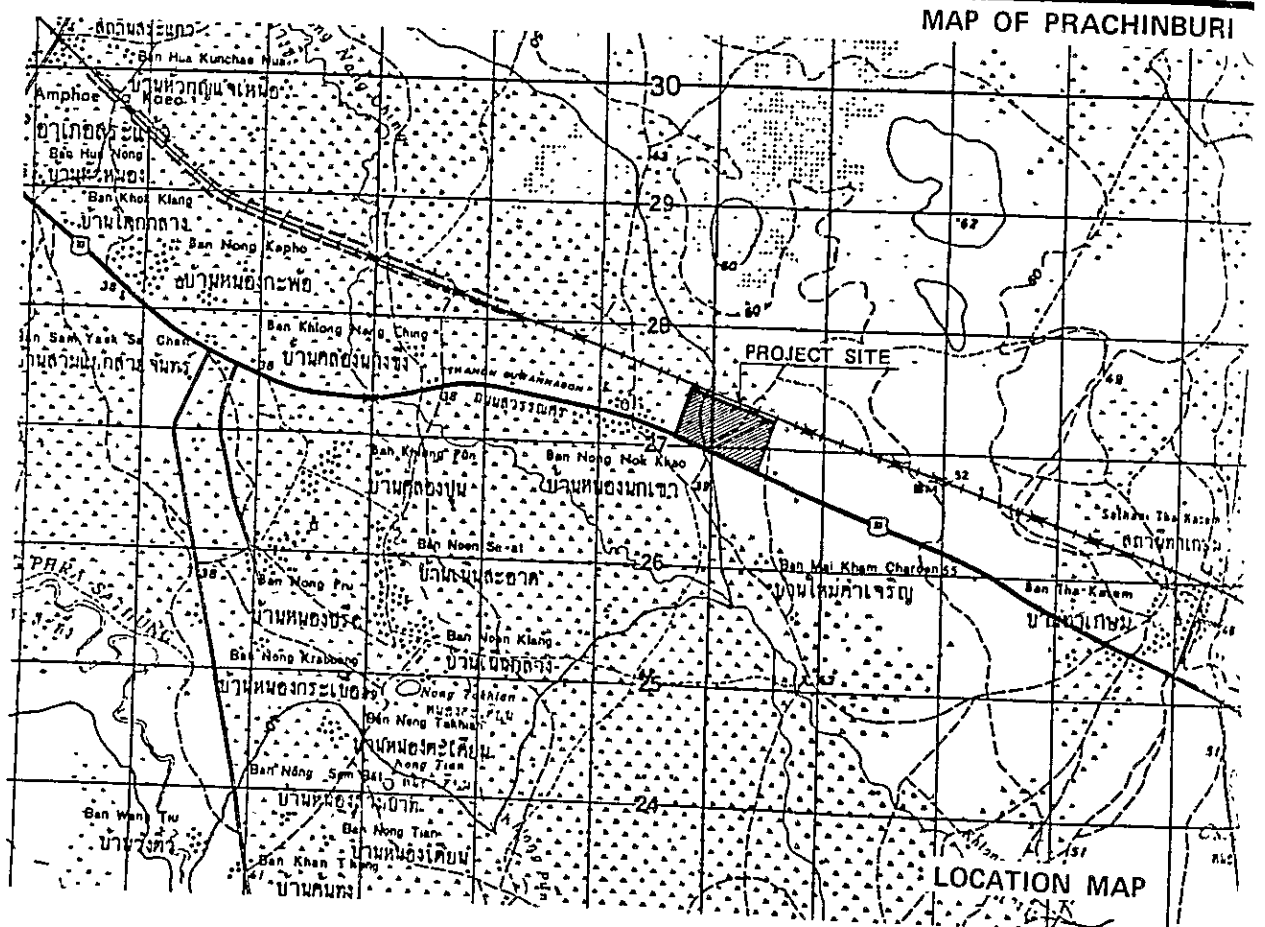
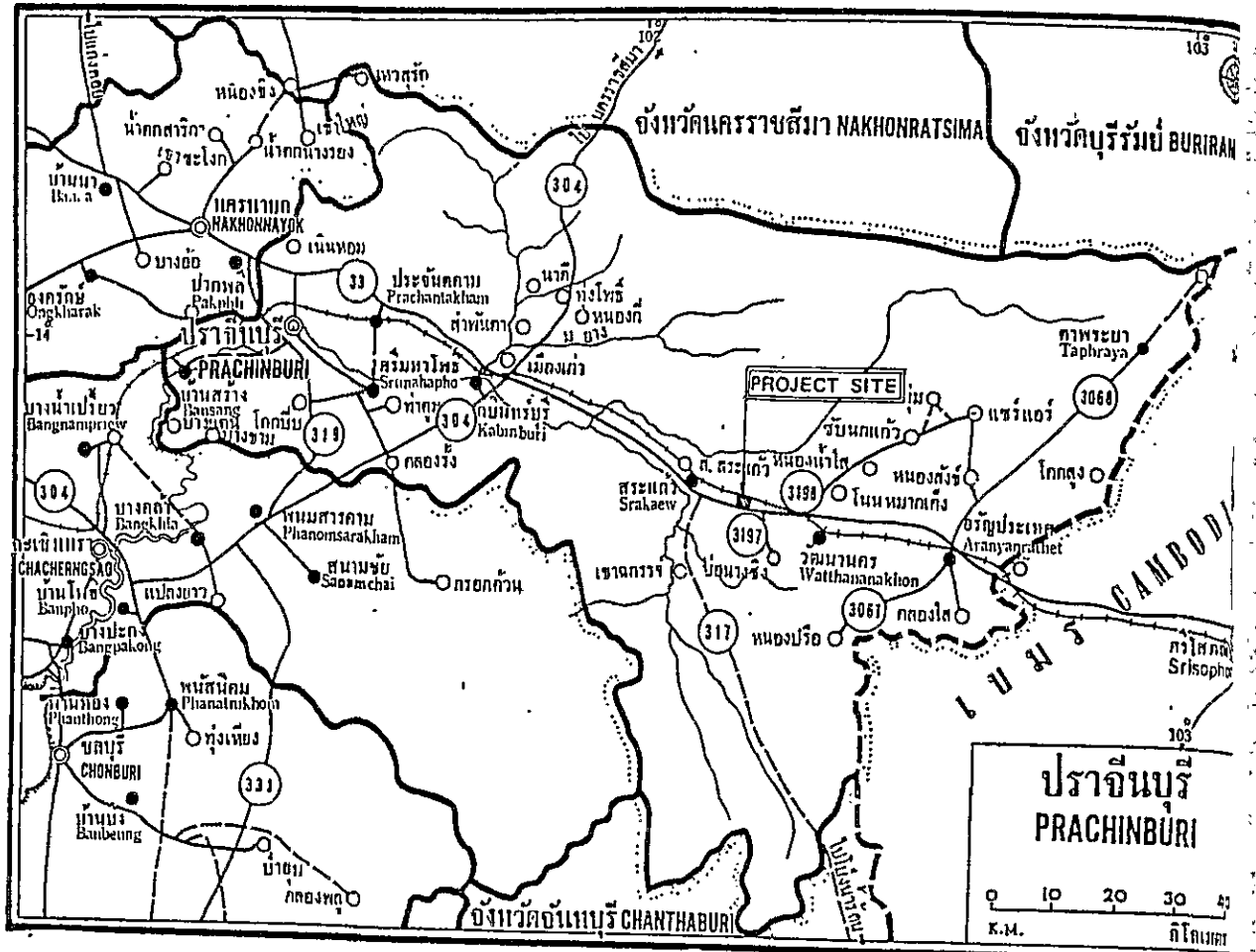
Month	Air pressure, recorded in millibars						Surface wind			
	Mean (8 hours)		Extreme low		Mn. daily range		Prevailing direction		Mean force	
	1973	1974	1973	1974	1973	1974	1973	1974	1973	1974
Jan.	13.27	11.84	07.65	06.35	4.90	5.01	NE	E	0.6	0.8
Feb.	12.61	11.18	06.70	04.19	5.27	5.87	NE	NE	0.6	1.2
Mar.	10.43	11.21	04.39	04.95	5.87	5.44	W	W	0.8	1.1
Apr.	07.95	08.86	02.07	03.53	5.60	5.07	W	W	0.7	0.8
May	08.48	07.95	03.74	02.58	4.65	4.49	W	W	0.5	0.8
June	06.59	06.28	01.85	00.05	3.98	3.46	W	W	0.7	1.1
July	06.08	07.51	98.17*	02.50	3.86	3.79	W	W	1.0	0.9
Aug.	06.96	05.99	02.23	00.30	3.89	3.85	W	W	1.1	0.8
Sept.	08.46	08.70	04.16	03.90	4.54	4.46	W	W	1.1	0.8
Oct.	09.68	08.19	03.58	03.30	4.28	4.75	E	NE	1.0	0.6
Nov.	12.15	11.02	06.12	04.20	4.36	4.38	NE	NE	1.2	0.9
Dec.	14.04	12.49	09.38	05.80	4.66	4.81	NE	NE	1.3	1.0

3. AIR TEMPERATURE AND NEBULOSITY : 1973~1974

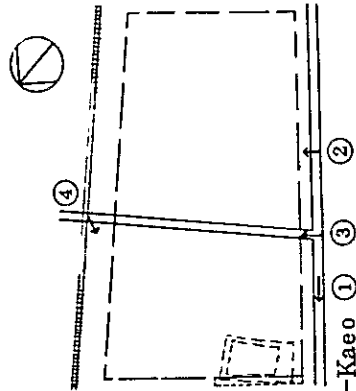
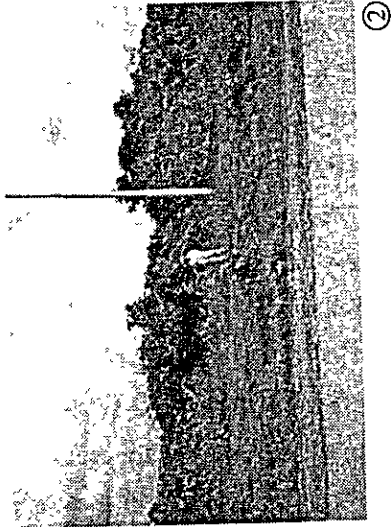
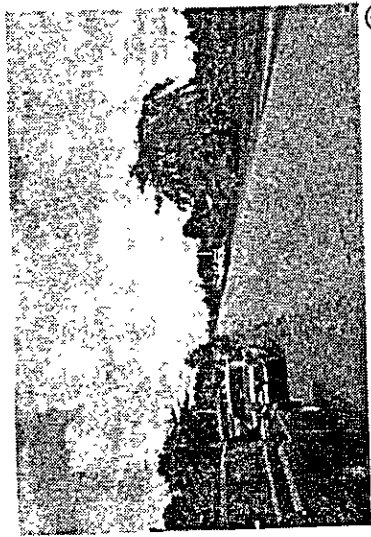
Month	Air temperature in shade (°C)								Mean nebulosity (0~8)	
	Monthly mean		Mn. daily range		Extreme high		Extreme low		1973	1974
	1973	1974	1973	1974	1973	1974	1973	1974		
Aranyaprathet Lat. 13° 42'N Long. 102° 35'E										
January	25.3	24.5	14.5	13.5	35.0	33.9	14.6	10.7	2.4	3.3
February... ..	28.1	26.3	14.3	12.6	37.7	37.6	14.5	14.2	3.1	3.6
March	30.4	27.9	12.6	11.4	38.8	36.6	21.0	16.0	3.7	5.3
April	31.4	29.1	12.8	10.7	40.0	36.5	22.5	20.8	3.8	5.2
May	31.2	28.5	10.7	9.2	38.0	35.7	23.4	21.5	5.2	5.7
June	29.6	28.5	9.1	9.1	36.7	34.3	23.5	22.3	6.4	5.9
July	28.5	28.2	8.2	8.7	35.7	34.3	22.8	21.0	6.6	5.5
August	28.3	27.8	7.9	7.9	35.0	34.0	22.5	22.0	6.8	7.1
September ...	28.2	28.3	7.7	8.8	35.0	34.6	23.2	22.0	6.7	5.5
October	27.1	27.7	8.9	8.2	35.3	33.7	17.6	22.0	5.0	5.9
November ...	25.0	26.2	9.2	10.0	34.2	34.8	15.3	17.5	4.7	4.5
December ...	23.8	25.6	11.6	11.6	33.0	34.0	13.2	17.0	3.2	3.3
Mean annual...	28.0	27.4	10.6	10.1	40.0	37.6	13.2	10.7	4.8	5.1

4. RAINFALL AND HUMIDITY : 1973~1974

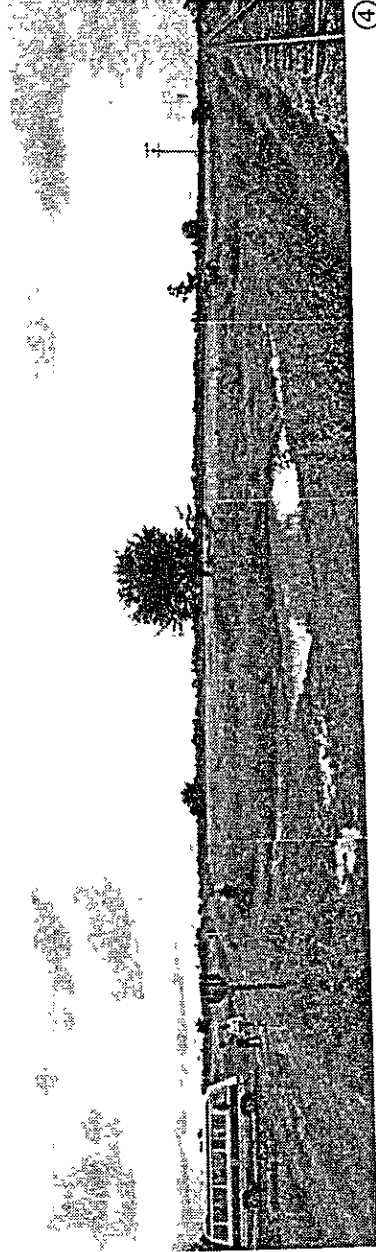
Month	Rainfall (in millimetres)						Percentage humidity			
	Total		Max. in 24 hours		Days of rain		Monthly mean (8 hours)		Mn. daily range	
	1973	1974	1973	1974	1973	1974	1973	1974	1973	1974
Aranyaprathet Lat. 13° 42'N Long. 102° 35'E										
January	3.0	15.4	3.0	14.1	1	3	71.8	65.5	46.4	44.3
February... ..	6.8	22.6	6.8	19.1	1	2	69.4	64.2	45.3	43.9
March	8.6	91.8	6.7	51.8	4	6	70.3	69.3	45.1	39.5
April	40.7	256.3	10.3	66.9	7	14	71.3	75.8	45.4	38.3
May	103.9	162.1	23.4	28.8	15	18	79.9	81.4	39.5	32.1
June	119.5	178.2	30.6	31.4	18	15	82.3	79.5	32.8	34.5
July	295.4	112.2	48.7	17.8	20	13	85.0	80.2	28.6	33.1
August	140.0	155.0	46.6	43.0	17	18	83.4	82.9	29.6	28.9
September ...	321.6	184.3	55.2	39.9	15	15	84.4	81.0	28.1	35.7
October	183.1	203.6	52.5	65.7	13	16	80.8	80.2	29.4	33.5
November ...	90.1	96.4	24.8	38.9	10	6	78.1	74.9	26.2	36.8
December ...	0	0	-	-	-	-	64.9	69.5	36.5	38.2



VIEWS OF THE PROJECT SITE



To Sa-Kaeo ① ② ③ ④



CHAPTER 5. BASIC DESIGN

5.1 Design Principles

The basic design of this Project is prepared in accordance with the undermentioned design principles with regard to the buildings, facilities and equipment to be provided by the Japanese Government based on the local survey and the consultation with the departments concerned of the Thai Government.

- (1) The scope and scale of the buildings, facilities and equipment are schemed to the extent not to affect the objectives and functions of this Project taking into consideration that the limited range of the grant aid from the Japanese Government does not allow to fulfill all the requirement from the Thai Government.
- (2) The buildings and facilities are designed to harmonize with the locality by employing the materials suitable to the area and the forms appropriate to the weather and climate as well as by grasping local natural conditions, lifestyle and situation of construction.
- (3) The cut down of the construction cost is aimed by putting priority in positively employing the constructional materials of locally made items and those easily procurable in Thailand.
- (4) The materials and equipment for training are selected as much as possible from the items having the replacement parts easily procurable in Thailand so that the maintenance and service are possible without problem.

5.2 Scale of Facilities

As the consequence of the consultation with the Thai parties based on the function, scheduled programs and curriculums of this Center, the scope of the facilities and buildings to be provided to the Main Center of this Project of as shown in the attached minutes 12 buildings in total including the administration building, meeting hall and workshop and others. After having studied obtained information and materials, however, it is concluded that the expected performance is infeasible and the aim for establishing the Center can not be met if the dormitory for trainees is not constructed in time because the dormitory is indispensable for satisfactorily carrying out the training, due to the situations of proposed trainees. The living facilities such as housing, dormitories and so on are originally within the scope of the work to be undertaken by the Thai Government. Considering various conditions, however, the basic design is prepared by including two buildings of dormitory in the scope of the facilities and buildings to be provided in agricultural training district as a minimum to somehow fulfill the function of this Center.

As referred to in the preceding clause 4.2.3, there is no water supply system around the site, therefore, the building construction will be affected by shortage of water required for the work. The water supply system is included in the scope of the facilities to be provided because it is concluded that the advance investment for the construction of water supply system prior to the building construction considered due to various conditions to be infeasible for the Thai Government although the same is within the scope of the works of the Thai Government. The water supply system is designed of such scale as to be utilized, after used for the construction works, as water system for daily life of the Main Center.

The facilities of the Main Center have the following number of buildings and floor area. The floor area of each building is based on the assumption from the consultation with the Thai party and total floor area of about 4,550 m² not including two buildings of dormitory has been acknowledged by the Thai party. Having made repeated reviews, the aforementioned 12 buildings are integrated into 10 buildings to be completed more functionally and economically, which come to 12 all together including dormitories. The floor area of each building might somewhat fluctuate in drawing out the working design within the limit of total area as aforementioned.

Buildings:

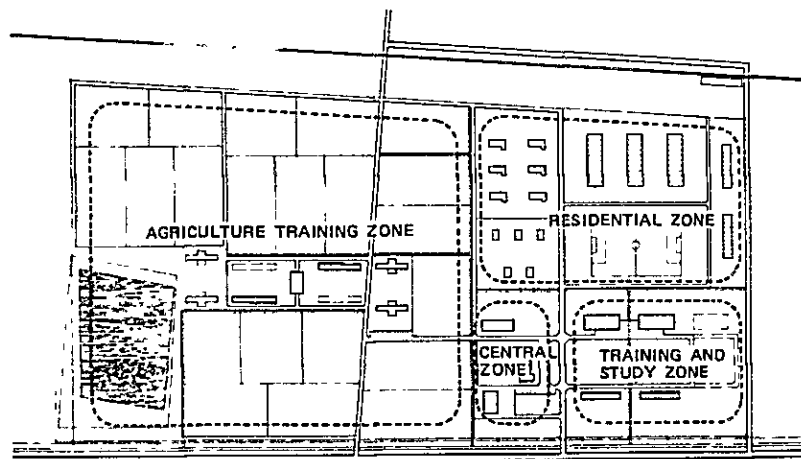
(1) Administration	483.84 m ²
(2) Auditorium	445.32 m ²
(3) Technical Service (Library, A.V., Printing) ..	476.28 m ²
(4) Industry, Workshop -1 (Auto-repair, Welding) .	705.60 m ²
(5) Industry, Workshop -2 (Radio-T.V., Electricity, Construction)	705.60 m ²
(6) Home Economics, Class room -1	332.64 m ²
(7) Business & Home Industry, Class room -2	332.64 m ²
(8) Agriculture, Green House	332.64 m ²
(9) Agriculture, Animal Husbandry	362.88 m ²
(10) Agriculture, Plants	362.88 m ²
(11) Agriculture, Dormitory -1	322.56 m ²
(12) Agriculture, Dormitory -2	322.56 m ²
Total 12 Buildings	5,185.44 m ²

5.3 Plot Plan

The site of the Main Center is divided by respective function into four zones, i.e., the central zone, agriculture zone, workshop zone and residential zone. The central zone has the administration building, auditorium and technical service

building. The agriculture zone has the practice farm as its main, the green house, the buildings for agriculture plants and animal husbandry at the center and the dormitories for agriculture trainees at the surrounding area. The workshop zone has two buildings of industrial mechanic workshop and two other buildings for study and practice rooms. The residential zone has the housing for staff and instructors and the dormitories for trainees. The facilities of each zone are to be so arranged that the future extension can be feasible without problem since the scale of the facilities under this basic design is limited to the required minimum. Each zone is, in order to function most efficiently, linked together by in-premise main road and each facility in the zone is linked as well by auxiliary roads.

The practice farm is partitioned into 4 areas of the east, west, south and north and each area is divided into five sections. Each section has the area of about 6,000 m².



ZONING PLAN

5.4 Building Design

The floor level of each building is designed 1 meter higher to the ground level against flooding during rainy season because the ground level is lower for 1.2 meter in average from the national highway at the south side. All the buildings are to be one-storied construction with gabled roofs. With regard to the floor plan of each building, the Thai party proposed their requirement for the rooms, which, however, can not be accommodated to the buildings of limited capacity. The design, therefore, was prepared based on their requirement to match the capacity by taking into account the function of each room.

5.4.1 Individual Design of Each Building

(1) Administration

The Administration building is designed by combining the Cooperative to the same one building. Rooms for the director, deputy director, office, hall, meeting and storage for the administration, and rooms for office, shop stand and storage are to be arranged in the Cooperative. The shop is to be located close to the auditorium at the south side of the building to function as subsidiary to it.

(2) Auditorium

The auditorium is designed as a multi-purpose hall to function for meeting, large classroom, messroom and others. Stage, storage, kitchen and lavatory are to be positioned surrounding the sitting area. The floor of the auditorium is to be flat and not to be stepped floor in view of the above purpose.

(3) Technical service

Originally the Thai party proposed to design it in two separate buildings, which however are to be integrated in single building by efficiently utilizing the space such as common use of service area for the reason of economic advantage in construction cost. Office, library, audio-visual laboratory, studio, film storage, printing room, dark room and store room are to be arranged.

(4) Workshop -1 and -2

The vocational training program for industrial engineering to be conducted in the Center is composed of five courses. Two buildings are designed to integrate the interrelation and function of the abovementioned courses.

- a) Workshop - 1 Auto repair and welding
- b) Workshop - 2 Radio-TV, electricity and
construction

Two workshop buildings are to be on the same plan having the training room of 16.8 M by 21.0 M size and a flexible space without no columns inside is arranged. The workshop is furnished with the instructor room, classroom, tools and supplies storage, locker room and lavatory.

The building was originally designed to have a mezzanine to install the instructor room and classroom, which, however, rearranged to one storied construction accomodating all rooms in the same ground floor, in view of economic advantage in the construction cost.

The floor of the training room is constructed with concrete slabs and light weight training appliances are to be placed directly on the floor except heavy equipments to be installed on additional individual foundation.

(5) Classroom -1 and -2

Two classroom buildings are designed to accomodate the practice courses for the home economics, business and home industry. Both buildings having instructor room, classroom, storage and lavatory are designed on the same plan to have interchangeability. A part of partition walls between classrooms are made with movable partition for flexibility.

(6) Agriculture; Green house

Planting area is to be of size, 13.2 M by 21.0 M with a storage attached.

(7) Agriculture; Animal husbandry

The building is for livestock raising course of the agricultural training and arranged with instructor room, classroom, practice room, storage and lavatory.

(8) Agriculture; Plants

The building is for the farming course of the agricultural training having instructor room, classroom, agricultural equipment storage, store room and lavatory.

(9) Dormitory -1 and -2

Each building is designed to accomodate 26 trainees. Two bedrooms, each for 13 beds, living-mess room, kitchen, shower room and lavatory are arranged. The dormitory is constructed in the agricultural zone

exclusively for agricultural trainees. However, until the time to completing all housing and dormitories, any persons including instructors and trainees of other courses can be accommodated.

5.4.2 Element Design

In view of the buildings to be constructed in tropical area of high temperature and humidity, proper design is required on each element of the building against sunlight, ventilation and rainfall.

(1) Roof

The roof being mostly affected by sunlight has to be designed to prevent the room from radiant heat. Efficient insulation layer has to be installed between the roof and room accordingly. Insulation materials are to be filled between the ceiling and the roofing is supposed to be of corrugated slate. If an attic is designed, sufficient ventilation has to be designed.

(2) External wall

External wall also being affected by sunlight has to be designed with eaves, if necessary, to prevent it. The materials for external wall are to be of high insulating efficiency. External wall of the building of the center is built with concrete blocks, a part of which is to be hollow blocks for better ventilation.

(3) Window

The window is important element in natural ventilation plan for interior rooms. Ventilation to east and west direction is available throughout the year in the region in which the Main Center is to be constructed. Windows are to be so designed that open area can be as large as

possible by taking into account the abovementioned wind direction. The window is designed for single swing wooden sash.

(4) Ceiling

Ceiling of the room is to be arranged at the highest level in order to make interior space to the maximum for better interior amenity having sufficient ventilation.

(5) Room partition

Interior wall partition of the building is generally to be of concrete blocks.

(6) Floor

Floor of the building is to be of concrete to be finished in even and smooth surface by adding anti-abrasive agent for sufficient hardness. The level of the floor is arranged to be higher for one meter to the ground level around the building.

5.5 Structural Design

5.5.1 Design Policies

With regard to seismic and wind pressure forces which are main factors to work on buildings as lateral force, there is almost no earthquake in Thailand which is located off main seismic belt and the wind velocity is 1.5 to 2.0 m/sec. in average with maximum velocity of around 28.3 m/sec. Because the lateral force is very small as above, special lateral stress structure is not required for designing one-story building.

Proposed site ground is almost level and the stratum is composed of sandy silt of approximately 20 cm thick surface layer, silty gravel of 50 to 80 cm thick second layer and clayey gravel thereunder. Because it is presumed to have the ground bearing capacity of 5 t/m² at clayey gravel, independent direct foundation is applicable in designing.

In structural design, the column and beam are to be made of reinforced concrete and the roof is to be steel trussed structure. Floor for workshop and the like where heavy live load is expected shall be of plain concrete, and composite slab floor of prestressed concrete slab and reinforced concrete is applicable for raised story.

5.5.2 Design Bases

Structural design is to be made in conformity with the manners as stipulated by pertinent codes and standards of the Japan Architecture Society and based on pertinent regulations regarding structural design of Thailand.

(1) Fixed load

Dead load is to be calculated of materials to be fixed into building such as structural materials, finish materials and the like.

(2) Live load

The value of building standards law of Japan is in general applicable to live load, and the value suitable to actual condition is calculated for rooms of special purposes. The following table shows the live loads for typical rooms.

unit: kg/m²

Title of room	For slabs	For structure
Office	300	180
Classroom	230	210
Library	360	300
Meeting room	360	300
Hall	360	330
Dormitory	180	130

(3) Wind pressure force

Horizontal force of 100 kg/m² is applicable in accordance with the Control of the Construction of Building Act.

(4) Seismic force

Seismic force, not being stipulated in building laws and regulations of Thailand, is not taken into account.

5.5.3 Structural Materials

(1) Concrete

Plain concrete having 4-week strength of 210 kg/cm² is to be used. A concrete plant is to be installed on the site for batching and mixing. Concrete is to be stiff consistency and sufficient curing by water and others to be made after placing.

(2) Reinforcing bar

Mainly SD 30 to be used.

(3) Structural steel

Section steel materials for structural truss are all Thai made. All the steel fabrication works to be done in shops and simple assembly works only done on the site.

5.6 Utilities Plan

5.6.1 Plumbing System Plan

(1) Water supply plan

Water supply system shall be so planned that the well water is once reserved in a receiving tank to be installed outdoor, then pumped up to an overhead storage tank and thereafter distributed to required places by gravity. The capacity of the receiving tank shall be 100 M³ because the Center requires about 100 M³ of water supply per day.

The water pump shall have capacity to satisfy the maximum instantaneous supply capacity and 2 units shall be installed against any trouble.

The overhead storage tank shall be installed 30 M above the ground level and have capacity of 12 M³. Water supply piping shall be galvanized steel pipes. All the water supply shall be limited only for living purpose and the water for irrigation shall be distributed from the existing irrigation pond. The deep well to be bored within the site for the construction works shall be utilized after completion of the works.

(2) Drainage Plan

(2)-1) Miscellaneous drainage plan

Miscellaneous drainage from each building shall be discharged through piping to open ditch to be installed around the building. Galvanized steel pipes for interior and concrete hume pipes shall be used for outdoor piping.

(2)-2) Rain water drainage plan

Rain water drainage of each building shall be discharged to open ditch to be installed around the building. Rain water drainage in the site shall be also discharged to open ditch around the building and around the site.

(2)-3) Sanitary sewage plan

Sewage from lavatory of each building shall be conveyed to septic tank to be installed outdoor and, after processing, discharged to open ditch.

Cast iron pipes for interior sewage piping and concrete hume pipes shall be used for outdoor sewage piping.

(2)-4) Workshop drainage design

Drainage containing oil from workshop is to be introduced to oil separation tank and, after having separated water borne oil, only the water to be discharged into miscellaneous drain system. Piping is to be the same as miscellaneous drain.

(3) Sanitary fixture design

Sanitary fixture necessary for lavatory and bathroom of each building are to be installed. Closet bowls of lavatory are to be of typical Thai model.

(4) Sewage purifier design

Sewage purifiers made of fiber reinforced plastic are to be installed in each building.

(5) Gas utilities design

Various kinds of gas for welding are to be piped into building from cylinders to be installed outdoor. Small type cylinders of LPG for cooking gas is to be installed at required places.

5.6.2 Electric System Plan

(1) Substation equipment

Electricity is to be lead into the site by aerial service line from 22 KV distribution line along national highway from PEA and the voltage is transformed to 3 p 4 w 380 V/220 V by outdoor open type substation for supplying to each load. Utilization loads are as follows:

- (1) Lighting and plug socket
- (2) Power for water supply, drainage and ventilation equipment
- (3) Electricity for printing machine
- (4) Electricity for electric training equipment

Total installed capacity is to be about 450 KVA. Transformers to be installed on the ground are protected by net fencing, inside of which is gravel filled.

(2) Main line installation

Low voltage power board of outdoor type is to be installed in substation, therefrom aerial line connects to the points nearest respectively to administration building, workshop, classroom building and agriculture

building and thereafter low voltage electricity to be supplied to panel board of each building by underground cable.

(3) Power installation

Power installation works are to cover the electricity work for operation control of water supply, drainage, ventilation equipment and electricity supply work for training equipment. Electricity supply to training equipment is to be done by installing panel board and power control board to each building, thereafter by secondary wiring of overhead metal duct along the wall of classroom then by open wiring on the wall upto the load to supply electricity to manual operation board or plug socket of training equipment. Earthing conductor of 3rd grade has to be installed for equipment requiring 3 phase electricity.

(4) Lighting equipment

Lighting is mostly flourescent lamps except practice classrooms where mercury lamps are to be used as well. Lighting in practice classrooms are to be so arranged as to have even illumination with shades attached. Lighting fixtures are in general to be directly fixed. Circuit for switching on and off is so arranged as to be done per each group. Illumination lux of each room is to be approximately as follows:

1) Office, meeting room, library and classroom	300 Lx.
2) Practice classroom	400 Lx.
3) Hall	100 Lx.

(5) Plug socket installation

Plug sockets are to be installed at the points required to receive electricity in the building.

(6) Lighting wiring installation

Panel boards are to be installed at such places as maintenance and inspection can be easily conducted. Non-fuse breakers are to be used for wiring respectively for single phase, 220 V., double-pole load and single phase, 100 V., single-pole load.

Wiring inside the building is to be done generally by open wiring using vinyl insulated cable in accordance with Thai Industrial Standard (TIS). In case wiring in concrete floor or wall is required, conduit tube to be used as well. Circuit for lighting and plug socket are to be installed separately.

(7) Telephone equipment

Telephone line is to be lead in by aerial service line to the point nearest to the administration building from the TOT line along the national highway at the south to the site, thereafter lead into MDF board in the administration building by underground conduit. Electric wiring is to be extended outside the building in order to make branching out from MDF board to each building. Office rooms of the administration building are to be installed with the outlets for extension set.

(8) Interphone equipment

Interphone for inter-office communication between the administration building and office or instructor's room of each building.

(9) Loud speaker equipment

An amplifier is to be installed in the office of the administration building so that business and information message can be announced in the premises. Also, the equipment is so arranged that announcement can be done per each system.

(10) Common use TV equipment

Main antennas and outlets for TV sets are to be installed respectively in the administration building, technical service building and electrical related workshop.

(11) Emergency alarm equipment

Manually operated alarm bells are to be installed to announce any emergency in the premises.

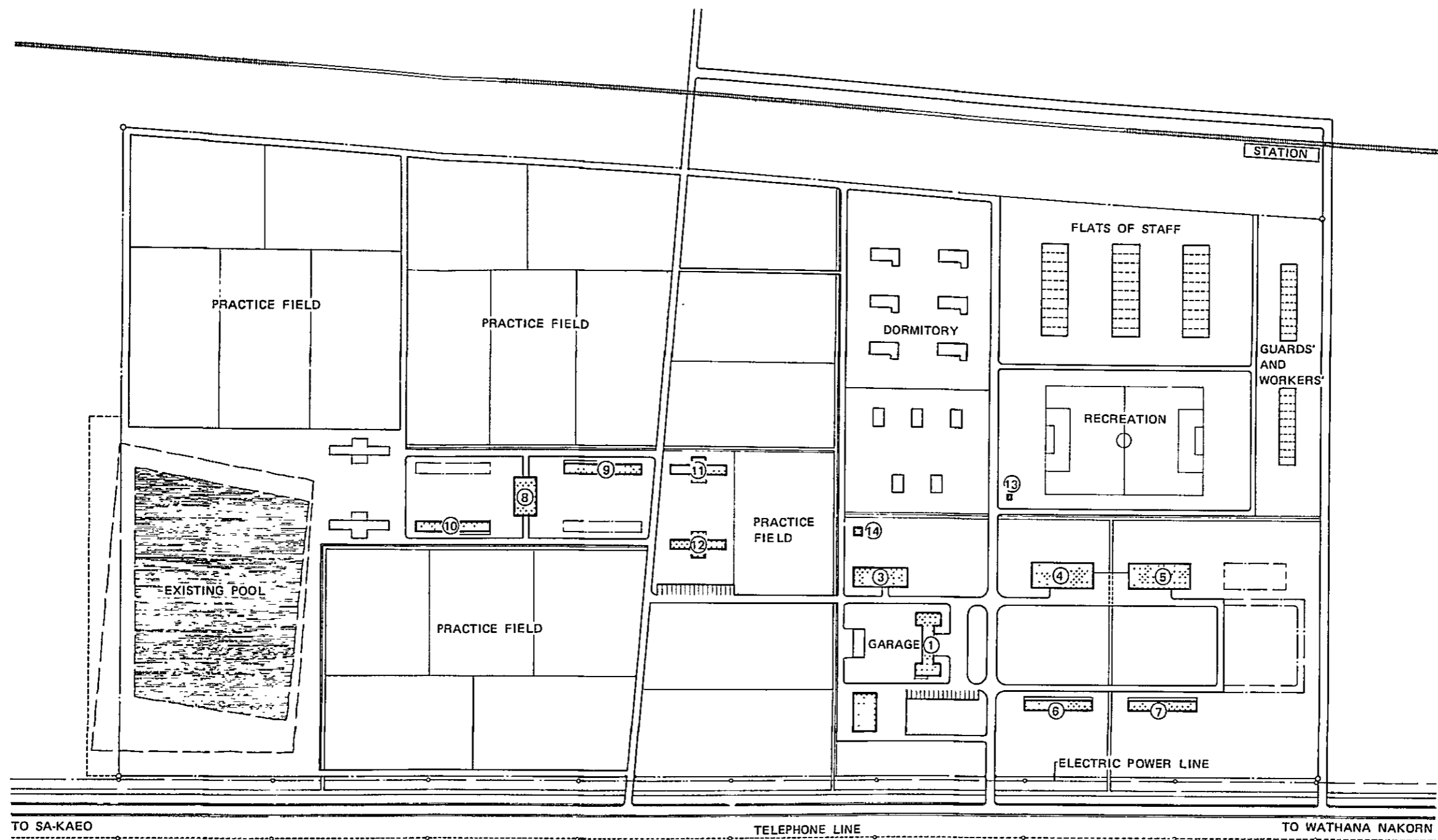
(12) Lightning conductor installation

Lightning conductor is to be installed above the elevated water tank.

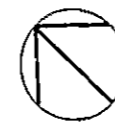
5.7 Basic Design Drawings

List of Drawings

- 01 PLOT PLAN
- 02 ADMINISTRATION BUILDING
- 03 AUDITORIUM
- 04 TECHNICAL SERVICE BUILDING
- 05 WORKSHOP - 1, 2
- 06 CLASSROOM BUILDING - 1, 2
- 07 GREEN HOUSE
- 08 AGRICULTURE BUILDING - 1, 2
- 09 DORMITORY - 1, 2
- 10 WATER SUPPLY SYSTEM
- 11 SEPTIC TANK LAYOUT & DRAINAGE SYSTEM
- 12 ELECTRIC POWER SUPPLY SYSTEM



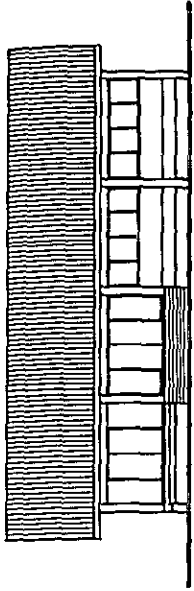
- | | |
|------------------------------|----------------------------|
| ① ADMINISTRATION BUILDING | ⑧ GREEN HOUSE |
| ② AUDITORIUM | ⑨ AGRICULTURE BUILDING - 1 |
| ③ TECHNICAL SERVICE BUILDING | ⑩ AGRICULTURE BUILDING - 2 |
| ④ WORKSHOP - 1 | ⑪ DORMITORY - 1 |
| ⑤ WORKSHOP - 2 | ⑫ DORMITORY - 2 |
| ⑥ CLASSROOM BUILDING - 1 | ⑬ ELEVATED WATER TANK |
| ⑦ CLASSROOM BUILDING - 2 | ⑭ TRANSFORMER SUB-STATION |



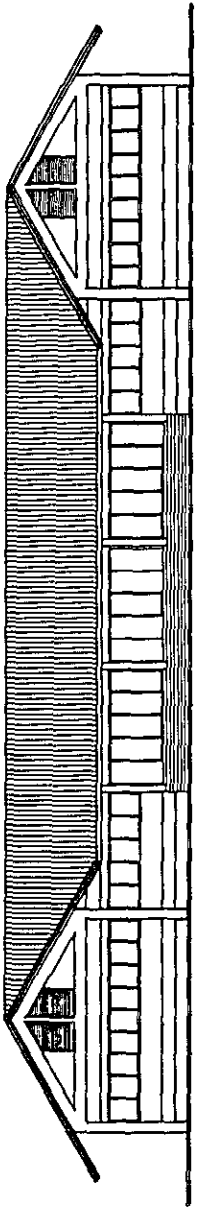
0 10 50 100 200M

PLOT PLAN

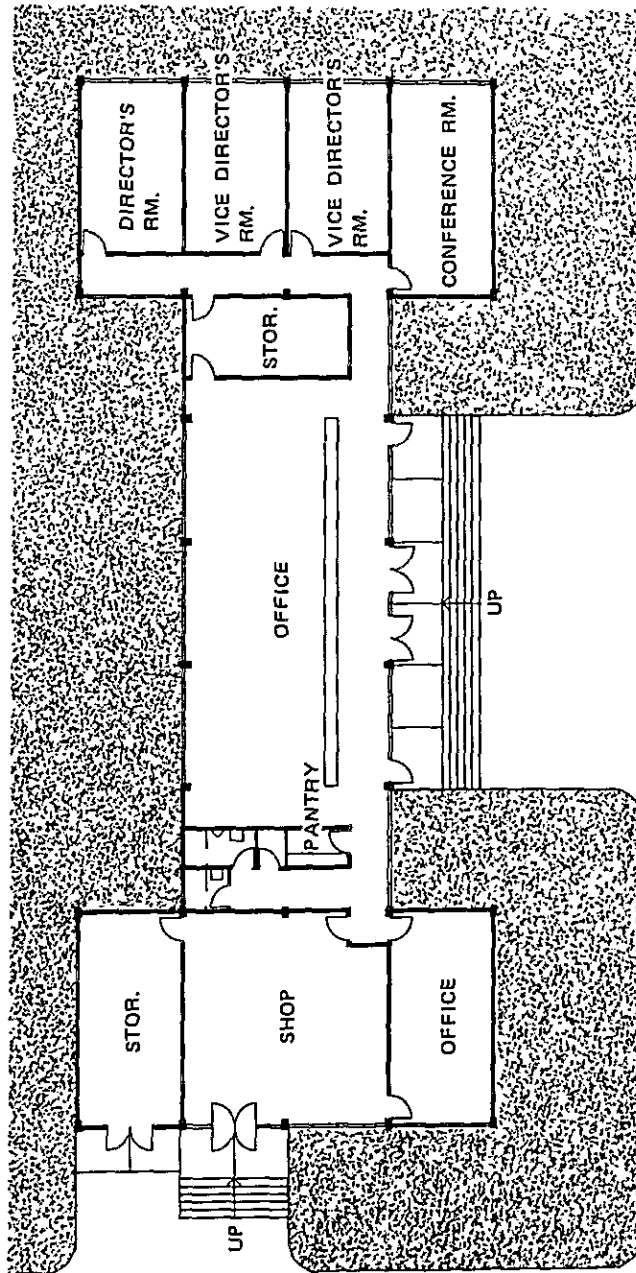
01



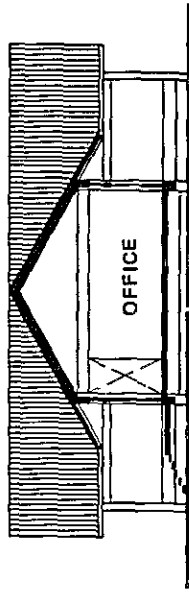
SOUTH ELEVATION



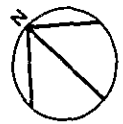
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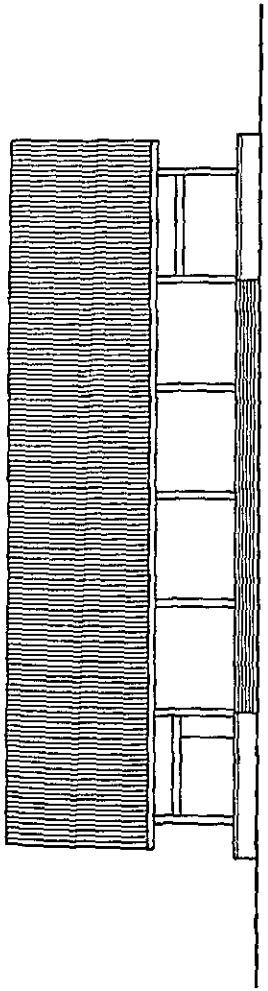


PLAN

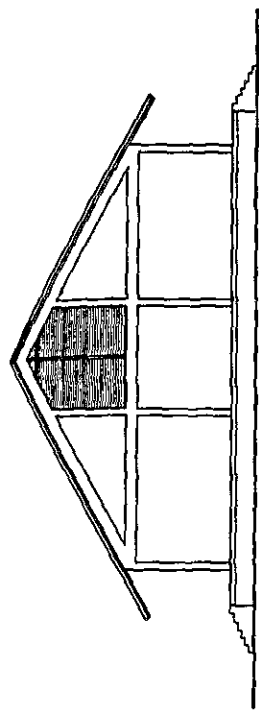


SECTION

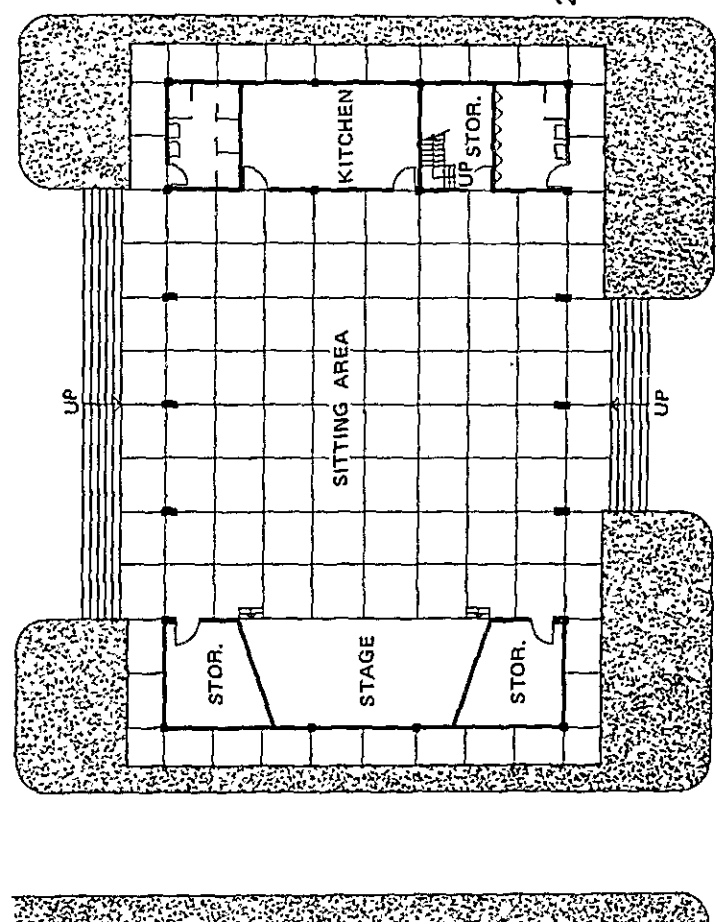




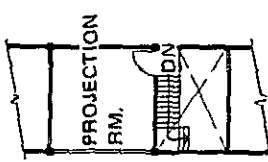
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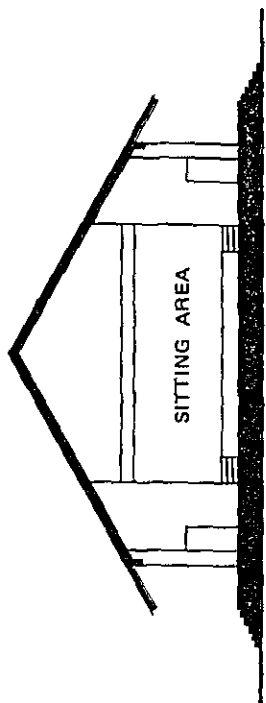
NORTH ELEVATION



1ST FLOOR PLAN



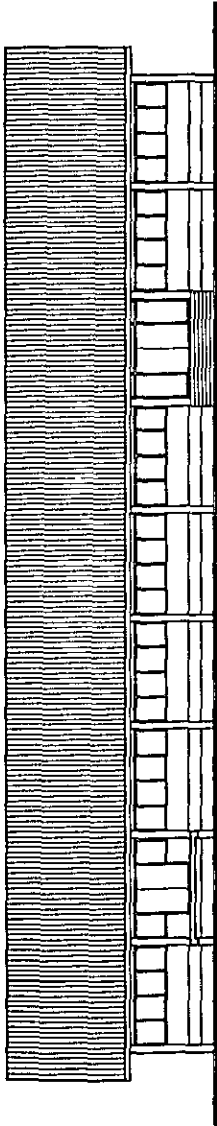
2ND FLOOR PLAN



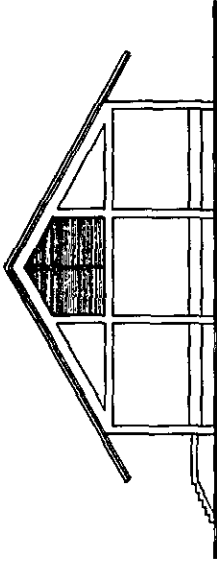
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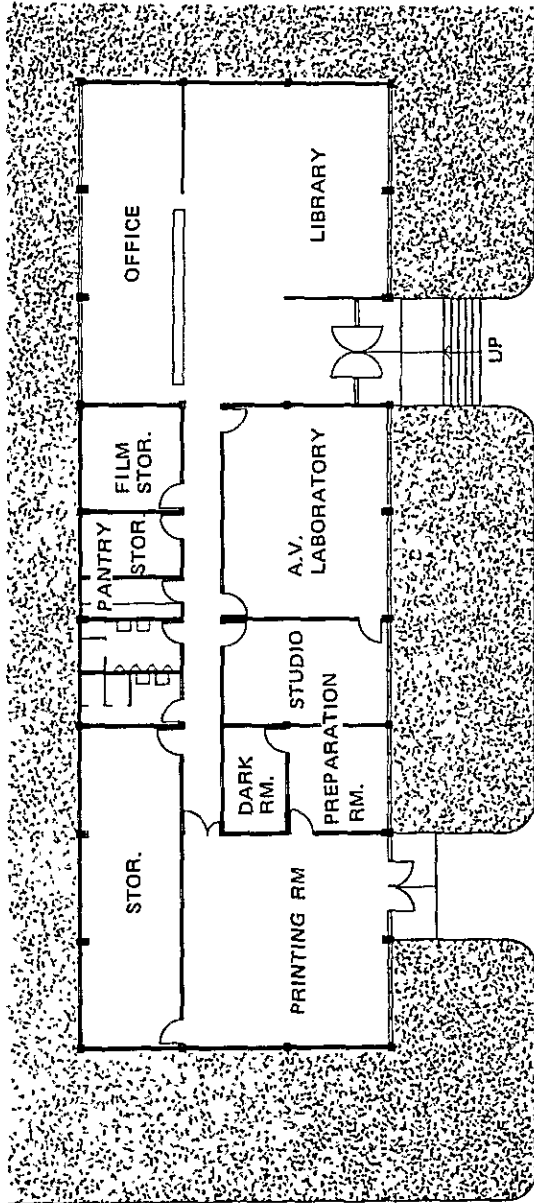
AUDITORIUM 03



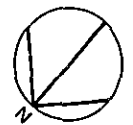
SOUTH ELEVATION



EAST ELEVATION



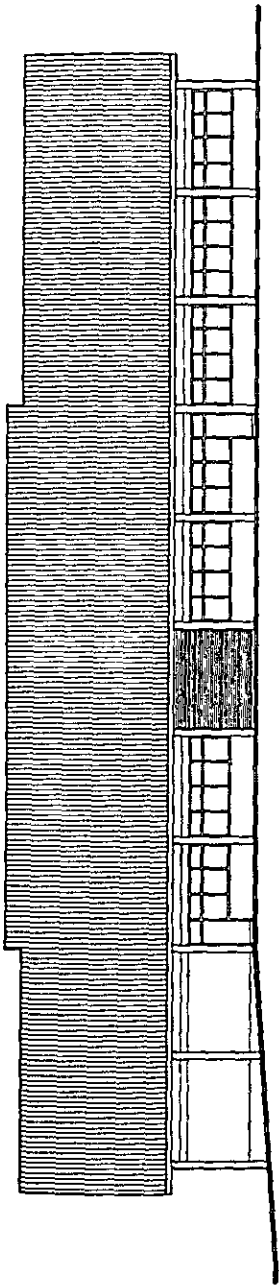
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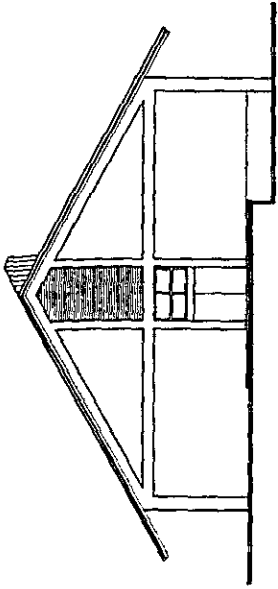
PLAN

TECHNICAL SERVICE BLDG.

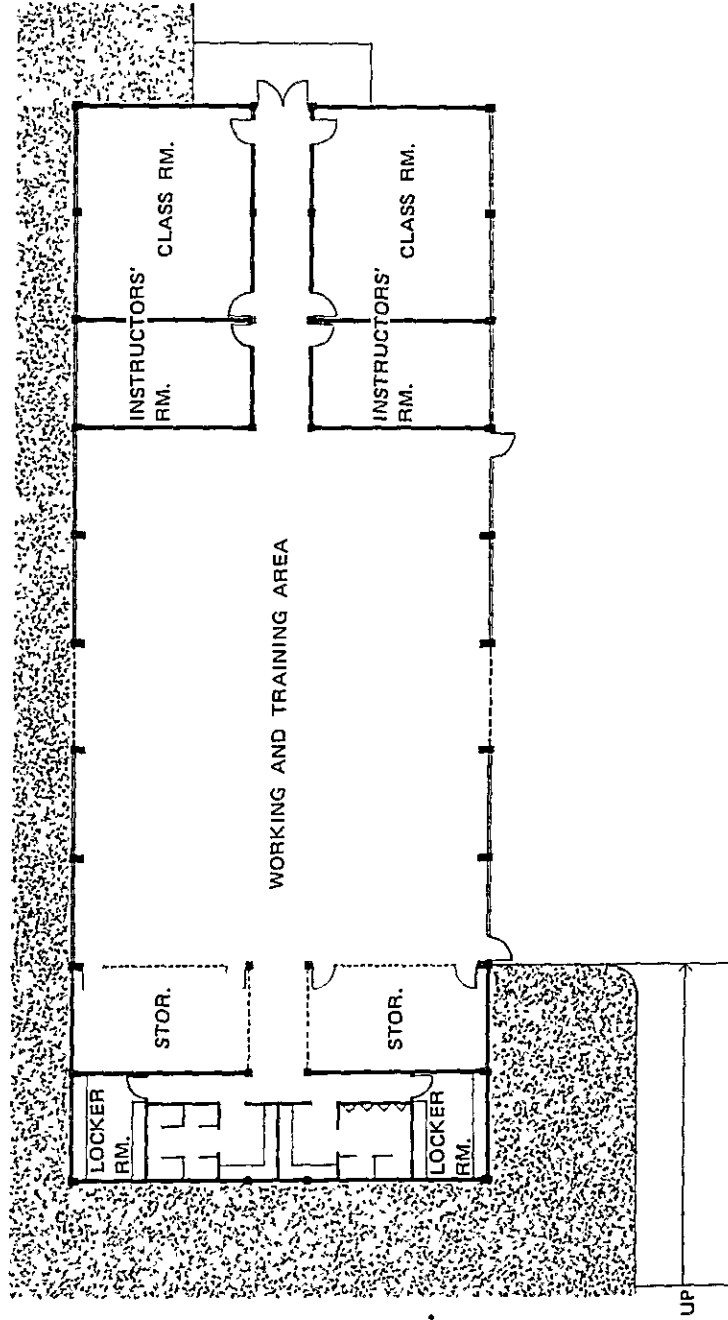
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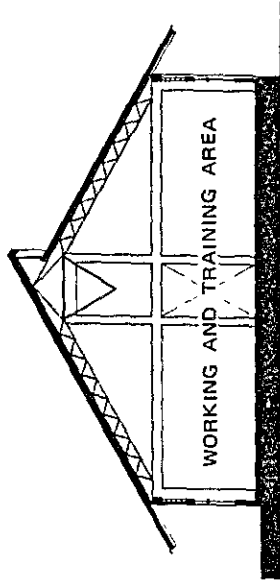
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EAST ELEVATION

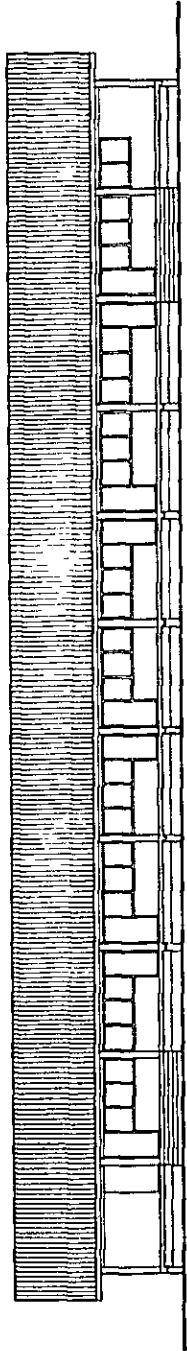


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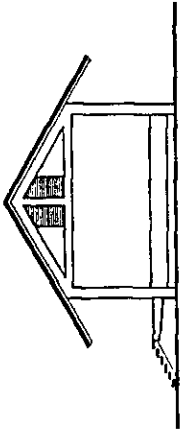


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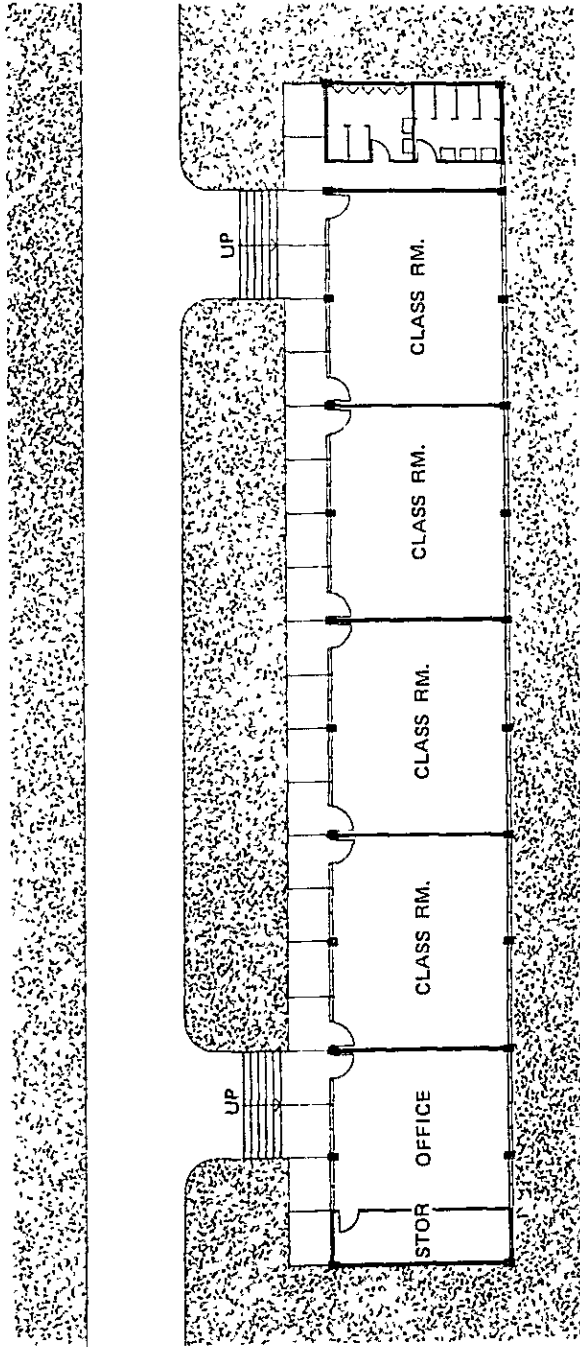




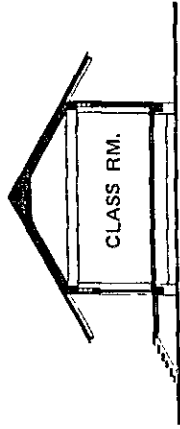
NORTH ELEVATION



WEST ELEVATION



PLAN



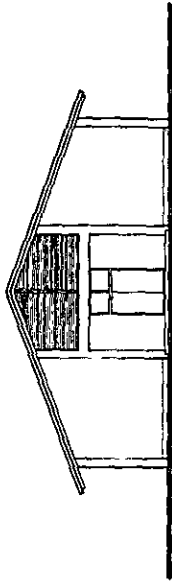
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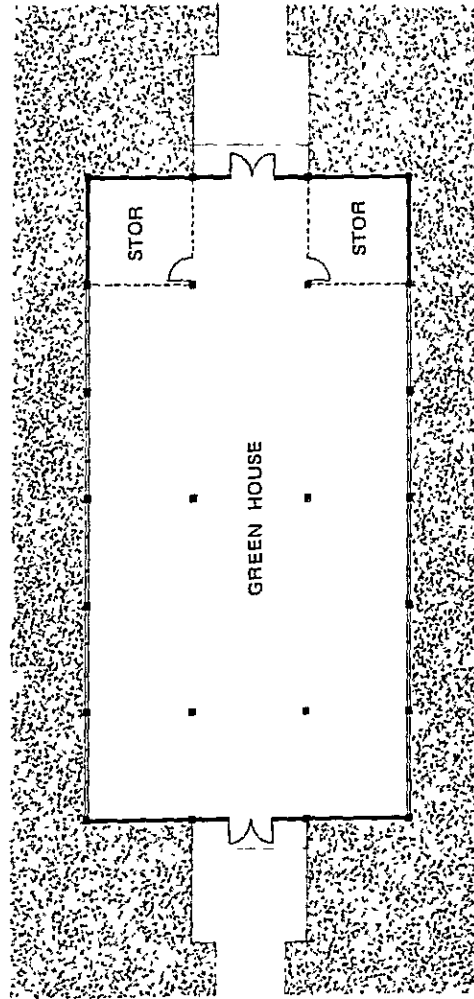
CLASSROOM BLDG. - 1, 2 **06**



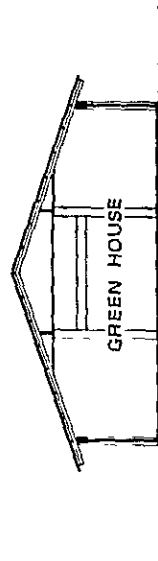
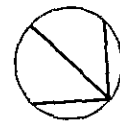
WEST ELEVATION



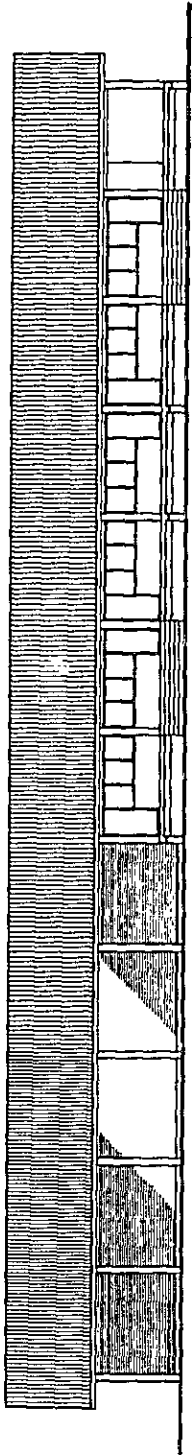
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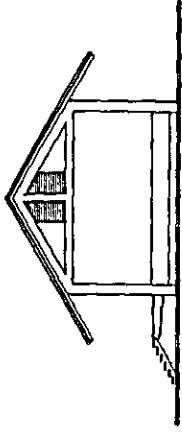
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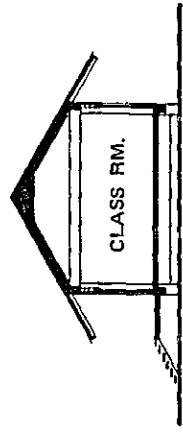
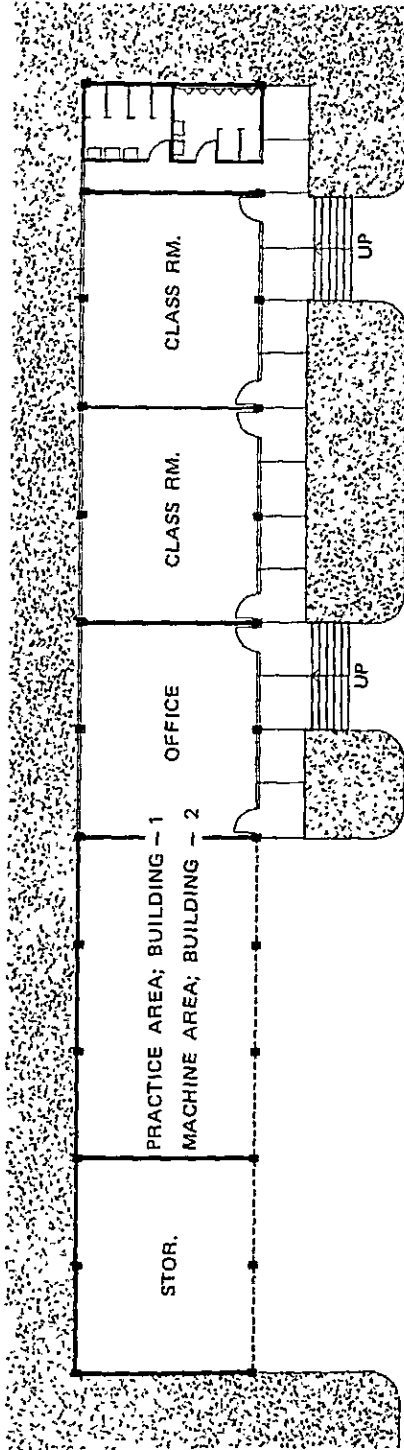
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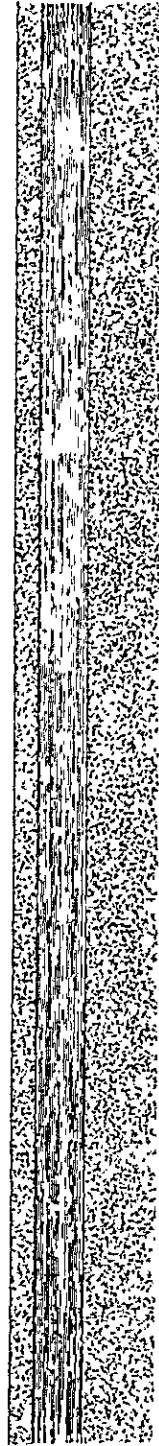
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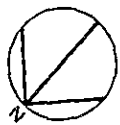
WEST ELEVATION



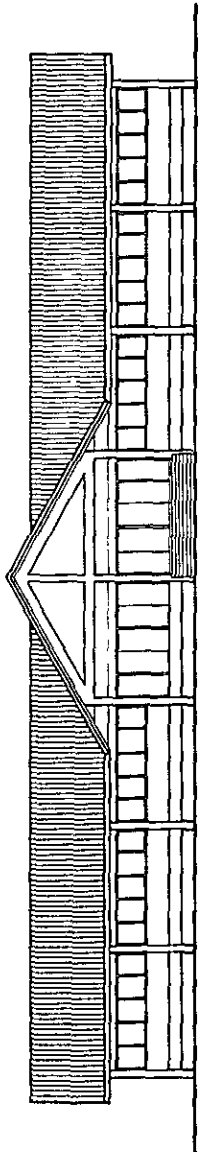
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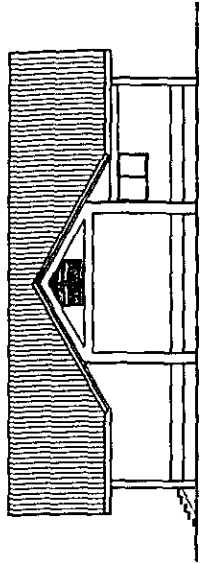
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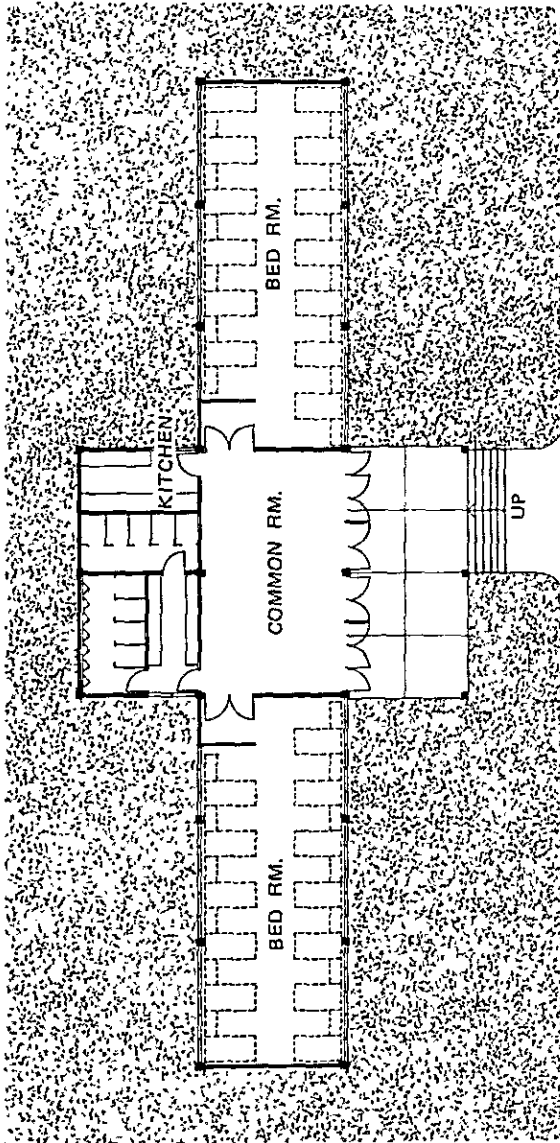
AGRICULTURE BLDG. - 1, 2 08



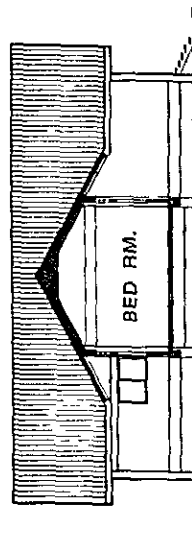
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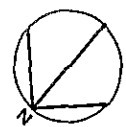
EAST ELEVATION



PLAN

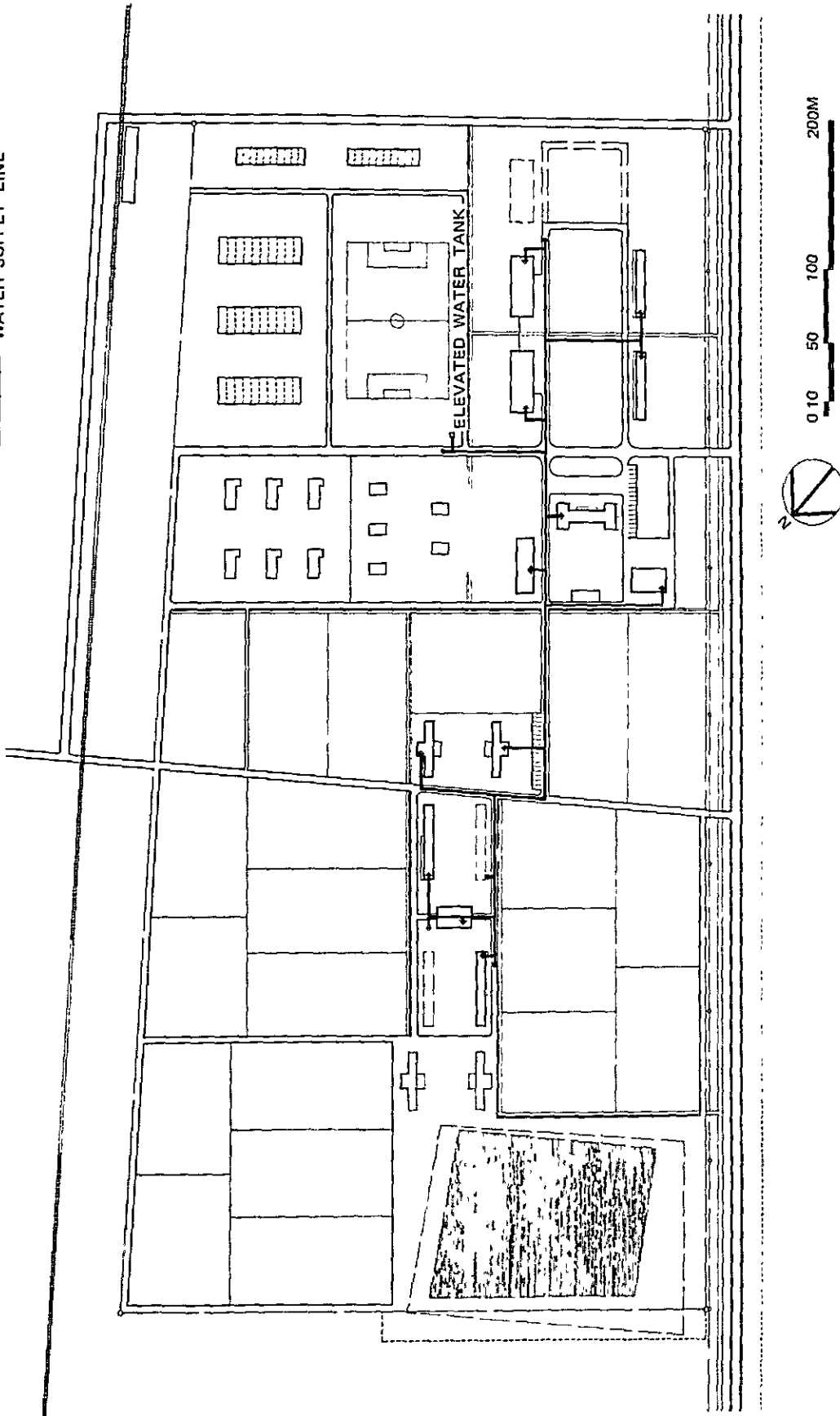


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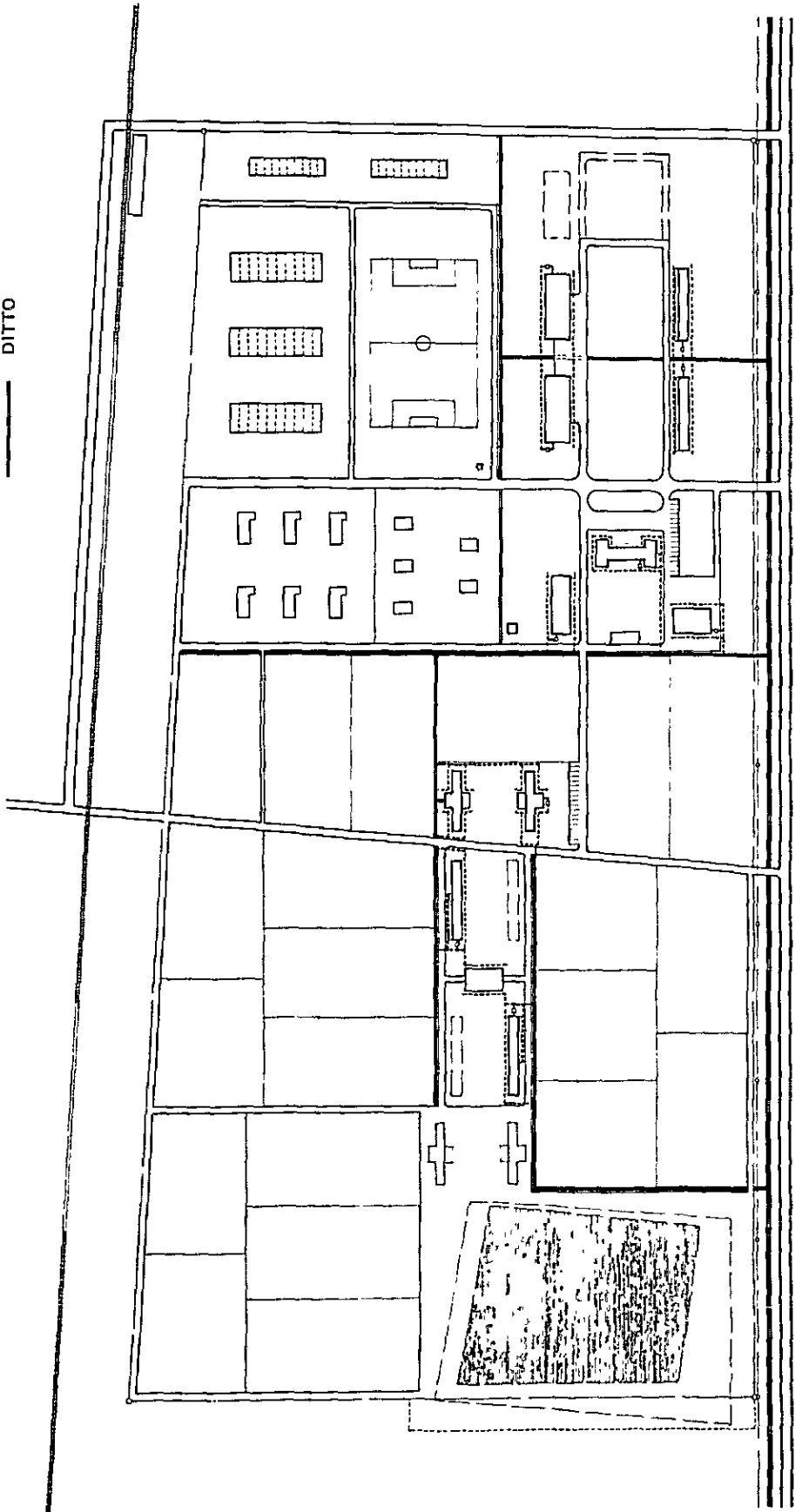


DORMITORY - 1, 2 **09**

• DISTRIBUTION VALVE
— WATER SUPPLY LINE



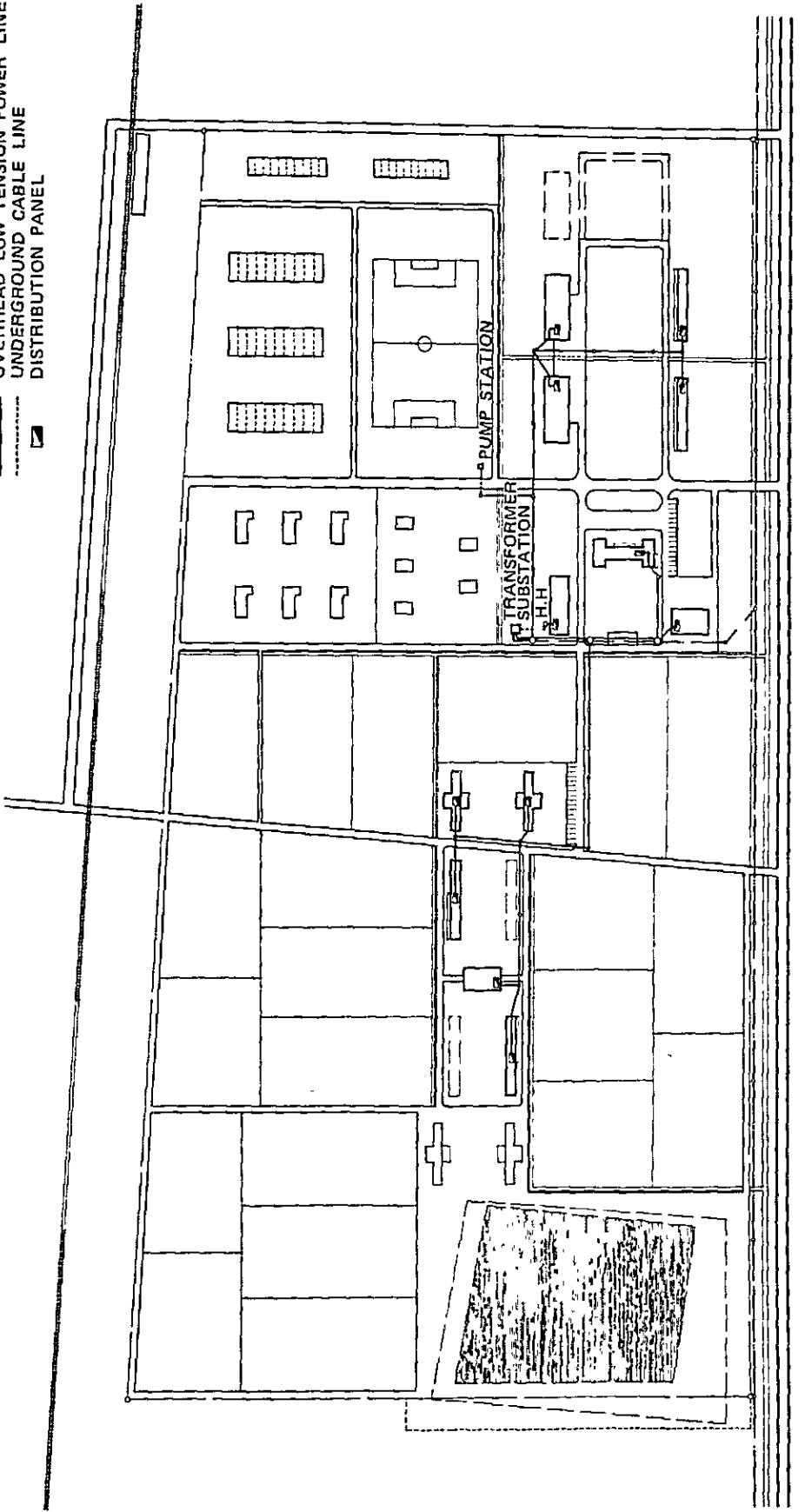
□ SEPTIC TANK
 - - - - - OPEN DITCH
 ———— DITTO



0 10 50 100 200M

SEPTIC TANK LAYOUT & DRAINAGE SYSTEM 11

- OVERHEAD HIGH TENSION POWER LINE
- OVERHEAD LOW TENSION POWER LINE
- UNDERGROUND CABLE LINE
- ▣ DISTRIBUTION PANEL



5.8 Equipment Plan

In selecting the equipment of various kinds for the Vocational Training Center under jurisdiction of the Department of Nonformal Education, Ministry of Education of Thailand, the consultations with the Thai parties concerned were repeated reviewing, for reference, various materials such as the equipment list by each department as mentioned in the Thai party request, the survey report of various training equipment of relevant facilities in Thailand, the particulars of equipment standard of public job training institute of the Department of Job Training, Japanese Ministry of Labor as Japanese counter plan, also the opinion of Messrs. Keisuke Ikeda and Shusuke Imamura were referred to.

The items and quantity of various training equipment were selected in such limited range as to most efficiently meet the objective and function of this vocational Training Center since the limited budget is unable to fulfill all the requirement from the Thai party.

The items which the Japanese side can only provide were preferentially pinpointed in the list and furnishings or fixtures were deleted except those easily procurable in Thailand.

The equipment list has to be still finalized through consultation with the Thai party, therefore, final adjustment is further required. The particulars of the equipment list is presumably fluctuant to some extent in drawing out actual working design.

EQUIPMENT PLAN BY RESPECTIVE SECTION AND TRAINING COURSE

1. Directorate Office Section

The section requires mostly office appliance and supplies, among which the mostly demanded copying machine is selected.

2. Technical Service Section

The equipment is selected by considering that the section functions as a pivot of all the activities of the Center and the mobile training unit is one of most important factors of the activities of the Center. Priority is given in selecting to the printing machine for pamphlets and textboods, video-tape recorder and projector for audio-visual class and motor vehicle for mobile training unit.

3. Operation Section

The calculating machine most important to the section is selected.

4. Agriculture

In selecting the equipment, the consideration is given that the agricultural training is most important for the Center. Selected equipments are agricultural tools required for practice farm, equipment required for attaining the knowledge and skill for better productivity in farming and livestock raising, also small tractor, cultivator and other apparatus for the training to master the handling skill, which are mostly of Thai products except those of Japanese made to be used for Agricultural research purposes.

5. Auto and Small Engine Repair

Mainly Japanese made machines are selected except engines to be used as teaching materials by considering the purposes of training to acquiring the knowledge and skill required for dismantling, assembling and repair of various engines, power

transmitting apparatus, electric systems and other machines, car body repair and inspection and checking of motor vehicles.

6. Radio and Television

Japanese made machines are mainly selected except small tools by considering the subjects of training to acquire the knowledge and skill required for assembling, inspection adjustment and repair of radios and televisions.

7. Electricity

Mostly Japanese made machines are selected except small tools by considering the subjects of training to acquire the knowledge and skill required for learning elementary electric theory, piping, wiring, checking and reappear of electric facilities, maintenance, checking, adjustment and repair of electric motors and so on.

8. Welding and Metal Work

Mostly Japanese made machines are selected except Thai made small tools by considering the subjects of training to acquire the knowledge and skill required for overhead, horizontal and downhand methods of electric and gas welding, preparatory method for welding tests, embossing metal work, other sheet metal works and appliance handling methods.

9. Construction

Japanese made items are selected except tools and the like of Thai made by considering the subjects of training to acquire the knowledge and skill required for form, fixture and furnishings carpentry and for masonry including concreting, brick laying, tiling and plastering.

10. Typing

The Thai language typewriters said to be more difficult than English typewriting are mainly selected for the typist training course.

11. Hairdressing

Stand type hair dryers are mainly selected.

12. Tailoring

13. Dressmaking

Sewing machines are mainly selected.

14. Barbering

Appliance suitable for training by the mobile training unit are selected.

5.9 Equipment List

	Number
<u>1. Directorate Office Section</u>	
1. Photo Copying Machine	1
2. Electronic Calculator (desk type)	2
<u>2. Technical Service Section</u>	
1. Film Projector 16 m.m.	2
2. Video Tape (Studio Installation)	1
3. Video Tape (Mobile)	3
4. Dark Room Equipment	1
5. Off-set Duplicator and Platemaker	1
6. Blueprint Machine	1
7. Duplicating Machine	1
8. Typewriter Thai 13"	3
9. Typewriter, English 12"	2
10. Tape Recorder (Studio installation)	1
11. Tape Recorder	3
12. Camera - 16 m.m.	1
13. Camera - 8 m.m.	1
14. Overhead projector	2
15. Opaque projector	1
16. Slide projector	2
17. Cenerator 2KVA	2
18. Microphone	8
19. Microphone Stand	8
20. Amplifier 50 W	2
21. Micro Bus 15 person Gasoline En.	1
22. Station Wagon 6 " " "	2
23. Land Cruiser 5 " " "	1
24. Pickup Truck 2 " " "	1
<u>3. Operation Section</u>	
1. Electric table calculator	5

Equipment List	Number
<u>4. Agriculture</u>	
1. Maize Sheller	2
2. Seed grader	2
3. Pruning knife	30
4. Pruning saw	50
5. Shear for cutting flower	25
6. Pruner	50
7. Porter pole pruner	10
8. Duster-Mist Blower	2
9. Hand Sprayer	10
10. Carden Rake	50
11. Soil Moisture Tendionmeter	2
12. Acid testing set	5
13. Seed Moisture Test	2
14. Seed Sower	5
15. Mist Sprayer	2
16. Leaf Crinder	4
17. Germination Tester	2
18. Soil Auger, Borer	2
19. Thresher	1
20. Electric Fruits Blender	3
21. Engine Sprayer	2
22. Vegetable Cutter	1
23. Respirator-Toxic Type	5
24. Even-End Shovel	25
25. Soil Basket	100
26. Large Crocodile Erand Hoe	100
27. Spade	100
28. Watering can (shoulder-carry)	25
29. Insect case	2
30. Egg Grader	2
31. Egg Candler	2
32. Chick Incubator	2

Equipment List	Number
33. Pig Tooth Nipper	2
34. Artificial Inseminator Kit, and Dry Ice (Liquid Nitrogen)	2
35. Electric Incubator	2
36. Egg Scale	1
37. 1,000 Kg. Scale	2
38. Microscope, 1,500	5
39. 7.5 Kg. Utility Scale	10
40. 2 Kg. Scale	2
41. Microwave Oven	2
42. Large Oven 5 Shelves	1
43. Dryer	3
44. Tractor 75 hp. with equipment	1
45. Small Tractor with equipment 8 HP	3
46. Water tank trailer	1
47. Motorcycle c.c. 90cc	2
48. Lawn Mower, Hand truck system	3
49. Tap Cutter Set	2
50. Wrench Set, Tap	2
51. Diesel Water Pump Type/tube 4" and Equipment	3
52. Electric Water Pump 4 hp. 3.7 kw 0.7m ³ x 13m	1
53. Crease Pump	1
54. Crease Gun	2
55. Drill Hand Electric ½" H.D.	2
56. Portable Electric Drill ½" H.D.	2
57. Anvil	2
58. Thresher	1
59. Huller	1
60. Jack Hydraulic	1
61. Steel Measuring Tape	2
62. Measure Tape	2
63. Circular Saw	1
64. Circular Saw Sharpening Machine	1

Equipment List	Number
<u>5. Auto and Small Engines Repairs</u>	
1. 4 Cylinder 4 strokes gasoline engine completed with transmission	5
2. 4 Cylinder 4 strokes diesel engine completed with transmission	2
3. 2 Cylinder 4 strokes gasoline engine completed with transmission	2
4. 2 Cylinder 2 strikes gasoline engine completed with transmission	2
5. 2 Cylinder 4 strokes gasoline engine motorcycle	2
6. 2 Cylinder 2 strokes gasoline engine motorcycle	2
7. 1 Cylinder 4 strokes gasoline engine	4
8. 1 Cylinder 4 strokes diesel engine	4
9. 1 Cylinder 4 strokes gasoline engine motorcycle	4
10. 1 Cylinder 2 strokes gasoline engine 70 CC.	4
11. Garage Jack Hydroulic 3 tons	2
12. Battery charger 6-12 votts. slow type 20 Amp.	2
13. Battery charger 6-12 votts. (Booster) Quice charge 50 Amp.	2
14. Bench Grinding machine High speed type	2
15. Electric hand drill ½ inch. ESD-330 D x Ø ½	2
16. Electric portable drill DG-5	2
17. Hydraulic compressor (handpump) MH-3	2
18. Air Compressor 3 hp. SU-229 BA	2
19. Crane 2 tons	1
20. Crane 1½ tons CF-1-1½	2
21. Spark Plug cleaner SP-30D	2
22. Grease gun and Lubricator S + B - 60	2
23. Nozzle testing DT-60	2
24. Timing light (gasoline) KTL-12	2
25. Advance test Tachometer Diesel DET-55	2
26. Tach-Dwell Meter	2
27. Compressor Gauge	G-24B 2
28. Electric Soldering Iron 200 watts	2
29. Carwasher Car CW-16	2

Equipment List	Number
30. Parts washer stand WS-25D 200 volt.	2
31. Anvil 50 kgs.	2
32. Battery Tester PB-12	2
33. Vise 4" 100. MM-UV-100	4
34. Universal Puller Set up-300	2
35. Universal Tool Set 1000-M	3
36. Universal Tool Set 1000-I	2
37. Auto Tool Box TB-6	4
38. Mechanic Stand	4
39. Volt Ampere Meter EM	2
40. Torque wrench 460 F	2
41. Deluxe Tool cabinet	2
42. Torque wrench 1900 F	2
43. Hexagon wrench AW-70	2
44. Hexagon wrench AW-8	2
45. Hexagon wrench AW-101815	2
46. Bell Hammer 16 lb.	5
47. Bell Hammer 1 lb.	5
48. Bell Hammer 2 lb. BH-32	4
49. Hammer Plastic PH-2 450 g	4
50. Screwdrivers standard 6" 6BH(-)	10
51. Screwdrivers standard 8" 8BH(-)	10
52. Screwdrivers standard 10" BH(-)	10
53. Screwdrivers standard 12" BH(-)	4
54. Screwdriver Phillip 6" No 3B (+)	10
55. Screwdriver Phillip 8" No 4B (+)	10
56. Chain Nose Cutting Plier	10
57. Diagonal cutting Plier	10
58. Combination Pliers H-28	10
59. Adjustable Pipe/Wrench PW-10	10
60. Vise grip 12" VC-7	10
61. Spapping Plier	10
62. Spapping Plier SPS-4	10

Equipment List		Number
63. Piston Ring Tool RT-45		2
64. Piston Ring compression		2
65. Piston Valve Lifter compressor		2
66. Piston Valve Lifter compressor		2
67. Hack Saw Frames 12"		10
68. Universal Chain wrench BCW-6		2
69. Steel Ruller	600mm	4
70. Steel Ruller	300mm	2
71. Punch Driver Pin and Chiesels Plate		4
72. Centre Punch set		2
73. Screw Plate M-618		2
74. Taps and Dies I-412		2
75. Oiler PO-01		5
76. Gasket outting Punch Set		2
77. Service creeper SC-12		4
78. Rigid Rack M-12B		5
79. Attack Driver Set S-112A		4
80. Engine cleanning Gun 88 ED-5		2
81. Tinner shears 240 C		4
82. Tinner shears 240 ST		4
83. Ring groove scraper		2
84. Filler gauge (FEELER GAUGE)		6

6. Radio and Television

1. Multimeter		20
2. Digital Multimeter		2
3. Electric Soldering Gun		20
4. Electric Soldering Iron		20
5. Audio generator		2
6. RF. signal generator		2
7. RF. Sweep Marker generator		2
8. Signal Tracer		2
9. Audio Sweep generator		2

Equipment List	Number
10. General purpose Oscilloscope	2
11. Dual beam Oscilloscope	2
12. RF. Piclo Strength Metor	2
13. AF. Ohm meter	2
14. Black & White Color Pattern Generator	2
15. Transistor Tester	2
16. Demonstration board transmission and Radio	2
17. Demonstration. T.V. B & W	2
18. Demonstration. T.V. Color	2
19. T.V. Receiver Black & White	5
20. T.V. Receiver Color	4
21. Amplifier Stereo 180W and speaker	2
22. Record Player (stereo)	2
23. Tape cassette stereo recorder	2
24. Screw Drivers (Flat) & Phillips	20
25. Plier Diagonal Cutting and grinder cutter	20
26. Plier Long Chain	20
27. Plier Electrician	10
28. Hach saw	10
29. A.M., F.M. Radio Receiver	2
30. Vise Machine 2"	2
31. Vise Machine 4"	2
32. T.V. Camera Set	1
33. Video tape T.V.	1
34. Electric Portable Drill ½"	2

7. Electricity

1. Electric Press ½"	1
2. Electric Portable Drill ½"	2
3. Electric Portable Drill ½"	2
4. Vise Machine 4"	5
5. Plier Diagonal Cutting	20
6. Plier Long Chain	20

Equipment List	Number
7. Plier for Electrician	10
8. Multimeter	10
9. Insulative tester	2
10. Electric Soldering gun	5
11. Soldering Iron	5
12. Hammer clip	20
13. Adjustable wrench Set	5
14. Serew Drivers Flat and Phillip Set	4
15. Puller	2
16. Copper pipe cutter	2
17. Pipe cutter ¼" - ¾"	2
18. Press copper pipe plier ¼" - ¾"	2
19. Flaring tool	2
20. Pipe expanded tool set	2
21. Pipe bender 3/8" - 1"	1
22. Hack Saw Frame	10
23. Wiring machine (manual)	10
24. Wiring machine (electric)	2
25. Plier (spring cutter)	2
26. Motor for apprenticeship	10
27. Amature tester	2
28. Watt-Hour meter	2
29. Clamp Ammeter	2
30. Electric frequency Testor	2
31. Vise Machine 4"	4
32. Electric tool for apprenticeship (Home economic)	2
33. File set	2
34. Grinder (Table Type)	2
35. Level	4
36. Anvil	1
 <u>8. Welding and Metal Work</u>	
1. Ac Arc welder 300 Amp B-300A	2

Equipment List		Number
2.	Ac Dc Arc wedler 300A	2
3.	Oxygen cylinder	2
4.	Acetylene cylinder	2
5.	Acetylene Generator	2
6.	Gas cutting Tool & Regulator	2
7.	Spot welding SU 3800-6000 Amp. 9.2 KVA	1
8.	Pipe benging machine Ø 2"	1
9.	Sheet metal forming set	1
10.	Sheet metal bending machine	1
11.	Combination brake and folder	1
12.	Slip roll forming machine	1
13.	Squaring shear 8"	1
14.	Squaring shear 10"	1
15.	Arc welding table	2
16.	Gas welding table	2
17.	Power hack saw	1
18.	Drill press	1
19.	Hand drill ½"	2
20.	Hand drill 3/8"	2
21.	Drill twist set	2
22.	Grinding machine (Table Type)	2
23.	Disc Grinder 125 m.m.	1
24.	Disc Grinder 150 m.m.	1
25.	Disc Grinder 180 m.m.	1
26.	Air compressor	1 HP
27.	Sprayer set (Painting)	1
28.	Mechanic vise	6
29.	Rivet set	2
30.	Anvil 50 L.B.	2
31.	Jig saw	2
32.	Fieder cutting	1
33.	Pipe cutter	1/8"~2"
34.	Pipe vise	4

Equipment List		Number
35. Fire extinguisher	3kg	4
36. Hammer for auto body set		1
37. Welding boot		5
38. Jack 1 ton		1
39. Mobile AC. welding machine		1
40. Soldering Iron		5
41. Soldering gun		5
42. Soldering copper (various-type)		10
43. Hammer 1 LB		10
44. Hammer for metal forming set		10
45. Combination Snips	270mm	10
46. Hack saw, Hand		5
47. Rivet gun		3
48. C" clamp		5
49. Wrench, adjustable	250mm	5
50. Calipers		3
51. Screw Driver Flat 15"		3
52. Screw Driver Flat 12"		6
53. Screw Driver Flat 8"		10
54. Screw Driver Flat 5"		10
55. Philip head screw driver 15"		3
56. Philip head screw driver 12"		10
57. Philip head screw driver 8"		10
58. Philip head screw driver 5"		10
59. Pipe wrench 24"		2
60. Pipe wrench 15"		2
61. Chain wrench 5"		1
62. Wrench set, Socket		2
63. Auger Bit set of 13		1
64. Punch set		5
65. Plier		6
66. Arc welding shield (hand)		10
67. Arc welding shield (Head)		3

Equipment List	Number
68. Goggles	10
69. Gloves welding set	10
70. Lighter	3
71. File set (rough)	5
72. File set (fine)	5
73. File (round)	3
74. File (triangle)	5
75. File (rat tail)	5
76. Chisel set	5
77. Slag hammer	5
78. Electrode holder	10
79. Wrench adjustable 15"	5
80. Tape 2 m.	5
81. Tape 3 m.	5
82. Rivet set	2
83. Hand Groover (Portable)	2
84. Sheet metal forming set	
84.1 Bench Plate	2
84.2 Needlecase stake	2
84.3 Peakhorn stake	2
84.4 Bending the edge	2
84.5 Candlemold stake	2
84.6 Conductor stake	2
85. Squaring shear (Angle Cutter)	1
86. Ring and circle shear	1
87. Marker number 0 - 9	5mm 2
88. Marker A - Z	5 mm 2

9. Construction

1. Wood planer electric	1
2. Wood jointing machine	1
3. Sander (Portable)	1
4. Wood planer electric (Portable)	1

Equipment List			Number
5.	Screwdriver		5
6.	Carpentry vise		3
7.	Crowbar	390mm 32,500	5
8.	Screwdriver set with electric Portable Drill	32,500	1
9.	Cutting pipe	3/8"~2"	3
10.	Pipe-threading set	1~2 1/2"	1
11.	Mechanic - vise		2
12.	Pipe - wrench 15"		10
13.	Iron chain wrench 5"		3
14.	Screw Driver Flate 4", 6", 10"		2
15.	Screw Driver Phillips 4", 6", 10"		2
16.	Adjustable wrench 12", 18"		2
17.	Electric Drill	10mm	2
18.	Drill twist set	1/16"1/2"	3
19.	Rat tail saw		5
20.	Iron cutting saw		5
21.	Cold chisel set		2
22.	Soldering, electric		3
23.	Hammer Iron		3
24.	File Set		2

10. Typing

1.	Typewriter Thai 13"	10
2.	Typewriter English 12"	2

11. Hair Dressing

1.	Hair dryer (Stand)	10
2.	Hair Dryer	10
3.	Barber Trimming Scissors	20
4.	Mirror	900x600 10
5.	Manicur stool	20
6.	Hair Washing sink	10
7.	Wheeled Tray	10

Equipment List		Number
<u>12. Tailoring</u>		
1. Sewing Machine Treadle		20
2. Sewing Machine Zigzag		2
3. Orelock sewing machine		2
4. Iron		5
<u>13. Dress Making</u>		
1. Sewing Machine Treadle		20
2. Sewing Machine Zigzag		5
3. Zigzag scissor	205mm	10
4. Streight scissor	210mm	20
5. Electric iron		10
<u>14. Barbering</u>		
1. Clipper		20
2. Hair cutting Razor		20
3. Mirror		8
4. Sharpener stone		8

CHAPTER 6. IMPLEMENTATION PLAN

6.1 Scope of Construction Work

The scope of the construction work to be shared respectively by the Japanese party and the Thai party are itemized by each category of the work as follows:

(Hereinafter the Japanese party is called J and the Thai party called T.)

6.1.1 Fundamental Work

(1) Site preparation

(T) Site preparation and leveling work in accordance with the site preparation drawing to be prepared by J.

(2) Water supply

(J) Well boring on the site and installation of pumping equipment, receiving tank and overhead water tank and the construction of underground water main to each building to be provided by J from the above points.

(T) Construction of extended underground water main to each building to be undertaken by T from branch valve to be installed by J.

(3) Drainage

(J) The scope of the work appurtenant to the building to be provided by J, i.e., miscellaneous drain piping from external wall of building to catch basin to be installed at the point 2 meters apart from the wall and sewage piping through the purifier to catch basin to be installed one meter apart to the basin.

(T) Construction of all discharging channels in the site and open drain channels around the site.

(4) Electricity

(J) Outdoor open type substation is installed in the site and low voltage wiring of 3 p. 4 w. 380 V/220 V to the load of each building to be provided by J.

(T) Leading by aerial line into the substation to be installed by J from PEA's 22 kv distribution line. Wiring from the distribution board to be installed by J to the load of each building and facility to be undertaken by T.

(5) Telephone

(T) Leading into MDF to be installed in the Administration building from TOT line.

6.1.2 Building

(J) 12 buildings as indicated in clause 2 of chapter 5.

(T) Housing facility for staff and instructor, dormitory for trainees, guard room, livestock barn and roost in the agricultural zone.

6.1.3 Perimeter Work

(T) Gate, fencing, roads and parking lot in the premises, landscaping including sodding, flagstaff and outdoor lampost installation.

6.1.4 Furnishing and Provision

(T) Regular office furnishing and provision for all facilities in the premises.

6.1.5 Training Equipment and Material

- (J) The equipment and material as indicated in the pertinent list of 5.9 including delivery and installation thereof.
- (T) Those not included in the above including delivery and installation thereof.

6.1.6 Transportation of Equipment and Material

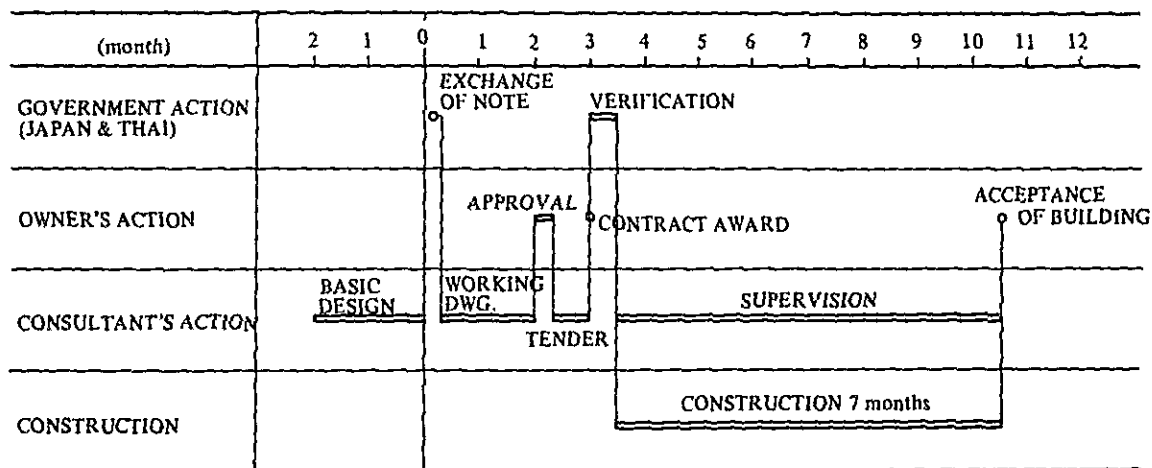
- (J) Packing, insurance, shipping and ocean transport of the equipment and material to be exported from Japan.
- (T) Landing and import custom clearance at the port of Bangkok and inland transport to the construction site of the equipment and material to be imported to Thailand.

6.2 Schedule and Period of Construction Work

Preparation of final design is to be commenced upon signing the Exchange of Note in regard to the grant aid from the Japanese Government for the construction of the Main Center. After completing working drawings, an approval from the owner is asked for about the content, prospective contractors are invited for distribution of bid documents and the tender is called for.

After signing the contract agreement of the construction between the owner and successful bidder, a consent is asked for from the Japanese Government and the construction is started. The period of the construction work is estimated to be about 7 months.

TENTATIVE CONSTRUCTION SCHEDULE



6.3 Approximate Estimate of Cost of Works
To be Undertaken by the Government of Thailand

I Construction

	BT
1. Building Work	43,760,000
2. External Work	8,940,000
3. Basic Service Work	1,250,000
Sub-Total	53,950,000

II Furniture & Equipment

1. Furniture	2,000,000
2. Equipment	4,150,000
Sub-Total	6,150,000
 Total	 60,100,000

Breakdown of Construction Cost

1. Building Work

1) Dormitory for 26 persons	x 2 units	.....	3,864,000
2) Dormitory for 10 persons	x 6 "	.....	4,320,000
3) Staff Residence	x 5 "	.....	4,900,000
4) Staff Flat for 10 families	x 3 "	.....	23,400,000
5) Staff Flat for 20 families	x 2 "	.....	7,200,000
6) Guard House	x 3 "	.....	76,000
Sub-Total		.....	43,760,000

2. External Work

1) Site Development including Open Ditch	....	1,500,000
2) Public Road	.....	2,300,000
3) Roads in the Premises & Approach	.....	2,500,000
4) Parking Area	.....	40,000
5) Fence & Gates	.....	600,000
6) Exterior Lighting System	.....	2,000,000
Sub-Total	.....	8,940,000

3. Basic Service Work

1) Water Supply System	.....	550,000
2) Electric Supply System	.....	700,000
Sub-Total	.....	1,250,000

Total 53,950,000

6.4 Operation and Maintenance Plan

It is essential to conduct proper operation and maintenance as well as to establish operation system and organization of

the Center in order to uphold the function of the Center and to achieve the proposed purposes. The operation and maintenance plan of the Center first starts with properly arranging the operation system by securing qualified personnel to conduct operation and training as well as the staff to engage in maintenance of the facilities along with the personnel recruiting plan. The maintenance of the facilities shall be successfully conducted not affect respective function under the sole responsibility of the person in charge of whole facilities. The equipments are regularly checked and repaired with established complete inventory system under responsible custody of respective section. Also, proper arrangement shall be made for maintaining the function of the Center and the trainees of proposed number shall be recruited. Considering the various factors of the situations surrounding the residents of prospective three provinces, the recruitment for various trainings in the Center shall be extended in wide range to fill the capacity.

The budget must bve secured in order to substantiate the operation and maintenance of the Center to be carried out satisfactorily. The operation and maintenance cost consists of personnel expenses, facilities and equipment maintenance cost, training equipment cost, utilities cost, vehicle maintenance cost, consumables and other miscellaneous expenses. The cost on trial calculation based on the data obtained from the local survey for the first year is as follows;

Approximate operation and maintenance cost

	(BT)
1. Personnel expenses	4,170,000
2. Maintenance and supplies	700,000
3. Material cost	2,000,000
4. Electricity and gas	600,000
5. Fuel and maintenance cost of vehicles	250,000
6. Office supplies	200,000
7. Miscellaneous expenses	1,180,000
Total	9,100,000

Note: Building construction cost, material and equipment cost to be undertaken by the Thai party are not included in the above.

CHAPTER 7. EVALUATIONS

7.1 Social Benefit

In Thailand, though the agriculture is major industry, the income gap between the urban area and rural agricultural area is growing bigger. The efforts that the Thai Government has been continuously making to rectify the gap. In the Fifth Socio-Economic Development Plan the Government pays her utmost consideration to the poverty of the rural area by giving the top priority and the Ministry of Education is promoting the Non-Formal Education which have direct bearing on the living standard improvement based upon the said Development plan.

The proposed Project is planned out to establish the Center to conduct the Non-Formal Education focussing on the vocational training to meet the requirement of prospective regional people, and to acquire the knowledge and skill for the agriculture as well as for small scale industries, home economy, household industries and so on, all of which are designed to improve their economic conditions and to settle them in the Projected area by upgrading their living and social standard.

In the agricultural training, the cultivation of marketable cash crops and the farm and livestock productivity improvement suitable to local characteristics are carried out so that the rural people can concentrate in the agriculture as trueborn farmers to bring about thriving agricultural industry. The training for small scale industries is conducted in a wide range including maintenance and repair of the motor vehicle, small engine and pump, sheet metal work, welding, other constructional techniques, electric wiring, radio and TV repair

and so on. The tailoring, dressmaking, hairdressing, handicraft, typewriting, bookkeeping and other training are conducted to be utilized for the direct job opportunity in the project area. These contribute to have the opportunity for employment and cash income as well. At the same time the Project will serve about 90,000 local people, and it will largely benefit low income families of the community, who have very few opportunities to be able to receive higher education.

7.2 Economic Benefit

The buildings to be constructed in the Main Center are the administration building to accommodate the Directorate Office Section for controlling all activities, the Technical Service building, auditorium, the workshop classroom buildings to conduct wide range of trainings, trainees dormitories, housing and apartment buildings for staff and instructors.

In order to alleviate the financial burden of the Thai Government local materials and methods of the construction shall be positively adopted to reduce construction unit cost. The appearance of the buildings is designed to harmonize with the surroundings by fully considering local speciality. With regard to selecting criteria of the materials and equipment and considering proposed function of the Center, main equipments are selected from a view point of an easy and economical operation and maintenance.

The estimated budget for the Project by the Ministry of Education is sufficient comparing to the trially calculated amount Baht 9,100,000 per year, against which the budget calculated by the Thai party for the first year is Baht 9,082,000 by even after subtracting the miscellaneous expenses of Baht 12,000,000.

CHAPTER 8. CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

As mentioned above, the proposed Project is effective for the educational development problem in rural area, appropriate from both economic and technical viewpoints for local conditions and based on the least cost consideration in the contest of Thailand.

8.2 Recommendations

1. Transportation charges for commuting the Center is expensive to trainees, therefore, utmost efforts must be made to alleviate their burden in order to effectively operate the Project, for which the following measures should be considered.

- 1-1 In each course other than long term agricultural training including special training like farming practice, the training hours per day should be intensive in the shortest possible time.

- 1-2 The transportation charges to the Main Center are burdens to the majority of the trainees except those living nearby the Main Center, therefore, suitable accommodation should be prepared even though two dormitory buildings are provided in the scope of the Japanese grant aid.

- 1-3 One of the other remedies for the financial burden to the trainees will be the subsidy system, while, it is desirable to utilize efficiently the mobile training unit to conduct the training on the spot particularly for short term training.
2. The equipments to be provided from the Japanese grant aid are mostly for training purpose and also limited to principal equipment, therefore, all other furnishings and supplies are to be prepared by the Thai Government. It is expected to secure the budget for the items to be undertaken by the Thai side.
3. It is essential to recruit necessary number of staff and instructors in order to operate and maintain the Center effectively and achieve the proposed objects. Accordingly, necessary arrangement for recruitment should start before the construction works.

APPENDIXES

APPENDIXES

1. MINUTES
2. POPULATION
 - 2-a Population of the Whole Kingdom
 - 2-b Population of the Central Region by Changwat
 - 2-c Population of the Project Area by Age, 1970
3. CONSUMER PRICE INDEX
 - 3-a Consumer Price Index for Whole Kingdom by Groups
 - 3-b Consumer Price Index for Bangkok Metropolis
 - 3-c Consumer Price Index for Whole Kingdom by Regions
4. MAIN CONSTRUCTION MATERIALS AND OIL PRICE LIST
5. CONSTRUCTION COST LIST
6. SURVEY DRAWING
7. SOIL CONDITION OF THE SITE

1. MINUTES

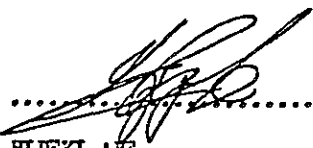
Minutes of Discussions
on
the Establishment of the Vocational Training and Development Center
in Thailand

In response to a request made by the Government of Thailand for the establishment of the vocational training and development centre in Thailand (hereinafter referred to as "the Project"), the Government of Japan has sent, through the Japan International Cooperation Agency (hereinafter referred to as "JICA") which is an official agency implementing the technical cooperation of the Government of Japan, a team headed by Mr. HIDEKI ABE, Head of Basic Design Division of Grant Aid Department, JICA to conduct a basic design survey for the project from November 1st, 1981.

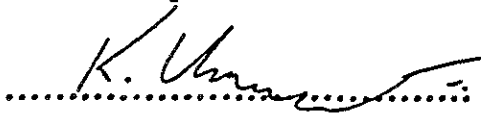
The team has carried out a field survey, held a series of discussions and exchanged views with the Thai Authorities concerned as to the Project.

The Japanese survey team and the Thai Authorities concerned have agreed to recommend to their respective Governments to examine the results of the survey attached herewith toward the realization of the project.

November 10th, 1981


.....
HIDEKI ABE
Head, Japanese Survey Team
J I C A


.....
For the Director-General, NFE Dept.

In the presence of

.....
for Director-General, DTEC

1. The purpose of this project is to provide necessary buildings and facilities as well as equipment for the establishment of the Vocational Training and Development Centre for Thai People in the Far East Region (hereinafter referred to as "the Centre").
2. The Centre will undertake its activities based on the following objectives;
 1. To provide vocational skill training as relevant to the needs and problems of the people living in the villages along the Thai-Kampuchean Border.
 2. To act as the inter-agency coordinative centre for the provision of nonformal education activities to the rural people in the target communities.
 3. To be the centre for demonstration on modern agricultural productivity as well as for promotion and dissemination of knowledge on various cooperatives fields.
 4. To be the centre for experimentation and demonstration on appropriate technology.
 5. To organize learning programmes and activities pertinent to the needed improvement of the quality of life of the people in the existing environment.
3. The proposed site of the Centre is the land acquired by the Thai Government at SA-KAEO, Prachinburi Province.
4. The Description of programmes of the Centre is as given in Annex 1. The Japanese Survey Team will convey the desire of the Thai Authorities concerned to the Government of Japan that the latter will take necessary measures to cooperate in implementing the project and provide with buildings and other items as listed in Annex II within the scope of Japan's Economic Cooperation Programme in grant form.
5. The Thai Authorities concerned will take necessary measures listed in Annex III on condition that the grant assistance by the Government of Japan is extended to the Project.

M.A

*Wald,
Kasem*

ANNEX 1.

1. Programmes to be organized in the Centre

1. Agriculture
2. Industry
3. Home economics
4. Business
5. Home industry
6. Appropriate technology
7. Related vocational courses and recreation

H.A.

*Michael
Karam*

ANNEX II

Items requested by the Thai Authorities whose costs will be borne by the Government of Japan, and the priority order is shown as follows.

1. Building

- Administration
- Auditorium
- Technical Service-1 (Printing etc.)
- Technical Service-2 (Library & Audio-Visual Laboratory)
- Operation Sect., Cooperative
- Industry, Workshop-1 (Auto-repair, Welding & Construction)
- Industry, Workshop-2 (Electricity & Radio)
- Home Economics, Class room
- Business Administration & Home Industry, Class room
- Agriculture, Green house
- Agriculture, Animal Husbandry
- Agriculture, Storage

2. Equipment for

- | | |
|----------------------|--------------------------|
| - Technical Services | - Accounting |
| - Wood Making | - Music |
| - Agriculture | - Handicraft |
| - Auto-Mechanic | - Basketing |
| - Hair Dressing | - Pottery |
| - Tailoring | - Silk Screen |
| - Barbering | - Radio and Television |
| - Cooking | - Leathering |
| - Typing | - Electrics |
| | - Welding and Metal work |

H.A.

Richard
Kasun

ANNEX III

Following arrangements are required to be taken by the Government of Thailand

1. To secure a lot of land necessary for the construction of facilities and to clear, fill and level the site as needed before the start of the construction.
2. To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities outside the Building.
3. To ensure prompt unloading and customs clearance at ports of disembarkation in Thailand and prompt internal transportation thereof of the products purchased under the grant.
4. To exempt Japanese nationals from customs duties, internal taxes and other Fiscal levies which may be imposed in Thailand with respect to the supply of the products and the services under the verified contracts.
5. To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into Thailand and stay therein for the performance of their work.
6. To maintain and use properly and effectively that the facilities constructed and equipment purchased under the grant.
7. To bear all the expenses, other than those to be borne by the grant, necessary for the construction of the facilities as well as for the internal transportation of the products and services under the grant.
8. To undertake incidental civil works such as road planting, gates, gate offices, parking lots and exterior lighting, if needed.

H.A.

Wichai
Kasong

2. POPULATION

2-a. POPULATION OF THE WHOLE KINGDOM

Census population		Estimated Population (mid-year)				Density (per sq. km) 1979
April 1st, 1970	Dec. 31st, 1979	1976	1977	1978	1979	
34,397,374	46,113,756	42,960,000	44,039,000	45,100,000	46,142,000	85

2-b. POPULATION OF THE CENTRAL REGION BY CHANGWAT

Changwat, Region	1947	1960	1970	1970 Pop. per Sq. km	Percent increase	
					1947~ 1960	1960~ 1970
Whole Kingdom	17,442,689	26,257,916	34,397,374	67	50.5	31.0
Central Region	5,428,897	8,271,302	10,611,877	102	52.4	28.3
Phra Nakhon	889,538	1,577,003	2,157,303	1,963	77.3	36.8
Thon Buri	289,343	559,432	920,058	2,045	93.3	64.5
Kanchanaburi	140,812	233,341	329,054	17	65.7	41.0
* Chanthaburi	114,076	157,803	216,344	36	38.3	37.1
Chachoengsao	242,898	322,660	354,521	65	32.8	9.9
Chon Buri	210,513	392,025	541,695	121	86.2	38.2
Chai Nat	170,962	245,317	261,513	99	43.5	6.6
* Trat	45,040	66,328	94,119	32	47.3	41.9
Nakhon Nayok	117,004	153,683	163,036	68	31.3	6.1
Nakhon Pathom	273,683	370,481	419,319	193	35.4	13.2
Nonthaburi	133,623	196,196	269,067	432	46.8	37.1
Pathum Thani	142,488	189,801	233,861	156	33.2	23.2
Prachuap Khiri Khan	73,400	152,456	249,202	39	107.7	63.5
* Prachin Buri	225,636	334,895	423,810	36	48.4	26.6
Phra Nakhon Si Ayutthaya	373,889	478,738	501,737	202	28.0	4.8
Phetchaburi	180,251	237,853	289,719	46	31.9	21.8
Rayong	84,461	147,713	250,671	76	74.9	69.7
Ratchaburi	301,563	410,573	482,696	94	36.1	17.6
Lop Buri	202,041	335,661	463,933	70	66.1	38.2
Samut Prakan	163,137	234,701	329,404	353	43.9	40.4
Samut Songkhram	126,592	161,899	162,526	407	27.9	0.4
Samut Sakhon	113,673	165,712	200,460	239	45.8	21.0
Saraburi	207,051	303,505	353,436	119	46.6	16.5
Sing Buri	115,669	154,409	165,371	196	33.5	7.1
Suphan Buri	341,039	491,252	562,008	105	44.0	14.4
Ang Thong	150,515	197,865	217,014	222	31.5	9.7

2-c. POPULATION OF THE PROJECT AREA BY AGE 1970

Changwat, Region	0~4 Years	5~9	10~14	15~19	20~24	25~29	30~34	35~39	40~44
Chanthaburi	34,378	32,141	27,619	22,400	14,829	14,416	14,615	13,331	10,384
Trat	15,169	13,642	11,616	9,656	6,676	6,838	6,514	5,652	4,632
Prachin Buri	74,303	68,889	57,602	44,161	30,274	25,624	24,958	22,733	19,211

Changwat, Region	45~49	50~54	55~59	60~64	65~69	70 and over	Un-known	Median age
Chanthaburi	7,922	6,451	5,496	4,487	3,207	4,407	261	18.0
Trat	3,477	2,823	2,399	1,798	1,286	1,817	124	18.3
Prachin Buri	14,713	11,349	9,893	7,266	5,441	6,826	567	16.0

3. CONSUMER PRICE INDEX

3-a. CONSUMER PRICE INDEX FOR WHOLE KINGDOM BY GROUPS AUGUST 1981 (1976=100)

Group and subgroup	Indexes			Percentage Change from	
	Aug. 1981	July 1981	Aug. 1980	July 1981	August 1980
<u>ALL COMMODITIES</u>	173.4	172.7	156.0	+ 0.4	+ 11.2
<u>FOOD AND BEVERAGES</u>	172.0	171.1	158.8	+ 0.5	+ 8.3
Rice and cereal products	188.3	186.9	147.1	+ 0.7	+ 28.0
Meat, poultry and fish	170.4	170.5	164.3	- 0.1	+ 3.7
Vegetables and fruits	154.6	151.5	154.8	+ 2.0	- 0.1
Eggs and milk products	146.8	144.0	124.0	+ 1.9	+ 18.0
Other food bought in market	159.5	160.2	174.8	- 0.4	- 8.8
Non-alcoholic beverages	193.1	192.2	176.7	+ 0.5	+ 9.3
Prepared food	174.9	174.9	159.8	0.0	+ 9.4
<u>CLOTHING AND CLOTH</u>	166.7	166.4	153.8	+ 0.2	+ 8.4
Men's and boy's	166.2	166.1	153.9	+ 0.1	+ 8.0
Women's and girl's	165.7	165.1	152.5	+ 0.4	+ 8.7
Cloth and sewing services	171.9	171.5	157.0	+ 0.2	+ 9.5
<u>HOUSING AND FURNISHINGS</u>	167.2	166.2	147.2	+ 0.6	+ 13.6
Shelter	136.5	134.5	125.9	+ 1.5	+ 8.4
Furniture and equipment	166.7	166.5	155.2	+ 0.1	+ 7.4
Paper and cleaning supplies	149.0	148.9	130.6	+ 0.1	+ 14.1
Household textiles	150.1	149.5	138.0	+ 0.4	+ 8.8
Household operations	225.7	226.2	186.1	- 0.2	+ 21.3
<u>HEALTH AND PERSONAL CARE</u>	165.0	164.5	149.5	+ 0.3	+ 10.4
Medical care	166.2	166.2	154.5	0.0	+ 7.6
Personal care	162.8	161.7	143.6	+ 0.7	+ 13.4
<u>TRANSPORTATION</u>	224.4	224.1	180.7	+ 0.1	+ 24.2
Vehicles	215.5	215.0	188.0	+ 0.2	+ 14.5
Public transportation	240.7	240.6	176.7	0.0	+ 36.2
<u>RECREATION AND EDUCATION</u>	160.6	160.6	147.2	0.0	+ 9.1
Recreation	138.8	138.8	131.3	0.0	+ 5.7
Reading and education	183.4	183.4	164.0	0.0	+ 11.8
<u>TOBACCO AND ALCOHOLIC BEVERAGES</u>	142.9	142.9	127.3	0.0	+ 12.3
Non-food and beverages	171.8	171.2	151.4	+ 0.4	+ 13.5

Source: News Synopsis

3-b. CONSUMER PRICE INDEX FOR BANGKOK METROPOLIS
AUGUST 1981 (1976=100)

Group and subgroup	Indexes			Percentage Change from	
	Aug. 1981	July 1981	Aug. 1980	July 1981	August 1980
<u>ALL COMMODITIES</u>	177.6	177.1	159.1	+ 0.3	+ 11.6
<u>FOOD AND BEVERAGES</u>	172.0	171.2	159.1	+ 0.5	+ 8.1
Rice and cereal products	190.8	190.3	146.3	+ 0.3	+ 30.4
Meat, poultry and fish	176.7	176.5	170.1	+ 0.1	+ 3.9
Vegetables and fruits	154.8	151.3	153.7	+ 2.3	+ 0.7
Eggs and milk products	145.9	143.4	124.5	+ 1.7	+ 17.2
Other food bought in market	159.3	159.9	178.3	- 0.4	- 10.7
Non-alcoholic beverages	188.3	188.3	174.5	0.0	+ 7.9
Prepared food	166.5	166.5	152.0	0.0	+ 9.5
<u>CLOTHING AND CLOTH</u>	165.3	165.2	157.3	+ 0.1	+ 5.1
Men's and boy's	162.1	162.1	153.5	0.0	+ 5.6
Women's and girl's	171.9	171.9	166.1	0.0	+ 3.5
Cloth and sewing services	165.2	164.6	153.3	+ 0.4	+ 7.8
<u>HOUSING AND FURNISHINGS</u>	170.5	170.3	150.2	+ 0.1	+ 13.5
Shelter	128.7	128.1	121.2	+ 0.5	+ 6.2
House rent	126.2	125.7	119.0	+ 0.4	+ 6.1
Building materials	172.4	172.4	152.3	0.0	+ 13.2
Furniture and equipment	166.5	166.5	160.6	0.0	+ 3.7
Paper and cleaning supplies	155.3	155.3	135.9	0.0	+ 14.3
Household textiles	156.7	156.7	146.4	0.0	+ 7.0
Household operations	235.5	235.7	192.9	- 0.1	+ 22.1
<u>HEALTH AND PERSONAL CARE</u>	180.4	179.6	161.7	+ 0.4	+ 11.6
Medical care	180.2	180.2	165.5	0.0	+ 8.9
Personal care	178.5	176.9	156.0	+ 0.9	+ 14.4
<u>TRANSPORTATION</u>	246.5	246.1	191.5	+ 0.2	+ 28.7
Vehicles	244.6	243.8	209.0	+ 0.3	+ 17.0
Public transportation	258.3	258.2	183.4	0.0	+ 40.8
<u>RECREATION AND EDUCATION</u>	164.9	164.9	147.9	0.0	+ 11.5
Recreation	138.9	138.9	129.7	0.0	+ 7.1
Reading and education	191.0	191.0	166.2	0.0	+ 14.9
<u>TOBACCO AND ALCOHOLIC BEVERAGES</u>	144.1	144.1	127.7	0.0	+ 12.8
<u>NON-FOOD AND BEVERAGES</u>	178.0	177.7	155.6	+ 0.2	+ 14.4

Source: News Synopsis

3-C. CONSUMER PRICE INDEX FOR WHOLE KINGDOM BY REGIONS

Line	Weights	1976					1980				
		March	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1	100.0	100.0	146.6	154.4	154.8	153.9	156.0	156.2	158.2	160.3	159.0
2	35.0	100.0	149.8	157.9	157.7	156.6	159.1	158.8	161.3	163.9	162.0
3	23.0	100.0	144.7	151.3	151.9	151.6	153.0	153.9	156.1	157.6	156.7
4	16.0	100.0	139.4	146.1	146.8	147.1	149.1	150.5	150.6	151.1	151.4
5	15.0	100.0	141.5	153.9	156.1	153.0	153.7	154.4	155.7	157.5	154.9
6	11.0	100.0	143.8	148.0	149.5	150.4	151.7	152.3	153.0	156.3	157.4

Line	1981					
	Jan.	Feb.	March	April	May	June
1	162.3	164.2	168.9	170.7	171.8	172.8
2	166.1	168.3	174.5	176.0	176.6	177.8
3	158.9	161.2	163.6	165.2	166.6	167.3
4	153.4	154.7	158.2	160.6	162.1	162.4
5	158.6	160.2	163.1	166.4	169.0	170.2
6	158.0	158.8	160.7	162.5	164.4	165.2

Source: Department of Business Economics, Ministry of Commerce

4. MAIN CONSTRUCTION MATERIALS AND OIL PRICE LIST

		MAIN CONSTRUCTION MATERIALS PRICE LIST						OIL PRICE LIST	
		CEMENT (BULK)	CEMENT (BAG)	CONCRETE C=300 KG/M ³	DEFORMED BAR SD30 (D16-D28)	DIESEL OIL	MAI- YANG 1M"x3" 3M UP	CRUDE Oil-C	Gasolin Regular
		PRICE P/TON	PRICE P/TON	PRICE P/M ³	PRICE P/TON	PRICE P/LITER	PRICE P/CF ³	PRICE P/LITER	PRICE P/LITER
1980	Jan.	1,115	1,168	770	8,290	4.88	135	2.90	7.45
	Feb.	1,128	1,178	830	8,640	7.39	160	3.61	9.28
	Mar.	1,128	1,178	850	8,640	6.54	160	3.61	9.28
	Apr.	1,128	1,178	850	8,640	6.54	160	3.61	9.28
	May	1,128	1,178	850	8,640	6.54	160	3.61	9.28
	June	1,128	1,178	850	8,640	6.54	160	3.61	9.28
	Jul.	1,128	1,178	850	8,640	6.54	160	3.61	9.28
	Aug.	1,128	1,178	850	8,640	6.54	160	3.61	9.28
	Sep.	1,128	1,178	850	8,640	6.54	160	3.61	9.28
	Oct.	1,250	1,291	885	8,640	6.54	160	3.61	9.28
	Nov.	1,250	1,291	885	8,640	6.54	160	3.61	9.28
	Dec.	1,250	1,291	885	8,640	6.54	160	3.61	9.28
1981	Jan.	1,250	1,291	910	8,640	7.39	160	4.47	11.40
	Feb.	1,346	1,460	955	8,640	7.39	160	4.47	11.40
	Mar.	1,410	1,460	955	8,640	7.39	160	4.47	11.40
	Apr.	1,410	1,460	955	8,640	7.39	160	4.47	11.40
	May	1,410	1,460	955	9,240	7.39	160	4.47	11.40
	June	1,601	1,651	1,010	9,240	7.39	160	4.47	11.40
	Jul.	1,601	1,651	1,010	9,240	7.39	160	4.47	11.40
	Aug.	1,601	1,651	1,010	9,240	7.39	160	4.47	11.40
	Sep.	1,601	1,651	1,010	9,240	7.39	160	4.47	11.40
	Oct.	1,601	1,651	1,030	9,240	7.39	160	4.47	11.40
	Nov.	1,601	1,651	1,030	9,240	7.39	160	4.47	11.40

5. CONSTRUCTION COST LIST

1. Average Construction Cost of building per square meter (m²) include service facilities

	Construction	M & E	Total
Office Building	6,300~7,500	3,200~4,000	9,500~11,500
School (High grade)	7,400.-	11,500.-	8,900.-
Hospital	12,100.-	7,500.-	19,600.-
Laboratory	7,000.-	2,600.-	9,600.-
Factory	4,200~6,700	600~9,300	4,800~16,000
Warehouse	3,200~3,900	300~600	3,500~4,500
Dormitory	3,500~4,000	1,000~1,500	4,500~5,500
Residence	5,000~19,600	1,500~7,400	6,500~27,000

2. Construction Cost for Detailed Items
(Include Installation and labor cost)

<u>Item</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Remarks</u>
Excavation	M ³	45~50	H=0.5~1.5 ^m
Backfilling	M ³	40~45	
Concrete (LEAN)	M ³	M ₈₀₀ +L ₁₅₀	
Concrete for structure	M ³	M _{1,070} +(L ₁₂₀ ~130)	
Concrete form	M ²	170~190	exposed 220~250
Reinforce Steel	ton	See IV-3	
Fabrication of reinforce steel	ton	1,250~1,350	
Steel frame	ton	See IV-3	
Fabrication of steel frame	ton	3,500.-	
Erection of steel frame	ton	1,500.-	

<u>Item</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Remarks</u>
Concrete block	4"	150.-	
Brick	m ²	130.-	
Terrazo block	m ²	500~1,000	
Ceramic tile	m ²	M ₂₂₀ +(L ₁₂₀ ~130)	
Porcelain tile	m ²	270+(L ₁₂₀ ~130)	
Roof tile	m ²	300~500	
Corrugate cement asbestos board	m ²	140.-	
Cement mortar (Floor)	m ²	75.-	
Terrazo (Floor)	m ²	330.-	
" (Wall)	m ²	350.-	
Plaster (Wall)	m ²	80.-	
Wooden flush door 900wx2,100h (include hardware)	piece	3,900.-	
Steel flush door 900wx2,100h (include hardware)	piece	4,200.-	
Aluminum sash 1,800wx1,500h (Sliding)	piece	4,500.-	
Glazing (Clear Glass 5T)	m ²	830.-	
Painting: Oil paint for metal	m ²	M _{25~30} L ₂₀	
Oil paint for wood	m ²	" L ₂₀	
Acrylic resin emulsion paint	m ²	M ₂₀ L ₂₀	
Plastic flooring tile	m ²	M+L ₁₃₀	
Plywood 10,	m ²	M ₁₂₀	
Gypsum board 12T	m ²	65	

<u>Item</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Remarks</u>
Cement asbestos board 6m/m	m ²	50.-	
Wooden framing (Wall & partition)	m ²	260.-	
Wooden joist framing (Ceiling)	m ²	220.-	

3. Construction Material Cost

BKK. Nov. 1981

<u>Item</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Remarks</u>
Cement (Bag) Portland I	ton	1,651.-	
Cement (Bulk) Portland I	ton	1,601.-	
Ready Mixed concrete 250kg/m ² ℓ=360kgs/m ³	m ³	1,110.-	
Ready Mixed concrete 300kg/m ² ℓ=375kgs/m ³	m ³	1,150.-	
Lime 6kg/bag	bag	8.-	
Rough sand	m ³	170.-	
Fine sand	m ³	195.-	
Gravel No.1	m ³	190.-	
Concrete pile	piece		
Prestressed concrete pile	piece	4,095.-	
Reinforce steel SR.24 9ø	ton	9,695.-	
12ø	ton	9,295.-	
15ø	ton	9,035.-	
SD.3010ø	ton	9,890.-	
12ø	ton	9,505.-	
16ø	ton	9,365.-	
Structural steel (L=6,000)			
Angle shape 3x40x40	piece	90.-	
" " 6x65x65	"	285.-	
" " 9x75x75	"	500.-	
Channel shape 35x40x5kg/m	"	350.-	
100x50x5kg/m	"	460.-	

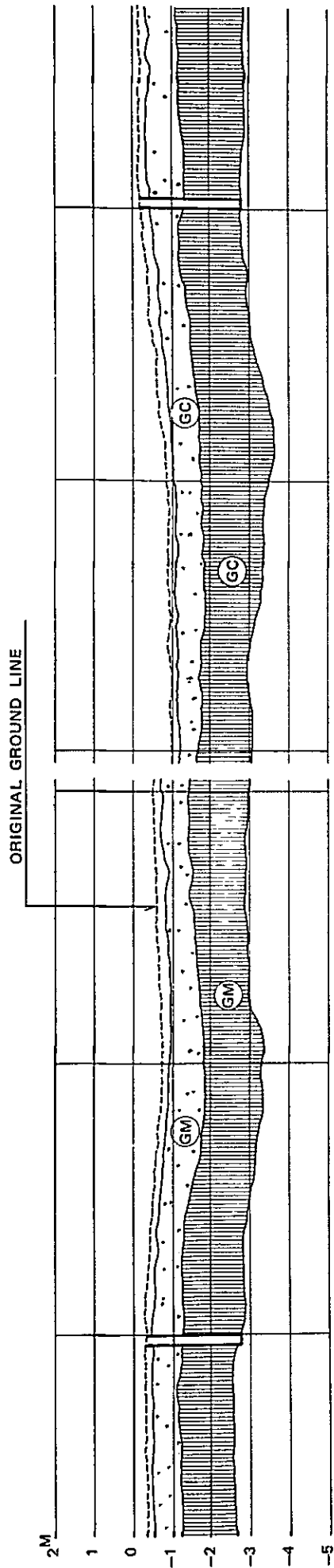
<u>Item</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Remarks</u>
Light guage steel (L=6,000)			
Angle shape 3x40x40	piece	} 9,500.-	
6x50x50	"		
Channel shape 2x80x40	"		
C. shape 2.3x100x50	"		
" 3.2x150x50	"		
Lumber Yang 1/2"x6"x6,000	m ³	} 5,500.-	
1"x1"x4,000	"		
5"x5"x6,000	"		
Takian			
Tong 2"x6"x6,000	"	8,100.-	
Den 1"x4"x4,000	"	9,600.-	
Teak 1"x6"x6'	"	} 20,000.-	
1"x12"x6'	"		
2"x12"x6'	"		
Corrugated roof tile 540x1,200	sheet	28.0	
Corrugated roof coioured 540x1,200	"	38.-	
Plywood S/S 1,200x2,400x10	"	553.-	
Plywood Y/Y 1,200x2,400x15	"	500.-	
Cement asbestos board 1,200x2,400x4	"	99.-	
Cement asbestos board 1,200x2,400x6	"	129.-	
Corrgate cement asbestos board (large) 1.02x1.80	"	139.-	
Gypsum board 1,200x2,400x9	"		
Perticle board (S/Y) 1,220-2,440x12	"	275.-	
Perticle board (Y/Y) 1,220x2,440x12	"	310.-	

<u>Item</u>	<u>Unit</u>	<u>Unit Price</u>
Galvanized iron sheet 665x1,800	sheet	39.-
Corrugated G.I.S.		
Ceramic tile 4"x4"	"	2.-
Marble 300x300x20	m ²	2,000.-
Maka flooring 3/8"T	m ²	215.-
Wood flush door S/S 800x2,000	piece	280.-
Steel sash (project) 600x6,000	"	-
Aluminum sash sliding 980x1,200	"	-
Glass clear 1/8"T Max30"x30"	f ²	10.-
Glass clear 3/16"T " 30"x30"	"	21.-
Paint (Exterior use) (vinyl)	gal	290.-
Paint (Interior use) (")	"	150.-
Wire P.V.C. 4sq/mm.	m	15.-
G.I. Pipe B.S.M. ½"øx6000	piece	108.-
1½"øx6000	"	320.-
Plastic resin coated pipe 4"ø4,000	"	572.-
Cement asbestos pipe 200øx3,000	"	850.-

4. Wage for Construction Workers
per one.day

Laborer		
Earthworker		61~70
Carpenter (Rough)		130~150
Carpenter (Finish)		150~250
Plasterer		130
Reinforce steel worker		100
Painter		130
Tile worker		150~170
Electrician		130~150
Plumber		130~140
Contractor's staff	H	10,000.-/M
	M	7,500.- "
	L	5,000.- "
Foreman		15,000.- "
Japanese		90,000 130,000.-/M

7. SOIL CONDITION OF THE SITE



GC; CLAYEY GRAVELS MIXTURE, MEDIUM PLASTICITY

GM; SILTY GRAVELS, GRAVELS-SAND-SILT MIXTURE

JICA