3-3-5 Training Program

(1) Objectives

Manpower is essential to the success of the Philippine rice production program. Manpower here includes farmer-leaders, extensionists, subject matter specialists and scientists of rice research institutions. The objectives of the PhilRice training programs are to transfer the results of research developed in the seven program thrusts.

(2) Training courses and subjects

Four courses are established to accomplish the above objectives.

	No. of annual participants
a) Farmers' training courses	120
b) Extensionists' training courses	360
c) Specialized training courses	360
d) Administrators' training courses	150

a) Farmers' training courses

Target people : Selected farmers
No. of trainees : 30
Training period : 2 weeks
Annual No. of trainees : 120
Frequency of training : 4 times per year

Goal: To offer basic knowledge and skills on rice farming to create outstanding farmers with the latest technology through technology transfer

Curricular thrusts

1. Upland rice production
2. Rice-based farming systems
3. Water management for rice farming
4. Maintenance and operation of farming equipment
5. Postharvest operation
6. Seed production

b) Extensionists' training courses

Target people : Extensionists of the BPI
No. of trainees : 30
Training period : 4 weeks
Annual No. of trainees : 360
Frequency of training : 12 times per year

Goal: To offer theoretical knowledge and practical skills on rice production to sustain the professional motivation of extensionists in serving Filipino farmers

Curricular thrusts

1. Evaluation of improved varieties
2. Upland rice production
3. Rice-based farming system
4. Irrigation water management
5. Farm engineering and mechanization
6. Prevention of postharvest loss
7. Utilization of rice byproducts
8. Extension and transfer of technology
9. Seed production

c) Specialized training courses

Target people: Governmental or nongovernmental specialists on each subject related to rice production
No. of trainees : 30
Training period : 4 weeks
Annual No. of trainees : 360
Frequency of training : 12 times per year

Goal: To upgrade the professional competence of specialists on various subjects like varietal improvement, integrated pest management, soil and water management, farm equipment, rice processing, farming systems, etc. for further technological advancement

Curricular thrusts

1. Varietal improvement
2. Integrated pest management
3. Evaluation of soil fertility and fertilizer
4. Rice-based farming systems
5. Farm engineering and mechanization
6. Rice chemistry and food science
7. Social science and policy research
8. Technology transfer

d) Administrators' training courses

Target people: Staff of PhilRice, governmental organizations and regional or provincial governments

No. of trainees : 30
Training period : 2 weeks
Annual No. of trainees : 150
Frequency of training : 5 times per year

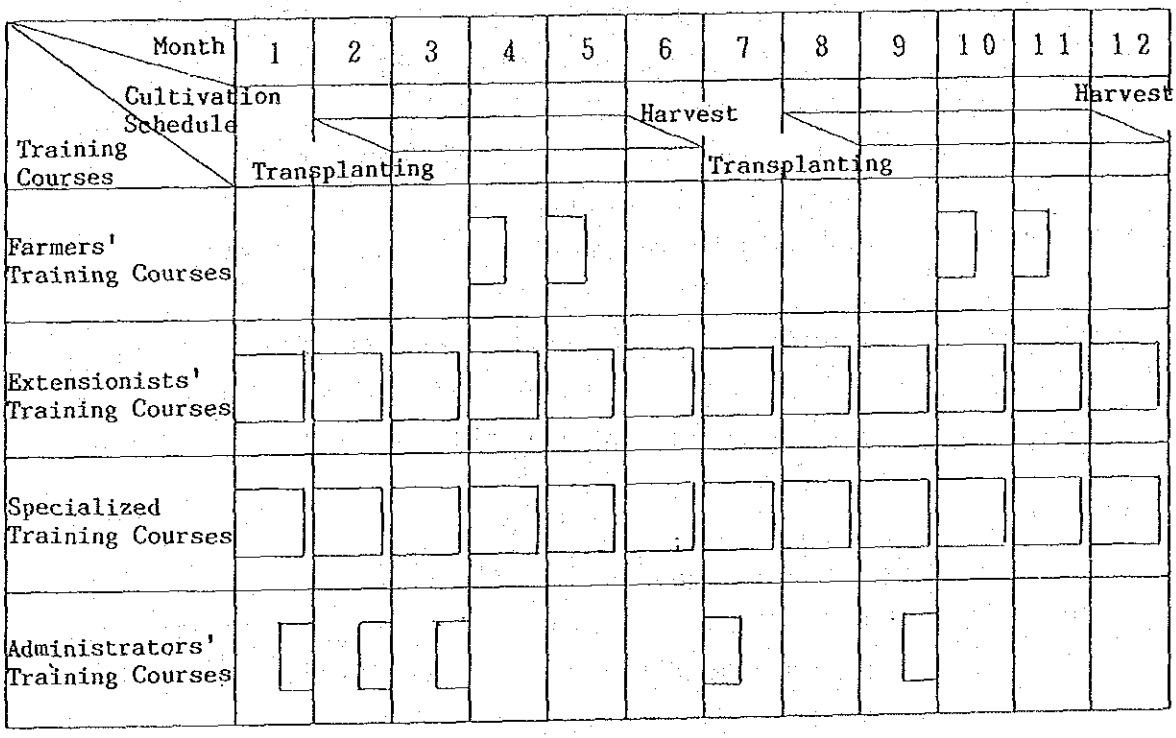
Goal: To attain effective and efficient operation of PhilRice, successful dissemination of rice farming technology and establishment of the national extension-communication network

Curricular thrusts

1. Evaluation of improved varieties
2. Dissemination method of rice farming technology
3. Seed production and management
4. Annual schedule and report regarding training and technology transfer

(3) Training schedule

One class will be composed of 30 trainees for the optimum class management. The farmers' training courses are to be scheduled during their off-season, while the administrators' courses scheduled during the farming seasons so that one training room can be used by both courses. The extensionists' courses and specialized courses will be held once a month regularly. Thus, at least three training rooms will be required; each one for the farmers'/administrators' courses, extensionists' courses and specialized courses.



Required training rooms: at least three rooms for 30 persons each.

3-3-6 Operation and Maintenance Plan

(1) Operation and Maintenance System

This station, in view of its size, shall have a regular well-experienced operation and maintenance staff in order to establish a system to take suitable care of the station. It is suggested that the staff be appointed well before the completion of construction so that the consultant can give instructions on special construction points such as embedded piping or other parts which will be hidden after completion and on their construction method, etc. to the maintenance staff during construction.

Consideration will be given to the selection of equipment for research and training use which is easily available and maintainable in the Philippines.

(2) Maintenance Schedule

Most of the buildings in this project are of reinforced concrete construction. In general, the physical life span of a reinforced concrete building means the period until the concrete changes from alkaline to neutral (to over pH 12) and loses the support of reinforcing bars as the bars become rusty and lose their structural strength. Though the period of neutrality depends on the environment of the building as well as concrete proportioning ratio, especially the weight ratio of cement and water (water-cement ratio) and workmanship, this life is usually 40 to 80 years. The life span of installed facilities is said to be shorter, 20 to 25 years for electric installations, 15 to 20 for water supply and drainage installations, and 10 to 15 years for air-conditioning equipment. This project plans, in principle, to expose the building facilities and piping system as much as possible for the purpose of easy inspection, maintenance and repairs.

The greenhouses have structural steel frames. As steel structures lose strength through corrosion, they require regular painting and repairs. Glass surfaces also need regular cleaning to maintain their clearness.

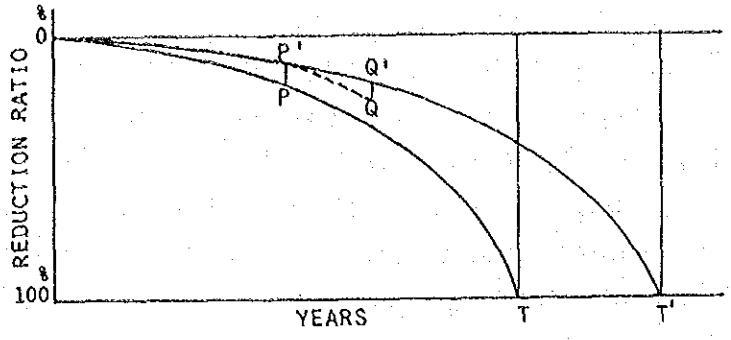


FIGURE 3-4 REDUCTION CURVE OF A BUILDING

Annual maintenance costs vary from country to country but usually amount to 0.6% to 1.4% of the construction cost. Maintenance costs of 0.3% of the building cost are regarded as reasonable for this project considering the type of the building and the fact that no interest is to be charged on the construction costs.

The depreciation period for the analytical equipment and laboratory furniture, both of which also require regular inspection, maintenance and repairs is considered to be about 10 years. This period can be extended with proper maintenance, as in the case of buildings. However, the supply of spare parts may stop along with the development of new equipment. A necessary amount of spare parts shall always be kept on hand. The annual maintenance cost of the analytical equipment and laboratory furniture is estimated at around 2% of the purchase price.

The frequency of scheduled maintenance is to be as shown in the following diagram.

Materials & Equipment	Air Conditioning								Plumbing & Fire Extinguishing					Electricity		
	Piping					Duct & Equipment										
	Hot & cold water	Cooling water	Steam	Oil	Refrigerant	Air conditioning	Ventilation	Smoke exhaust	Water supply	Hot water supply	Sewage	Fire extinguisher	Gas	Communication	Power feeder	Emergency
Pipes																
Steel, exposed	A	A	A	B					A	B	A	A	A			
Steel, in concrete			B	B					B	B	C	C	B			
Steel, embedded				B					B		C	C	B			
Stainless steel	C								C	C						
Cast iron, exposed									B		A					
Cast iron, embedded									C		B					
Copper	C				A				C	A	C					
Lead									B		B					
Lining steel		C							A				B			
Coating steel											C					
Plastic		B							B	C	B					
Valves	B	B	B	B					B	B	C	B	B			
Conduits & cables														A	A	A
Ducts																
Steel, stainless steel						A	A	A								
Glasswool						C	C									
Resin							C									
Flexible						B	B									
Dampers, outlets						B	B	B								
Equipment																
Freezer, boiler						B										
Cooling tower						B										
Heat excg., tank, header						B										
Pumps						B			B	B	C	B				
Air-han.unit, pckge, fan						B	B									
Radiator						B										
Automatic controller						B	B	B								
Water treatment unit						B			B	B						
Tank (plumbing)									B	B	B					
Hot water tank										B						
Sani.ware, hardware, pit									B	B	B					
Fire extinguisher												B				
Transformer															A	
Generator															A	
Panel															A	
Lamp, receptacle outlet															A	
Lighting fixture															A	
Communication system														A		
Security system																A
Lightning, ground															A	
Transportation															A	
Outdoor lighting															A	
Others (kitchen, septic tank, incinerator, etc.)																

Frequency : A --- high, B --- moderate, C --- low

CHAPTER 4 BASIC DESIGN

CHAPTER 4 BASIC DESIGN

4-1 Design Policy

4-1-1 Climatic Conditions

As shown in the meteorological data for the Muñoz area in the "Country Data" in the annex, the area around the project site is, like Manila and other major Philippine cities, located in the tropical monsoon climate zone. The Philippines has two seasons: the dry season from December to April and the rainy season from May to November, which includes the typhoon season from June to August. The temperatures do not change drastically, probably because the site area is remote from the sea shores. The annual temperature stays rather high, around 25 to 30°C (average temperature).

Rain is concentrated in the period from June to September, with extraordinarily high rainfalls during the typhoon season. Rainstorms sometimes continue several days in this season, while the other seasons have squalls, typical rain phenomenon in the tropical areas, in which heavy rain lasts only one or two hours. Thunderstorms also occur frequently in proportion to the rainfall.

To adapt to this tropical climate, the following policies have been adopted in drawing up the basic design.

(1) Design large openings (windows, etc.) to introduce natural breeze and ventilation as much as possible.
(2) Design wide and deep canopies and balconies to avoid direct sun rays coming into the rooms with provisions against rain water.
(3) Secure insulation in the attic (area between the roof and ceiling) to cope with tremendous heat exposure on the roof.
(4) Limit the zones which generate heat to a minimal area and discharge such heat promptly.
(5) Design the facilities so that rain is discharged into the ground promptly to cope with intensive rainstorms.
(6) Design the facilities to permit some experiments under natural lighting as thunderstorms may interrupt electric power supply.

As to building strength, provisions against seismic forces and wind pressures need consideration. The Philippine Islands are in the Circum-Pan-Pacific Earthquake Belt, and most areas except for Palawan have been hit by big earthquakes over magnitude 5. The islands have frequent typhoons every year as they are located near a breeding ground for typhoons. In particular, the greenhouses shall have rigid structures, as mentioned in the following pages, to protect these vital facilities for rice cropping experiments.

4-1-2 Social Conditions

Manila and other cities have a number of modern, so called functional type buildings. Among these modern buildings are sometimes seen low Spanish-style buildings with light brown roofs in good harmony with surrounding rich greens. Such scenery, when found in the countryside, gives refreshing feeling in hot tropical weather. These buildings do not have completely traditional Spanish style but are arranged in modern style to fit the weather and environment. Deep eaves and roofs with steep slants keep off the sun, and spacious attics provide optimum heat insulation. Windows under the deep eaves can be opened to some extent in the rainstorms. Rain falling on the steep-slanted roofs is discharged quickly.

This Spanish-influenced design is also feasible for the design policies stated in the previous section. The project buildings are surrounded by a flat plain of rice fields. In such pastoral scenery, buildings with gentle appearance, familiar to the Filipinos, match the environment better than modern buildings.

4-1-3 Construction Conditions or Special Conditions of the Philippine Construction Companies

Situation of the Philippine Construction Companies

Building construction seems active in Metro Manila, and most of it is carried out by Philippine companies. Major Philippine construction companies number some 3,900 all over the country, and the three largest dominate the market. Their share was about 12% of all the construction projects last year.

Interest rates are quite high in the Philippines now. Because of this, the cost of bank credit reaches 25 to 30% of the construction price, compared to 10 to 18% in Japan.

Construction skills are assumed to be reliable seeing a number of skyscrapers in Manila, with many more being constructed. The speed of construction progress in the Philippines, however, may be slower than that in Japan. Thus, a Japanese-integrated construction supervisory system needs to be introduced. The basic work methods for air conditioning, plumbing and electrical systems are similar in both countries, but the individual worker is not so particular about the skill or quality of work. The Japanese construction standards shall be adopted especially for the following work items:

(1) Sound insulation and vibration protection work method,
(2) Air tightness of duct installation,
(3) Anti-corrosion protection of piping materials,
(4) Energy cost saving work methods, etc.

Equipment and materials made in the Philippines

The products and materials are regulated under Philippine standards, which are based on standards of the American Society for Testing and Materials (ASTM). The large factories are equipped with adequate machinery to manufacture products of high quality, conforming to Philippine standards, though the small- and medium-scale factories do not have the capacity for quality control in observing the standards, and manufacture products of rather poor quality. Some products of the large factories are not sufficient as to quantities in stock. Thus, careful attention is required in selecting and procuring Philippine equipment and materials.

The basic selection principles are as follows:

(1) Products that can be processed in the Philippines
(2) Products in plentiful supply
(3) Products whose peripherals and spare parts are easily available in the Philippines

In principle, cement, aggregates, ready-mixed concrete, light-gauge structural steel, plywood for concrete forms, timber, stone, construction machinery, etc. are to be procured in the Philippines.

4-1-4 Employment of Philippine Consultants and Construction Companies

Judging by present construction projects and their scales in Metro Manila, Philippine construction companies and consultants are assumed to have high technological standards. However, they do not seem as conscious about quality control and safety precautions as Japanese companies. It is recommended that Japanese contractors fully experienced in the Philippines supervise local subcontractors in terms of construction schedules and safety management. Active adoption of the Philippine companies is in compliance with the grant aid policies of creating employment opportunities in the project country.

The Philippine consultants seem reliable seeing their brisk activity in construction projects. Since the signatures of the member consultants registered in the United Architects of the Philippines (UAP) are required for construction projects in the Philippines, and for the purpose of smooth progress of the construction work, the project is to be carried out in cooperation with local consultants.

4-1-5 Operation and Maintenance Capabilities of the Implementing Organization

During the first few years after its the establishment, PhilRice was in a kind of preparatory stage, and has still been only a short time since it actually started full operations. Staffed by rather young members, PhilRice is expected to develop further in the future. To supplement the lack of experience and to sustain and improve the level and quality of research, 21 researchers have been invited to act as consultants from other research institutions like the the UPLB. They have doctoral qualifications or the equivalent in their own specialties, and are quite capable of assuming leadership of R & D activities. Along with the move to Muñoz, additional staff are to be employed from among the graduates of CLSU and other nearby colleges to reinforce manpower.

According to the PhilRice balance sheet, there were two big sources of income in the past three years. The first was 7.5 million pesos from the NAFC in 1986 at the time of the foundation of PhilRice, and the second 20.0 million pesos as a government subsidy in 1988 and 40.73 pesos in 1989. The first was when the Aquino Administration started. The second was the second year of the MTDP, an economic project plan prepared by the Aquino Administration, and was about equal to the total expenditures of that year. This is assumed to be the results of the MTDP, the principle of which is to emphasize agriculture through expansion of employment opportunities and farm incomes. The PhilRice staff allocation will gradually increase toward 1992, the final year of the plan. It is not certain what percentage of the shortage of the staff members will be filled considering the government's severe financial conditions. Budget appropriations for at least 210 members consisting of 189 regular staff members and 21 consultants will be approved, seeing the income-expenditure balance of 1988. It is, therefore, most appropriate and effective to provide facilities and equipment according to the present organization for efficient use of the facilities and equipment provided.

4-1-6 Scope and Quality of Facilities and Equipment

As mentioned above, it is best to estimate the amount of facilities and equipment to be granted according to the present organization. It is true that there is a strong need for the dissemination of PhilRice's services in various fields. Considering that rice is the staple food of over 80% of the Filipinos, rice R & D efforts shall be continued even after the MTDP is finished. It is significant in terms of dissemination that Muñoz was chosen as the project site, as it is in the middle of the major rice production area in Central Luzon. This location has the advantage that the effects and influence of research and promotion can be reflected and grasped directly. Dissemination of research results from Mindanao and other branch stations to island areas is also important. The fact that PhilRice is a rather young organization with only a few years of experience behind it should be kept in mind.

All these factors are taken into account in providing facilities and equipment. The facilities are so designed that PhilRice research can accomplish satisfactory results with the provided facilities. Rooms and laboratories are arranged to cope with coordination of research results and future rearrangement of space. In principle, the rooms and laboratories are designed according to the present organization and continuing research subjects while keeping flexibility for future change and development of the organization.

4-1-7 Construction Work Schedule

The project is to be composed of five functional blocks:

Block 1 Laboratory Building, Generator House
Block 2 Dormitory
Block 3 Greenhouse, Headhouse
Block 4 Field Service Building
Block 5 Irrigation Drainage System

Block 1 takes up the largest space with a two-storey building with approx. 5,624 m^2 floor area. The construction period is the longest accordingly, estimated at 12 months. Taking advantage of broad site area, other blocks can be constructed in parallel to block 1. Their construction will take from five to 11 months each. The construction site is about five hectares (50,000 m^2), with sufficient space for planning work space, material stocks and temporary offices, etc.

There do not seem to be any difficulties in planning the construction schedule, setting construction block 1 in main and the other blocks to follow its construction procedure. The following are random factors in preparing construction schedules in the Philippines. In many cases, dealing with these factors is the key to success.

- Typhoons and other weather damage
- Period of delivery of materials to the site (including transport from Manila)
- Non-availability of water supply, telephone system, etc.

Ample experience and capabilities are needed in integrated supervision of the entire construction schedule and the extensive work area keeping the above factors in mind.

The construction period is estimated at 12 months at the longest, with all the construction to be finished in one fiscal year. For design considerations, the facilities are designed to be simple and easy for construction so as not to add more unpredictable factors.

4-2 Review of the Design Conditions

The required floor area of the station is estimated based on the present research programs and the staff allocation plan. The number of staff members is estimated at 210, the number in the first of the staff allocation plan presented by PhilRice.

There are two criteria for calculating floor areas; Philippine standards, based on the U. S. design standards, and Japanese standards. Both the Philippine and Japanese standards will be examined to calculate the required floor areas.

Estimation of each room and its criteria are described in the following pages.

RICE VARIETAL IMPROVEMENT DEPARTMENT 31 persons

(Manager, Deputy Manager, 2 Chief Researchers, 18 Researchers, 9 Assistants)

Floor Area Calculation Criteria	Design Floor Area
Seed Preparation Room Documentation Room Two rooms are required but combined into one room, to be separated by work tables. 3 Researchers, 4 Assistants ** Work table length per person 4.5-8.0 m Floor area per table unit length 2.1-2.7 m^2 9.5 - 21.6m^2/man x 7 = 66.5 - 151.2 m^2 Space for 3 work tables (4 m long), drier, packing apparatus	7.5 x 3.0 x 4 spans = 90.0 m^2
Ordinary Seed Storage Room Storing about 50% of 1890 varieties with the highest demand in the Philippines Capacity 10kg x 900 varieties Rack (900OW x 600D x 1800H.5shelves) 15 varieties in one rack 900/15 = 60 racks needed Assuming the passage as 1.2 m wide 7.2m x (0.9 x 10 + 1.2 x 2) = 82.08 m^2 (6 racks) (racks) (passage)	7.5 x 3.0 x 4 spans = 90.0 m^2
Medium-term Gene Bank (10 years or more) Prefabricated cold storage (0-10 C, RH 35-40 %) 10 g seed stock in aluminum can of 55 mm dia. Capacity 900 varieties x 3 kg 1 variety: 300 x 300 x 300 cases Rack 2000W x 350D x 2100H.6 shelves / 36 cases 900/36 = 25 racks needed (36 vrts) Passage 1.2 m wide 5.7m x (2.0 x 4 + 1.2 x 2) = 59.28 m^2 (6 racks)	Cold storage 6.0 x 10.0 m Considering column 650 x 650 7.5 x 10.5 = 78.75 m^2
Anteroom for the Medium-term Gene Bank 3.0 x 3.5 = 10.5 m^2	10.5 m^2
Fumigation Room - Anteroom Fumigation Room 3.0 x 3.5 = 10.5 m^2 Anteroom 3.0 x 3.5 = 10.5 m^2	21.0 m^2

Floor Area Calculation Criteria	Design Floor Area
Tissue Culture Lab 5 Researchers, 2 Assistants ** Work table length per person 4.5-8.0 m Floor area per table unit length 2.1-2.7 m^2 9.5 - 21.6m^2/man x 7 = 66.5 - 151.2 m^2 Space for 2 work tables (4 m long), freezer, distilling apparatus, hood, etc.	7.5 x 3.0 x 4 spans = 90.0 m^2
Genetics Lab 4 Researchers, 3 Assistants (** same as above) Space for 2 work tables (4 m long), freezer, etc.	7.5 x 3.0 x 4 spans = 90.0 m^2
Culture Rooms (two rooms, each for anther culture and embryo culture) Racks on both walls, work space at the center Rack 900W x 600D x 1800H. 3 shelves/6 racks 6.0 x 2.5 = 15.0 m^2 x 2 rooms = 30.0 m^2	6.0 x 2.5 x 2 spans = 30.0 m^2
Isolation Room For the work that cannot be done in the work space in the culture room. Also used as anteroom of the culture room.	6.0 x 2.5 x 1 span = 15.0 m^2
Staff Room (1 Manager, 1 Dep.Manager, 2 Chief Researchers, 18 Researchers) Desk work only * Standard space 5.2m^2/man x 18 = 93.6 m^2 manager, dep. manager, chief 7.7m^2/man x 4 = 30.8 m^2 124.4 m^2 Space for personal computers, typewriters, filing cabinets, etc.	7.5 x 3.0 x 6.0 spans = 135.0 m^2
Prep./Storage Room About one-quarter of the laboratory A distilling apparatus will be installed.	7.5 x 3.0 x 1 span = 22.5 m^2
Subtotal	650.25 m^2

- Instrumentation room, microscope room and dark room are planned as the laboratories for common use.
- Instead of a cold storage, a refrigerator will be placed in the laboratory.
- Personal computers will be installed in the research staff room in place of an independent computer room.

PLANTING AND FERTILIZER MANAGEMENT DEPARTMENT 13 persons

(Manager, 9 Researchers, 3 Assistants)

Floor Area Calculation Criteria	Design Floor Area
Plant Physiology Lab Solution Preparation & Extraction Room 5 Researchers, 3 Assistants ** Work table length per person 4.5-8.0 m Floor area per table unit length 2.1-2.7 m^2 9.5 - 21.6m^2/man x 8 = 76.0 - 172.8 m^2 Space for 3 work tables (4 m long), atomic absorption spectroscope, Kjeldahl unit, hood, etc.	7.5 x 3.0 x 4 spans = 90.0 m^2
Drying Room Space for walk-in dryer, draft oven, vacuum cleaners, etc.	4.0 x 3.5 = 14.0 m^2
Grinding Room For soil grinding. Needs to be an independent room so as not to let dust adversely affect other rooms.	3.5 x.3.5 = 12.25 m^2
Soil and Plant Sample Prep. Room Space for a work table, chemical & instruments partition cabinet	6.0 x.7.0 = 42.0 m^2
Staff Room (1 Manager, 9 Researchers) Desk work only * Standard space 5.2m^2/man x 9 = 46.8 m^2 manager 7.7m^2/man x 1 = 7.7 m^3 54.5 m^2 Space for personal computers, typewriters, filing cabinets, etc.	7.5 x 3.0 x 3 spans = 67.5 m^2
Storage Room Space for plant and soil sample stock	7.5 x 3.5 x 1 span = 26.25 m^2
Prep.Storage Room About one-quarter of the laboratory	7.5 x 3.5 x 1 span = 26.25 m^2
Subtotal	278.25 m^2

- Three research sections (physiology, soils, agronomy) are to be combined into one room for efficient and flexible space utilization.

INTEGRATED PEST MANAGEMENT DEPARTMENT 16 persons

(Manager, Chief Researcher, 11 Researchers, 3 Assistants)

Floor Area Calculation Criteria	Design Floor Area
Plant Pathology Lab (4 Researchers, 1 Assistant)	
** Work table length per person 4.5-8.0 m Floor area per table unit length 2.1-2.7 m^2 9.5 - 21.6m^2/man x 5 = 47.5 - 108.0 m^2	
Space for 2 work tables (4 m long), spectrophotometers, etc.	7.5 x 8.0 = 60.0 m^2
Culture Room	
Space for dryers, humidifiers and incubators	4.5 x 4.0 x 1 span = 18.0 m^2
Weed Science Lab (2 Researchers, 1 Assistant)	
(** same as above) 9.5 - 21.6m^2/man x 3 = 28.5 - 64.8 m^2	
Space for a work table	7.5 x 3.0 x 1.5 spans = 33.75 m^2
Herbarium	4.5 x 3.5 x 1 span = 15.75 m^2
Entomology Lab Desk work only 5 Researchers, 1 Assistant	
(** same as above) 9.5 - 21.6m^2/man x 6 = 57.0 - 129.6 m^2	
Space for 2 work tables	6.0 x 10.5 = 63.0 m^2
Insect Collection Room 3 shelves (900W X 600D X 1000H) on one wall and a collection display space on the other	4.0 x 3.5 = 14.0 m^2
Sterile Room	3.0 x 7.5 = 22.5 m^2
Staff Room (1 Manager, 1 Chief Researcher, 11 Researchers) Desk work only	
* Standard space 5.2m^2/man x 11 = 57.2 m^2 mgr.,chief res. 7.7m^2/man x 2 = 15.4 m^2 72.6 m^2	
Space for personal computers, typewriters, filing cabinets, etc.	7.5 x 3.0 x 3 spans 6.0 x 6.0 = 81.0 m^2

Floor Area Calculation Criteria	Design Floor Area
Prep/Storage Room About one-quarter of the laboratory	7.5 x 3.0 x 1 span = 22.5 m²
Subtotal	330.5 m²

FARMING SYSTEMS DEPARTMENT 12 persons

(Manager, 9 Researchers, 2 Assistants)

Floor Area Calculation Criteria	Design Floor Area
Staff Room (1 Manager, 9 Researchers) Desk work only * Standard space 5.2m²/man x 9 = 46.8 m² manager 7.7m²/man x 1 = 7.7 m² 54.5 m² Space for personal computers, typewriters, filing cabinets, etc.	7.5 x 3.0 x 3 spans = 67.5 m²
Analytical Lab 2 Researchers, 2 Assistants ** Work table length per person 4.5-8.0 m Floor area per table unit length 2.1-2.7 m² 9.5 - 21.6m²/man x 4 = 38.0 - 86.4 m² Space for a work table	7.5 x 3.0 x 2 spans = 45.0 m²
Prep/Storage Room About one-quarter of the laboratory	6.0 x 3.5 x 1 span = 21.0 m²
Subtotal	133.5 m²

RICE ENGINEERING AND MECHANIZATION DEPARTMENT 19 persons

(Manager, 14 Researchers, 4 Assistants)

Floor Area Calculation Criteria	Design Floor Area
Blueprinting Room Space for 1 blueprinter, blueprint paper	6.0 x 3.0 x 1 span = 18.0 m^2
Staff Room (1 Manager, 14 Researchers) Desk work only * Standard space 5.2m^2/man x 14 = 72.8 m^2 manager 7.7m^2/man x 1 = 7.7 m^2 80.5 m^2	
Design and Drafting Room 2 drafting tables * Standard 8.3m^2/table x 2 = 16.6 m^2 Space for drawing cabinets, meeting, etc. about 15 m^2	6.0 x 15.0 = 90.0 m^2 1.5 x 6.0 = 9.0 m^2 = 99.0 m^2
Subtotal	117.0 m^2

Others to be located in the Field Service Buildings
Machine shop, space simulated to field conditions, tool stock, store room, display area, locker room, threshing area

RICE CHEMISTRY AND FOOD SCIENCE DEPARTMENT 20 persons

(Manager, 13 Researchers, 6 Assistants)

Floor Area Calculation Criteria	Design Floor Area
Milling and Physical Quality Lab (RICE CHEMISTRY) 3 Researchers, 1 Assistant Space for dehullers and whiteners	2 work tables to be installed
** Work table length per person 4.5-8.0 m Floor area per table unit length 2.1-2.7 m^2 9.5 - 21.6m^2/man x 4 = 38.0 - 86.4 m^2	7.5 x 3.0 x 3 spans = 67.5 m^2
Space for dehullers and whiteners	

Floor Area Calculation Criteria	Design Floor Area
Sampling Room For storing crops Also serving as an anteroom of the laboratory	7.5 x 3.0 x 1 span = 22.5 m^2
Physio-chemical Lab To be combined into one room Research Lab 4 Researchers, 1 Assistant	2 work tables to be installed
(** same as above) 9.5 - 21.6m^2/man x 5 = 47.5 - 108.0 m^2	7.5 x 3.0 x 3 spans = 67.5 m^2
Sensory Evaluation Room Located adjacent to the cooking room. 8 testing booths at 1,200 space in between. Test samples will be delivered from the cooking room directly to each booth.	6.0 x 3.0 = 18.0 m^2 7.5 x 3.0 = 22.5 m^2 40.5 m^2
Cooking Room (FOOD SCIENCE) Two rows of work tables, cooking tables, ovens, gas ranges and gas cooking stoves will be installed along both walls. A window to deliver test samples to each booth in the sensory evaluation room.	6.0 x 4.0 = 45.0 m^2
Prep.Storage Room About one-quarter of the laboratory contains a storage area for dangerous chemicals	7.5 x 3.0 x 1 span = 22.5 m^2
Staff Room (1 Manager, 13 Researchers) Desk work only * Standard space 5.2m^2/man x 13 = 67.6 m^2 manager 7.7m^2/man x 1 = 7.7 m^2 75.3 m^2	7.5 x 3.0 x 3.5 spans = 78.75 m^2
Subtotal	323.25 m^2

- The fermentation room has been cancelled assuming it is a subsidiary research subject and is not considered so urgent as to be covered by the project.

SOCIAL SCIENCE AND POLICY RESEARCH DEPT., DEVELOPMENT PLAN & COLLABORATIVE PROJECT ROOMS, ETC.

Floor Area Calculation Criteria	Design Floor Area
Staff Room (1 Manager, 1 Chief Researcher, 10 Researchers, 2 Assistants) Desk work only * Standard space 5.2m²/man x 12 = 62.4 m² mgr.,chief res. 7.7m²/man x 2 = 17.3 m² 77.8 m² Space for personal computers, typewriters, filing cabinets, etc.	7.5 x 3.0 x 3.5 spans = 78.75 m²
Subtotal (Social Science & Policy Research Dept.)	78.75 m²
<Research Staff Room> Research Staff Room (5 Researchers, 10 Assistants) Assuming 2 to 30 assistants for each researcher * Standard space 5.2m²/man x 10 = 52.0 m² researcher 7.7m²/man x 5 = 38.5 m² 90.5 m²	6.0 x 6.0 x 2 spans = 90.0 m²
Subtotal	90.0 m²
<Development Plan Room> <Collaborative Project Room> Staff <Dev> 1 chief, 3 researchers, 1 assistant <Col> 1 chief, 7 researchers, 1 assistant Staff Room (Commonly used by both sections) * Standard space 5.2m²/man x 12 = 62.4 m² Space for personal computers, typewriters, filing cabinets, etc.	7.5 x 3.0 x 2.5 spans = 56.25 m²
Subtotal	56.25 m²
As the staff often work in other research departments for collaborative study or instructions, the staff room need to have only minimal required floor area.	

LABORATORIES FOR COMMON USE

Floor Area Calculation Criteria	Design Floor Area
Dark Rooms 2 rooms: one each on the ground & 2nd floors Space for work tables, a wash basin, shelves, etc.	6.0 x 3.0 x 2 rooms = 36.0 m^2
Instrumentation Room 1F 4 instruments (balance, seed counter, etc.) 1.8 m long work tables 1.8 x 4 = 7.2 m Floor area per table unit length 2.1-2.7 m^2 7.2 x 2.1 - 21.6 m^2 = 15.12 - 19.44 m^2	6.0 x 3.0 x 1 span = 18.0 m^2
Microscope Room Space for placing 5 microscopes 1.8 x 5 = 9.0 m 9.0 x 2.1 - 2.7 m^2 = 18.9 - 24.3 m^2	7.5 x 3.0 x 1 span = 22.5 m^2
Preparation Rooms (2 rooms: each on the ground and 2nd floor) Space for installing microtome, paraffin dispenser, etc. to make microscope test samples.	6.0 x 3.0 x 2 rooms = 36.0 m^2
Central Chemicals Storage Room	6.0 x 5.0 = 30.0 m^2
Data Room A data and document stock space to be used in common; separated by racks for each department.	7.5 x 3.0 x 2 spans = 45.0 m^2
<Common Space> Conference Rooms (3 rooms) 1) Weekly meeting (managers, chiefs, staff) about 50 attendants 50 x 2.0 m^2/man = 100.0 m^2 2) Group meeting (research staff), 10 to 15 persons 10-15 x 2.0 m^2/man = 20.0-30.0 m^2 One big room to be used for 1) and separated into 3 rooms by partitions for use 2)	7.5 x 3.0 x 4 spans = 90.0 m^2 In case separated to 3 rooms: 45.0 m^2 x 1 room 22.5 m^2 x 2 rooms
Storage Room Space for conference furniture, etc.	7.5 x 3.0 x 1 span = 22.5 m^2
Subtotal	300.0 m^2

TECHNOLOGY TRANSFER DEPARTMENT 25 persons

(Manager, 3 Chief Researchers, 18 Researchers, 3 Assistants)

Floor Area Calculation Criteria	Design Floor Area
<Communication><Library & Documentation Center>	
Production Room digitizer, plotter, drafting table, etc.	7.5 x 3.0 x 1 span = 22.5 m^2
Printing & Bookbinding Room 1 offset printer, 1 mimeograph machine space for binding area	7.5 x 3.0 x 2 spans = 45.0 m^2
Materials Storage Room Printing materials (paper, chemicals) stock, shelves	6.0 x 3.0 x 1 span = 18.0 m^2
Storage Room for Printed Materials Printed materials stock, shelves	7.5 x 3.0 x 1 span = 22.5 m^2
A-V Production Room One room containing space for video editing, control booth, recording booth, mixing control, filing cabinet, etc.	7.5 x 3.0 x 2 spans = 45.0 m^2
Library and Documentation Room 20,000 books, Required space by sorted stack system 160 books/m^2 Book stack area 20000/160/m^2 = 125 m^2 Other space for video and audio tapes	12.0 x 10.0 3.0 x 6.0 = 138.0 m^2
Reading Room Recording booths 20 x 2.0 m^2/booth = 40.0 m^2	6.5 x 3.0 x 2 spans = 39.0 m^2
Reference Space Involving the library management space	4.5 x 6.0 = 27.0 m^2

Floor Area Calculation Criteria	Design Floor Area
<Technology Development, Training Section>	
Training Rooms (3 rooms) Training course 30 persons each, held throughout a year, at least 3 rooms Technology transfer conference 3 times a year, 130 persons Annual congress, planning meeting once a year each, 120 persons	
Three rooms for 40 persons for training will be designed, separated by partitions, to be combined into one big room for large meetings. * 1.0 - 1.3 m^2/man x 40 = 40.0 - 52.0 m^2	7.5x 3.0 x 2 spans = 45.0 m^2 45.0 m^2 x 3 rooms = 135.0 m^2
Seminar Room 3 rooms, each for 10 to 12 persons * 2.0 m^2/man x 10-20 = 20.0-24.0 m^2 x 3 rooms = 60 - 72 m^2	7.5 x 3.0 x 2 rooms 6.0 x 4.0 x 1 room = 69.0 m^2
Material/Data Store Room Materials and accessories of the training and seminar rooms will be kept there.	7.5 x 3.0 = 22.5 m^2
Research Staff Room (1 Manager, 3 Chief Researchers, 18 Researchers) Desk work only * Standard space 5.2m^2/man x 18 = 93.6 m^2 mgr.,chief res. 7.7m^2/man x 4 = 30.8 m^2 124.4 m^2	6.0 x 6.0 x 3.5 spans = 126.0 m^2
Subtotal	709.5 m^2

ADMINISTRATION DEPARTMENT

Floor Area Calculation Criteria	Design Floor Area
Director's Office According to the Construction Design Data Book, Standard for administrative offices	5.0 x 6.0 = 30.0 m^2
Guest Room 6 to 8 chairs	6.0 x 3.0 = 18.0 m^2
Deputy Director's Office Deputy Director Acting Deputy Director, 3 Secretaries * Standard space 5.2m^2/man x 3 = 15.6 m^2 dep. direc. 7.7m^2/man x 1 = 7.7 m^2 dep. direc. 17.3m^2/man x 1 = 17.3 m^2 40.6 m^2 Space for meeting area, filing cabinets, etc.	
Office (1) (Finance) Manager 7.7 m^2 Accounting Div. 1 chief, 7 clerks Budget Div. 1 chief, 2 clerks Cash Div. 1 chief, 3 clerks * Standard space 5.2m^2/man x 12 = 62.4 m^2 chief 7.7m^2/man x 3 = 23.1 m^2 85.5 m^2	
Office (1) (Administration) Personnel Div. 1 chief, 2 clerks Records Div. 1 chief, 2 clerks * Standard space 5.2m^2/man x 4 = 20.8 m^2 chief 7.7m^2/man x 2 = 15.4 m^2 36.2 m^2 TOTAL 170.0 m^2	7.5 x 3.0 x 8 spans = 180.0 m^2
Storage Room Office supplies, etc.	7.5 x 2.5 x 1 span = 18.75 m^2
Subtotal	246.75 m^2

Note: The general services div. (supply & property, farm operations, buildings & grounds) will be located in the existing building (admin. bldg.) and is not included in floor area estimation.

FIELD SERVICE BUILDING (Experimental Farm approx. 70 Ha)

Floor Area Calculation Criteria	Design Floor Area
1. Yield Survey Room (1) A steel net encasement (rodent protection) where yielded crops will be stored during surveys Four shelves 0.5 m deep on the sides	5.0 x 5.0 x 1 span = 25.0 m^2
2. Drying Room Machine stock about 20.0 m^2 (for maintenance) Work space about 25.0 m^2	5.0 x 5.0 x 2 spans = 50.0 m^2
3. Test Milling Facilities Room Accommodating 29 instruments of 24 types including grain graders, grain moisture meters, grain shape tester, testing whitener, weight to volume balance, etc. for yield survey before whitening.	5.0 x 5.0 x 2 spans = 50.0 m^2
4. Comparative Milling Facilities Room Accommodating 11 instruments including paddy husker, rice whitener, broken separator, automatic weighing balance, etc. for survey and analysis after hulling and whitening.	5.0 x 5.0 x 2 spans = 50.0 m^2
5. Yield Survey Room (2) Provided adjacent to rooms 5 and 6. For studies after drying and hulling Space for seed divider, magnifier and sizing device.	5.0 x 5.0 x 1 span = 25.0 m^2
6. Seed Storage Room Capacity 3.8 to 4.5 tons (55 to 65 kg/ha) 50 kg/bag : 3800-4500 kg/50 = 76 - 90 bags 4 shelves of 1 m depth, 5 bags/1m length 80/5 = 16 m long, passage 1.2 m wide	5.0 x 5.0 x 1.5 span = 37.5 m^2
7. Chemical Fertilizer Storage Room (1 room) 4 shelves 0.5 m deep, passage 1.2 m wide	5.0 x 5.0 = 25.0 m^2
8. Machine Shop (Rice Engineering & Mechan. Div.) For fabrication of new equipment Fabrication using lathes, grinders, etc. 25.0 m^2 Assembly space for fabricated machine/parts 25.0 m^2	5.0 x 5.0 x 2 spans = 50.0 m^2
9. Signboard Storage Room Storage room for field/demonstration signboards and work space	5.0 x 5.0 x 1 span = 25.0 m^2

Floor Area Calculation Criteria	Design Floor Area
10. Small-Farm-Equipment Room Spades, hoes, etc. passage 1.0 m wide and 70 cm wide equipment space on both sides wall hangers	5.0 x 5.0 x 0.5 span = 12.5 m^2
11. Meeting Room (REMD) For small meetings like review on improved equipment, training schedule, etc.	5.0 x 5.0 x 0.5 s@an = 12.5 m
12. Men's/Women's Locker Rooms each for 20 persons dressing space 0.6 m^2/man x 40 = 24.0 m^2 to be used for lunch area on rainy days	5.0 x 5.0 x 1 span = 25.0 m^2
13. Toilets, Shower Room Shower facilities will be provided to wash off pesticides and chemical fertilizer to be used in the farm.	5.0 x 5.0 x 1 span = 25.0 m^2
14. Control Room	7.5 x 3.0 x 0.5 span = 12.5 m^2
15. Storage Room	7.5 x 3.0 x 1 span = 25.0 m^2
16. Work Area - Drying area 30 m^2 per variety 30 x 5-10 varieties = 150 - 300 m^2 - Work space seed preparation, threshing 70 - 100 m^2 - Tractors, cultivators, 12 units stock space 22 m^2 maintenance space 30 - 45 m^2 Rooms from 1 to 15 will be provided on both sides of the work area so that no corridors are needed. Total spans for rooms 1 to 15 = 5.0 x 5.0 unit bay = 18 spans 18/2 = 9 spans 9 x 5.0 m = 45.0 m (depth of work area) Width of the work area covers space for operation of machines in addition to that estimated above (turnover radius x 2 + 2.0 m passage) (3.5 - 4.5) x 2 + 2.0 = 9.0 - 11.0 --- 10.0 m (turnover radius) (width of work area)	45.0 x 10 = 450.0 m^2
T O T A L	900.0 m^2

DORMITORY

Floor Area Calculation Criteria	Design Floor Area
<Dormitory> - Trainees from various parts of the country 90 persons in maximum, and to accommodate 80% of the trainees considering the attendance percentage,	90 x 0.8 = 72 (approx.)
- Scientists and instructors from the IRRI, UPLB and other institutions for collaborative projects and training	
- Cafeteria for the staff and trainees	
Men's Quarters 10 rooms	
Room for 4 pers. x 10 rooms w/ lockers and basin	5.0 x 5.5 x 10 rooms = 275.0 m^2
Ladies' Quarters 80 rooms	
Room for 4 pers. x 8 rooms w/ lockers and wash basin	5.0 x 5.5 x 8 rooms = 220.0 m^2
Guest Rooms 5 rooms (for long stays)	
Bedroom, living room, lavatory	5.0 x 5.5 x 5 rooms = 137.5 m^2
Caretaker's Room	
Reception, dining kitchen, bedroom, lavatory	7.0 x 5.5 = 38.5 m^2
Store Rooms and Linen Supply 3 rooms	5.0 x (2.5+2.5+3.0) = 40.0 m^2
Hot Water Supply 3 rooms	5.0 x (2.5+2.0) = 22.5 m^2 3.0 x 2.5 = 7.5 m^2
Subtotal	741.0 m^2

Floor Area Calculation Criteria	Design Floor Area
<Cafeteria> - PhilRice staff 210 + visitors - Trainees 90 Assuming more than 80% of the staff will use the cafeteria because there are few cafeterias or restaurants nearby. Trainees and staff members are assumed to use in different hours.	
Cafeteria Seats 210 x 80% x 2 turns = 84 seats assume 90 seats including visitors 90 x 1.7 m^2/seat = 153.0 m^2	17.0x8.0 + 2.0x12.0 = 164.0 m^2
Kitchen 210 x 0.8 + 90 = 258 meals designing the kitchen to serve 250 to 300 meals Kitchen 250 x 0.3 m^2/meal = 75.0 m^2 Washing space 3.0 x 6.0 m = 18.0 m^2 Pantry 2.5 x 5.0 m = 12.5 m^2 Locker rooms (2 for men/women) 2.5 x 3.0 x 2 = 15.0 m^2 Office 2.0 x 5.0 = 10.0 m^2 130.5 m^2	12.0 x 5.5 x 2 spans = 132.0 m^2
Common Space (toilets, corridors, etc.)	645.2 m^2
T O T A L	1,682.2 m^2

GREENHOUSE

a) Criteria

The number and size of greenhouses are limited to what is sufficient only for the continuing PhilRice research programs. The present programs that need greenhouses in relation to their studies include 18 subjects in varietal improvement, 17 in plant physiology, 5 in pest management, 4 in pathological research and 4 in agronomy and soils research. For these research subjects, seven greenhouses will be constructed so as not to interfere with each other's research activities.

Varietal improvement	2	
Plant physiology	2	
Pest management	1	
Pathological research	1	
Agronomy and soils research	1	(two standard size houses to be combined into one large house)
T o t a l	7	

b) Floor area calculation

In the greenhouses for varietal improvement and plant physiology, rice will be cultivated in planter pots which will be placed in carts for easy transport. The size of each cart is 0.8 x 1.0 m. Intermediate and side passage ways will be provided so that the carts can be moved easily.

Insect cages of 2 x 2 x 2 m will be put in the pest management greenhouse. Cages will be used in pairs for each subject for comparative study, one to place insects in and the other for pest management.

Planters and carts will also be placed in the pathological research greenhouse. Insect cages will be used for research on virus diseases and avoid insect vector infection.

Experimental soil boxes of 2 x 4 m will be used in the agronomy and soil research greenhouse. Three boxes will be placed in one unit for each subject for comparative studies.

c) Equipment

A forced-type exhaust fan will be installed in the upper monitor roof to avoid temperature increase in the house. For air intake through the lower wall, open-type insect screens will be provided in the pest management greenhouse and bird screens in the other houses.

d) Size of the greenhouse

For varietal improvement and plant physiology

Carts will be placed in three rows, one row consisting of four groups of three carts each. Passage ways 1.3 m wide will be left between each row, two on the walls and two in the middle, to allow work space from both sides of each cart. As the width of one cart is 0.8 m, a total width of 8.0 m will be required. Calculated at 3 m length per block of carts and 1.3 m space in between, a total house length of 20.0 m is needed, leaving enough space for workers.

For pest management

There will be two rows, each composed of three groups of two carts each. The greenhouse size will be the same as those for varietal improvement to allow sufficient work space in the passage ways.

For pathological research

There will be three rows, each composed of two groups of three carts each. The greenhouse will be the same size as above.

For agronomy and soils research

There will be a space to accommodate three soil boxes for each of four subjects, 12 boxes in total. Considering the layout of the carts for good work efficiency, a space over 300 m^2 will be required. Two houses will be combined into one large house for this purpose.

If the greenhouses are designed in random shapes and sizes, they will need various types and sizes of glass and steel frames. To avoid this, and especially glass replacement problems, all the

greenhouses have been designed based on the same standard, 8 by 20 meters.

HEADHOUSE

The headhouse serves as a work space attached to the greenhouse facilities. Though one headhouse was requested for each greenhouse, they are combined into one house for work space efficiency.

4-3 Basic Planning of the Facilities

4-3-1 Arrangement of the Buildings

The total site ground of about 98 hectares is divided into two main zones. One is a vast rice field of about 70 hectares to be used as the experimental farm in the east of the ground. Various cultivation experiments are undertaken. The remaining 28 hectares in the east of the ground are the building zone. Flat MRRTC buildings are scattered over 20 hectares of this zone. The central experiment station itself is about 5 hectares southeast of these facilities. Route 5, connecting the area with Manila, runs along the west of the site. The laboratory building, main building of the experiment station, is arranged to face Route 5 for transportation convenience. The following are under consideration for the facility arrangement plan.

- Connection from the laboratory building to the greenhouses and headhouse
- Connection between the field service building and the experimental farm
- Future expansion of the laboratory building, greenhouses and headhouse
- Location of the dormitory to maintain independence after the future expansion of the laboratory building
- Location of the administration department for convenience of supervision of the entire facilities as well as interconnection with the program department

As for the flowline planning, access from Route 5 and approach to the front of the main entrance of the laboratory building is provided by an extension of the road in front of the existing facilities for convenience of access. This access road reaches the dormitory further south. In principle, the flowline is designed to be simple and easy to follow. The personnel flowline is arranged parallel with this vehicle flowline on the front side of the laboratory building. Along the extension of the corridor which runs the length of the laboratory building north to south are arranged the headhouse, the field service building and the ground for the future expansion of the laboratory building. The personnel flowline is planned so as not to cross the vehicle flowline.

Two parking areas are designed to accommodate about 50 cars, one-sixth of the total 300 assumed occupants of the Station including the trainees. There will be 40 cars to be parked in front of the laboratory building and 10 in front of the dormitory.

4-3-2 Architectural Plan

(1) Floor Plan

This experiment station, composed of eight program sections, is to be established as an integrated organization for rice research, each section studying specific subjects. These sections have close relations with the practical facilities such as the experimental farm, the greenhouses and the field service building. On the whole, the arrangement is designed for unification of the entire facility and interconnection between the sections.

a) Laboratory Building

The construction site is located in the middle of a vast plain. There are two concepts for building design in such an environment. One is to harmonize the buildings with the environment and the other to design the buildings to be conspicuous and display their existence. In this project the former concept is to be employed considering the fact that the object of research, rice, the staple food of over 80% of the Filipinos, is a broad and profound subject but that the organization has only a short history. However, its future development is expected and indeed, definitely needed for PhilRice to achieve its objectives.

The buildings will have two floors with a quiet and sturdy appearance. The laboratory building is to have a court surrounded by two research and laboratory wards on the north and south sides. The wards will be connected by an entrance hall and laboratories used in common. Rooms categorized as eight program sections will be functionally divided to laboratories, research rooms and common facilities. Rooms belonging to the same section will be placed nearby. A laboratory on the first

floor will be located right under that on the second floor for the simplicity of utility planning.

The following describe the considerations of the major facilities.

Laboratories

- Laboratories
  As mentioned in the floor area estimation list, each laboratory is designed as a 7.5 × 3.0 m unit bay. An experiment table is installed in the center with built-in work tables under the windows to allow some experiments under natural lighting.

- Culture, drying and sterile rooms
  Separate rooms are designed to provide special room conditions (humidity, temperature) depending on experimental purposes.

- Grinding room
  A separate room will be provided to isolate noise, vibrations and dust generated in this room.

- Instrumentation rooms
  An instrumentation room will be provided on each floor. Precision instruments like balances, microscopes, cameras, etc. will be kept there to be available for the program sections.

Research Staff Rooms

The research rooms to be used mainly for desk work are to be located on the second floor for better environment. Two rooms are arranged next to each other for active intercourse among the sections and to permit future changes in room arrangements.

Training and Promotion Section

This section mainly consists of the seminar and training room areas, where visitors like trainees gather, and the research

and documentation room area. The training and seminar rooms will be located on the first floor and other rooms on the second.

Library

The library will be located on the second floor, south side of the entrance for the convenience of the staff and trainees. It will be so located that the trainees can have access to it directly without passing through another section.

Administration Dept.

Only the management and finance sections will be accommodated in the laboratory building, arranged close to each other. A space for future expansion is left on the east side of the building. Though individual offices were requested for each management and finance staff member and secretaries, one room will be provided for each section according to trend in recent design.

b) Greenhouse, Headhouse

The seven greenhouses (double-sized one for planting and fertilizer management) are arranged together with consideration of shading and breezes. The headhouse, located in the middle of the greenhouses, has a simple rectangular shape for the convenience of the workers. It is arranged along the personnel flowline from the laboratory building.

c) Field Service Building

The field service building is located at the intersection of the service road from the experimental farms and the personnel flowline from the laboratory building. This building is important for both sections. Rooms designed with a 5.0 x 5.0 m unit bay are provided on the north to south sides and an open space of a 10.0 x 45.0 m span in the center to be used for a work and stock area.

d) Dormitory

For security, men's sleeping rooms for 40 persons are provided on the first floor. Ladies' quarters for 32 persons and five guest rooms are on the second. A cafeteria is located on the first floor facing the laboratory building for the convenience of people coming from the laboratory building.

A sleeping room for four persons is designed with a standard 5.0 x 5.0 m unit bay. A guest room is a single room with a bed and a desk for the instructors and scientists invited from outside institutions. A living room space to accommodate two armchairs and a table, and a shower room are provided in the guests' quarters to make their stay comfortable.

As part of the common utility system, toilets, showers, a lounge and a hot water supply corner are provided for trainees. For fire prevention purposes, the hot water supply is not installed in each guest room but provided separately in the corridor for common use.

(2) Sectional Plan

a) Laboratory Building

The optimum ceiling height of a common room like an office, research room or laboratory is around 2.7 meters. The first floor will be 3.9 meters high to have space for the installation of the air conditioning ducts and exhaust ducts of the laboratories. The second floor will be 3.7 meters high. This building has a slope roof and the ducts are to be accommodated in the space under the slope. Wide eaves and balconies are designed on the north and south sides to decrease the air conditioning load. The provision of a place for outdoor air conditioner units is considered appropriate.

b) Headhouse

The building height is to be 3.3 meters because it does not need duct space in the ceiling. The ceiling is provided under the beam soffits.

c) Field Service Building

This building is a large flat one to serve mainly as a work space. The structure is of a simple steel-frame construction. Ceilings are to be provided only for the rooms where heat insulation is required (control room, locker rooms, chemical fertilizer storage, etc.) This building, with a gable roof, is 4.0 meters high at the eaves end and 6.5 meters at the ridge.

d) Dormitory

For a large space like this cafeteria with a capacity for 90 diners, it is better to have a high ceiling. Thus, the ceiling height is designed at 2.7 meters, the same as for the laboratory building.

No air conditioning system will be provided for the sleeping rooms, but natural ventilation will be introduced through the ceiling fans and windows. The ceiling is to be about 2.7 meters high. The storey height is to be 3.5 meters to accommodate space for the kitchen exhaust duct.

(3) Structural Plan

Seismic force and wind force must be taken into consideration because the Philippines is a part of the Circum-Pan-Pacific Earthquake Belt and a breeding ground for typhoons.

a) Foundations

Below the ground a sandy silt or gravel-mixed sandy silt layer lies to about 8.0 m below the surface of the ground, with a silty clay layer below that. For the 2-storey project buildings, this silty clay layer spreading from -2.0 to -3.0 m can be taken as the bedrock. The N value of this layer is 20. The foundation system will be of the spread foundation type. Continuous footings will be employed to limit differential settlement to a minimum.

b) Framing

The laboratory building and the dormitory are to be 2-storey reinforced concrete structures with rigid framing. A part of the reinforced concrete walls is to be designed as an earthquake-resistant wall in order to lower the construction cost of the framing. The exterior walls are designed to be reinforced concrete walls as much as possible, to prevent water leakage in a strong wind. Partition walls are to be of concrete blocks or wooden construction for cost economy and will permit removal with partition design change to accommodate usage changes in the future. The first floor is planned to be a reinforced concrete floor slab that will not sink due to settlement of the filled soil under the slab.

The greenhouses and headhouse are to be of structural steel frames.

c) Design Standards

The structural design of the project is to be based on the present construction regulations in the Philippines, and where the local standards are not available, the U.S. standards will be applied.

National Structural Code of the Philippines (NSCP)
Uniform Building Code (UBC)
ACI Code (Building Code Requirements for Reinforced Concrete, American Concrete Institute)
Timber Design Specifications

d) External Forces and Loads

1. Dead load

Dead load will include the weights of all the structural members, partitions, finishing materials, etc.

2. Live load

Live load of each room will be as follows, calculated in compliance with the NSCP and UBC:

Room	Live load (kg/m°)
Office	300
Laboratory	300
(This figure may be increased if necessary to accommodate heavy equipment.)	
Library	615
Conference Room	490
Lavatory	250
Corridor & Stairs	490

3. Seismic force

The base shear assumed to act on the structure and distribution of seismic force to each element will be determined according to the NSCP:

$V = Z\ I\ K\ C\ S\ W$

where

V: base shear

Z: numerical coefficient depending on the zone
See figure 4-1. Zone No.1, therefore Z = 3/4

I: occupancy importance factor
See table 4-1. I = 1.0

K: horizontal force factor
See table 4-2. K = 1.0

C: coefficient determined by the natural frequency of the structure; must be less than 0.12

$C = \frac{1}{15\sqrt{T}}$ therefore, $T = \frac{0.05hn}{\sqrt{D}}$

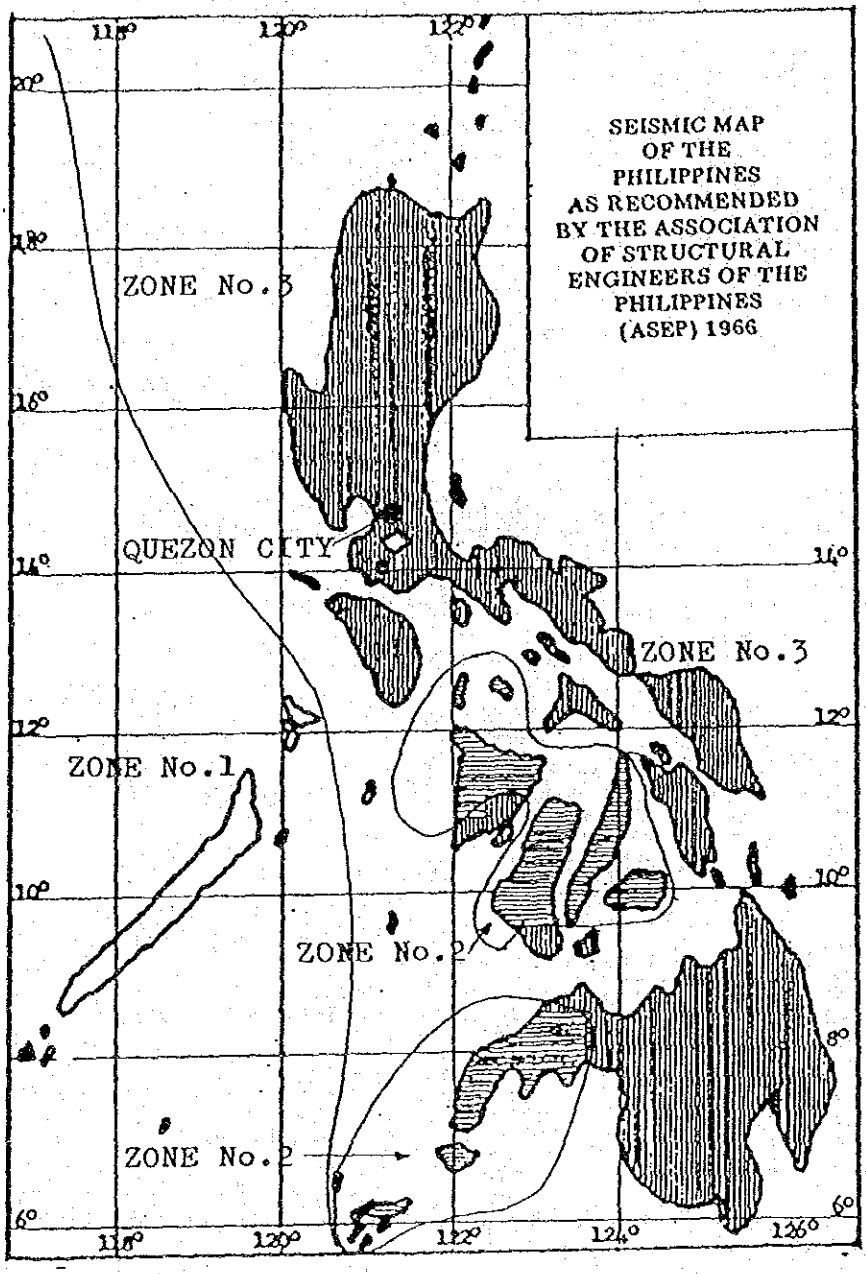
S: numerical coefficient for site-structure resonance

C S = 0.14 ªas per UBC 2312 (d)Ñ

W: total load for calculation of seismic force

4) Wind force

The wind force affecting the structure will be determined according to the NSCP. Muñoz belongs to AREA II, (figure 4-2), therefore the column of AREA II in table 4-3 will be applied. As for the pressure coefficient, the recommended value prescribed by the NSCP will be applied.



	ZONE No.1	ZONE No.2	ZONE No.3
Z	3/16	3/8	3/4

FIGURE 4-1 **SEISMIC MAP OF THE PHILIPPINES**
(ASEP's Recommendation : 1966)

TABLE 4-1 VALUES FOR OCCUPANCY IMPORTANCE FACTOR

TYPE OF OCCUPANCY	I
Essential Facilities*	1.5
Any building where the primary occupancy is for assembly use for more than 300 persons (in one room)	1.25
All others	1.0

*See Section 2312 (k) for definition and additional requirements for essential facilities.

(National Structural Code of the Philippines)

TABLE 4-2 HORIZONTAL FORCE FACTOR "K" FOR BUILDINGS OR OTHER STRUCTURES[1]

TYPE OR ARRANGEMENT OF RESISTING ELEMENTS	VALUE[2] OF K
1. All building framing systems except as hereinafter classified	1.00
2. Buildings with a box system as specified in Section 2312 (b)	1.33
3. Buildings with a dual bracing system consisting of a ductile moment-resisting space frame and shear walls or braced frames using the following design criteria: a. The frames and shear walls shall resist the total lateral force in accordance with their relative rigidities considering the interaction of the shear walls and frames b. The shear walls acting independently of the ductile moment-resisting portions of the space frame shall resist the total required lateral forces c. The ductile moment-resisting space frame shall have the capacity to resist not less than 25% of the required lateral force	0.80
4. Buildings with a ductile moment-resisting space frame designed in accordance with the following criteria: The ductile moment-resisting space frame shall have the capacity to resist the total required lateral force	0.67
5. Elevated tanks plus full contents, on four or more cross-braced legs and not supported by a building	2.5[3]
6. Structures other than buildings	2.00

[1]Where wind load as specified in Section 2311 would produce higher stresses, this load shall be used in lieu of the loads resulting from earthquake forces.

[2]See definition of "Z" as specified in Section 2312(c).

[3]The minimum value of "KC" shall be 0.12 and the maximum value of "KC" need not exceed 0.25.

The tower shall be designed for an accidental torsion of 5 % as specified in Section 2312(e)5. Elevated tanks which are supported by buildings or do not conform to type or arrangement of supporting elements as described above shall be designed in accordance with Section 2312(g) using "Cp" = 0.3.

(National Structural Code of the Philippines)

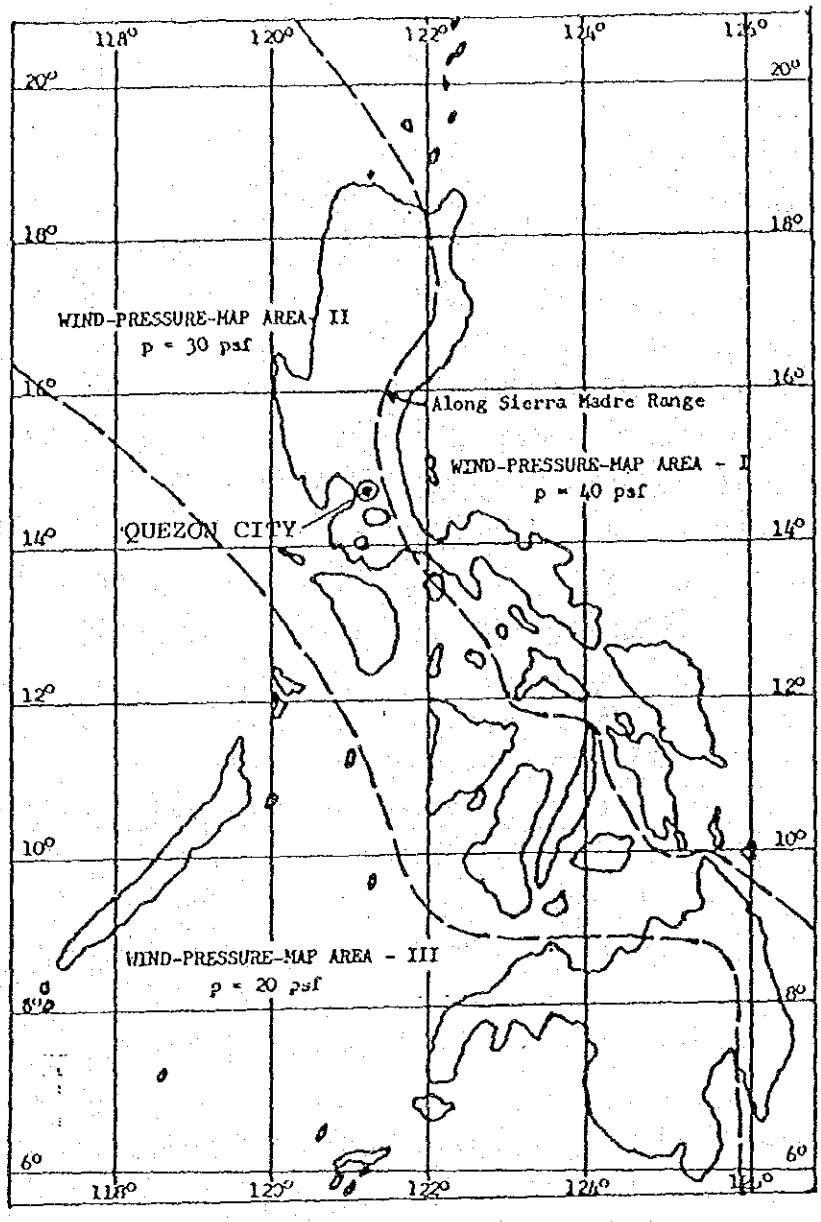


FIGURE 4-2 WIND-PRESSURE MAP AREAS FOR THE PHILIPPINES

TABLE 4-3 BASIC WIND PRESSURES FOR DIFFERENT HEIGHT ZONES ABOVE THE GROUND (UBC)

Height Zone in Feet	Wind-pressure-map Area		
	Area I	Area II	Area III
Less than 30	30 psf	20 psf	10 psf
30 to 50	40 psf	30 psf	20 psf
50 to 100	50 psf	35 psf	25 psf
100 to 500	60 psf	40 psf	30 psf
500 to 1200	70 psf	45 psf	35 psf
Over 1200	80 psf	50 psf	40 psf

(4) Utility Plan

a) Electric System

1. Receiving and substation system

The electric machine room will provide power supply of 3 ϕ 3 W 13.2 KV through the substation of the electric company.

2. Generator system

To deal with power failures, a generator system of say, 200 KVA will be provided. The power will be supplied to the safety and security facilities including fire hydrant pumps, fire alarms, broadcasting amplifiers, lift pumps, the telephone exchange system, security lamps, etc.

3. Main feeder system

From the main switch board in the electric machine room, power will be supplied to the lighting distribution panel and the power distribution panel on each floor. The wiring will be installed in the ceiling cable racks.

a. Lighting distribution panel	3 ϕ	3 W	230 V	60 Hz
	1 ϕ	2 W	230 V	60 Hz
b. Power distribution panel	3 ϕ	3 W	230 V	60 Hz

4. Lighting system

Fluorescent lamps will be used in principle. Lighting fixtures will be selected to ensure sufficient illumination. For the special purpose rooms, the equipment appropriate to the purpose will be selected. The JIS illumination criteria will be applied in the design.

5. Receptacle system

Receptacle outlets of sufficient capacity for the specified usage will be provided where necessary.

6. Power control system

The pumps will be provided with automatic on-off function. The power for the ventilation system will be regulated both at the switch panel and the remote switch.

In case either the power system or tank system malfunctions, alarms will sound in the administration office.

7. Telephone system

Approximately 10 circuits for the station's exclusive use will lead into the building. A telephone exchange system will be installed in the administration office, from which the telephone wiring will be distributed to each set. The exchange will be a type that allows both extension calls and public calls.

8. Master TV antenna system

The outlets will be installed in the director's office and A-V room in the laboratory building and the cafeteria, lounge and guest rooms in the dormitory.

9. Broadcasting system

An amplifier for broadcasting in the PhilRice compound will be installed in the administration office for summoning staff members in the building.

10. Electric clock system

A main clock will be installed in the administration office. Branch clocks connected to the main clock will be provided in each room.

11. Fire alarm system

Alarm terminals will be provided where necessary to activate fire alarms in case of fire. An automatic fire detector will be installed where fire is used.

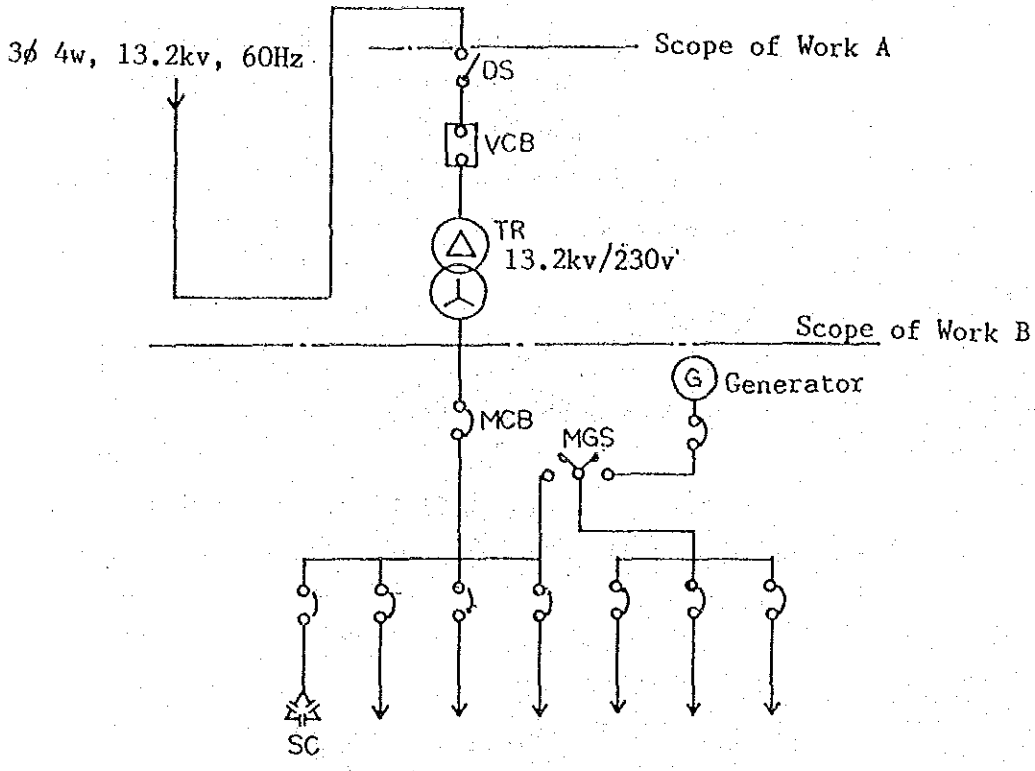


FIGURE 4-3 ELECTRIC SYSTEM DIAGRAM

b) Plumbing System

There are no city water mains in the area around the project site. PhilRice has two deep wells in its grounds; one is for the experimental farm and the other for potable use. The result of a water quality test in 1988 show the water has potable quality.

1. Deep well system

Two deep wells will be dug within the site to supply a sufficient amount of water for daily use of 75 - 150 m^3/day. Well water will be treated through the underground sedimentation pit and stored in the water tank.

Amount to be pumped	75 to 150 m^3/day × 2
Diameter of the wells	200 ϕ
Depth	250 m

2. Water supply system

Water will be lifted up to the elevated tank from the water tank (40 m^3) by the lift pump, and distributed to the laboratory building, the dormitory and others by a gravity type supply system.

3. Drainage system

Sewage and drainage water will be drained separately within the building, combined outside and treated in the sewage treatment system. The laboratory waste water will be led by individual piping to the neutralization pit, and drained into the sewage treatment system after neutralization. Drainage after the treatment system will be combined with rain water and discharged into the NIA irrigation canal.

4. Hot water supply

The local hot water supply system will be used. A gas boiler will be installed where necessary to supply hot water.

5. Plumbing system

Plumbing fixtures will be installed where necessary according to the architectural design. Special provisions will be provided in the laboratories appropriate to the equipment.

c) Air Conditioning and Ventilation System

1. Air conditioning system

Ordinary rooms : air-cooled package and duct system (partly direct blow system)

Special rooms : a window type cooler will be installed in each room

Fresh air will be taken into through the louvers. No heating system is assumed necessary.

2. Ventilation system

Kitchen : air intake and exhaust by the pressure fan

In other rooms, an individual fan will be provided where ventilation is required. The sleeping rooms will be equipped with ceiling fans.

d) Other Systems

1. Gas system

LPG will be supplied to points where gas is required via the central piping system.

2. Fire extinguishing system

A fire hydrant system will be installed in the laboratory building and the dormitory.

3. Sewage treatment system

Sewage and laboratory waste water will be treated to pass the sewage standards before discharging into the existing drainage piping.

TABLE 4-4 SEWAGE STANDARDS

	Protected Inland Waters (Class A & B)	Protected Coastal Waters (SB & NP)	Inland Waters (C & D)	Coastal Waters (SC)
Color in platinum cobalt units	100	100	100	200
pH	6-8.5	6-8.5	6-8.5	5.5-9
Temperature in °C	40	40	40	40
Phenols in mg/l	0.05	0.05	0.1	1
Suspended solids in mg/l	30	50	75	200
BOD in mg/l	30	50	80	250
Oil/grease in mg/l	5	5	10	15
Detergents in mg/l	1	1	5	10

(source : Manila Pollution Control Commission)

(5) Materials Plan

Materials scheduled to be adopted in this project are as shown below. Local products and materials will be used as much as possible, unless they are disadvantageous as to quality, price or supply conditions, the aim being economy and easy construction and maintenance.

a) Structural Materials (Main elements)

Member	Material	RP/Japan	Reason
1. Laboratory Bldg., Dormitory, Headhouse			
Columns, Beams	Reinforced concrete	o	
Floors, Stairs			
Exterior walls	Reinforced concrete	o	
Interior walls	Reinforced conc. block	o	
2. Field Service Bldg.			
Columns, Beams	Structural steel	o	quality, strength
Floors	Reinforced concrete	o	
Exterior walls	Reinforced conc. block	o	
Interior walls	Reinforced conc. block	o	
3. Greenhouse			
Columns, Beams	Structural steel	o	quality, strength
Floor	Reinforced concrete	o	
Exterior walls	Aluminum sash (frame)	o	quality, supply
	Glass	o	ditto

b) Exterior Finish Materials

1. Laboratory Bldg., Dormitory

Member	Material	RP/Japan		Reason
Roof, Roof deck	Asphalt waterproofing w/ gravel cover, roofing tile	o		
	Membrane waterproofing (part)		o	quality
Exterior wall	Spray tile		o	quality, supply
Doors & Windows	Aluminum sash		o	quality, supply
Floors	Concrete, trowel finish	o		
	Partly marble stone, washing finish	o		
Eaves (plancier)	Wood,	o		(lumber)
	termite-proof painting		o	(paint) quality
Balcony: skirting	Gravels, washing finish	o		
floor	Mortar waterproofing	o		waterproofing agent from Japan (quality)

2. Headhouse

Member	Material	RP/Japan		Reason
Roof	Asphalt waterproofing with gravel cover	o		
Exterior walls	Exposed concrete with lithing spraying finish	o o		
Doors & Windows	Aluminum sash		o	quality, supply
Floors	Gravels, washing finish	o		

3. Field Service Bldg.

Member	Material	RP/Japan		Reason
Roof	Folded steel sheet		o	quality, supply
Exterior walls	Reinforced conc. block,	o		
	Partly cement board w/ paint finish	o		
Doors & Windows	Aluminum sash		o	quality, supply

c) Interior Finish Materials

1. Laboratory Bldg.

Member	Material	RP/Japan		Reason
Floors:				
Research & ordinary rooms	Plastic tile		o	quality
Laboratories	Vinyl sheet in rolls		o	quality
Direc. office Guest room	Flooring block	o		
Hall	Gravels, washing finish	o		
Machine room & elec.machine rm	Mortar with trowel finish	o		
Walls:				
Research & ordinary rooms	Mortar w/ trowelling, paint finish	o		
Laboratories	Mortar w/ trowelling, paint finish	o		
Direc. office Guest room	Wood siding board w/ varnish	o		
Hall	Gravels with washing finish Partly wood siding w/ varnish	o		
Machine room & elec.machine rm	Exposed concrete	o		
Ceilings:				
Research & ordinary rooms	Decorative gypsum board		o	quality, supply
Laboratories	Decorative gypsum board		o	quality, supply
Direc. office Guest room	Rock wool acoustic board		o	quality, supply
Hall	Decorative gypsum board		o	quality, supply
	Wooden coffered ceiling w/ paint	o		
Machine room & elec.machine rm	Exposed concrete	o		
Doors & Windows:				
Ordinary rooms	Wooden door	o		
A-V produc.room, machine room & elec.machine rm	Steel door		o	quality, supply

2. Dormitory

Member	Material	RP/Japan	Reason
Floors:			
Cafeteria & sleeping rooms	Plastic tile	o	quality, supply
Kitchen	Clinker tile	o	quality
Toilet & shower rooms	100 x 100 (mm) porcelain tile	o	quality, supply
Walls:			
Cafeteria & sleeping rooms	Mortar with trowelling, paint finish	o	
Toilet, shower rooms & kitchen	100 x 100 (mm) tile	o	quality, supply
Ceilings:			
Cafeteria & sleeping rooms	Decorative gypsum board	o	quality, supply
Toilet, shower rooms & kitchen	Cement board, paint finish	o	
Doors & Windows:			
Ordinary rooms	Wooden door	o	

3. Headhouse

Member	Material	RP/Japan	Reason
Floor:			
Work Rooms, corridor & toilet	Mortar with trowelling	o	
Wall:			
Work Rooms & corridor	Mortar with trowelling, paint finish	o	
Toilet	100 x 100 (mm) tile	o	quality, supply
Ceilings:			
Work Rooms, corridor & toilet	Cement board, paint finish	o	

4. Field Service Building

Member	Material	RP/Japan		Reason
Floor:				
Rooms, work space	Mortar with trowelling	o		
Wall:				
Control room	Mortar w/ trowelling, paint	o		
Toilet	100 x 100 (mm) tile		o	quality, supply
Ordinary rooms	Fair-faced concrete block	o		
Ceilings:				
Control room	Decorative gypsum board		o	quality, supply
Seed storage toilet, locker rooms	Cement board, paint finish	o		

4-3-3 Improvement of Experimental Farm

The improvement of the experimental farm is planned according to the following conditions.

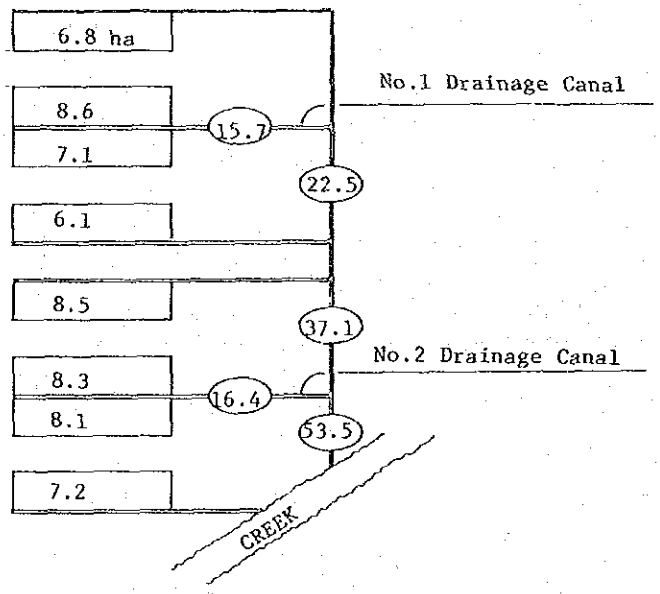
(1) Design Rainfall

The design rainfall is defined as 77.1 mm, which is the maximum daily rainfall according to the F/S Report on the Improvement, Report of the Operation and Maintenance of National Irrigation Systems (UPRIS), Appendix I, Meteorology and Hydrology PI.T.14.

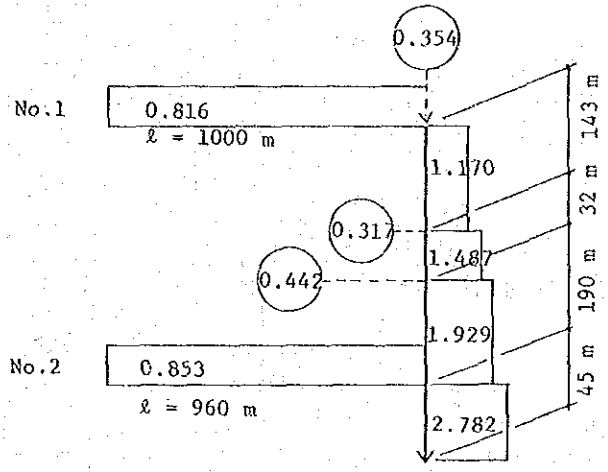
(2) Design Canal Area, Rate of Discharge

The design drainage canal area is prepared based on the data in the Muñoz area presented by PhilRice, and the design rate of discharge is calculated accordingly.

Design Drainage Canal Area (in hectares)



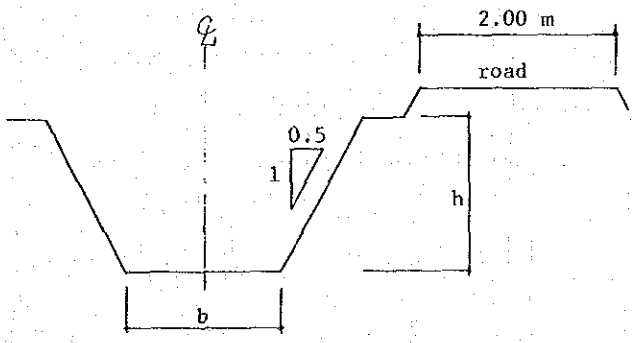
Design Rate of Discharge (m^3/s)



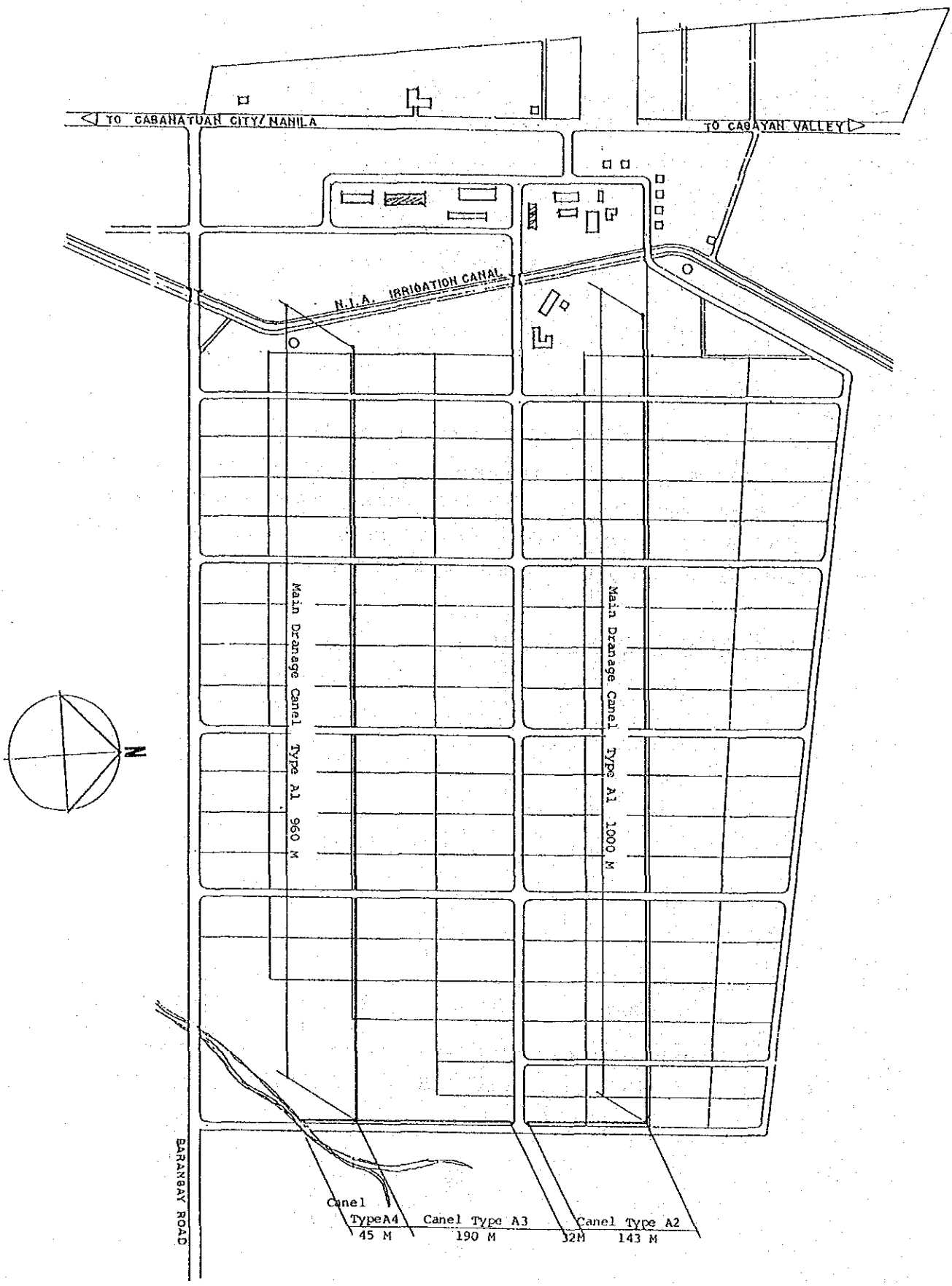
(3) Determination of Drainage Canal Section

The drainage canal is designed to have a reinforced concrete frame because the region has heavy rain and the experimental farm is not provided with plow pans. Four types of drainage ditches are considered according to the design rate of discharge.

Drainage Canal Section



Type	Width (b)	Height (h)	Design Discharge	Length of Waterway (ℓ)
A 1	0.60 m	0.95--1.20 m	0.85 m^3/S	1000+960=1960 m
A 2	1.20	1.10	1.25	143
A 3	1.20	1.20	1.95	190
A 4	1.20	1.35	2.80	45


TO CABANATUAN CITY/ MANILA
TO CABAYAN VALLEY
N.I.A. IRRIGATION CANAL
Main Drainage Canel Type A1 960 M
Main Drainage Canel Type A1 1000 M
N
BARANGAY ROAD
Canel TypeA4 45 M
Canel Type A3 190 M
32M
Canel Type A2 143 M

Culvert (Closed Conduit)

The culverts crossing the footpath between the fields		ϕ 810 (32 inch)
Air strip	crossing	Box Culvert (1.20 x 1.20)

4-3-4 Equipment Plan

The equipment to be provided in this project is classified in the following categories:

(1) Equipment for test and research (to be installed in the laboratories and headhouse)

a) Equipment for varietal improvement
- Seed separator, germinator, seed selection thresher, etc.

b) Equipment for planting & fertilizer management
- Atomic absorption spectrophotometer, magnetic stirrer, spectrophotometer, etc.

c) Equipment for integrated pest management
- Clean bench, autoclave, oven, etc.

d) Equipment for rice farming systems
- Platform scale, porometer, etc.

e) Equipment for rice engineering and mechanization
- Testing whiteners (abrasion type, friction type), testing broken separator, etc.

f) Equipment for rice chemistry and food science
- Distilling apparatus, spectrophotometer, Kheldal set-up

g) Laboratory utensils
- Center tables (for chemical experiments, for ordinary use), glassware, etc.

(2) Equipment for training

a) Simple audio-visual equipment (to be installed in the classrooms and seminar rooms)
- OHP, control power amplifier, etc.

b) Equipment for making teaching materials
- Video editing system, microresearch video equipment, etc.

c) Printing equipment
- Plate maker, binding machine, etc.

(3) Farm preparation equipment (to be installed in the field service building)

- Tractor and attachment, etc.

(4) Maintenance equipment (to be installed in the field service building)

- Machine hydraulic press, AC arc welder, etc.

(5) Transportation equipment (to be provided in the parking area)

- Pick-up truck, minibus, etc.

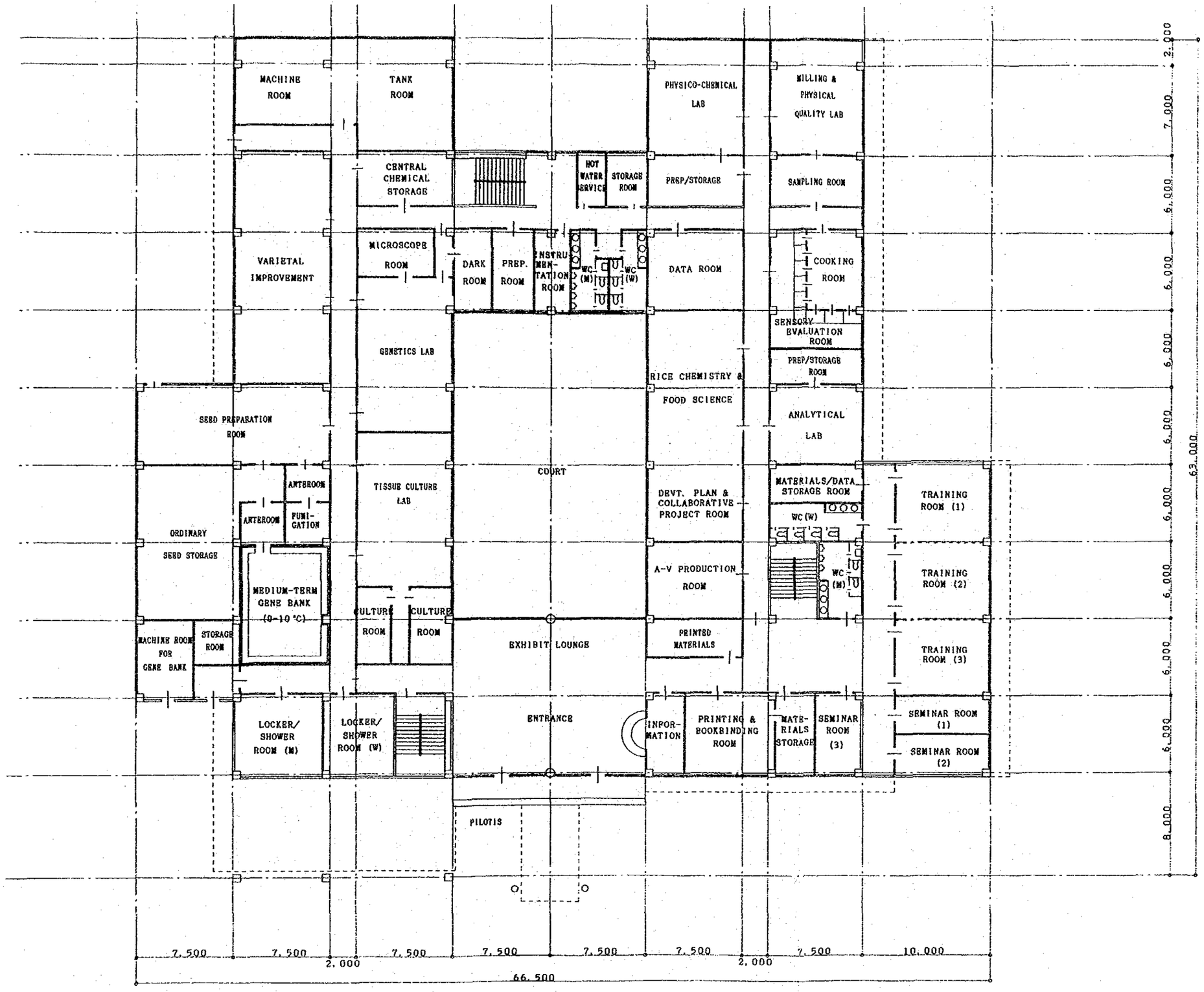
(6) Office equipment (to be provided in the administration department)

- Digitizer, drafting machine, etc.

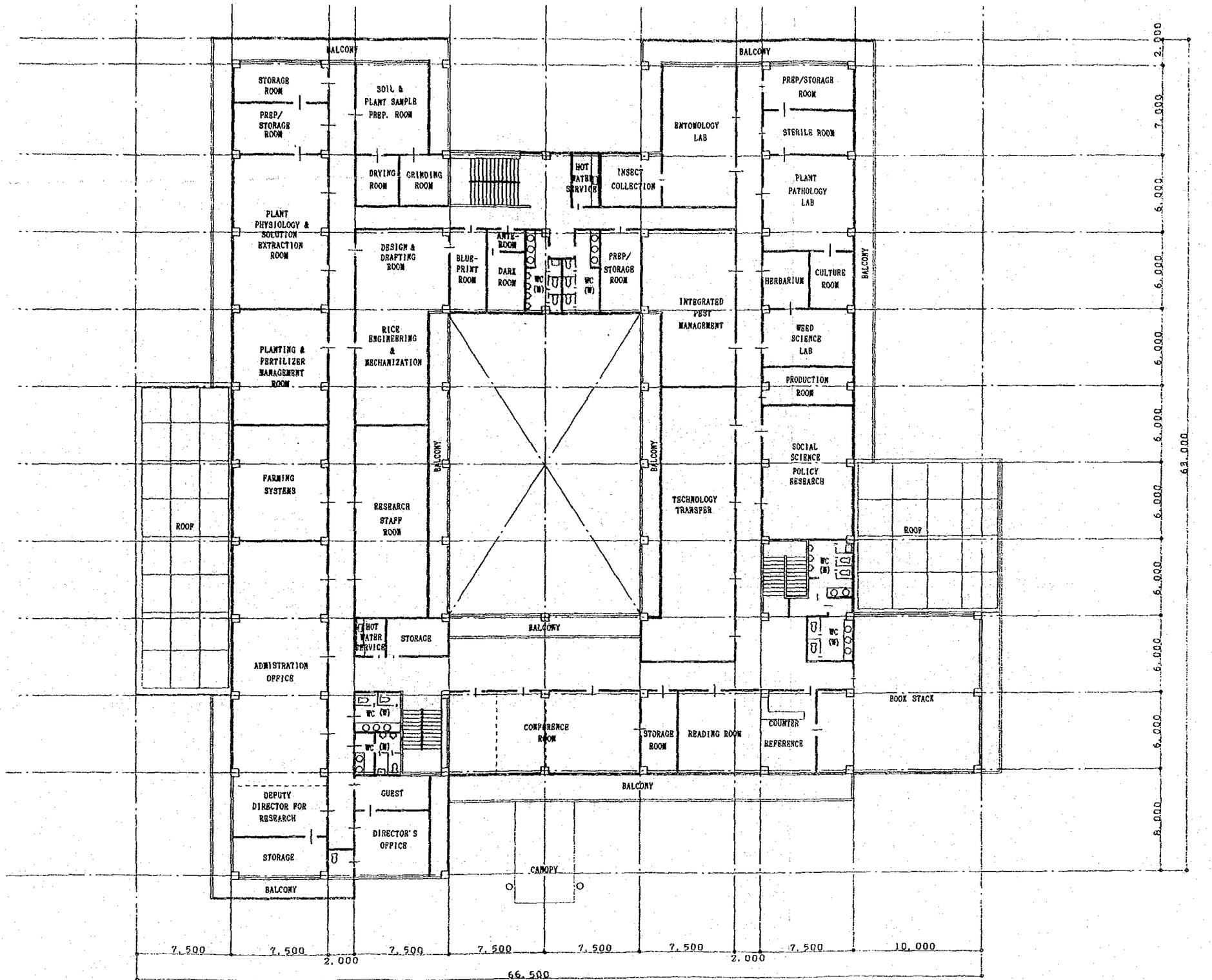
4-3-5 Basic Design Drawings

A-01	PLOT PLAN	
A-02	LABORATORY BUILDING	GROUND FLOOR PLAN
A-03	LABORATORY BUILDING	SECOND FLOOR PLAN
A-04	LABORATORY BUILDING	SECTION
A-05	LABORATORY BUILDING	WEST AND SOUTH ELEVATION
A-06	LABORATORY BUILDING	NORTH AND EAST ELEVATION
A-07	DORMITORY	GROUND AND SECOND FLOORS PLAN
A-08	DORMITORY	NORTH AND SOUTH ELEVATION
A-09	DORMITORY	SECTION, EAST AND WEST ELEVATION
A-10	GENERATOR HOUSE	PLAN, SECTION, ELEVATION
A-11	FIELD SERVICE BUILDING	PLAN
A-12	FIELD SERVICE BUILDING	ELEVATION
A-13	GREENHOUSE, HEADHOUSE	PLAN
A-14	GREENHOUSE	ELEVATION
A-15	HEADHOUSE	ELEVATION

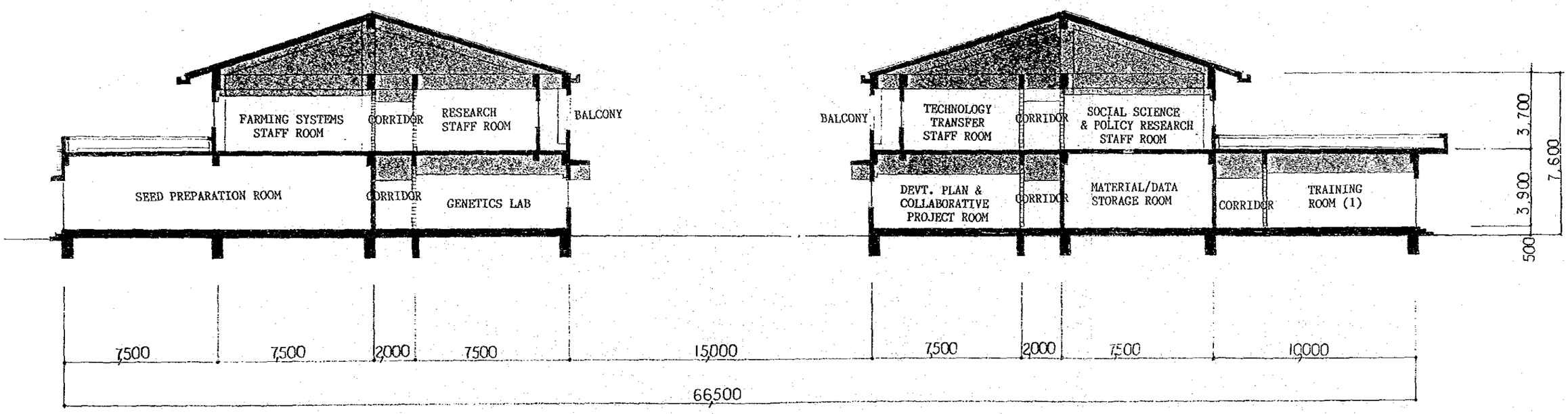
PROJECT FOR IMPROVEMENT OF THE CENTRAL EXPERIMENT STATION OF PHILRICE	A－1
配置図 PLOT PLAN	



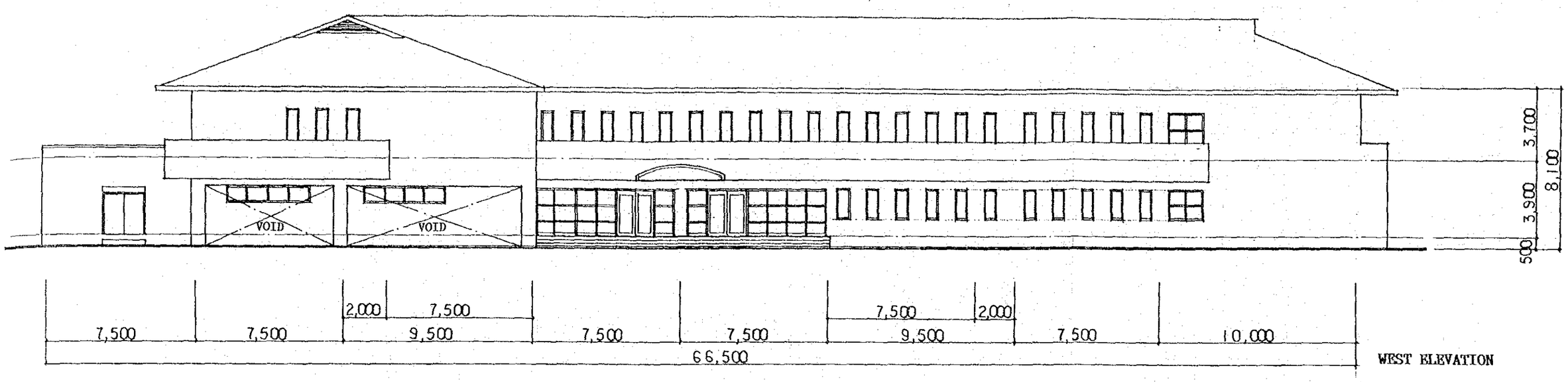
			PROJECT FOR IMPROVEMENT OF THE CENTRAL EXPERIMENT STATION OF PHILRICE	A — 2
			LABORATORY BUILDING GROUND FLOOR PLAN / 1 / 300	



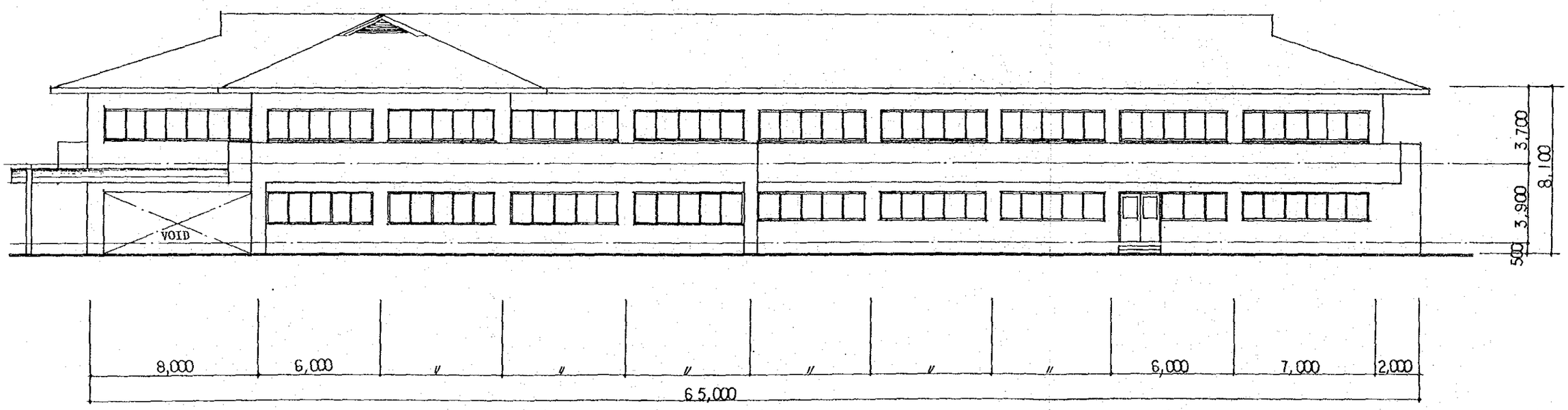
			PROJECT FOR IMPROVEMENT OF THE CENTRAL EXPERIMENT STATION OF PHILRICE	
			LABORATORY BUILDING SECOND FLOOR PLAN	1 / 300
				A — 3



			PROJECT FOR IMPROVEMENT OF THE CENTRAL EXPERIMENT STAION OF PHILRICE	A—4
			LABORATORY BUILDING SECTION 1 / 200	

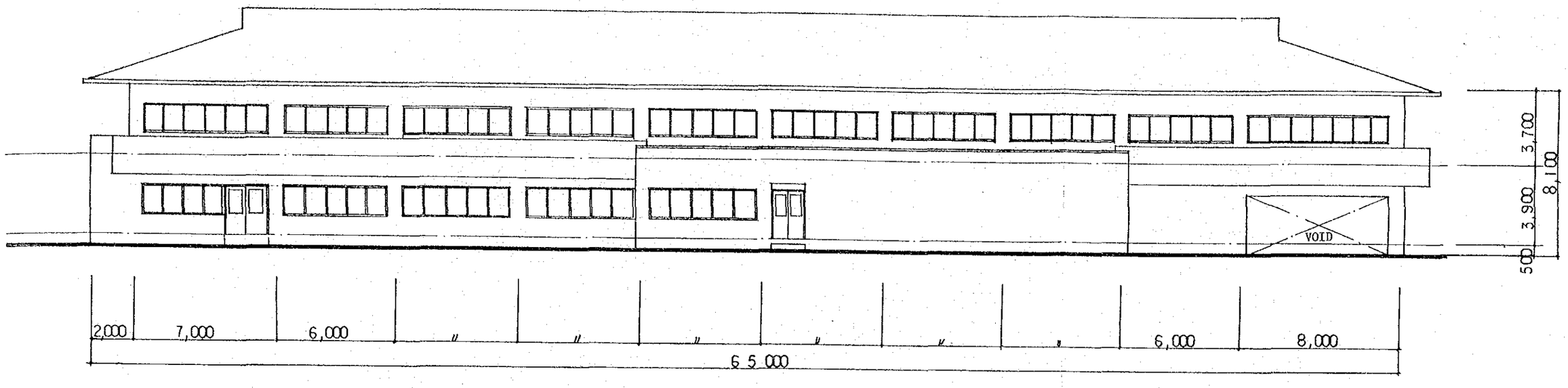


WEST ELEVATION

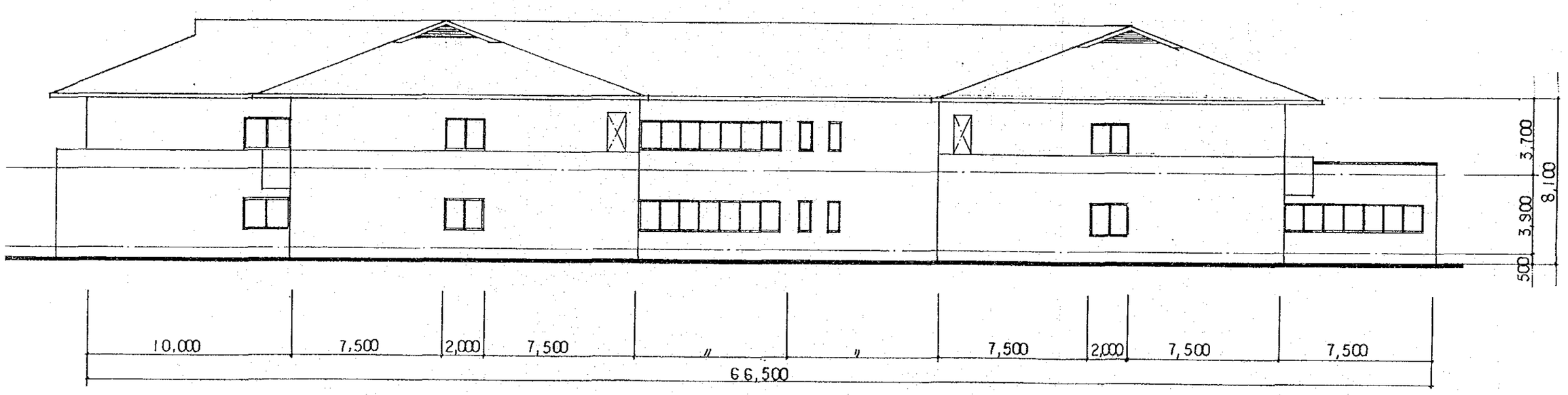


SOUTH ELEVATION

			PROJECT FOR IMPROVEMENT OF THE CENTRAL EXPERIMENT STATION OF PHILRICE	A — 5
			LABORATORY BUILDING WEST AND SOUTH ELEVATION / 1 / 200	



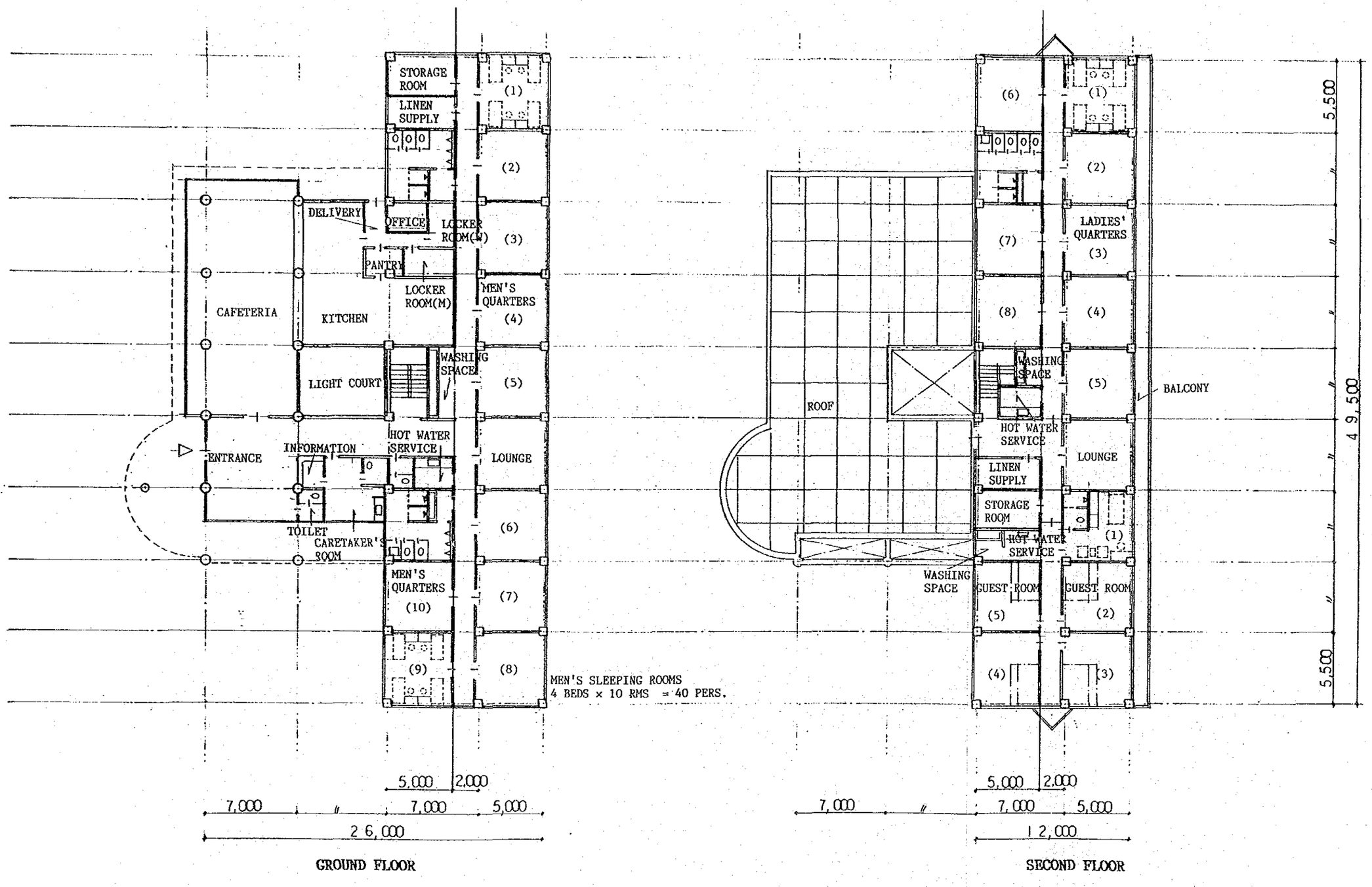
NORTH ELEVATION



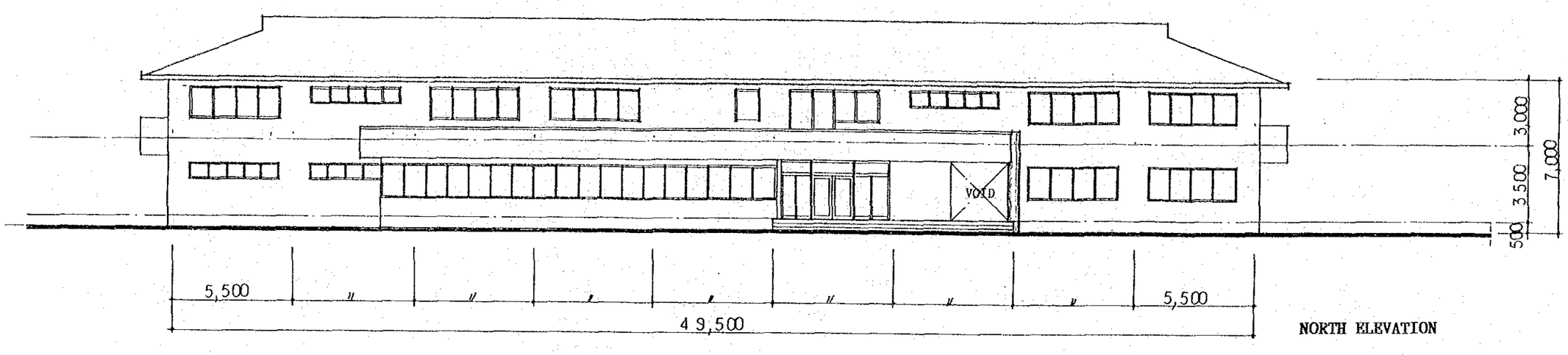
EAST ELEVATION

			PROJECT FOR IMPROVEMENT OF THE CENTRAL EXPERIMENT STATION OF PHILRICE	
			LABORATORY BUILDING NORTH AND EAST ELEVATION	1 / 200

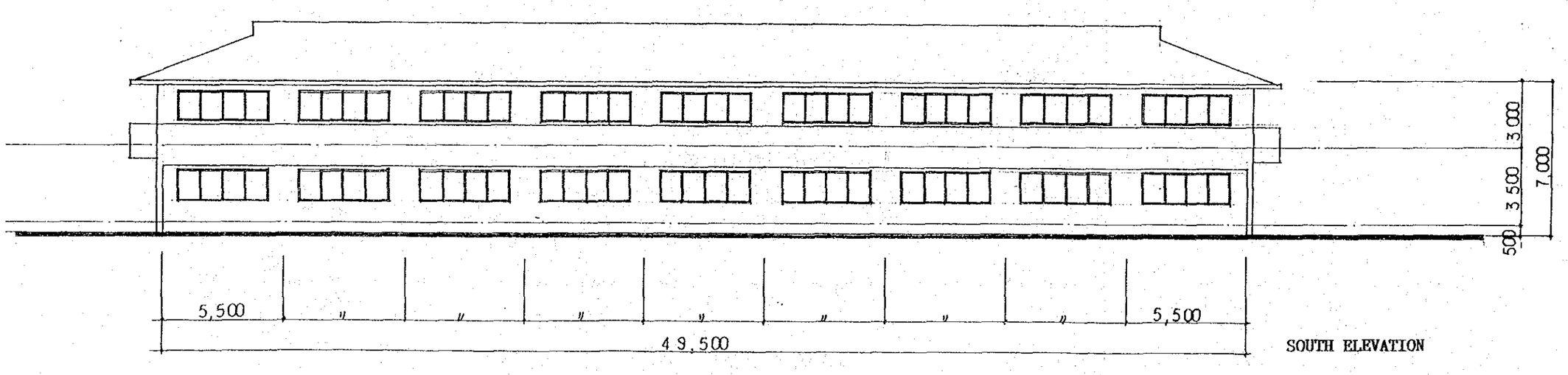
A — 6



			PROJECT FOR IMPROVEMENT OF THE CENTRAL EXPERIMENT STATION OF PHILRICE	A—7
			DORMITORY GROUND AND SECOND FLOORS PLAN	1 / 300

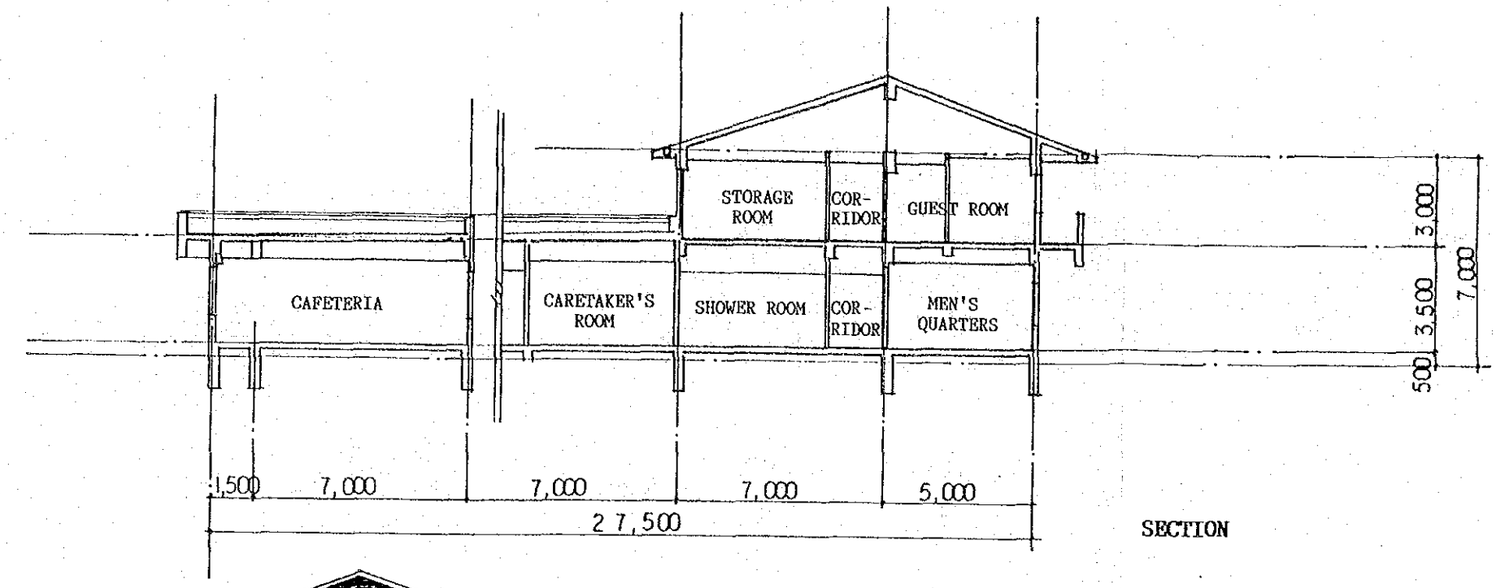


NORTH ELEVATION

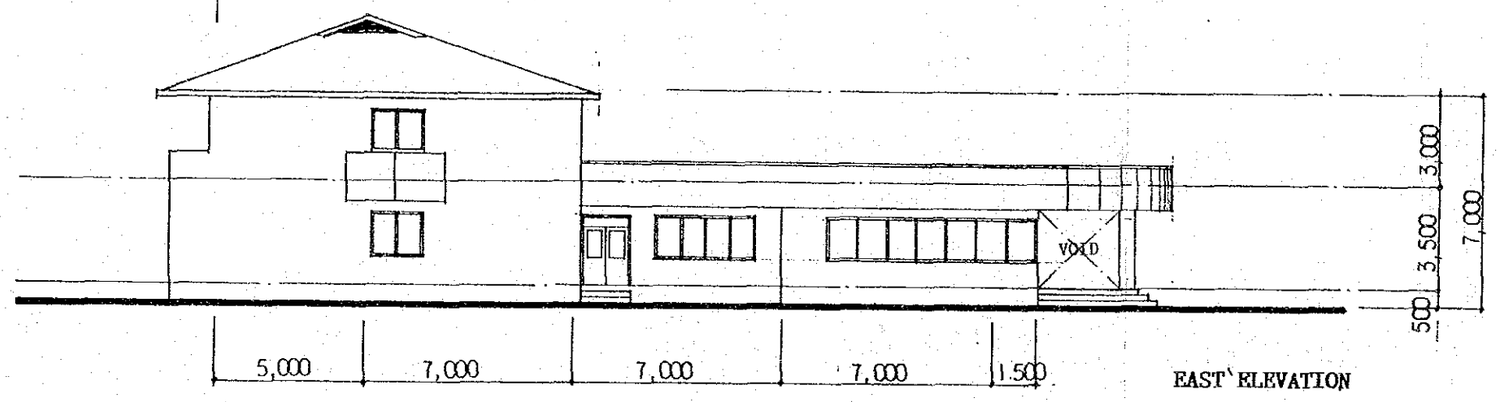


SOUTH ELEVATION

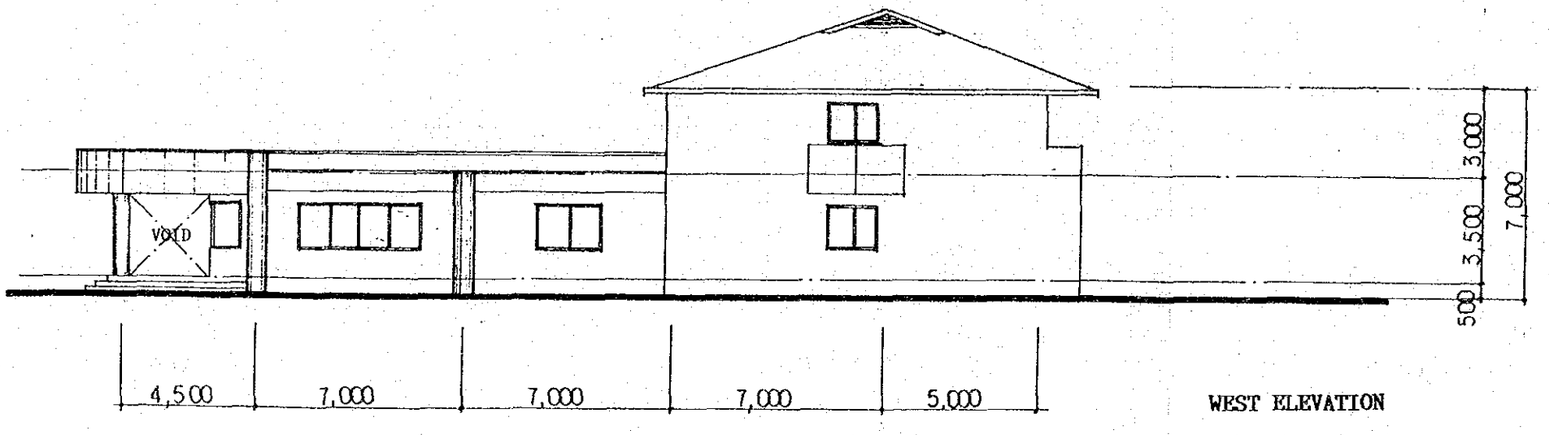
			PROJECT FOR IMPROVEMENT OF THE CENTRAL EXPERIMENT STATION OF PHILRICE	A — 8
			DORMITORY NORTH AND SOUTH ELEVATION 1 / 200	



SECTION

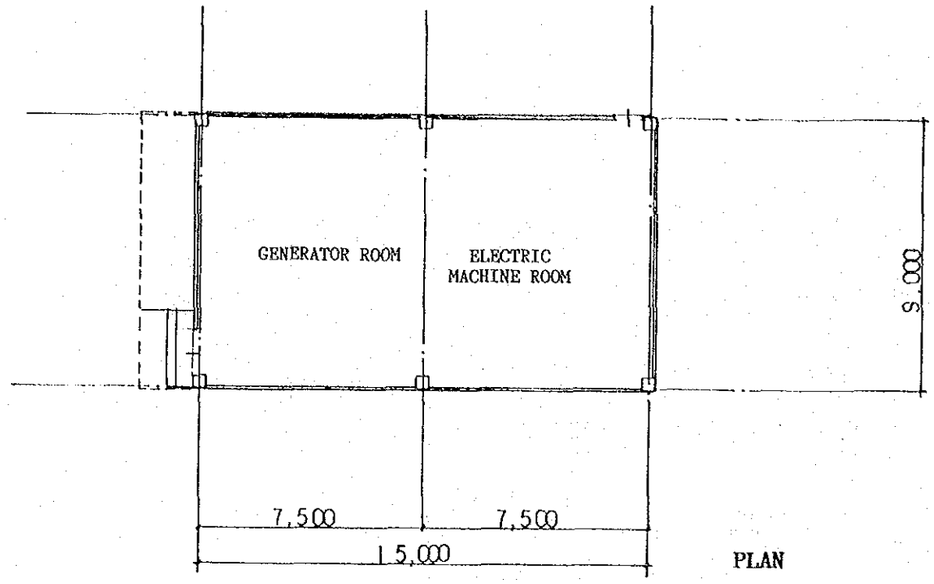


EAST ELEVATION

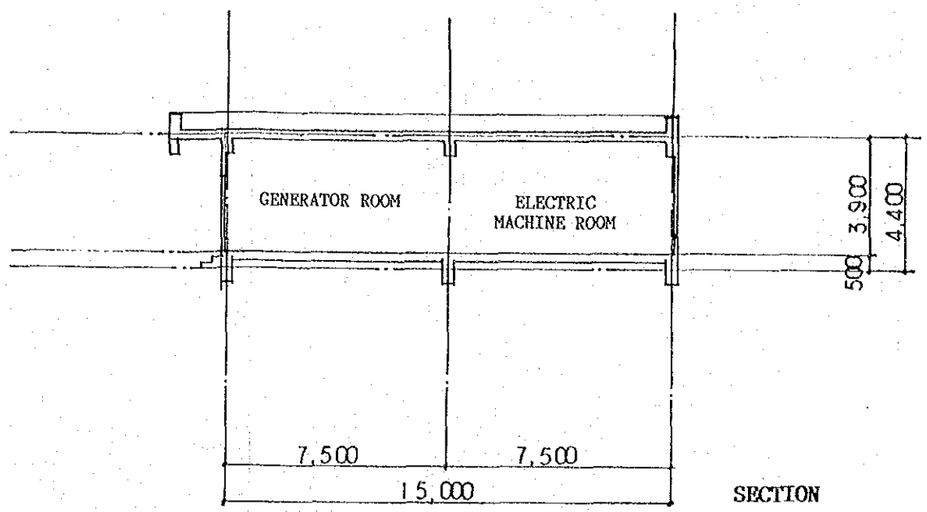


WEST ELEVATION

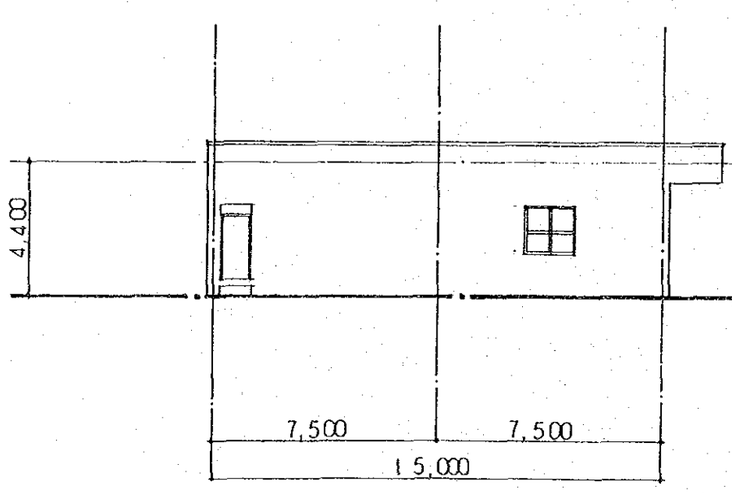
			PROJECT FOR IMPROVEMENT OF THE CENTRAL EXPERIMENT STATION OF PHILRICE	A — 9
			DORMITORY SECTION, EAST AND WEST ELEVATION 1 / 200	



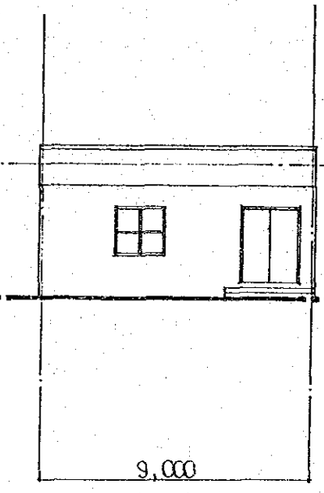
PLAN



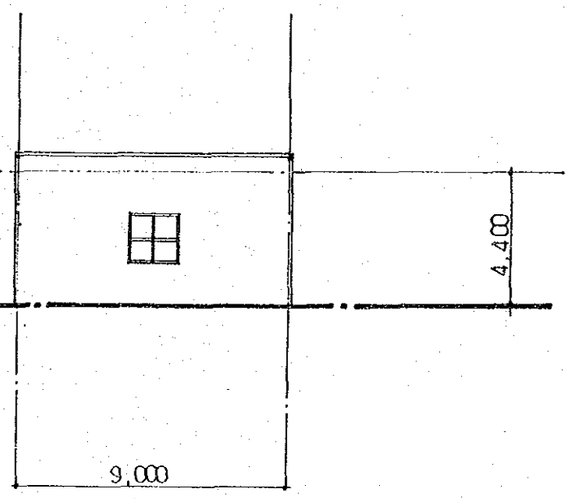
SECTION



EAST ELEVATION

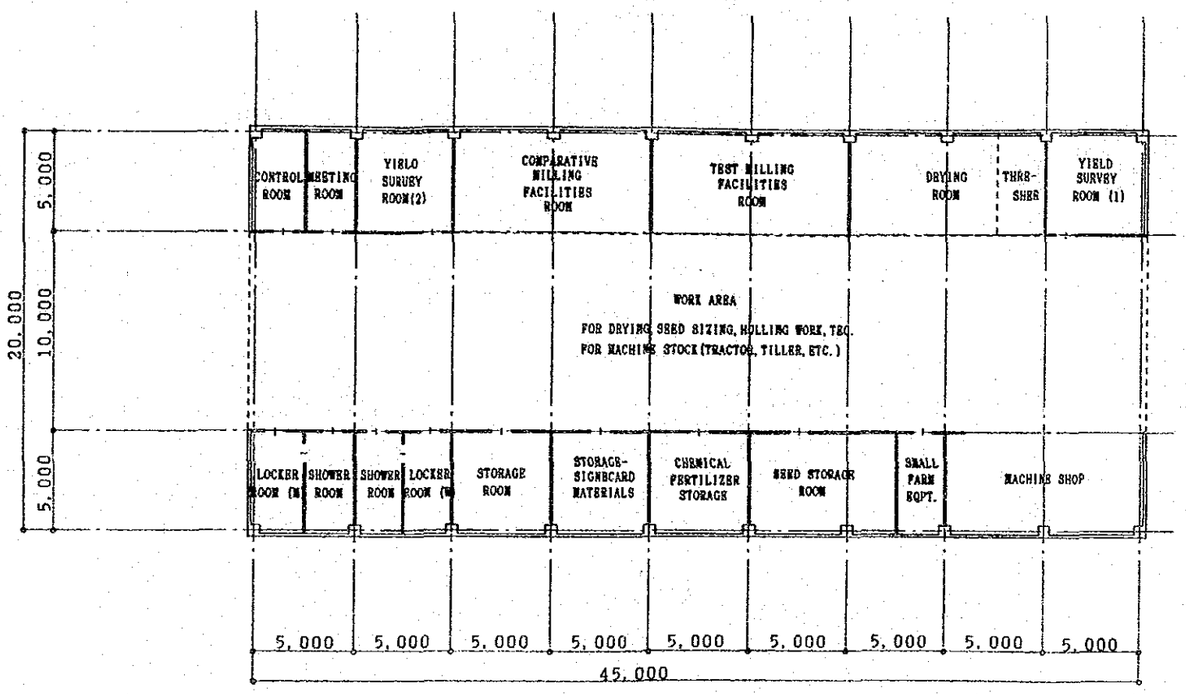


NORTH ELEVATION

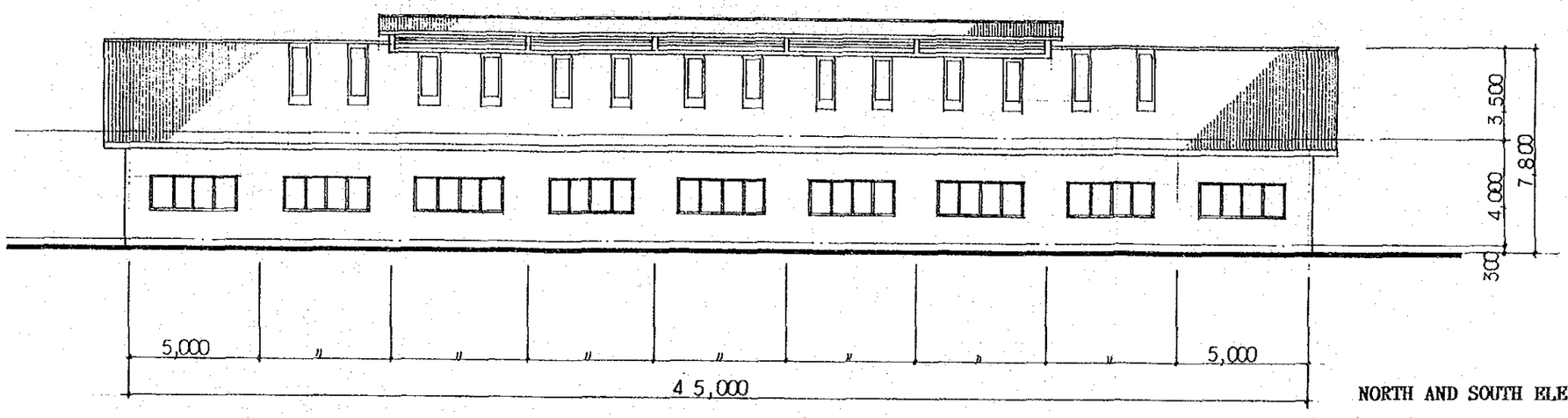


SOUTH ELEVATION

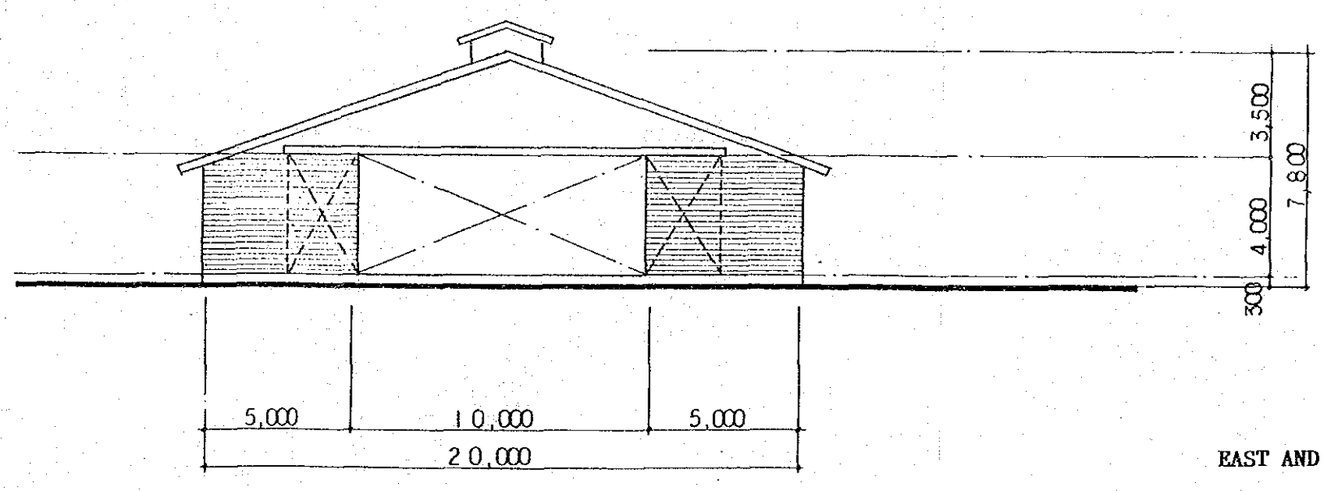
			PROJECT FOR IMPROVEMENT OF THE CENTRAL EXPERIMENT STATION OF PHILRICE	A — 10
			GENERATOR HOUSE PLAN, SECTION, ELEVATION / 1 / 200	



			PROJECT FOR IMPROVEMENT OF THE CENTRAL EXPERIMENT STATION OF PHILRICE	A — 11
			FIELD SERVICE BUILDING PLAN	1 / 300

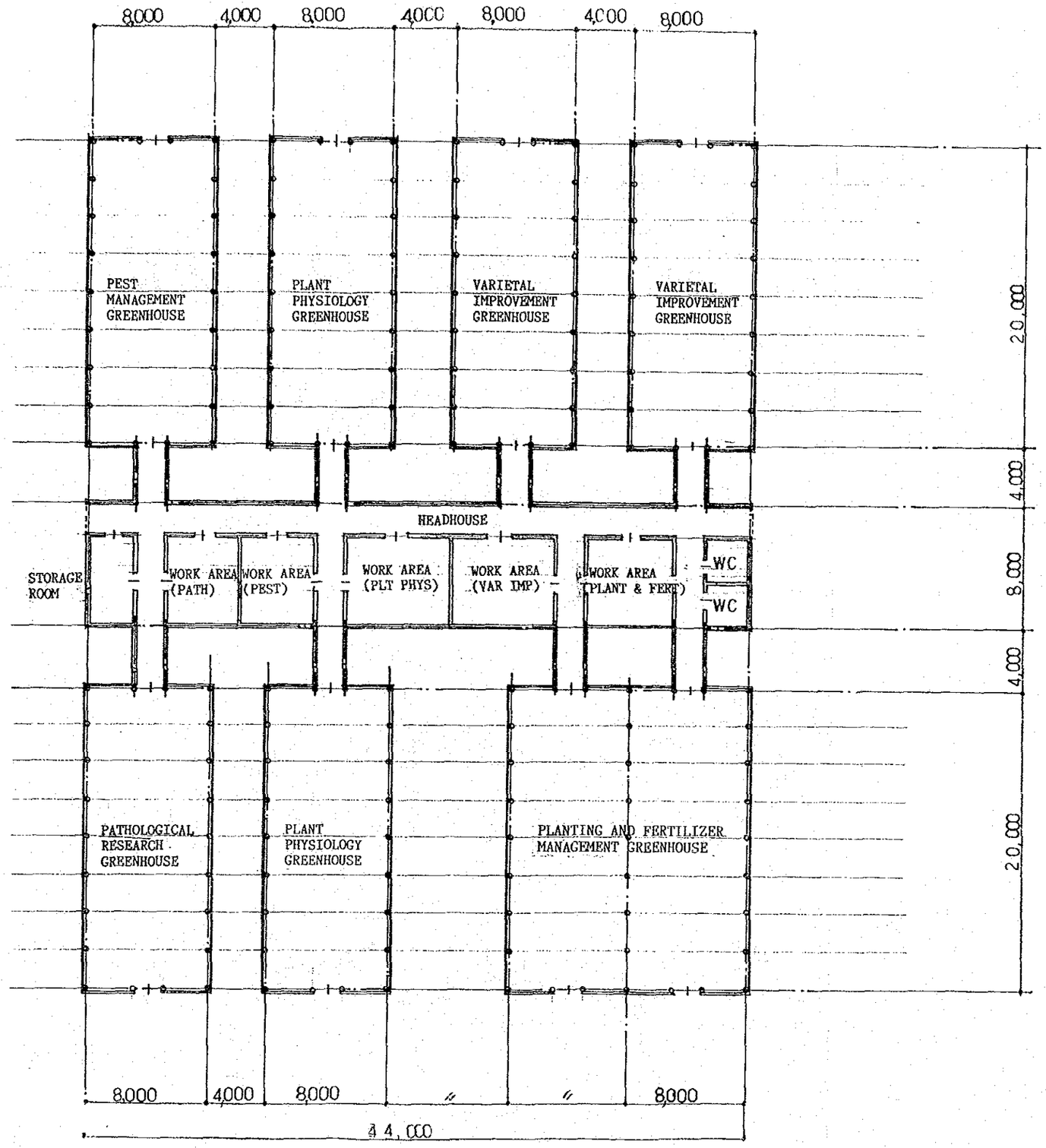


NORTH AND SOUTH ELEVATION

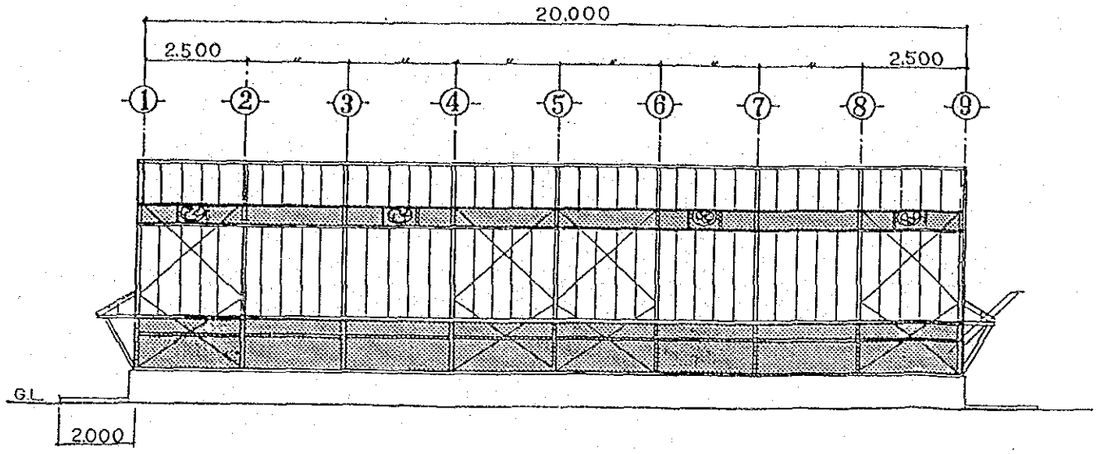


EAST AND WEST ELEVATION

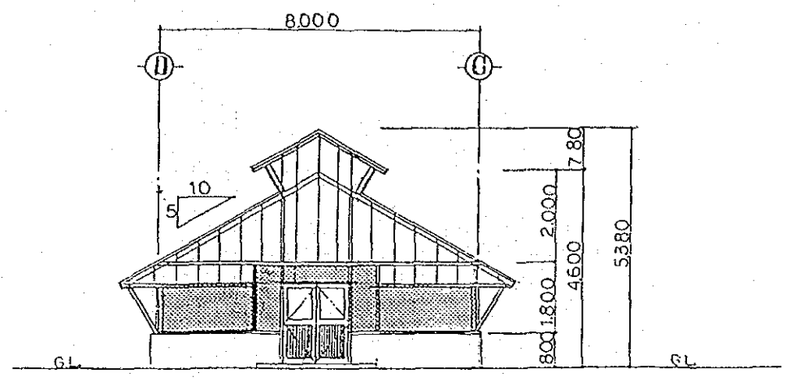
			PROJECT FOR IMPROVEMENT OF THE CENTRAL EXPERIMENT STATION OF PHILRICE	A — 12
			FIELD SERVICE BUILDING ELEVATION 1 / 200	



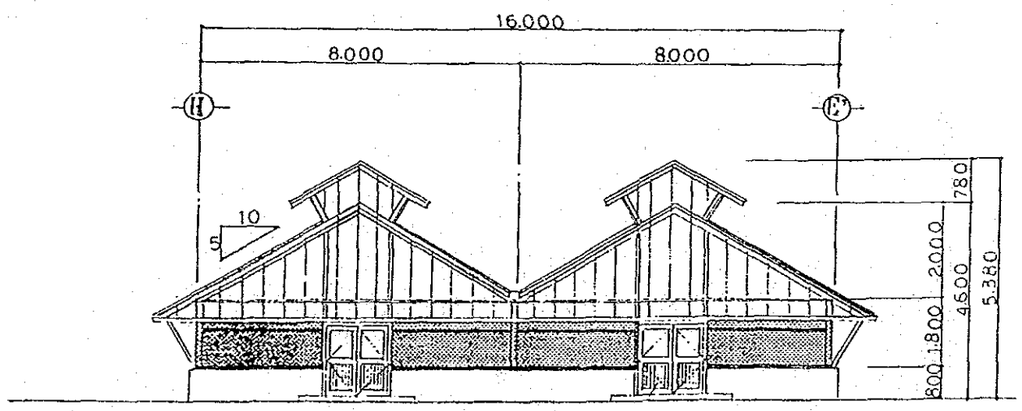
			PROJECT FOR IMPROVEMENT OF THE CENTRAL EXPERIMENT STATION OF PHILRICE	
			GREENHOUSE, HEADHOUSE PLAN	1 / 300
				A—13



SIDE ELEVATION

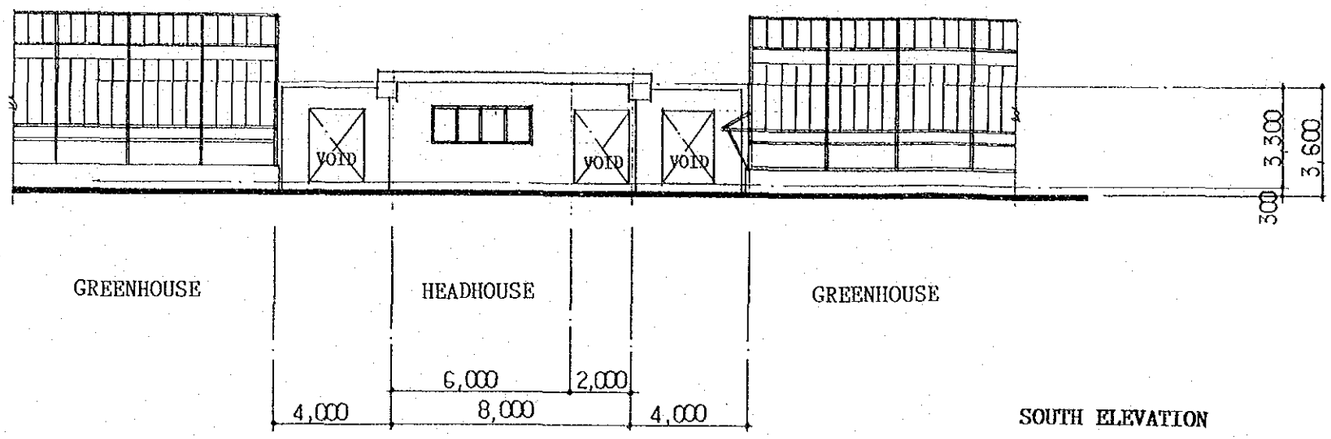


FRONT ELEVATION

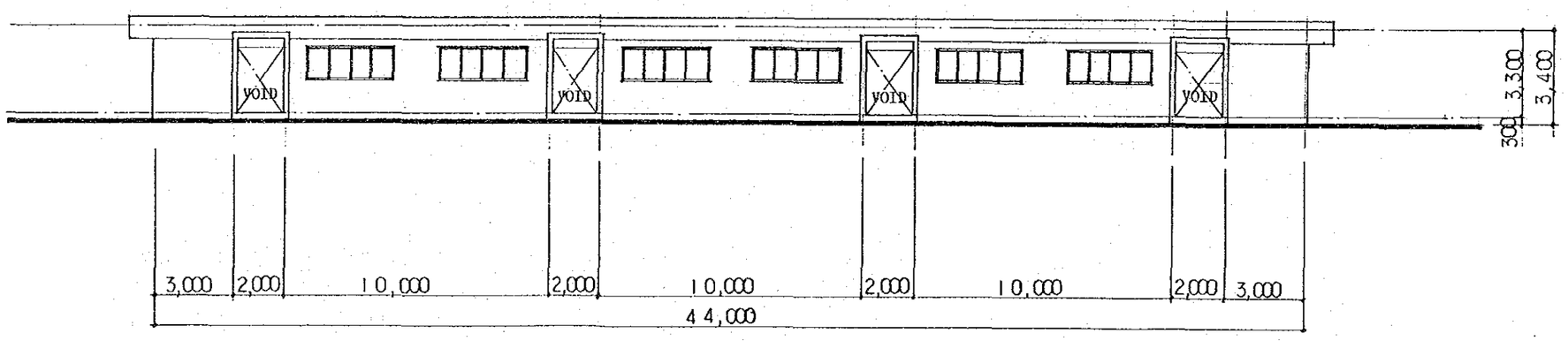


FRONT ELEVATION

			PROJECT FOR IMPROVEMENT OF THE CENTRAL EXPERIMENT STATION OF PHILRICE	A—14
			GREENHOUSE ELEVATION	



SOUTH ELEVATION



EAST ELEVATION

			PROJECT FOR IMPROVEMENT OF THE CENTRAL EXPERIMENT STATION OF PHILRICE	A — 15
			HEADHOUSE ELEVATION	1 / 200

4-4 Construction Plan

4-4-1 Construction Situation

In general, the following phenomena can be observed in the construction in the Philippines. Post-tension prestressed concrete construction is popularly applied to middle- and high-rise buildings because structural steel is expensive and seismic force is rather minor. Low buildings are usually of concrete blocks or wooden construction. Steel structures are rarely seen. Precast concrete boards are often used in exterior walls.

In construction sites 2" x 4" lumber is commonly used as form support and 12 mm thick plywood for sheeting. Construction machinery is available from commercial construction machinery lease companies. Compared to Japanese construction companies, those in the Philippines do not seem to have strong relations with subcontractors. Thus, Japanese management and supervision of work progress and engineering will be important.

In the light of this situation in addition to specific site conditions, the following shall be reviewed and investigated for the construction purpose.

(1) As the project site is located in the MRRTC compound, due care needs to be given for safety precaution such as erecting a temporary fence around the site so that unauthorized persons cannot enter.

(2) Well planned temporary work and construction schedules with safety precaution shall be made taking into account rainfall during typhoons, rain storms and the rainy season (from May to November).

(3) Care shall be given to drain water out of the site during construction, since the site is located next to the experimental farm.

(4) The purchase of local materials shall be scheduled at an early stage, due to insufficient supply. Those to be imported also need to be carefully scheduled taking into account the shipping and transport period to the site.