3-2 Study and Examination on Design Criteria

[1] Configuration of facilities

The entire facility will be operated by a total of 98 staff consisting of 39 staff in BBI, 32 in BPSB Ⅲ (Malang), and 27 in BBU.

<Facilities>

① BBI

Administrative Building:	general offices, director's office, meeting rooms, laboratories, rooms for Japanese experts, storage room
Training Building:	auditorium, lecture rooms, lecturer's rooms, exhibition space, dining hall
Related facilities:	drying adjustment room, seed storage (normal temperature), storage for farming equipment, storage for pharmaceutical items, garage, drying floor, net house, parking lot
Others:	reservoir, water tank, elevated water tank, gas-cylinderstorage, incinerator, septic tank, infiltration tank, meteorological observatory

② BPSB III (Malang)

Administrative Building:	general offices, director's office, meeting rooms, laboratories
Related facilities:	net house

③ BBU:

Administrative Building:	general offices, director's office, meeting rooms, laboratories, rooms for Japanese experts
Related facilities:	drying adjustment room, seed storage (normal temperature), storage for farming equipment, storage for pharmaceutical items, garage, drying floor, net house, parking lot
Others:	well, gas-cylinder storage, incinerator, septic tank, infiltration tank

[2] Policies for determining the scales of facilities

In calculating the total site area and the scale of each room and external facility, the following guidelines were observed:

① Similar facilities in Japan and a similar project in Indonesia, "The Project for Multiplication and Distribution of High Quality Potato Seed," shall be referred to for calculating the total area of the whole facilities.

② In calculating the areas of individual rooms and external facilities, the following documents shall be referred to in addition to the above similar facilities:

(1) Building Design Data Book (design standards used in Japan)
(2) Architectural Systems (design standards used in Japan)
(3) Area requested by the Government of Indonesia
(4) Standard design documents of Indonesia (Blue Book)

③ For rooms, whose sizes are hard to be determined based on the numbers of people to accommodate, the necessary scales for such rooms shall be determined based on the types and volume of equipment to be installed in such rooms.

④ For rooms, whose sizes can be determined based on the numbers of people to accommodate, the scales shall be calculated based on the area per person while taking into account the work procedures of local people, equipment to be installed, and needs for accepting visitors. For such facilities as lavatories, changing rooms, and shower rooms, the areas shall be determined based on the male versus female ratio while giving considerations to local customs that may prefer the same sides for men and woman.

[3] Calculation of each room size

While the scale of each building will be determined based on the personnel allocation plan for each room, the size of each room was established like below by taking into account the areas requested by Indonesia and drawings obtained in Indonesia as well as the general standards in Japan, specifications of research institutions of the Ministry of Agriculture, Forestry and Fisheries, and the Agricultural Center in Ibaraki Prefecture :

• Administrative office space	4.5-7.5 m^2/person (for general or special use)
• Research room/Laboratory	20-22 m^2/person
• Research room/Laboratory	10-12 m^2/person (for simple research)
• Meeting room	1.5-3.5 m^2/person (for general use)
• Director's office	20-30 m^2/person
• Training (lecture) room	1.2-3.5 m^2/person (classroom or multi-purpose)

- Faculty room 10 - 20 m^2/person
- Trainee's lounge 2 - 3.5 m^2/person
- Dining hall 1.2 - 2.5 m^2/person
- Kitchen 35 - 50% of the area of dining hall
- Areas for special rooms shall be determined based on the layout of equipment to be installed.

(1) BBI

It is assumed that the facility will have a total of 39 staff comprised of a director, 13 staff in charge of seed production, 8 in charge of seed processing, 6 in charge of seed technology and development, 3 trainees, 5 clerical workers, and 3 operators/drivers.

① Director's Office (for one person)

Value used: 28 m^2/person

Floor area: 28.1 m^2 (furniture for meeting visitors will be installed)

② Clerical Office (for 11people comprised of 5 clerks, 3 trainees, and 3 operators/drivers)

Value used: 5.1 m^2/person

Floor area: 56.3 m^2

③ Meeting Room (for 30 people or 80% of 39 staff)

Value used: 1.9 m^2/person

Floor area: 56.3 m^2

④ Meeting Room for expert (for 8 comprised of 5 long term experts, 2 short term experts and 1 coordinator)

Value used: 7 m^2/person

Floor area: 56.3 m^2 (furniture for meeting visitors will be installed)

⑤ Small Meeting Room for expert leader

Value used: 28.1 m^2/person

Floor area: 28.1 m^2

⑥ Laboratory Room-1 (for 16 staff comprised of 8 for seed processing, 6 for seed technology development, and 2 long-term specialists)

Value used: 3.52 m^2/person

Floor area: 56.3 m^2 (work tables, etc. for experimentation will be installed)

⑦ Laboratory Room-II (for 15 staff comprised of 8 for seed processing, 5 for seed technology development, and 2 long-term specialists)

Value used: 3.75 m^2/person

Floor area: 56.3 m^2 (work tables, etc. for experimentation will be installed)

(2) BPSB III, Malang

It is assumed that the facility will have a total of 32 staff comprised of a director, 5 seed-cultivation staff, 5 seed-certification staff, 5 seed-management staff, 5 seed researchers, 5 clerical workers, and 6 operators/drivers.

① Director's Office (for one person)

Value used: 28.1 m^2/person

Floor area : 28.1 m^2 (furniture for meeting visitors will be installed)

② Clerical Office (for 11people comprised of 5 clerks and 6 operators/drivers)

Value used: 5.1 m^2/person

Floor area : 56.3 m^2

③ Meeting Room (for 30 people including specialists)

Value used: 1.8 m^2/person

Floor area : 56.3 m^2

④ Laboratory Room-I (for 8 staff comprised of 5 seed-cultivation staff, 2 seed researchers, and a long-term specialist)

Value used: 7 m^2/person

Floor area : 56.3 m^2 (work tables, etc. for experimentation will be installed)

⑤ Laboratory Room-II (for 8 staff comprised of 5 seed-management staff, 2 seed researchers, and a long-term specialist)

Value used: 7 m^2/person

Floor area : 56.3 m^2 (work tables, etc. for experimentation will be installed)

⑥ Research Room-III (for7 staff comprised of 5 seed-certification staff, a seed researcher, and a long-term specialist)

Value used: 7 m^2/person

Floor area : 56.3 m^2 (work tables, etc. for experimentation will be installed)

(3) Training Center

The number of people to receive for practical training in the farm will not likely exceed three to five trainees per long-term training course (three months) and 15 trainees per short-term training course(two weeks or less). Considering the most suitable seasons for soy bean production, no more than two training courses per year will be held at the Training Center.

① Auditorium (can accommodate up to 80 people in a large-scale seminar or 70 to 80 trainees)

Value used: 2.8 m^2/person

Floor area : 225 m^2 (movable partitions may be installed for dividing the space for smaller classes)

② Training/Lecture Room (for 20people)

Value used: 2.8 m^2/person

Floor area : 56.3 m^2

③ Lecturer's Room (for 2 to 3 instructors)

Value used: 9.3 m^2/person

Floor area : 28.1 m^2

④ Dining Hall/Trainee's Lounge (for 40 people)

Value used: 2.2 m^2/person

Floor area : 112.6 m^2 (including 24 m^2 for food serving area*)

*Note: the serving area was designed in a local style.

(4) BBU

It is assumed that the facility will have a total of 27 staff comprised of a director, 4 seed-production staff, 4 seed-processing staff, 4 seed-technology staff, 4 seed development staff, 4 clerical workers, and 6 operators/drivers.

① Director's Office (for one person)

Value used: 28 m^2/person

Floor area : 28.1 m^2(furniture for meeting visitors will be installed)

② Clerical Office (for 10 people comprised of 4 clerks and 6 operators/drivers)

Value used: 5.6 m^2/person

Floor area : 56.3 m^2

③ Meeting Room (for 30 people including specialists)

Value used: 1.8 m^2/person

Floor area : 56.3 m^2

④ Laboratory Room (for 10 staff comprised of 4 seed-production staff, 4 seed-development staff, and 2 long-term specialists)

Value used: 5.6 m^2/person

Floor area : 56.3 m^2 (work tables, etc. for experimentation will be installed)

⑤ Small Meeting Room for short-term specialists (for two)

Value used: 14 m^2/person

Floor area : 28.1 m^2 (work tables, etc. for experimentation will be installed)

(5) Natural-Temperature Seed Storage

• Natural-Temperature Seed Storage at BBI (10 tons)

The room will be installed with three-story shelves, which can store double-stacked 60 kg-bags on each shelf or up to 180 bags.

Floor area: 64 m^2

• Natural-Temperature Seed Storage at BBU (40 tons)

The room will be installed with three-story shelves, which can store double-stacked 60 kg-bags on each shelf or up to 680 bags.

Floor area : 100 m^2

(6) The scales of the drying adjustment room, garage, farming equipment storage will be determined based on the layout of equipment to be installed.

The area of each facility in the Project is shown in Table 3-1.

Table 3-1 List of Floor Area of Main Room

Facility	Area	Remarks
[BBI]		
• Director's office	28.1 m²	• For 1 with furniture for visitors
• General office	56.3 m²	• For 11
• Meeting room	56.3 m²	• For 30
• Meeting room for expert	56.3 m²	• For 7 (expert and coordinator); furniture for visitors
• Small meeting room for expert leader	28.1 m²	• For 2 (leader and coordinator)
• Laboratory room-I	56.3 m²	• For 16 with work tables
• Laboratory room-II	56.3 m²	• For 15 with work tables
• Drying floor	——	
• Net house	32 m²	
• Norm. temp. seed storage	64 m²	• 10 tons (60 kg x 180 bags)
• Seed processing room	450 m²	• Equipment to be installed
• Farm machinery room	60 m²	• Equipment to be installed
• Farm instrument room	60 m²	• Equipment to be installed
• Garage	90 m²	• Equipment to be installed
[BPSB]		
• Director's office	28.1 m²	• For 1 with furniture for visitors
• General office	56.3 m²	• For 11
• Meeting room	56.3 m²	• For 30
• Laboratory room-I	56.3m²	• For 8 with work tables
• Laboratory room-II	56.3 m²	• For 8 with work tables
• Laboratory room-III	56.3 m²	• For 7 with work tables
• Net house	32 m²	
[Training Center]		
• Auditorium	225 m²	• Accommodates 80 people (for large-scale seminars or 70-80 visitors)
• Training/lecture room	56.3 m²	• For 20
• Lecturer's room	28.1 m²	• For 2 to 3
• Dining hall/Trainee's lounge	112.6 m²	• For 40

[BBU]		
• Director's office	28.1 m²	• For 1 with furniture for visitors
• General office	56.3 m²	• For 10
• Meeting room	56.3 m²	• For 30
• Laboratory room-I	56.3 m²	• For 10 with work tables
• Small meeting room for short-term specialists	28.1 m²	• For 2
• Drying floor	——	
• Seed processing room	720 m²	• Equipment to be installed
• Norm. temp. seed storage	100 m²	• 40 tons (60 kg x 680 bags)
• Farm equipment room	108 m²	• Equipment to be installed
• Garage	72 m²	• Equipment to be installed

[4] Policies for setting grade of facility

The grade of each building and their components will be determined based on the following principles.

① Grade of whole facility

The facilities overall shall be set based in the grades of public facilities in Indonesia. The Administrative Building and the Training Building will have reinforced concrete structures, and related facilities will be made with steel posts and beams with walls made of concrete blocks. The seed storage buildings will be made of wood.

② Grade of individual part

Grade for each facility shall be determined by taking into account such factors as cost, durability, and maintenance. Table 3-2 below compares the grades of individual parts in this project and the facilities built for the potato seed multiplication project (implemented through Japan's grant aid assistance for the establishment of a comprehensive system for the multiplication and distribution of seed potatoes).

Table 3-2 Comparison of Grades

Part		Potato Project	This Project
Ext.	Roof	Tile roof	Asphalt shingles with iron plates in some parts*
	Ext. wall	Bricks with sprayed tiles	Bricks with sprayed tiles
Int.	Floor	Finish layer on concrete	Finish layer on concrete
	Wall	Concrete blocks with paint finish	Concrete blocks with paint finish
	Ceiling	Ceiling board with paint finish	Ceiling board with paint finish

*Note: As locally available roof tiles do not come with specially-shaped tiles to install at the edges of eaves to direct rainwater in the right direction, and their lack of strength causes concern; locally-made asphalt shingles will be used in this project.

3-3 Basic Plan

3-3-1 Site and Layout Plan

The project are divided into two zones: one for administrative and research facilities and the other for supporting facilities while giving considerations to the following points:

① The administrative and research facilities shall be located in the front part of the site so that they will serve as a symbol of the project, and people can have a direct access to such buildings from the access road (Goro-Kaeaga Road).

② The supporting facilities will be located at the rear of the site in consideration of the effect of noise on the administrative facilities and to provide easy access to the fields.

③ Administrative buildings such as BBI Administrative Buildings, Trainig, BPSB Buildings, will be connected to other buildings with roofed passageways to provide easy acces even during the rainy season.

The layout was drawn up based on the above zoning and the following guidelines:

① The layout of buildings shall be determined in such a way that flow lines of regular workers, visitors, and operators will be separated, and the facilities as a whole will function as one unit.

② Administrative facilities shall be connected in such a way to facilitate the work flow. Such common facilities as dining hall and training rooms shall be located in a place that can be easily accessed to from all buildings.

③ As the site slopes slightly inwards from the front road to the back, buildings shall be placed along the slope to minimize the ground preparation work.

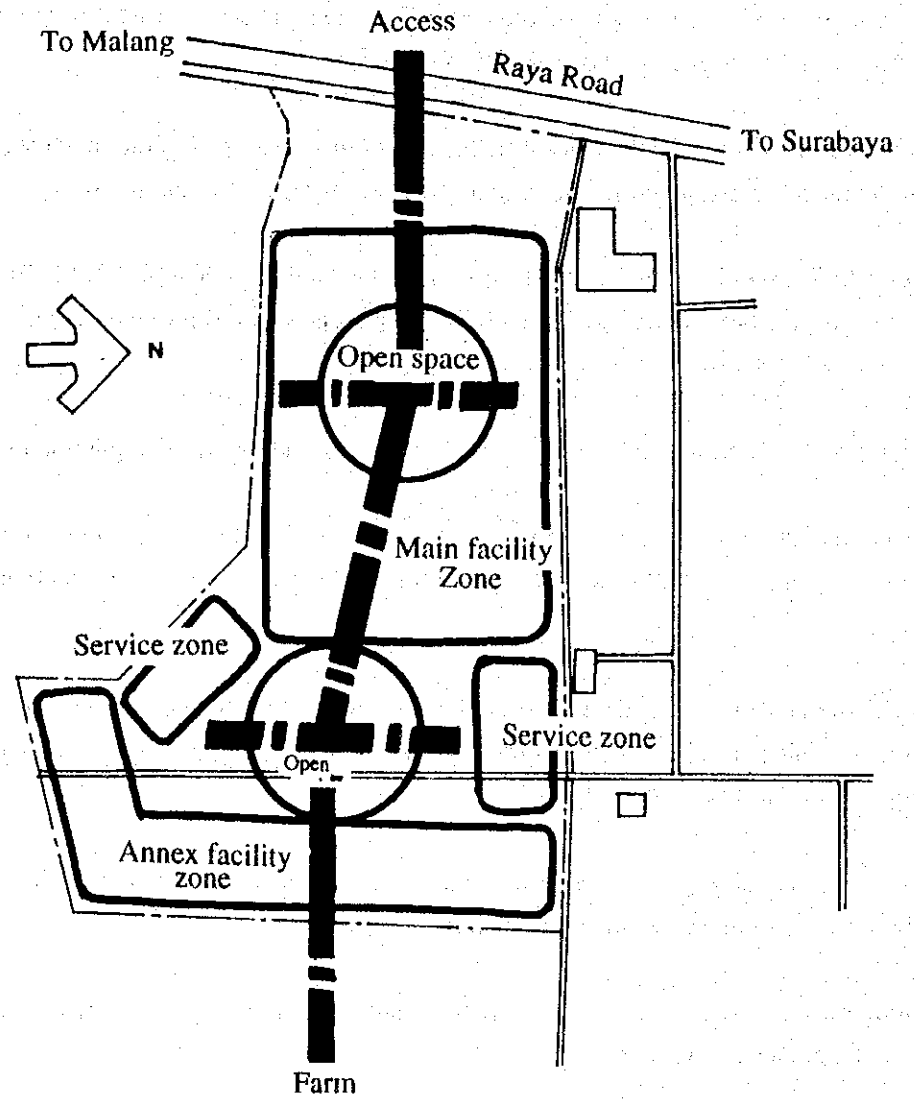
④ Buildings shall be arranged in such a way that rainwater and sewage water from the buildings will drain away naturally.

⑤ Sanitary and electric facilities shall be located in the center of the school facilities in order to achieve the maximum functionality and economic efficiency.

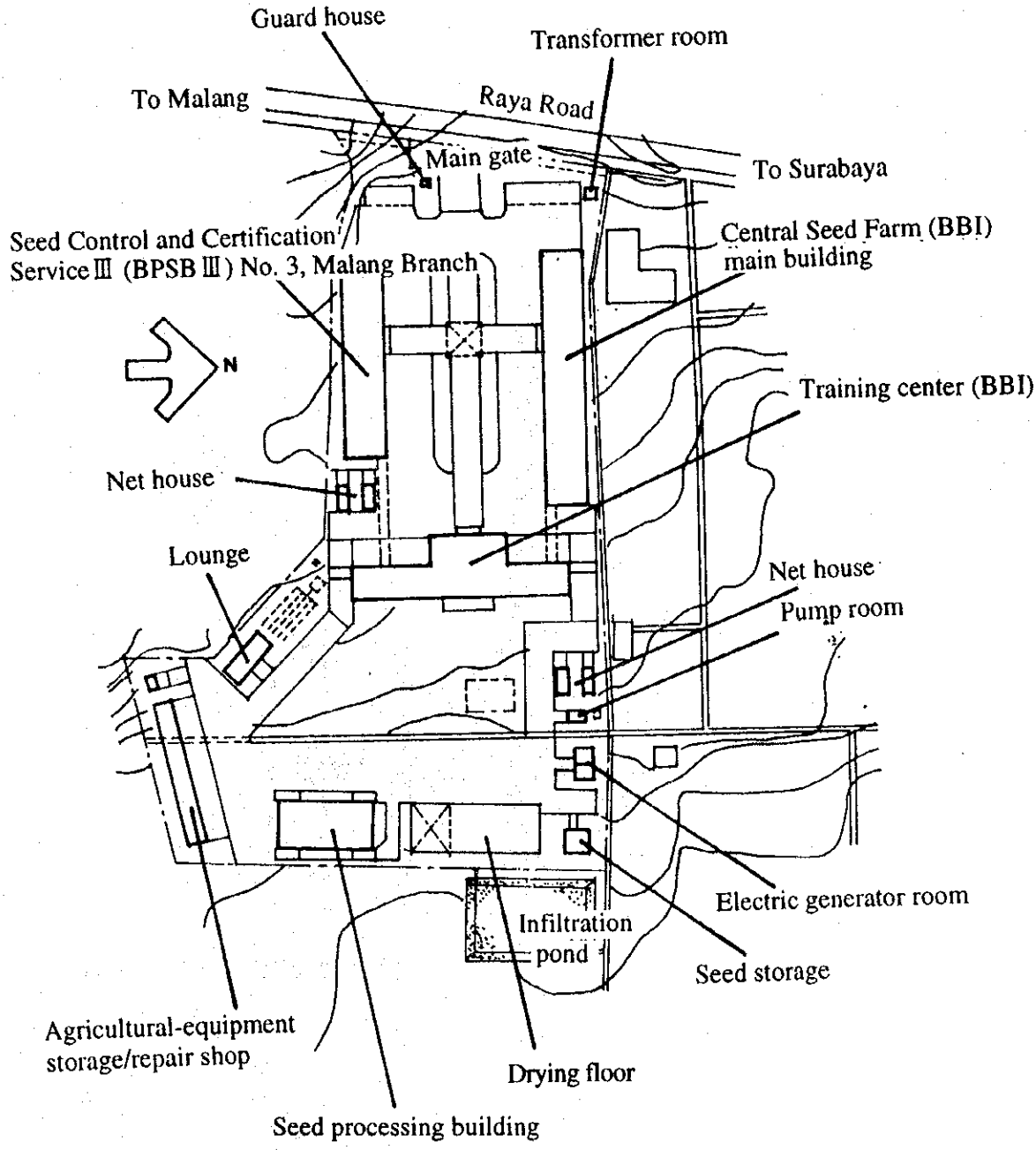
⑥ Natural ventilation shall be used to counter the high humidity of the area. As the winds blow from the northeast in the rainy season and from the southeast in the dry season, the window sides of school buildings shall be arranged to face south and north for efficient ventilation.

⑦ Buildings shall be placed at sufficient intervals to ensure adequate ventilation and sunlight.

[1] BBI

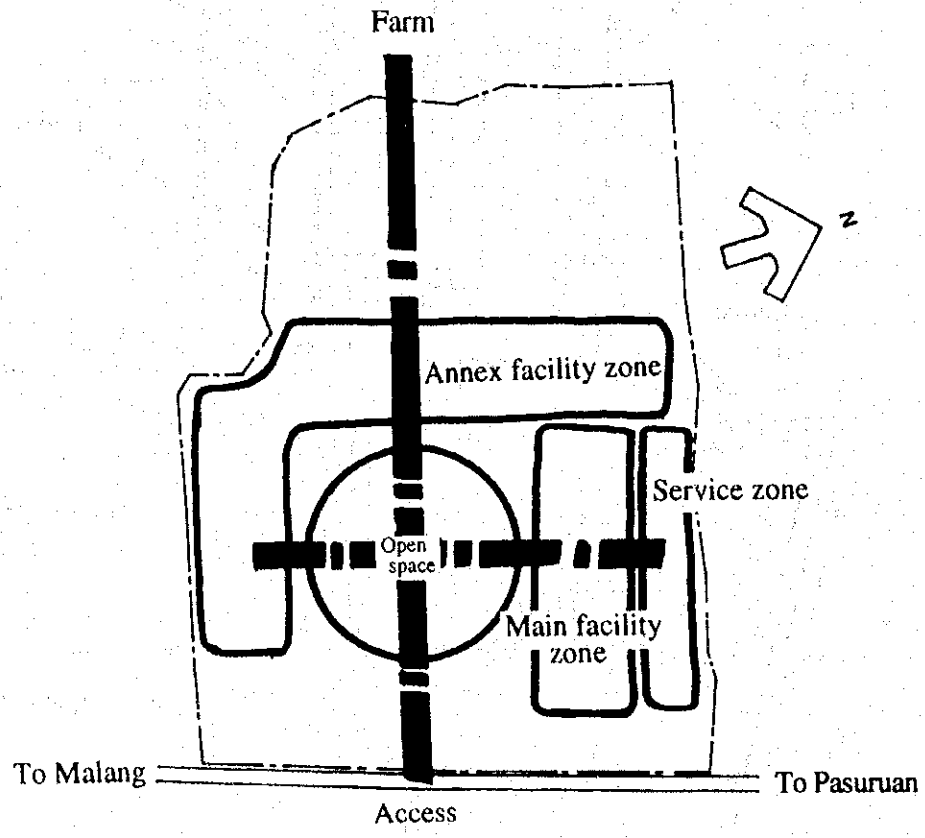


Zoning Plan for BBI

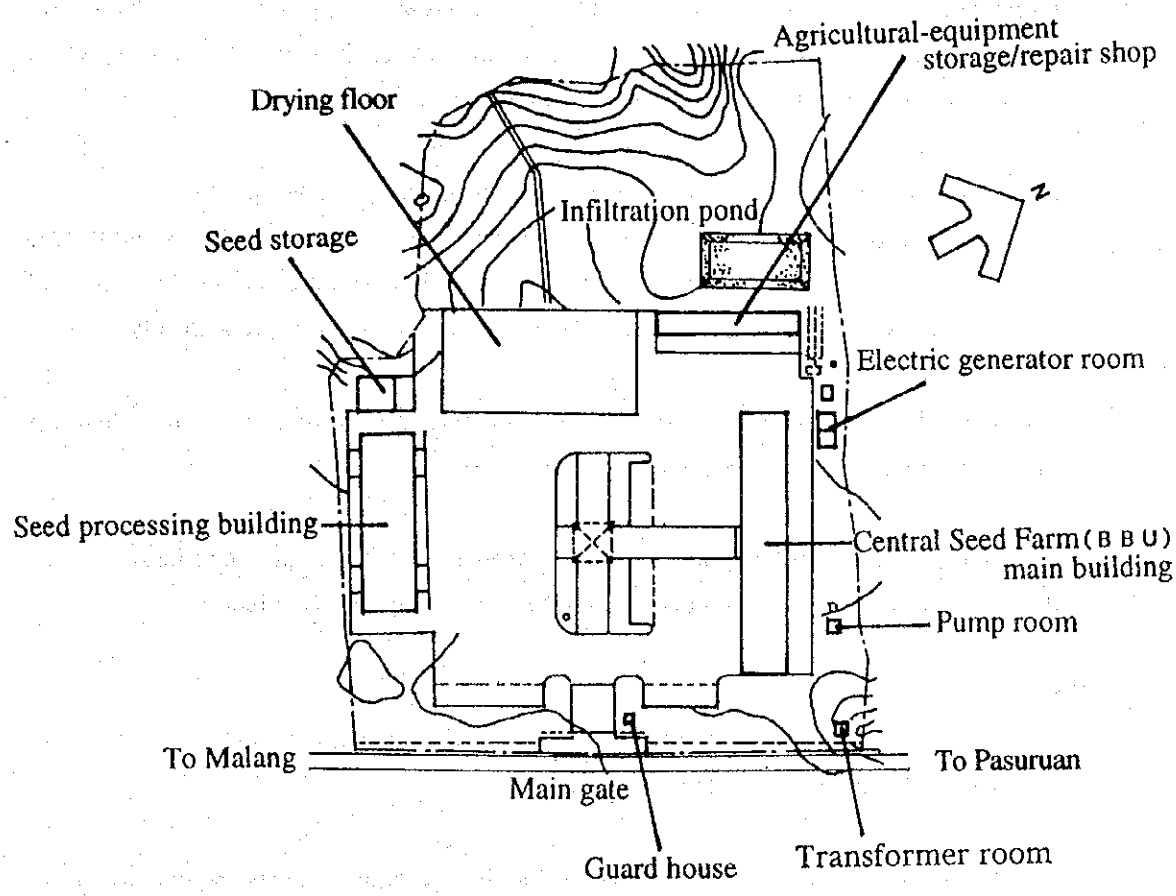


Lay-out Plan for BBI

[2] BBU



Zoning Plan for BBU



Lay-out Plan for BBU

3-3-2 Architectural Designs

[1] Floor Plan

The floor plan was drafted based on the span of each facility corresponding to the area calculated in the paragraph 4-2-4 and the configuration and the number of rooms while complying with the following policies:

① A 8 m x 8m concrete-block module was adopted as a basic module for general office rooms. The reasons behind this are that using locally available concrete blocks is the most commonly accepted construction method in Indonesia and that the 8 m x 8 m span can be used for general office rooms requiring 64 m^2 of floor space each or for other rooms whose required floor areas can be calculated based on the basic module.

② For rooms and facilities whose sizes are to be calculated based on the activities to be carried out regardless of the number of people using the rooms such as the drying adjustment rooms, seed storage rooms, and garages; the scales of such rooms and facilities shall be determined based on the volumes and quantities of equipment items to be installed.

③ The auditorium and the lecture rooms in the Training Center were designed in such a way that the lecturers and participants would face each other.

④ Corridors would be built on both sides of the Administration Building in order to separate the flow lines of staff and visitors as well as to secure sufficient ventilation.

[2] Section Plan

The section plan was drafted based on the local construction methods and styles while giving considerations to the following points:

① Local construction methods will be used for building structures. Posts, beams, floors, etc. will be constructed with reinforced concrete, and external walls and partitions will be constructed using stacked bricks made by local manufacturers.

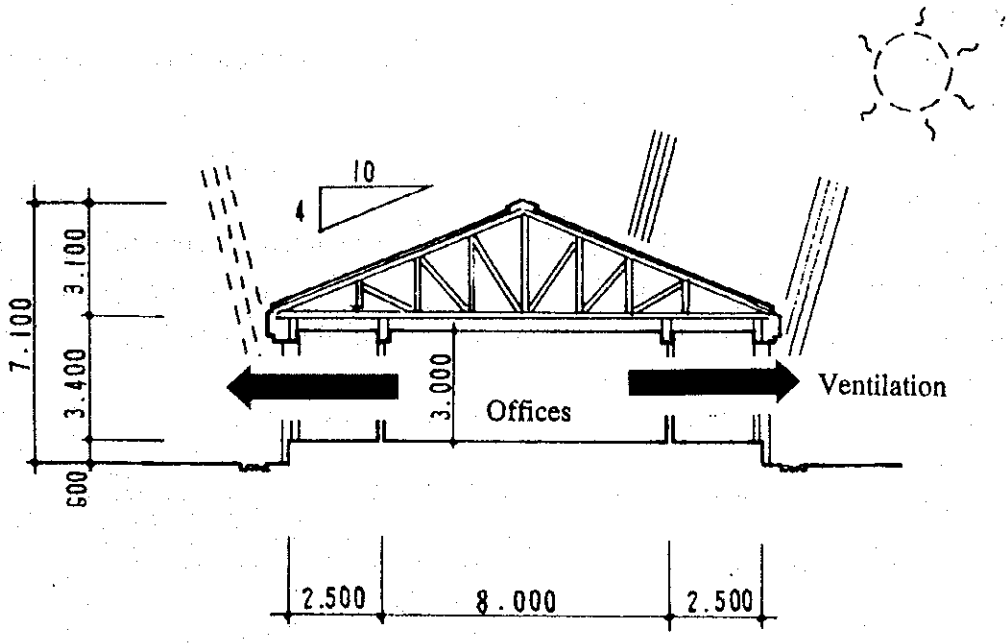
② Roofs will be either of a gable or hip type constructed with wooden or light steel frame trusses. Locally made asphalt products will be used as roofing materials.

③ Thermal insulation and ceiling plenums will be installed under the roofs.

④ Long eaves will be installed to block and protect the rooms from the strong sunlight.

⑤ Jalloje windows will be used on external walls to dispel as much hot air as possible from the rooms, and vents will be installed in wainscots to facilitate ventilation.

A standard cross section based on the above is shown below.



[3] Structural Design

(a) Structural design policy

The structures shall be so designed that long-term loads would not cause sagging or vibrations that might interfere the normal operations of the project. In addition, sufficient safety measures that can withstand short-term loads shall be taken.

The building designs shall meet the building construction standards of Indonesia, and reference shall be made to Japanese structural standards.

The following standards shall be adopted:

1. Building Standards of Indonesia
2. Building Load Standards of Indonesia, 1981
3. Building Seismic Design Standards of Indonesia, 1981
4. Reinforced Concrete Standards of Indonesia, 1971
5. Manual for General Concrete and Reinforced Structure of Indonesia
6. Building Structure Standards of Japan

(b) Frame construction method

Economical frame construction methods that are appropriate for the floor plan and spanning shall be adopted for each of the buildings listed below:

① Administrative building

Since it is a one-storied building with relatively low live-loads, only the framework will be of Rahmen rigid-frame structure made of reinforced concrete.

The roof will use the timber-truss construction method.

② Training Center building

The boundary walls will be constructed using reinforced concrete, and the 16-meter span frame will use steel girders.

③ Supporting facilities

The framework and roof shall be constructed using steel reinforcement for the drying adjustment building and using wooden timbers for the seed storage. Other facilities will be made with concrete blocks and steel frame as well as using timber-truss method for roofing.

(c) Loads

① Live load

(Unit) kg/m²

Element / Usage	Floor	Beam	Rahmen	Seismic calculation
Office, research rm., mtg. rm.	250	200	150	80
Laboratory	400	270	240	160
Warehouse	400	350	300	200
Library	550	480	400	200
Corridor, stair	300	280	230	90
Balcony	300	180	130	60
General room	250	220	190	80

② Seismic load

$V = C \cdot I \cdot K \cdot Wt$

V : Total horizontal seismic base shear

C : Basic seismic coefficient

I : Importance factor

K : Structural type factor

Wt : Total building weight

The values used in this project (main buildings) are as follows:

C = 0.05 (Basic seismic coefficient for Zone 4 (soft ground) is applied)

Importance factor I = 1.0

Structural type factor K = 1.0

Therefore, $V = 0.05 \times Wt$

③ Wind load

$Pw = C \cdot q \cdot A$

Pw : Wind load

q : Velocity pressure

A : Area to take pressure

C : Coefficient of wind force

$q = 25\ kg/m^2$ will be used for the project buildings.

④ Materials and their strength

Concrete

General structure	general concrete	Fc 210 kg/cm^2
Concrete slab on grade	general concrete	Fc 150 kg/cm^2
Leveling concrete	general concrete	Fc 135 kg/cm^2

Reinforcement bar

Deformed bar	D10 to D 16	--- SD 295A
	D19 or higher	--- SD345
Plain bar		--- SR235

In principle, equivalent to JIS G 3112 or higher grades shall be used.

Structural steel

Equivalent to SS400 (JISG3101) and SSC 400 (JISG3350) or higher grades shall be used.

High tension bolt (FIOT)

Equivalent to JISB1186 or higher grades shall be used.

⑤ Foundation

According to the subsoil exploration report, the long-term load-bearing capacity of the soil at the level of GL -1.5 (1.5 meters below the ground level) is over 5.0 ton/m^2. Thus, the subsoil is firm enough to directly support the structures.

[4] Building Facility Plan

(1) BBI

1) Electric system

① Electric service

The Indonesian side will be responsible for the installation of wiring up to the main switch at the PLN situated in the project site. The Japanese side will take care of lowering the voltage of the incoming power (3-phase 3-wire, 20 kV (50 Hz)) at the transformer station (estimated capacity of 250 kVA) and distributing low-voltage (3-phase 4-wire, 380-220 V (50 Hz)) electricity to each facility. The garud for storing PLN sub-switch, watt-hour meter, etc. will be installed in the project site, as it is so required to all users of electricity in the SURABAYA district.

② Power generation system

A power generator with a capacity of approximately 75 kVA will be installed to ensure continuous power supply to the low-temperature seed storage, emergency lights, computers, etc. in case of power failure.

③ Wiring

Cables from the switchboard in the electric room to the distribution board and power control board of each facility will be installed through metal pipes or using cable racks. As the buildings are scattered throughout the site, the cables connecting the electric room and various buildings will be buried directly under the ground. Wiring to the deep-well pump in the farm area will use elevated cables. A watt-hour meter (small type) will be installed on the primary side of the wiring in the BPSB zone.

④ Power facility

Wiring will be installed to provide electricity to air-conditioning systems, pumps, fans, agricultural/inspection equipment and so forth. The voltages will be, in principle, single-phase 220 V for fans and other small-capacity appliances and 3-phase 380 V for other types of powered equipment.

⑤ Lamps and receptacles

Natural lighting will be utilized wherever possible. Artificial lighting will be provided mostly by fluorescent lamps and partially by incandescent lamps. The intensities of illumination in major rooms are as follows:

	Project (LX)	JIS standard (LX)
Office room	400	300 - 750
Inspection room	450	300 - 750
Meeting room	300	200 - 500
Training room	300	200 - 500
Toilet/corridor	100	100 - 200

General receptacles will be installed for office equipment, and receptacles with grounding earth will be installed where inspection equipment will be used and other necessary places. Street lamps will be built around the buildings and the rotary.

⑥ Telephone system

Installation of telephone cables to the main terminal board in the project site will be carried out by the Indonesian side. The Japanese side will take care of installing all other telephone facilities. BBI zone will be installed with three or so lines , and BPSB with about two lines. For switchboard, a simple, button-type telephone device will be used.

⑦ Clocks

Battery-operated clocks will be installed in such rooms as director's office, faculty rooms, office rooms, inspection rooms, training rooms, and dining halls.

⑧ Communal TV system

Television terminals will be installed in such rooms as director's office, faculty rooms, training rooms, and dining halls; and the TV antennas will be connected with cables and piping.

⑨ Lightening protection

Although there are no regulations that require lightening protection measures, lightening conductors will be installed in the buildings to avoid the damage from lightening that occurs frequently in the area.

2) Ventilation and air conditioning

① Ventilation

The buildings have high ceilings with grilles to ensure sufficient natural ventilation.

Rooms requiring mechanical ventilation are listed below:

toilet, hot-water service room, electric room, generator room, etc.

② Air conditioning

To minimize the maintenance cost, only rooms listed below will have air conditioners:

director's office, inspection room, lecture room, expart room, etc.

3) Pluming

① Water supply system

The Indonesian side will be responsible for the pluming installation from the main supply line to the water meter in the project site. The Japanese side will take care of the installation of all other water supply facilities including the installation of receiving tank and elevated tank, from which water is distributed by gravity to various facilities. The water usage is estimated at 20 ㎥/day. The capacities of the receiving tank and the elevated tank are as follows:

Receiving tank : 10 ㎥ (1/2 of average daily supply)
Elevated tank : 5 ㎥ (equivalent to 2-hour's supply)

Rooms that require purified water such as inspection rooms will be installed with distillation equipment. A small water meter will be installed on the branched supply pipe in the BPSB zone.

② Discharge system

Sewage and waste water

Sewage and waste water discharged through separate systems will merge outside the buildings and will be collected in a septic tank (decomposition type) for non-powered filtration.

Rainwater

Rainwater collected in U-shaped roof drains, etc. will be guided to a filtration tank, through which rainwater will be discharged into the ground.

③ Sanitary fixture

Western-style (including local style) toilet bowls, urinals, wash basins, and clean-out sinks will be installed in the lavatories.

④ Hot water service room

Such items as gas-tables, gas-stoves, and sinks will be installed in the hot water service room, kitchen, pantry, etc..

⑤ Gas supply system

LP gas will be provided to rooms that require gas supply. A gas cylinder will be installed outside each building near the room requiring gas.

⑥ Water supply to farms

A deep well, which will be drilled by the Japanese side, will be installed with a pump that draws up water from the well. By the force of gravity, water will be carried to all the farming areas from a reservoir through irrigation canals.

⑦ Fire extinguishers

Fire extinguishers will be installed throughout the project site. The number and locations of fire extinguishers will be determined based on the following guidelines:

One extinguisher per area of 200 m^2

One extinguisher at every walking distance of 20 meters or less

(2) BBU

1) Electric system

① Electric service

The Indonesian side will be responsible for the installation of wiring up to the main switch at the PLN situated in the project site. The Japanese side will take care of building all other electric facilities including the distribution facility that branches the incoming power and distribute the electricity to all buildings. The voltage of incoming electricity is estimated to be 3-phase 4-wire 380-220 V (50 Hz), and the contracted load capacity is estimated around 85 kVA.

② Power generation system

A diesel power-generator with a capacity of approximately 40 kVA will be installed to ensure continuous power supply to the air-conditioner in the cold storage, computers, etc. in case of power failure.

③ Wiring

Cables from the switchboard in the electric room to the distribution board and power control board of each facility will be installed through metal pipes or using cable racks. As the buildings are scattered throughout the site, the cables connecting the electric room and various buildings will be buried directly under the ground.

④ Power facility

Wiring will be installed to provide electricity to air-conditioning systems, pumps, fans, agricultural/inspection equipment and so forth. The voltages will be, in principle, single-phase 220 V for fans and other small-capacity appliances and 3-phase 380 V for other types of powered equipment.

⑤ Lamps and receptacles

Natural lighting will be utilized wherever possible. Artificial lighting will be provided mostly by fluorescent lamps and partially by incandescent lamps. The intensities of illumination in major rooms are as follows:

	Project (LX)	JIS standard (LX)
Office room	400	300 - 750
Laboratory room	450	300 - 750
Meeting room	300	200 - 500
Toilet/corridor	100	100 - 200

General receptacles will be installed for office equipment, and receptacles with grounding earth will be installed where inspection equipment will be used and other necessary places. Street lamps will be built around the buildings and the rotary.

⑥ Telephone system

Installation of telephone cables to the main terminal board (MDF) in the project site will be carried out by the Indonesian side. The Japanese side will take care of installing all other telephone facilities in the site. About two telephone lines will be installed, button telephones will be used to connect extensions.

⑦ Clocks

Battery-operated clocks will be installed in such rooms as director's office, faculty rooms, and office rooms.

⑧ Communal TV system

Television terminals will be installed in such rooms as director's office, faculty rooms, and office rooms; and the TV antennas will be connected with cables and piping.

⑨ Lightening protection

Although there are no regulations that require lightening protection measures, lightening conductors will be installed in the buildings to avoid the damage from lightening that occurs frequently in the area.

2) Ventilation and air conditioning

① Ventilation

The buildings have high ceilings with grilles to ensure sufficient natural ventilation.

Rooms requiring mechanical ventilation are listed below:

toilet, hot-water service room, electric room, generator room, etc.

② Air conditioning

To minimize the maintenance cost, only rooms listed below will have air conditioners:

director's office, laboratory room, etc.

3) Pluming

① Water supply system

A shallow well (depth: 7 to 10 meters) will be drilled. Water will be pumped up from the well and carried to a receiving tank (settling tank) and to an elevated tank, from which water is distributed by gravity to various facilities. The water usage is estimated at 6 ㎥/day. The capacities of the receiving tank and the elevated tank are as follows:

Receiving tank : 3 ㎥ (1/2 of average daily supply)

Elevated tank : 1.5 ㎥ (equivalent to 2-hour's supply)

② Discharge system

Sewage and waste water

Sewage and waste water discharged through separate systems will merge outside the buildings and will be collected in a septic tank (decomposition type) for non-powered filtration.

Rainwater

Rainwater collected in U-shaped roof drains, etc. will be guided to a filtration tank, through which rainwater will be discharged into the ground.

③ Sanitary fixture

Western-style (including local style) toilet bowls, urinals, wash basins, and clean-out sinks will be installed in the lavatories.

④ Hot water service room

Such items as gas-tables, gas-stoves, and sinks will be installed in the hot water service room, kitchen, pantry, etc.

⑤ Gas supply system

LP gas will be provided to rooms that require gas supply. A gas cylinder will be installed outside each building near the room requiring gas.

⑥ Fire extinguishers

Fire extinguishers will be installed throughout the project site. The number and locations of fire extinguishers will be determined based on the following guidelines:

One extinguisher per area of 200 m^2

One extinguisher at every walking distance of 20 meters or less

[5] Main Building Material Plan

① Construction work

The construction materials and equipment to be used in the project need to be chosen from such items that can be maintained and repaired easily. In the project, materials and equipment that are locally available shall be procured as much as possible.

Between items that can be sourced either from Japan or Indonesia, the less expensive item will be chosen in principle.

In light of the above, the sources of material/equipment are shown in Table 3-3 below:

Table 3-3 Material/Equipment Procurement Plan

Material/equipment	Local	Japan	Third country
1. Sand/gravel	○		
2. Cement	○		
3. Lumber	○		
4. Reinforcing bar	○		
5. Structural steel	○		
6. Block/brick	○		
7. Tile	○		
8. Wooden door & window	○		
9. Metal door & window	○		
10. Glass	○		
11. Waterproofing material	○		
12. Base board (plywood)	○		
13. Roofing material	○		
14. P-tile	○		
15. Ceiling board	○		
16. Paint	○		
17. Misc. hardware	○		
18. Distributor board	○		
19. Lighting fixture	○		
20. Telephone system	○		
21. Cable/piping	○		
22. Wiring instrument	○		
23. Transformer	○		
24. Light electrical appliance	○		
25. PVC pipe	○		
26. Sanitary fixture	○		
27. Elevated tank	○		
28. Pump	○		
29. Filtration device	○		
30. Generator		○	
31. machine for temporary work	○		

3-3-3 Equipment Plan and Equipment Procurement Plan

[1] Equipment Plan

In the current study, the equipment was examined in the light of the points below to ensure that it would fit in with the project content and scale for each facility.

- give priority to eqipment forming a core element of each facility
- match equipment to local level of technology
- harmonize equipment with that already there
- give priority to equipment for which maintenance is easy and parts and expendable supplies are available locally

The equipment plan for the project is shown below and the equipment list is shown on 62 page.

① Equipment for seed production

Function : agricultural work including pest control and cultivation management necessary for seed production

Main equipment: tractor, plow, soybean harvester, power sprayer, manual sprayer, bush cutter, etc.

Location : BBI, BBU

Selection policy : • The equipment shall be appropriate for the technical capabilities of local people.

• Labor saving shall not be the objective of the procurement plan as labor force needing employment opportunities is abundant in Indonesia.

② Equipment for seed processing

Function : threshing, cleaning, separating, and drying of soybean seed

Main equipment: thresher, cleaner, gravity separater, dryer, packager, scale, etc.

Location : BBI, BBU

Selection policy : • The equipment shall be appropriate for the technical capabilities of local people.

• The equipment scale shall be appropriate for the volume of seed production

• Each equipment item shall be an independent unit that can be reassembled or moved to different locations to suit different purposes or volumes.

③ Equipment for seed inspection

Function : inspection of germination ratio, moisture content, purity, etc. and basic research for seed health.

Main equipment: incubator, autoclave, distilled water apparatus, microscope, stereo-micro scope, moisture meter, divider, pH-meter, etc.

Location : BPSB Ⅲ, Surabaya and Malang branch

Selection policy : • The equipment shall be appropriate for the technical capabilities of local people.
• Equipment that is easy to maintain and control shall be selected.
• The equipment shall be of an appropriate scale to save energy cost and other operational expenses.

④ Data-processing equipment

Function : issuance of seed certificates and processing of related information as well as preparation of statistical data on seed production and educational materials

Main equipment: personal computer

Location : BPSB Ⅲ, Surabaya and Malang branch

Selection policy : • The equipment shall be appropriate for the technical capabilities of local people.
• Same models as those used currently shall be selected.
• Data format shall be compatible with those of equipment in other departments.

⑤ Vehicles

Function : collection of seed samples, inspection of farms, training of seed producers, transportation of trainees, etc.

Main equipment: jeep-type wagon, pickup truck, microbus, etc.

Location : BBI, BBU, BPSB Ⅲ, Surabasya and Malang branch

Selection policy : • Models that are appropriate for the practical usage shall be selected.
• Minimum number of vehicles to serve the purposes shall be procured.

⑥ Climatologic Instrument

Function : observation of climatological conditions at seed farms

Main equipment: thermohygrometer, wind direction and speed recorder, rain gauge, instrument screen, etc.

Location : BBI

Selection policy : • Meter readings shall be recorded manually.
• Equipment with the capability to collect necessary data on environmental conditions shall be carefully selected.

The current status of each equipment to be supplemented or replaced by the above equipment under the project is as follows:

1. Tractor (33 HP):

   It has been used for five years since it was introduced to the Central Seed Farm through the assistance for the increase of food production in 1989. The current utilization rate is high, thus the maintenance cost will likely increase in the future. The project will procure a 40-HP tractor to be used along with the current one.

2. Tractor (35 HP):

   It was introduced to the Central Seed Farm about 30 years ago. It is broken beyond repair.

3. Hand tractor:

   It was introduced to the Central Seed Farm in 1976. It is broken beyond repair.

4. Thresher:

   Of the three Japanese-made threshing machines, which were introduced in 1978 and are about to expire their expected lives, only one is working. The tractor is also used for threshing of corns, and its utilization rate is therefore high. Under the project, a thresher that will be used only for threshing soybeans will be procured.

5. Gravity Separator

   Currently, a Japanese-made separator is used, which is not specially made for soybeans or selecting seeds accurately due to severe deterioration caused by many years of heavy usage. Under the project, separators that work effectively for the selection of soybeans especially one grown in Indonesia will be chosen.

6. Moisture meter

   Three Japanese-made moisture meters brought by individual experts are being used, of which two are of old types that cannot be calibrated and one is inscribed in Japanese that is not suitable for the usage of the local staff. Under the project, a moisture meter that is inscribed in English and can be calibrated will be procured.

7. Germination test equipment

   Wooden and aluminum boxes for germination test were made locally on a trial basis. However, the type used in the BPSB Ⅲ (Surabaya) is most suitable from the standpoints of strength and ease of use. So, this type will be supplemented through the project.

8. Thermohygrometer

The thermohygrometer in the Central Seed Farm is not used as it uses hair to sense humidity and is not reliable. Under the project, one with an electric-sensor will be procured.

In this project, BPSB Ⅲ (Surabaya), which is only being considered for equipment, will carry out inspections on soybean and other seeds for all 30 districts in East Java Province. At present its activities are not sufficient due to a shortage of equipment, etc. If this project is implemented, although some soybean inspection activities will be moved to the new Malang Branch, BPSB Ⅲ will perform a vital role in providing an inspection setup bringing all BPSB Ⅲ branches together. As BPSB Ⅲ will provide technical instruction and a research setup, the equipment planned for it is therefore as follows:

1) Seed inspection equipment

Function: basic research on viruses and molds affecting soybean seeds

Main equipment: analytical balance, autoclave, stereo microscope, phase contrast microscope, pH meter

2) Data processing equipment

Function: issuing seed inspection certificates and processing data for them, preparing various statistical information

Main equipment: personal computer

3) Vehicles

Function: transportation of personnel for inspections and instruction on analytical techniques at BPSB Ⅲ branches, seed inspection and sample collection at fields, and analytical equipment

Main equipment: Jeep-type wagon, motorcycle

[2] Equipment Procurement Plan

Instruments used for seed production and certification shall be procured from Japan as there are no manufacturers in Indonesia that make such products. Data processing equipment, etc. will be sourced locally, as they require a local support system.

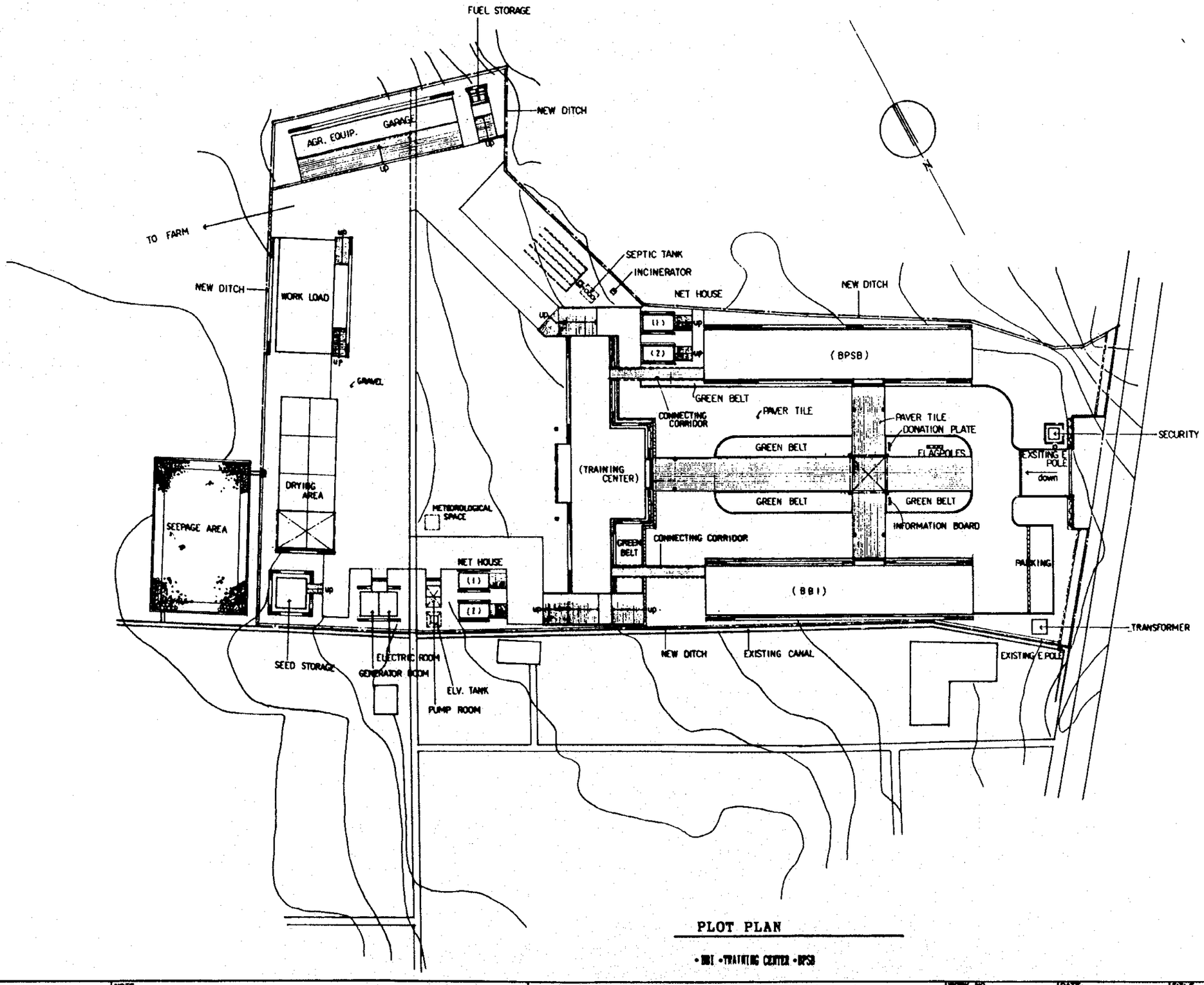
Transportation of equipment procured from Japan, including precision instruments, must be handled with great care. Installation of such equipment will require supervision of specialized engineers dispatched from Japan. For such instruments to be utilized fully, local staff will need to be trained for a certain period of time.

In light of the above, a procurement plan for the equipment used in the project is established as below:

	Equipment procured locally	Equipment procured from Japan
Equipment for seed production	Hand tractor.	Tractor, plow, power sprayer, etc.
Equipment for seed processing	Vacuum cleaner	Thresher, gravity separator, dryer, scale, etc.
Equipment for seed inspection	Germination test equipment Refrigerator (seed)	Moisture meter, analytical balance, thermohygrometer, divider, autoclave, incubator, distilled water apparatus, pH-meter, etc.
Data-processing equipment	Personal computer	
Vehicle	Jeep-type wagon, pick-up truck, microbus, motorcycle, etc.	

〔Equipment List〕

No.	Equipment Name	Quantity				
		BBI	BBU	BPSB Malang	BPSB Surabaya	Total
001	Autoclave	0	0	1	1	2
002	Analytical Balance	1	0	3	1	5
003	Balance	1	0	2	0	3
004	Chemical Cabinet	0	0	2	0	2
005	Center Table	0	0	1	0	1
006	Centrifuge	0	0	1	0	1
007	Climatologic Instrument	1	0	0	0	1
008	Colony Counter	0	0	1	0	1
009	Distilled Water Apparatus	0	0	1	0	1
010	Fume Food	0	0	1	0	1
011	Germination Test Equipment	1	0	1	0	2
012	Hot Plate with Magnetic Stirer	0	0	2	0	2
013	Incubator	0	0	1	0	1
014	Magnifier with lamp	0	0	5	0	5
015	Stereo Microscope with monitor	0	0	1	0	1
016	Stereo Microscope	0	0	6	0	6
017	Phase Contrast Microscope	0	0	0	2	2
018	Biological Microscope with camera	0	0	1	0	1
019	Biological Microscope	0	0	6	2	8
020	Moisture Meter	3	2	2	0	6
021	NUV Lamp (Incubator)	0	0	1	0	1
022	Oven	0	0	1	0	1
023	Refrigerator (chemical)	0	0	1	1	2
024	Refrigerator (seed)	1	0	1	0	2
025	Sample Divider	2	0	0	0	2
026	Sample Divider (electrical)	0	0	1	0	1
027	Soil Divider	0	0	4	0	4
028	Trier	10	0	0	0	10
029	Shaker	0	0	1	1	2
030	Side Table	0	0	1	0	1
031	Sink for Laboratory	0	0	1	0	1
032	Test Mill	0	0	2	0	2
033	Thermohygrometer	1	0	2	0	3
034	Water Bath	0	0	1	0	1
035	pH Meter	2	0	2	2	6
036	Personal Computer	2	0	1	1	4
037	Bag Closer	1	1	0	0	2
038	Cleaner	2	3	0	0	5
039	Dryer	2	4	0	0	6
040	Gravity Separator	1	2	0	0	3
041	Packager	1	1	0	0	2
042	Plastic Bag Sealer	1	2	0	0	3
043	Scale	1	2	0	0	3
044	Seed Treatment Equipment	1	0	0	0	1
045	Thresher	2	3	0	0	5
046	Vacuum Cleaner	2	0	0	0	2
047	Hand Sprayer	5	6	0	0	11
048	Hand Tractor (12HP)	5	4	0	0	9
049	Power Sprayer	2	4	0	0	6
050	Soybean Harvester	1	2	0	0	3
051	Tractor (40HP) with attachment	1	2	0	0	3
052	Weed Cutter	3	2	0	0	5
053	Air Compressor	1	0	0	0	1
054	Jeep	1	0	0	1	2
055	Micro Bus	1	0	0	0	1
056	Motor Cycle	5	3	0	6	14
057	Pick-up Truck	1	1	0	0	2
058	Tool Kit	1	0	0	0	1



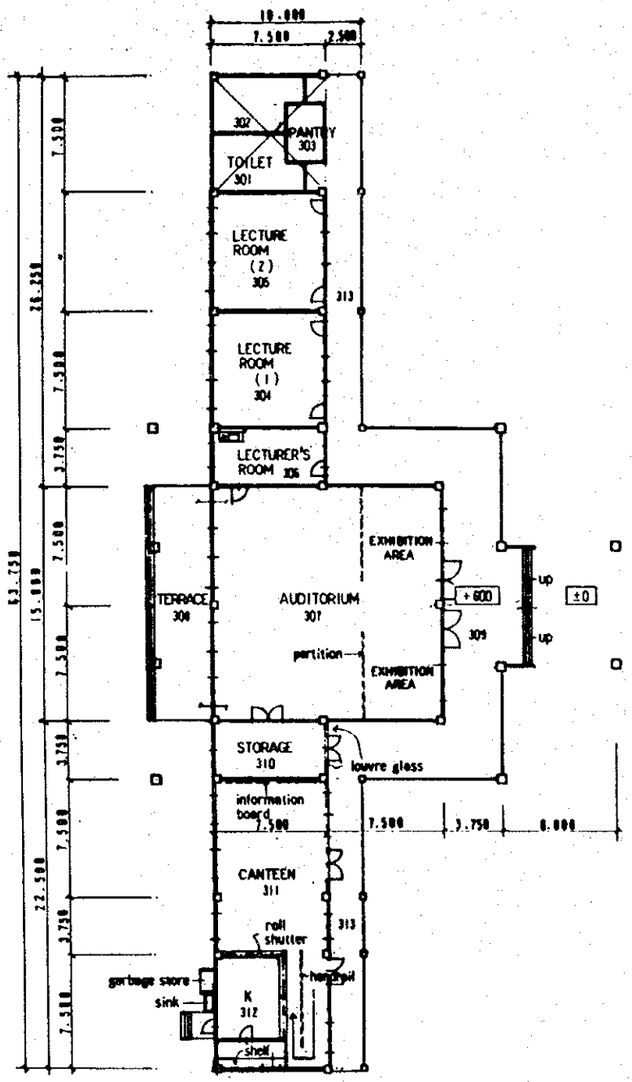
PLOT PLAN

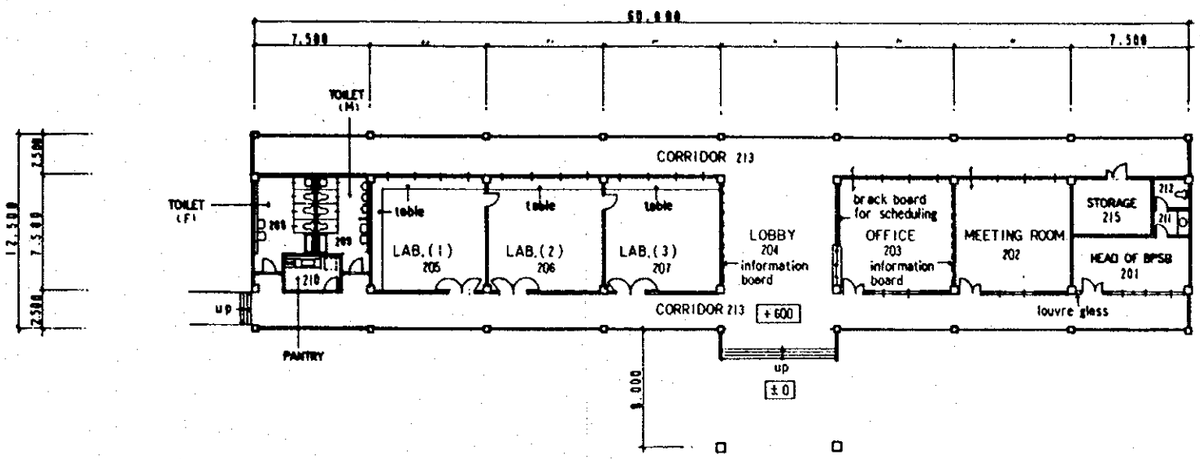
• BBI • TRAINING CENTER • BPSB

創造社 SOZOSHA CO.,LTD. TOKYO
CONSULTANTS, ARCHITECTS & ENGINEERS

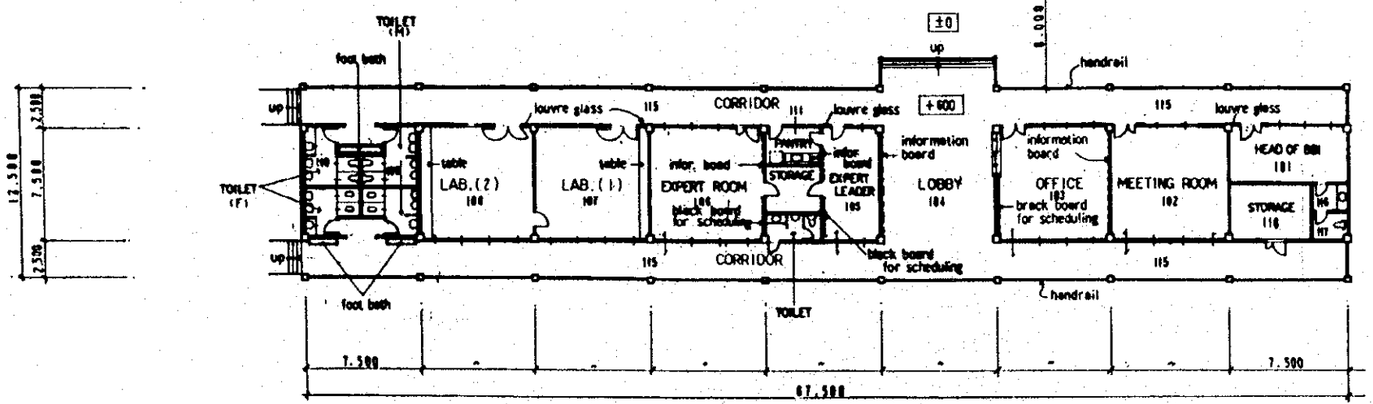
NOTE		WORK NO	DATE	TITLE	DRAWN NO.
		APPROVAL / DRAWN	SCALE 1/1,000	PLOT PLAN BBI TRAINING CENTER BPSB	1

TRAINING CENTER





BPSB



BBI

創造社 SOZOSHA CO.,LTD. TOKYO CONSULTANTS, ARCHITECTS & ENGINEERS	NOTE	WORK NO.	DATE	TITLE: FLOOR PLAN	DRAWN NO. 2
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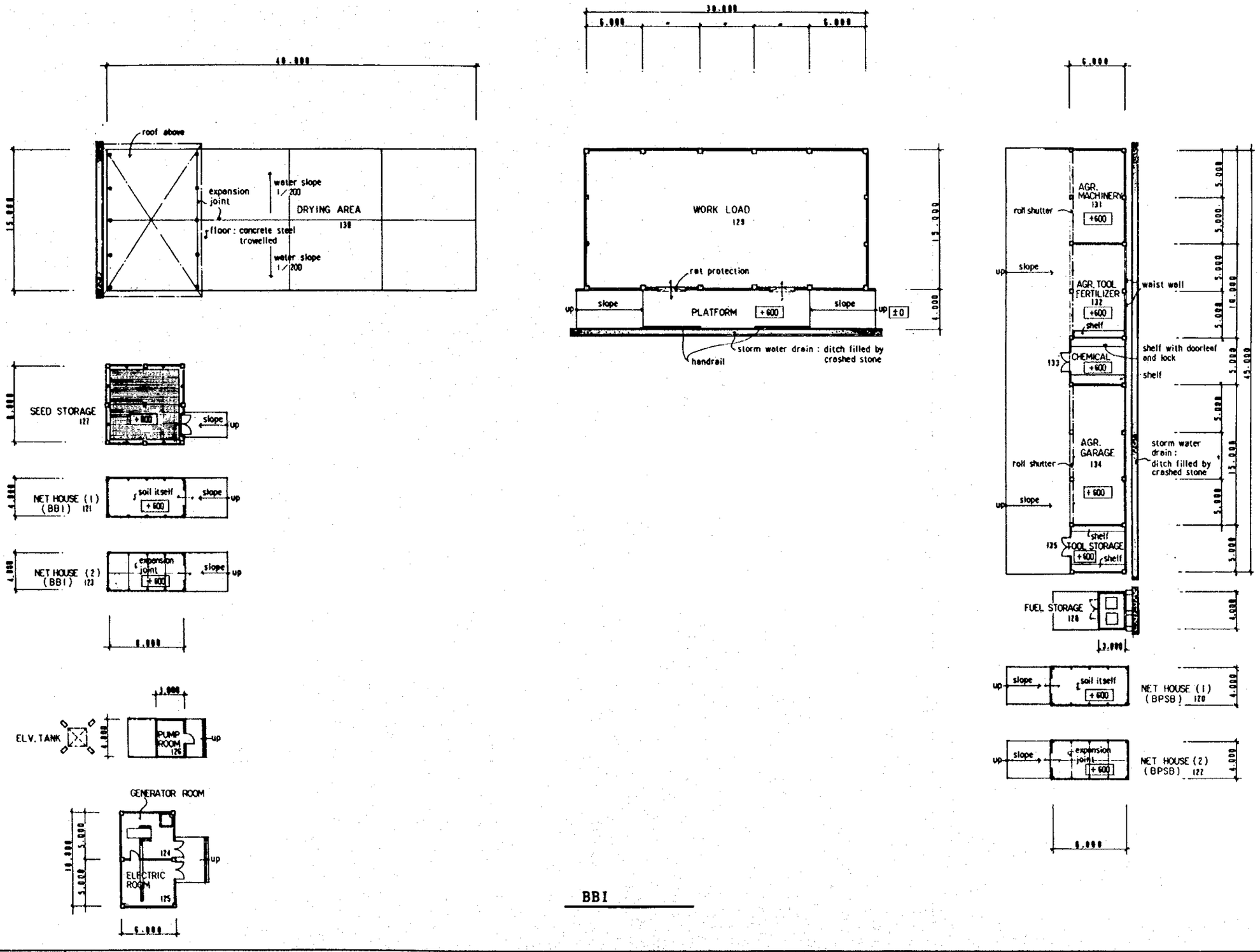

BBI

創造社 SOZOSHA CO.,LTD. TOKYO CONSULTANTS, ARCHITECTS & ENGINEERS 1級建築士登録 第31988号 八 矢 英 雄 HIDEYO HACHIYA	NOTE	WORK NO.	DATE	TITLE: FLOOR PLAN	DRAWN NO. 3
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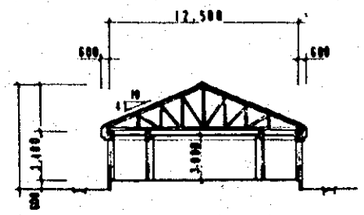
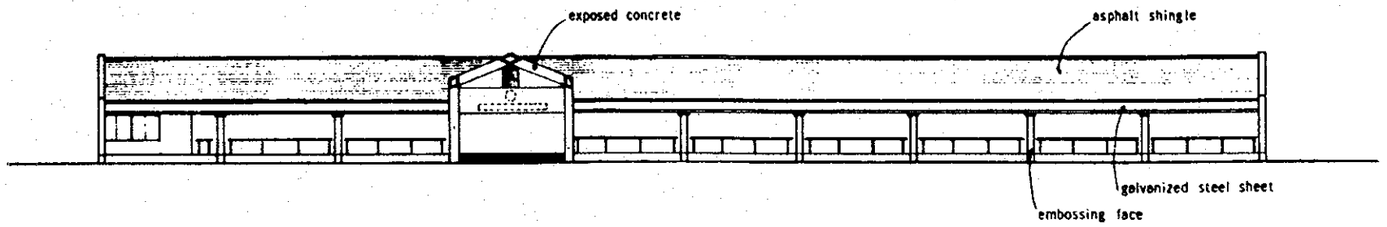
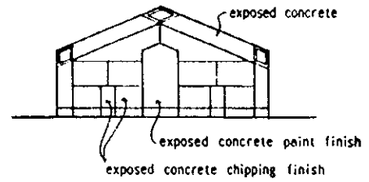
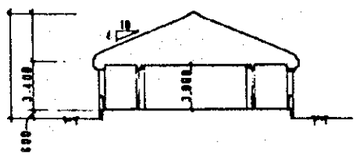
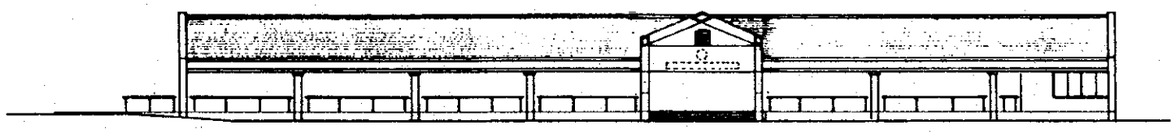


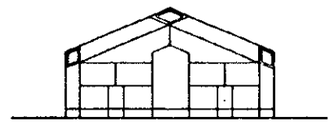




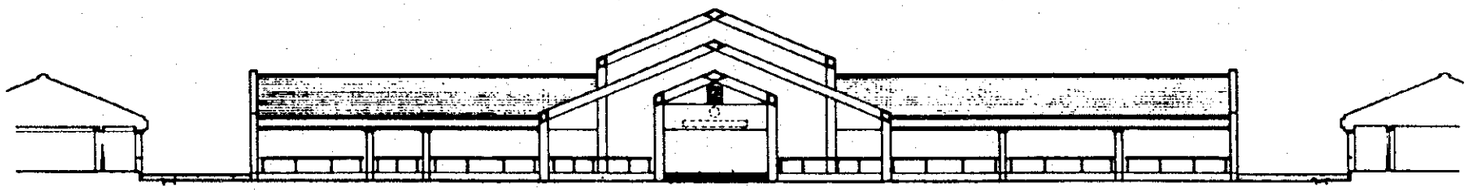
BBI (MAIN BUILDING)



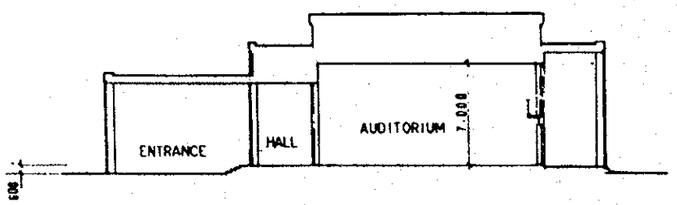




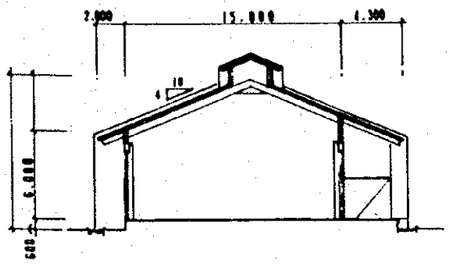
BPSB (MAIN BUILDING)



TRAINING CENTER



創造社 SOZOSHA CO.,LTD. TOKYO CONSULTANTS, ARCHITECTS & ENGINEERS 一級建築士登録 第11819号 八矢英俊 HIDEYO HACHIYA	NOTE	WORK NO. / APPROVAL / DRAWN	DATE / SCALE 1/400	TITLE EXTERIOR ELEVATION & SECTION BBI TRAINING CENTER BPSB	DRAWN NO. 4



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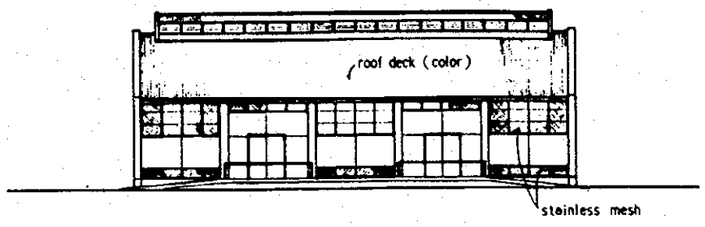
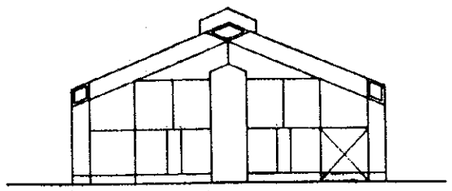
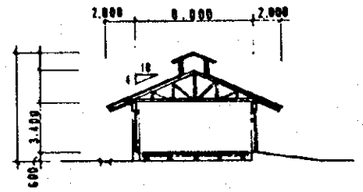
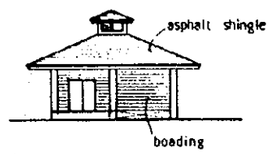
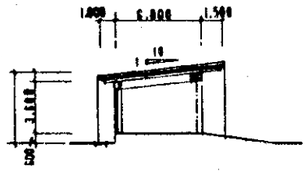


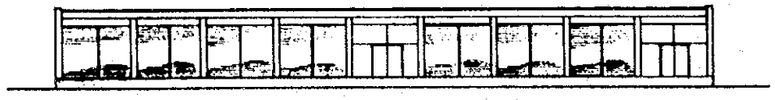




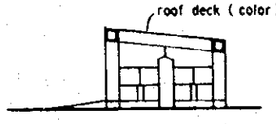


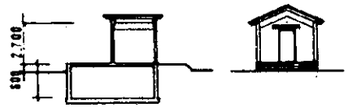
BBI (SEED STORAGE)





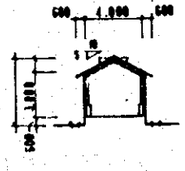
BBI (AGR.MACHINERY, GARAGE, etc.)

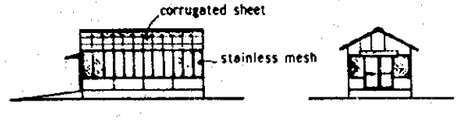




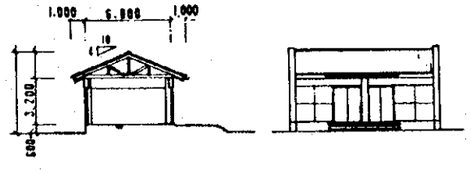
BBI (PUMP ROOM)

BBI (FUEL STORAGE)





BBI (NET HOUSE)



BBI (GENERATOR, ELECTRIC ROOM)

創造社 SOZOSHA CO.,LTD. TOKYO
CONSULTANTS ARCHITECTS & ENGINEERS
一級建築士登録 第31999号 八 矢 民 雄 HIDEYO·HACHIYA

NOTE

WORK NO.

APPROVAL

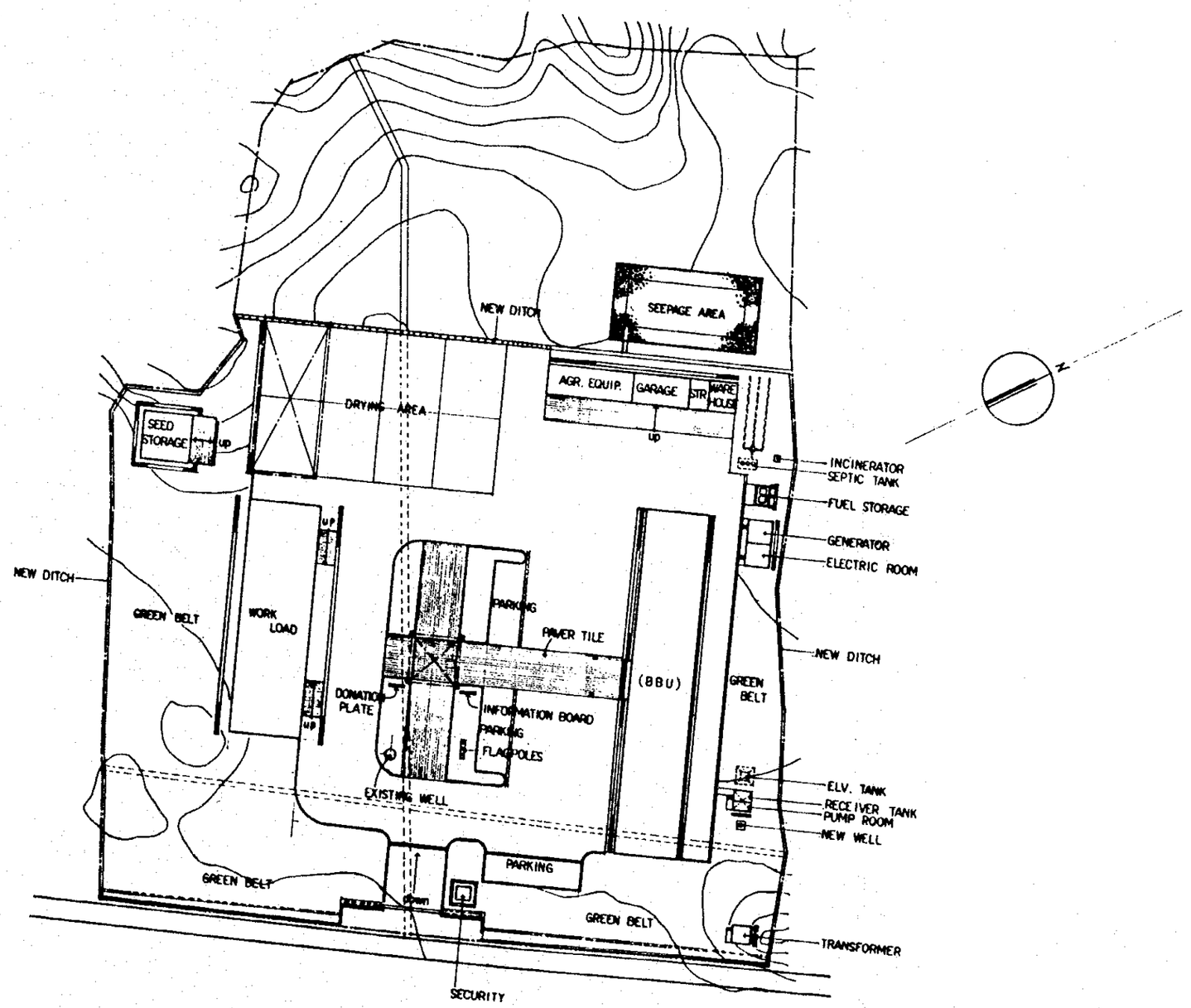
DRAWN

DATE

SCALE 1 / 400

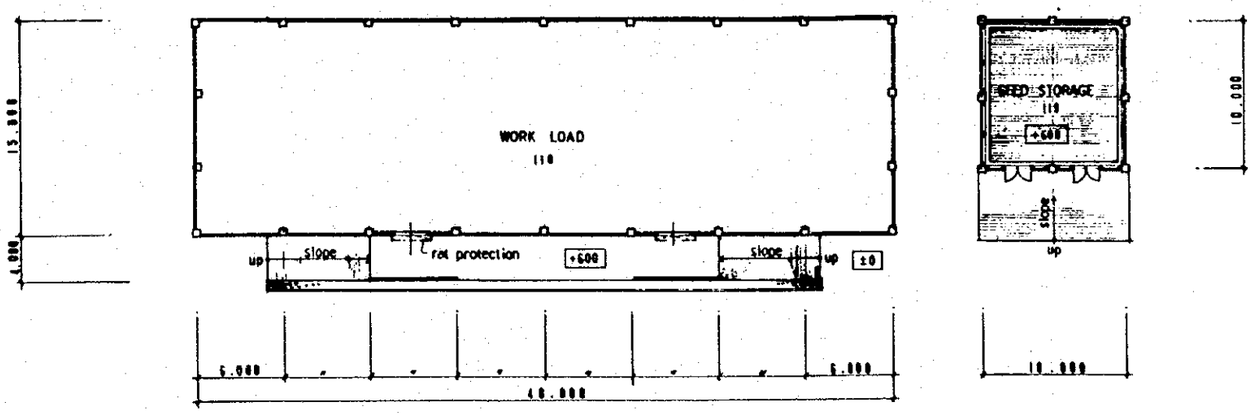
TITLE EXTERIOR ELEVATION & SECTION
BBI

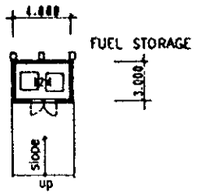
DRAWN NO. 5

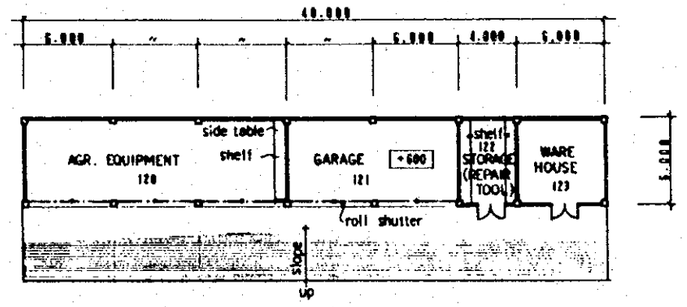


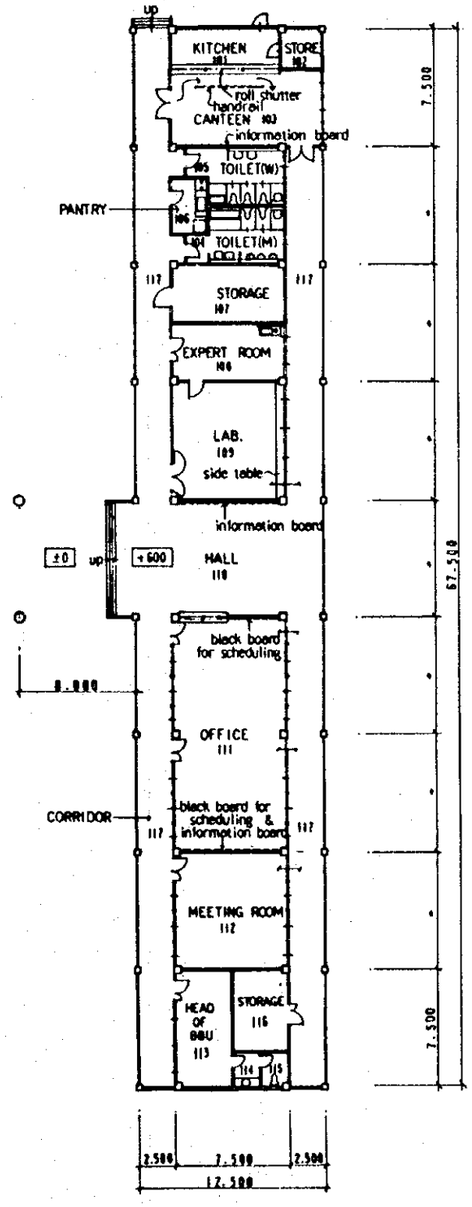
(BBU)PLOT PLAN

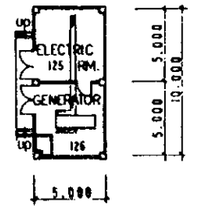
創造社 SOZOSHA CO.,LTD. TOKYO CONSULTANTS, ARCHITECTS & ENGINEERS 1級建築士登録 第31969号 八矢保雄 HIDEYO·HACHIYA	NOTE	WORK NO.	DATE	TITLE PLOT PLAN	DRAWN NO. 6
		APPROVAL / DRAWN	SCALE 1/1,000	BBU	

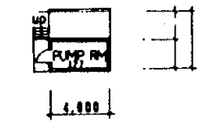


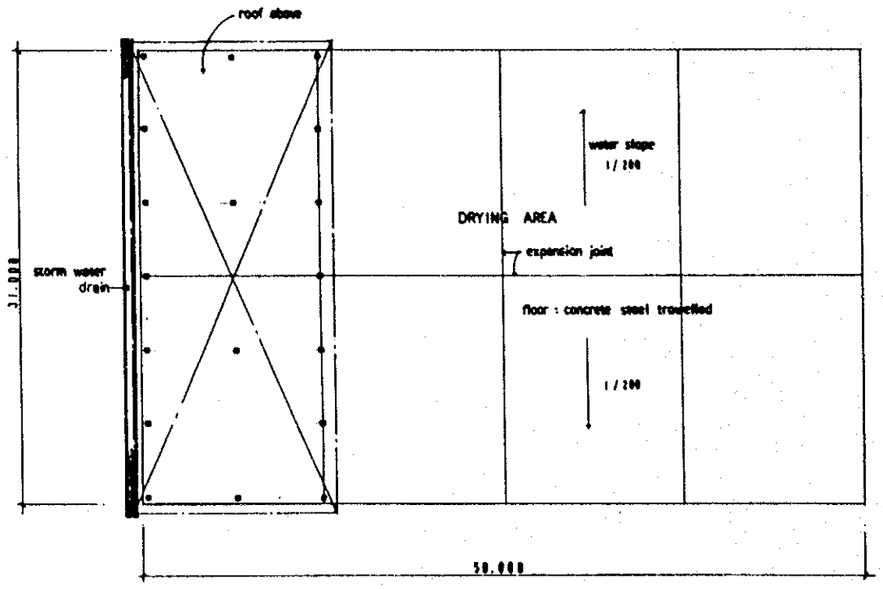












BBU

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創造社 SOZOSHA CO, LTD. TOKYO CONSULTANTS ARCHITECTS & ENGINEERS 一級建築士登録 第31969号 八矢英世 HIDEYO-HACHIYA	NOTE	WORK NO.	DATE	TITLE FLOOR PLAN	DRAWN NO. 7
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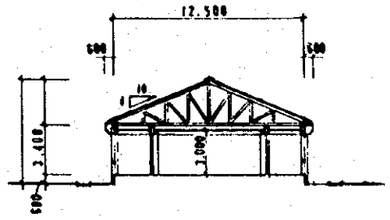

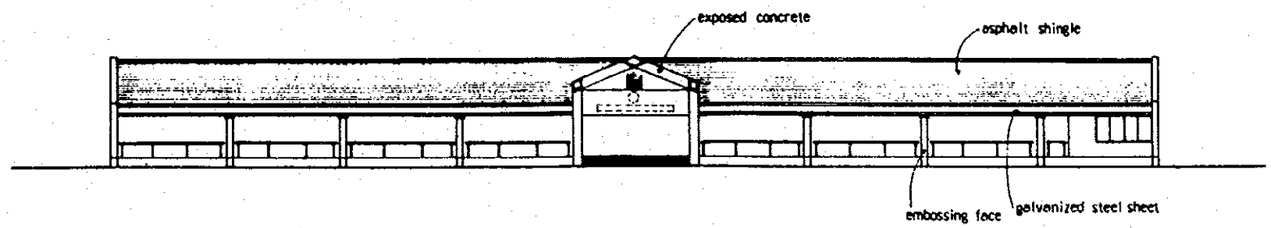

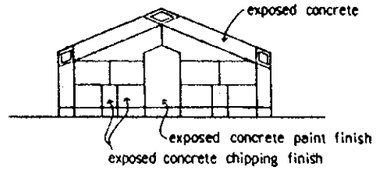

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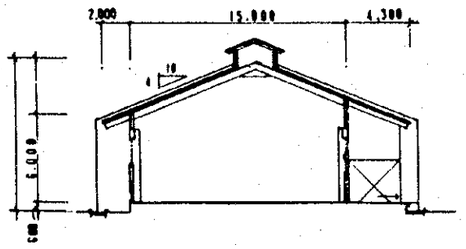

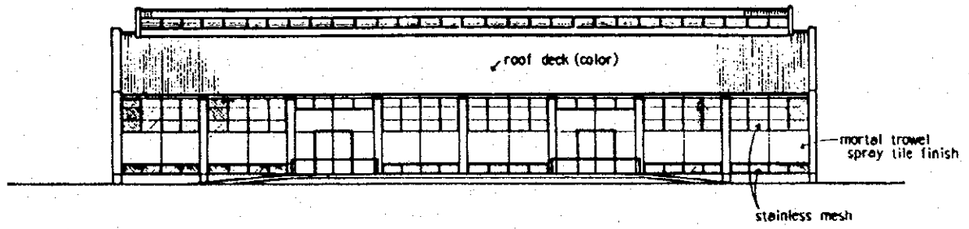

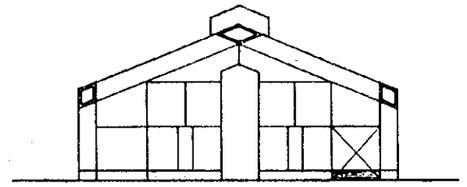

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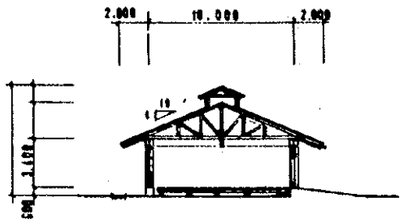
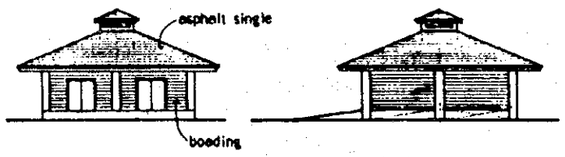
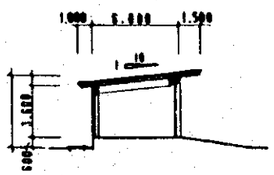
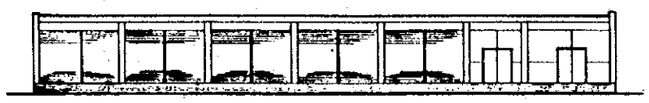
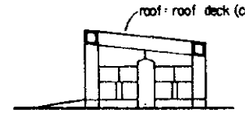




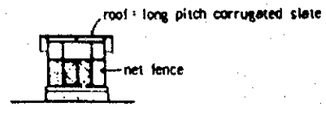


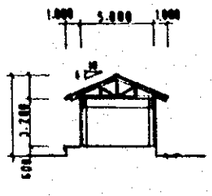


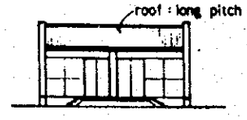


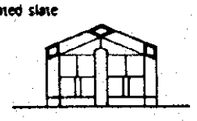
BBU (SEED STORAGE).

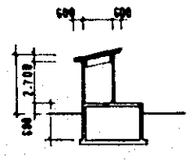
BBU (GARAGE . WARE HOUSE)

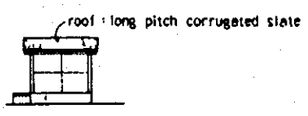












BBU (FUEL STORAGE)

BBU (GENERATOR . ELECTRIC ROOM)

BBU (PUMP ROOM)

創造社 SOZOSHA CO.,LTD. TOKYO CONSULTANTS, ARCHITECTS & ENGINEERS 1級建築士登録 第31989号 八 矢 英 世 HIDEYO HACHIYA	NOTE	WORK NO.	DATE	TITLE	DRAWN NO.
		APPROVAL / DRAWN	SCALE 1 / 400	EXTERIOR ELEVATION & SECTION	8

3-4 Implementation Plan

If this project is to be implemented through Japan's grant aid assistance, it shall be implemented in consideration of the grant aid system of Japan by observing the following procedures:

3-4-1 Construction Condition

[1] Basic item

① Prior to proceeding with the project, the Exchange of Notes (E/N) shall be concluded between the Government of Japan and the Government of Indonesia.
With the E/N, Japan shall commit itself officially to assist and initiate specific actions.

② After the conclusion of the E/N, construction document contract and construction supervisory contract shall be concluded between a consultant firm of Japanese nationality and the Government of Indonesia, and the consultant shall start producing working drawings immediately thereafter.

③ The consultant, after completing all necessary construction documents, shall obtain approval for said documents from the Government of Indonesia.

④ Contractors selected through preliminary screening shall be summoned for a tender.

⑤ The successful bidder shall conclude a contract agreement with the Government of Indonesia after the detail of the bidding price is examined and its appropriateness is confirmed.

⑥ The Government of Indonesia shall complete all preparatory works, including ground preparation, electrical and telephone lead-in installation, and obtaining of necessary permissions for construction, before the commencement of the construction work.

[2] Positioning and scope of work of parties involved in construction work

① Consultant

The consultant shall be entrusted by the Ministry of Agriculture of Indonesia to perform the following tasks with regards to preparation of construction documents and supervision of construction:

[Scope of work]

a. Construction document stage

Based on the basic design, prepare tender documents consisting of detail drawings, specifications, calculation sheet, estimation sheet, etc., which will be verified and approved to be used in a tender.

b. Construction supervision stage

Consult closely with the Ministry of Agriculture and other concerned government agencies in Indonesia, local consultant and Japanese contractor. Supervise and coordinate the construction work to ensure that the work will be carried out according to the detail drawings, specifications, etc. Record the progress of the construction work. Report periodically to the Japanese and the Indonesian parties concerned.

Issue a certificate of completion at the end of each construction phase to be approved by the Government of Indonesia. The consultant shall dispatch staff, who will be stationed at the construction site on a full-time basis during the construction stage, and dispatch engineers when the equipment for stock-seed production and seed certification will be carried into the buildings.

When handing the equipment over the Indonesian side, check the items and their quantities against the list, issue a certificate of delivery completion, and receive inspection completion certificates from the Government of Indonesia.

② Contractor (construction and equipment procurement)

a. Construction firm

The Japanese contractor shall liaise closely with the parties concerned so that the con struction work will be carried out smoothly and completed on time. It is also respon sible for managing construction schedule and controlling the materials, safety, and the qualities of construction works.

b. Equipment supplier

The Japanese equipment supplier shall procure equipment that meet the required specifications and deliver it before due date. At the time of delivery, the supplier shall explain the owners of the equipment how to operate, maintain, and repair the equipment.

③ Local consultant, construction firm

a. Local consultant

In case the Japanese consultant decides to use a local consultant, the local consultant shall enter into an agreement with the Japanese consultant and check that the working drawings, specifications, etc. are complied with laws and regulations of Indonesia. Application forms for building permission shall be submitted through the local agency of agricultural affairs.

The local consultant shall assist the Japanese consultant when explanation about the project is requested by the local authorities.

b. Local construction firm

In case the Japanese construction firm decides to use a local construction company, the local company shall engage in the construction work under the supervision of the Japanese firm as their subcontractor.

3-4-2 Implementation Method

The system for implementing the project under Japan's grant aid assistance shall be as follows:

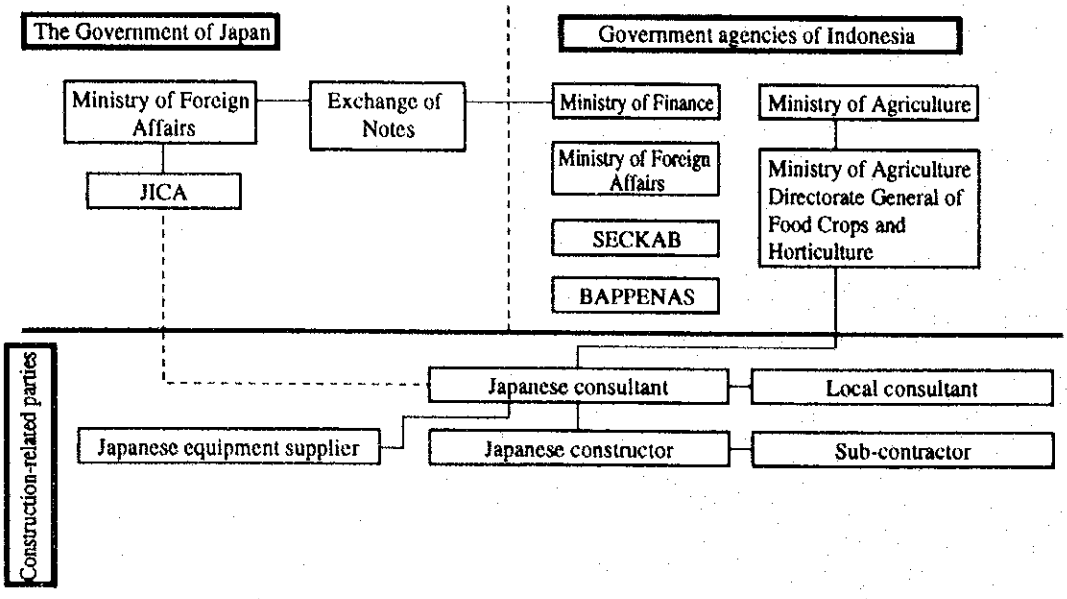
① The Ministry of Finance shall be responsible for the signing of Exchange of Notes between the governments of Japan and Indonesia and banking procedures. Taxation exemption procedures shall be handled by the Technical Cooperation Coordination Committee, President's Office.

② The Directorate General of Food Crops and Horticulture is the Indonesian implementing agency of the project and is in charge of concluding contracts with the Japanese consultant, contractor, and equipment supplier.

③ Department of Public Works shall be responsible for supervising the technical aspects of the construction work and applying for necessary permission and license.

④ Department of Public Works shall be the contact agency for the building permission for the project and is responsible for conducting various inspections.

The following diagram shows the relationships between the government agencies of Japan and Indonesia, consultants, contractors, and equipment supplier:



3-4-3 Construction and Supervisory Plan

In the construction and supervisory stage, the consultant shall dispatch competent full-time supervisors, who will be responsible for directing the construction work and for the communications among parties concerned, to the construction site as well as dispatching short-term specialists, who will inspect, witness, and guide the construction work, as necessary.

Specific tasks that the consultant shall perform during the construction period are as follows:

① Cooperation in concluding construction contracts:
Selection of a contractor, determining the contracting method, drafting the contract, examining the details of the estimation sheet, witnessing the conclusion of the contract.

② Examination and approval of shop drawings:
Examination of shop drawings, materials, finish samples, and equipment.

③ Guidance for construction work:
Examination of construction schedule and process, providing guidance to contractors, and reporting of the progress of construction work to the relevant organizations

④ Cooperation in payment and approval procedures
Inspection of construction work and the contents of invoices, etc. at the completion of each construction stage

⑤ Final inspections
Inspection of work value of each construction stage and issuance of completion certificate

The consultant shall, upon confirming that the construction has been completed according to the terms and condition stipulated in the contract, witness the handover of the project to the relevant organizations, and obtain their approvals, which will mark the fulfillment of their duties. The consultant is also responsible for reporting to relevant government agencies of Japan necessary information regarding the progress of construction work, payment procedures, and handover of the project.

3-4-4 Construction Plan

In implementing the project through Japan's grant aid, the construction work shall be carried out in accordance with the following policies:

① Strict observance of construction period

All construction processes shall be established on the assumption that the construction work will be carried out under the guidance of Japanese engineers.

② Securing of quality and quantity

All qualities and quantities specified in the design documents shall be ensured.

③ Enforcement of safety-first

Safety shall be given the top priority during the construction period. Ample attention must be paid to safety considerations when building temporary structures.

In light of the above construction policies, the following points must be noted in carrying out the construction work:

(1) Many subcontractors in Indonesia are small- to medium-size construction companies with little financial and technical resources. Thus, special attention needs to be paid to the securing and allocation of manpower when managing the construction process.

(2) The technical standards established by the Ministry of Labor for construction workers are relatively high and are not causes of concern for the construction of general buildings. However, the need for supervision is high as the work ethics and efficiency of local laborers are estimated at around 30% of those of Japanese workers.

(3) As the domestic production of construction materials are being promoted in Indonesia, most of the materials needed for the project can be procured from local sources:
Below is the current situation of construction materials:

a. Major materials produced in Indonesia are as follows:

Structural	: cement, reinforcement bars, structural steel, bricks
Finish	: glass, paint, tiles, aluminum materials
Electrical/mechanical	: ceramic sanitary fixtures, piping materials

b. Major materials imported are as follows:

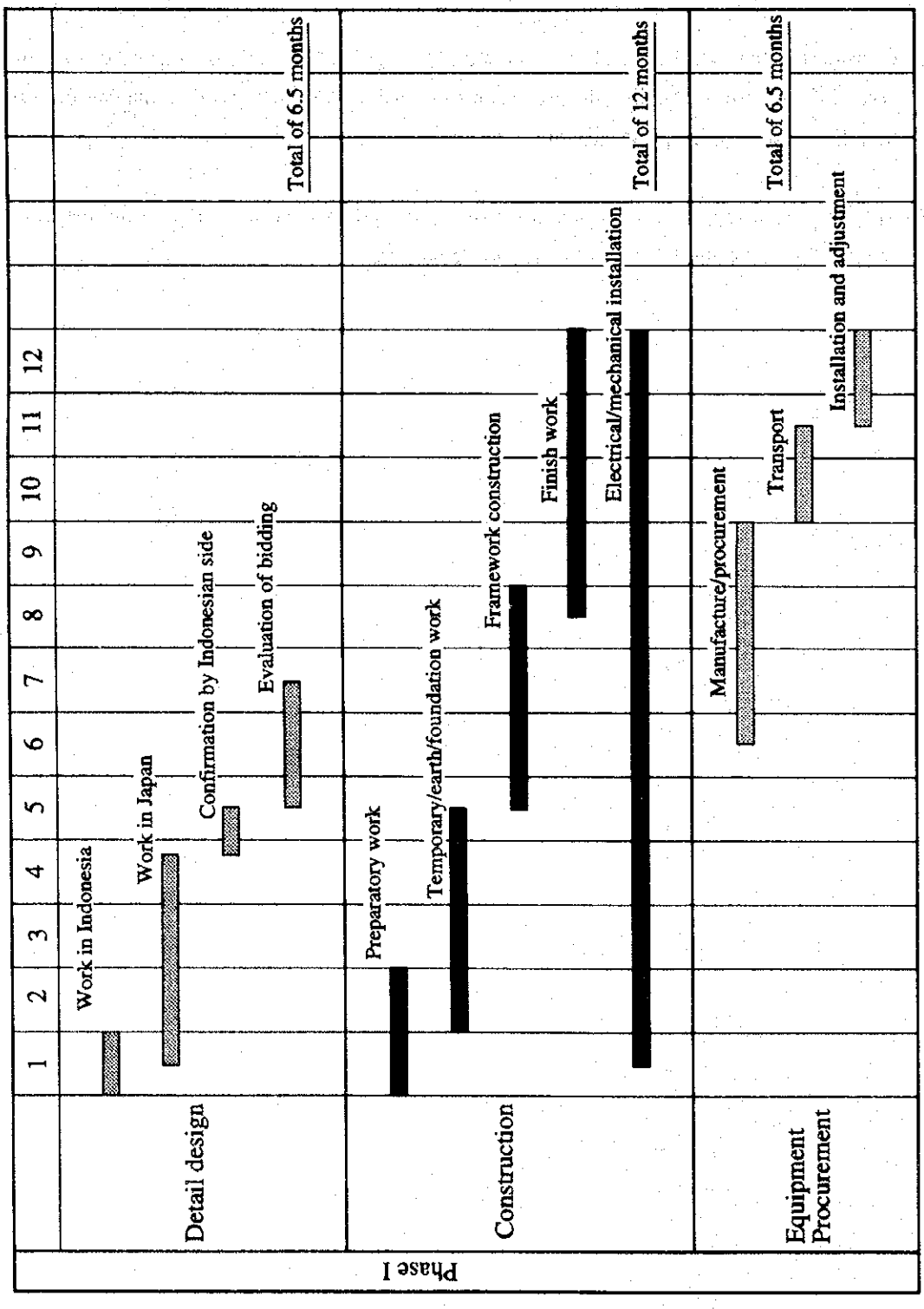
Structural	: heavy-weight structural steel
Finish	: door/window hardware, gypsum board, wall paper, carpet
Electrical/mechanical	: lighting fixtures, special waterproofing materials

(4) Connection of electric cables and sewage pipes must be carried out after discussing the methods and timings with relevant parties.

(5) Considering the fact that local laborers need to be guided properly by Japanese staff, the construction period including the time for temporary work shall be worked out carefully so that the construction will be carried out in the most efficient manner.

(6) Special precautions need to be taken for the earth and foundation works during the rainy season that takes place between April and September.

3-4-5 Implementation Schedule



3-4-6 Scope of Work

If the project is to be implemented under the grant aid system of the Government of Japan, the scope of work for the governments of Japan and Indonesia will be as follows:

Table 3-4 Scope of Work

Japanese side	Indonesian side
1. Construction work: structural, framework, finish 2. Electrical installation: transformer facility, power facility, cables, lamps, outlets, telephone facility, PA system, emergency alarm system, lightening protection facility 3. Pluming/air-conditioning: water supply system, drainage/vent, sanitary fixtures, air-conditioning/ ventilating fan, fire extinguishing system, kitchen facility, incinerator, gas supply system 4. Exterior site: paths, streetlights 5. Equipment: equipment for seed production, seed processing, seed certification, and data processing, vehicles	1. Ground preparation: removal of existing facilities, ground preparation, development of farm areas 2. Exterior work: landscaping, tree planting, fences 3. Preparation of infrastructure: lead-ins for in electric/telephone facilities, installation of portable fire extinguishers, payment of electric connection charges 4. Furniture and General Equipment desks, chairs (training, clercial work , office equipment, general training equipment), etc. 5. Fixtures: curtains, blinds, general furniture 6. Others: procedures for applications, confirmation, customs clearance, and tax exemption 7. Expenses for maintenance, management, operation, and ceremonies

[1] Construction documents

Preparation of construction documents is estimated to take 6.5 month after the signing of E/N.

[2] Bidding

After the construction documents are prepared, applicants for bidding will be examined for pre-qualification. The implementing agency will summon the pre-qualified tenderers and conduct tender in witness of relevant parties.

The successful bidder will sign a contract agreement with the Government of Indonesia. The time needed for pre-qualification through the signing of the contract agreement is estimated at two months.

[3] Estimation of cost that Indonesian side should prepare

887,300,000 RP

Cost estimation for each category born by Indonesia excluding O/M cost is as follow:

Reclaim	261,800,000 RP
Exterior work	184,500,000 RP
Household articles	184,300,000 RP
Infrastructure	72,000,000 RP
Other (building permission, ceremony)	184,700,000 RP

CHAPTER 4 PROJECT EVALUATION AND CONCLUSION

Chapter 4 Project Evaluation and Conclusion

4-1 Expected Effects of the Project

The proposed project is to be implemented as a part of the promotion effort of domestic food crop production especially for raising the self-sufficiency in soybeans under the Sixth National Development Plan. The project is expected to enhance the production of high quality soybean varieties and the proliferation of such varieties among Indonesian farmers through education and training on the cultivation techniques of high quality soybeans. Below is a list of current problems and expected results to be brought through the implementation of the project:

a. Present situation and problems	b. Measures to be taken under the project	c. Extent of expected effects and improvements
a-1 The amount of imported soybeans, which represents about 12% of the total importation of primary products to Indonesia, is growing every year. Although the Sixth National Development Plan aims to raise the degree of self sufficiency in food crops, the domestic production of soybeans is yet to be increased and the cultivation area to be expanded.	Multiplication of high quality seeds will be enhanced in order to increase soybean production and expand the cultivation area.	Through the growing of high quality varieties and the upgrading of the Foundation Seed Farm (BBI) and the Stock Seed Farm (BBU), preservation and storage of seeds will become possible and the basic environment for increasing the production will be established. This also will lead to higher profit for general farmers.
a-2 The East Java Province produces 30% of the soybeans grown in Indonesia, and the farmers in the Province have high interest in soybeans. However, the proliferation and distribution of superior varieties are not carried out smoothly.	A series of facilities for production, supply, and certification of soybeans including the Foundation seed Farm, the Stock Seed Farm, and the Seed ertification Center will be established under the project along with training and education facilities.	Through the implementation of the project, an integrated system for the multiplication of foundation seeds, stock seeds, and popular seeds will be secured. At the same time, cultivation, distribution, and popularization methods of high quality seeds will be established through training and education.

4-2 Examination and Verification of Appropriateness

The problems concerning the soybean production in Indonesia include:

(1) Production techniques for high quality seeds are still at a low level; (2) The germination rate is low due to the underdeveloped seeds storage facilities; (3) The seed certification techniques and systems for each stage of foundation-, stock-, and extention-seed production are inadequate due to insufficient facilities and equipment for seed certification and related activities; (4) underdeveloped education and guidance systems for the multiplication and distribution of high quality seeds. In order to improve the situation, the proposed project aims to establish an integrated system for the production of foundation, stock, and extention seeds and for the training on certification, education, and guidance; and use the system as a model case to spread the positive results throughout the country.

To achieve the above objectives, it will be essential to extend the assistance that is followed up by technical cooperation. Since the Indonesian side is already developing the Central Seed Farm in Bedali, Malang, which will be the operation and management base of the project, the necessary personnel and budget are expected to be secured.

In view of the above facts, the grant aid assistance for the project is deemed appropriate as it will sufficiently improve the situations surrounding the soybean production in Indonesia, and the recipient country has an adequate set up to accommodate the project.

The project's appropriateness for grant aid assistance is also verified by the following points:

1. The project is aimed at benefiting a large portion of the general public including ordinary farmers.
2. The project intents to enhance the multiplication and distribution of high quality soybean seeds, and thus, will directly respond to the urgent need for improving the living standard of the nation.
3 The project can be maintained and managed with Indonesia's own financial, human, and technical resources.
4. The project is expected to contribute to the actualization of goals that are established under the middle- and long-term development plans of Indonesia.
5. The implementation of the project will not cause any environmental damage in the areas surrounding the project site.
6. No special difficulties exist under the system of Japan's grant aid cooperation.

4-3 Recommendation

4-3-1 Seed production and quality

In order to rely less on imported soybeans, the domestic production needs to be increased. In order to increase the yield, it is necessary to ① improve seed qualities and cultivation techniques, and ② expand the area for cultivation.

It is said that increase of yield per area is interfered by the following factors; ① slow development, introduction, and proliferation of high- yield varieties, ② insufficient investment in fertilizers and other agricultural matirials, ③ underdeveloped irrigation systems, ④ insufficient measures against pests and diseases, ⑤ inadequate cultivation techniques of farmers, ⑥ low supply or usage of high quality seeds.

Technical problems concerning high quality seeds include ① decline in germination rate, ② seeds infected with virus in breeding process are mixed in ③ a mixture of superior seeds and other varietes are distributed and used, ④ inadequate techniques for post-harvest processing and seed processing and insufficient processing facilities result in low germination rate caused by defective or immature seeds mixed with good seeds.

4-3-2 Cultivation and cropping pattern

One of the most critical issues in soybean cultivation is the amount of pesticide and the timing of spraying. While a variety of agricultural chemicals are being used to control pests and diseases, new control methods such as planting marry golds between rows of soybean plants to repelnematodes and other harmful insects are being studied. The possibility of adopting such methods should also be considered.

The area of cultivation by month is shown in Figure 5-2-1, which indicates that April and August are the peak months. Although the correlation between the cultivation of soybean and the irrigating technic is not clearly identified in Indonesia, it seems appropriate to adopt the rotation cropping of rice-soybean-soybean as the project is designed on the premise that sufficient irrigating cultivation will be set in place. Although the second crop of soybeans will most likely be less than the first, the second cropping of soybeans is advantageous in terms of enhancing the fertility of the soil.

4-3-3 Managing the soil conditions of farms

As mentioned in the section of soil conditions of the farms in the project site, they are poorly managed. As seen in the cross section of the soil, 10 cm to 30 cm from the surface is a layer of highly compact soil. Although the exact cause of the hard layer could not be identified in the survey, it was not a plow sole resulted from rice cultivation. The result of chemical analysis indicates that the layers C1 and C2 below the surface layer are made of rich soil and will be made suitable for cultivation by breaking the crust or by deep cultivation (at least 40 cm below the surface).

The water permeability coefficient is calculated at K x 10^{-3}. Thus, the area can be made into excellent cultivation fields if the hard layer is tilled, an irrigation systems is installed, and the water is controlled properly.

Judging from the fact that soils in many areas in the East Java are mostly composed of basic or neutral volcanic ash and that vertisol mainly composed of limestone is distributed throughout; a large portion of the farm land is likely be covered with a layer of hard crust created by many years of rice cultivation. Thus, it seems necessary to promote deep cultivation in a wide scale, which is recommended to be carried out after detailed study and research on the subject.

4-3-4 Conclusion

It is appropriate to separate the proliferation and distribution of high quality seeds among the farmers through upgrading the Foundation Seed Farms and Stock Seed Farms from the development of foundation seeds of high quality varieties.

For the former, strengthening of seed control and certification services, enhancement of facilities, upgrading of the levels of technicians are necessary. It seems that they can be achieved mostly by improving physical conditions. The educational level of farmers can be raised by improving relevant organizations.

The latter is a task for engineers and researchers. It will be achieved only through the joint effort of research organizations.

Although the project's focus is mostly on the former, the latter should not be neglected.

The enhancement of soybean production has great significance in Indonesia as it will contribute to the realization of self-sufficiency and the improvement of nutrition for the nation. Thus, the project will play an important role in achieving the above goals.