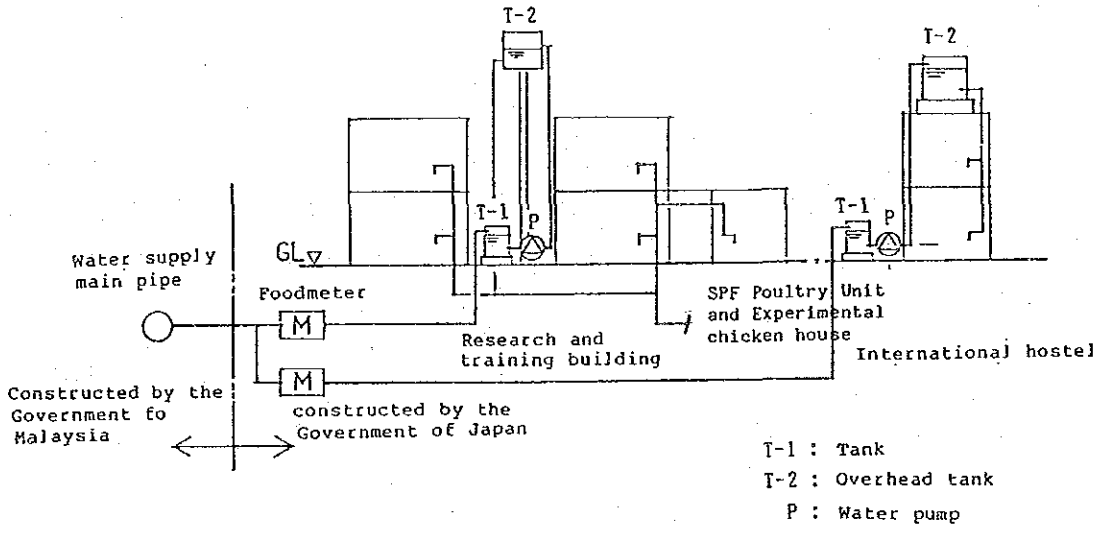
1. Sanitary facility

1) Water Supply

a. Supply method : The gravitation method will be used for consistent pressure supply. Two systems will be set up, one is for the research and training building, SPF poultry unit and Experimental chicken house. The other one is for the International Hostel. Two systems will be used different rate systems are used for the offices and for the International Hostel.



Water supply system

b. Quantity of water supply : Approximate the water supply is as follows :

Research and Training Building

Research personnel	500 ℓ/d x 15 (persons)	= 7,500 ℓ/d
Trainees	200 " x 25	= 5,000 "
Others		= 4,500 "
SPF Poultry Unit and Experimental Chicken House		= 8,400 "
Total		25,400 ℓ/d

International Hostel

Lodgers	250 ℓ/d x 29 (persons)	= 7,250 ℓ/d
Others		= 1,750 "
Total		9,000 ℓ/d

2) Hot Water Supply

a. Supply System

Research and Training Building

An individual supply system will be provided since there are only a few places requiring hot water. A gas water heater will be installed for each laboratory.

International Hostel :

A gas water heater for the shower will be provided in the Lecturers' room.

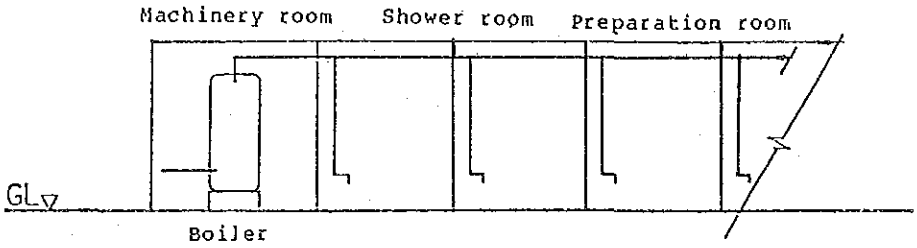
SPF Poultry Unit and Experimental Chicken House :

A boiler warmer will be provided in the machine room of each building to supply hot water as shown in the following diagram.

b. Quantity of hot water supply :

The hot water supply is approximately as follows :

Research and Training: Building	50 ℓ/d	x 15	=	750 ℓ/d
International hostel				
(trainers)	: 10 ℓ/d	x 25	=	250 ℓ/d
(lectures)	: 100 ℓ/d	x 4	=	400 ℓ/d
SPF Poultry Unit	: 300 ℓ/d	x 2	=	600 ℓ/d
Experimental Chicken	: 300 ℓ/d	x 2	=	600 ℓ/d



Hot Water System (SPF, Experimetnal Chicken House)

3) Drainage Facility

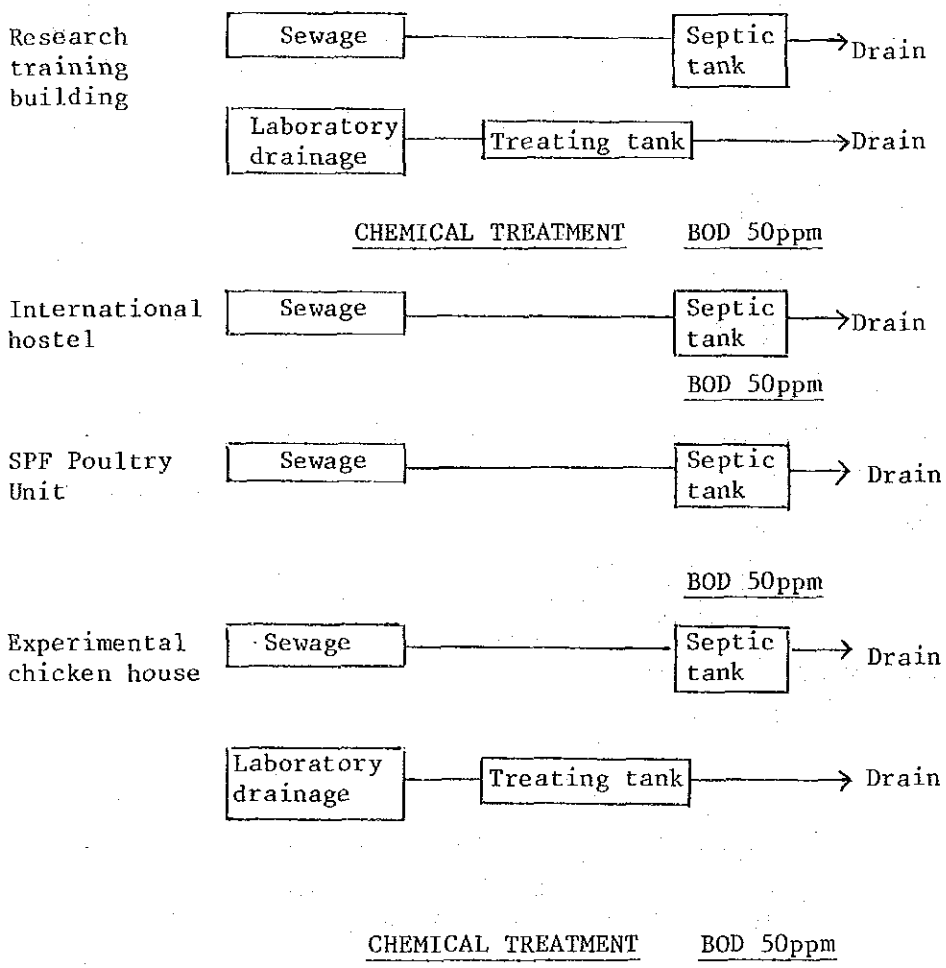
a. Distributary method shall be used as the drainage system.

b. The drainage system consists of the following .

Indoor drainage - ° Waste route drainage
° Sanitary route
° Laboratory route

Outdoor drainage - ° Sewage route
° Laboratory route

c. Drainage treatment system



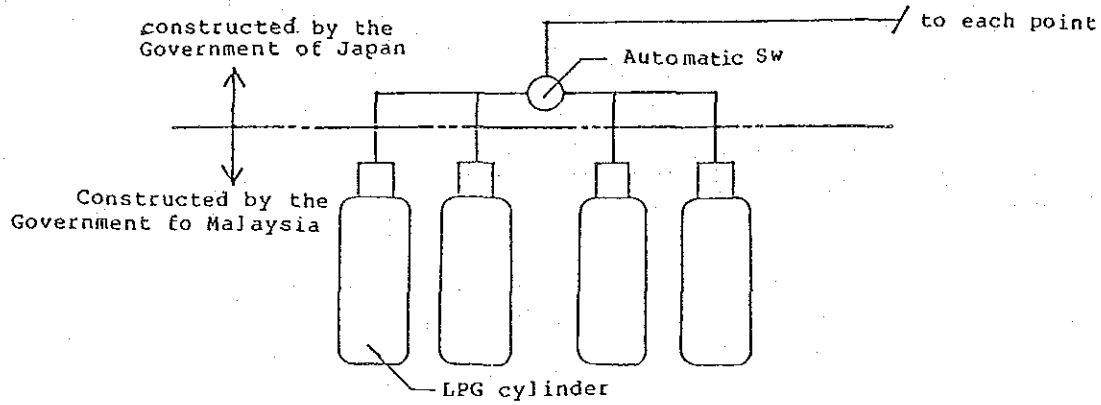
4) Sanitary equipment : The following equipment shall be installed.

- o Closet
- o Urinal
- o Wash basin
- o Slope sink

5) Gas facility : LPG gas cylinders will be provided in each building. Each building will have two cylinders for approximately for one week of gas consumption. The cylinders will automatically change one to the other.

Gas consumption is estimated as follows :

Research and Training Building	: 1.0 kg/d x 15 (persons)	= 15 kg/d
International Hostel	: 0.5 kg/d x 29 (persons)	= 14.5 kg/d
SPF Poultry Unit	:	= 4 kg/d
Experimental Chicken House	:	= 4 kg/d



LPG Supply (Common in every building)

6) Emergency equipment : The following devices shall be provided :

Research and Training Building :

Fire extinguisher and hose-reel

International Hostel :

Fire extinguisher and hose-reel

SPF Poultry Unit and Experimental Chicken House :

Fire extinguisher

7) Incinerator : For burning dead chickens

Model : Outdoor type (for animals)

Capacity : 50 kg/Hr

Burner : Medium pressure burner (A heavy oil or kerosene)

2. Air-conditioning facility

1) Cooling : The following systems will be used in consideration of easy maintenance and repair.

Research and Training Building

Administration and research section : Fan coil system

Training section : Room air-conditioner system

SPF Poultry Unit and Experimental Chicken House : Central duct system

International Hostel :

Lecturers : Room air-conditioner system

Trainees : Ceiling Fan

2) Cooling will be provided for the following rooms :

Reseach and Training Building :

Conference room, Director room, Experts' rooms, General office, Electron microscope room and its Anteroom, Heads' rooms, Meeting rooms, Laboratories, Dark rooms, Autopcy room, Common experimental room, Precision Machinery room, Data Processing room, Clean room, Reference library, Laboratory exercise room, Administration office, Lecture hall, Lecturers' room, etc.

International Hostel :

Lecturers' rooms (only one room each)

SPF Poultry Unit :

Examination room, Incubation room, Egg storage room, Preparation room, Breeding room, Breeding Chicken room, Dressing room, etc.

Experimental Chicken House :

Anatomical examination room, Preparation room, Dressing room, Breeding room, Corridor, etc.

3) Ventilation : Ventilation of rooms will be accomplished by ventilating fans; the volume of ventilation is as follows:

Laboratory	7	times/hour
Data Processing and autopcy room	15	"
Lavatory and pantry	10	"
Other working rooms	5	"

4) Special facility (SPF Poultry Unit and Experimental Chicken House)

a. Air cleaning : The air cleanliness and pressure difference between inside and outside the rooms are important for the SPF poultry unit and Experimental chicken house. This was determined as follows:

SPF Poultry Unit :

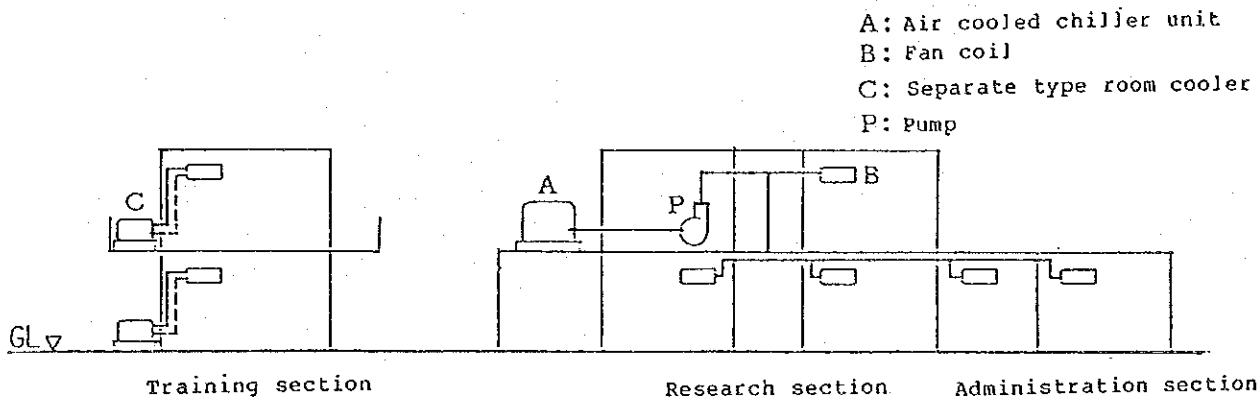
Dust collecting filter efficiency rate	:	99.97% of 0.3 micron diameter dust
Pressure difference	:	2 mm Aq Positive pressure

Experimental Chicken House :

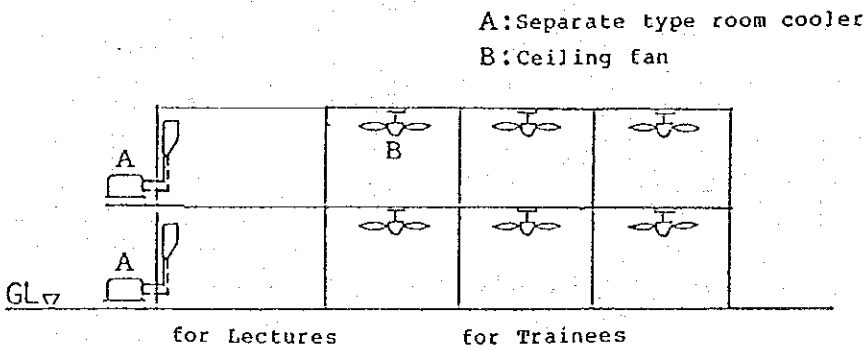
Dust collecting filter efficiency	:	99.97% of 0.3 micron diameter dust
Pressure difference	:	2 mm Aq Negative pressure

5) Environmental condition of rooms : The cooling condition of the rooms is determined as follows :

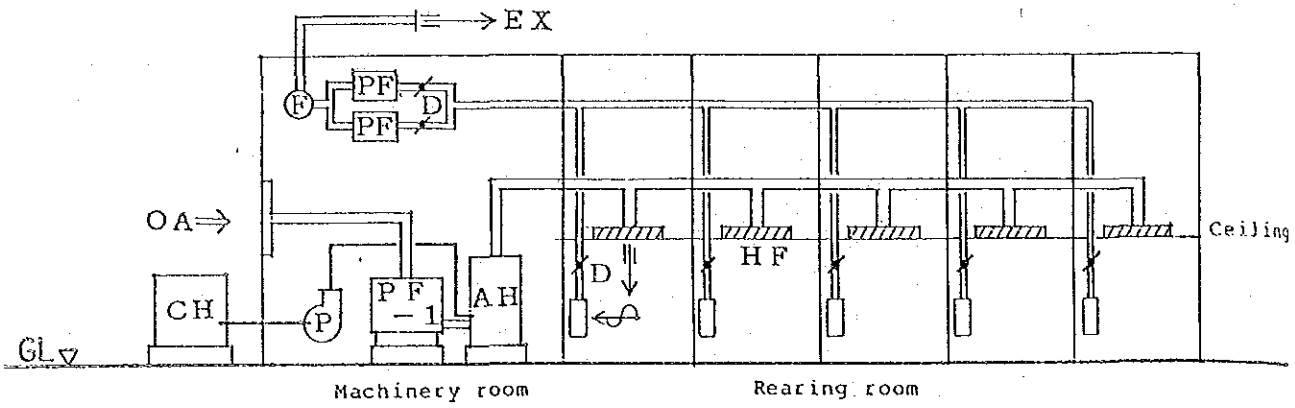
	Temperature (DB°C)	Humidity (RH%)
Outdoor air	34	65
Room air		
Research and Training Building	25	50
International Hostel	25	50
SPF Poultry Unit	25±2	50±10
Experimental Chicken House	25±2	50±10



Air Cooling System (Research and Training Building)



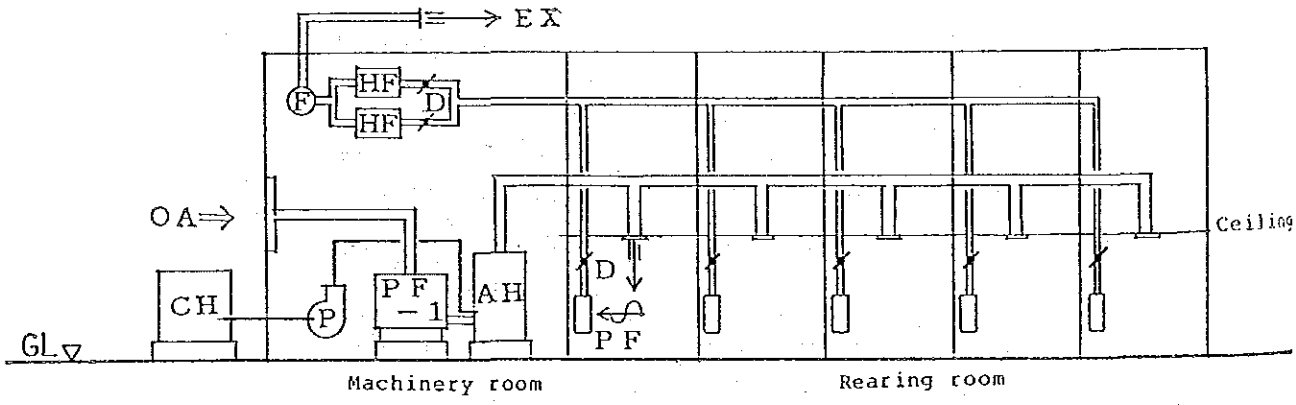
Air Cooling System (International Hostel)



Two units of PF-1, AH will be installed.

AH: Air conditioner
CH: Air cooled chiller unit
PF: Prefilter
HF: Highly efficient filter unit
F: Fan
P: Pump
OA: Outside air
EX: Exhaust air
D: Damper

Air conditioning system (SPF Poultry Unit)

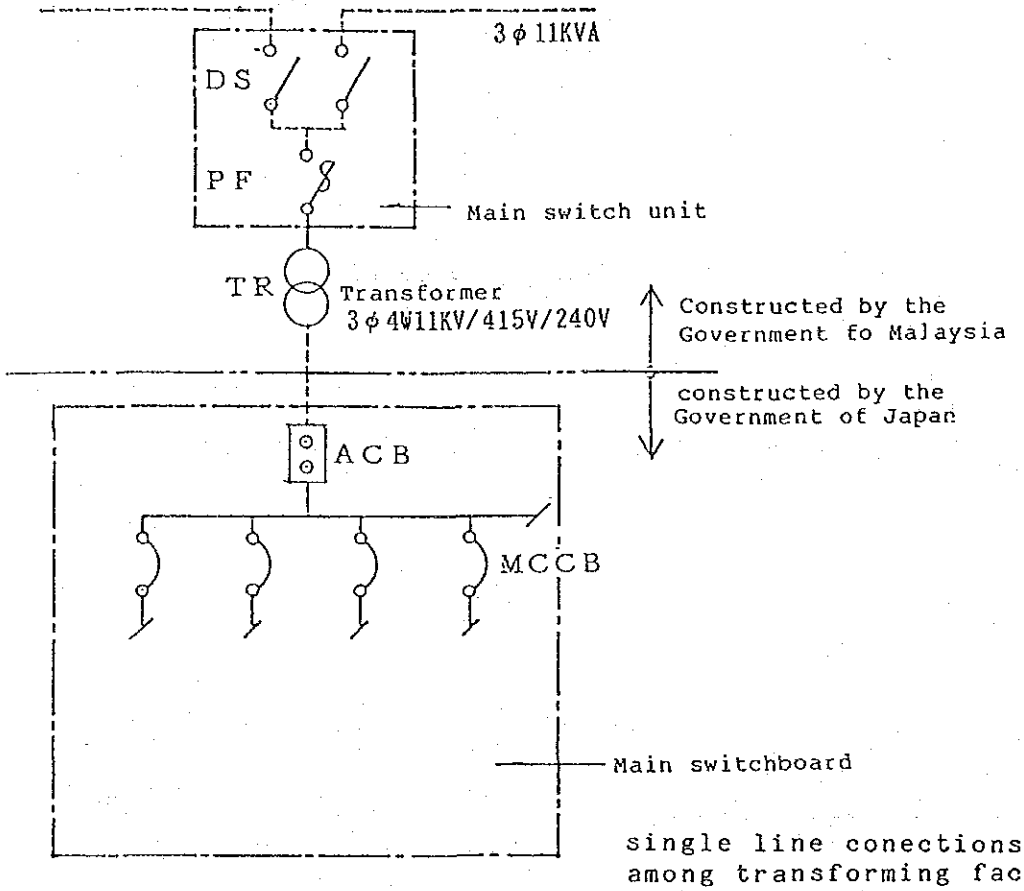


Two units of PF-1, AH will be installed.

Air conditioning system (Experimental Chicken House)

3. Electrical facility

1) Diagram of the sub-station is as follows :



single line conections among transforming facilities (Electric Room)

2) Load capacity : The load capacity is estimated as follows :

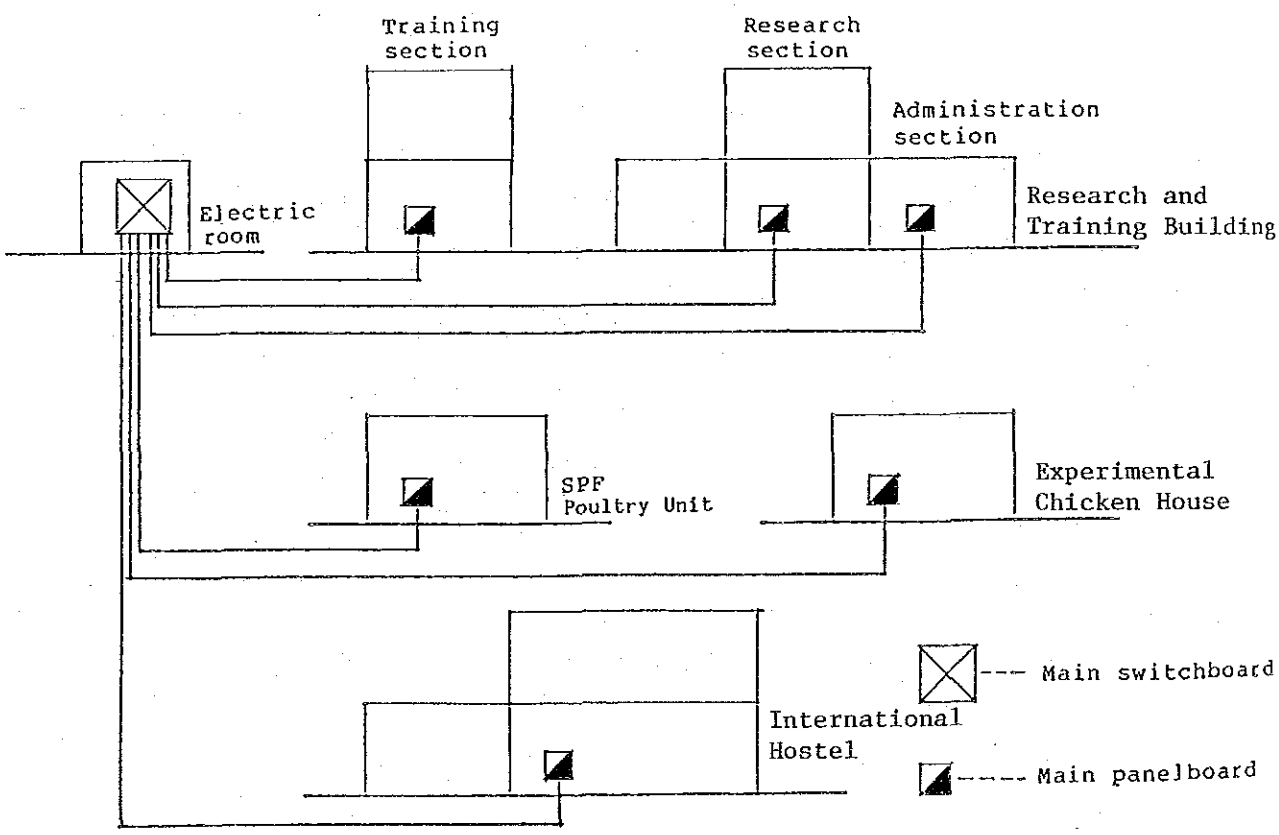
Lamps and outlets	107 KVA
Air-conditioners	550 KVA
Other load	43 KVA
Total	700 KVA

3) Generator shall be installed as an auxilliary power source for the SPF Poultry Unit, Experimental Chicken Houses and Ultra Deep Freezer. Air-conditioners, experimental equipment and emergency lighting shall be connected to the generator. The capacity will be as follows :

Engine : Diesel engine
Generator : 3Ø4 W, 415/240 V
Capacity : 300 KVA

4) Trunk line

Supply to each building from the main distribution board is as follows :



Main electric lines

5) Fluorescent lighting fixtures will be used mainly for the sake of maintenance ;

Luminous intensity : 100LX for lavatory, corridor, pantry and lobbies
200LX for machine room and storage room
300LX for SPF and Experimental Chicken House, office laboratory

Disinfectant light : Shall be installed in the SPF and Experimental Chicken House. A light controller will be installed for controlling brightness and lighting time.

6) Telephone facility

Telephone lines will be led from the existing MDF room to a Distribution Panel which be borne by the Japanese side. Telephone hand sets and Private Branch Extension (PBX) will be provided by Malaysian side.

Research and training building	22 places
International hostel	1 "
SPF Poultry Unit	1 "
Experimental Chicken House	1 "

7) Inter-communication equipment :

The following amount of equipment shall be installed for inter-communications ;

International Hostel	29 places
SPF Poultry Unit	7 "
Experimental Chicken House	7 "

8) Television antenna

An attenna for television broadcast reception will be installed in the following rooms.

One for the lecturers' living room (International Hostel)
One for the lounge used by the trainees

9) Emergency facility

The following facilities will be installed in compliance with the regulations :

Research and Training Building :

Emergency exit light

Hand-operated fire alarm

Emergency exit light, hand-operated fire alarm

(International Hostel)

4-3-2-5 Construction Material Plan

Local materials will be used whenever possible to cut construction expenses and make maintenance easier.

(1) Exterior Finishing Materials

1) Research and Training Building

Roof	Waterproof Asphalt
	Heat-insulating blocks
Outer walls	Tiles sprayed with mortar

2) International Hostel

Roof	Spanish tiles (A wooden roof truss)
	Partly Waterproof Asphalt
	Heat-insulating blocks
Outer walls	Tiles sprayed with mortar

3) SPF Poultry Unit and Experimental Chicken House

Roof	Waterproof Asphalt
	Mortar Hold
Outer walls	Tiles sprayed with mortar

(2) Interior Finishing Materials

Interior finishing materials of the respective buildings are as shown in the following tables. Abbreviations used are as follows :

SV	:	Stain varnish
EP	:	Emal joint paint
VP	:	Vinyl paint

1) Research and Training Building

Administration Section	Floor	Skirting Board	Wall	Ceiling
Director Room	Carpet	Wooden SV	Vinyl cloth	Noise absorp-tion boards
Expert's Room	Carpet	Wooden SV	Vinyl cloth	Noise absorp-tion boards
Office	Vinyl tiles	Wooden SV	Mortar EP	Noise absorp-tion boards
Conference	Needle punched carpet	Vinyl skirting boards	Vinyl cloth	Noise absorp-tion boards
Preparation Room	Vinyl tiles	Vinyl skirting boards	Mortar EP	Boards EP
Entrance Hall	Porcelain tiles	Terrazzo	Mortar EP	EP
W C	Mosaic tiles	Tiles	Tiles	Noise absorp-tion boards

Research Section	Floor	Skirting Wall	Wall	Ceiling
LAB Room	Coated Floor	Terrazzo	Mortar EP	Noise absorption boards
Treatment Room	Coated Floor	Terrazzo	Mortar EP	"
Storage	Vinyl Tiles	Vinyl skirting boards	Mortar EP	Noise absorption boards
Autopsy	Coated Floor	Terrazzo H = 1000	Mortar EP	"
Electrone Microscope	Vinyl Tiles	Vinyl skirting boards	Mortar EP	Noise absorption boards
Reference	Vinyl Tiles	"	Mortar EP	"
Common Room	Vinyl Tiles	Vinyl skirting board	Mortar EP	Noise absorption boards
Precision	Vinyl Tiles	"	Mortar EP	"
Data Room	Vinyl Tiles	"	Mortar EP	"
Freeze Room	Vinyl Tiles	"	Mortar EP	"
Corridor	Terrazzo	Terrazzo	Mortar EP	EP
Washing Room	Coated Floor	Tiles	Tiles	Noise absorption boards
WC	Mosaic Tiles	Tiles	Tiles	Noise absorption boards
Pantry	Terrazzo	Tiles	Tiles	Boards EP

Training Section	Floor	Skirting board	Wall	Ceiling
LAB Room	Coated Floor	Terrazzo H = 1000	Mortar EP	Noise absorption boards
Storage	Vinyl tiles	Vinyl Skirting Boards	Mortar EP	Boards EP
Preparation Room	Vinyl tiles	Vinyl Skirting Boards	Mortar EP	Boards EP
Lecturers' Room	Vinyl tiles	Vinyl Skirting Boards	Mortar EP	Noise absorption boards
Lecture Room	Vinyl tiles	Vinyl Skirting Boards	Mortar EP	Noise absorption boards
Exhibition Corner	Vinyl tiles	"	Mortar EP	"
Administration Office	Vinyl tiles	Vinyl Skirting Boards	Mortar EP	Noise absorption boards
Locker	Vinly tiles	"	Mortar EP	"
Lounge	Porcelain tiles	Terrazzo	Mortar EP	"
Pantry	Porcelain tiles	Tiles	Tiles	Boards EP
Entrance	Terrazzo Porcelain tiles	Terrazzo	Mortar EP	EP
Corridor	Terrazzo Porcelain tiles	Terrazzo	Mortar EP	EP
WC	Mosaic Tiles	Tiles	Tiles	Boards EP

2) International Hostel

	Floor	Skirting Board	Wall	Ceiling
Lecturers' Lodging	Carpet	Wooden	Vinyl cloth	Noise absorption boards
Trainees' Lodging	Terrazzo	Terrazzo	Vinyl cloth	Noise absorption boards
Entrance Hall	Porcelain Tiles	Terrazzo	Mortar EP	EP
Corridor	Terrazzo	Terrazzo	Mortar EP	EP
Dining	Parquet flooring	Wooden	Vinyl cloth	Noise absorption boards
Multi-purpose room (TV Lounge)	Porcelain Tiles	Wooden	Vinyl cloth	Noise absorption boards
Storage	Mortar	Mortar	Mortar	Boards EP
Kitchen	Mosaic Tiles	Tiles	Tiles	Boards VP
WC	Mosaic Tiles	Tiles	Tiles	Boards EP

3) SPF POULTRY UNIT

	Floor	Skirting Board	Wall	Ceiling
PREPARATION ROOM (1)	Vinyl Tiles	Vinyl	Mortar EP	Board EP
PREPARATION ROOM (2)	Vinyl Sheet	"	Mortar VP	"
FEED STORAGE	Vinyl Tiles	"	Mortar EP	"
FEED BAG STERI-LIZING ROOM	Coated Floor	Epoxy Paint	Epoxy Paint	Board VP
CLEAN CORRIDOR	"	"	Mortar VP	"
AL ROOM	"	Vinyl	Mortar EP	Boards EP
WORK ROOM	"	Epoxy Paint	Epoxy Paint	Board VP
BREEDER ROOM	"	"	"	"
EGG STOCKER INCUBATOR ROOM	"	"	"	"
BROODER ROOM	"	"	"	"
FILTER ROOM	Vinyl tiles	Vinyl	Mortar EP	Insulation Board
DIRTY CORRIDOR	Coated floor	Epoxy Paint	Mortar VP	Board VP
DIRT ROOM	"	Mortar VP	Mortar VP	"
ENTRANCE	Porcelain tiles	Porcelain Tiles	Mortar EP	Boards EP
A/C ROOM	Mortar	Mortar	Mortar	Insulation Board
VENTILATION CONDUCTING RM	Mortar	Mortar	Mortar	Board EP
STORAGE	Vinyl sheet	Vinyl	Mortar EP	Board EP
CHANGE ROOM	"	"	EP	"
SHOWER	Mosaic Tiles	Tiles	Tiles	Board VP
VC	Mosaic Tiles	Tiles	Tiles	Board VP

4) EXPERIMENTAL CHICKEN HOUSE

	Floor	Skirting Board	Wall	Ceiling
PREPARATION ROOM (1)	Vinyl Tiles	Vinyl	Mortar EP	Boards EP
PREPARATION ROOM (2)	Vinyl Sheet	Vinyl	Mortar VP	Boards EP
FEED STORAGE	Vinyl Tiles	Vinyl	Mortar EP	Boards EP
FEED BAG STERI-LIZING ROOM	Coated Floor	Epoxy Paint	Epoxy Paint	Boards VP
CLEAN CORRIDOR	Coated Floor	Epoxy Paint	Mortar VP	Boards VP
AL ROOM	Coated Floor	Vinyl	Mortar EP	Boards EP
WORK ROOM	Coated Floor	Epoxy Paint	Epoxy Paint	Boards VP
BREEDER ROOM	Coated Floor	Epoxy Paint	Epoxy Paint	Boards VP
FILTER ROOM	Vinyl Tiles	Vinyl	Mortar EP	Insula-tion Board
TRAINEE ROOM	Vinyl Tiles	Vinyl	Mortar EP	Board EP
DIRTY CORRIDOR	Coated Floor	Epoxy Paint	Mortar VP	Board VP
DIRT ROOM	Coated Floor	Mortar VP	Mortar VP	Board VP
WORK ROOM	Coated Floor	Epoxy Paint	Mortar VP	Board VP
AUTOPSY ROOM	Coated Floor	Epoxy Paint	Epoxy Paint	Board VP
ENTRANCE	Porcelain Tiles	Tiles	Mortar EP	Board EP
AIR CONDITION-ING ROOM	Mortar	Mortar	Mortar	Insula-tion Board
VENTILATION CONDUCTING RM	Mortar	Mortar	Mortar	Insula-tion Board
STORE	Vinyl Sheet	Vinyl	Mortar EP	Board EP
CHANGE ROOM	Vinyl Sheet	Vinyl	Mortar EP	Board EP
SHOWER ROOM	Mosaic Tiles	Tiles	Tiles	Board VP
W C	Mosaic Tiles	Tiles	Tiles	Board VP

4-3-3 Equipment Plan

1. Basic Policy

The selection of research and training equipment necessary for this centre has been carried out in accordance with the following basic policy.

1) Selection of equipment will be made in accordance with the basic planning principles of 4-1, 3) from among the equipment necessary for long-range research in the virology, bacteriology, parasitology and pathology laboratories and for the third country training programme.

2) Taking into account the equipment now the possession of VRI and the execution of Japan's technical cooperation, research and training equipment will be selected in line with the basic designing principles of 4-1, 3) and make plans which will result in technological transfers.

3) Preference will be given to equipment that can be easily maintained and controlled and that can be operated at a low running cost.

4) Equipment will be shared by laboratories whenever possible.

5) The following points will be considered in order to maintain efficient equipment and research by making free use of the precision equipment.

   a. In order to make maintenance and control easy, similar types of equipment will be selected.
   b. Maintenance and control should be undertaken by the laboratory that most frequently uses the equipment.

6) The makers' guarantee provisions, such as periodical inspections of equipment conditions and spare parts supply, will be considered. In order to keep equipment in conformity with

their initial purposes, maintenance techniques will be systematically transferred to local engineers and the Malaysian side will be ready to receive the techniques. Sufficient attention will be given to maintenance and inspection of expensive research and training equipment, including the electron microscope.

2. Equipment Plan

1) Research and Training Building

a. Administration Section

Conference room
- VTR monitor TV

Preparation room
- 16 mm film projector
- Slide projector
- Microphone set
- Tape recorder
- Shelf

b. Research Section

Virological research room

Experimental room
- Laboratory table
- Storage cabinet
- Instrument cabinet

Preparation room
- Laboratory table
- Storage cabinet

Clean room
- Laboratory table

Dark room
- Laboratory table

Bacteriological research room

Experimental room
- Laboratory table
- Storage cabinet
- Instrument cabinet

Preparation room
- Lamina flow
- Laboratory table
- Storage cabinet

Dark room
- Laboratory table

Parasitological research room

Experimental room
- Laboratory table
- Storage cabinet
- Instrument cabinet

Preparation room
- Lamina flow
- Laboratory table
- Storage cabinet

Dark room
- Laboratory table

Pathological research room

Experimental room
- Laboratory table
- Storage cabinet
- Instrument cabinet

Preparation room
- Photo developer
- Laboratory table
- Storage cabinet

Autopsy room
- Autopsy table
- Autopsy instruments
- Microscope (Biological)
- Cooling centrifuge (Haematocrit)
- Shadowless stand light
- Wide-view magnifying camera
- Disinfection sprayer
- Autoclave
- Blood letting table
- Poultry weighing scale
- Instrument cabinet

Treatment room
- Laboratory table
- Storage cabinet
- Instrument cabinet

Washing and sterilizing room
- Autoclave
- Drying sterilizer
- Distillatory apparatus
- Ultrasonic cleaner
- Lab.-ware drying oven
- Deionizer
- Laundry machine
- Carrier
- Metal wire cage
- Instrument shelf
- Working table

Common equipment & apparatus room
- Laboratory table

Freeze drying room
- Freezing dryer
- Ample sealing burner
- Compressor
- Laboratory Table
- Instrument shelf
- Storage cabinet

Precision instrument room
- Laboratory table
- Storage cabinet
- Instrument cabinet

Electron microscope room
Transmission electron microscope
Scanning Electron microscope

c. Training Sction

Experimental room
- Laboratory table

Preparation room
- Storage cabinet
- Instrument cabinet

2) SPF Poultry Unit

Entrance porch
- Atomizer

Preparation room
- Autoclave
- Pass box
- Washing machine, dryer

Brooder room
- Brooding set

Pullet room
- Cage
- Poultry weighing scale

Breeder room
- Cage
- Artificial insemination equipment

Egg stocker, incubator room
- Incubator
- Egg stocker
- Atomizer
- Egg candler
- Vacuum cleaner
- Top pan balance
- Table

Feed producting room
- Pellet mill
- Grinder
- Mixer
- Dryer

Others
- Steam cleaner
- Boiling sterilizer
- Pass box

3) Experimental Chicken House

Entrance porch
- Atomizer

Preparation room
- Autoclave
- Washing machine, dryer
- Video tape deck

Experiment room
- Pass box
- Video camer

Others
- Pass box

4-3-4 Basic Design Drawings

PLANNED FLOOR AREA TABLE

BASIC DESIGN DRAWINGS

1 MASTER PLAN
2 SITE PLAN

(RESEARCH & TRAINING BUILDING)

3 GROUND FLOOR PLAN & FIRST FLOOR PLAN
4 ELEVATIONS & SECTIONS

(INTERNATIONAL HOSTEL)

5 GROUND FLOOR PLAN & FIRST FLOOR PLAN
6 ELEVATIONS & SECTIONS

(SPF POULTRY UNIT)

7 PLAN, ELEVATIONS & SECTION

(EXPERIMENTAL CHICKEN HOUSE)

8 PLAN, ELEVATIONS & SECTION

PLANNED FLOOR AREA TABLE

RESEARCH AND TRAINING BUILDING	3,524 m²
INTERNATIONAL HOSTEL	1,600
SPF POULTRY UNIT	376
EXPERIMENTAL CHICKEN HOUSE	576
OTHERS	132
TOTAL	6,208 m²

1) RESEARCH AND TRAINING BUILDING (3,524 m^2)

a. Administration Section (492 m^2)

Room	Planned floor area m²
DIRECTOR ROOM	36
EXPERT ROOM (1)	36
EXPERT ROOM (2)	36
ADMINISTRATION OFFICE	90
CONFERENCE ROOM	72
PREPARATION ROOM	18
ENTRANCE HALL	114
PORCH	72
BALCONY	18
TOTAL	492

Research Section (2,040 m²)

Room	Planned Floor area m²
VIROLOGICAL-RESEARCH ROOM	(155)
EXPERIMENTAL ROOM	22
LABORATORY	89
PREPARATION ROOM	8
CLEAN ROOM	6
DARK ROOM	30
BACTERIO-RESEARCH RM	(139)
EXPERIMENTAL ROOM	22
LABORATORY	89
DARK ROOM	6
PREPARATION ROOM	14
INSECT REARING ROOM	8
PATHO-RESEARCH ROOM	(178)
EXPERIMENTAL ROOM	22
LABORATORY	89
DARK ROOM	6
PREPARATION ROOM	17
POSTMORTEM ROOM	22
TREATMENT ROOM	22
COMMON APPARATUS RM	44
FREEZE DRYING ROOM	22
CONSTANT TEMP RM (37°C)	5
CONSTANT TEMP RM (4°C)	11
CONSTANT TEMP RM(-20°C)	9
PRECISION MACHINERY RM	44
WASHING DISINFECTION RM	89

ELECTRON MICROSCOPE RM	67
DATA PROCESSING RM	37
REFERENCE ROOM	44
EQUIPMENT STORAGE ROOM	67
AIR-COND. MACHINE ROOM	80
WC/CORRIDOR ETC.	660
BALCONY	250
TOTAL	2,040

c. Training Section (992 m^2)

Room	Planned floor area m^2
LECTURE ROOM	67
EXHIBITION CORNER	22
PREPARATION ROOM	22
TRAINING ROOM	89
PREPARATION ROOM	22
INSTRUMENT STORAGE	22
OFFICE	27
LECTURE'S ROOM	44
LOUNGE	44
LOCKER ROOM	22
ENTRANCE HALL	27
WC CORRIDOR, ETC	325
BALCONY	133
TERRACE	100
OPEN CORRIDOR	26
TOTAL	992

2) INTERNATIONAL HOSTEL (1,600 m^2)

Room	Planned floor area m^2
LECTURER'S ROOM	44 m^2 x 4 = 176
TRAINEE'S ROOM	16 m^2 x 25 = 400
DINING	64
KITCHEN	28
OFFICE	17
STORAGE	6
MULTIPURPOSE ROOM (TV LOUNGE)	94
LAUNDRY	11
STORAGE	11
LINEN ROOM	5
CARETAKER ROOM	16
ENTRANCE HALL	72
PORCH	87
WC CORRIDOR/ STAIRCASE ETC	522
BALCONY	191
TOTAL	1,600

3) SPF POULTRY UNIT (376 m²)

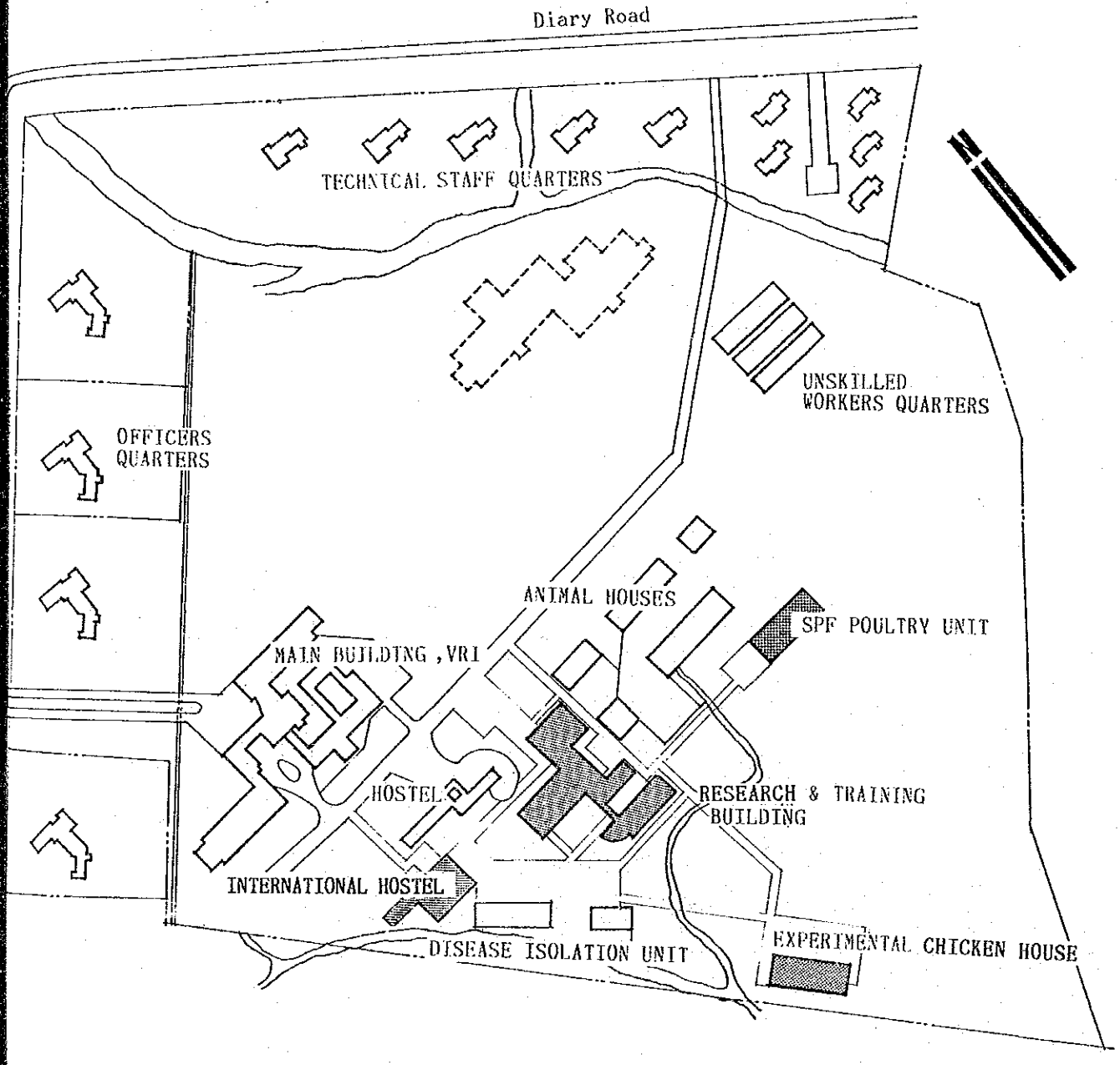
Room	Planned floor area m²
PREPARATION ROOM (1)	20
PREPARATION ROOM (2)	29
STORE	4
FEED STORAGE	4
FEED BAG STERILIZING RM	5
CLEAN CORRIDOR	33
AIR LOCK ROOM (1)	4
WORK ROOM (1)	4
EGG STOCKER INCUBATOR RM	16
BROODER ROOM	23
YOUNG PULLET ROOM	23
PULLET ROOM	23
WORK ROOM (2)	12
BREEDER ROOM	16x2= 32
DIRTY CORRIDOR	34
AIR LOCK ROOM (2)	3
DIRT ROOM	7
AIR-CONDITIONING ROOM	58
FEED PRODUCTION ROOM	14
WC SHOWER ROOM ETC	28
TOTAL	376

4) EXPERIMENTAL CHICKEN HOUSE (576 m²)

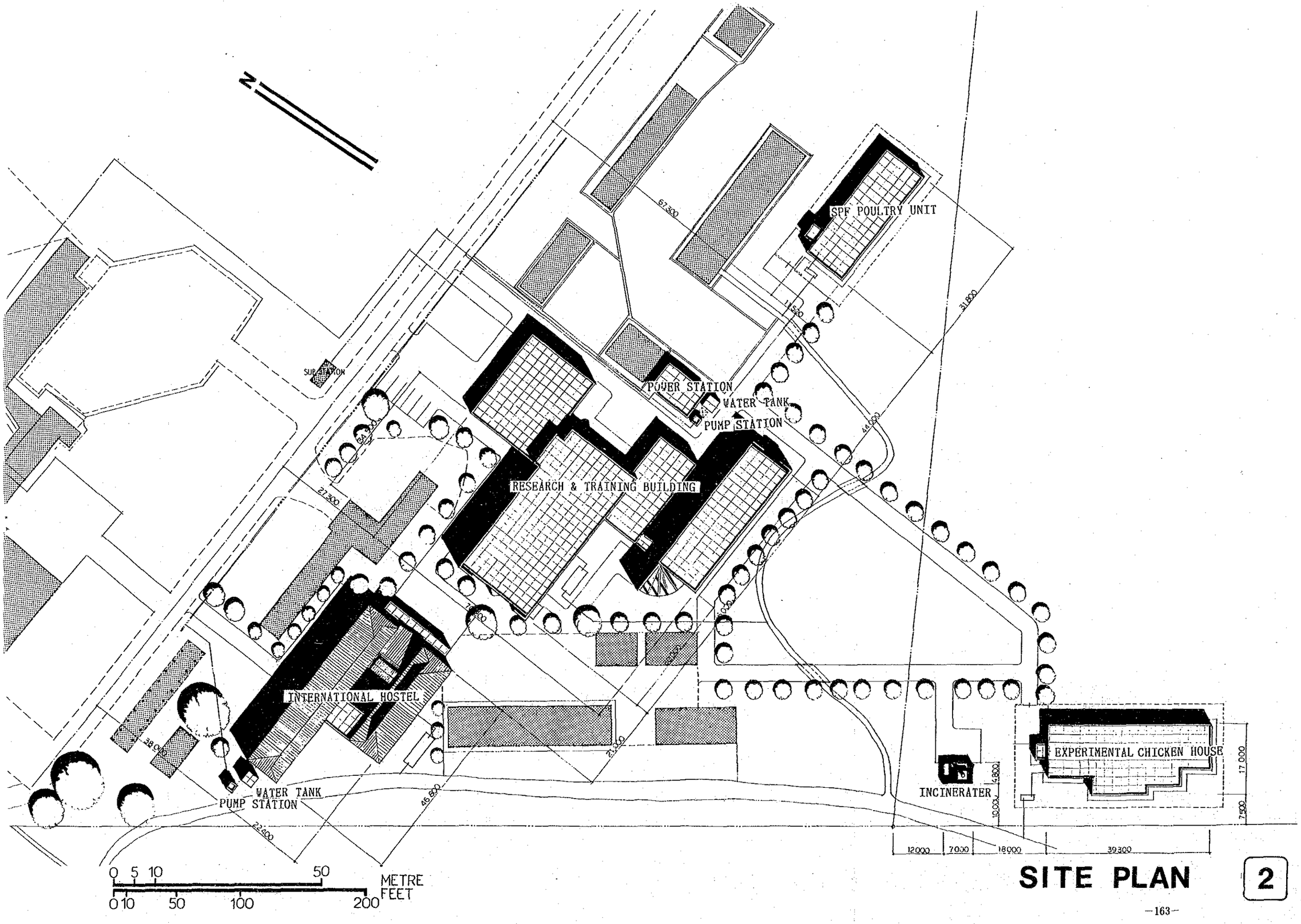
Room	Planned floor area m²
PREPARATION ROOM (1)	30
PREPARATION ROOM (2)	23
STORE	4
FEED STORAGE	7
FEED BAG STERILIZING ROOM	4
CLEAN CORRIDOR	54
AIR LOCK ROOM (1)	4
WORK ROOM (1)	5x10 = 50
EXPERIMENT ROOM 1 - 7	10x8 = 80
EXPERIMENT ROOM 8 - 10	13x3 = 39
FILTER ROOM	3x 7 = 21
DIRTY CORRIDOR	65
AIR LOCK ROOM (2)	5
TRAINEE ROOM	9
WORK ROOM (2)	6
AUTOPSY ROOM	17
STORE	6
DIRT ROOM	9
AIR-CONDITIONING ROOM	81
VENTI-CONDITIONING ROOM	33
WC SHOWER ROOM ETC.	29
TOTAL	576

5) OTHERS (132 m²)

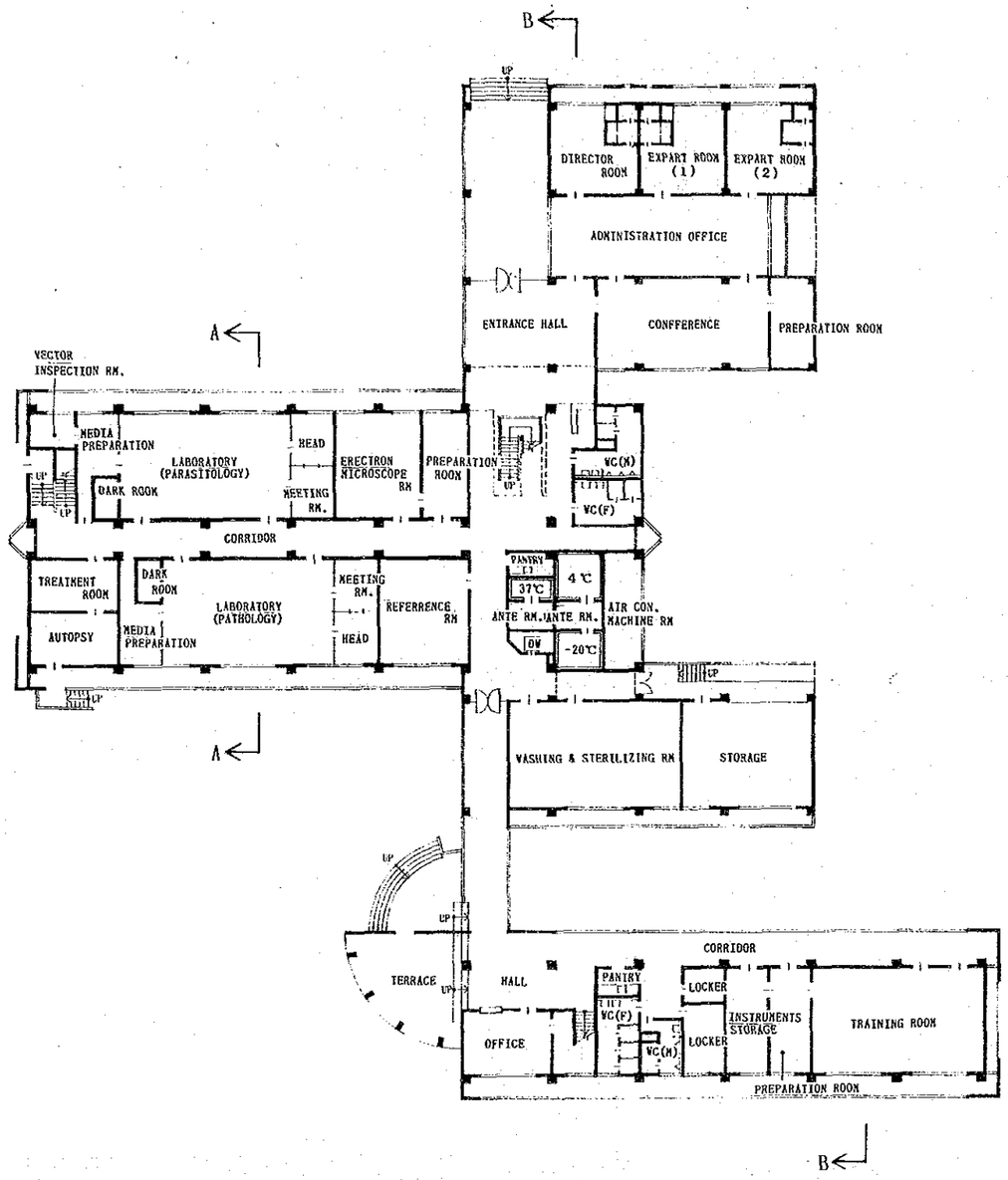
Rooms	Planned floor area m²
INCINERATOR • PUMP STATION	36
POWER STATION	48
GENERATOR ROOM	48
TOTAL	132



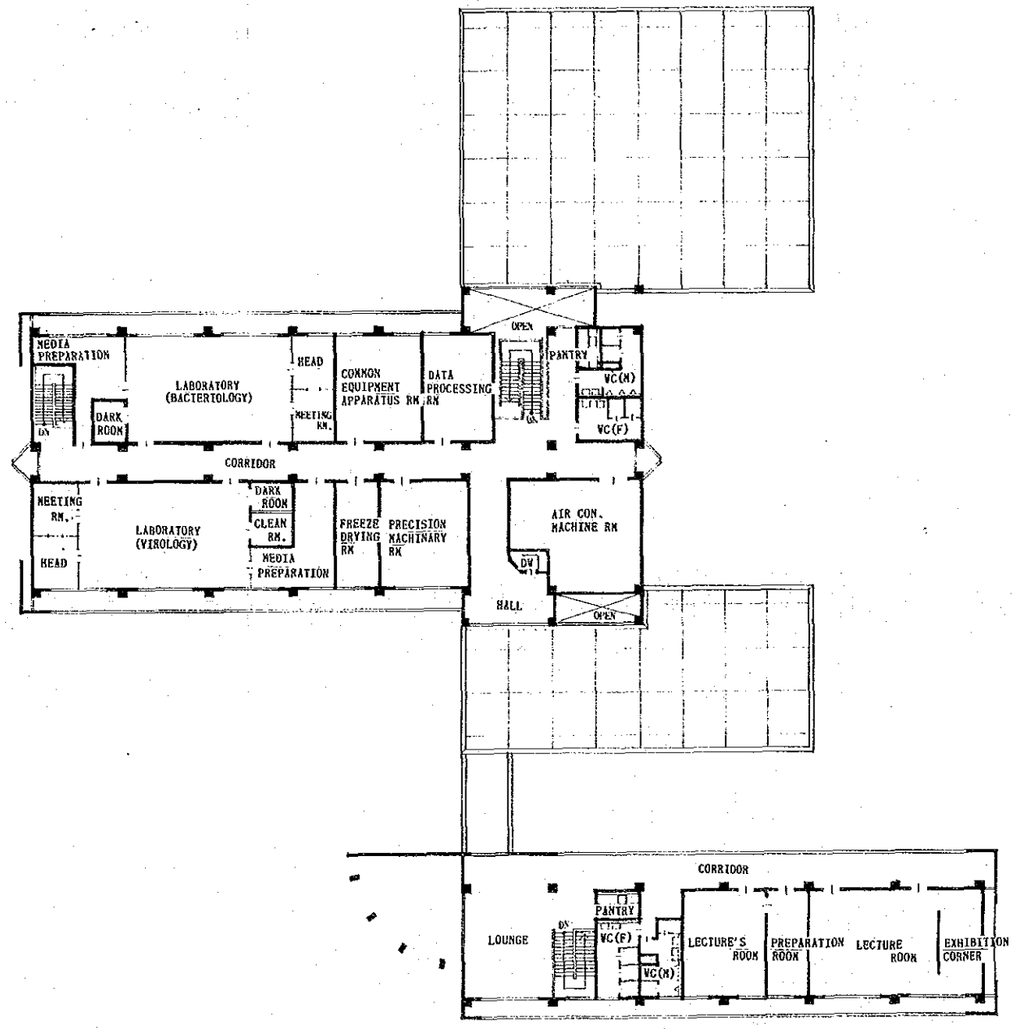
MASTER PLAN 1


N
SUB-STATION
POWER STATION
WATER TANK
PUMP STATION
RESEARCH & TRAINING BUILDING
SPF POULTRY UNIT
INTERNATIONAL HOSTEL
WATER TANK
PUMP STATION
INCINERATER
EXPERIMENTAL CHICKEN HOUSE
67300
31800
44000
21300
46800
22400
21300
12000
7000
18000
39300
17000
7500
4800
10000
0 5 10 50 METRE
0 10 50 100 200 FEET

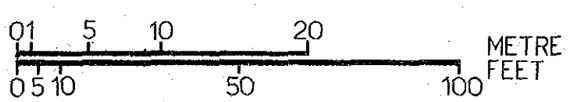
SITE PLAN 2



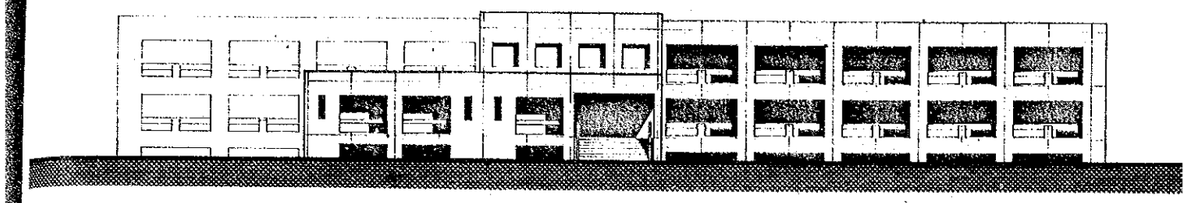
GROUND FLOOR PLAN



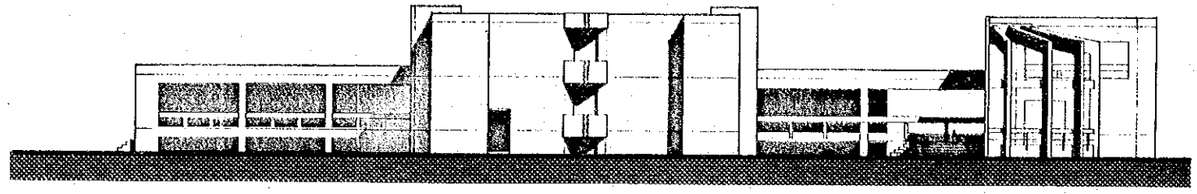
FIRST FLOOR PLAN



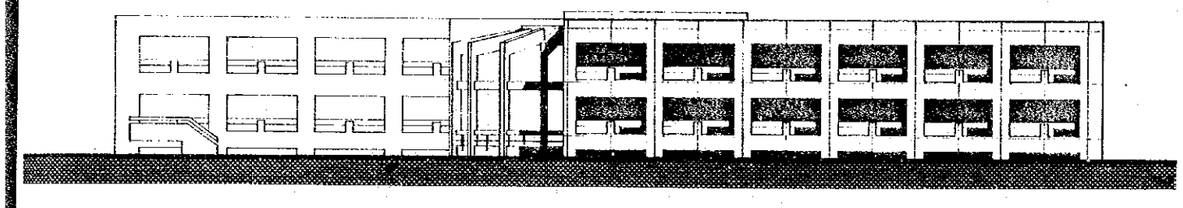
RESEARCH & TRAINING BUILDING 3



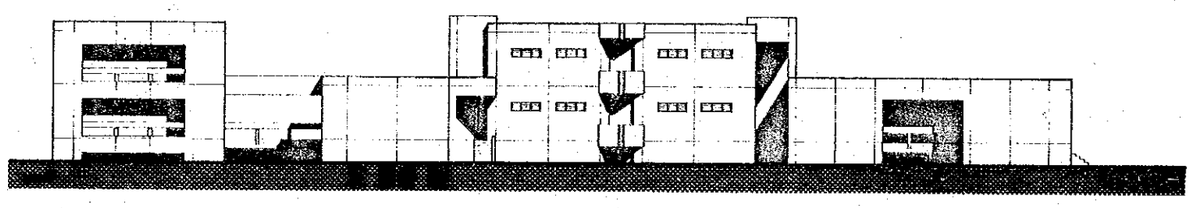
NORTH ELEVATION



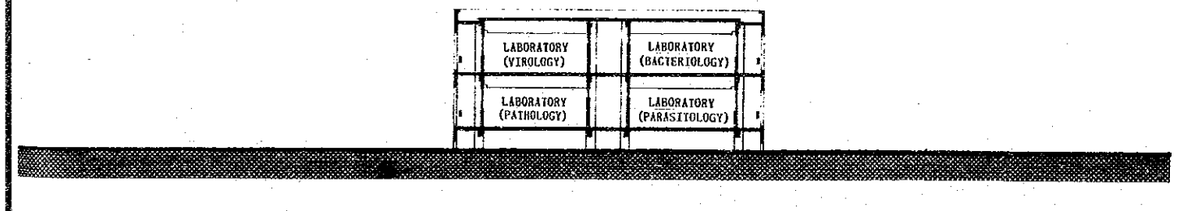
WEST ELEVATION



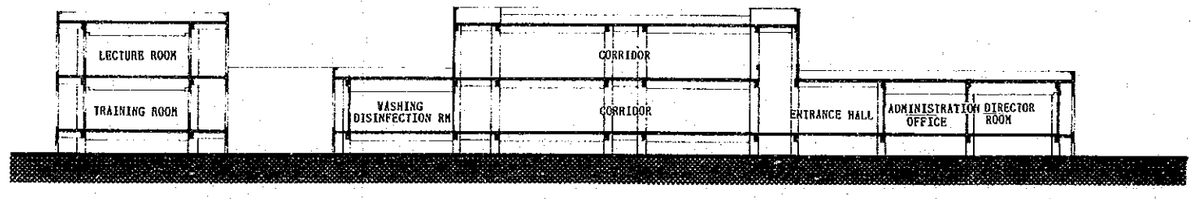
SOUTH ELEVATION



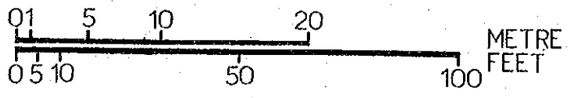
EAST ELEVATION



A-A SECTION

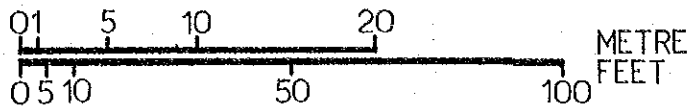


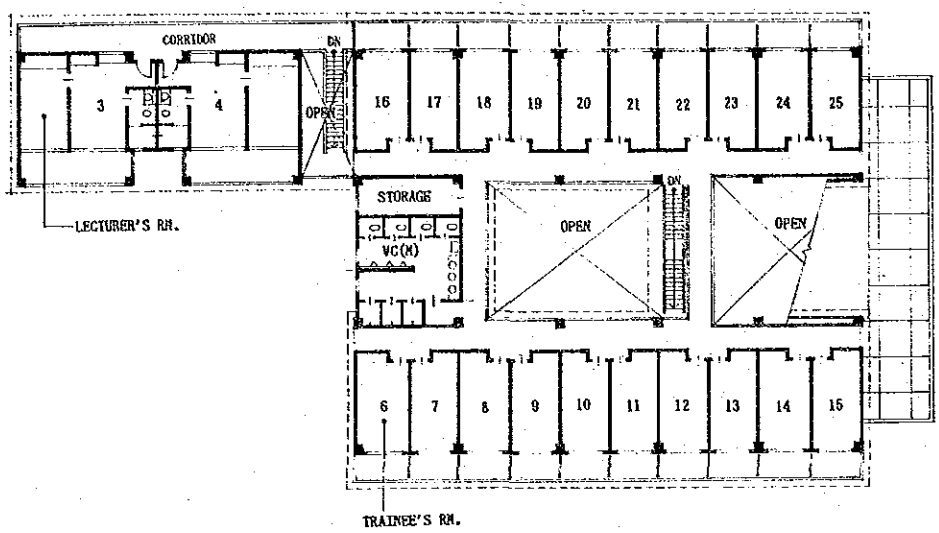
B-B SECTION



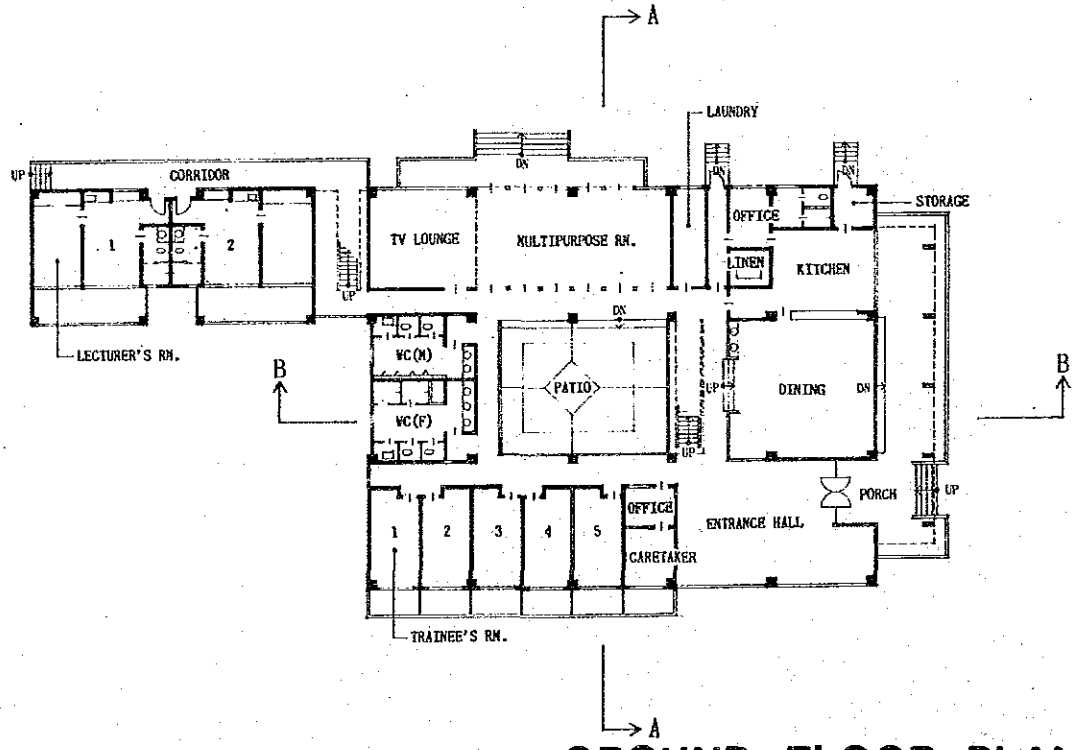
RESEARCH & TRAINING BUILDING

4





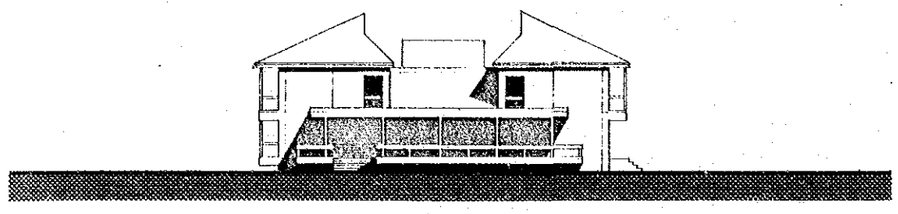
FIRST FLOOR PLAN



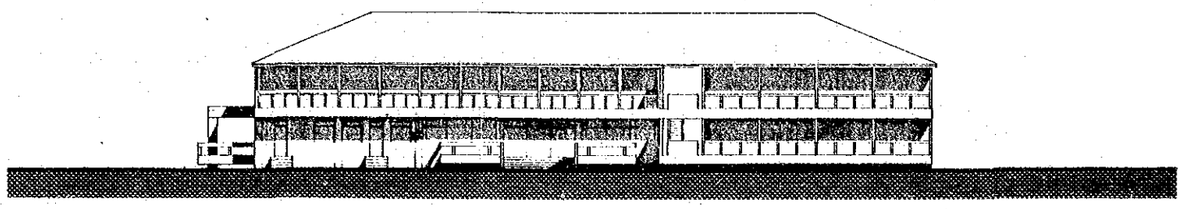
GROUND FLOOR PLAN

INTERNATIONAL HOSTEL

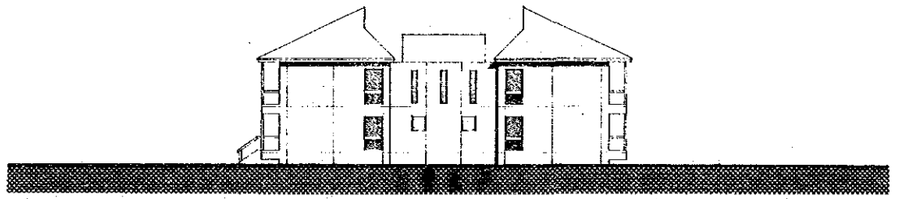
5



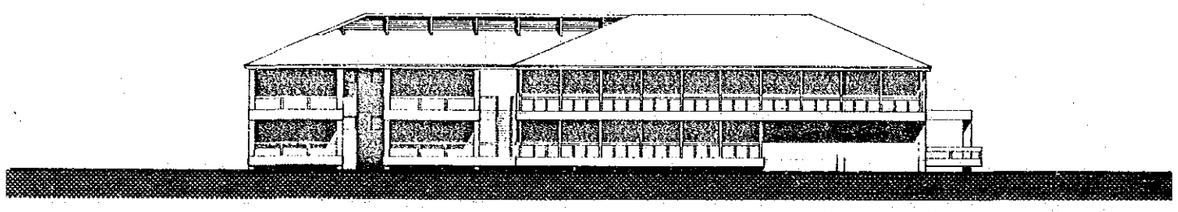
EAST ELEVATION



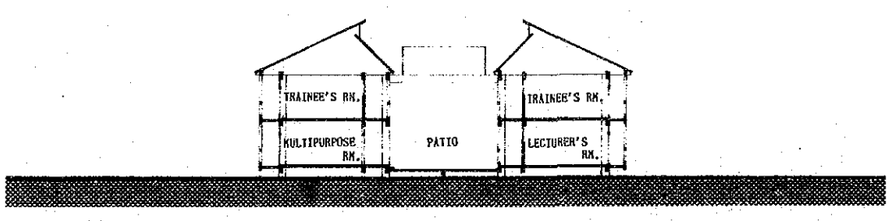
NORTH ELEVATION



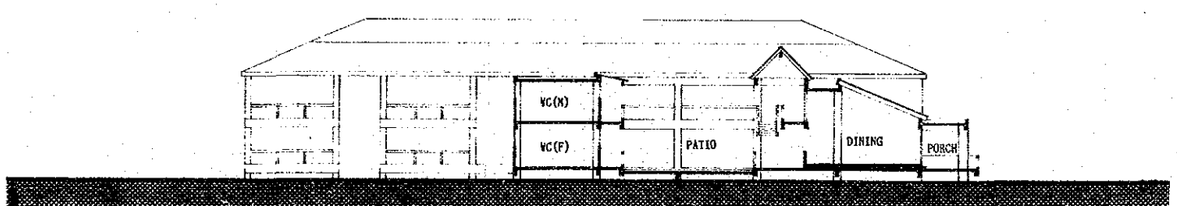
WEST ELEVATION



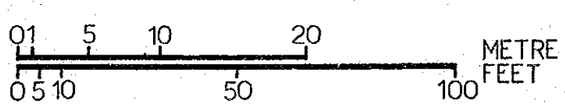
SOUTH ELEVATION



A – A SECTION

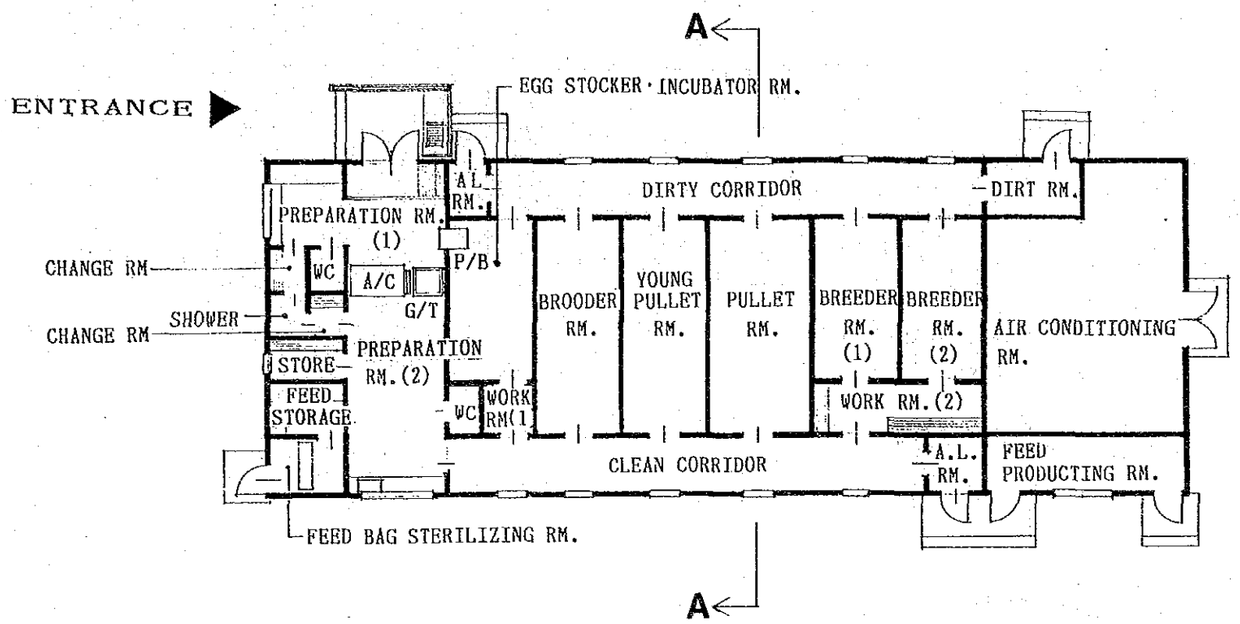


B – B SECTION

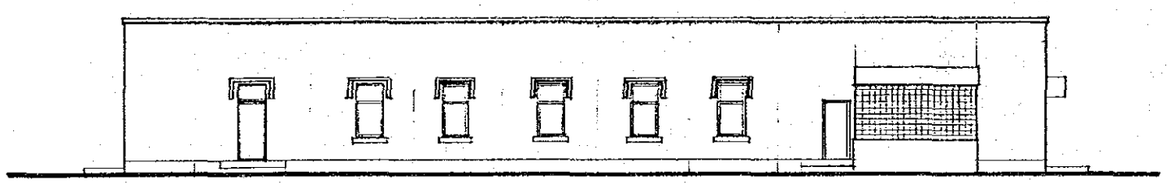


INTERNATIONAL HOSTEL

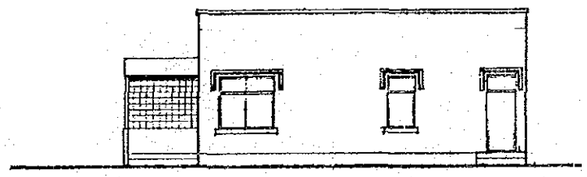
6



GROUND FLOOR PLAN



NORTH ELEVATION



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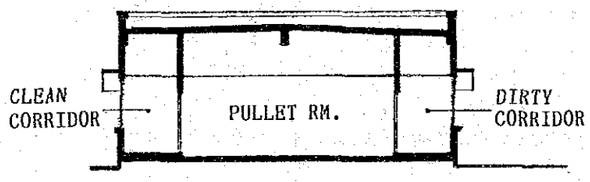
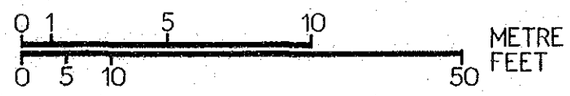
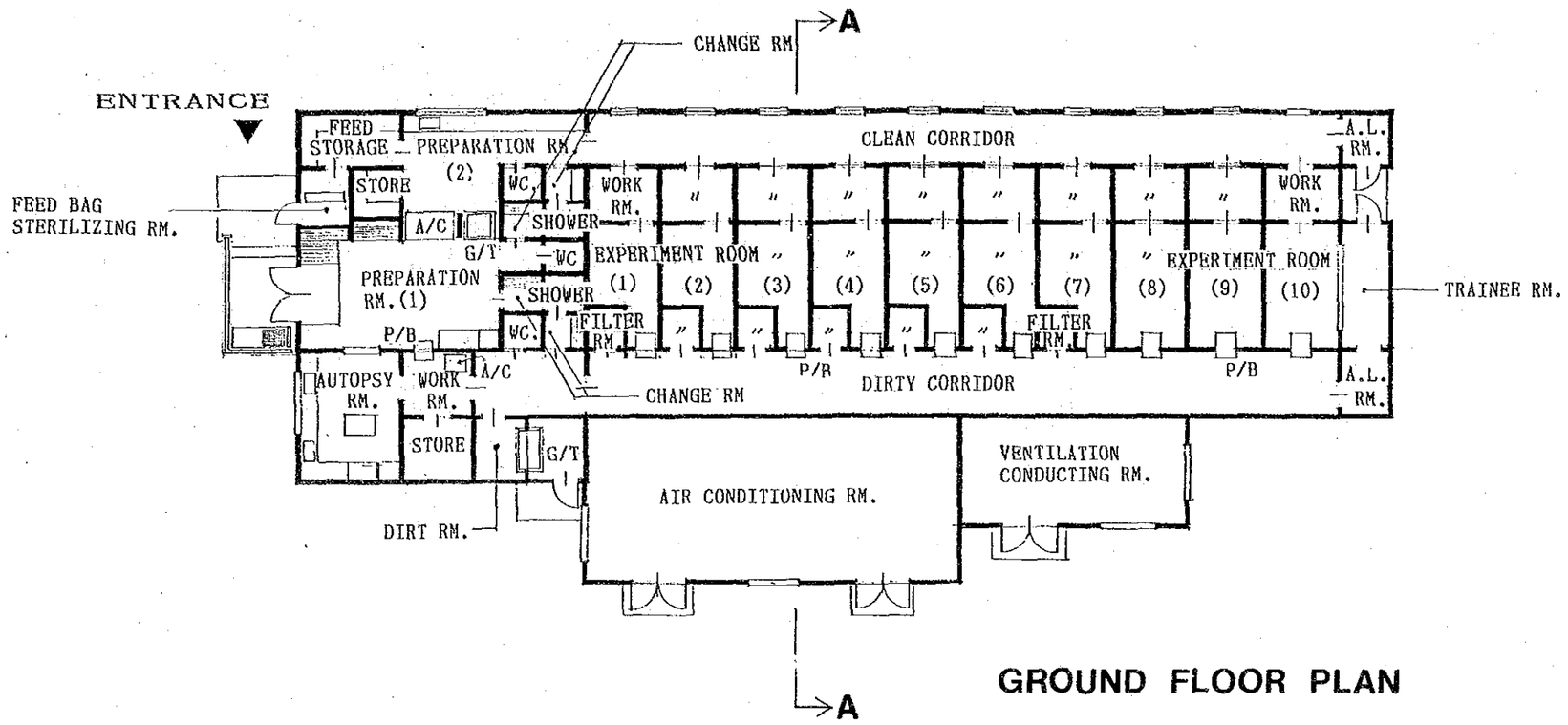


A-A SECTION

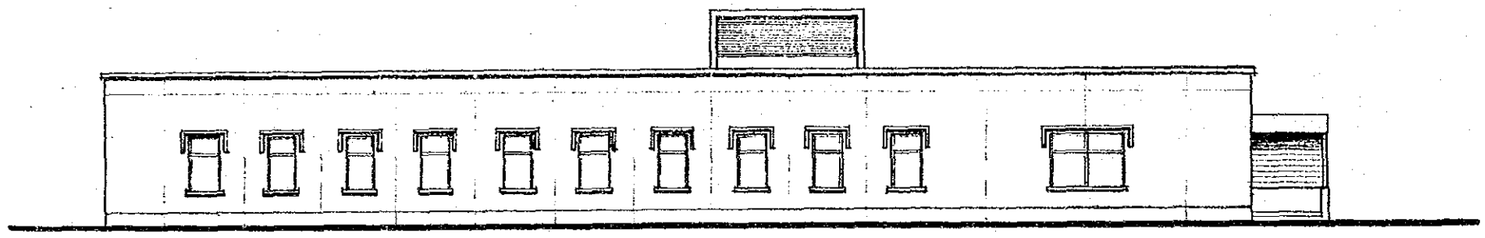


SPF POULTRY UNIT

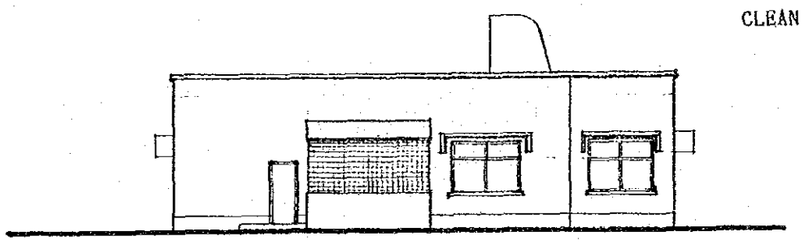
7



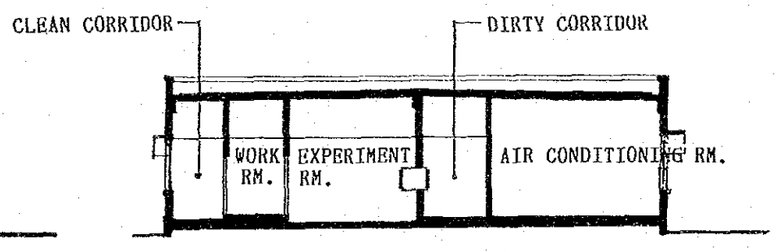
GROUND FLOOR PLAN



NORTH ELEVATION



WEST ELEVATION



A–A SECTION

0 1 5 10 METRE
0 5 10 50 FEET

EXPERIMENTAL CHICKEN HOUSE

8

4-4 Implementation Plan

4-4-1 Implementation Organization

1) Work Execution

The work of this project is executed by the DVS of the Ministry of Agriculture of Malaysia in collaboration with the Coordinating Group on Livestock of the ASEAN-COFAF. In constructing the Centre, meanwhile, it is considered necessary to get an organ called the Construction Committee instituted in Malaysia and have someone with deciding power regarding this matter appointed as its leader so as to facilitate the decision concerning the construction. Also to facilitate construction work, it is desirable to station a permanent staff in charge of liaison at the construction site.

2) Consultant

Under the Japanese grant aid system, the Japanese consultant will perform the task. The scope of the consulting activities will at least include the following contents :

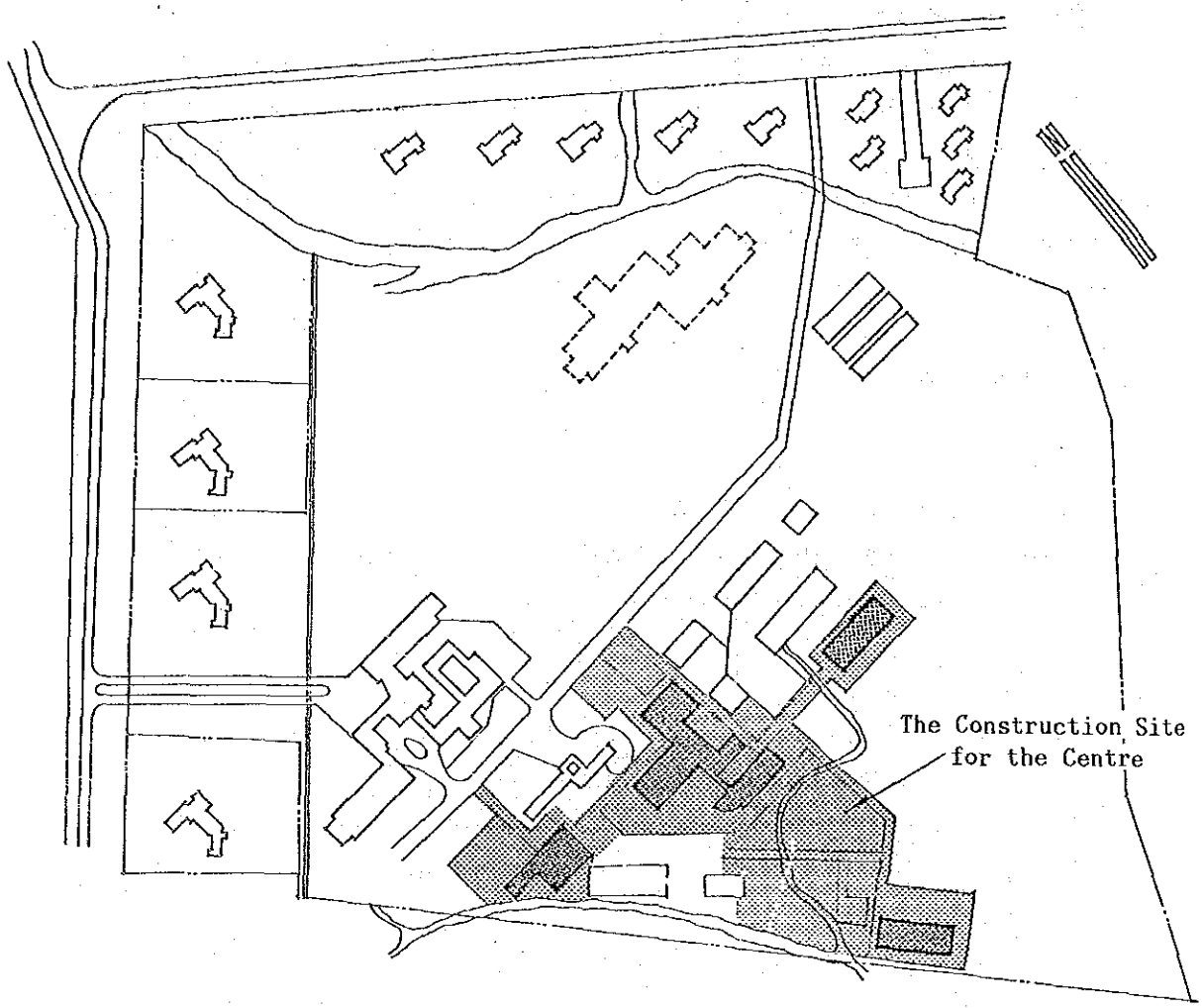
a. Detail Design
   (1) Formulation of design drawings, table of specifications and other tender documents.
b. Substitute of tendering and contracting activities
   (1) Prior screening of tender participants
   (2) Tendering
   (3) Attendance at the place of contract signing
c. Construction supervision

3) Contractors

Under the Japanese grant aid system, Japanese contractors will perform the task. Accordingly, the first condition shall be to meet this system, and particular attention should be given to observing the construction schedule.

4-4-2 *Scope of Works*

In order to clarify the work division, the centre site shall be the area indicated below :



1. Items borne by the Government of Japan (Grant Aid)

1) Main Work

a. Research and Training Building, International Hostel, SPF Poultry Unit, Experimental Chicken House, all building work, electrical work, hygienic water supply and drainage works, air-conditioning and ventilating equipment installation work, etc.

2) Infrastructure work

a. Drainage work within the site

b. Electrical work between the buildings and connection to a transformer in a substation to be constructed

c. Telephone line work between the buildings and piping up to an existing MDF

3) Equipment furnished

a. Equipment listed 2. equipment plan, 4-3-3 Equipment Plan

4) Others

a. Transportation cost for imported equipment relating to the project from the port to the construction site

b. Detail Design, Acting Tendering, Construction Supervision

2. Items borne by the Government of Malaysia

1) Fundamental work

a. To reclaim the site before beginning construction work (including the transfer of the existing goat shed)

b. To secure the site for a temporary office, workshop, material yard, etc. for the construction work

c. To facilitate water, power, telephone, etc. during the construction work period, which covers the preparation of the work and arrangement after the work.

2) Infrastructure work

a. Water supply work up to the Pump Station

b. Drainage work outside the site

c. Installation of a transformer in the new substation and drawing work for the special high-tension circuit

d. Installation of more telephone distribution panel, telephones, and drawing work from an existing MDF to the main terminal boards in the new buildings.

3) Outside work

a. Planting and landscaping

b. Necessary road in the site

4) Furniture and equipment

a. General furniture, office furniture and fixturers, equipment for research and training which can not be supplied by the grant aid, consumption goods, etc

5) Others

a. Advising commission of Authorization to Pay

b. Payment commission

c. To ensure unloading, customs clearance and tax exemption of materials and equipment related to the Project at the port of disembarkation in Malaysia.

d. To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into Malaysia and stay therein for the performance of their work.

e. To maintain and use properly and effectively that facilities constructed and equipment purchased under the grant aid.

f. To bear all the expenses other than those to be borne by the grant aid, necessary for construction of the facilities as well as for the transportation and the installation of the equipment.

4-4-3 Construction and Supervisory Plan

1) Construction Principle

Malaysian construction workers can be classified into three kinds, namely, "Kepala", skilled worker and unskilled worker (Labourer). Kepala is equivalent to the master in Japan, and coordinates workmen activities and controls them. The skilled worker is the person engaged in his job for more than 5 years. In Ipoh, there are excessive workers because of an economic slump due to sluggish tin production, and for this reason, there appears to be no problems in securing workmen. Ramadan comes in June-July, and the New Year holidays for the people of Chinese decent are celebrated in February, however, and manpower may become short during these periods. Especially since the construction will be enforced on the basis of Japan's grant aid, the rule of completing the work within a single fiscal year has to be observed in principle. In formulating the construction timetable, sufficient consideration should be given to this point.

2) Construction Plan

As regards the form of the working group at the construction work sites, it is desirable to establish a set-up comprising the master, and under him, at least chief worker, clerk(s) and engineer(s) in charge of building facility as permanent personnel and engineer(s) in charge of research and training equipment installation as short-term.

In the construction work, attention should be paid to the following points :

a. Especially in connection with the execution of the construction items to be shouldered by the Government of Malaysia, sufficient coordination with the construction programme of the main construction work will be necessary.

b. The local capability of soil-related work is at a fairly high level partly because of the long history of tin mining. Since contamination of public highways due to soil transportation is rigorously controlled, it is absolutely necessary to install tire washing equipment.

c. At the envisaged construction site of the Centre, the construction of the Biologics Unit is being planned by the Government of Malaysia, with the srart of construction work scheduled for some time within this year. Accordingly, attention should be paid to the following points :

(1) Thorough control of construction materials
(2) Utilization plan of the joint transportation routes for construction materials and heavy equipment.

3) Supervisory plan

As for the construction work survision, it is planned to post a permanent staff member (person who has the qualification of construction engineer in Japan) there in consideration of the scale and contents of the planned facilities and have him coordinate opinions between those concerned with the project in Japan and Malaysia and solve technical problems. For study, confirmation, decision, etc. concerning important matters accompanying the construction work timetable, it is required to despatch experts from Japan, when necessary, so as to complete the main construction work within the time frame fixed under Japan's grant aid.

Although the construction techniques in Malaysia can be evaluated positively to a certain extent, poor quality can be observed in some cases regarding degree of precision and finishing. This should be given sufficient consideration in conducting supervision.

Regarding construction designing, it is that there is no problem if it meets the latest edition of the uniform Building By-laws. As the procedure, it is necessary to undergo examination and guidance in accordance with the Government Building Standard by the Technical Services Division of EPU in Kuala Lumpur. Furthermore, Ipoh City, must be notified of the execution of the project.

4-4-4 Procurement Plan

1. Construction Materials

Most of the construction materials are available in Malaysia. Procurement conditions for main cosntruction materials around the construction site are as follows :

1) Iron reinforcing bars
In conformity with the British Standards, round reinforcing bars Ø6 - Ø32 and deformed reinforcing bars D9 - D40 are produced as unprocessed bars in the country and their length can be freely specified. In principle, import is prohibited.

2) Concrete
There are three main cement makers and their quality is good. There are two ready-mixed concrete makers in Ipoh City. Formwork is, for the most part, plywood with wood used for support.

3) Shape steel for structure
Shape steel is mainly imported but, regarding import duties, processed material has a considerably higher rate than unprocessed material. Although gratuitous projects are exempted from duty payments, three months will have to be allowed to receive any structural materials ordered.

4) Laying materials
As bricklaying constitutes the main stream of construction methods in the country, there is no problem in the supply amount.

2. Building Equipment

In principle, building equipment will be procured from within the country, but products which are not reliable or which are not produced in the country will be supplied from Japan.

Hygienic Equipment	Procured in Malaysia
Air-conditioning equipment	Procured in Japan except for piping material
Electrical Equipment	
Wires, Cables	Procured in Malaysia
Wiring implements	Procured in Malaysia
Light electrical appliances	Procured in Malaysia
Boards	Procured in Japan
Conduit tubes	Procured in Japan
Generators	Procured in Japan

3. Research and Training Equipment

Since most of the research and training equipment to be installed in this centre under the grant aid are not produced in Malaysia, they will be imported from Japan.

4-4-5 Execution Schedule

A consultant contract concerning this project will be concluded and detail design will be started promptly after the Exchange of Notes (E/N) regarding this grant aid is conducted between the Governments of Japan and Malaysia. Work after the Exchange of Notes can be roughly divided into the following three stages, but the overall schedule is as shown on the next page.

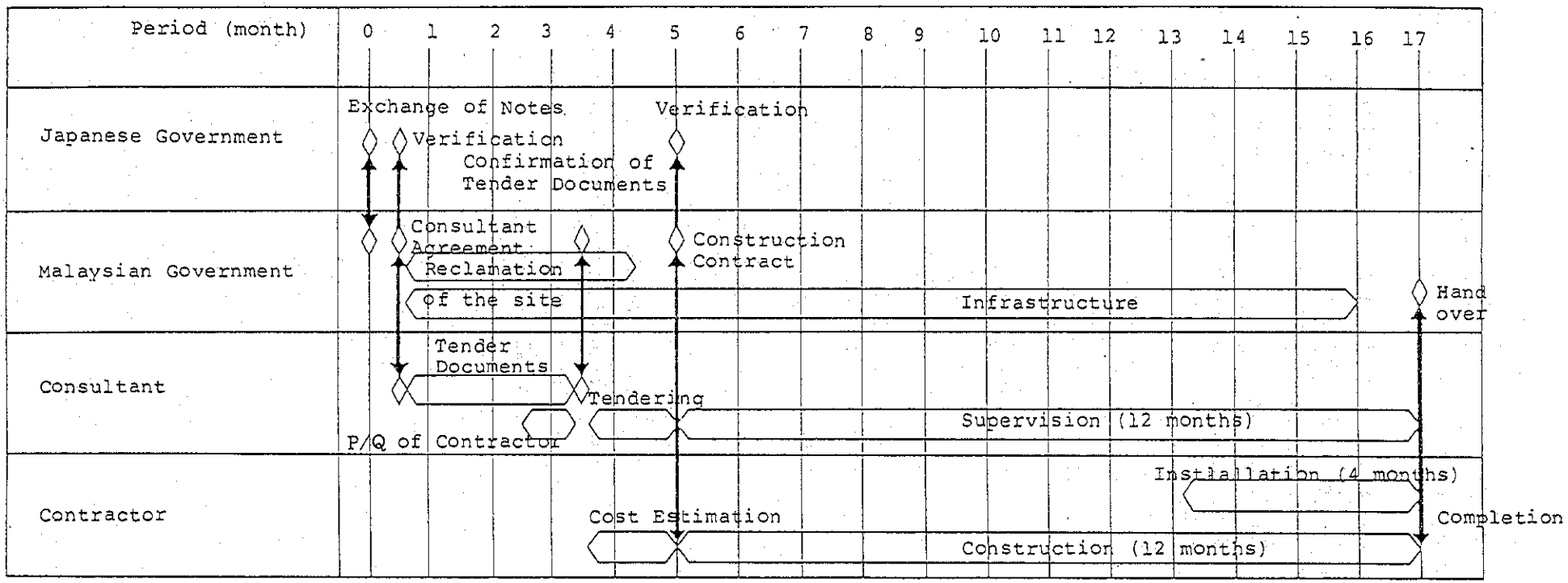
First stage : Detail Design
Tender documents will be formulated on the basis of this report. About 3 months are slated for this stage

Second stage : Pre-Qualification, Tender
A series of work from tender announcement, qualification screening of tender participants, inspection of cost estimates and attendance at the place of contract conclusion are made. Approximately 2 months are scheduled.

Third Stage : Construction
The period of construction, including that of installation of research and training equipment and their test operation, is scheduled to last approximately 12 months.

Schedule

(Grant Aid)



4.5 Maintenance and Operation Cost

The estimated expenses for building services, maintenance, repair and personnel required after completion of the centre, are shown as follows :

Item	Expenses	Amount (M$/year)
1) Building services	a. Electric	239,667
	b. Water	6,356
	c. LPG gas	9,187
Sub-Total		255,210
2) Maintenance Expenses	a. Facilities	54,000
	b. Equipment	138,000
Sub-Total		184,000
3) Personnel Expenses		648,000
Grand Total		1,095,210

The details are as follows :

1) Building service expenses

a. Electric

(1) Research and Training Building
(Estimated Amount used 322 KVA)

	KVA	M$	months					
Basic charge	190 x	12 x	12					= 27,360
	KVA	M$	hr	days	months	M$		
Use charge	322 x	0.6 x	8 x	20 x	12	x 0.19		= 70,479
	Rate of usage		0.6					
								97,839

(2) International Hostel (Estimated Amount used 19 KVA)

	KVA	M$	months					
Basic charge	11 x	12 x	12					= 1,584
	KVA	M$	hr	days	months	M$		
Use charge	19 x	0.4 x	10 x	30 x	12x0.5	x 0.19		= 2,599
	Rate of usage		0.4					
	Rate of operation		0.5					
								4,183

(3) SPF Poultry Unit (Estimated Amount used 61 KVA)

	KVA	M$	months					
Basic charge	36 x	12 x	12					= 5,184
	KVA	M$	hr	days	M$			
Use charge	61 x	0.5 x	24 x	365 x	0.19			= 50,764
	Rate of usage		0.5					
								55,948

(4) Experimental Chicken House (Estimated Amount used 89KVA)

	KVA	M$	Month		
Basic charge	53 x	12 x	12	=	7,632
	KVA	Hr	day	M$	
Use charge	89 x 0.5x	24 x	365 x	0.19 =	74,065

Rate of operation 0.5

81,697

(1) + (2) + (3) + (4) = M$239,667

b. Water Basic charge M$0.9/$m^3$ (except hostel)

(1) Research and Training Building
(Estimated amount used 17 m^3/day)

	m^3	days	months	M$	
Use charge	17 x	20 x	12 x	0.9	= 3,672

(2) International Hostel
(Estimated amount used 270 m^3/month)

Basic charge
-10m^3 M$3
10-20m^3 M$0.45/$m^3$
20- m^3 M$0.55/$m^3$

	m^3	M$	m^3	M$	
Use charge	M$3+10x0.45 +	(270-20)x0.55			= 145
	145 x	12 months x	0.5		= 870

Rate of operation 0.5

(3) SPF Poultry Unit (Estimated amount used 4.2 m^3/day)

	m^3	days	months	M$	
Use charge	4.2 x	20 x	12 x	0.9	= 907

(4) Experimental Chicken House (Estimated amount used 4.2 m^3/day)

	m^3	days	months	M$	
Use charge	4.2 x	20 x	12 x	0.9	= 907

(1) + (2) + (3) + (4) = M$ 6,356

c. Liquid Propane Gas (Basic charge 1.13 M$/kg)

(1) Research and Training Building 15 kg/day

	days	months		
Use charge	15 x	20 x	12 x 1.13	= 4,068

(2) International Hostel (Estimated amount used 14.5 kg/day)

	days	months		
Use charge	14.5 x	30 x	12 x 1.13 x 0.5	= 2,949

Rate of operation 0.5

(3) SPF Poultry Unit (Estimated amount used 4 kg/day)

	days	months		
Use charge	4 x	20 x	12 x 1.13	= 1,085

(4) Experimental Chicken House (Estimated amount used 4 kg/day)

	days		months		
Use charge	4	x	20 x 12	x 1.13	= 1,085

(1) + (2) + (3) + (4) = M$ 9,187

2) Maintenance expenses

a. Facilities

As VRI applies about 5% of its gross expenses to maintenance expenses, the centre will follow VRI as shown below :

1,080,000* x 5% = M$ 54,000

* see Foot-note below.

b. Equipment

About 10% of total cost of the equipment will be necessary for annual maintenance fee.

3) Personnel expenses

VRI's annual expenses (1985) divided by the total number of staff gives the following :

M$2,219,612 ÷ 137 = 16,200 M$/person

As the estimated total number of staff is forty, the personnel expenses are calculated as follows :

16,200 x 40 = M$648,000

Foot-note : as the rate of personnel expenses is about 60% of the annual expenses of VRI, a rough estimate of the centre will be calculated. 648,000 ÷ 60% = M$1,080,000*

4-6 Estimated Overall Project Cost

Breakdown of development cost (borne by the Government of Malaysia)

M$ 600,000

(M$)

Grading before commencement of work	10,000
Water supply	20,000
Installation of transformer to new electric house and plumbing of special high voltage circuit	61,200
Increases in telephones and plumbing from existing MDF rooms to the centre main terminal board	1,500
Outside structure (Planting, road, etc)	382,000
Fixtures (general furniture, etc.)	93,300
Overhead (5%)	32,000
Total	M$600,000

CHAPTER 5 PROJECT EVALUATION

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In the ASEAN countries, about 10 percent of the annual poultry production are lost to disease every year. In an effort to curb this high loss, the Government of Malaysia, as a member of the ASEAN countries, intends to realize a project for a poultry disease research and training centre. The construction of the necessary facilities and the installation of the necessary equipment will be highly expected to the project which is expected to have great affects regarding the following points and largely contribute to the sound development of the poultry industry in ASEAN countries.

1) Concrete solutions will be worked out for the poultry disease problem which confronts the ASEAN countries.

   a. Since the poultry industry in ASEAN countries has been developing into the form of collective chicken raising, the out-break and spread of epidemics have been faster and more extensive than in other livestock. Many effects can be expected in this regard, therefore, from the planned formulation of measures to counter common poultry diseases in ASEAN countries through utilization of the Centre.
   b. At present, the distribution of seed fowls and commercialized fowls is conducted on a worldwide scale. Since providing a place for concerted ASEAN efforts for the solution of this problem will help grasp the present state of world poultry diseases, the role of the Centre can be termed as quite important.

2) The research level will be raised by the introduction of advanced laboratory equipment.
   a. It will become possible to take speedy steps for examinable materials.
   b. It will become possible to deal with highly advanced research techniques.

3) Through research and training of poultry disease researchers in ASEAN countries, the talents of these people will be effectively cultivated and their research results and techniques will spread

throughout ASEAN countries.

a. It will become possible to attain concentrated human development regarding research on poultry diseases in ASEAN countries through the utilization of the Centre.

b. It will become possible to provide a place for the exchange of information concerning the prevention of poultry diseases in ASEAN countries and the expectation of disease outbreak.

4) Propagation of research results and developed techniques to all ASEAN countries.

a. Smooth propagation of the techniques to every part of the ASEAN countries can be expected through activities of the experts of ASEAN countries to be trained at the Centre.

5) Development of the poultry industry

a. It will become possible to provide safe, inexpensive, quality protein to the ASEAN nations.

This project, moreover, will be carried out at VRI, Malaysia, one of the most advanced institutions in the ASEAN countries concerned with the study of poultry disease indeed the most suitable place for the project.

On the Malaysian side, the head of this Centre has been appointed (January 1986) and development expenses have been included in the budget. In view of the current preparations, no problems relating to the Centre are foreseen.

That the facilities will become a base for Japanese technical cooperation and execution of the third country training programme, smooth execution of this project will be significant in making the relationship between Japan and ASEAN countries more intimate.

CHAPTER 6 CONCLUSION AND RECOMMENDATION

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The establishment of this project for the ASEAN Poultry Disease Research and Training Centre is expected to contribute to the development of the poultry industry and consequently provide safe, inexpensive, quality protein to the ASEAN nations as stated before. It is therefore valid that this project be executed by grant aid. In order to propel the project more smoothly, we suggest the following, which we think are desirable for appropriate execution.

1) The establishment of a joint committee to work out annual activities planned for this project and to assess the activities. It is desirable that a system be established in which the intentions of the ASEAN countries be smoothly conveyed to the Centre.

2) Preparation of a Budget for operation and development costs borne by the Government of Malaysia.

3) Responsible individuals should be chosen for maintenance, inspection, and control of research and training equipment and assurance that the equipment be used appropriately.

4) Japanese technical cooperation is necessary and desirable for smooth research activities and maximum results in the Centre. Regarding the SPF, as soon as the facilities are completed, operation and management techniques of the chicken unit have to be smoothly transferred. Japanese professionals concerned with this matter should be dispatched in advance.

5) Training activities at this Centre will be indispensable for technical improvement of ASEAN poultry disease researchers. It is desirable that the Japanese system for the third country training programme be adapted to this project.

6) The equipment designated to be supplied by grant aid is basically essential and fundamental equipment. It is desirable that other necessary equipment be supplied within the scope of the Project-

type Technical Cooperation and auxilliary equipment and expendable be supplied by Malaysia.

7) It is said that the prevention of poultry disease should be carried out from a worldwide standpoint. With this in mind, it is preferable that research on the prevention of poultry disease be carried out in ASEAN countries in order to continually strive for higher positions and roles of ASEAN countries in the world arena.