

GOVERNMENT OF MALAYSIA  
THE FEASIBILITY STUDY ON THE PILOT PROJECT FOR IMPROVEMENT OF  
FISH MARKETING AND DISTRIBUTION SYSTEM IN MALAYSIA  
JAPAN INTERNATIONAL COOPERATION AGENCY

Endau Fishing  
Port Complex

Fig.III.2.5.4 Bird's-Eye View of Endau Fishing Port Complex

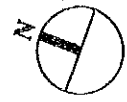
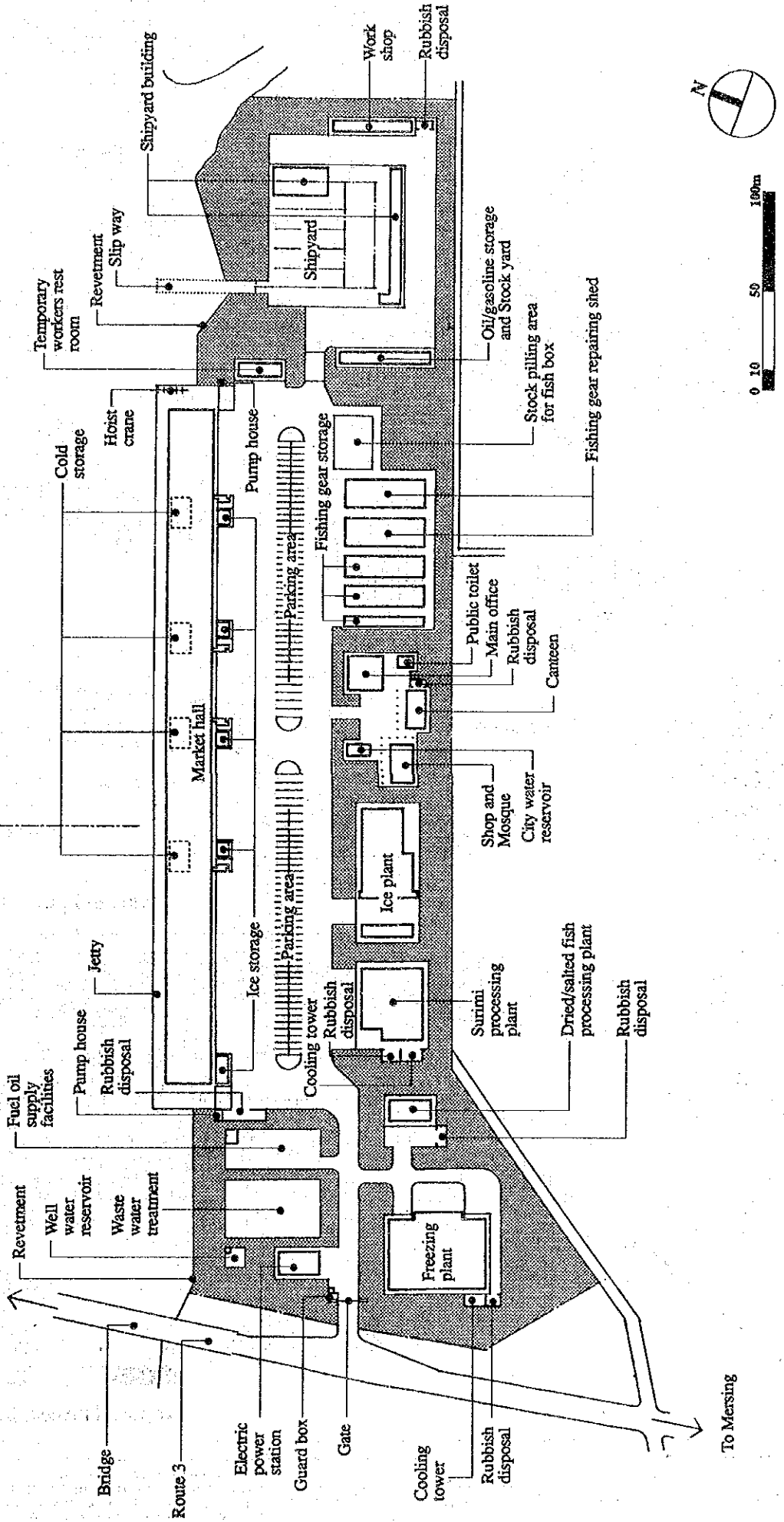


Endau River

Preparing jetty ← Fish landing jetty →

To Kuantan

To Mersing



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Endau Fishing  
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Fig. III.2.5.5 Layout Plan

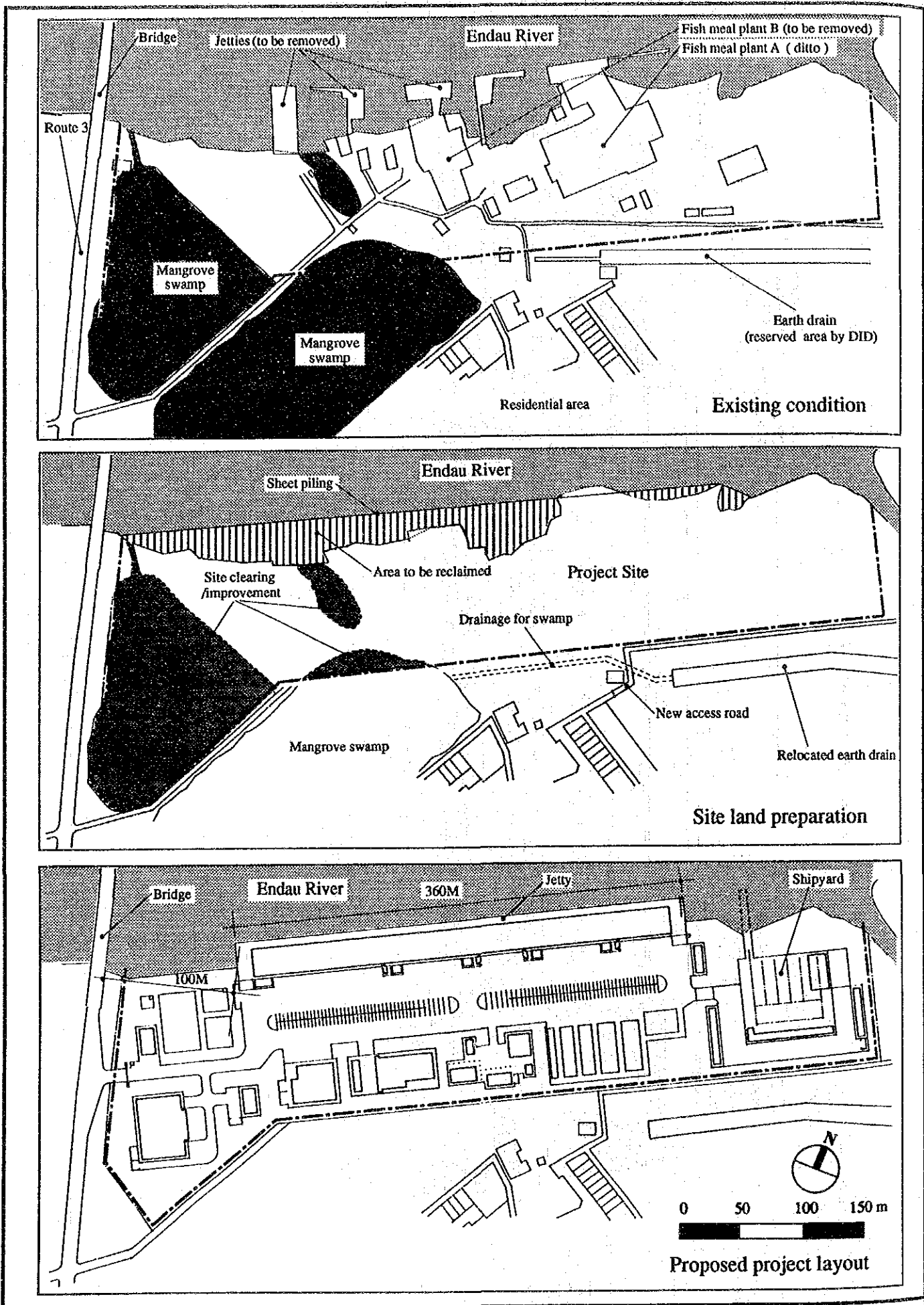


Fig. III.2.5.6 Stagewise Construction Plan

Endau Fishing Port Complex

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Table III.2.5.1 Required Berth Length for Unloading, Preparing and Mooring.

Required Berth Length for Unloading

Boat Class	Max Draft of Boat	Berth Length Per Boat	Required Berth No.	Required Berth Length	Allocated Available Time To Use Berth
A, B	2.7	23.9	1.0	23.9	4.6
C, C2	3.0	28.1	7.0	196.7	4.6
Total			8.0	220.6	

Required Berth Length for Preparing

Boat Class	Max Draft of Boat	Berth Length Per Boat	Required Berth No.	Required Berth Length	Allocated Available Time To Use Berth
A, B	2.7	23.9	1.0	23.9	6.0
C, C2	3.0	28.1	4.0	112.4	6.0
Total			5.0	136.3	

Required Berth Length for Mooring

Boat Class	Max Draft of Boat	Berth Length Per Boat	Required Berth No.	Required Berth Length	No. of Boats Mooring Per Berth Max (Normal)
A, B	2.7	23.9	2.0	47.8	12 (6)
C, C2	3.0	28.1	10.0	281.0	13 (5)
Total			12.0	328.8	

Remarks:

- 1 Tonnage of Class A Boats = 10 - 25 Ton
- 2 Tonnage of Class B Boats = 25 - 40 Ton
- 3 Tonnage of Class C Boats = 40 - 70 Ton
- 4 Tonnage of Class C2 Boats = 70 - 100 Ton
- 5 Maximum number of boats mooring per berth shows the case of all boats using the mooring facilities due to rough sea condition which prevents fishing operations. In this case, berth for unloading and preparing (total 13 berths) will also be used for mooring.
- 6 Figures in brackets show the number of boats/berth using the mooring facilities during normal condition.
- 7 Allocated Available Time To Use Berth for Unloading has been set at 4.6 hours in order that all unloading operations will be completed in the morning.
- 8 Allocated Available Time To Use Berth for Preparing has been set at 6 hours so that preparator operations will be completed in almost half-day.

Table III.2.5.2 Required Capacity of Major Facilities (1/2)

Facilities	1995		2010	
	Basic Data for Estimation of Capacity		Basic Data for Estimation of Capacity	Required Capacity
<b>Basic Facilities</b>				
1. Jetty				
Fish landing	8 - A boat, 10 - B boats/day 7 - C boat, 5 - C <sub>2</sub> boats/day	108mL	16 - B boat, 15 - C boats/day 13 - C <sub>2</sub> boats/day	220.6mL
Preparing	8 - A boat, 10 - B boats/day 7 - C boat, 5 - C <sub>2</sub> boats/day	80mL	16 - B boat, 15 - C boats/day 13 - C <sub>2</sub> boats/day	136.3mL
2. Mooring Facilities	12 - A boat, 34 - C boat 48 - C boat, 58 - C <sub>2</sub> boat	6	26 - B boat, 261 - C, C <sub>2</sub> boats	12
3. Navigation Buoy	2 for Navigation Channel 1 for Boat turning Basin	3	2 for Navigation Channel 1 for Boat turning Basin	3
Light Beacon	2 for Jetty	2	2 for Jetty	2
<b>Functional Facilities</b>				
1. Marketing Hall	Fish landing volume: 14,300 MT/year	1,386m <sup>2</sup>	Fish landing volume: 45,800 MT/year	3,388m <sup>2</sup>
2. Ice Plant	Supply: 98 MT/day, Demand: 87 MT/day Balance: 11 MT/day	0	Supply: 98 MT/day, Demand: 111 MT/day Balance: -47 MT/day	47 MT/day
3. Ice Storage				
For fishing	Demand: 4,120 MT/year	11.4 MT/day	Demand: 10,917 MT/year	30.3 MT/day
For marketing	Demand: 9,324 MT/year	25.9 MT/day	Demand: 30,007 MT/year	83.3 MT/day
4. Cold Storage	Fish landing volume: 40 MT/day Storage volume: 30% Revolving rate: once per 4 days	48 MT	Fish landing volume: 127 MT/day Storage volume: 30% Revolving rate: once per 4 days	152 MT
5. Freezing Plant				
For cuttle fish	Total landing volume: 2,081 MT/year in Endau Raw material supply In Endau: 281 MT/year From Kuantan: 627 MT/year <u>Total 908 MT/year</u>	1.5 MT/day	Total landing volume: 3,705 MT/year in Endau Raw material supply In Endau: 1,219 MT/year From Kuantan: 1,116 MT/year <u>Total 2,335 MT/year</u>	3.9 MT/day
For Selayang	Total landing volume: 3,750 MT/year, 1,659 MT in 5 peak months. Volume frozened: 50% of volume in peak months.	8.3 MT/day	Total landing volume: 5,625 MT/year, 2,475 MT in 5 peak months. Volume frozened: 50% of volume in peak months.	12.4 MT/day
6. Surimi Processing Plant	Species: Kerisi and others. Total landing volume of Kerisi: 8,390 MT/year in Endau & Mersing Raw material supply In Endau & Mersing: 1,480 MT/year From Kuantan: 130 MT/year <u>Total 1,610 MT/year</u>	1.1 MT/day	Species: Kerisi and others. Total landing volume of Kerisi: 15,000 MT/year in Endau & Mersing Raw material supply In Endau & Mersing: 3,330 MT/year From Kuantan: 220 MT/year <u>Total 3,550 MT/year</u>	2.4 MT/day
7. Dried/Salted Fish Processing Plant	Species: Talong, Pari, Gelama, Merah, Duri Raw material supply: 140kg/day	77kg/15hr	Species: Talong, Pari, Gelama, Merah, Duri Raw material supply: 140kg/day	77kg/15hr

Table III.2.5.2 Required Capacity of Major Facilities (2/2)

Facilities	1995		2010	
	Basic Data for Estimation of Capacity	Required Capacity	Basic Data for Estimation of Capacity	Required Capacity
8. Stockpiling Area for Fish Boxes	Number of Boxes stocked: 400 boxes, stocking stage: 3	80m <sup>2</sup>	Number of Boxes stocked: 1,270 boxes, stocking stage: 3	255m <sup>2</sup>
9. Fishing Gear Repairing Shed	Trawler: 4 sets of gear P/S: 1 set of gear	504m <sup>2</sup>	Trawler: 9 sets of gear P/S: 2 sets of gear	108m <sup>2</sup>
10. Fishing Gear Storage	Number of Agent: 15	500m <sup>2</sup>	Number of Agent: 30	1,000m <sup>2</sup>
11. Ship Yard	Number of boats: 347 boats in Endau, Rompin and Mersing District. Number of boat repairing: 109 boats/year Number of new boat construction: 2 boats/year	2 Work Bay	Number of boats: 409 boats in Endau, Rompin and Mersing District. Number of boat repairing: 205 boats/year Number of new boat construction: 2 boats/year	5 Work Bay
12. Oil Supply Facilities	4 - A boat, 6 - B boats/day 4 - C boat, 3 - C <sub>2</sub> boats/day	31kl/day	16 - B boat, 16 - C boats/day 14 - C <sub>2</sub> boats/day	115kl/day
13. Office Main Office	-	-	LKIM: 16 persons AFA: 14 persons <u>Total 30 persons</u>	
Field Office	-	-	LKIM: 10 persons AFA: 12 persons <u>Total 22 persons</u>	
14. Canteen	-	-	App. 250 persons	For 83 persons
15. Electric Power Station	-	-	-	2,000KVA
16. City Water Reservoir	300m <sup>3</sup>	300m <sup>3</sup>	410m <sup>3</sup>	410m <sup>3</sup>
17. Waste Water Treatment	Freezing plant: 9.8 MT/day Surimi plant: 1.1 MT/day	23m <sup>3</sup> /day 52m <sup>3</sup> /day	Freezing plant: 16.0 MT/day Surimi plant: 2.4 MT/day Dried/salted plant: 77.0 kg/day Marketing Hall: 6,006m <sup>2</sup>	47m <sup>3</sup> /day 113m <sup>3</sup> /day 1m <sup>3</sup> /day 109m <sup>3</sup> /day
18. Parking Area	Fish handling volume AM: 32 MT PM: 8 MT	Personal car: 50 units Light lorry: 5 units Heavy lorry: 4 units	Fish handling volume AM: 102 MT PM: 25 MT	Personal car: 130 units Light lorry: 15 units Heavy lorry: 12 units

Table III.2.5.3 Planned Capacity of Major Facilities (1/2)

Facilities	Q'ty	Planned Capacity
<b>Basic Facilities</b>		
<b>1. Jetty</b>		
Fish landing	1	224mL × 20mW
Preparing	1	136mL × 20mW
2. Mooring Facilities	1	12 berth
3. Navigation Buoy	3	Light Buoy
Light Beacon	2	Light Pole
<b>Functional Facilities</b>		
1. Marketing Hall	1	273mL × 22mW 6,006m <sup>2</sup> , including stock area
2. Ice Plant	1	50 MT/day with 50 MT Ice Storage
3. Ice Storage		
For fishing	1	32 MT storage 12.6mL × 4.5mW × 2.8mH
For marketing	4	16 MT storage 6.3mL × 4.5mW × 2.8mH
4. Cold Storage	4	Rated storage cap: 100 MT Net storage cap: 43 MT 13.5mL × 9.9mW × 2.8mH with 8 sections Total storage capacity: 172 MT
5. Freezing plant		
For Cuttle fish	4	Freezer: 0.5 MT/3HR Operation: 1 shift in 1995, 2 shift in 2010
	2	Cold storage: 65 MT
	1	Chilled storage: 20 MT
For Selayang	2	Freezer: 1 MT/4HR Operation: 2 shift in 1995 3 shift in 2010
6. Surimi Processing Plant	4	Freezer: 0.5 MT/3HR Operation: 1 shift in 1995 2 shift in 2010
	1	Cold storage: 65 MT
	1	Chilled storage: 20 MT



Table III.2.5.3 Planned Capacity of Major Facilities (2/2)

Facilities	Q'ty	Planned Capacity	
7. Dried/Salted Fish Processing Plant	1	Drier: 77kg/15HR	
	1	Cold storage: 5 MT	
	1	Chilled storage: 2.5 MT	
8. Stockpiling Area for Fish Boxes	1	494m <sup>2</sup> , including passage	
9. Fishing Gear Repairing Shed	2	14mW × 36mL (504m <sup>2</sup> )	
10. Fishing Gear Storage	5	5mW × 40mL Building with 10 sections. Total 1,000m <sup>2</sup>	
11. Shipyard	4	Repairing work bay	
	1	New boat building work bay	
	2	Winch: 19kW	
12. Fuel Oil Supply Facilities	10	Oil tank: 2.25mφ × 6mL (23.9kl)	
13. Office	6	Oil gear pump: 40φ × 125 l/min × 3.7kW	
	Main Office	1	311m <sup>2</sup>
		1	310m <sup>2</sup>
	Field Office	1	315m <sup>2</sup>
		1	315m <sup>2</sup>
14. Canteen	1	200m <sup>2</sup> 88 persons × 3 times	
15. Electric Power Station	3	Total 2,000 KVA 1,200 KVA × 1, 500 KVA × 1, 300 KVA × 1	
16. City Water Reservoir	2	Elevated Water Tank 100m <sup>3</sup> Water Reservoir 100m <sup>3</sup>	
17. Well Water Supply Facilities	1	Well: 3000mm φ × 50m	
	2	Well pump: 80φ × 1m <sup>3</sup> /min × 7.5 kw	
	2	Supply pump: 65φ × 550 l/min × 7.5 kw Pressure tank system	
	1	Reservoir: 100 m <sup>3</sup>	
18. Waste Water Treatment	1	Inlet waste water: 270m <sup>3</sup> /day. Discharge water character: BOD 50 PPM COD 100 PPM SS 100 PPM PH 5.5 ~ 9.0	
19. Parking Area	130	Personal car	
	15	Light lorry	
	12	Heavy lorry	

## 2.6 Basic Design

### 2.6.1 Basic Facilities

#### (1) Basic Facilities

- 1) The length of the fish landing jetty is 224 meters (required length 220.6 meters); and the preparation jetty is 136 meters long (required length 136.3 meters). The total combined length is 360 meters.
- 2) The upstream end of the preparation jetty will be 100 meters downstream from the bridge on National Road 3, followed by the fish landing jetty.
- 3) The upstream end of the mooring jetty will be located near the mooring area of the existing LKIM jetty, 100 meters upstream from the bridge on National Road 3.
- 4) The new revetment will be located approximately 30 meters into the river from the existing shore-line/revetment. The upstream end of the new revetment will be connected to the existing revetment. The downstream end will be connected to the proposed slipway. The preparation and fish landing jetties will be built in front of the 360 meter long center area of the new revetment (see Fig.III.2.6.1).
- 5) The water area in front of the jetties will be dredged to a depth of -3.5 meters (Reference Datum: LAT). The mooring jetty will also be located in an area with a depth of -3.5 meters.

#### (2) Structure of the facilities

##### 1) Design

##### a) Conditions

##### - Fishing boat class and tonnage

Class B: 25 tons - 40 tons

Class C: 40 tons - 70 tons

Class C2: 70 tons - 100 tons

##### - Planning depth: -3.5 meters

##### - Wharf crown height: +3.8 meters

##### - Apron width and slope

Width: 6 meters

Slope: 1/100

- Live Load on wharf: 1.0 ton/m<sup>2</sup>
- Boat velocity approaching the wharf: 0.5 meters/sec
- Boat traction force (against mooring pillar): 10.0 tons/pillar

b) Tide

H.W.L. + 2.66 meters  
L.W.L. + 0.72 meters

c) Ground conditions

- Reclaimed soil

Internal friction angle: 30°  
Bulk density: 1.8 tons/m<sup>3</sup>

- Existing ground condition

Borehole R1 located in the river (see Fig. II.6.10 - Borehole Logs at Endau) indicates: N value 0 of silt clay 10 meters below river bottom; average N value 17 of silt layer 10 to 28 meters deep

Borehole R2 located in the river indicates: Average N value 5 of silt sand layer 8 meters below river bottom; average N value 17 of silt layer 8 to 30 meters deep

Boreholes L1, L2, and L3 located on land indicates: N value 0 of silt clay layer 8 meters below ground surface; N value of more than 10 of silt sand layer from 8 meters to 28 meters below ground surface

- Bearing layer

N value of more than 50 for hard layer of weathered fractured rock 28 meters to 30 meters below ground surface.

d) River flow

Maximum recorded current velocity: 2.8 meters/sec (Oct 1992)

e) Wind

Maximum wind velocity recorded (August 1987): 32.0 meters/sec; wind direction south

2) Structural arrangement

a) Fish landing, preparation wharf, and embankment

The structural arrangement of the wharf minimizes the changes in water depth and shoreline configuration. A structure capable of accommodating large fishing boats ( maximum 100 tons) was selected. Subsequently, the body of the wharf will be a pier type supported by concrete piles; and a revetment structured by steel sheet piles will be built between the existing embankment and jetty. The pier slab will be made of concrete, fronted by a rubber fender and a mooring post (cast steel, filled with concrete) near the area of the apron.

The length of the concrete piles will be 30 meters to be founded on the bearing layer (see Fig.III.2.62, 2.63, and 2.64).

b) Mooring jetty

The mooring jetty will be a wood dolphin structure composed of three piles combined together. A small wooden footway bridge will connect the dolphin to the land (see Fig.III.2.6.5).

### 2.6.2 Functional Facilities

The design of the functional facilities in the Project were based on the factors delineated below.

- 1) The construction plan has taken into consideration, the natural conditions surrounding the proposed construction site and the high humidity and rainfall characteristic of the area. The type, structure, specifications, and layout plan of each functional facility will reflect these considerations.
- 2) Construction methods and materials predominantly used in the study area will be utilized as much as possible, in order to keep construction costs down and to insure easy maintenance of completed facilities.
- 3) In the layout plan of the functional facilities, the compound will be divided into zones by function, in order to facilitate easier and more efficient use of the facilities.

- 4) The objective of the layout plan is to achieve effective use of the limited port area while maintaining a balance between its surrounding environment.

- (1) Layout planning

Legal restrictions pertaining to the existing bridge and road are explained below.

- 1) Under the existing legal regulations, there must be a minimum of 132 feet between the existing bridge and the jetties on the river. The access road to the port compound must be more than 150 feet away from the bridge on National Road 3. A distance of 66 feet from the center of the national road must be secured for the road. In addition, there must be a distance of 20 feet between the road boundary and the border of the port compound, where structures cannot be built (fences are excluded).

- 2) Zoning

The zones of the port compound are given in Fig.III.2.6.6. The layout of the functional facilities has been planned according to their function, maintenance, and operations and are explained below.

Zone 1: Facilities relevant to fish landing, distribution, and support services of fishing activities have been placed in Zone 1.

Zone 2: Fish processing facilities have been located in Zone 2.

Zone 3: Shipyard facilities have been located in Zone 3.

There will be one access road into the port compound from National Road 3 on the west side. An open space approximately 360m x 60m created by the compound road will be located in the center of the port complex. It will contain a parking lot and trucking berth capable of accommodating 130 cars, 15 medium sized, and 12 large sized vehicles. Fish landing and distribution facilities as well as other fishing related facilities will be concentrated here facing the open area.

Fish processing facilities located in Zone 2 have been placed at the west end of the compound, in order to facilitate transport activities and to avoid interruptions by activities in Zone 1. In addition, shipyard facilities have been located at the east end of the compound in Zone 3.

- a) The fish flow from jetty to Market Hall and the loading equipment are shown in Fig.III.2.6.7. The traffic line in the Market Hall is not straightforward, due to the presence of four cold storage and four ice storage facilities.

Fish which has been sorted on board the fishing boat will be hoisted onto the jetty by hoist crane and transported to the Market Hall by cart or fork-lift. After being weighed and auctioned, the fish will be transported to the truck berth by hoist crane or cart and transported to its destination. In some cases, the fish may be placed in cold storage due to the time factor. The truck berth will be supplied ice from the ice storage facility. Each ice storage facility will be replenished by the ice plant.

- b) Market hall

The total floor area of the Market Hall will be 6,006 m<sup>2</sup> and the fuel, water, ice supply area will be 1,386 m<sup>2</sup>. However, when there is a concentration of fishing boats returning to the port, the latter area will also be used as part of the Market Hall.

3) Infrastructure

- a) Incoming services of the Project site

City water will be supplied to the port compound from the existing eight inch pipe running parallel National Road 3.

High voltage electricity (11 KV) will be supplied by the existing electric substation, located approximately 200 meters southwest of the port compound.

The main telephone line running along National Road 3 will be connected to the port complex.

- b) Management of services by relevant agencies

The JBA (water supply), NTB (electricity), and Telekom (telephone) will manage the water, electricity, and telephone services of the projected construction site.

c) Infrastructure at the Project site

- Main electrical lines

The main electrical lines within the port compound are shown in Fig.III.2.6.8. Three electrical substations will supply 11KV of high voltage electricity within the port compound. The 11KV will supply 220V of electricity for lighting and 440V for motor operations. These three substations will be capable of providing electrical power throughout the spacious port compound.

- Water supply and Drainage

Main lines of City water and well water

The main water and drainage lines are given in Fig.III.2.6.9. City water will be supplied to all facilities within the compound by the elevated water reservoir built in the center of the complex. In addition, a reservoir for well water will be constructed at the north end of the compound. Well water will be used in the Market Hall, freezing plant, surimi processing plant, and the dried/salted fish processing plant.

Main drainage lines

Daily waste water of each facility will be treated by a septic tank and released with the rain water into the Endau River at the east and west ends of the compound. In addition, the waste water produced by the three processing plants will be collected into the waste water treatment facility (activated sludge method) at the west end of the compound, treated, and released into the Endau River.

- Fire fighting equipment

The outline of the fire fighting equipment is presented in Fig.III.2.6.10. In conformity with the relevant bye-laws and the requirements of the Fire Department, fire hydrants and fire alarms will be placed in all areas of the port compound. Hose reel and CO<sub>2</sub> fire extinguishers will be installed.

(2) Building material and construction

In Malaysia steel and reinforced concrete is mainly used in the structure of large buildings. However, small and medium buildings are often "hybrid structures". For example, the column and beam of the outside wall will be made of reinforced concrete, while the truss of the roof will be made of steel or wood; or the column and beam will be

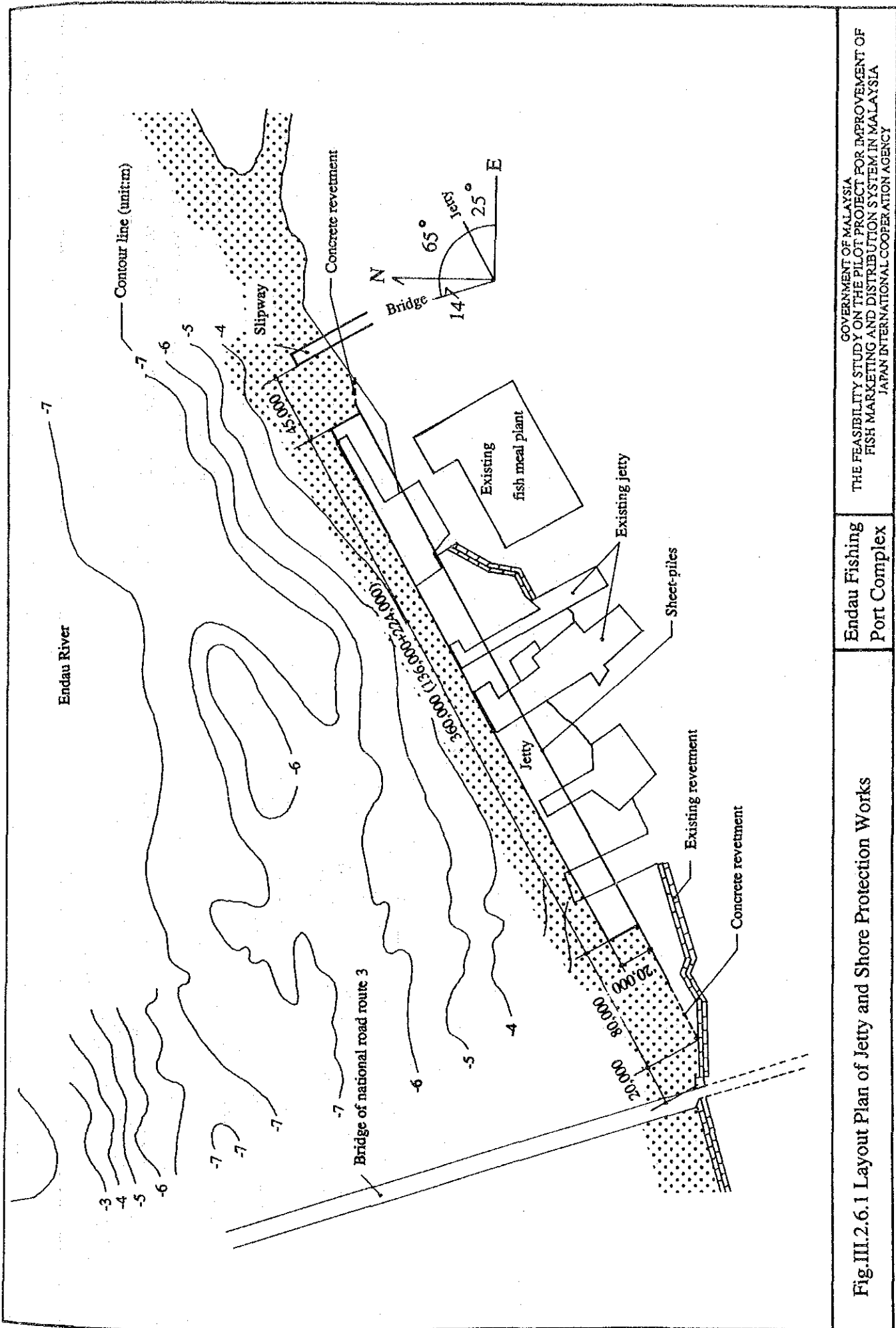
made of steel, and the truss of the roof will be made of wood. This is a very common method employed at the LKIM complexes in Chendering, Kuala Sedili, and Kuantan. Moreover, as Terengganu state is a producer of wood, all three of the LKIM complexes have frequently used wood in the structure of their small buildings.

A characteristic of the LKIM complexes is that their main structural member and specifications of their functional facilities have been based on a flexible plan that takes account of the differences in usage, scope, and relationship with regard to other facilities. The building plan in this Project will adopt this flexible policy.

In addition, the building material for both the interior and exterior finishing will be material which is predominantly used and locally obtainable.

The drawings of planned functional facilities are shown in Fig.III.2.6.11 to Fig.III.2.6.18. The total floor area, foundation, and main structural member of each functional facility are given in Table III.2.6.1.

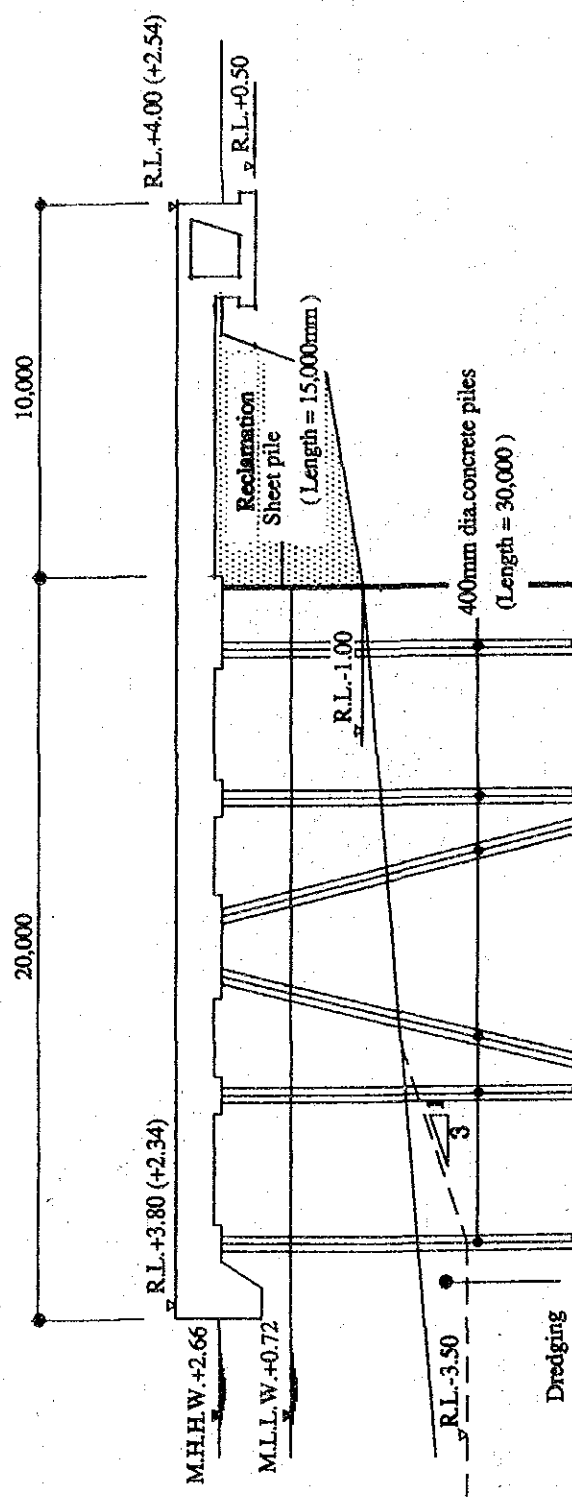




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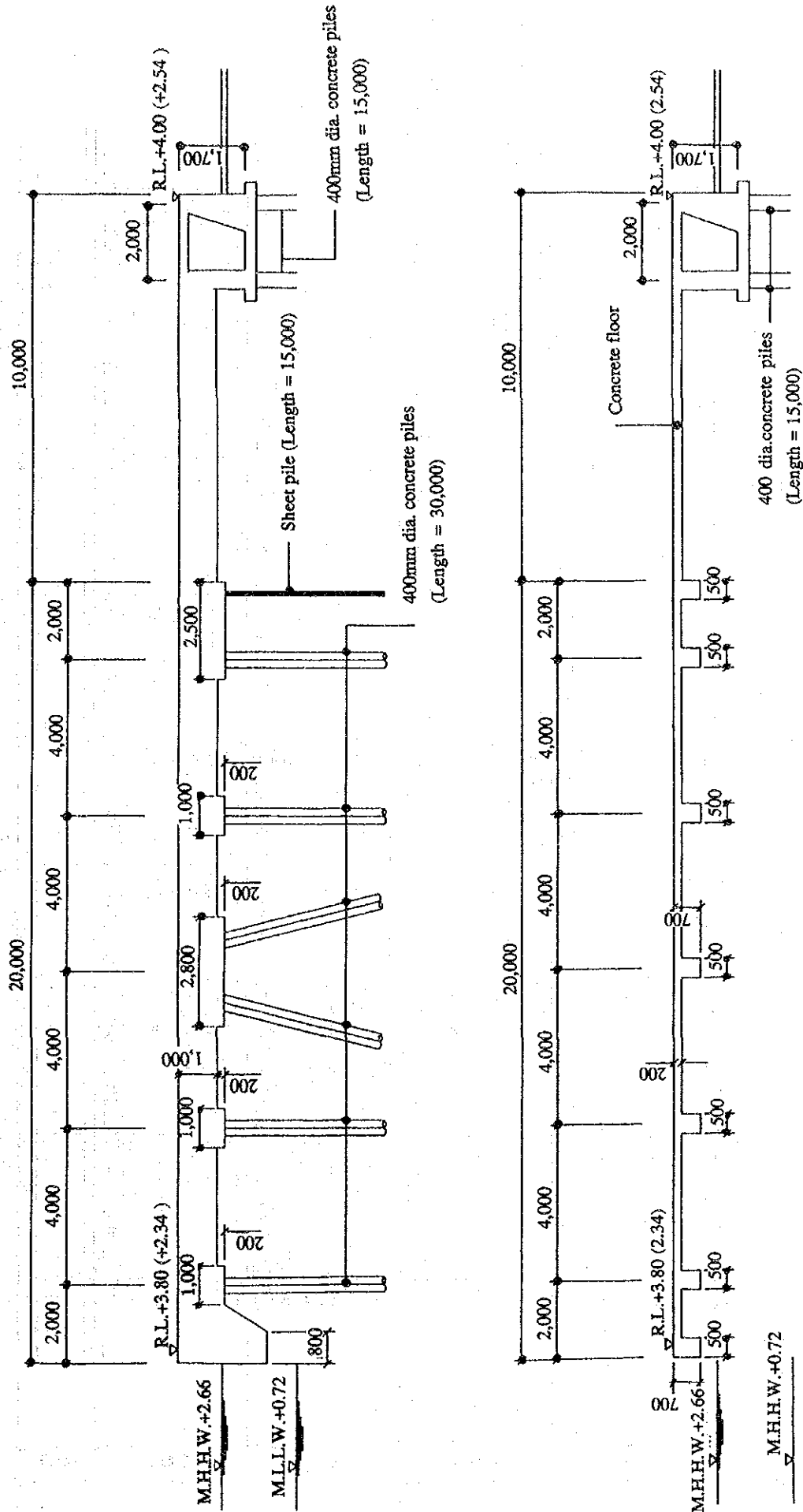
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Fig.III.2.6.1 Layout Plan of Jetty and Shore Protection Works



Remarks

- 1. R.L. refers to Lowest Astronomical Tide.
- 2. Figures in brackets refer to Land Survey Datum.

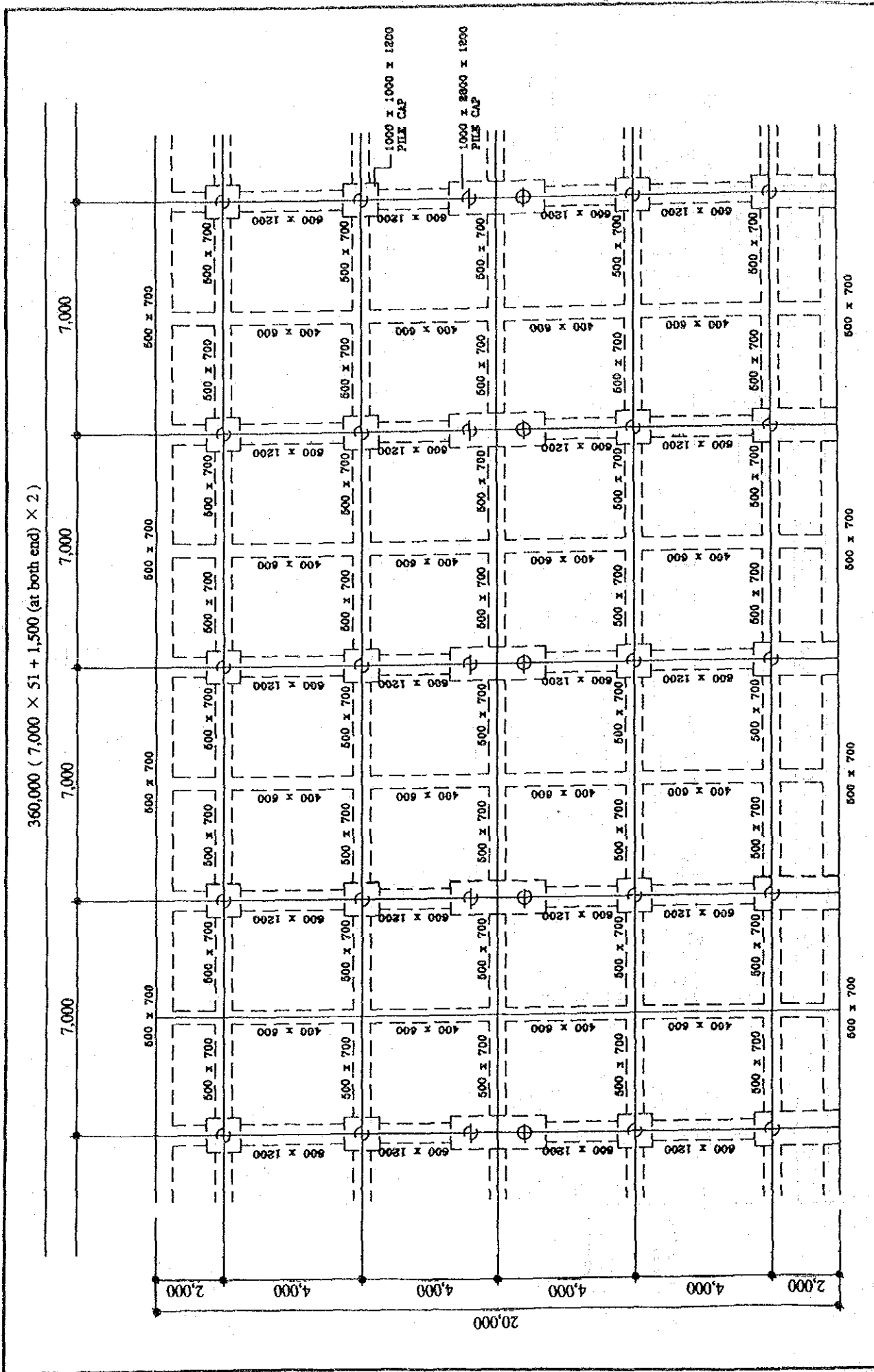


Remarks  
 1.R.L. refers to Lowest Astronomical Tide. 2.Figures in brackets refer to Land Survey Datum.

Fig. III.2.6.3 Section of Jetty showing R.C arrangement S=1/150

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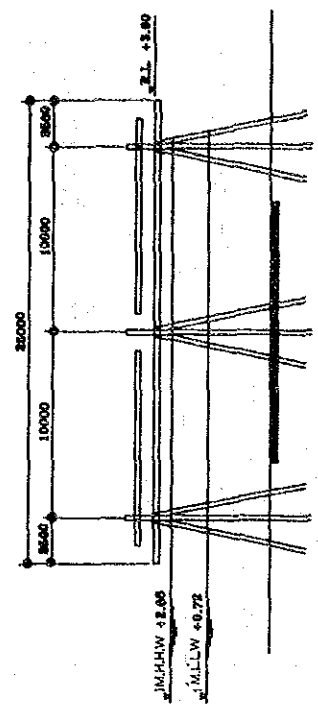
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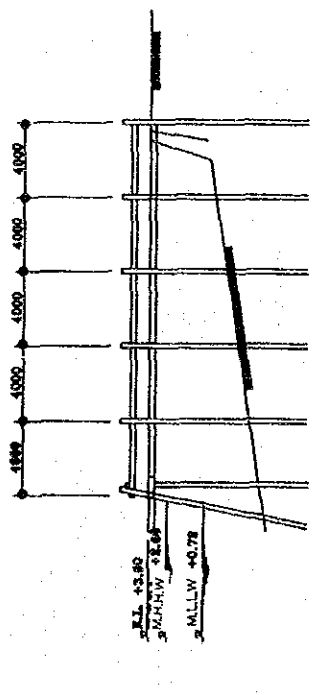
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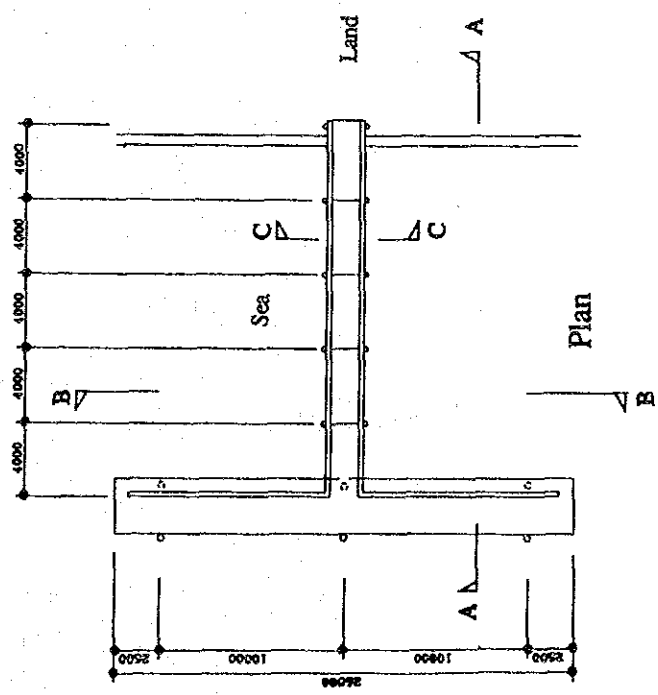
Fig. III.2.6.4 Plan of Jetty showing beam / pile cap arrangement S=1/150



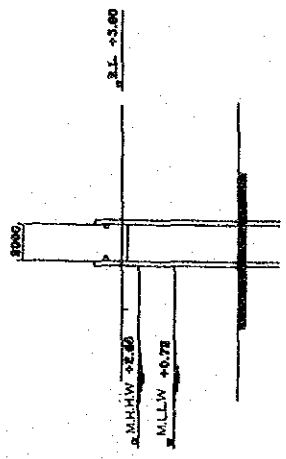
Section A-A



Section B-B



Plan

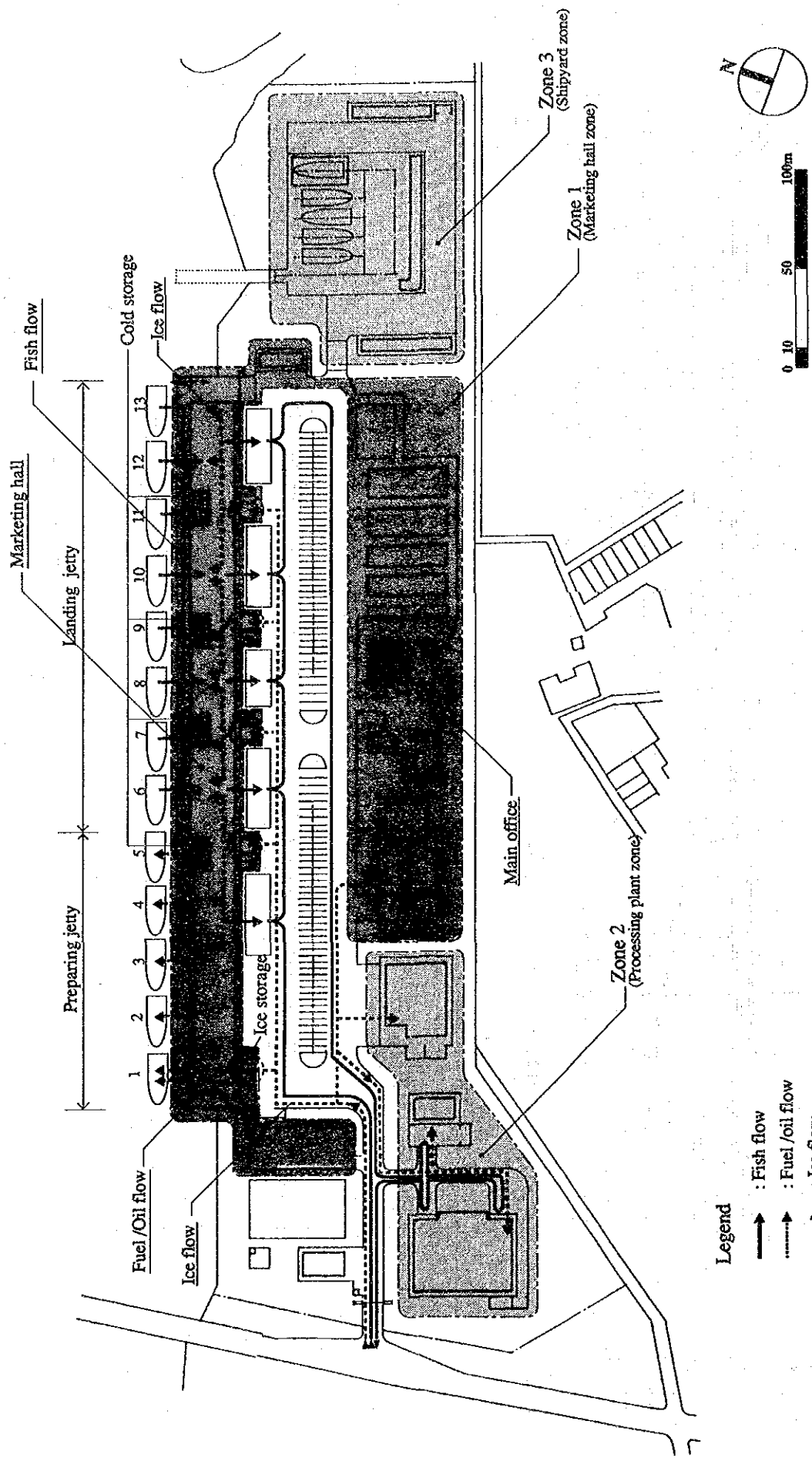


Section C-C

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Fig. III.2.6.5 Mooring Jetty S=1/400



- Legend**
- : Fish flow
  - .....→ : Fuel /oil flow
  - - - - -→ : Ice flow

Fig. III.2.6.6 Zoning of the Port Facilities

Endau Fishing Port Complex

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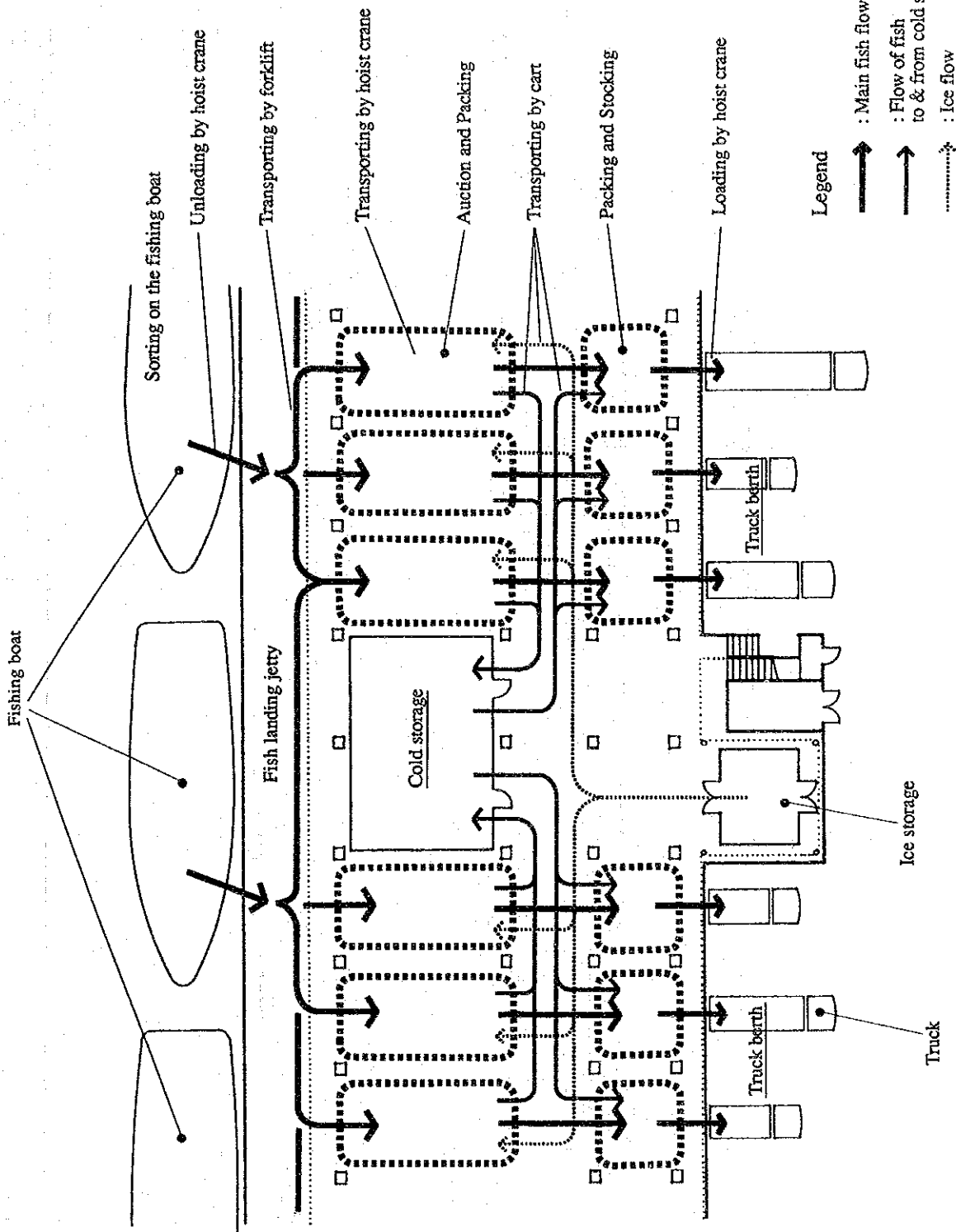


Fig. III. 2.6.7 Fish Flow in Marketing Hall

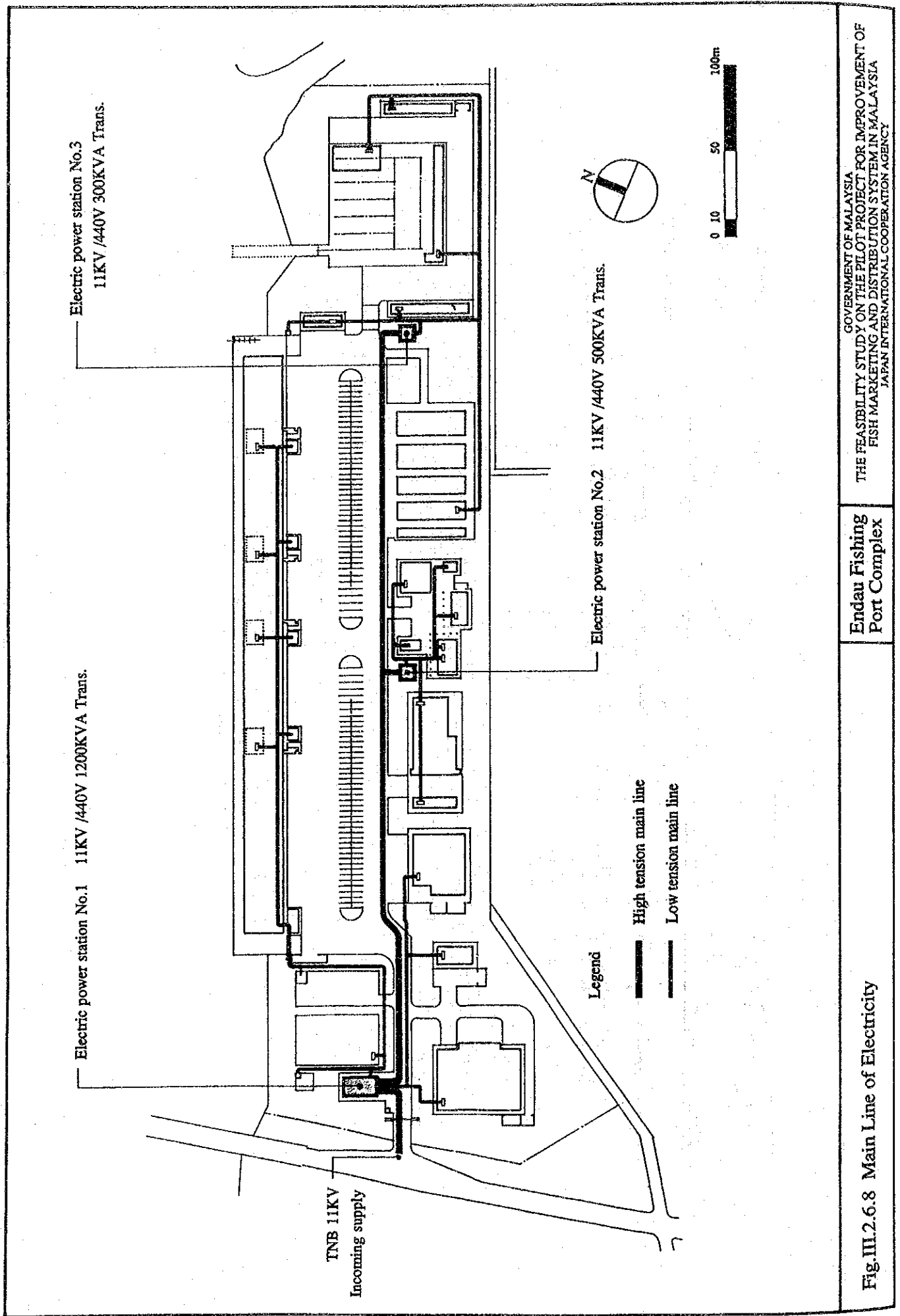


Fig.III.2.6.8 Main Line of Electricity

Endau Fishing Port Complex

GOVERNMENT OF MALAYSIA  
 THE FEASIBILITY STUDY ON THE PILOT PROJECT FOR IMPROVEMENT OF  
 FISH MARKETING AND DISTRIBUTION SYSTEM IN MALAYSIA  
 JAPAN INTERNATIONAL COOPERATION AGENCY



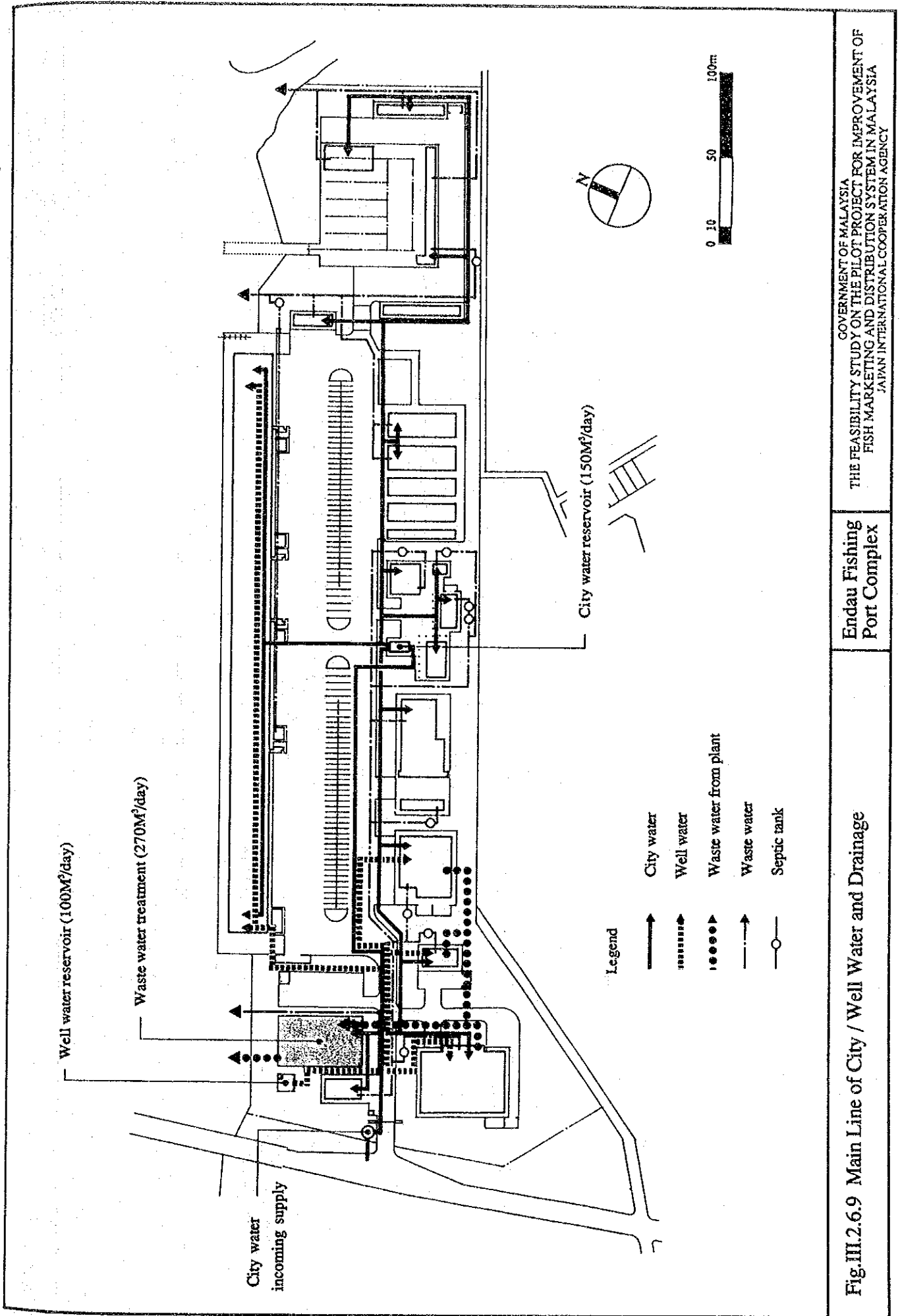
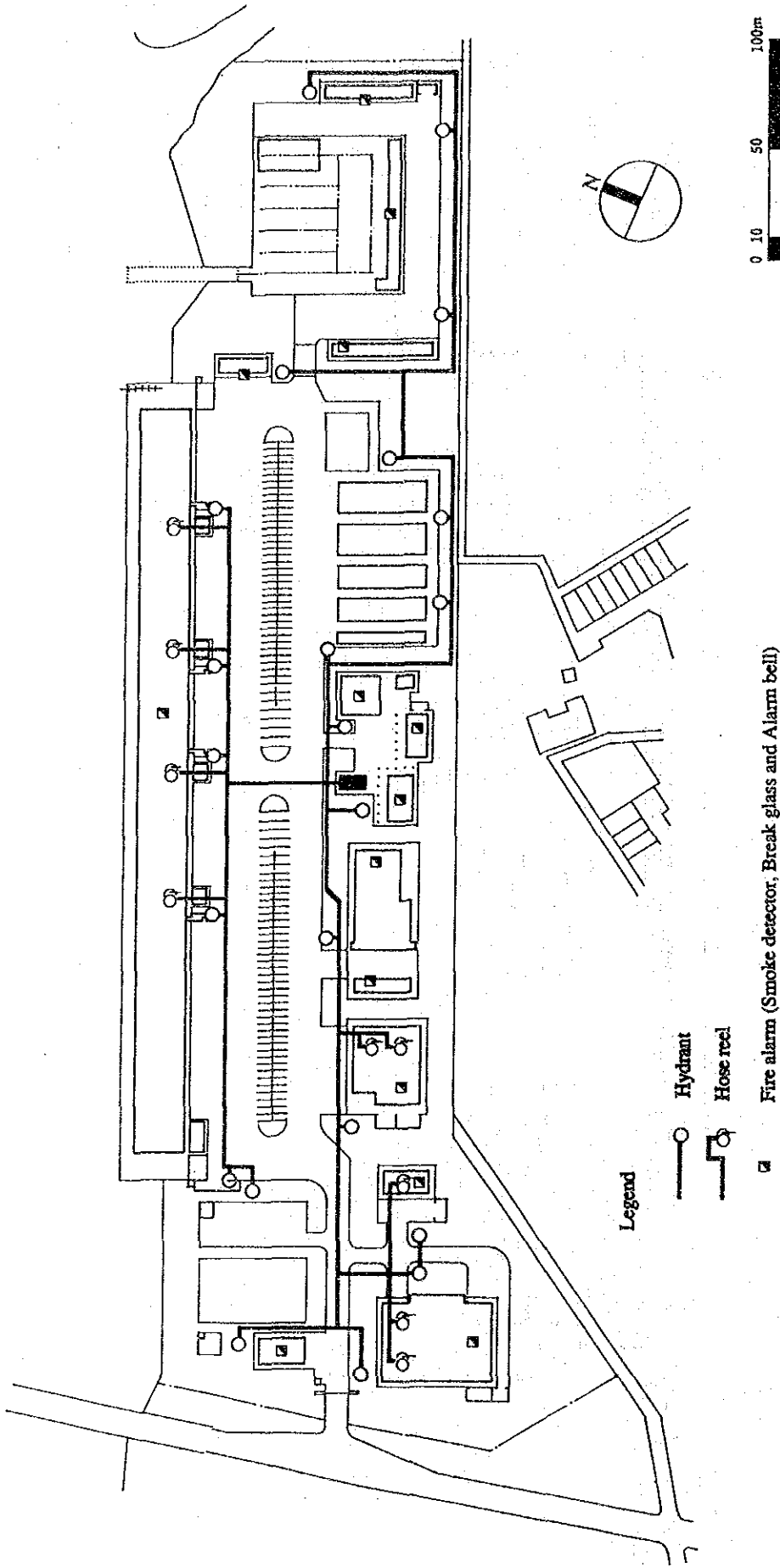


Fig.III.2.6.9 Main Line of City / Well Water and Drainage

Endau Fishing Port Complex

GOVERNMENT OF MALAYSIA  
 THE FEASIBILITY STUDY ON THE PILOT PROJECT FOR IMPROVEMENT OF  
 FISH MARKETING AND DISTRIBUTION SYSTEM IN MALAYSIA  
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Legend

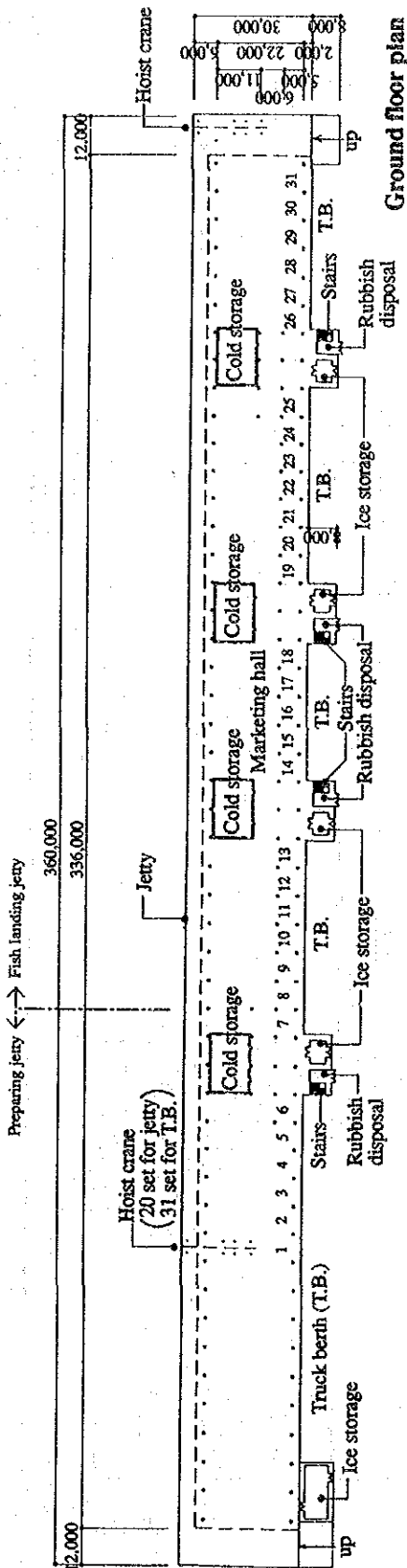
- Hydrant
- Hose reel
- Fire alarm (Smoke detector, Break glass and Alarm bell)

0 10 50 100m

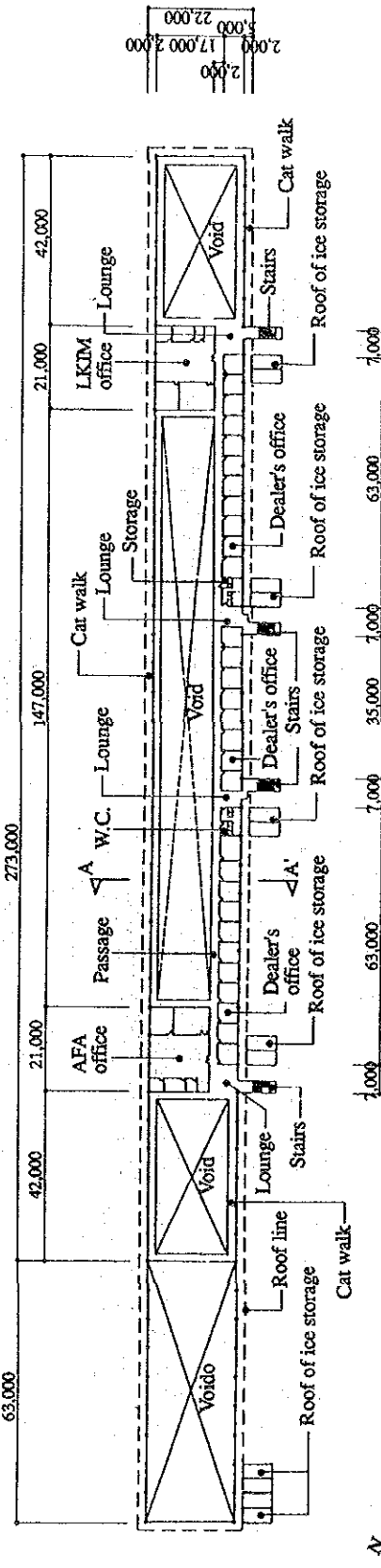
Fig.III.2.6.10 Hydrant, Hose reel and Fire alarm system

Endau Fishing Port Complex

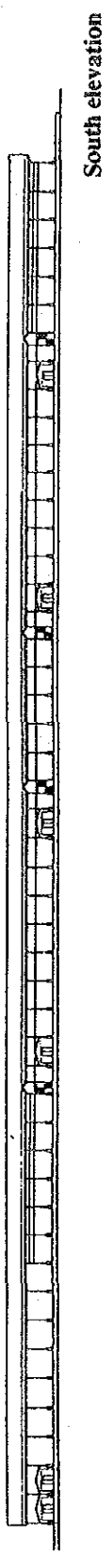
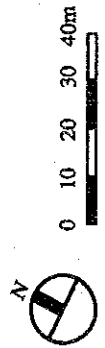
GOVERNMENT OF MALAYSIA  
 THE FEASIBILITY STUDY ON THE PILOT PROJECT FOR IMPROVEMENT OF  
 FISH MARKETING AND DISTRIBUTION SYSTEM IN MALAYSIA  
 JAPAN INTERNATIONAL COOPERATION AGENCY



Ground floor plan



First floor plan

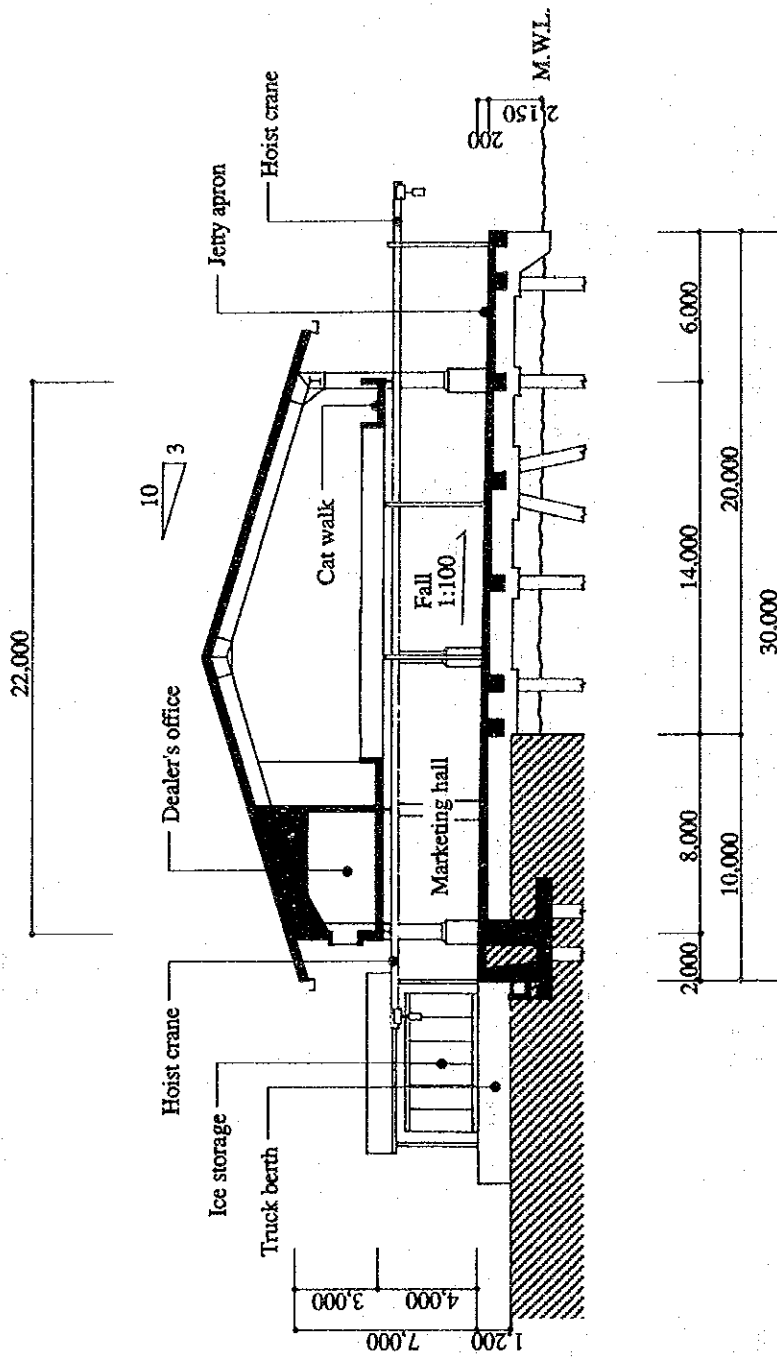


South elevation

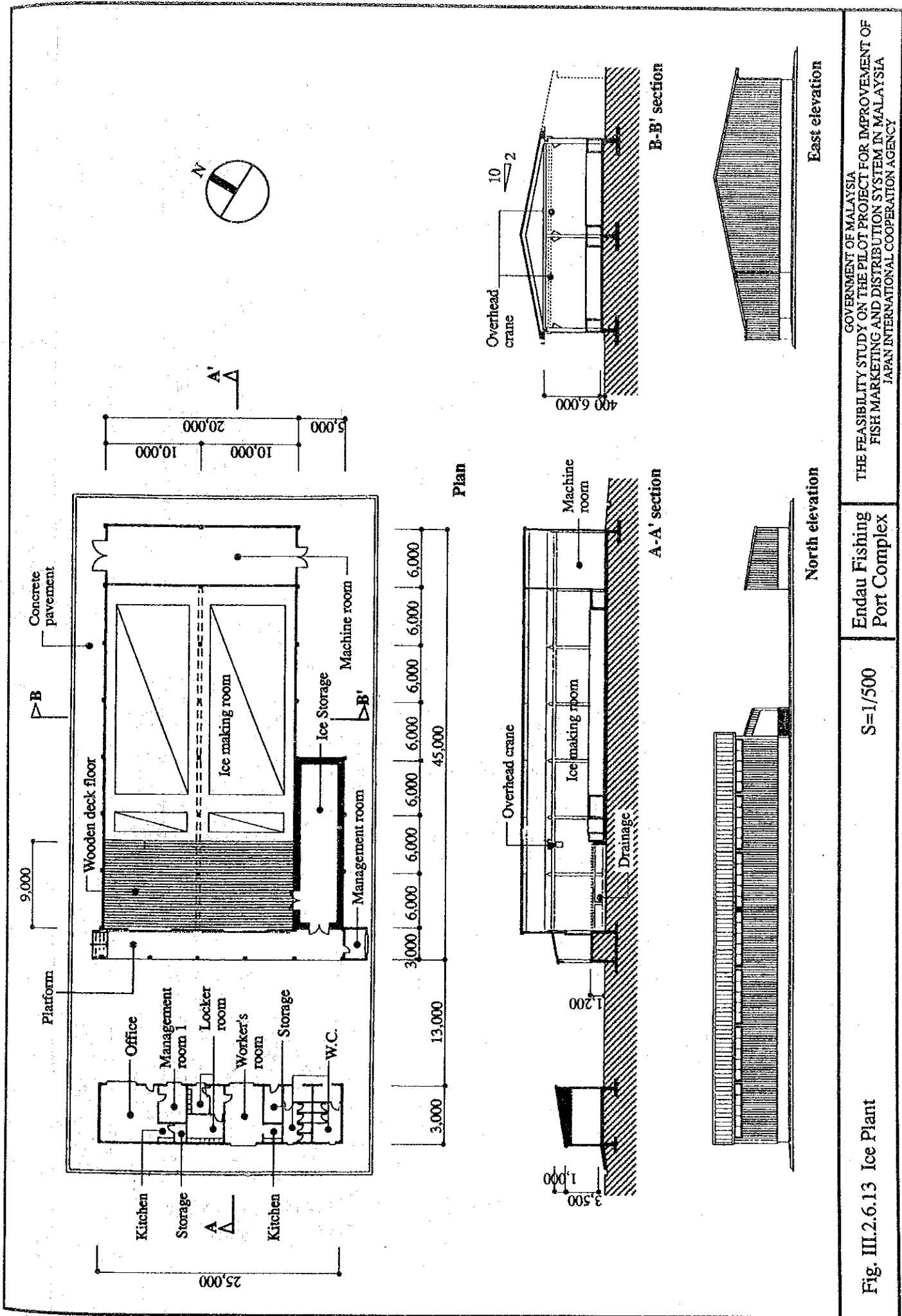
Fig. III.2.6.11 Marketing Hall (Plan and Elevation)

GOVERNMENT OF MALAYSIA  
THE FEASIBILITY STUDY ON THE PILOT PROJECT FOR IMPROVEMENT OF  
FISH MARKETING AND DISTRIBUTION SYSTEM IN MALAYSIA  
JAPAN INTERNATIONAL COOPERATION AGENCY

Endau Fishing Port Complex



A-A' section



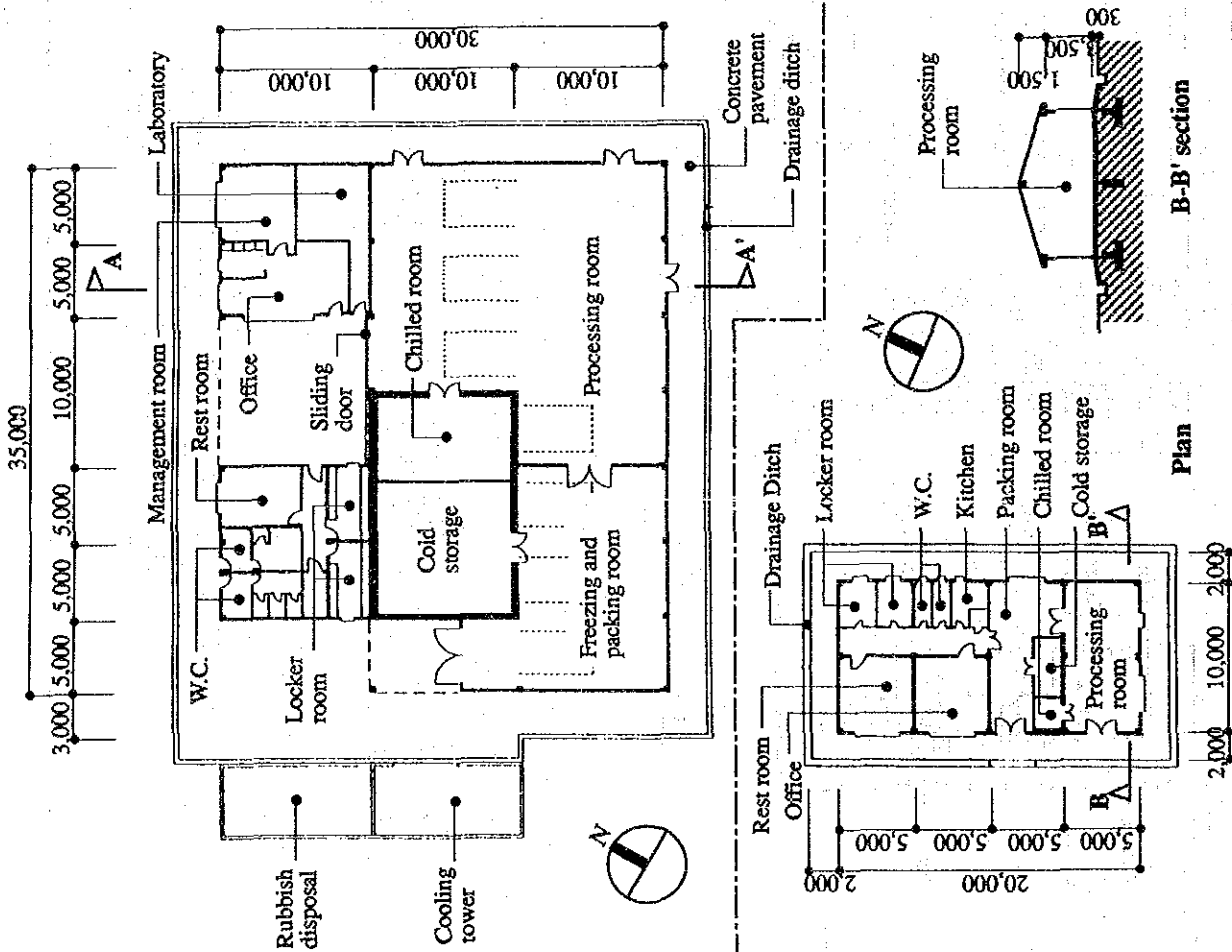
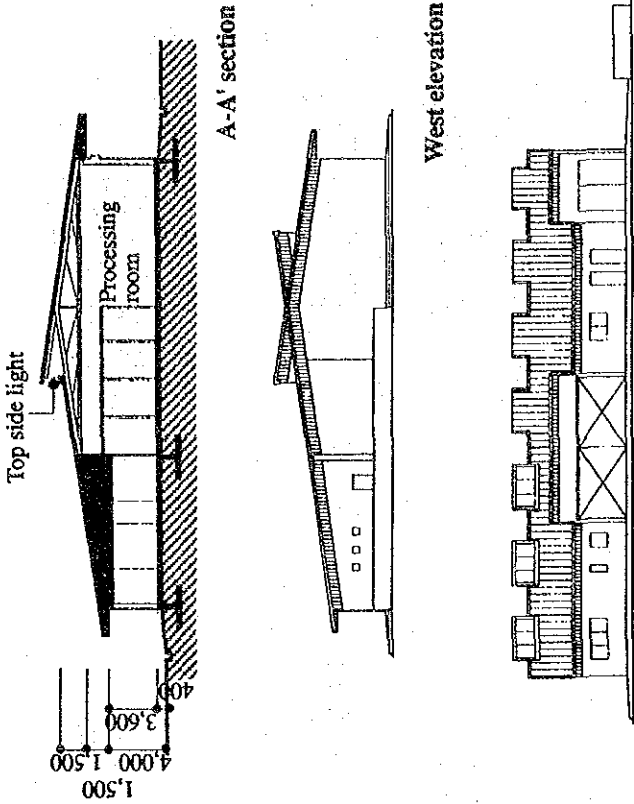
GOVERNMENT OF MALAYSIA  
 THE FEASIBILITY STUDY ON THE PILOT PROJECT FOR IMPROVEMENT OF  
 FISH MARKETING AND DISTRIBUTION SYSTEM IN MALAYSIA  
 JAPAN INTERNATIONAL COOPERATION AGENCY

Endau Fishing  
 Port Complex

S=1/500

Fig. III.2.6.13 Ice Plant

Surimi processing plant



Dried / salted fish processing plant

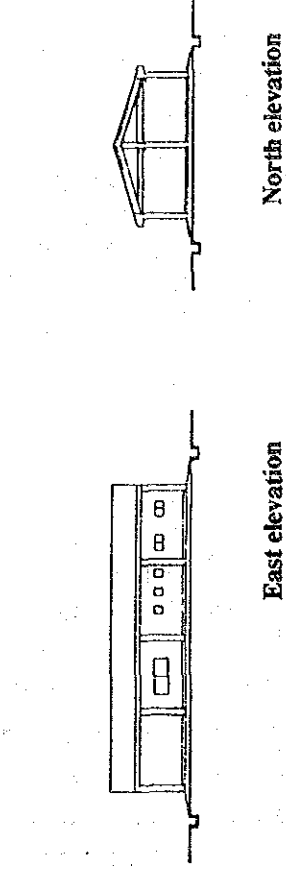
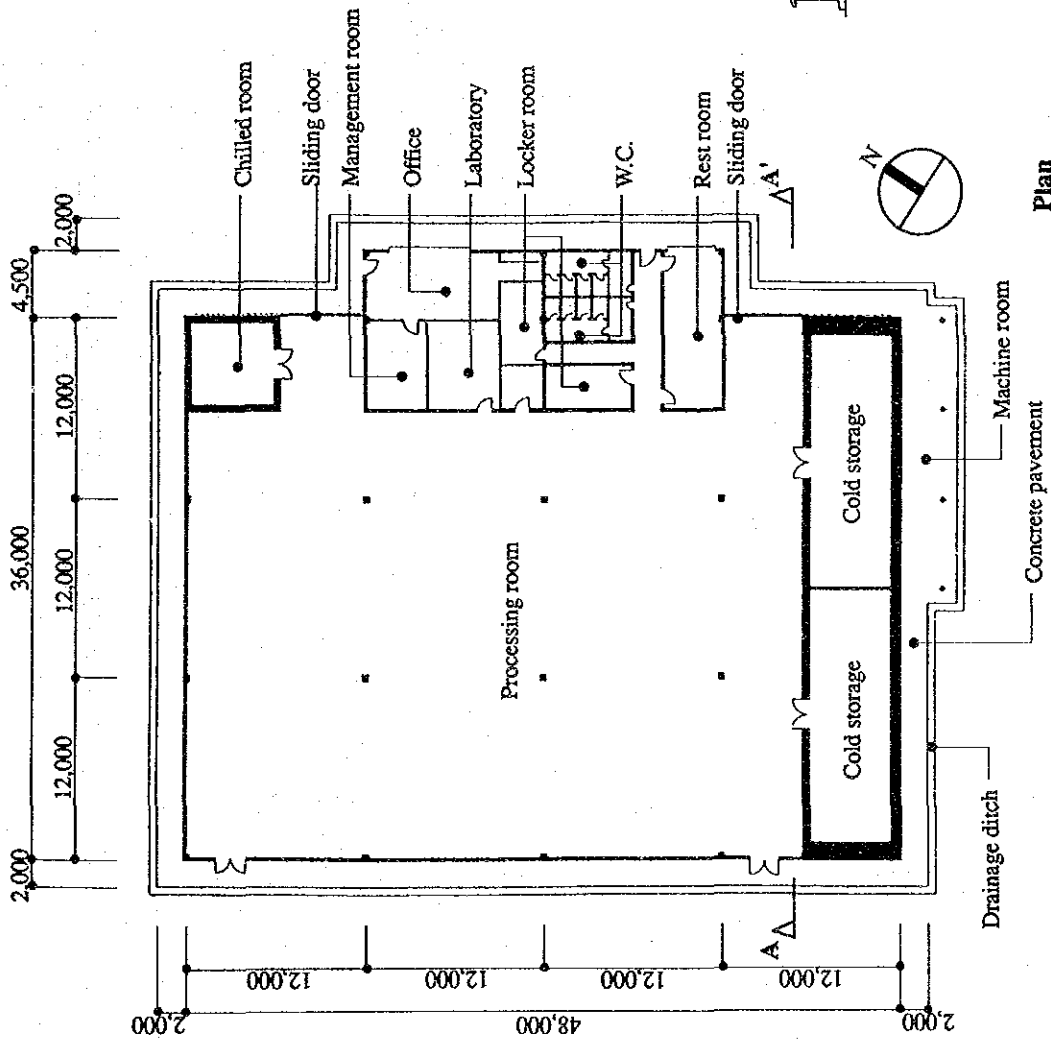


Fig. III.2.6.14 Surimi Processing Plant, Dried / Salted Fish Processing Plant

Endau Fishing Port Complex

S=1/500

GOVERNMENT OF MALAYSIA  
THE FEASIBILITY STUDY ON THE PILOT PROJECT FOR IMPROVEMENT OF FISH MARKETING AND DISTRIBUTION SYSTEM IN MALAYSIA  
JAPAN INTERNATIONAL COOPERATION AGENCY



Plan

Top side light

Processing room

A-A' section

South elevation

East elevation

GOVERNMENT OF MALAYSIA  
 THE FEASIBILITY STUDY ON THE PILOT PROJECT FOR IMPROVEMENT OF  
 FISH MARKETING AND DISTRIBUTION SYSTEM IN MALAYSIA  
 JAPAN INTERNATIONAL COOPERATION AGENCY

Endau Fishing  
 Port Complex

S=1/500

Fig. III.2.6.15 Freezing Plant

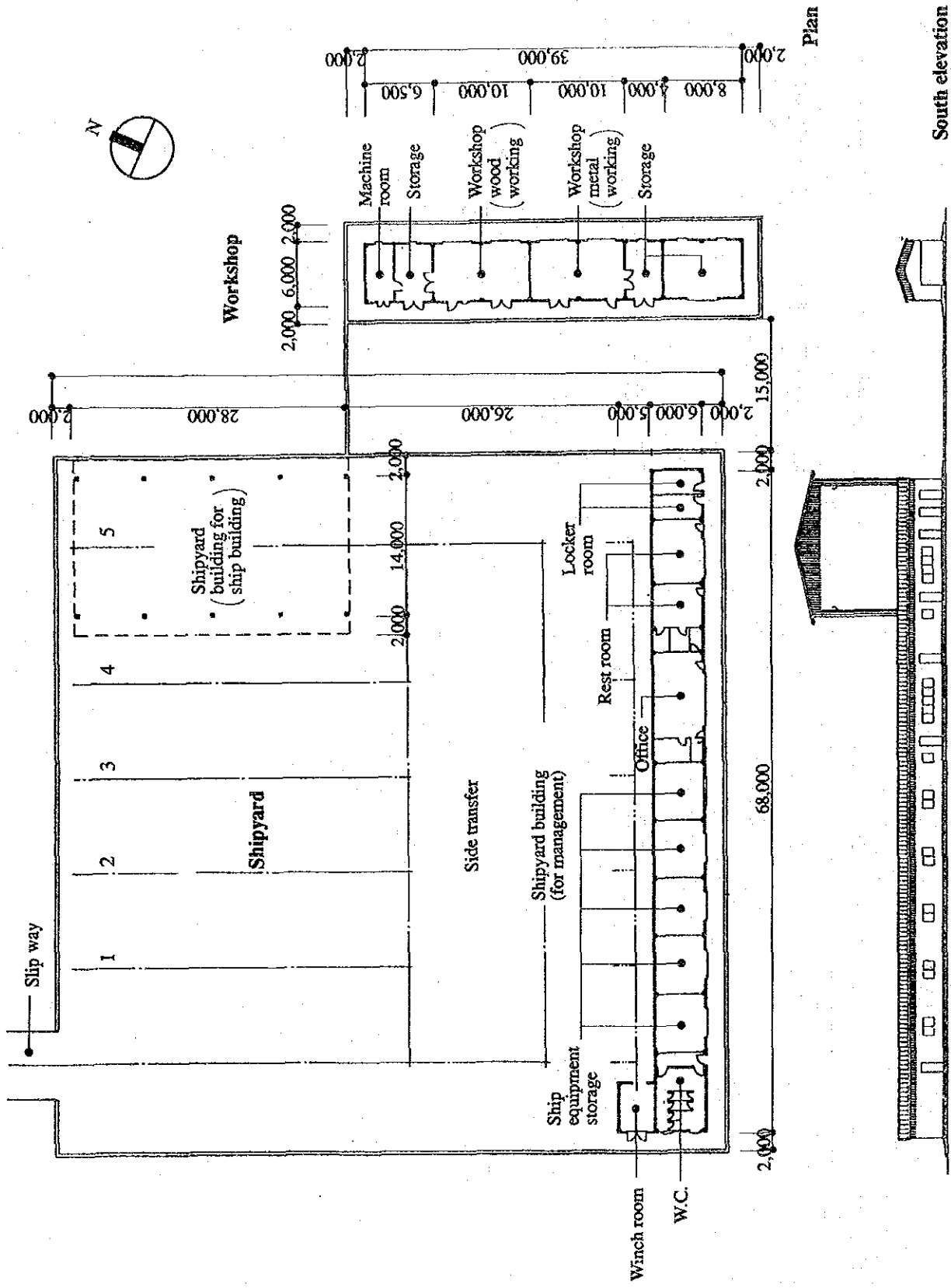


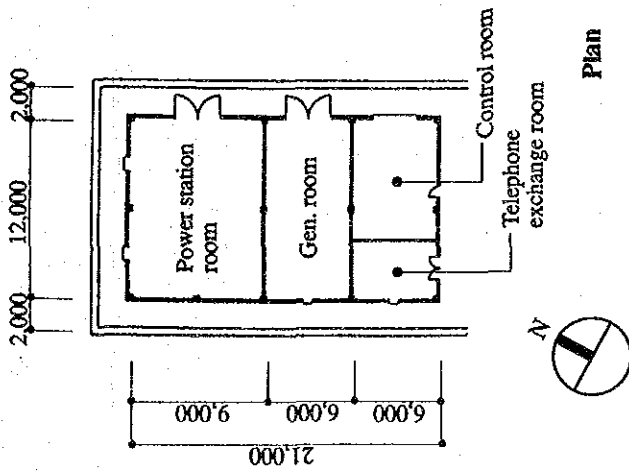
Fig. III.2.6.16 Shipyard

S=1/600

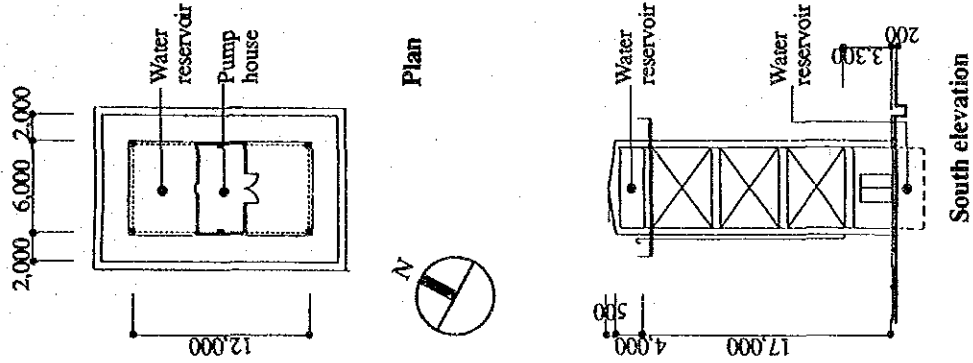
Endau Fishing Port Complex



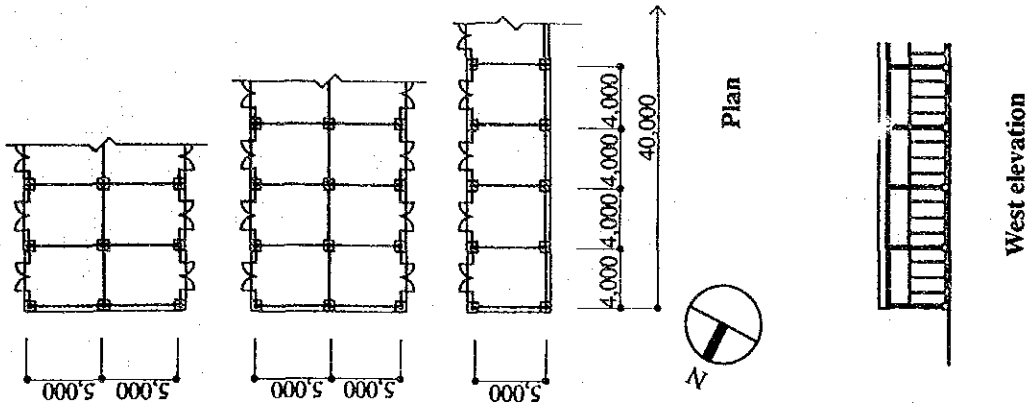
Electric power station



City water reservoir



Fishing gear storage



Fishing gear repairing shed

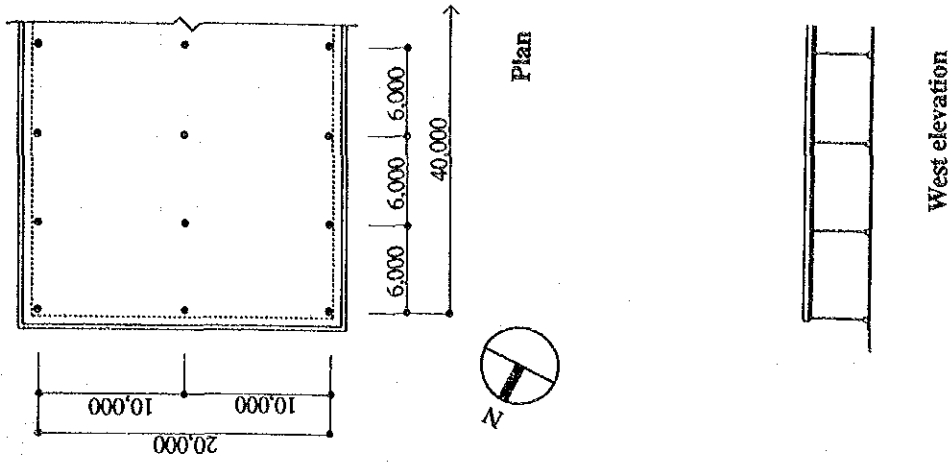
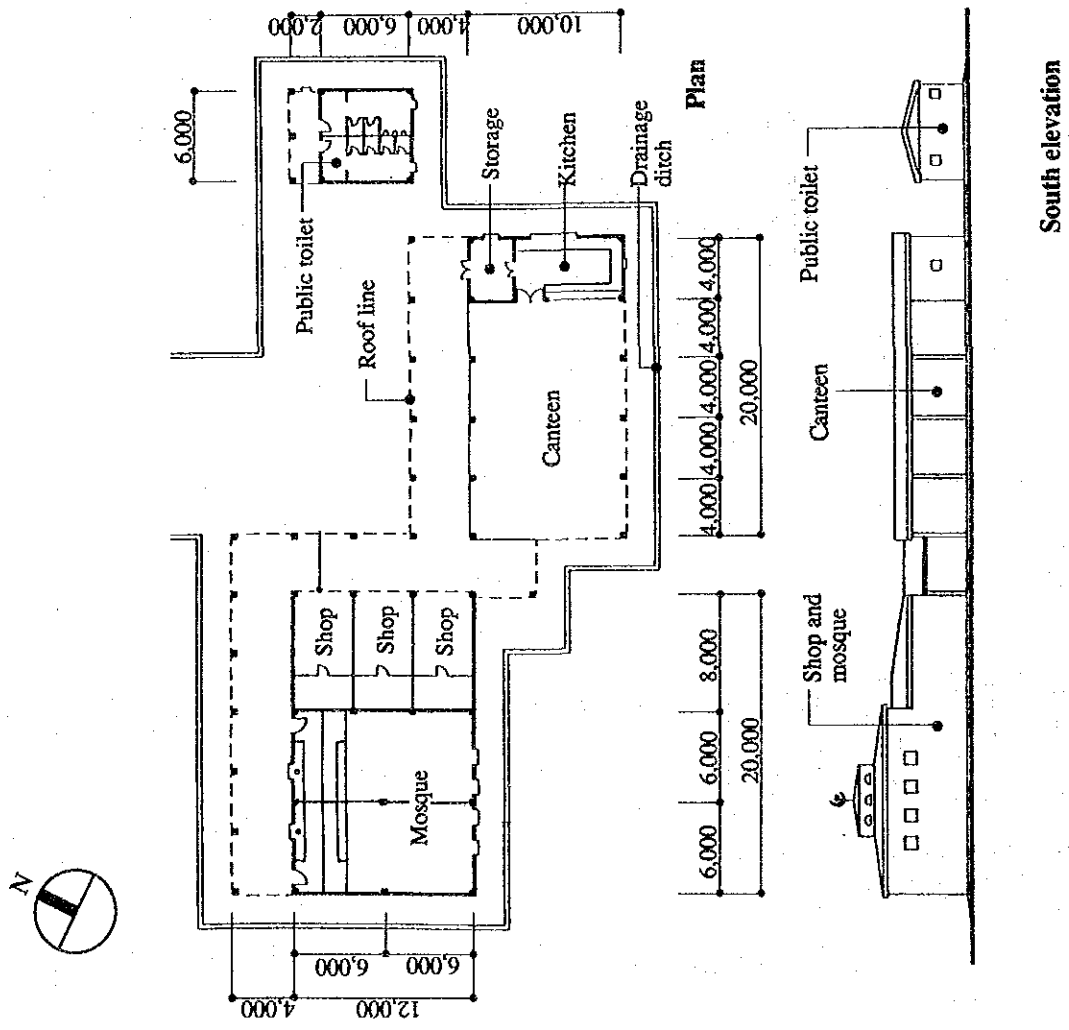


Fig. III.2.6.17 Electric Power Station, City Water Reservoir  
Fishing Gear Storage and Fishing Gear Repairing Shed S=1/500

Endau Fishing Port Complex

GOVERNMENT OF MALAYSIA  
THE FEASIBILITY STUDY ON THE PILOT PROJECT FOR IMPROVEMENT OF  
FISH MARKETING AND DISTRIBUTION SYSTEM IN MALAYSIA  
JAPAN INTERNATIONAL COOPERATION AGENCY

Shop and mosque, canteen, public toilet



Main office

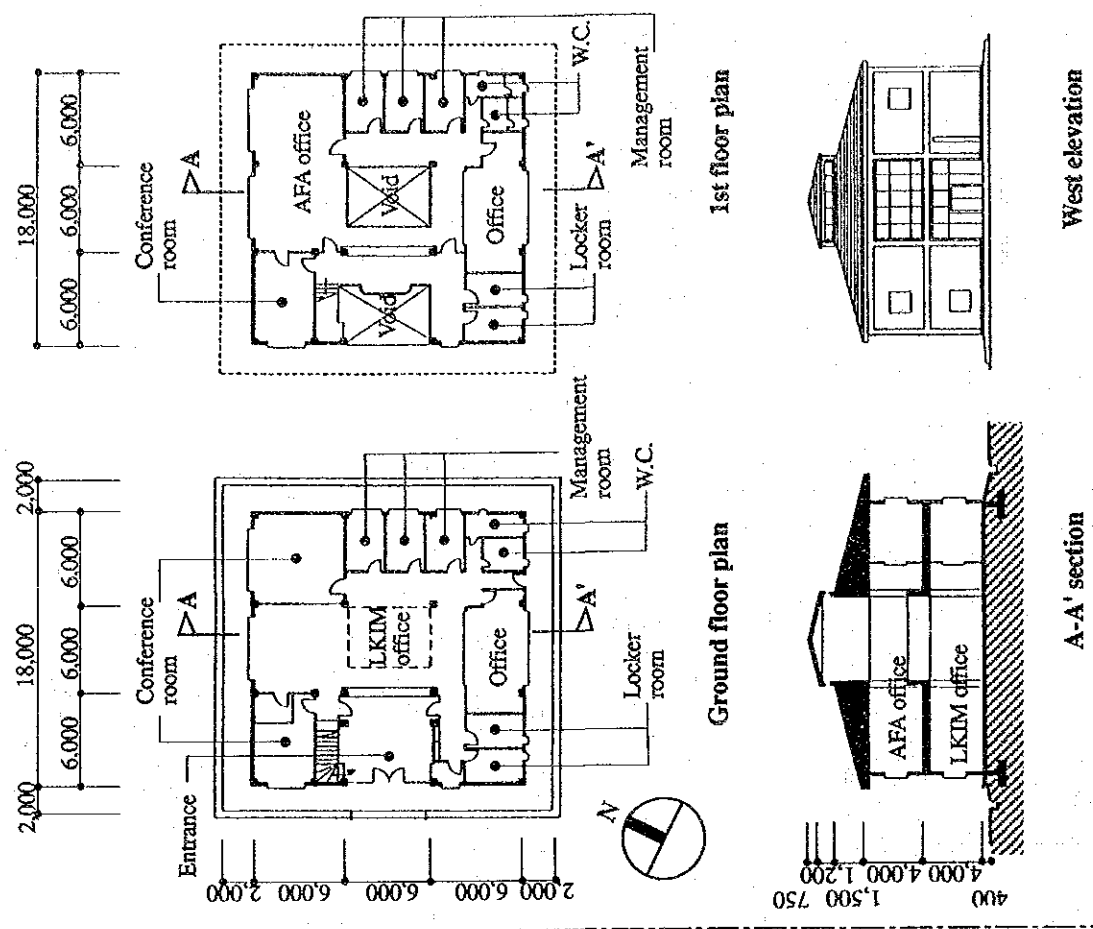


Table III.2.6.1 Floor Area, Foundation and Structure of Functional Facilities of Endau Fishing Port Complex

	Functional Facilities	Number of Storey	Total Floor Area (sq.m)	Foundation	Structure	
1	Market hall	2	10,357.00	Piling	Steel	Refrigerater, Hoist crane, Forklift
2	Ice storage	1	336.00	Piling	-	Prefabricated refrigerator
3	Ice Plant	1	1,170.00	Piling	Steel	Overhead crane
4	Surimi plant	1	975.00	Piling	RC,Steel	Refrigerator, Freezer, Processing machine
5	Freezing plant	1	1,890.00	Piling	RC,Steel	Refrigerator, Freezer, Processing machine
6	Dried/salted fish plant	1	200.00	Piling	R C	Refrigerator, Drier
7	Shipyards building	1	825.00	Piling	Steel	Overhead crane
8	Stockyard in shipyard	-	240.00	Spread	Wooden	
9	Workshop in shipyard	1	234.00	Piling	Wooden	Woodworking and metal working tools
10	Fishing gear storage	1	1,000.00	Spread	Steel	
11	Canteen	1	200.00	Piling	Steel	Kitchenwares
12	Shop and mosque	1	240.00	Piling	R C	
13	Public toilet	1	48.00	Piling	R C	
14	Electric power station	1	252.00	Piling	R C	
15	City water reservoir	-	72.00	Piling	R C	Water pump
16	Well water reservoir	-	-	Piling	R C	Water pump
17	Oil/gasoline storage	1	30.00	Spread	R C	
18	Guard box	1	6.25	Spread	Wooden	
19	Fuel oil supply facilities	-	350.00	-	-	
20	Incinerator/rubbish disposal	-	250.00	-	-	
21	Fishing gear repairing shed	1	1,008.00	Spread	Steel	
22	Main office	1	621.00	Piling	R C	Personal computer
23	Workers restroom	1	132.00	Piling	Wooden	
24	Waste water treatment	-	1,500.00	-	-	Water pump, FRP tank, RC tank
25	Pump house	1	63.87	Spread	Wooden	Water pump
26	Parking area	-	2,588.00	-	-	
27	Stockpiling area	-	494.00	-	-	

## **2.7 Implementation Plan on Construction**

### **2.7.1 Construction Work Plan**

#### **(1) Environmental conditions of construction work site**

The weather conditions of the study area are normally calm except during the monsoon season. It is projected that construction work in the river area will be able to proceed during the northeast monsoon season, on non-rainy days or strong windy days.

Soil improvement and land reclamation work in a segment of the swamp will be required, due to a soft layer in the upper soil layer of the port compound ground.

Access to the port is good, as the Project site is located near National Road 3. Existing facilities and structures within the planned site must be removed or relocated before commencing construction work.

#### **(2) Construction material and equipment**

Nearly all of the major construction material will be supplied domestically. Imported materials are steel sheet piles, rubber fender, mooring post, light buoy, refrigerating machine, fish processing equipment and waste water treatment equipment.

#### **(3) Construction work of major facilities**

The concrete piles for the jetty and the sheet pile will be driven into the ground by a pile driving barge. Dredging work will be carried out by a grab dredger and the dredged soil will be disposed at a designated location.

The foundation for nearly all of the land facilities will utilize concrete pile.

### **2.7.2 Project Schedule**

After the Project has been approved by the Government of Malaysia and loan arrangements have been completed, it is assumed that appraisal by the loan agency will take 3.5 months, followed by a six month period for selection and appointment of the Consultant. This is the minimum required period of time projected.

Application for the necessary permits and approvals will be made to relevant government and statutory authorities for the design process; and it is estimated that a period of six months will be required before such permits and approvals are granted.

The construction contract of the Project is estimated to take 16 months. However, the soil investigation contract and the site clearing/soil improvement contract are two separate contracts which will precede the construction contract (see Table III.2.7.1).

TABLE III.2.7.1 ENDAU FISHING PORT COMPLEX PROJECT SCHEDULE

Project Item	PROJECT SCHEDULE																																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36				
1 Approval of Project																																								
Arrangement of Loan																																								
Appraisal by Loan Agency																																								
Selection/Appointment of Consultant/Implementing Agency																																								
Design of Project																																								
Submission of Plans for approval by the various Government Agencies																																								
Project Land Acquisition																																								
Calling of Tender																																								
Award of Contract																																								
2 Site Investigation Contract																																								
3 Site Clearing/Soil Improvement Contract																																								
4 Project Construction																																								
Mobilisation																																								
Temporary Works																																								
Land Reclamation																																								
Demolishing of existing private jetties and fishmeal plants																																								
Sheet piling and Piling Works																																								
Shore protection and revetment works																																								
Jetty Construction																																								
Mooring Facilities (Piling, decking etc)																																								
Dredging																																								
Site services works eg. electricity, water, fire fighting, street lighting etc																																								
Marketing Hall / Cold Storage																																								
Functional facilities																																								
External Works																																								

## **2.8 Construction Cost Estimates**

### **(1) Assumptions for cost estimation**

- 1) Constant price as of December 1992 will be utilized.
- 2) Imported construction material and goods will be tax exempted.
- 3) The currency exchange rate will be set at RM1.00 to 50 Japanese Yen . The foreign exchange rate from the latter half of 1992 was highest at 51.65 yen/M\$1.00 (July), and the lowest at 48.30 yen/M\$1.00 (September). On the average, the exchange rate fluctuated at around 50 yen Japanese, hence the exchange rate for this Project was fixed at 50 yen.
- 4) The cost of imported materials and goods is estimated at CIF price at Port Klang, Malaysia.
- 5) The annual price escalation rate of the total Project cost is estimated at 4.5 percent. This value was based on an analysis of the recent trends in the Building Cost Index (BCI), Consumer Price Index (CPI) and the index of successful tender prices produced by JKR.
- 6) Physical contingency is assumed to be 10 percent of the total project cost.

### **(2) Project cost**

The Project cost and its breakdown are shown in Table III.2.8.1 and III.2.8.2.

Table III.2.8.1 Project Cost Breakdown

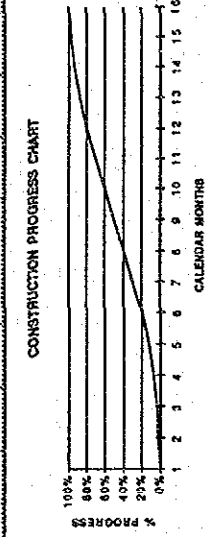
Item	Constant Price as of Dec. 1992							Total (RM)
	CIVIL/BUILDING COST			PLANT/EQUIPMENT COST				
	Local Portion (RM)	Foreign Portion (RM)	Sub-Total (RM)	Local Portion (RM)	Foreign Portion (RM)	Sub-Total (RM)		
<b>BASIC FACILITIES</b>								
1 Jetty	6,321,041	1,100,000	7,421,041	0	0	0	7,421,041	
2 Mooring Facilities	506,550	0	506,550	0	0	0	506,550	
3 Revetment and shore protection	2,510,600	1,300,000	3,810,600	0	0	0	3,810,600	
4 Navigation sys. & survey	100,000	0	100,000	75,000	325,000	400,000	500,000	
Subtotal of Basic Facilities	9,438,191	2,400,000	11,838,191	75,000	325,000	400,000	12,238,191	
<b>FUNCTIONAL FACILITIES</b>								
5 Marketing Hall/Cold Storage	4,618,893	0	4,618,893	687,000	1,319,000	2,006,000	6,624,893	
6 Ice Plant	1,291,276	0	1,291,276	1,200,000	460,000	1,660,000	2,951,276	
7 Surimi Plant	1,152,037	0	1,152,037	723,000	2,022,000	2,745,000	3,897,037	
8 Office	803,925	0	803,925	0	150,000	150,000	953,925	
9 Freezing Plant	2,121,093	0	2,121,093	769,000	920,000	1,689,000	3,810,093	
10 Dry Fish Plant	236,690	0	236,690	72,000	147,000	219,000	455,690	
11 Shipyard Building, Stockyard, Slipw	2,052,945	0	2,052,945	1,034,000	92,000	1,126,000	3,178,945	
12 Workshop	235,485	0	235,485	240,000	315,000	555,000	790,485	
13 Fish Gear Storage	512,150	0	512,150	0	0	0	512,150	
14 Shop & Mosque	318,975	0	318,975	0	0	0	318,975	
15 Electric Power station	307,926	0	307,926	1,183,500	0	1,183,500	1,491,426	
16 City Water Reservoir	119,835	0	119,835	0	0	0	119,835	
17 Fish Gear Repairing Area	629,030	0	629,030	0	0	0	629,030	
18 Waste Treatment Plant	704,770	0	704,770	0	1,300,000	1,300,000	2,004,770	
19 Infrastructure	4,428,340	0	4,428,340	0	0	0	4,428,340	
20 Fuel Supply Pumphouse	63,000	0	63,000	70,000	97,000	167,000	230,000	
21 Other Facilities	1,276,242	0	1,276,242	0	0	0	1,276,242	
22 Furniture	0	0	0	505,000	0	505,000	505,000	
Subtotal of Funct. facilities	20,872,613	0	20,872,613	6,483,500	6,822,000	13,305,500	34,178,113	
<b>PRELIMS &amp; OTHER COSTS</b>								
23 Preliminaries	4,200,000	0	4,200,000	0	0	0	4,200,000	
24 Site Clearing/Reclamation	1,200,000	0	1,200,000	0	0	0	1,200,000	
25 Relocation of DID Drain	172,500	0	172,500	0	0	0	172,500	
26 Dredging	307,200	0	307,200	0	0	0	307,200	
27 Land Acquisition	734,058	0	734,058	0	0	0	734,058	
28 Consultancy Fee	2,216,840	2,216,840	4,433,680	0	0	0	4,433,680	
29 Contingencies	5,750,000	0	5,750,000	0	0	0	5,750,000	
Subtotal of Prelims & Other Costs	14,580,598	2,216,840	16,797,438	0	0	0	16,797,438	
<b>Total Project Cost</b>	<b>44,891,400</b>	<b>4,616,840</b>	<b>49,508,240</b>	<b>6,558,500</b>	<b>7,147,000</b>	<b>13,705,500</b>	<b>63,213,740</b>	

Remarks:

- 1 Building cost includes electrical, plumbing, fire fighting and sewage services of the building.
- 2 Plant/Equipment cost includes supply & installation of the equipment.
- 3 The foreign portion of Item 1 comprises bollards, bits, mooring rings and fenders.
- 4 The foreign portion of Item 3 comprises steel sheet piles.
- 5 The foreign portion of Item 4 comprises navigation buoys and light beacons.
- 6 The foreign portion of Item 5 comprises cold & ice storage plant, ice crusher, forklifts, and hoist cranes.
- 7 The foreign portion of Item 8 comprises 3 nos. Pajeros
- 8 Item 19: Infrastructure includes ext. works (eg. road, lawn, geen drainage, fencing) and common services (eg. elect, water, tel. com lines, str. light
- 9 Item 21: Other facilities, includes ice storage, public toilet, guard box, incinerator/rubbish area, temp. workers rest room, canteen and their associated M & E.
- 10 Item 22: Furniture includes basic furniture for all the facilities.
- 11 Item 23: Preliminaries include site establishment & setting out, temporary facilities, site management, demolition/disposal of existing structure, contractor's personnel & plant mobilisation, performance bond/insurance and other necessary prelim. expenses for constr. activities.
- 12 Consultancy fee has been split 50:50 between Local & Foreign Portion to allow foreign consultant participation in J.V with local consultant. It has been estimated at 8% of total constr. cost (excl. land acq.) + RM250,000 for Soil Investigation for detail design stage.

TABLE III.2.8.2 ENDAU FISHING PORT COMPLEX INVESTMENT PAYMENT SCHEDULE

Project Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Construction Price as of December 1992																										
Project Item																										
Consultancy Services:																										
Design/Supervision:																										
Submision of Plans for approval by the relevant Government Agencies																										
Project Land Acquisition																										
Callling of Tender																										
Award of Contract																										
Soil Investigation Contract																										
Site Clearing/Improvement Contract																										
Construction Contract:																										
Mobilisation																										
Temporary Works																										
Land Reclamation																										
Demolishing of existing private jetties and fished piers																										
Sheet piling and Piling Works																										
Shore protection and revetment works																										
Bray Construction																										
Moorng Facilities (Piling, decking etc)																										
Dredging																										
Site services works eg. electricity, water																										
Ice fighting, street lighting etc																										
Warting Jett/Gold Storage																										
Functional Facilities																										
External Works																										
Land Acquisition																										
Consultancy Services Cashflow (\$)																										
Construction Cashflow (\$)																										
Construction Progress (%)																										
Construction Cashflow (Amount M\$)																										
Monthly Amount Required																										
Monthly Amount Required ± 10%																										
Contingencies																										
Payment Schedule (12 months @rate)																										
Remarks																										





## 2.9 Project Management Plan

### (1) Basic principle

- 1) Efficiency and impartiality: The aim is not only to ensure economic efficiency in the management and operation of the facilities, but it is also highly concerned with promoting income redistribution for fishermen at all levels. Subsequently, benefits for fishermen is the foremost issue pervading all aspects of the Project.
- 2) Privatization: In the initial stages, port management will be directly supervised by the government, but in future it will be turned over to the private sector. Therefore, a policy aimed at turning over the facilities to private supervision in stages will be instituted (projected to be achieved within five years from the start of its operations).
- 3) Institution of integrated management: The entire Project will be integrated into one general organization. Those facilities which can be placed under private management from the start of operations will be completely turned over or leased to the private sector. Under this system, the AFA will be regarded as one private organization which will be involved in Project management and operations.

### (2) General organization

"The Fishing Port Complex of East Johor", henceforth referred to as the fishing port complex, will be placed under the jurisdiction and management of the LKIM for the present. In future, the port complex will become a private incorporation. In order to manage the port complex, a staff of 26 members will be employed. The operational organization of the complex is shown in Fig. III.2.9.1.

### (3) Board of Directors

The Board of Directors will be comprised of representatives from various areas who will function as advisors to the fishing port complex manager.

- 1) Board of Director members: MOA, DOF, LKIM, BPM, NFA, SFA, state representatives, state branch offices (DOF, FDA, LKIM, BPM), fishing boat owners, fishing crew members, fish processors, fish traders.
- 2) Role of each committee member (role of each agency)
  - a) MOA: Provide assistance on administrative and budgetary measures, and legal revisions.

- b) DOF: Issue fishing licenses, manage and monitor fishery resources, provide information on fish harvest.
- c) LKIM: Provide assistance on legal revisions, issue licenses to fish traders, operate fishing port facilities and equipment, provide information on fish distribution, provide port staff personnel, provide educational and technical guidance, provide financial assistance to the AFA, and implement measures for the gradual withdrawal of existing private jetties.
- d) BPM: Finance AFA revolving funds and provide collection services, provide fishing port staff personnel.
- e) NFA: Support AFA economic activities by providing diesel oil, ice, etc. to the AFA.
- f) SFA: Support the AFA as the NFA.
- g) State government representatives: Responsible for securing land site of the fishing port complex, accelerate investments in fish processing plant, etc., and supervise removal of private jetty.
- h) DOF state branch office: Monitor fishery resources in Project area waters and provide information to DOF headquarters.
- i) Local FDA: Provide guidance to local fishermen and fish traders.
- j) LKIM Branch Office: Execute duties stipulated by LKIM headquarters.
- k) BPM Branch Office: Supervise AFA credit system and execute duties as stipulated by BPM headquarters.
- l) Fishing boat owners: Adjust the advantages and disadvantages found within each class of boat ( A, B, C, C2).
- m) Fishing crew members: Revise income distribution system according to the panggu system .
- n) Fish traders: Represent the interests of this group.
- o) Fish processors: Represent the interests of this group.

(4) Advisory Committee

The advisory committee will provide advice to the fishing port complex manager. The committee will be composed of experienced personnel in the areas of fishing port management and fish marketing system, etc.

(5) Organization and function

- 1) General Manager (1): Responsible for the general administration of the entire fishing port complex.

- 2) Assistant General Manager (1): Responsible for carrying out the general administrative duties as stipulated by the general manager and to carry out the duties of general manager in his absence.
- 3) Administrative Personnel Department (14 members)
  - a) Department Chief (1): Responsible for overall indirect general administration.
  - b) Financial/accountant officer (1): Responsible for procuring capital, compiling statement of profit and loss, in addition to other daily duties.
  - c) Clerical Section (3): Responsible for drawing up documents and various regulations.
  - d) Legal Affairs (1): Responsible for legal measures relevant to port management and operations.
  - e) Computer Section (2): Responsible for accounting and information on fish distribution.
  - f) Inspection and Evaluation Section (2): Responsible for carrying out periodic monitoring of the fishing port complex and administration of the AFA, and for providing instructions on administrative reforms.
  - g) Drivers (2) and Security Guards (2)
- 4) Operations Department (10 personnel)
  - a) Department Chief (1): Responsible for providing general support of complex facilities and various AFA activities.
  - b) Port Management Section (6): Responsible for the maintenance and operations of all basic and functional facilities (one personnel will be in charge of basic facilities, one personnel for functional facilities, two engineers, and two mechanics).
  - c) AFA Administrative Support Section (1): Responsible for providing support of all AFA administrative activities as well as playing an advisory role.
  - d) Section on Fish Marketing Information System (2): Responsible for collection and dissemination of data on fish marketing and processing.
- (6) Plans on ownership and management of Project facilities

Reformation of Project management have been classified into basic facilities, and groups A & B of functional facilities as shown in Table III.3.2.13. Alternative plans in the ownership and management of the facilities have been considered based on the following concept.

- 1) The basic facilities and group A of the functional facilities are mainly public service

facilities, although service charges/fees are collected.

- 2) Group B of the functional facilities are the main revenue earning facilities in the Project and they are attractive to government subsidiary companies and the private sector.
- 3) The AFA will not fulfill a role of ownership or management, but will only be a user of the facilities.
- 4) The private sector is encouraged to invest in the Project.
- 5) The private sector as well as government subsidiary companies will contribute its own capital and participate in the joint venture.

The following alternative plans are proposed in the ownership and management of the facilities. The basic facilities will be owned by the government and/or subsidiary company. The functional facilities can be owned by the government and/or subsidiary company and leased to other private companies; or the government and/or subsidiary company can invest in a joint venture with a private company. The income statement of the basic and functional facilities according to groups and interest rate are shown in Tables III.3.2.17 (a), (b) & (c).

#### Alternative Plans for Ownership/Management of the Facilities

	Basic Facilities	Functional Facilities		Interest Rates	
		Group A	Group B	Basic/Group A	Group B
Plan 1	Government	Government	(1) Private (Subsidiary) (2) Other Private	3%	6.5%
Plan 2	Private (Subsidiary)	Private (Subsidiary)	(1) Private (Subsidiary) (2) Other Private	6.5%	6.5%
Plan 3	Private (Subsidiary)	(1) Private (Subsidiary) (2) Other Private	(1) Private (Subsidiary) (2) Other Private	6.5%	6.5%

Remarks: 1) Government refers to LKIM and subsidiary refers to government subsidiary company.

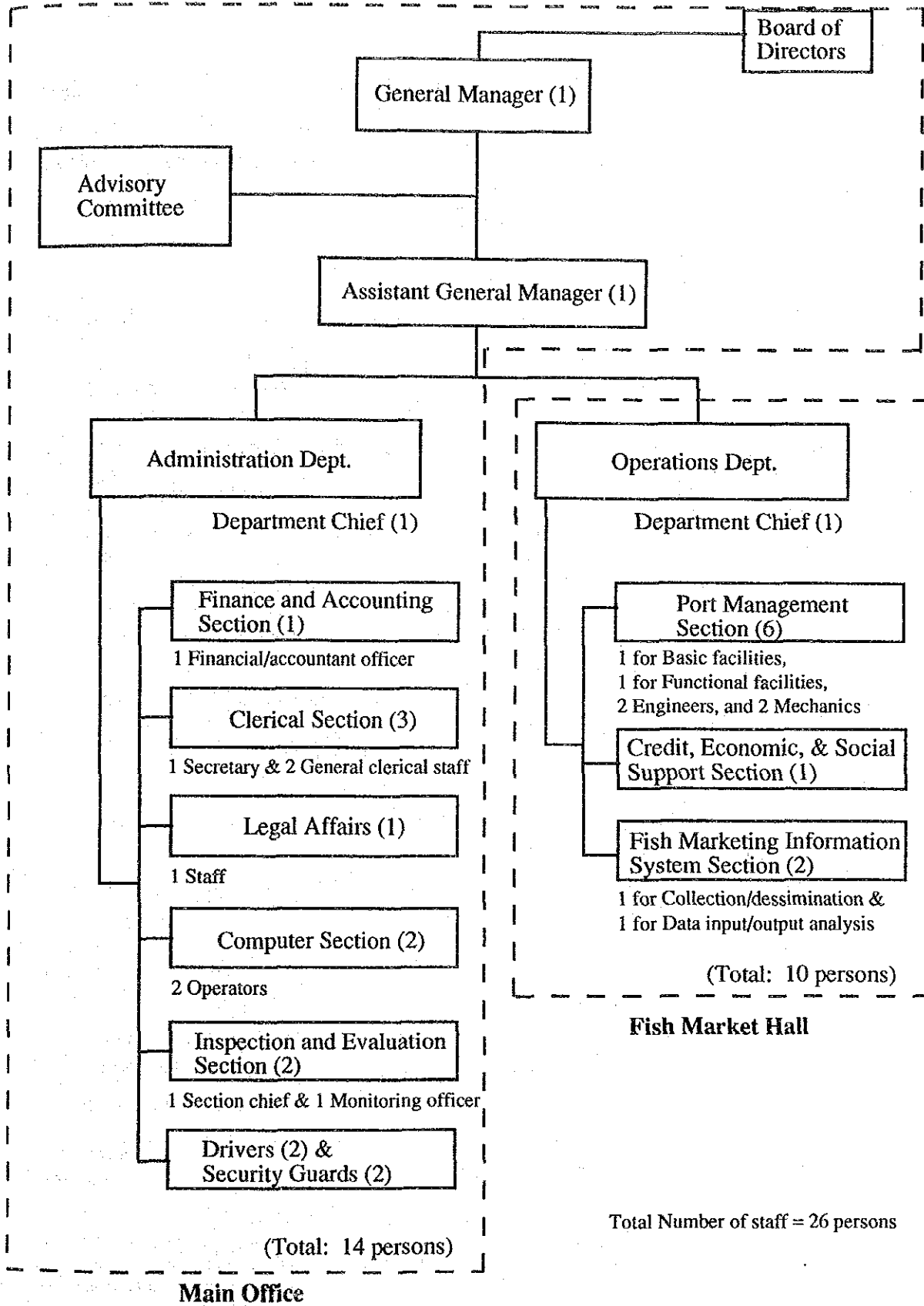


Fig. III.2.9.1 Operational Organization of the Complex

### 3. Project Evaluation

The economic and financial evaluation of the project was carried out based on the integration of basic and functional facilities as well as on institutional building aspects. The other benefits on land use and regional development, arising from the project have also been evaluated.

#### 3.1 Economic Evaluation

Economic evaluation was conducted with the project cost and major direct benefits accrued through opportunity cost and value added of processing. The evaluation index is the Economic Internal Rate of Return (EIRR) based on the following assumptions for the new Endau complex.

##### (1) With/without project

The following assumptions have been considered for the new Endau complex.

	Without Project	With Project
Fish landing	Quantity No change 1995 LKIM = 10% Private jetty = 90% 2010 LKIM = 10% Private jetty = 90%	No change LKIM = 50% Private jetty = 50% LKIM = 90% Private jetty = 10%
1) Time cost saving		
(a) Boat entry	Waiting time due to tidal condition and shallow berth	No need to wait due to sufficient depth for berthing
(b) Unloading/handling	Time consuming due to low efficiency of the facilities	Unloading/handling takes less time due to modernized equipment and facilities.
2) Fuel saving for RSW	40% of trawlers (C & C2) have to wait till next day to market their catch to consumption areas due to poor berthing facilities.	Only 20% of trawlers have to wait due to improved berthing facilities
3) Time cost saving (wholesalers/fish traders)	Wholesalers move to at least three landing sites to purchase fish. (decentralized marketing)	Wholesalers can assemble and trade under one roof (centralized marketing)
4) Credit tie	Added revenue in the form of commission paid to wholesalers in Singapore for credit tie	Foreign currency is economized due to income distribution of fishermen with implementation of credit system

(2) Physical life of project components

The physical life by project components is listed in Table III.3.1.2.

(3) Prices

All costs and benefits are indicated at the constant price of 1992.

### 3.1.1 Project Economic Cost

The financial cost of basic and functional facilities, etc. is converted to economic cost by applying the national economic conversion factors prepared by EPU as shown in Table III.3.1.1. The total economic cost is RM51.607 million which is about 84 percent of the financial cost (RM63.214 million). Transfer costs within the national economy, such as interest, insurance and tax are excluded from the economic cost.

### 3.1.2 Economic Benefits

(1) Time cost savings: Savings in opportunity costs due to reduced waiting time.

Without the Project, fishing boats will be forced to wait when passing through the river mouth and docking at the jetty for fish landing during the ebb and flow of the tide. Waiting time will be further incurred by crowded conditions due to insufficient jetty capacity. This time loss will contribute to a reduction in fishing hours (i.e. a drop in fish harvest efficiency), and market operational hours; and in order to adjust the value during the most optimum hours, loss resulting from waiting time on land after fish has been landed (additional costs) will be seen. This loss will be considerably alleviated with implementation of the Project, which will effect large scale improvements of the fishing port on the Endau River.

With the new Endau fishing complex, time cost is reduced in port entry, fish landing, marketing and waiting time. The time saved in 1995 and 2010 according to class of boat is shown in Table III.3.1.3. The time saved contributes to longer fishing hours. The catch per boat/class per fishing hour for 1995 and 2010 based on the estimated CPUE, is shown in Table III.3.1.3. Based on this net increase in fish catch, the annual benefit in 1995 is estimated to be RM 1.8 million and RM3.3 million in 2010.

(2) Fuel saving

In order to meet consumption market hours, the fish landed in the morning and early afternoon are marketed by direct consignment and daily cash trading. However, the boats (particularly C and C2 trawlers), arriving late in the evening must retain their catch in the fish hold until the next morning to unload. In order to maintain the quality of the fish, the RSW must be kept running for at least 12 hours.

Currently, about 40 percent of the trawlers (C & C2), arrive in the evening and wait until the following morning for unloading. With the project, about 20 percent have been projected to arrive late and will wait until the next morning. Therefore, about 20 percent of the trawlers will be able to unload their fish catch on the day of their arrival. Without the project, fishing boats of class C and C2 must keep the RSW operating, in order to maintain fish quality during the waiting period. With the project, the fuel for RSW can be economized, because the new fishing port has large fish landing facilities and most of the boats can enter into the port in the morning. The operation efficiency of the engine will be 40 percent, and the waiting period will be 12 hours. Fuel consumption of a class C boat is estimated to be 240 liters for 12 hours and 288 liters for a C2 boat. The details of the estimation is presented in Table III.3.1.4 and the annual fuel cost savings in 1995 and 2010 are given below.

	Unit: RM	
	1995	2010
Class C trawlers	106,080	112,320
Class C2 trawlers	102,960	149,760
Total	209,040	262,080

(3) Increase in added value due to improved standards in fish processing

Currently, cuttlefish, fish for surimi processing, etc. are exported to Thailand and Singapore in their natural state where they undergo processing. With implementation of the project, the fish will be domestically processed at the fish processing plants set up under the project, and exported. The ensuing increase in added value is viewed as a benefit.

Another item considered for value added benefit is round scad which is landed in large quantities during the glut season and used as feed for aquaculture or processed as fish meal. In this project, round scad will be frozen and effectively utilized. The value added benefits derived are summarized in the following page.



	Unit: RM	
	1995	2010
Cuttlefish	332,700	1,249,300
Surimi	308,100	1,004,900
Round scad	214,200	313,400
Dried/salted fish	205,600	205,600
<b>Total</b>	<b>1,060,600</b>	<b>2,773,200</b>

(4) Increased benefits due to a rise in distribution efficiency

Time and costs will be economized in the transition from decentralized to centralized marketing.

Currently wholesalers/fish dealers spend a considerable amount of time moving daily from one jetty to another purchasing fish. It is assumed that a fish dealer spends about four hours visiting at least four jetties daily.

With the project, fish landings are concentrated under one roof, and each dealer will save about four hours of his time. There are 114 fish dealers/wholesalers in the study area; and if 90 dealers (80%) visit the landing jetties daily, the total hours saved by one dealer is as follows:

$$\begin{aligned}
 3 \text{ hours} \times 360 \text{ days} &= 1,080 \text{ hours} \\
 &= 135 \text{ man days} \\
 &= 5.6 \text{ man months}
 \end{aligned}$$

The total man months of 90 dealers is  $5.6 \times 90 = 500$  man months. The annual time cost at RM4,800 per man month is as follows:

$$500 \times \text{RM}4,800 = \text{RM } 2,400,000$$

(5) Savings from credit service

Approximately 60 percent of the fish landed in Endau, is earmarked for Singapore. Of this amount, 35 percent is purchased by the Singaporean wholesalers, according to the existing credit system. Under the current situation, the fishermen sustain a loss due to payment of commissions to the Singaporean dealers. Concurrently, it is a loss in hard currency for Malaysia. With the institution of a credit system based on a BPM-AFA revolving fund, fishermen will no longer be required to pay these commissions, which will in turn contribute to an increase in hard currency and is a benefit.

Currently, the fishermen who are indebted to Singaporean wholesalers pay a maximum 20 percent of the fish value for every shipment of fish from the production area to the wholesalers in Singapore. In order to derive savings by eliminating commissions, a moderate 10 percent as credit service has been considered for the estimation. The estimated annual saving in 1995 and 2010 are summarized below.

	1995	2010
Export quantity (to Singapore)	29,034 MT	45,000 MT
Quantity with credit ties (35%)*	10,162 MT	15,750 MT
Credit service (10%)**	RM1,829,160	RM2,835,000

Remarks: \* indicates 35% of the quantity exported to Singapore are on credit-tie.  
 \*\* indicates 10% of the fish value deducted as credit service (fish price at RM1.80/kg).

### 3.1.3 Evaluation Results

#### (1) EIRR

The economic evaluation of the Project is shown in Table III.3.1.5. The EIRR (Economic Internal Rate of Return) of this project is estimated to be 12.05 percent. Implementation of facility construction will be feasible since the EIRR is higher than the long-term bank loan interest, which is 6.5 percent in Malaysia. Subsequently, the Project will contribute to the growth of the national economy.

#### (2) Sensitivity Analysis

Calculation of the EIRR was based on the most probable value of key factors. Sensitivity analysis was carried out to evaluate the extent of the changes in the EIRR, if key factors change within a reasonable range. The key factors and their percentages were considered and the results are shown below.

	Investment Cost	Benefit	EIRR
Base case	-	-	12.05%
Case 1	+10%	-	10.75%
Case 2	-	-10%	10.23%
Case 3	+10%	-10%	9.02%

### (3) Benefit distribution

The economic benefits accrued in this Project are characterized by opportunity cost in terms of time saving cost, fuel saving cost and savings from credit service, and value added of processing. The economic benefits are integrated with measures to build up the institutional building through revolving credit and AFA activities. In 1995, the share of opportunity costs arising from this Project is about 80 percent of the total economic benefit; and it reflects the significance of the benefit accorded to fishermen and wholesalers (50% to fishermen and 30% to wholesalers). The remaining 20 percent is to the processors through the value added of processing. Consequently, the project is economically justified.

## 3.2 Financial Evaluation

### 3.2.1 Evaluation of Institutional Plan

Financial evaluation of the proposed credit system and major AFA activities was made in order to clarify the financial viability of the proposed plan. It was found viable as delineated below.

#### (1) Financial evaluation of revolving credit

##### 1) Fund requirement

The monthly operating fund for fishing boats in Endau is shown in Table III.3.2.1 for 1995. The major items considered for the operation fund are fuel, maintenance, and food. The operating fund required for a A-class boat is estimated to be RM2,200 per month, RM9,625 for B-class and RM11,968 and RM7,124 for C and C2, respectively.

Fund requirement by percentage of boat coverage is shown in Table III.3.2.2. The total number of boats, including those at Penyabong, is projected at 274 in 1995. A coverage of 50 percent of the boats, i.e. 137 is planned for the revolving credit.

##### 2) AFA expenditures for revolving fund management

The implementation of the revolving fund by AFA will require administrative and other expenses, and the estimated expenditure by month and year is shown in Table III.3.2.3. Four personnel, including a division chief, will be required for credit management and administration, in addition to a computer for

data processing and accounting. The estimated cost is RM4,080 per month or RM48,960 per year.

3) Credit recovery and AFA's revenue from revolving fund management

Credit recovery and AFA revenue generated through management of the revolving fund, is shown in Table III.3.2.4. Sensitivity or viability analysis was done based on the interest rate to be charged to fishermen and the percentage of the boats to be covered (Table III.3.2.5). The source of the revolving credit fund will be from BPM since LKIM has stopped providing launching funds to AFAs. BPM charges an interest rate ranging from 2 to 6 percent for its loans, excluding its commission charge, if the source of the loan is from SPKP. In the viability analysis, case 6 (Table III.3.2.4) was found to be viable in terms of 50 percent coverage and profitability to AFA's efforts. The loans to fishermen must be recovered at an 8 percent interest in order to cover the BPM's interest of 4 percent (2% + 2%-BPM's commission) and AFA's 4 percent commission for its credit management. A minimum of 137 boats is required in order for the loans to remain viable (Table III.3.2.4). Monthly AFA income and debt service (interest and repayment of principal) were estimated for a three-month loan to fishermen (Table III.3.2.6). The AFA income is estimated to be RM87,721 a year for managing the revolving credit.

(2) Financial evaluation of AFA's activities

An evaluation of the Endau AFA activities delineated below indicate that the AFA is financially viable.

1) Economic activities

The major economic activities being carried out by Endau AFA are sales of diesel and ice, auction of fish landed at LKIM complex, and deep-sea fishing using two boats purchased on BPM loans. In 1990 the total net profit earned by AFA was RM300,818 from its economic activities including deep-sea fishing (Table III.3.2.11). Revenue generated from economic activities was RM547,398 and the expenditure was RM246,580, corresponding to 45 percent of the revenue.

With this Project, the economic activities are expected to be carried out on a comparatively larger scale (Table III.3.2.7). In 1995 diesel sale is projected to increase, when 50 percent of the fishing boats are projected to land their catches at LKIM complex. The diesel requirement of these boats is (including Penyabong) 20.8 million liters (Table III.3.2.7). The quantity of fish auctioned, including fishing boats at Penyabong, will be 4,147 MT and the commission earned at 3

percent is RM223,949. In the year 2010, the income from diesel sales and auctions will be RM 854,543. The earnings from deep-sea fishing operations are estimated to be RM102,496 in 1995 and RM325,000 in 2010 (Table III.3.2.8). The ice produced at the new complex will be 18,000 MT a year and will be sold by AFA. The expected revenue will be RM270,000 a year.

## 2) Social activities

Revenue generated from membership dues will be RM2,646 in 1995 and RM8,832 in 2010. This revenue will be allocated for credit and social activities, (the proposed membership dues are RM12 a year for full members and RM6 a year for associate members, Table III.3.2.9). The contribution to the social welfare program from each member is RM 20 a year; and the total revenue collected in 1995 will be RM9,000 and RM 14,900 in 2010 (Table III.3.2.10). The fund will be mainly used for education and compensation for deaths in the family.

## 3) Revolving fund

Income from the AFA revolving fund is expected to be about RM87,721 (Table III.3.2.6).

## (3) Justification

The income statement and cash flow of the AFA are shown in Table III.3.2.11. Currently the source of AFA revenue is mainly from the sales of diesel and ice, auction of fish and fishing; and it will continue to be the main source of funds since this Project will have a large impact on its revenues. The income statement shows a continuous surplus net income of RM513,674 in 1996 to RM1,262,256 in 2011. Although, there are weaknesses in AFA management, it can generate its own surplus through its economic activities. Its use of funds are only for social activities and it is comparatively low in comparison to its net income. Even after it is used for social activities, there is an ample surplus of cash flow. These surplus funds can be put to better use in terms of improving the skills of fishermen, as well as the socio-economic conditions of the fishing community.

### 3.2.2 Financial Evaluation of Revenue Earning Functional Facilities

A financial evaluation of the revenue earning facilities namely; fish processing facilities (surimi, cuttlefish , round scad, dried/salted fish), ice plant and ship yard was carried out using two interest rates; 6.5 percent (under AJDF loan) and 9 percent (under commercial loan). The projected scope of each facility for the year 2010 will be

constructed in 1995; and the total profit after depreciation and interest rate (6.5% and 9.0%) will be in the black. Each facility will be in a financially sound state, however, surimi and cuttlefish will be in the red during the initial stages (Table III.3.2.12).

### 3.2.3 Financial Evaluation of Pilot Project

Financial evaluation of the pilot project was based on income statement and cash flow. The following conditions were assumed for the calculation.

- Fund  
It is assumed that a loan, under favorable conditions will cover the project cost. Since the basic facilities of the project are mainly for the socio-economic benefits of the fishermen community, about 50 percent (RM6 million) of the cost of the basic facilities is considered as a subsidy (equity) from the government. The OECF loan conditions offered to Malaysia was considered. The annual interest rate is 3.0 percent and the repayment period is 25 years including a grace period of 7 years, was applied.
- Physical life of the project  
The physical life of project components is listed in Table III.3.1.2.
- Depreciation  
Depreciation costs are estimated by the fixed amount method.
- Prices  
All costs and benefits are indicated at the constant price of 1992.

#### (1) Revenue and operation cost

Revenue will be generated from processing facilities (cuttlefish, surimi and round scad) as well as shipyard and ice plant are shown in Table III.3.2.12. Service charges arising from the complex are indicated below. The operation and maintenance costs for the facilities under full and phase constructions are shown in Table III.3.2.14 (a) & (b).

Service Items	Unit: RM		
	1996	2000	2010
Berthing (Fish landing)	142,350	341,000	458,120
Forklift (rental)	110,400	255,750	343,590
Vehicles (entry)	12,000	31,200	36,000
Auction	354,275	700,000	1,551,816
Space rental	440,880	559,590	564,660

Remarks: Space rental refers to market hall, trader office, cold storage, canteen, fishing gear repair area, store, etc.

## (2) Financial cost

The financial cost of the pilot project facilities is RM63.214 million (Table III.3.2.13). On the basis of ownership and management role, the facilities are categorized into public service facilities (basic facilities and Group A of functional facilities) and revenue earning facilities (Group B of functional facilities). In the case of implementing the whole project by 1995, the cost of public service facilities that are to be constructed by the government and/or govt. subsidiary body, is RM40.990 million. The cost of revenue earning facilities (Group B) is RM22.223 million that can be constructed by the govt. subsidiary body and/or private sector. In case of implementing the project by phase construction, i.e. the public service facilities in 1995 and the functional facilities in 2000, the cost of public service facilities in 1995 is RM29.793 million and RM11.197 million in 2000; and the cost of revenue earning facilities is RM22.223 million in 2000.

### 3.2.4 FIRR

The income statement and cash flow of full construction and phase construction is shown in Table III.3.2.15 (a) and Table III.3.2.15 (b), respectively. The Financial Internal Rates of Return (FIRR) are in Tables III.3.2.16 (a) & (b). In case of full construction, the FIRR is 7.38 percent with equity. In case of phase construction the FIRR is 8.45 percent with equity. Since the FIRR is higher than the interest rate of 3.0% under the OECF loan to Malaysia, and interest rate of 6.5 percent (AJDF), the project is viable financially.

### 3.2.5 Sensitivity Analysis

A sensitivity analysis was carried out to evaluate the extent of the changes in the FIRR, if the key factors change within a reasonable range. The key factors and their percentages were considered and the results are shown below. The project is considered financially viable even in case 3 (10% increase in cost and 10% fall in benefit), where the FIRR range from 5.70 to 6.38 percents.

	Investment Cost	Benefit	Financial Internal Rate of Return (FIRR)	
			Full Construction	Phase Construction
Base case	-	-	7.38%	8.45%
Case 1	+10%	-	6.35%	7.45%
Case 2	-	-10%	6.12%	7.18%
Case 3	+10%	-10%	5.70%	6.38%

Table III.3.1.1 Financial and Economic Cost

Items	Financial Cost	Conversion Factor	Unit: RM
			Economic Cost (Cost x Factor)
Office	4,300,977	0.81	3,483,792
Reinforced Conc.Piling	4,737,651	0.78	3,695,368
Timber Piling	146,550	0.88	128,964
Excav.& Embankment	1,634,735	0.8	1,307,788
General Road Building	1,233,000	0.84	1,035,720
Conc.work	6,503,068	0.77	5,007,362
Structural Steel Work	4,239,420	0.78	3,306,748
Prelims	4,198,643	0.84	3,526,860
Land clearing/improv	1,200,000	0.84	1,008,000
Relocation of DID Drain	172,500	0.84	144,900
Ext.Work	580,000	0.84	487,200
Spl Plant(incl waste trt)	11,617,000	0.84	9,758,280
M&E	6,190,632	0.84	5,200,131
Furniture,tools	505,000	0.84	424,200
Navigational system	500,000	0.84	420,000
Others	4,536,825	0.84	3,810,933
Land Acquisition	734,058	0.84	616,609
Consultancy Fee	4,433,680	0.77	3,413,934
Contingencies	5,750,000	0.84	4,830,000
<b>Total</b>	<b>63,213,740</b>		<b>51,606,788</b>

Remarks: Constant price 1992

Source: Conversion factors from "National Parameters for Project Appraisal in Malaysia Vols. I & II, 1986, EPU, Malaysia".



Table II.3.1.2 Physical Life of Civil/Building and Plant/Equipment

	Unit: RM				
	Civil/Building	Lifespan	Plant/Equipment	Lifespan	Depreciation
<b>BASIC FACILITIES</b>					
1 Jetty	7,421,041	50	-	-	148,421
2 Mooring Facilities	506,550	10	-	-	50,655
3 Revetment and shore protection	3,810,600	50	-	-	76,212
4 Navigation sys. & survey	-		400,000	10	40,000
<b>FUNCTIONAL FACILITIES</b>					
5 Office	803,925	25	150,000	5	62,157
6 Marketing Hall/Cold Storage	4,618,893	25	2,006,000	15	318,489
7 Ice plant	1,291,276	25	1,660,000	15	162,318
8 Surimi plant	1,152,037	25	2,745,000	15	229,081
9 Freezing plant	2,121,093	25	1,689,000	15	197,444
10 Dry fish plant	236,690	25	219,000	15	24,068
11 Ship yard	2,052,945	25	1,126,000	15	157,184
12 Workshop	235,485	25	555,000	15	46,419
13 Fish gear storage	512,150	25	-	-	20,486
14 Shop & mosque	318,975	25	-	-	12,759
15 Power station	307,926	25	1,183,500	15	91,217
16 Water reservoir	119,835	15	-	-	7,989
17 Fish gear repair area	629,030	25	-	-	25,161
18 Waste water treatment	704,770	25	1,300,000	15	114,857
19 Infrastructure	4,428,340	15	-	-	295,223
20 Fuel supply/pump house	63,000	25	167,000	15	13,653
21 Other facilities	1,276,242	25	-	-	51,050
22 Furniture	-		380,000	15	25,333

Remarks: Based on Japanese standard.

Table III.3.1.3 Increase of Catch and Benefit through Time Saving

	Total Time Saved (hr)		Catch/boat/hour (kg)		Increase Catch (MT)		Net Cash Benefit (RM/kg) (Deduct operation cost from catch value)		Total Benefit (RM)	
	1995	2010	1995	2010	1995	2010			1995	2010
Trawler										
A	413	-	-	-	-	-	-	-	-	-
B	1,267	-	127	-	97	0	0.60	(1.80-1.20)	57,927	0
C	5,647	6,796	190	201	644	1,024	0.85	(1.80-0.95)	547,194	870,822
C2	5,069	8,737	226	212	859	1,389	0.95	(1.80-0.85)	816,236	1,319,724
P.Seine										
A	-	-	-	-	-	-	-	-	-	-
B	351	-	130	-	46	0	0.90	(1.80-0.90)	41,067	0
C	1,145	3,304	156	225	179	743	1.10	(1.80-0.70)	196,482	817,740
C2	445	1,128	172	173	77	195	1.20	(1.80-0.60)	91,848	234,173
Others										
A	3,499	-	4	-	14	-	1.90	(2.50-0.60)	26,592	0
B	4,228	4,691	6	8	25	38	1.90	(2.50-0.60)	48,199	71,303
C	-	-	-	-	-	-	-	-	-	-
C2	-	-	-	-	-	-	-	-	-	-
	22,064	24,656			1,940	3,390			1,825,546	3,313,762

Remarks: 1) Increase catch benefit refers to food fish (excludes trash fish).

Table III.3.1.4 Total Hours of Waiting and Fuel Consumption for RSW

	No. of Boats		Trips/ year	No. of boats had to wa		Total waiting hours		Total fuel consumed (l)		Total fuel cost (RM)	
	1995	2010		1995	2010	1995	2010	1995	2010	1995	2010
Trawler											
C	83	88	40	17	18	8,160	8,640	163,200	172,800	106,080	112,320
C2	109	158	25	22	32	6,600	9,600	158,400	230,400	102,960	149,760
<b>TOTAL</b>						<b>14,760</b>	<b>18,240</b>	<b>321,600</b>	<b>403,200</b>	<b>209,040</b>	<b>262,080</b>

Remarks: 1) Based on one-week survey, about 40 percent of C & C2 boats entering Endau in the evening wait till next morning for unloading.

- 2) With the project, 20 percent of boats are assumed to arrive in the afternoon.
- 3) The RSW has to be kept running in order to maintain the fish quality.
- 4) Operation efficiency of the engine is 40%.
- 5) The waiting hours till morning is on an average 12 hours.
- 6) Fuel consumption for 12 hours is 240 liters for class C (250 HP) and 288 liters for class C2 (300 HP).
- 7) Cost per liter of diesel is RM0.65.
- 8) Assumed that only C and C2 boats wait till next morning.

Table III. 3.1.5 Economic Evaluation of the Pilot Project

Year	Unit: RM			
	Investment Cost	O/M Cost	Benefits	Net Benefit
1995	51,606,788		0	-51,606,788
1996		1,754,776	7,324,346	5,569,570
1997		1,754,776	7,518,938	5,764,162
1998		1,754,776	7,723,210	5,968,434
1999		1,754,776	7,937,743	6,182,967
2000	396,000	1,754,776	8,163,164	6,012,388
2001		1,865,656	8,400,142	6,534,486
2002		1,865,656	8,649,394	6,783,738
2003		1,865,656	8,911,687	7,046,031
2004		1,865,656	9,187,847	7,322,191
2005	1,193,764	1,865,656	9,478,756	6,419,336
2006		1,865,656	9,785,364	7,919,708
2007		1,865,656	10,108,689	8,243,033
2008		1,865,656	10,449,824	8,584,168
2009		1,865,656	10,809,946	8,944,290
2010	15,865,234	1,865,656	11,190,316	-6,540,574
2011		2,036,596	11,584,042	9,547,446
2012		2,036,596	11,584,042	9,547,446
2013		2,036,596	11,584,042	9,547,446
2014		2,036,596	11,584,042	9,547,446
2015	1,193,764	2,036,596	11,584,042	8,353,682
2016		2,036,596	11,584,042	9,547,446
2017		2,036,596	11,584,042	9,547,446
2018		2,036,596	11,584,042	9,547,446
2019		2,036,596	11,584,042	9,547,446
2020		2,036,596	11,584,042	9,547,446

EIRR= 12.05%

Table III.3.2.1 Monthly Fishing Operation Fund Required for Boats Endau/Penyabong (1995)

	O/M Cost Per Trip (RM)			Total Cost/ Boat/Trip (RM)	Trips/ Month	O/M Cost/ Month	No of Boats 1995	Unit: RM
	Fuel	Food	Maintenance					Fund Required
	Per Month (RM)							
<b>Endau</b>								
<b>Trawlers</b>								
Class A	50	10	50	110	20	2,200	5	11,000
Class B	1,600	120	205	1,925	5	9,625	30	288,750
Class C	2,480	150	362	2,992	4	11,968	60	718,080
Class C-2	2,970	150	442	3,562	2	7,124	84	598,416
<b>P.Seine</b>								
Class A				0				
Class B	840	80	117	1,037	8	8,296	5	41,480
Class C	900	150	132	1,182	10	11,820	10	118,200
Class C-2	1,040	150	132	1,322	7	9,254	5	46,270
<b>Others</b>								
Class A	35	10	50	95	20	1,900	10	19,000
Class B	1,600	50	205	1,855	5	9,275	20	185,500
<b>Penyabong</b>								
Class A	50	10	50	110	20	2,200	20	44,000
Class B	1,600	120	205	1,925	15	28,875	25	721,875
<b>Total</b>							<b>274</b>	<b>2,792,571</b>

Remarks: 1) Constant price in 1992.

Table III.3.2.2 Fund Requirement for Fishing Operation in Endau (1995)

Percentage of Boat Coverage for Funding (%)	Number of Boats	Unit: RM
		Fund Required Per Month (RM)
20	55	558,514
30	82	837,771
40	110	1,117,028
50	137	1,396,286
60	164	1,675,543
70	192	1,954,800

Remarks: 1) Total number of boats 274 (1995) (incl. Penyabong)

2) Constant price in 1992

Table III.3.2.3 Expenditure Incurred For Credit Activity by AFA

Items	Unit: RM	
	Monthly	Annual
Division chief	1,250	15,000
Loan officer	1,000	12,000
Savings officer	750	9,000
Clerk	500	6,000
Computer	330	3,960
Communication	150	1,800
Transportation	100	1,200
<b>Total</b>	<b>4,080</b>	<b>48,960</b>

Remarks: 1) Cost of a computer is RM20,000. (including printer).

2) Constant price in 1992

Table III.3.2.4 Credit Recovery and AFA's Income through Revolving Fund Management (1/3)

Case-1		Interest= (BPM; 2% + 2%, AFA; 2%)					Unit: RM	
%	Number of Boats for Fund	In case of 6% interest from Fishermen						
		Revolving Fund Required/month	Recovery with 6% interest	Re-payment with 4% Interest to BPM	AFA's Income	AFA's Expenditure	AFA's Profit	
20	55	558,514	561,307	560,376	931	4,080	-3,149	
30	82	837,771	841,960	840,564	1,396	4,080	-2,684	
40	110	1,117,028	1,122,614	1,120,752	1,862	4,080	-2,218	
50	137	1,396,286	1,403,267	1,400,940	2,327	4,080	-1,753	
60	164	1,675,543	1,683,920	1,681,128	2,793	4,080	-1,287	
70	192	1,954,800	1,964,574	1,961,316	3,258	4,080	-822	

Case-2		Interest= (BPM; 4% + 2%, AFA; 2%)					Unit: RM	
%	Number of Boats for Fund	In case of 8% interest from Fishermen						
		Revolving Fund Required/month	Recovery with 8% interest	Re-payment with 6% Interest to BPM	AFA's Income	AFA's Expenditure	AFA's Profit	
20	55	558,514	562,238	561,307	931	4,080	-3,149	
30	82	837,771	843,356	841,960	1,396	4,080	-2,684	
40	110	1,117,028	1,124,475	1,122,614	1,862	4,080	-2,218	
50	137	1,396,286	1,405,594	1,403,267	2,327	4,080	-1,753	
60	164	1,675,543	1,686,713	1,683,920	2,793	4,080	-1,287	
70	192	1,954,800	1,967,832	1,964,574	3,258	4,080	-822	

Case-3		Interest= (BPM; 6% + 2%, AFA; 2%)					Unit: RM	
%	Number of Boats for Fund	In case of 10% interest from Fishermen						
		Revolving Fund Required/month	Recovery with 10% interest	Re-payment with 8% Interest to BPM	AFA's Income	AFA's Expenditure	AFA's Profit	
20	55	558,514	563,168	562,238	931	4,080	-3,149	
30	82	837,771	844,753	843,356	1,396	4,080	-2,684	
40	110	1,117,028	1,126,337	1,124,475	1,862	4,080	-2,218	
50	137	1,396,286	1,407,921	1,405,594	2,327	4,080	-1,753	
60	164	1,675,543	1,689,505	1,686,713	2,793	4,080	-1,287	
70	192	1,954,800	1,971,090	1,967,832	3,258	4,080	-822	

Remarks: 1) BPM charges minimum 2% and maximum 6% (SPKP) percent annual interest of its loan.

2) Percentage indicates share of boat coverage for funding.

3) Total number of boats 274 (229-Endau and 74- Penyabong)

4) Prices constant in 1992.

Table III.3.2.4 Credit Recovery and AFA's Income through Revolving Fund Management (2/3)

Case-4		Interest= (BPM; 2% + 2%, AFA; 3%)						Unit: RM
%	Number of Boats for Fund	In case of 7% interest from Fishermen						
		Revolving Fund Required/month	Recovery with 7% interest	Re-payment with 4% Interest to BPM	AFA's Income	AFA's Expenditure	AFA's Profit	
20	55	558,514	561,772	560,376	1,396	4,080	-2,684	
30	82	837,771	842,658	840,564	2,094	4,080	-1,986	
40	110	1,117,028	1,123,544	1,120,752	2,793	4,080	-1,287	
50	137	1,396,286	1,404,430	1,400,940	3,491	4,080	-589	
60	164	1,675,543	1,685,317	1,681,128	4,189	4,080	109	
70	192	1,954,800	1,966,203	1,961,316	4,887	4,080	807	

Case-5		Interest= (BPM; 2% + 2%, AFA; 3.5%)						Unit: RM
%	Number of Boats for Fund	In case of 7.5% interest from Fishermen						
		Revolving Fund Required/month	Recovery with 7.5% interest	Re-payment with 4% Interest to BPM	AFA's Income	AFA's Expenditure	AFA's Profit	
20	55	558,514	562,005	560,376	1,629	4,080	-2,451	
30	82	837,771	843,007	840,564	2,443	4,080	-1,637	
40	110	1,117,028	1,124,010	1,120,752	3,258	4,080	-822	
50	137	1,396,286	1,405,012	1,400,940	4,072	4,080	-8	
60	164	1,675,543	1,686,015	1,681,128	4,887	4,080	807	
70	192	1,954,800	1,967,017	1,961,316	5,701	4,080	1,621	

Case-6		Interest= (BPM; 2% + 2%, AFA; 4%)						Unit: RM
%	Number of Boats for Fund	In case of 8% interest from Fishermen						
		Revolving Fund Required/month	Recovery with 8% interest	Re-payment with 4% Interest to BPM	AFA's Income	AFA's Expenditure	AFA's Profit	
20	55	558,514	562,238	560,376	1,862	4,080	-2,218	
30	82	837,771	843,356	840,564	2,793	4,080	-1,287	
40	110	1,117,028	1,124,475	1,120,752	3,723	4,080	-357	
50	137	1,396,286	1,405,594	1,400,940	4,654	4,080	574	
60	164	1,675,543	1,686,713	1,681,128	5,585	4,080	1,505	
70	192	1,954,800	1,967,832	1,961,316	6,516	4,080	2,436	

- Remarks: 1) BPM charges minimum 2% and maximum 6% (SPKP) percent annual interest of its loan.  
 2) Percentage indicates share of boat coverage for funding.  
 3) Total number of boats 274 (229-Endau and 74- Penyabong).  
 4) Prices constant in 1992.

Table III.3.2.4 Credit Recovery and AFA's Income through Revolving Fund Management (3/3)

Case-7		Interest= (BPM; 4% + 2%, AFA; 3%)						Unit: RM
%	Number of Boats for Fund	In case of 7.5% interest from Fishermen						
		Revolving Fund Required/month	Recovery with 9% interest	Re-payment with 6% Interest to BPM	AFA's Income	AFA's Expenditure	AFA's Profit	
20	55	558,514	562,703	561,307	1,396	4,080	-2,684	
30	82	837,771	844,055	841,960	2,094	4,080	-1,986	
40	110	1,117,028	1,125,406	1,122,614	2,793	4,080	-1,287	
50	137	1,396,286	1,406,758	1,403,267	3,491	4,080	-589	
60	164	1,675,543	1,688,109	1,683,920	4,189	4,080	109	
70	192	1,954,800	1,969,461	1,964,574	4,887	4,080	807	

Case-8		Interest= (BPM; 4% + 2%, AFA; 3.5%)						Unit: M\$
%	Number of Boats for Fund	In case of 8% interest from Fishermen						
		Revolving Fund Required/month	Recovery with 9.5% interest	Re-payment with 6% Interest to BPM	AFA's Income	AFA's Expenditure	AFA's Profit	
20	55	558,514	562,936	561,307	1,629	4,080	-2,451	
30	82	837,771	844,404	841,960	2,443	4,080	-1,637	
40	110	1,117,028	1,125,872	1,122,614	3,258	4,080	-822	
50	137	1,396,286	1,407,339	1,403,267	4,072	4,080	-8	
60	164	1,675,543	1,688,807	1,683,920	4,887	4,080	807	
70	192	1,954,800	1,970,275	1,964,574	5,701	4,080	1,621	

Remarks: 1) BPM charges minimum 2% and maximum 6% (SPKP) percent annual interest of its loan.

2) Percentage indicates share of boat coverage for funding.

3) Total number of boats 274 (229-Endau and 74- Penyabong)

4) Prices constant in 1992.

Table III.3.2.5 Sensitivity of Revolving Credit for Coverage of 50 Percent of the Boats By Different Interest Rates

	Interest Requirement			Total	Status
	SPKP	BPM	AFA		
Case-1	2%	2%	2%	6%	Not viable
Case-2	4%	2%	2%	8%	Not viable
Case-3	6%	2%	2%	10%	Not viable
Case-4	2%	2%	3%	7%	Not viable
Case-5	2%	2%	3.5%	7.5%	Not viable
Case-6	2%	2%	4%	8%	Viable
Case-7	4%	2%	3%	9%	Not viable
Case-8	4%	2%	3.5%	9.5%	Not viable

Remarks: Fifty percent coverage of boats was fixed based on the survey of fishermen.

Table III.3.2.6 Monthly Income Through Revolving Fund Management

										Unit: RM
Months	1	2	3	4	5	6	7	8	9	
Recovery from Loanee (8%)										
Interest		55,851	103,283	141,957	115,672	88,336	59,906	30,340	10,245	-
Repayment		210,507	429,434	657,118	683,403	710,739	739,169	502,377	256,114	-
Total		266,358	532,717	799,075	799,075	799,075	799,075	532,717	266,358	-
Repayment to BPM (4%)										
Interest		27,926	51,424	70,408	56,518	42,008	27,209	12,113	3,479	-
Repayment		221,348	447,122	694,497	725,472	739,981	754,781	520,603	262,879	-
Total		249,273	498,547	764,905	781,990	781,990	781,990	532,716	266,358	-
Income for AFA		17,085	34,170	34,170	17,085	17,085	17,085	0	0	136,681
Expense		8,160	8,160	8,160	8,160	8,160	8,160			48,960
Profit		8,925	26,010	26,010	8,925	8,925	8,925	0	0	87,721

Remarks: Monthly AFA income and debt service (interest and repayment of principal) were estimated for a three-month loan covering 50 percent of the boats in 1995.

Table III.3.2.7 Revenue by AFA Economic Activities (1995 &amp; 2010)

**1. Endau****Diesel**

	Requirement in Endau (liter)	AFA handling volume (liter)	Commission per liter (RM)	Value RM
1995	23,203,900	11,601,950	0.03	348,059
2010	26,941,250	24,247,125	0.03	727,414

**Fish sales (auction)**

	Landing at LKIM (MT)	AFA handling (MT)	Commission (RM/kg) (3% of sales value)	Value RM
1995	14,236	2,847	0.054	153,749
2010	45,812	18,325	0.054	989,539

Remarks: 1) Auction commission at 5% of fish sales (3% for AFA and 2% for LKIM).

**Ice sales**

	Production (MT)	AFA handling (MT)	Commission RM/MT	Value RM
1995	18,000	18,000	15	270,000
2010	18,000	18,000	15	270,000

Remarks: Ice requirement for Penyabong included.

**2. Penyabong****Diesel**

	Requirement in Endau (liter)	AFA handling volume (liter)	Commission per liter (RM)	Value RM
1995	9,240,000	9,240,000	0.03	277,200
2010	18,480,000	18,480,000	0.03	554,400

**Fish sales (auction)**

	Landing at LKIM (MT)	AFA handling (MT)	Commission (RM/kg) (3% of sales value)	Value RM
1995	1,300	1,300	0.054	70,200
2010	1,875	1,875	0.054	101,250

Remarks: 1) 50 percent of boats are recipient of credit through revolving fund.

2) 50 percent of catch are to be marketed through AFA at LKIM Complex.

3) Fish price at RM1.80/kg.



Table III.3.2.8 Income Statement and Cash Flow of AFA Fishing Boats (1/3)

	Unit: RM						
<b>I. Income Statement</b>	1990	1991	1992	1993	1994	1995	1996
A. Revenue	0	243,987	243,987	487,974	487,974	547,200	547,200
1) Old boat		243,987	243,987	243,987	243,987	273,600	273,600
2) New Boat		0	0	243,987	243,987	273,600	273,600
B. Expense	0	180,679	178,855	375,507	369,538	376,633	369,967
1. Operation cost (Old boat)		145,799	145,799	145,799	145,799	152,500	152,500
2. Operation cost (New boat)		0	0	145,799	145,799	152,500	152,500
3. Depreciation		25,000	25,000	55,000	55,000	55,000	55,000
4. Interest		9,880	8,056	28,909	22,940	16,633	9,967
C. Income before D & I	0	98,188	98,188	196,376	196,376	242,200	242,200
D. Net Income	0	63,308	65,132	112,467	118,436	170,567	177,233
<b>II. Cash Flow</b>							
A. Sources of Funds	355,000	88,308	533,852	167,467	173,436	225,567	232,233
1) Equity	108,000		93,720				
2) BPM (SKPK)	247,000						
3) BPM (AJDF)	0	0	350,000				
4) Depreciation	0	25,000	25,000	55,000	55,000	55,000	55,000
5) Net income	0	63,308	65,132	112,467	118,436	170,567	177,233
B. Uses of Funds	355,000	45,602	491,146	110,795	136,764	123,071	95,255
1) Construction	355,000		443,720				
2) Reinvestment (Net)					20,000		21,000
3) Repayment (old boat)		45,602	47,426	49,323	51,296	53,348	
4) Repayment (new boat)				61,472	65,468	69,723	74,255
C. Net cash flow	0	42,706	42,706	56,672	36,672	102,496	136,978

Table III.3.2.8 Income Statement and Cash Flow of AFA Fishing Boats (2/3)

	Unit: RM						
<b>I. Income Statement</b>	2004	2005	2006	2007	2008	2009	2010
A. Revenue	547,200	547,200	547,200	547,200	547,200	547,200	812,000
1) Old boat	273,600	273,600	273,600	273,600	273,600	273,600	406,000
2) New Boat	273,600	273,600	273,600	273,600	273,600	273,600	406,000
B. Expense	360,000	360,000	335,000	335,000	305,000	305,000	467,000
1. Operation cost (Old boat)	152,500	152,500	152,500	152,500	152,500	152,500	206,500
2. Operation cost (New boat)	152,500	152,500	152,500	152,500	152,500	152,500	260,500
3. Depreciation	55,000	55,000	30,000	30,000	0	0	0
4. Interest	0	0	0	0	0	0	0
C. Income before D & I	242,200	242,200	242,200	242,200	242,200	242,200	345,000
D. Net Income	187,200	187,200	212,200	212,200	242,200	242,200	345,000
<b>II. Cash Flow</b>							
A. Sources of Funds	242,200	242,200	242,200	242,200	242,200	242,200	345,000
1) Equity							
2) BPM (SKPK)							
3) BPM (AJDF)							
4) Depreciation	55,000	55,000	30,000	30,000	0	0	0
5) Net income	187,200	187,200	212,200	212,200	242,200	242,200	345,000
B. Uses of Funds	21,000	0	20,000	0	21,000	0	20,000
1) Construction							
2) Reinvestment (Net)	21,000		20,000		21,000		20,000
3) Repayment (old boat)							
4) Repayment (new boat)							
C. Net cash flow	221,200	242,200	222,200	242,200	221,200	242,200	325,000

Table III.3.2.8 Income Statement and Cash Flow of AFA Fishing Boats (3/3)

	Unit: RM						
	2004	2005	2006	2007	2008	2009	2010
<b>I. Income Statement</b>							
A. Revenue	547,200	547,200	547,200	547,200	547,200	547,200	812,000
1) Old boat	273,600	273,600	273,600	273,600	273,600	273,600	406,000
2) New Boat	273,600	273,600	273,600	273,600	273,600	273,600	406,000
B. Expense	360,000	360,000	335,000	335,000	305,000	305,000	467,000
1. Operation cost (Old boat)	152,500	152,500	152,500	152,500	152,500	152,500	206,500
2. Operation cost (New boat)	152,500	152,500	152,500	152,500	152,500	152,500	260,500
3. Depreciation	55,000	55,000	30,000	30,000	0	0	0
4. Interest	0	0	0	0	0	0	0
C. Income before D & I	242,200	242,200	242,200	242,200	242,200	242,200	345,000
D. Net Income	187,200	187,200	212,200	212,200	242,200	242,200	345,000
<b>II. Cash Flow</b>							
A. Sources of Funds	242,200	242,200	242,200	242,200	242,200	242,200	345,000
1) Equity							
2) BPM (SKPK)							
3) BPM (AJDF)							
4) Depreciation	55,000	55,000	30,000	30,000	0	0	0
5) Net income	187,200	187,200	212,200	212,200	242,200	242,200	345,000
B. Uses of Funds	21,000	0	20,000	0	21,000	0	20,000
1) Construction							
2) Reinvestment (Net)	21,000		20,000		21,000		20,000
3) Repayment (old boat)							
4) Repayment (new boat)							
C. Net cash flow	221,200	242,200	222,200	242,200	221,200	242,200	325,000

Table III.3.2.9 AFA Membership Dues and Its Usage Allocation

	Annual Dues (RM/Member)	Members	Total (RM)	Usage Allocation (RM)	
				Credit	Social
1995					
Full member	12	432	5,184	2,592	2,592
Associate member	6	18	108	54	54
		450	5,292	2,646	2,646
2010					
Full member	12	727	8,724	4,362	4,362
Associate member	6	18	108	54	54
		745	8,832	4,416	4,416

Table III.3.2.10 Contribution for Social Welfare and Its Usage and Saving

	Annual Dues (RM/Member)	Members	Total (RM)	Usage (RM)		Unit: RM
				Education	Death	Balance
1995	20	450	9,000	2,000	2,500	4,500
2010	20	745	14,900	4,000	3,500	7,400

Remarks: 1) Education assistance to 100 persons at RM20/person.

2) Death condolence expense to 1% of members at RM500/person.

3) Annual contribution of RM20/member for social welfare to be collected.

Table III.3.2.11 Income Statement Endau AFA (1/2)

	Unit: RM								
	1990	1996	1997	1998	1999	2000	2001	2002	2003
<b>A. Revenue</b>	547,398	1,046,516	1,098,609	1,155,207	1,216,742	1,283,694	1,356,591	1,436,752	1,524,203
1) Diesel supply	226,201	348,058	366,227	385,344	405,459	426,624	448,893	472,326	496,981
2) Ice supply	175,440	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000
3) Auction	85,783	223,949	249,703	278,419	310,437	346,137	385,943	430,327	479,814
4) Fishing	59,974	102,496	110,183	118,447	127,330	136,880	147,146	158,918	171,631
5) Welfare fund		9,000	9,302	9,615	9,939	10,275	10,622	10,981	11,352
6) Member dues		5,292	5,473	5,661	5,856	6,057	6,265	6,480	6,703
7) Revolving fund		87,721	87,721	87,721	87,721	87,721	87,721	87,721	87,721
<b>B. Expense</b>	246,580	532,842	549,300	577,600	608,370	641,850	691,740	733,360	778,800
1. Salary	57,627	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000
2. Other expense	188,953	253,300	279,300	307,600	338,370	371,850	421,740	463,360	508,800
3. Social service	0	9,542	9,903	10,277	10,666	11,069	11,489	11,926	12,381
<b>C. Net Income</b>	300,818	513,674	549,309	577,607	608,372	641,844	664,851	703,392	745,403

Table III.3.2.11 Income Statement Endau AFA (2/2)

	Unit: RM							
	2004	2005	2006	2007	2008	2009	2010	2011
<b>A. Revenue</b>	1,620,528	1,725,815	1,840,971	1,966,995	2,105,003	2,256,221	2,422,011	2,524,656
1) Diesel supply	522,923	550,220	578,941	609,162	640,960	674,419	709,623	727,414
2) Ice supply	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000
3) Auction	534,993	596,517	665,117	741,605	826,890	921,982	1,028,010	1,090,789
4) Fishing	186,220	202,049	219,223	237,857	258,075	280,011	303,812	325,000
5) Welfare fund	11,737	12,135	12,548	12,974	13,416	13,873	14,346	14,900
6) Member dues	6,934	7,173	7,421	7,676	7,941	8,216	8,499	8,832
7) Revolving fund	87,721	87,721	87,721	87,721	87,721	87,721	87,721	87,721
<b>B. Expense</b>	828,900	883,690	943,650	1,009,330	1,081,300	1,160,200	1,246,800	1,262,400
1. Salary	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000
2. Other expense	558,900	613,690	673,650	739,330	811,300	890,200	976,800	992,400
3. Social service	12,852	13,344	13,852	14,382	14,934	15,506	16,102	16,557
<b>C. Net Income</b>	791,628	842,125	897,321	957,665	1,023,703	1,096,021	1,175,211	1,262,256

Remarks: Data 1990 Annual Report Endau AFA

Table III.3.2.12 Revenue and Expenditure of Functional Facilities (1/3)

<b>Total Functional Activities</b>		Unit: RM		
	1996	2001	2011	
Revenue	11,363,700	16,874,900	22,883,000	
Expenditure	9,393,600	13,815,500	18,821,200	
Raw materials	6,707,200	10,438,300	14,647,400	
Packing	237,500	414,200	591,200	
Ice	81,100	123,300	175,700	
Fuel	14,100	21,800	30,800	
Utility	459,000	512,800	574,800	
Salary	1,064,000	1,208,000	1,430,000	
Administrative	166,500	180,900	203,100	
Maintenance	349,200	349,200	349,200	
Transportation	315,000	567,000	819,000	
Profit bef. Deprec.	1,970,100	3,059,400	4,061,800	
Depreciation	770,200	770,200	770,200	
Interest (6.5%)	929,080	929,080	929,080	
Profit after Deprec. & Int. (6.5%)	270,820	1,360,120	2,362,520	
Interest (9.0%)	1,286,418	1,286,418	1,286,418	
Profit after Deprec. & Int. (9.0%)	-86,518	1,002,782	2,005,182	

Remarks: Maintenance cost includes that of waste water treatment plant and workshop.

<b>Surimi</b>		Unit: RM		
	1996	2001	2011	
Revenue	2,227,500	3,442,500	4,860,000	
Expenditure	1,712,500	2,314,400	3,403,600	
Raw materials	1,107,000	1,530,000	2,415,300	
Packing	62,700	96,900	136,800	
Ice	57,600	89,000	125,700	
Fuel	14,100	21,800	30,800	
Utility	75,000	101,400	127,300	
Salary	282,000	354,000	438,000	
Administrative	28,200	35,400	43,800	
Maintenance	85,900	85,900	85,900	
Profit bef. Deprec. & Int.	515,000	1,128,100	1,456,400	
Depreciation	229,100	229,100	229,100	
Interest (6.5%)	253,280	253,280	253,280	
Profit after Deprec. & Int. (6.5%)	32,620	645,720	974,020	
Interest (9.0%)	350,695	350,695	350,695	
Profit after Deprec. & Int. (9.0%)	-64,795	548,305	876,605	

Table III.3.2.12 Revenue and Expenditure of Functional Facilities (2/3)

<b>Cuttlefish</b>		Unit: RM		
	1996	2001	2011	
Revenue	5,251,500	9,444,700	13,653,900	
Expenditure	4,918,800	8,670,000	12,404,600	
Raw materials	4,050,000	7,290,000	10,530,000	
Packing	174,800	317,300	454,400	
Ice	13,500	24,300	35,100	
Transportation	315,000	567,000	819,000	
Utility	63,900	90,600	106,100	
Salary	216,000	288,000	360,000	
Administrative	21,600	28,800	36,000	
Maintenance	64,000	64,000	64,000	
Profit bef. Deprec. & Int.	332,700	774,700	1,249,300	
Depreciation	170,700	170,700	170,700	
Interest (6.5%)	221,650	221,650	221,650	
Profit after Deprec. & Int. (6.5%)	-59,650	382,350	856,950	
Interest (9.0%)	306,900	306,900	306,900	
Profit after Deprec. & Int. (9.0%)	-144,900	297,100	771,700	

<b>Round Scad</b>		Unit: RM		
	1996	2001	2011	
Revenue	581,000	581,000	868,000	
Expenditure	363,200	363,200	554,600	
Raw materials	190,900	190,900	285,200	
Ice	10,000	10,000	14,900	
Utility	21,400	21,400	41,000	
Salary	119,000	119,000	185,000	
Administrative	11,900	11,900	18,500	
Maintenance	10,000	10,000	10,000	
Profit bef. Deprec. & Int.	217,800	217,800	313,400	
Depreciation	26,700	26,700	26,700	
Interest (6.5%)	26,000	26,000	26,000	
Profit after Deprec. & Int. (6.5%)	165,100	165,100	260,700	
Interest (9.0%)	36,000	36,000	36,000	
Profit after Deprec. & Int. (9.0%)	155,100	155,100	250,700	

Table III.3.2.12 Revenue and Expenditure of Functional Facilities (3/3)

<b>Dry/salted Fish</b>		Unit: RM		
	1996	2001	2011	
Revenue	565,500	565,500	565,500	
Expenditure	359,900	359,900	359,900	
Raw materials	279,000	279,000	279,000	
Utility	8,400	8,400	8,400	
Salary	57,600	57,600	57,600	
Administrative	5,800	5,800	5,800	
Maintenance	9,100	9,100	9,100	
Profit bef. Deprec. & Int.	205,600	205,600	205,600	
Depreciation	24,100	24,100	24,100	
Interest (6.5%)	29,700	29,700	29,700	
Profit after Deprec. & Int. (6.5%)	151,800	151,800	151,800	
Interest (9.0%)	41,123	41,123	41,123	
Profit after Deprec. & Int. (9.0%)	140,377	140,377	140,377	

<b>Shipyard</b>		Unit: RM		
	1996	2001	2011	
Revenue	1,658,200	1,761,200	1,855,600	
Repair	224,900	327,900	422,300	
New boat	860,000	860,000	860,000	
Maintenance	573,300	573,300	573,300	
Expenditure	1,275,400	1,344,200	1,334,700	
Raw materials	1,014,100	1,082,200	1,071,700	
Utility	6,800	7,500	8,500	
Salary	162,000	162,000	162,000	
Administrative	16,200	16,200	16,200	
Maintenance	76,300	76,300	76,300	
Profit bef. Deprec. & Int.	382,800	417,000	520,900	
Depreciation	157,200	157,200	157,200	
Interest (6.5%)	206,700	206,700	206,700	
Profit after Deprec. & Int. (6.5%)	18,900	53,100	157,000	
Interest (9.0%)	286,200	286,200	286,200	
Profit after Deprec. & Int. (9.0%)	-60,600	-26,400	77,500	

<b>Ice Plant</b>		Unit: RM		
	1996	2001	2011	
Revenue	1,080,000	1,080,000	1,080,000	
Expenditure	670,700	670,700	670,700	
Raw materials	66,200	66,200	66,200	
Utility	283,500	283,500	283,500	
Salary	227,400	227,400	227,400	
Administrative	22,700	22,700	22,700	
Maintenance	70,900	70,900	70,900	
Profit bef. Deprec. & Int.	409,300	409,300	409,300	
Depreciation	162,400	162,400	162,400	
Interest (6.5%)	191,750	191,750	191,750	
Profit after Deprec. & Int. (6.5%)	55,150	55,150	55,150	
Interest (9.0%)	265,500	265,500	265,500	
Profit after Deprec. & Int. (9.0%)	-18,600	-18,600	-18,600	

Table III.3.2.13 Project Cost Breakdown by Facilities for Full and Phase Construction

	FULL CONSTRUCTION			PHASE CONSTRUCTION (1995 & 2000)							Unit: RM		
	1995			1995			2000						
	Basic Facilities	Functional Facilities Group A Group B		Basic Facilities	Functional Facilities Group A Group B		Sub Total	Basic Facilities	Functional Facilities Group A Group B			Sub Total	TOTAL
<b>BASIC</b>													
1 Jetty	7,421,041	-	-	7,421,041	3,710,521	-	-	3,710,521	3,710,520	-	-	3,710,520	7,421,041
2 Mooring Facilities	506,550	-	-	506,550	253,275	-	-	253,275	253,275	-	-	253,275	506,550
3 Revetment & shore	3,810,600	-	-	3,810,600	1,905,300	-	-	1,905,300	1,905,300	-	-	1,905,300	3,810,600
4 Naviga. sys. & survey	500,000	-	-	500,000	500,000	-	-	500,000	-	-	-	0	500,000
Sub-total	12,238,191	-	-	12,238,191	6,369,096	-	-	6,369,096	5,869,095	-	-	5,869,095	12,238,191
<b>FUNCTIONAL</b>													
5 Office	-	953,925	-	953,925	-	953,925	-	-	-	-	-	-	953,925
6 Market Hall/Cold Ste.	-	6,624,893	-	6,624,893	-	3,312,447	-	-	3,312,446	-	-	3,312,446	6,624,893
7 Ice plant	-	0	2,951,276	2,951,276	-	-	-	-	-	2,951,276	2,951,276	2,951,276	2,951,276
8 Surfimi plant	-	0	3,897,037	3,897,037	-	-	-	-	-	3,897,037	3,897,037	3,897,037	3,897,037
9 Freezing plant	-	0	3,810,093	3,810,093	-	-	-	-	-	3,810,093	3,810,093	3,810,093	3,810,093
10 Dry fish plant	-	0	455,690	455,690	-	-	-	-	-	455,690	455,690	455,690	455,690
11 Ship yard	-	0	3,178,945	3,178,945	-	-	-	-	-	3,178,945	3,178,945	3,178,945	3,178,945
12 Workshop	-	0	790,485	790,485	-	-	-	-	-	790,485	790,485	790,485	790,485
13 Fish gear storage	-	512,150	0	512,150	-	256,075	-	-	256,075	-	-	256,075	512,150
14 Shop & mosque	-	318,975	0	318,975	-	318,975	-	-	-	-	-	0	318,975
15 Power station	-	1,491,425	0	1,491,425	-	899,676	-	-	591,750	-	-	591,750	1,491,425
16 Water reservoir	-	119,835	0	119,835	-	119,835	-	-	-	-	-	0	119,835
17 Fish gear repair area	-	629,030	0	629,030	-	314,515	-	-	314,515	-	-	314,515	629,030
18 Waste water treatment	-	0	2,004,770	2,004,770	-	-	-	-	-	2,004,770	2,004,770	2,004,770	2,004,770
19 Infrastructure	-	4,428,340	0	4,428,340	-	4,428,340	-	-	-	-	-	-	4,428,340
20 Fuel supply & pump	-	230,000	0	230,000	-	230,000	-	-	-	-	-	-	230,000
21 Other facilities & fum.	-	1,318,343	462,899	1,781,242	-	1,318,343	-	-	-	462,899	462,899	462,899	1,781,242
Sub-total	-	16,626,916	17,551,195	34,178,111	-	12,152,131	-	-	4,474,786	17,551,195	22,025,981	34,178,112	34,178,112
<b>OTHERS</b>													
22 Preliminaries	1,596,712	1,413,288	1,190,000	4,200,000	1,309,748	1,490,252	-	2,800,000	210,000	-	1,190,000	1,400,000	4,200,000
23 Site Clearing &	1,200,000	-	-	1,200,000	1,200,000	-	-	1,200,000	-	-	-	-	1,200,000
24 Relocation of Drain	172,500	-	-	172,500	172,500	-	-	172,500	-	-	-	-	172,500
25 Dredging	307,200	-	-	307,200	307,200	-	-	307,200	-	-	-	-	307,200
26 Land Acquisition	734,058	-	-	734,058	734,057	-	-	734,057	-	-	-	-	734,057
27 Consultancy Fee	1,438,633	1,496,422	1,498,625	4,433,680	1,243,372	1,414,727	-	2,658,099	276,956	-	1,498,625	1,775,581	4,433,680
28 Contingencies	1,770,890	1,995,230	1,983,880	5,750,000	1,590,409	1,809,591	-	3,400,000	366,520	-	1,983,480	2,350,000	5,750,000
Sub-total	7,219,993	4,904,940	4,672,505	16,797,438	6,557,286	4,714,570	-	11,271,856	853,476	-	4,672,105	5,525,581	52,166,303
<b>TOTAL</b>	<b>19,458,184</b>	<b>21,531,856</b>	<b>22,223,700</b>	<b>63,213,740</b>	<b>12,926,382</b>	<b>16,866,701</b>	<b>0</b>	<b>29,793,083</b>	<b>6,722,571</b>	<b>4,474,786</b>	<b>22,223,300</b>	<b>33,420,657</b>	<b>63,213,740</b>

Remarks: 1) Basic facilities refer to public service facilities.  
 2) Group A of functional facilities refer to public service facilities.  
 3) Group B of functional facilities refer revenue earning facilities.



Table III.3.2.14 (a) Replacement Cost and O/M Cost (Full Construction)

										Unit: RM
Year	Replacement Cost	Salary/wages		Maintenance		Utilities		Others		Total
		Complex	Functional	Complex	Functional	Market Hall	Main Office	Functional	Functional	
1996		268,000	1,064,000	340,000	349,200	126,300	13,000	459,000	7,500,000	10,119,500
1997		268,000	1,064,000	340,000	349,200	126,300	13,000	469,000	8,300,000	10,929,500
1998		268,000	1,064,000	340,000	349,200	126,300	13,000	479,500	9,200,000	11,840,000
1999		268,000	1,064,000	340,000	349,200	126,300	13,000	489,750	10,000,000	12,650,250
2000		268,000	1,064,000	340,000	349,200	126,300	13,000	500,000	10,800,000	13,460,500
2001	450,000	268,000	1,208,000	400,000	349,200	126,300	13,000	512,800	11,685,000	14,562,300
2002		268,000	1,208,000	400,000	349,200	126,300	13,000	520,500	12,150,000	15,035,000
2003		268,000	1,208,000	400,000	349,200	126,300	13,000	525,200	12,600,000	15,489,700
2004		268,000	1,208,000	400,000	349,200	126,300	13,000	531,900	13,050,000	15,946,400
2005		268,000	1,208,000	400,000	349,200	126,300	13,000	537,600	13,500,000	16,402,100
2006	1,356,550	268,000	1,208,000	400,000	349,200	126,300	13,000	544,300	13,840,000	16,748,800
2007		268,000	1,208,000	400,000	349,200	126,300	13,000	552,000	14,300,000	17,216,500
2008		268,000	1,208,000	400,000	349,200	126,300	13,000	557,700	14,800,000	17,722,200
2009		268,000	1,208,000	400,000	349,200	126,300	13,000	561,500	15,300,000	18,226,000
2010		268,000	1,208,000	400,000	349,200	126,300	13,000	567,100	15,700,000	18,631,600
2011	13,600,335	268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300
2012		268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300
2013		268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300
2014		268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300
2015		268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300
2016	1,356,550	268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300
2017		268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300
2018		268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300
2019		268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300
2020		268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300

Table III.3.2.14 (b) Replacement Cost and O/M Cost (Phase Construction)

										Unit: RM
Year	Replacement Cost	Salary/wages		Maintenance		Utilities		Others		Total
		Complex	Functional	Complex	Functional	Market Hall	Main Office	Functional	Functional	
1996		268,000	-	340,000	-	126,300	13,000	-	-	747,300
1997		268,000	-	340,000	-	126,300	13,000	-	-	747,300
1998		268,000	-	340,000	-	126,300	13,000	-	-	747,300
1999		268,000	-	340,000	-	126,300	13,000	-	-	747,300
2000		268,000	-	340,000	-	126,300	13,000	-	-	747,300
2001	450,000	268,000	1,208,000	400,000	349,200	126,300	13,000	512,800	11,685,000	14,562,300
2002		268,000	1,208,000	400,000	349,200	126,300	13,000	520,500	12,150,000	15,035,000
2003		268,000	1,208,000	400,000	349,200	126,300	13,000	525,200	12,600,000	15,489,700
2004		268,000	1,208,000	400,000	349,200	126,300	13,000	531,900	13,050,000	15,946,400
2005		268,000	1,208,000	400,000	349,200	126,300	13,000	537,600	13,500,000	16,402,100
2006	1,356,550	268,000	1,208,000	400,000	349,200	126,300	13,000	544,300	13,840,000	16,748,800
2007		268,000	1,208,000	400,000	349,200	126,300	13,000	552,000	14,300,000	17,216,500
2008		268,000	1,208,000	400,000	349,200	126,300	13,000	557,700	14,800,000	17,722,200
2009		268,000	1,208,000	400,000	349,200	126,300	13,000	561,500	15,300,000	18,226,000
2010		268,000	1,208,000	400,000	349,200	126,300	13,000	567,100	15,700,000	18,631,600
2011	1,356,550	268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300
2012		268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300
2013		268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300
2014		268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300
2015		268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300
2016	4,306,335	268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300
2017		268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300
2018		268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300
2019		268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300
2020		268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300
2021	10,650,550	268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300
2022		268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300
2023		268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300
2024		268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300
2025		268,000	1,430,000	400,000	349,200	126,300	13,000	574,800	16,121,000	19,282,300

Table III.3.2.15 (a) Income Statement and Cash Flow of the Pilot Project Project (Full Construction) (1/4)

	Unit: RM						
	0	1	2	3	4	5	6
I. Income Statement	1995	1996	1997	1998	1999	2000	2001
A. Revenue		13,469,516	14,695,309	16,024,907	17,286,442	18,853,394	20,212,091
Basic Facilities							
1) Fish landing		142,350	160,000	220,000	285,000	305,000	341,000
2) Vehicles		122,400	132,000	175,000	210,000	250,000	286,950
3) Rental		440,275	460,000	480,000	520,000	560,000	559,590
4) Auction		354,275	435,000	510,000	605,000	700,000	793,260
Functional Facilities							
1) Surimi		2,227,500	2,450,000	2,650,000	2,900,000	3,180,000	3,442,500
2) Cuttlefish		5,251,500	6,050,000	6,900,000	7,600,000	8,600,000	9,444,700
3) Roundscad		581,000	581,000	581,000	581,000	581,000	581,000
4) Dried/salted fish		565,500	565,500	565,500	565,500	565,500	565,500
5) Ice plant		1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000
6) Shipyard		1,658,200	1,683,200	1,708,200	1,723,200	1,748,200	1,761,000
AFA,s Rev. (incl. LKIM)		1,046,516	1,098,609	1,155,207	1,216,742	1,283,694	1,356,591
B. Expense		15,338,161	15,871,267	16,474,361	17,396,360	18,169,297	19,978,959
1) Basic facilities		747,300	747,300	747,300	747,300	747,300	807,300
2) Functional facilities		9,393,600	9,910,248	10,485,042	11,376,271	12,115,729	13,815,500
3) AFA activities		532,842	549,300	577,600	608,370	641,850	691,740
4) Depreciation		2,170,177	2,170,177	2,170,177	2,170,177	2,170,177	2,170,177
5) Interest	0	2,494,242	2,494,242	2,494,242	2,494,242	2,494,242	2,494,242
C. Income before D & I	0	2,795,774	3,488,461	4,214,965	4,554,501	5,348,515	4,897,551
D. Net Income	0	-1,868,645	-1,175,958	-449,454	-109,918	684,097	233,132
II. Cash Flow							
A. Sources of Funds	63,213,740	301,532	994,219	1,720,723	2,060,259	2,854,274	2,403,309
1) Loan	57,213,740						
2) Equity	6,000,000						
3) Depreciation		2,170,177	2,170,177	2,170,177	2,170,177	2,170,177	2,170,177
4) Net income	0	-1,868,645	-1,175,958	-449,454	-109,918	684,097	233,132
B. Uses of Funds	63,213,740	0	0	0	0	450,000	0
1) Construction	63,213,740						
Basic Portion	40,990,040						
Functional Portion	22,223,700						
2) Reinvestment						450,000	
3) Repayment of loan	0	0	0	0	0	0	0
C. Net cash flow	0	301,532	994,219	1,720,723	2,060,259	2,404,274	2,403,309

Remarks: Interest rates considered are 3% for basic portion and 6.5% for functional portion.

Table III.3.2.15 (a) Income Statement and Cash Flow of the Pilot Project Project (Full Construction) (2/4)

	Unit: RM						
	7	8	9	10	11	12	13
I. Income Statement	2002	2003	2004	2005	2006	2007	2008
A. Revenue	21,023,252	21,787,103	22,760,828	23,569,515	24,158,071	25,053,495	25,976,903
Basic Facilities							
1) Fish landing	350,000	365,000	370,000	380,000	390,000	405,000	415,000
2) Vehicles	290,000	295,000	300,000	310,000	320,000	340,000	350,000
3) Rental	562,000	562,000	562,000	562,000	562,000	562,000	562,000
4) Auction	840,000	945,000	1,030,000	1,100,000	1,150,000	1,250,000	1,300,000
Functional Facilities							
1) Surimi	3,580,000	3,750,000	3,950,000	4,080,000	4,150,000	4,350,000	4,580,000
2) Cuttlefish	9,950,000	10,300,000	10,850,000	11,300,000	11,600,000	12,000,000	12,450,000
3) Roundscad	598,000	619,000	641,000	664,000	687,000	711,000	736,000
4) Dried/salted fish	565,500	565,500	565,500	565,500	565,500	565,500	565,500
5) Ice plant	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000
6) Shipyard	1,771,000	1,781,400	1,791,800	1,802,200	1,812,600	1,823,000	1,833,400
AFA,s Rev. (incl. LKIM)	1,436,752	1,524,203	1,620,528	1,725,815	1,840,971	1,966,995	2,105,003
B. Expense	20,455,767	20,950,104	21,373,838	21,812,606	22,267,119	22,738,158	23,226,525
1) Basic facilities	807,300	807,300	807,300	807,300	807,300	807,300	807,300
2) Functional facilities	14,250,688	14,699,585	15,162,622	15,640,244	16,132,912	16,641,099	17,165,293
3) AFA activities	733,360	778,800	828,900	883,690	943,650	1,009,330	1,081,300
4) Depreciation	2,170,177	2,170,177	2,170,177	2,170,177	2,170,177	2,170,177	2,170,177
5) Interest	2,494,242	2,494,242	2,404,839	2,311,195	2,213,080	2,110,252	2,002,455
C. Income before D & I	5,231,904	5,501,418	5,962,006	6,238,281	6,274,209	6,595,766	6,923,010
D. Net Income	567,485	836,999	1,386,990	1,756,909	1,890,952	2,315,337	2,750,378
II. Cash Flow							
A. Sources of Funds	2,737,662	3,007,176	3,557,167	3,927,086	4,061,129	4,485,514	4,920,555
1) Loan							
2) Equity							
3) Depreciation	2,170,177	2,170,177	2,170,177	2,170,177	2,170,177	2,170,177	2,170,177
4) Net income	567,485	836,999	1,386,990	1,756,909	1,890,952	2,315,337	2,750,378
B. Uses of Funds	0	2,180,093	2,269,495	3,719,690	2,461,255	2,564,083	2,671,880
1) Construction							
Basic Portion							
Functional Portion							
2) Reinvestment				1,356,550			
3) Repayment of loan	0	2,180,093	2,269,495	2,363,140	2,461,255	2,564,083	2,671,880
C. Net cash flow	2,737,662	827,083	1,287,671	207,396	1,599,874	1,921,431	2,248,675

Remarks: Interest rates considered are 3% for basic portion and 6.5% for functional portion.