

## **Chapter 3. Basic Design**



## Chapter 3. Basic Design

### 3-1 Design Policy

As part of regional economic development policies promoted by the Government of Palau, the Project calls for the construction of fishing industry support buildings and the provision of equipment in order to improve the fish marketing system. The design policies of facilities and equipment needed for the Project are as follows.

#### (1) Ngeremlengui Ice Making Plant

A fishing industry center located on the west side of Babeldoab Island, Ngeremlengui State supplies ice to the neighboring states of Ngarard, Ngardmau, Ngatpang, and Aimeliik. Based on the daily catch of fishermen from the five states, ice making capacity will be investigated assuming that the fish to ice ratio is 1:1.

The buildings will be reinforced concrete structures so they can resist salt damage and be constructed using methods employed commonly in Palau.

#### (2) Fish Marketing Center in Koror

Constructed in the consuming region, the Malakal district in Koror State, it will be a facility capable of marketing fish to ordinary consumers as well as big buyers: hotels, restaurants, and so on. The building will be a reinforced concrete structure so that it can resist salt damage and be built using construction methods in common use in Palau.

The floor space of the existing sales room is approximately 30m<sup>2</sup>, but the space of three refrigerated show-cases will be added.

The second floor will be the office space.

#### (3) Fish Carrier Truck

A road connects Koror with Ngeremlengui, permitting land transport of fish. In the future all fish will be carried by land, a method which is safer and more economical than sea transport.

Shipments will be made every other day in order to keep costs down. This means that every shipment will carry a two day supply of fish.

#### (4) Fish Carrier Boat

The boat will gather fish product from four states, three in northern Babeldoab Island (Ngerchelong, Ngarard, Ngardmau) and from Kayangel, none of which are connected to Koror by road. It will set out periodically, carrying fuel oil and other

materials used by the fishermen on its outward trip, and return with insulated boxes filled with fresh fish.

Because the boat will make a trip every other day in order to keep costs down, every shipment will carry a two day supply of fish.

(5) Fishing Equipment, Materials, Machinery, Etc.

This will be sold to small fishermen affiliated with the PFFA at prices a little lower than the market price in order to stimulate the coastal fisheries. The directors of the PFA will select the fishermen who can buy it.

The contents of the fishing equipment will be outboard motors necessary for coastal fishery, insulated fish boxes for carrying fish, plastic net baskets for carrying ice, and so on.

3-2 Study and Examination on Design Criteria

3-2-1 Design Criteria of Facilities

(1) Building Standards

The Republic of Palau has not yet established its own codification for design standards governing public buildings. However, the Bureau of Public Works of the Ministry of Resources and Development examines plans and blueprints based on U.S. standards for public buildings. Judging from natural conditions, particularly strict criteria are unnecessary, but the design wind pressure should be 54m/s (120 mph). No seismic observations have been recorded for the area, but it is reported that in 1911 there was a large earthquake with an epicenter believed to lie between Palau and Yap. Accordingly, the following design seismic intensity and design wind pressure have been established.

Design seismic intensity:  $K_h = 0.20$

$K_v = 0.00$

Design wind pressure:  $q = 60\sqrt{h}$   $q$ : Velocity pressure

$h$ : Height (m) from ground level

(2) Ngeremlengui Ice Making Plant

The plant must be large enough to accommodate the ice making machine, ice storage, and generator specified in 3-2-2 Design Criteria of Equipment while allowing a 1m space for repair work around the machines.

**(3) Fish Marketing Center in Koror**

The space required in the new center equals the floor area of the existing fish marketing center plus space for the new equipment and machinery. Care must be taken that it is not too large, considering the quantity of fish to be handled by the center.

**3-2-2 Design Criteria of Equipment**

**(1) Ngeremlengui Ice Making Plant**

**1) Design Criteria**

- [1] Although the ice making machines will be installed in Ngeremlengui, they will supply ice to the fishermen in five states: not only those in Ngeremlengui State, but fishermen in neighboring Ngarard, Ngardmau, Ngatpang, and Aimeliik.
- [2] The amount of fish shipped, which is the basis for determining the ice making capacity of the plant, will be the average volume shipped per month for the last 3 years. This approach balances out year to year or month to month fluctuations in the volume of fish taken.
- [3] Because ice will be needed both to store fish shipped from and fish consumed in the producing regions, the total amount of fish shipped by these five states each month will be added to the amount consumed by their residents in a month to find the total monthly catch.
- [4] The daily average catch will be computed considering the average number of working days per month to be 20 days.
- [5] The amount of ice required each day will be estimated based on a fish to ice ratio of 1:1, and the ice making capacity determined based on the result of this calculation.

The result of the above calculations is shown on Table 1.

Table 1. Necessary Quantity of Ice Per Day

		1	2	3	4	5	6	7	8	9	10	11	12	Total
N G E R E M L E N G U I	Ngeremlengui	4,566	7,808	7,171	6,004	6,635	5,917	7,981	7,118	7,013	3,636	6,291	6,589	76,719
	Ngarard	5,289	6,782	6,149	5,800	3,873	4,525	7,597	5,945	5,769	5,977	6,196	6,506	72,408
	Ngardmau	2,795	2,448	1,658	2,181	918	1,392	2,606	2,520	2,037	3,923	4,198	4,168	30,844
	Ngatpang	4,207	3,298	2,824	2,560	3,294	3,918	4,382	3,438	3,453	2,066	2,268	2,559	38,266
	Aimeliik	1,415	1,418	1,943	1,523	1,385	898	766	938	1,684	1,261	2,393	2,446	18,068
	Total (lb)	18,272	21,755	21,745	18,068	16,105	16,646	23,332	19,959	19,956	16,863	21,336	22,268	236,305
⊙	⊙×2 Local Consumption (lb)	36,554	43,510	43,490	36,136	32,210	33,292	46,664	39,918	39,912	33,726	42,672	44,536	472,610
⊕	⊕+⊙ Total fish catch (lb)	54,816	65,265	65,235	54,204	48,315	49,938	69,996	59,877	59,868	50,589	64,008	66,804	708,915
⊕	⊕+20day Fish catch per day (lb/d)	2,741	3,263	3,262	2,710	2,416	2,497	3,500	2,994	2,993	2,529	3,200	3,340	
⊕	⊕×0.45 Fish catch per day (kg/d)	1,233	1,468	1,468	1,220	1,087	1,124	1,575	1,347	1,347	1,138	1,440	1,503	
⊕	Necessary quantity of ice per day (Total of 5 states)													
	(T/d)													
	2.0													
	1.5													
	1.0													
	0.5													
	0													

(Source: Annual Reports of the Marine Resources Division (1991 to 1993))

## 2) Study of Ice Making Capacity

Table 1 reveals that 1.5 tons of ice are required each day by the five states, but because it is necessary to allow for an ice loss rate of 40% during the two days before the fish is shipped, the amount really required will be  $1.5 \text{ tons} + (1 - 0.4) = 2.5 \text{ tons/day}$ .

And because, in principle, the machines will only operate during the 12 night-time hours that the free government-supplied electrical power is available, the machines actual capacity will be  $2.5 \text{ tons} \times 24/12 = 5 \text{ tons/day}$ .

In Ngeremlengui, Ngardmau, and Aimeliik, on the other hand, existing ice making machines with a daily capacity of one ton are operating, so if this production is deducted from the above estimate, the required daily production of the new plant need only be two tons per day ( $5 \text{ tons} - 3 \text{ tons} = 2 \text{ tons}$ ). But if a single two-ton per day machine is installed, the plant will not be able to supply ice when it is broken down or being serviced. Therefore two one-ton per day machines will be installed to produce two tons per day.

The type of ice produced will be plate ice which does not melt as easily as flake ice.

### 3) Study of the Ice Storage Capacity

Because each ice making machine must be installed on top of an ice storage bins, two ice storage boxes will be installed. Each one will be able to hold two tons, providing the ability to store a two day supply. Considering the shipment of the ice, it will only be possible to store ice equal to about half of their total cubic space, so their cubic capacity will be about  $5\text{m}^3$  and their outside length, height, and width will each be about 2m.

### 4) Study of Power Generation Capacity

In principle, the ice making machines will only be operated during the night when the free government-supplied power is available, but a generator will be needed so that the machines can run during a power failure and in the day-time during periods when the catch is particularly large.

Each ice making machine needs 7KW when it is running, but about four times as much is required to start it up. The amount of power needed when one machine is started up while the other is running is  $7\text{KW} + (7\text{KW} \times 4) = 35 \text{KW}$ .

The conversion rate used to convert this to KVA is 0.8. Therefore:

$$35\text{KW} + 0.8 = 44\text{KVA}$$

## (2) Fish Carrier Truck

### 1) Design Criteria

[1] It will carry fish to Koror from the producing regions and drums of fuel oil for use in fishing boats from Koror to the producing regions.

[2] The fish will all be carried in insulated boxes with a capacity of 160 liters. Each insulated box will hold 64 kilograms of fish, and each full box will weigh 150 kilograms.

[3] The truck will carry fish every other day. During each trip, it will bring a load of fish equivalent to two days catch.

[4] The daily catch is found based on the average catch per month in Ngeremlengui State over the past three years assuming that the fishermen work 20 days per month. The amount of fish in each shipment is found based on this estimate of the daily catch. The amount shipped is then converted into the number of insulated boxes carried.

The results of the above study is shown in Table 2.

Table 2. Volume of Fish Transported Each Time (Fish Carrier Truck)

		1	2	3	4	5	6	7	8	9	10	11	12	Total	
①	Fish catch per month (lb)	1991	7,792	6,535	5,732	529	10,446	8,840	7,651	11,734	10,432	5,451	8,847	9,561	93,550
		1992	2,354	11,202	6,655	4,744	4,791	5,292	10,708	5,748	8,380	3,421	5,938	5,679	74,910
		1993	3,612	5,688	9,127	12,738	4,697	3,620	5,587	3,872	2,288	2,036	4,057	4,527	61,849
		Average	4,586	7,808	7,171	6,004	6,645	5,017	7,061	7,118	7,033	3,636	6,281	6,589	76,769
②	① ÷ 20 day	Fish catch per day (lb/d)	229	390	359	300	332	296	399	356	352	182	314	320	
③	② × 0.45	Fish catch per day (kg/d)	103	176	162	135	150	133	180	160	158	82	141	145	
④	③ × 2	Transported fish per one time (kg)	206	352	324	270	300	266	360	320	316	164	282	297	
⑤	④ ÷ 64 kg	No. of fish box (pc.)	3.2	5.5	5.1	4.2	4.7	4.2	5.5	5.0	4.9	2.6	4.4	4.6	
⑥	No. of fish box	(pc.)													
		9													
		8													
		7													
		6													
		5													
		4													
		3													
		2													
		1													

(Source: Annual Reports of the Marine Resources Division (1991 to 1993))

## 2) Study of the Truck's Capacity

According to Table 2, only six insulated boxes are needed, but in fact during the season when the catch is particularly large, enough fish to fill as many as 9 boxes will be shipped at one time. In this case the capacity will be  $150\text{kg} \times 9 \text{ boxes} = 1,350\text{kg}$ .

When fuel drums (contents 180kg, drum weight of 40kg, for a total of 220kg per drum) are carried to the producing regions, 6 or 7 will be loaded each time, so the required capacity will be  $220\text{kg} \times 6 \text{ to } 7 \text{ drums} = 1,320 \text{ to } 1,540\text{kg}$ .

The capacity of the fish carrier truck has, therefore, been set at 1,500 kilograms.

The fish carrier truck will also be driven on steep unpaved mountain roads, so it has to be a four-wheel drive diesel powered vehicle. And because it will carry heavy loads, a hydraulic lift will be installed behind its cargo platform.



**(3) Fish Carrier Boat**

**1) Design Criteria**

- [1] The boat will gather fish from four states: Kayangel, Ngerchelung, Ngarard, Ngaradmau, none of which are connected to Koror by road.
- [2] The fish will all be carried in insulated boxes with a capacity of 160 liters. Each insulated box will hold 64 kilograms of fish, and each full box will weigh 150 kilograms.
- [3] The boat will bring back a load of fish every other day, which means that each shipment will bring in the amount of fish caught in a two-day period.
- [4] The daily catch is found based on the average catch per month in the four states over the past three years assuming that the fishermen work 20 days per month. The amount of fish in each shipment is found based on this estimate of the daily catch. The amount shipped is then converted into the number of insulated boxes to be carried.
- [5] The ship will depart Koror at 7:30 in the morning, gather its cargo of fish from the four northern states, then return to Koror's harbor at 16:30, early enough to allow time to unload its cargo.

Table 3 presents the results of the above study.

Table 3. Volume of Fish Transported Each Time (Fish Carrier Boat)

		1	2	3	4	5	6	7	8	9	10	11	12	Total
FISH CARRIER BOAT	Ⓐ Kayangel	964	2,841	1,423	2,026	3,621	2,915	1,334	1,876	2,371	2,980	3,982	3,887	29,920
	Ⓑ Ngerchelongs	6,755	9,226	14,069	9,247	7,460	7,319	13,366	9,059	9,652	10,149	9,927	8,245	114,674
	Ⓒ Ngarard	5,288	6,782	6,149	5,800	3,873	4,525	7,597	5,945	5,769	5,977	6,196	6,506	72,407
	Ⓓ Ngardmau	2,795	2,448	1,658	2,181	918	1,392	2,606	2,520	2,037	3,923	4,198	4,168	30,844
	Total (lb)	15,809	21,297	25,299	19,254	16,072	16,151	24,903	19,400	19,829	23,729	24,303	22,806	247,845
Ⓔ ①÷20day	Fish catch per day (lb/d)	790	1,065	1,265	963	804	808	1,245	970	991	1,136	1,215	1,140	
Ⓕ ②×0.45	Fish catch per day (kg/d)	356	479	569	433	362	363	560	436	446	511	547	513	
Ⓖ ③×2	Transported fish per one time (kg)	712	958	1,138	866	724	726	1,120	872	892	1,022	1,094	1,026	
Ⓗ ④÷64kg	No. of fish box (pc.)	11.1	15.0	17.8	13.5	11.3	11.4	17.5	13.6	13.9	16.0	17.1	16.0	
Ⓘ	No. of fish box (pc.)													

(Source: Annual Reports of the Marine Resources Division (1991 to 1993))

2) Study of Boat Capacity

Table 3 indicates that the boat will carry 18 insulated boxes. To do so, its capacity will need to be  $150\text{kg} \times 18 \text{ boxes} = 2,700 \text{ kg}$ .

As a 300 kilogram (equal to four crew members) allowance will be provided, the boat's capacity will be  $2,700\text{kg} + 300\text{kg} = 3,000 \text{ kg}$ .

3) Study of the Boat's Cruising Speed

The amount of time it would take for the boat to complete a single round trip from Koror's harbor is computed for three speeds, and the speed that conforms to the design conditions is selected. Table 4 shows the results of this computation.

Table 4. Study of the Boat's Cruising Speed

		Cruising Speed		
Item		11 knots (20.4km/h)	12 knots (22.2km/h)	13 knots (24.1km/h)
(Out Trip)				
Ngardmau (39km from Koror)		1.91h	1.76h	1.62h
Cargo handling time		0.50	0.50	0.50
Ngarard (8km from Ngardmau)		0.39	0.36	0.33
Cargo handling time		0.50	0.50	0.50
Ngerchelong (9km from Ngarard)		0.44	0.41	0.37
Cargo handling time		0.50	0.50	0.50
Kayangel (32km from Ngerchelong)		1.57	1.44	1.33
Cargo handling time		0.50	0.50	0.50
(Return Trip)				
Kayangel to Koror 80km		3.92	3.60	3.32
Total		10.23h	9.57h	8.97h
Time Table	Leave Koror	07:30	07:30	07:30
	Return to Koror	17:44	17:04	16:28
	Complete Unloading (30 minutes)	18:14	17:34	16:58

Based on the above, the cruising speed will be 13 knots out of consideration for the working hours of the crew (07:30 to 17:00).

(4) Fishing Gear, Equipment, and Supplies

1) Outboard Motors

The outboard motors will be 85 horsepower, the engine size most popular as a fishing boat motor. The usual lifetime of an outboard motor is between three and four years, but because they are very expensive for the fishermen of Palau, each one is usually used between seven and eight years. Import figures for 85 horsepower outboard motors indicate that during a ten year period between 1983 and 1993, the country imported 128 motors of this kind. A total of 14 were bought in 1984, 21 in 1988, and a peak of 22 in 1991. Assuming that the 21 motors imported in 1988 are nearing the end of their usable lifetime, a total of 20 new motors will be supplied to replace them.

2) Insulated Fish Boxes

The insulated fish boxes supplied will be 160 liter boxes, the size in widest use at this time. Larger boxes, being heavier, would not be easy for the fishermen to

handle. Transported fish amount in active season in Ngeremlengui, Kayangel, Ngerchelung, Ngarard and Ngardmau, which are the objective states of fish transportation of this Project, will be 24 pieces of insulated boxes per one time according to Table 2 and 3. As the same number of insulated boxes are necessary for storage and transportation, the total number will be 50 boxes adding 2 boxes as spare.

### 3) Plastic Net Baskets

These baskets will be used primarily to transport ice. Necessary quantity of ice in active season in Ngeremlengui, Ngarard, Ngardmau, Ngatpang and Aimeliik, which are the objective states of ice supply of this Project, will be about 1,500kg per day according to Table 1. One basket contains 15kg of ice, therefore total number of net baskets will be 100 pieces.

### 4) Hand Carts

Because these will be used to load and unload insulated fish boxes filled with fish, they will be able to handle loads of 150 kg. A total of five will be supplied: two to the Ngeremlengui State Fishing Co-op, and three to the Fish Marketing Center in Koror.

## 3-3 Basic Plan

### 3-3-1 Site and Layout Plan

#### 1) Ngeremlengui Ice Making Plant

As the site layout map indicates, the site is part of a 510m<sup>2</sup> plot of land owned by the State Government which has loaned the site to the Ngeremlengui State Fishing Co-op on a rent-free basis. It will be easy for the co-op to manage the new plant because it will be constructed beside an existing ice making plant and an office operated by the co-op on the same site.

The site is a good place to supply ice to fishing boats and to ship fish out by truck. On the south side of the site which faces a river at a point about 100m from its mouth, a mooring quay where small fishing boats can load or unload cargo has been constructed. And the north side faces a road with a width of 9.2m.

The new plant can use the power lines and water supply pipes which have already been provided to service the existing ice making machine.

## 2) Fish Marketing Center in Koror

As the site layout map shows, the site is part of a 3,584m<sup>2</sup> plot of land owned by the Koror State Government, which has rented the site to the PFFA. The PFFA office, an ice making plant, cold storage room, etc., are already on the site, and a loading-unloading mooring quay managed by the PFFA and the existing fish marketing center is located on the shoreline side. The existing facilities are well located for the unloading of fish, but because the buildings are owned by the State Government, it will be difficult to rebuild them. Because the planned location of the new building is near a roadway, it will be convenient for the center's customers. The PFFA plans to convert the old sales room to a sea-food restaurant after the new Fish Marketing Center is constructed. The PFFA hopes to expand the storage facilities to the south side and to the ocean side of the new buildings at a future date, so space will be allowed for this purpose. Space will also be set aside for a customer parking area at a location facing the road to the north.

The new facilities will be able to use the electric power and water already supplied to the site. Sewer pipes needed to carry the water to a central waste water processing plant will be laid in the near future, but not before this Project has been completed. For this reason, septic tanks which can process this waste water will be provided.

### 3-3-2 Architectural Designs

#### 1) Floor Plan

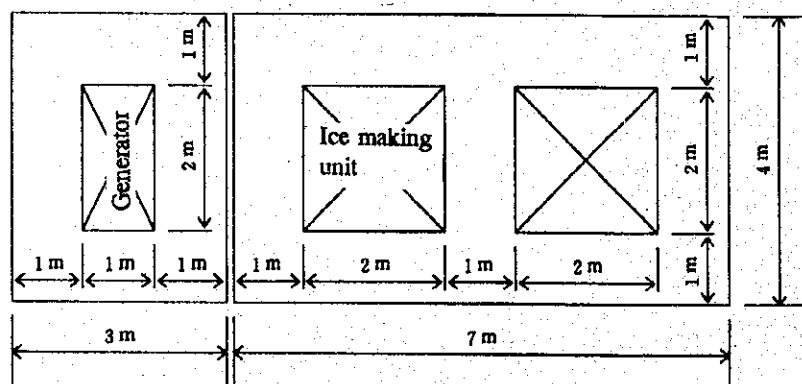
The following table shows the functions and floor surface area for each room in the Ngeremlengui Ice Making Plant and the Fish Marketing Center in Koror.

Facility	Room Name	Floor Area	Function
Ngeremlengui Ice Making Plant	Ice Making Room	28m <sup>2</sup>	Space for two 1-ton per day ice making machines
	Generator Room	12m <sup>2</sup>	Space for a single 44KVA generator
	Total	40m <sup>2</sup>	
Fish Marketing Center in Koror	Fish Sales Room	35m <sup>2</sup>	Space for 3 refrigerated show-cases, etc.
	Fish Process Room	16m <sup>2</sup>	Processing table, fish cleaning tank, sink, water and ice tank.
	Sanitary Section	12m <sup>2</sup>	One men's and women's toilet and one shower room.
	Corridors	7m <sup>2</sup>	
	First Story Total	70m <sup>2</sup>	
	Office	35m <sup>2</sup>	Office space for 5 people: 1 manager, 2 sales persons, and 2 persons in charge of the fish carrier boat.
	Second Story Total	35m <sup>2</sup>	
Total	105m <sup>2</sup>		

As indicated by the following diagram of the room that will house the ice making machines and ice storage boxes at the Ngeremlengui Ice Making Plant, each ice making - ice storage unit will be approximately two meters by two meters in size. A total of 28m<sup>2</sup> will be provided to accommodate two such units and allow a working area with a width of one meter around the units.

The generator room will have floor space of 12m<sup>2</sup> in order to accommodate one generator with a length of two meters and a width of one meter and provide working space with a width of one meter around the generator.

(Generator Room) (Ice Making - Ice Storage Room)



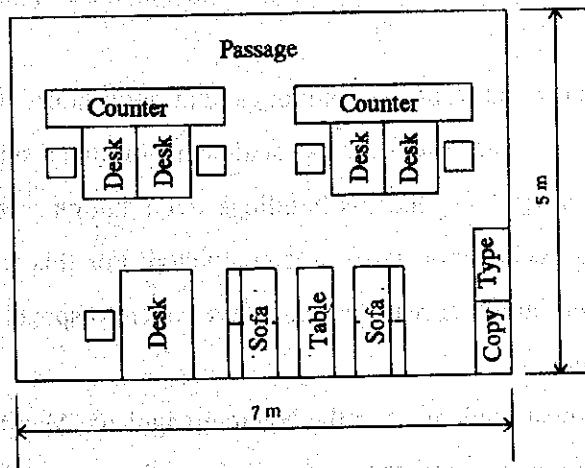
The fish sales room at the Fish Marketing Center in Koror will have a total floor space of 35m<sup>2</sup>. This size was determined by increasing the 30m<sup>2</sup> occupied by the existing fish sales room by the 5m<sup>2</sup> needed to accommodate three new refrigerated show-cases.

The new fish processing room will have a floor space of 16m<sup>2</sup>. With only 12m<sup>2</sup>, the existing fish processing room is extremely small, and the new room must accommodate a processing table larger than the one in use, a fish cleaning tank, and an ice water tank.

The sanitary facilities will occupy 12m<sup>2</sup>, which will contain a shower room for the employees and one men's and one women's toilet for both the employees and the customers.

Because the corridor has to divide the fish sales room from the fish processing room and sanitary section, it will occupy 7m<sup>2</sup>.

The office on the second story has to accommodate desks for five people: one manager, two fish sales personnel, and the two persons who will operate the fish carrier boat. It must also contain room for office equipment. As a result of a study of the following sample layout, 35m<sup>2</sup> was selected as the floor space of the office. But the furniture shown in the layout diagram will all be provided by the Palau side.



## 2) Cross Section Design

The Ngeremlengui Ice Making Plant will have an eave height of 5.8m in order to allow 1m of space between the ceiling and the top of each ice making - ice storage unit, an ice making machine placed on top of an ice storage box, which has a total height of 4.8m. The roof will have to be as wide as possible to block rain water, so

it will be extended one meter on each side, giving it a total surface area of 72m<sup>2</sup>. To allow the rain water to flow well, an overall incline of 100 millimeters will be provided. Sufficient ventilation ports will be installed on the upper part of the outside walls to dissipate the heat that will be produced by the ice making machines and the generator.

To make a good impression on customers visiting the fish sales room at the Fish Marketing Center in Koror, the first story ceiling will be 3m high. The second floor office ceiling will have a standard height of 2.5m.

### 3) Structural Design

The frames of both the Ngeremlengui Ice Making Plant and the Fish Marketing Center in Koror will consist of reinforced concrete columns and beams, and their walls will be made of concrete blocks. Because future expansion work is planned for the top of the roofs, they will be flat reinforced concrete roofs.

Although both are small buildings, in order to prevent long-term deterioration caused by rusting, prefabricated steel frame construction is generally not used in Palau, particularly in the case of public buildings. Reinforced concrete construction has been selected because the Project buildings will be close to the shoreline where they will be vulnerable to salt damage and because principal buildings constructed as part of fishing village development projects in other states are reinforced concrete structures.

The planned sites of the buildings that will house both facilities are on reclaimed land, but there has been no settlement or other sign of the existence of unstable ground around neighboring buildings, even though several tens of years have elapsed since the reclamation work was completed. For this reason, the foundations under the planned buildings will be reinforced concrete spread foundations.

### 4) Equipment Design

The electrical equipment in the Ngeremlengui Ice Making Plant will be 220V 60Hz to conform to the electricity supplied by the state. The equipment will be powered by the state power supply during the night, but when the power has failed or the plant is being operated in the day-time, power produced by the emergency generator will be used. Therefore, an incoming panel will be installed with the ability to switch between these two power sources. To obtain water for the ice making machine, a pipeline will draw water from the state water supply pipes and feed it to



the water tank , and to prepare for a cut-off of this water supply, equipment will be installed to guide rain water from the roof into the water tank.

At the Fish Marketing Center in Koror, air conditioning equipment will be installed in the fish sales room, fish processing room, and the office because the facility will handle fresh fish and it is customary to install air-conditioning systems in public buildings in Palau. Two power supplies will be provided: a 220V system to power the air-conditioning equipment and refrigerated show-cases and a 115V system to power ordinary electrical equipment. Water pipes will draw water from the 50mm diameter water supply pipes located on the site. Waste water, which will include water containing fish blood from the processing room and dirty water from the toilets and shower room, will be drained to and processed in separate septic tanks. The processed water will be piped to a drainage basin where it will permeate into the ground. To reduce the construction costs incurred when, at a future date, a sewer pipe connected to a central processing facility is installed, the drainage basin will be built close to the road.

#### 5) Building Construction Materials Design

The surface of the floor of the Ngeremlengui ice making plant will be mortar trowel finished. To maintain the cleanliness of the floors of the processing room, sales room, sanitary section, and corridor on the first floor of the Fish Marketing Center in Koror, these floors will be surfaced with ceramic tile. The floor of the second story office will be finished with plastic tile.

To make sure that the interior and exterior of the walls of the buildings at both sites are durable and attractive, all the walls be finished with mortar covered with a coat of vinyl paint.

To waterproof the roofs of both buildings, they will be finished by applying a water-proof mortar substrate finished with synthetic resin water-proof paint.

Ceilings will only be installed in the Fish Marketing Center in Koror, and sound-absorbent textile material will be used to enhance the effectiveness of the air conditioning.

The fittings, doors, etc. will be made of aluminum to prevent rusting.

Table 5 presents a comparison of the above construction methods with the construction methods generally used in Palau and the reasons why each method has

been selected.

Table 5. Comparative Table of Materials and Construction Methods

Item	Usual Local Construction Method	Construction Method to be Adopted	Reasons for Adoption
Foundation	Reinforced concrete Continuous footing	Same	Simplicity of Using Local Method
Columns and beams	Reinforced concrete		
Floor	Body Reinforced concrete Finish Trowelled mortar Mortar substrate under ceramic tile Or plastic tile		
External wall	Body Concrete blocks Finish Mortar substrate finished with VP		
Roof	Body Reinforced concrete Finish Waterproof mortar	Waterproof mortar substrate Synthetic resin waterproof paint	Improved durability
Ceiling	Sound-proof textile or Asbestos board finished with VP	Sound-proof textile	Enhanced air-conditioning effectiveness
Interior walls	Finish Mortar finished with VP Or gypsum board finished with VP	Mortar finished with VP	Improved durability
Windows, doors, etc.	Steel or aluminum	Aluminum	Improved durability

### 3-3-3 Equipment Plan

Table 6 presents the principal details about the equipment. A study of the equipment details reveals that it will not be necessary to procure the equipment locally or from a third nation.

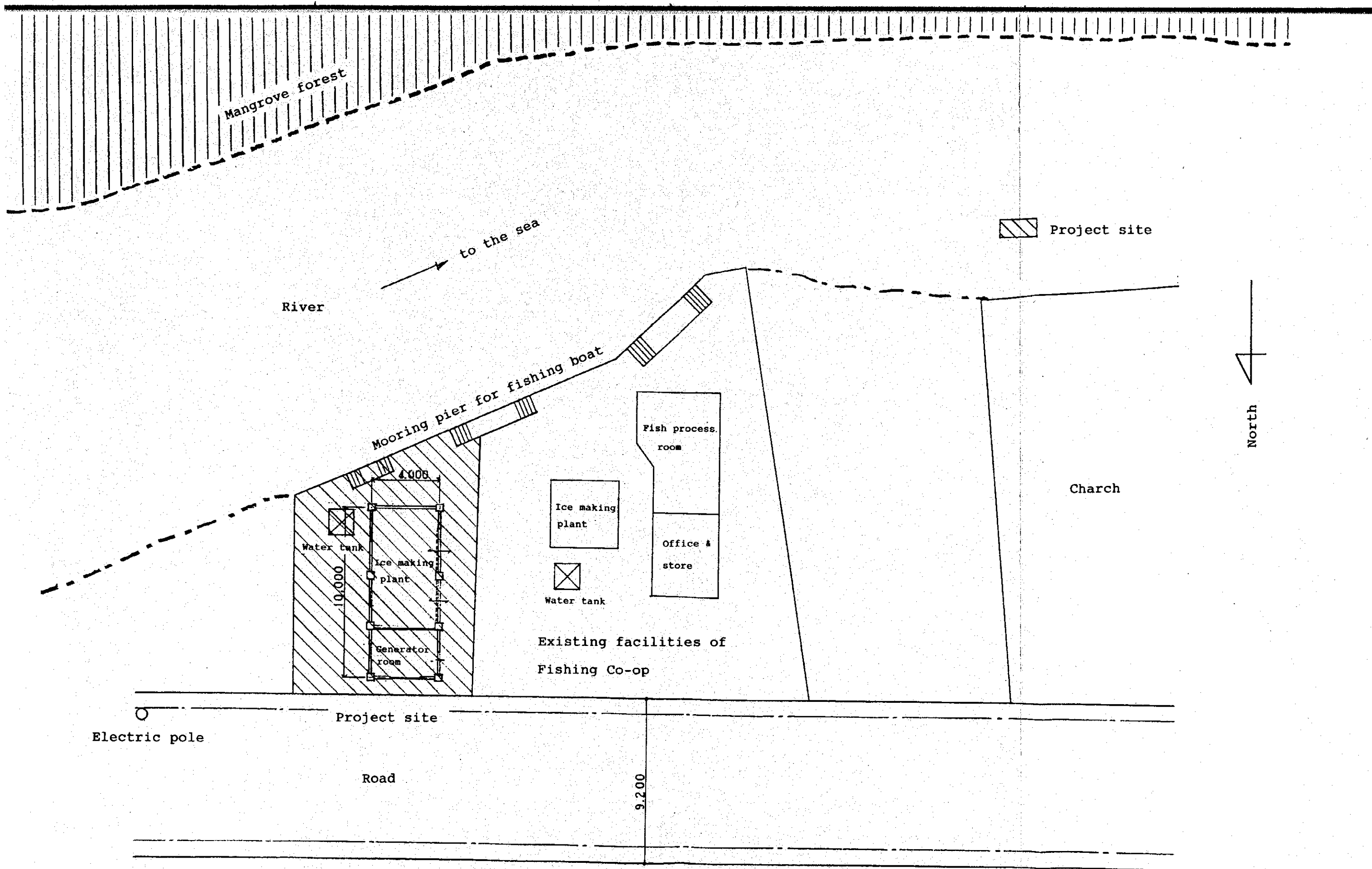
Table 6. Planned Equipment List

Machine	Size	Quantity	Details
Ice making machine	Capacity of 1 ton/day	2 units	Plate ice
Ice bin	Capacity approx. 2 tons	2 units	Prefabricated insulated panels
Water tank	Capacity approx. 3m <sup>3</sup>	1 unit	Prefabricated FRP
Generator	44KVA (35kW) 220V	1 unit	Diesel engine powered, sound-proof type
Fuel tank	Capacity approx. 1m <sup>3</sup>	1 unit	Steel
Fish carrier truck	Capacity 1.5 tons	1 unit	Diesel engine, four-wheeled drive, hydraulic lift behind the cargo platform
Fish carrier boat	Full length approx. 12.5m Capacity approx. 3 tons Main engine 180 horsepower Cruising speed approx. 13 knots	1 unit	FRP, Diesel engine
Fishing Equipment and Supplies			
Outboard motors	85 horsepower	20 units	With a 2-year supply of parts
Insulated fish boxes	Approx. 160 liters	50 units	FRP or polyethylene, for carrying fish
Net baskets	Approx. 50 liters	100 units	Plastic, for carrying ice
Hand carts	Capacity of 150kg	5 units	For handling insulated fish boxes
Processing Gear			
Pointed knives		3	
Sashimi knives		3	
Scale removers		3	
Stainless steel trays	500mm×500mm	10	

**3-3-4 Basic Design Drawing**

Figure	Figure Name	Figure Description	Figure Reference
Fig. 3-3-4-1	Isometric Drawing	Isometric drawing of a rectangular block with dimensions L, W, and H.	Fig. 3-3-4-1
Fig. 3-3-4-2	Orthographic Drawing	Orthographic drawing showing front, top, and side views of a rectangular block.	Fig. 3-3-4-2
Fig. 3-3-4-3	Sectional Drawing	Sectional drawing of a rectangular block showing internal features.	Fig. 3-3-4-3
Fig. 3-3-4-4	Technical Drawing	Technical drawing of a rectangular block with dimension lines and labels.	Fig. 3-3-4-4
Fig. 3-3-4-5	Isometric Drawing	Isometric drawing of a rectangular block with a hole.	Fig. 3-3-4-5
Fig. 3-3-4-6	Orthographic Drawing	Orthographic drawing showing front, top, and side views of a rectangular block with a hole.	Fig. 3-3-4-6
Fig. 3-3-4-7	Sectional Drawing	Sectional drawing of a rectangular block with a hole.	Fig. 3-3-4-7
Fig. 3-3-4-8	Technical Drawing	Technical drawing of a rectangular block with a hole, including dimension lines and labels.	Fig. 3-3-4-8

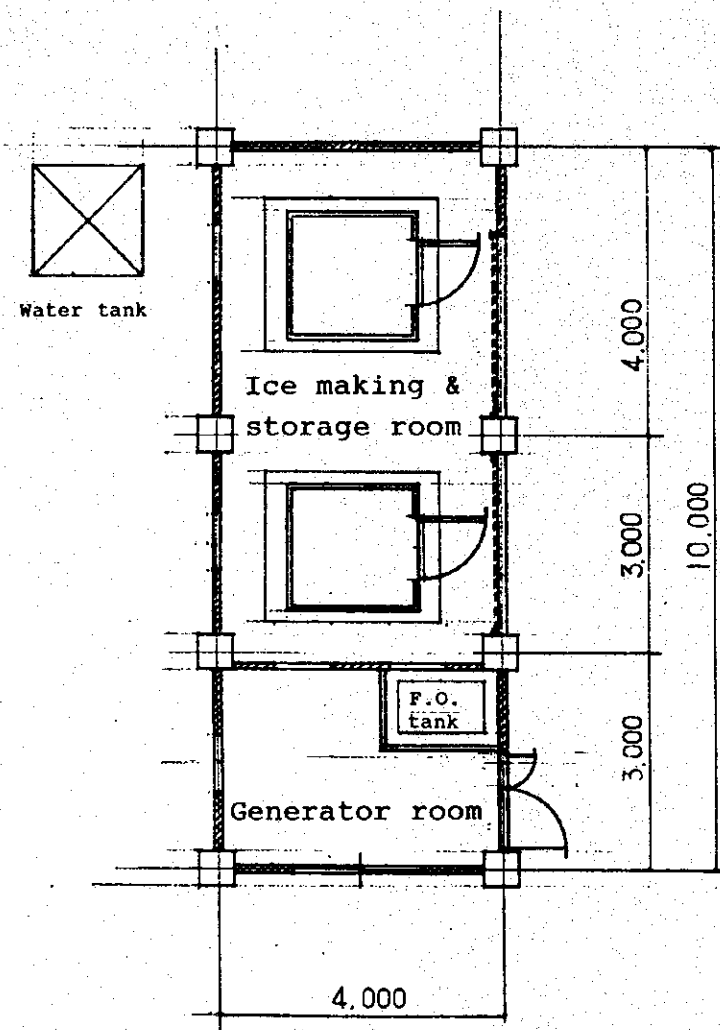




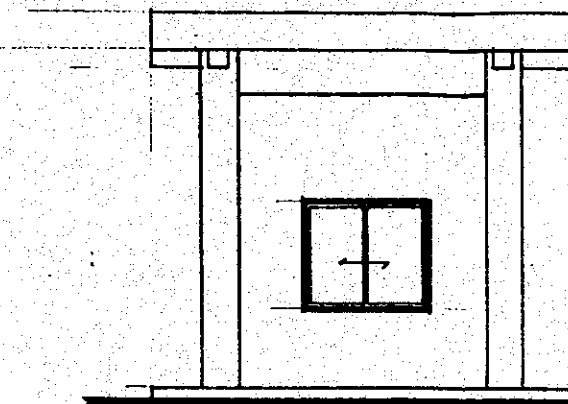
ICE MAKING PLANT IN NGEREMLENGUI

(LOCATION MAP)

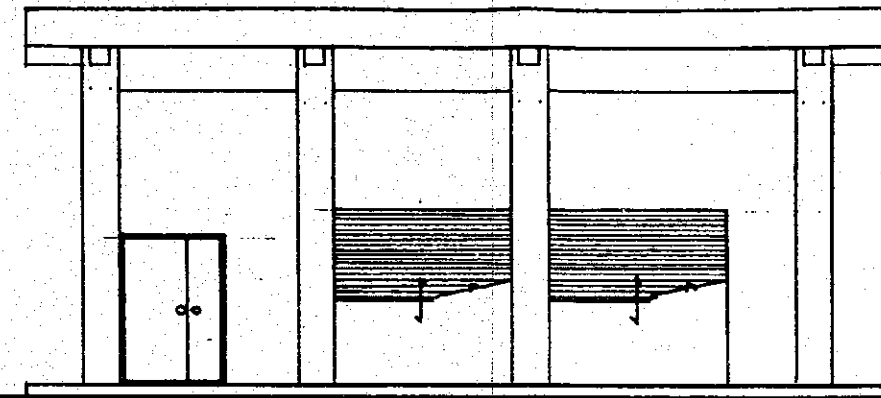
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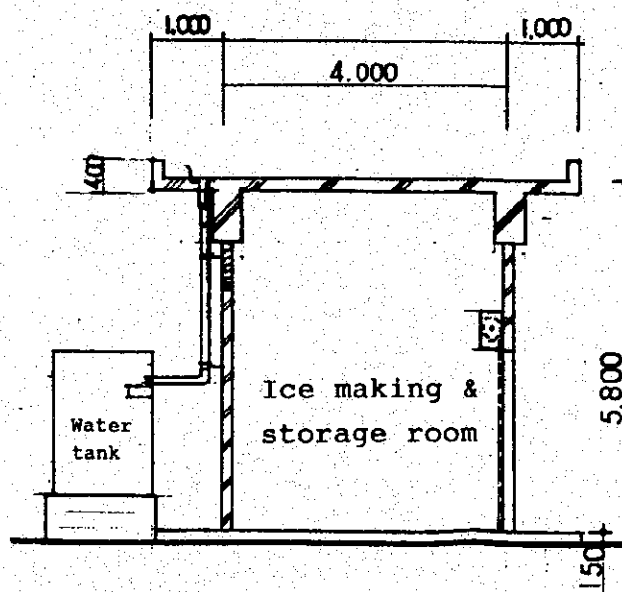
PLAN



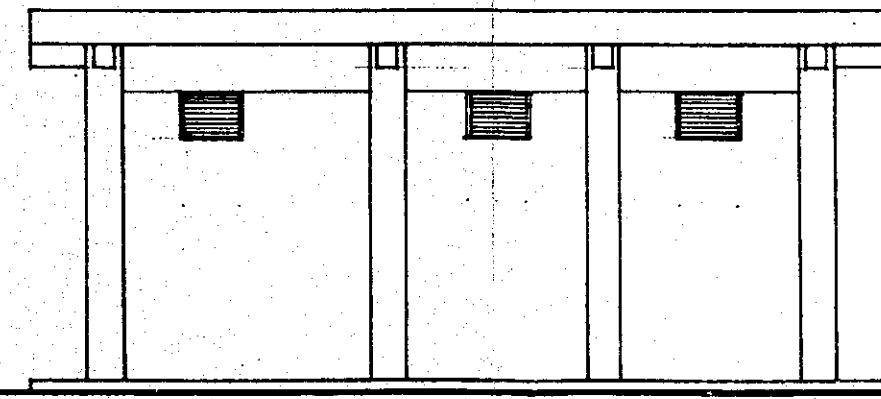
ELEVATION



ELEVATION



SECTION

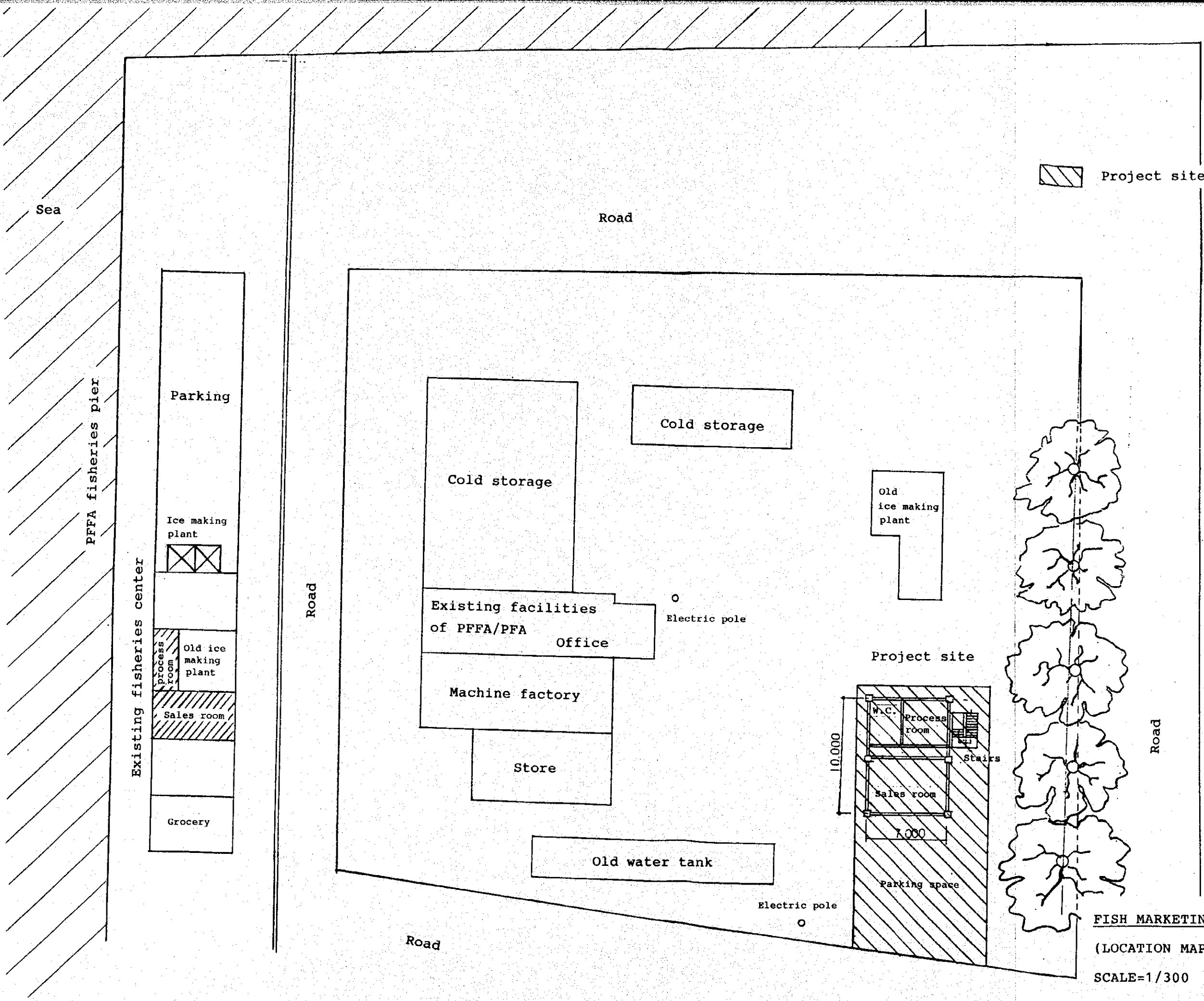


ELEVATION

ICE MAKING PLANT IN NGEREMLENGUI

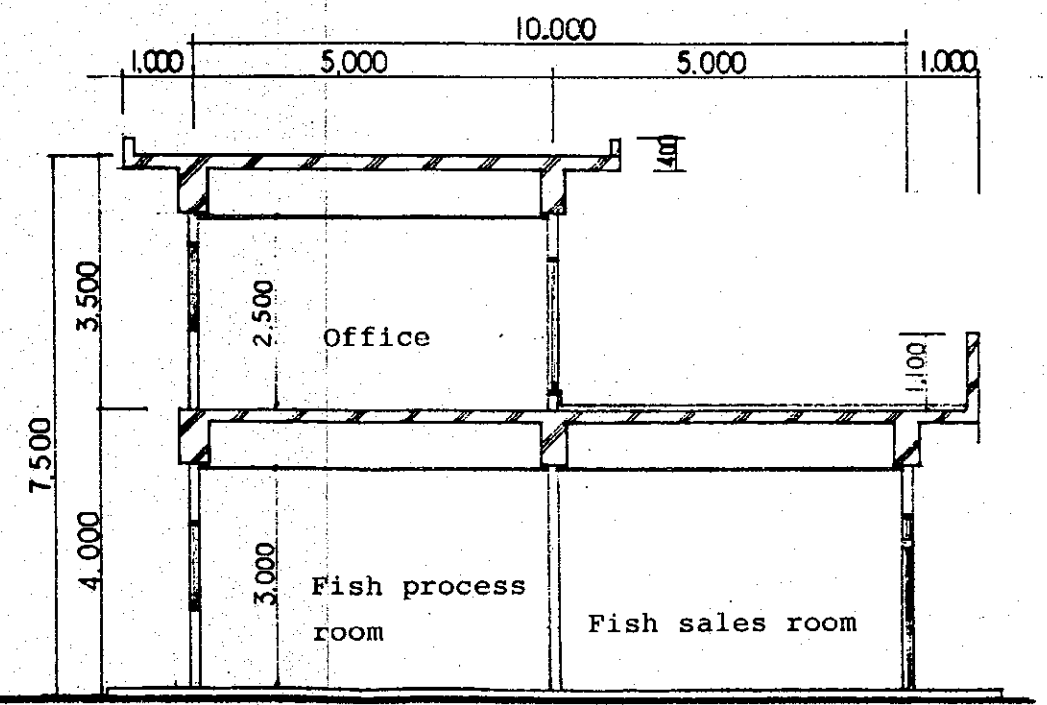
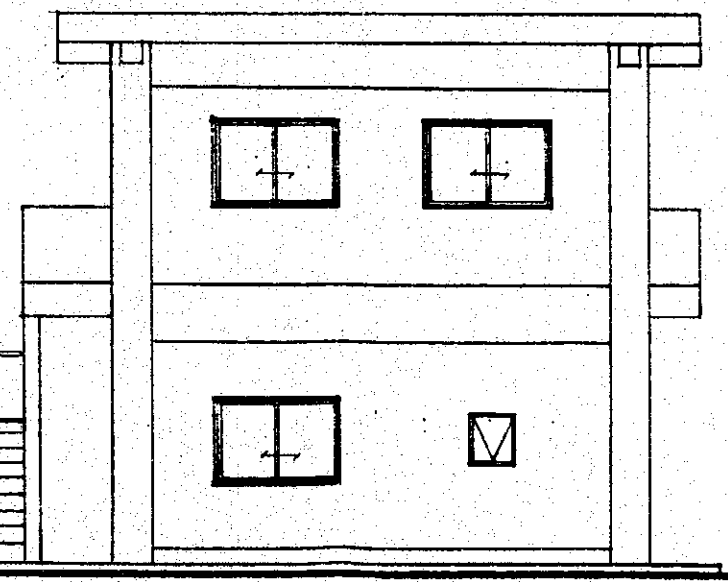
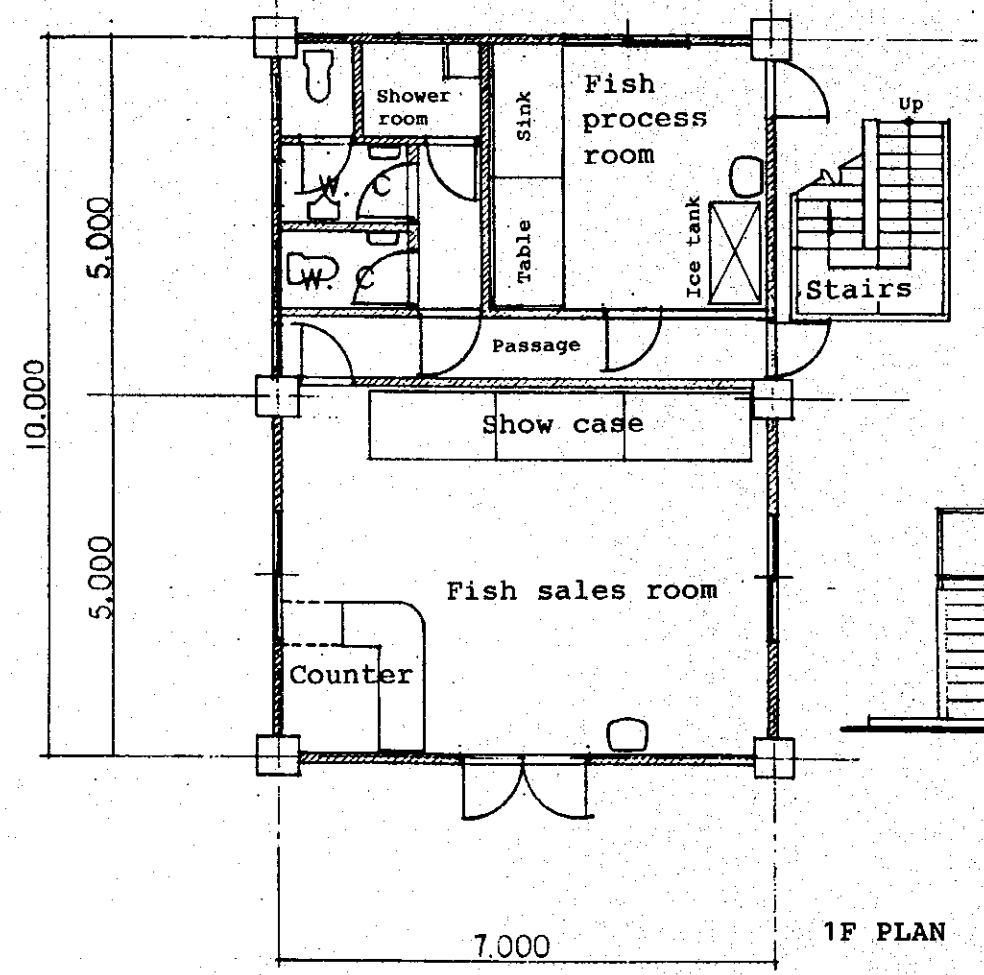
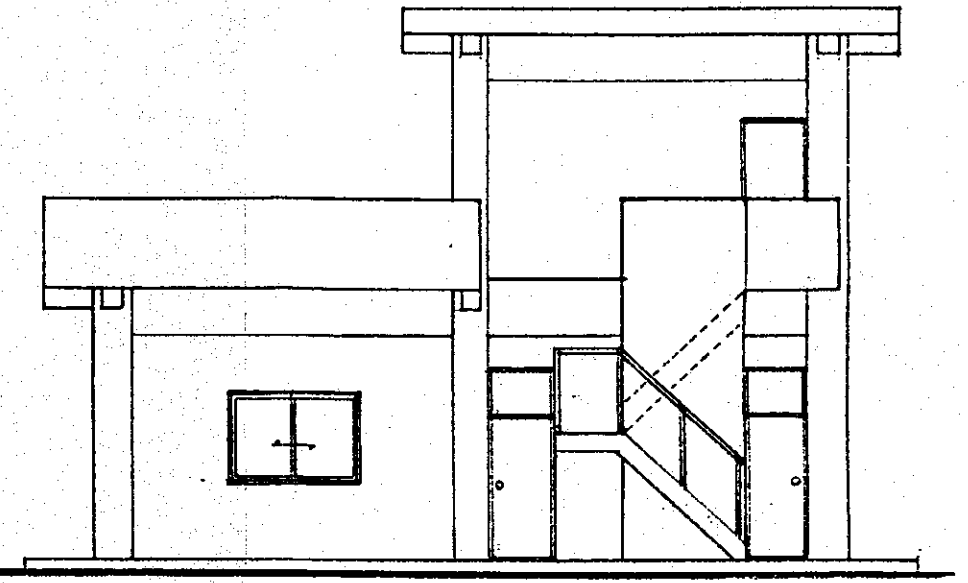
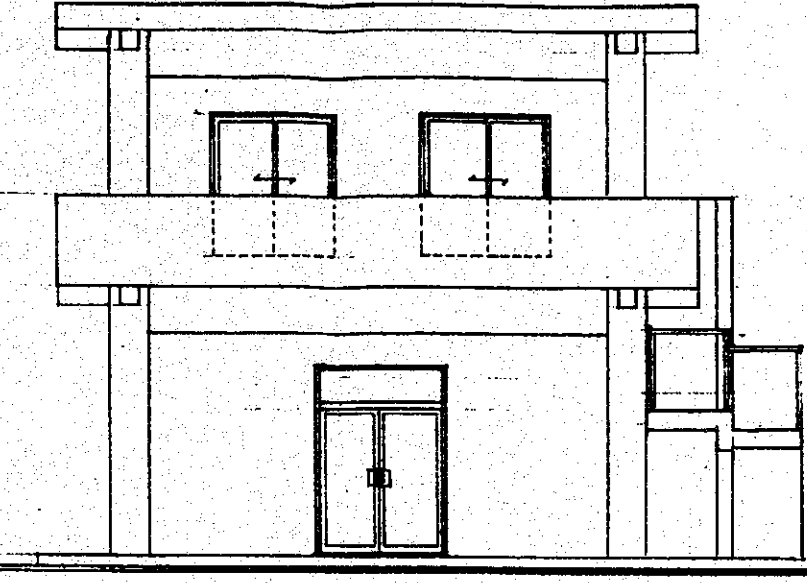
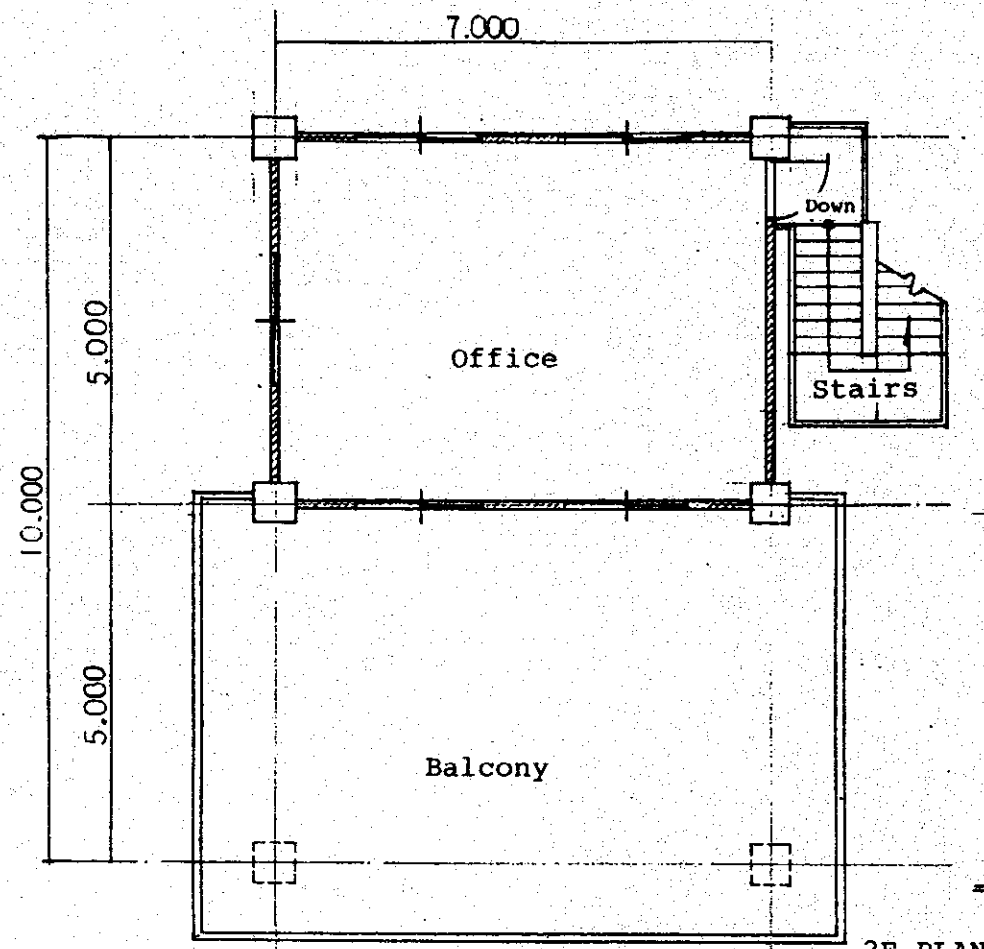
(PLAN, SECTION & ELEVATION)

SCALE=1/100



FISH MARKETING CENTER IN KOROR  
 (LOCATION MAP)  
 SCALE=1/300





FISH MARKETING CENTER IN KOROR  
 (PLAN, SECTION & ELEVATION)  
 SCALE=1/100



### **3-4 Implementation Plan**

#### **3-4-1 Construction Condition**

The planned facilities will be small buildings: the Ngeremlengui Ice Making Plant will have 40m<sup>2</sup> of floor space while the Fish Marketing Center in Koror will have 105m<sup>2</sup> of floor space. The construction method, one generally utilized in this area, will be reinforced concrete columns and beams and concrete block walls, a method which can be implemented using local construction techniques. The transport of the construction materials and equipment to Koror will not present any problems, but because there is no road to Ngeremlengui usable by large trucks, the amount of material that can be carried in one trip is limited. And it is forecast that during the rainy season from June to August it will be impossible to conduct the work as planned. In light of the above conditions, the following measures will be taken in order to complete the project on time.

- (1) The agency in Palau charged with examining construction plans for public facilities is the Public Works Bureau in the Ministry of Resources and Development, which is also the agency responsible for this Project. In the course of preparing detailed plans, we will submit our design standards and drawings as far as possible in advance in order to expedite the review process.
- (2) The required construction materials can be procured locally with the exception of part of the finishing materials, water supply and drainage equipment, and the electrical equipment. However, in view of the extremely limited production of concrete blocks in Palau, we will carefully perform an advance study considering the procurement lead times and the times required for various activities in the plan area.

#### **3-4-2 Implementation Method**

It is absolutely essential that as the work is performed, everything possible be done to minimize its effect on the environment. This is vital because the Project area is a location where a superior marine environment has been preserved and the marine environment of Palau is a resource of great value to both its fishing industry and its tourist industry. Special care must be taken to prevent muddy water from accidentally flowing into the sea in the event of a heavy rainfall occurring during the ground construction phase. And when supplying the fuel and oil needed to operate the construction machinery, the workers must be extremely careful to prevent any oily substances from permeating the sand and eventually flowing into the ocean water.

### 3-4-3 Construction and Supervisory Plan

Following the signing of the Exchange of Notes for the Project between the governments of Japan and the Republic of Palau, a consultant contract will be signed between a consultant of Japanese nationality and the Ministry of Resources & Development (MRD) of the Government of Palau for the implementation of the Project. The consultant will prepare all detailed plans and drawings necessary to implement the Project, specifications, written estimate of the project cost, and all documents needed for the tender and contractor agreement, and subject to the approval of the MRD, will set tender qualifications, evaluate tenders and tender documents, and select the contractors.

Following the signing of the construction contract, the consultant will approve the construction plans, and will inspect the equipment manufactured in Japan at the same time as he supervises the execution of the construction of the facilities in Palau to insure the progress of the construction work and the precision of its execution. Considering the small scale of the construction work and the absence of any special construction methods, the Consultant need only despatch one building construction specialist and one machinery technician to the site, and only when and for as long as necessary to supervise the ongoing construction work.

### 3-4-4 Procurement Plan

#### (1) Procurement of Construction Materials

To obtain the construction materials to be used in the Project, items that can be procured locally in Palau will, in principle, be locally sourced. In this case, these materials are sand, gravel, cement, steel reinforcing rods, concrete blocks, and so on. Aluminum sashes, doors, and other fittings, electrical equipment and machinery, water supply and drainage and other sanitary equipment are difficult to procure locally, and will, therefore, be imported from Japan.

The procurement categories for the principal construction materials and equipment to be used in the Project are as follows.

#### Main Building Materials

	Source
Sand	Palau
Gravel	Palau
Cement	Palau
Steel reinforcing rods	Palau

Concrete blocks Palau

Lumber and plywood Japan

Fittings Japan

Paint Japan

**Main Equipment Items**

Electric wires Japan

Lighting fixtures Japan

Switchboard Japan

Water intake and drainage pipes Japan

Sanitary equipment Japan

**(2) Equipment Procurement**

The main equipment items, which include the ice making machines, the emergency generator, fish carrier truck, fish carrier boat, outboard motors, etc., are all industrial products, which will, in principle, be procured from Japan out of consideration for quality and guarantees, including service.

**3-4-5 Scope of the Work**

As part of our study of the implementation schedule, we have summarized the scope of the responsibilities of the two governments that is necessary for the Project implemented with grant-aid from Japan. The results of the summarization are presented below.

**(1) The Scope of the Responsibility of the Government of Japan**

- 1) Facility construction.
- 2) Equipment procurement.
- 3) Consulting services concerning the detailed design, assistance with tenders, and construction supervision.

**(2) The Scope of the Responsibility of the Government of Palau**

- 1) Securing the construction site and providing vegetation and other landscaping work around the site.
- 2) Obtaining all required permits concerning the construction work as well as other permits required for the implementation of the Project.
- 3) Procuring general furnitures necessary in the facilities. The cost is estimated as 200,000 Japanese Yen.
- 4) All procedures and expenditures necessary to complete the work required to supply

the sites with water and electricity.

- 5) Prompt custom clearance of all equipment and materials imported into Palau in connection with this Project and exemption from all required duties and taxes.
- 6) Exemption from all taxes and duties for Japanese nationals residing in Palau in order to provide services related to the Project.
- 7) All other items necessary for the implementation of the Project which are not specifically included among the responsibilities of the Government of Japan.

The implementation schedule for construction work executed in accordance with the division of responsibilities described above has been divided into three categories: detailed design including tenders, facility construction, and the procurement of machinery and equipment. In accordance with the Government of Japan's grant-aid system, the entire implementation schedule must be completed within 12 months.

Facility construction will begin with the large scale element in the Project, the Fish Marketing Center in Koror, followed by the commencement of work on the Ngeremlengui Ice Making Plant. The major construction procedures may be broadly classified as follows.

- (1) Construction Work  
Temporary work, foundation work, body work, interior finishing, and exterior finishing.
- (2) Power, Water Supply, Drainage, and Sanitary Equipment  
Intake line work, wiring, plumbing, and installation of fixtures.
- (3) Machine Installation  
Ice making machines, emergency generator, along with delivery, installation, adjustment, and trial running of equipment at the Fish Marketing Center.

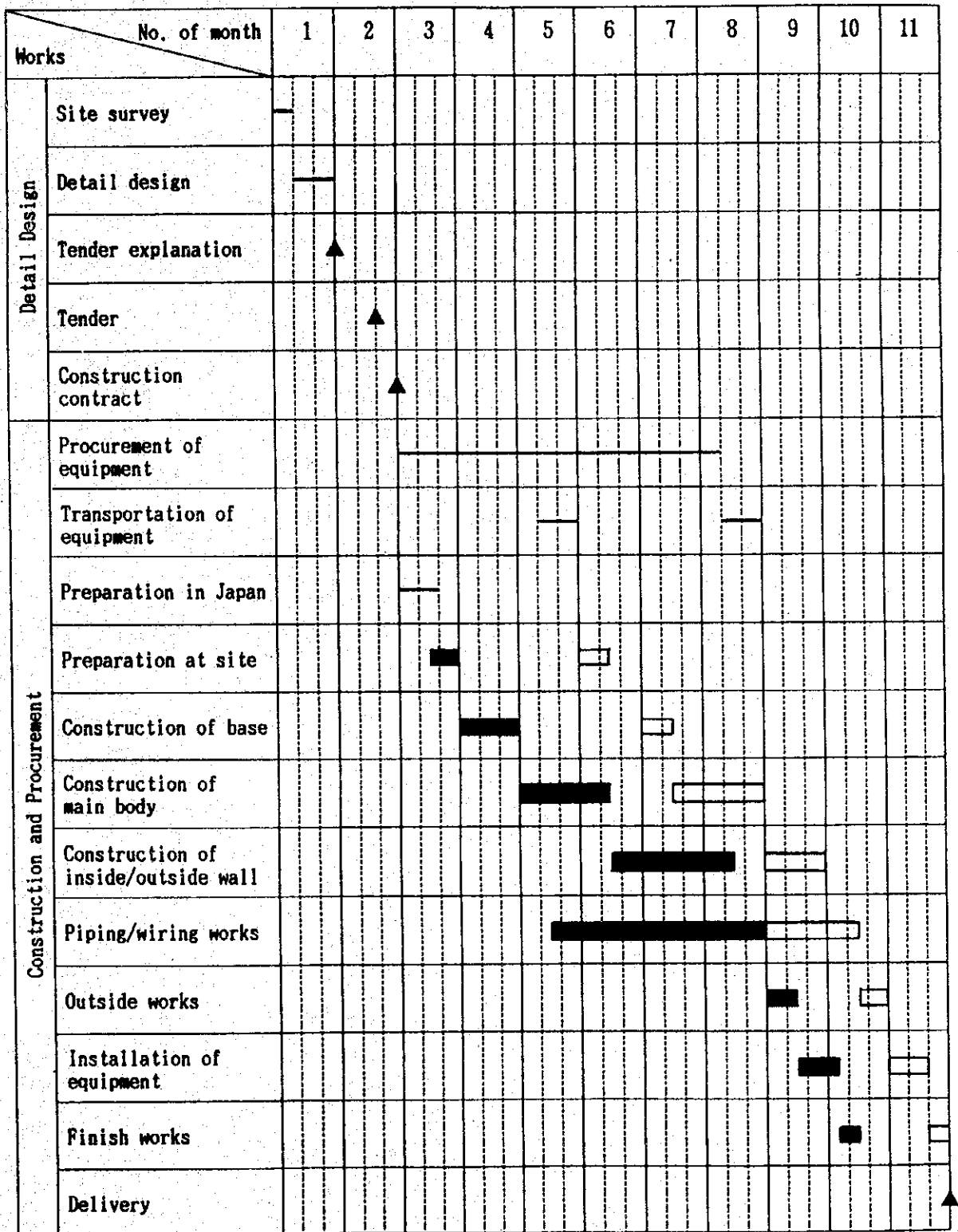
#### 3-4-6 Implementation Schedule

The construction phase, including preparation in Japan and construction on site, is expected to take about nine months. Equipment procurement is expected to take about five months: the length of time required to procure the fish carrier boat, the item with the longest procurement lead time. The other machinery and equipment will likely be procured within two to three months, but about 0.7 months will probably be required for the installation and adjustment of the ice making machines and the generator in Ngeremlengui.

On the basis of the above conditions, we have prepared an optimum construction

schedule from the standpoints of both time and cost. Table 7 shows the Project Implementation Schedule we have designed.

Table 7. Project Implementation Schedule



■ : Fish marketing center in Koror, □ : Ice making plant in Ngeremlengui





## **Chapter 4. Project Evaluation and Conclusion**



## Chapter 4. Project Evaluation and Conclusion

### 4-1 Project Evaluation

The coastal fishery of Palau, a nation with no other noteworthy industry aside from tourism, plays a vital role as a source of employment opportunities and cash income in its outlying regions and as a supplier of marine products to the capital city of Koror. For this reason, the Government of Palau has turned to grant-aid from Japan to carry out a total of four development projects involving regional fishing villages since 1981. But without a firmly established fish marketing system, the residents of the fishing villages have consumed most of their catch themselves.

The fish marketing system in Palau suffers from three shortcomings: an insufficient supply of ice necessary to retain the freshness of fish during shipping, a shortage of the land and sea transport equipment that is needed to transport the fish, and a lack of marketing facilities that can provide a stable supply of fresh fish. The purpose of this Project is to stimulate commercial fishing in the outlying fishing villages by resolving these problems and improving the fish marketing system.

The following is a summary of the beneficial results that the Project will bring.

Present Status and Problems	Measures Proposed by the Project Plan	Effectiveness/Degree of Improvement Achieved by the Project
<p><b>1. The Ngeremlengui Ice-making Plant</b></p> <p>In recent years Ngeremlengui State has stood in third place among the states of Palau in terms of the volume of fish taken, and it is becoming the center of the fishing industry on the west side of Babeldoab Island. The state is the site of a small ice-making plant built with the help of Grant-aid from Japan in 1981, but it will soon wear out and be unusable. And because the plant also provides ice to neighboring states, the area suffers from a chronic shortage of ice.</p>	<p>The Project plan calls for the installation in Ngeremlengui State of two ice making machines, each with a capacity of 1 ton of ice per day, and one emergency power generator. The Ngeremlengui State Fishing Co-op will operate the plant.</p>	<p>The new plant will supply 360 tons of ice per year to 211 fishermen, not only those in Ngeremlengui, but fishermen in the adjoining states of Ngarard, Ngardmau, Ngatpang, and Aimeliik. This will be enough to contribute to the maintenance of the freshness of approximately 320 tons of fish caught annually in the five states, including the fish consumed by their residents. The abundant supply of ice will reduce the volume of fish that was not shipped because its freshness could not be maintained, increasing the amount shipped to Koror.</p>
<p><b>2. The fish carrier truck</b></p> <p>The Ngeremlengui Fishing Co-op transports small loads of fish to Koror by truck, with large shipments taken to Koror in a small fishing boat. But it is difficult to maintain a regular shipping schedule because transport by sea is subject to ocean conditions.</p>	<p>All fish will be transported by road in a new four-wheel drive truck with a capacity of 1.5 tons. It will be operated by the Ngeremlengui Fishing Co-op.</p>	<p>Approximately 34 tons of the fish caught by the 42 fishermen of Ngeremlengui State will be shipped overland to Koror every year. This will permit regular shipments to Koror, because land transport is safer and more reliable than sea transport. After the switch-over to land transport, the Ngeremlengui Fishing Co-op will return the small fishing boat to the PFFA. This will reduce the annual expenses of the co-op by an amount equal to the rent paid for the use of the boat (\$1,200 per year).</p>

Present Status and Problems	Measures Proposed by the Project Plan	Effectiveness/Degree of Improvement Achieved by the Project
<p><b>3. The Fish Carrier Boat</b> Individual fishermen or separate fishing co-ops in the four states of northern Babeldaob Island, Ngerchelong, Ngarard, Ngardmau, and Kayangel, which are not connected to the capital Koror by road, carry their catch to Koror in their own boats. This cost of this practice places a heavy financial burden on the fishermen and its unreliability prevents the provision of a stable supply of fish to Koror.</p>	<p>One fish carrier boat with a full length of 12.5m, a capacity of 3 tons, and a main engine power of 180hp will be provided. The PFFA will operate the boat which will pick up and transport fish from the four northern states.</p>	<p>The fish carrier boat will transport to Koror about 110 tons of fish caught by 232 fishermen every year in the four northern states. Gathering and transporting the fish in this way will stabilize the amount shipped, and reduce annual transportation costs borne by the four states by approximately \$7,300. Small boats now involved in transportation activities by fishermen in the four states for a total of 50 days every year will be free for use in fishing. They can even be used for the development of fishing outside the reefs, an activity that will be particularly important in the years to come.</p>
<p><b>4. The Fish Marketing Center in Koror</b> The building housing the fish marketing center operated by the PFFA is a steel frame prefabricated building more than 40 years old. Rusting has caused severe deterioration of its structure. Its sales and processing rooms are narrow, sanitation is poor, and it is not a suitable place for the handling of fresh fish.</p>	<p>A new processing and sales building will be constructed. It will be a reinforced concrete structure, a type with the durability to withstand salt damage. It will contain clean processing and sales rooms along with office space. It will be managed by the PFFA.</p>	<p>Each year it will market almost 140 tons of fresh reasonably-priced fish to 22 hotels, 28 restaurants and to 10,000 ordinary consumers in the City of Koror. Improving its processing facilities will enable the PFFA to increase the amount of processed fish that it can produce each year from 10 tons to 50 tons, increasing the value it adds to the fish it sells. It will be able to process and sell about 20 tons per year of types of fish it formerly could not handle: bonito, tuna, and other offshore fish. These increases in the amount of fish that the PFFA can sell and the amount of money it earns can be counted on to increase the incomes of the fishermen belonging to the fishing co-ops affiliated with the PFFA.</p>

#### 4-2 Conclusion

As a consequence of the lack of a fish marketing system in Palau, the fishermen and their families living in the outlying fishing villages consume most of their catch themselves. And in the capital of Koror, the recent growth in the number of tourists and a rise in the standard of living of the residents has spurred a growing demand for fresh fish.

A key to preserving the freshness of fish is plentiful ice, but it is difficult to obtain sufficient ice in the outlying producing regions because of a chronic shortage of supplies of ice.

Fish caught in outlying states connected to Koror by road are shipped to the city by truck, while those caught in other states are brought to Koror by boat. But because the sea transport is done by individual fishermen and fishing co-ops using small boats, it is difficult to guarantee freshness and to maintain a stable supply. And the cost of transporting the fish to Koror this way is a severe economic burden for the fishermen.

The fish marketing center in the consuming region are, because of their deteriorated condition, definitely not sanitary. The room where the fish are processed is narrow and can not meet consumer needs such as the demand for fresh fish cut up for sale as sliced fish.

The Fish Marketing Improvement Project has been planned as a way to stimulate commercial fishing in the outlying fishing villages by providing an improved fish marketing system. Specifically, the Project will upgrade freshness preservation capabilities in the producing regions, provide efficient means of transporting the catch from the producing regions to the consuming region, and improve marketing operations in the consuming region. When the Project has been fully implemented, the fishing industry will be able to provide a stable supply of very fresh fish. The resulting reduction in transportation costs can be counted on to raise the income of the fishermen, nurture the coastal fishery, which is the only industry in the outlying regions of Palau, and help to stimulate the regional economy and motivate young people to remain in these fishing villages.

For these reasons, the Project is a highly appropriate program which is sure to make an important contribution, not only to the simulation of the commercial coastal fishery in the Republic of Palau, but also to activating the economy of the outlying regions of the nation and guaranteeing a stable supply of fish to the consumers of its capitol city of Koror.

#### 4-3 Recommendation

Fishing cooperative organizations have only been organized in seven of the country's

14 major states, and only six of these are affiliated with the PFFA. In one state, the fishing co-op is operated by the state government and ships and markets its catch independently without the assistance of the PFFA. We believe that in order to increase the efficiency of the management operations of the PFFA, an organization that will play a leading role in the Project, it is essential to strengthen the management capabilities of the PFFA by forming fishing co-ops in every state and affiliating each one with the PFFA. The PFFA on the other hand, ought to establish beneficial conditions for the purchase of fish from the affiliated co-ops and for the sale of fuel oil and other fishing gear, equipment, and supplies to the members of the affiliated co-ops, and make greater efforts to promote the development of the commercial coastal fisheries. A fishing co-op must be quickly established in Ngardmau State, one of the four northern states whose catch will be collected and transported by boat when the Project has been completed, and the only one of the four states without a fishing co-op.

The initial request only referred to fish carrier boat service for Ngerchelung State, but it would be difficult for the boat to earn enough income to cover the expenses incurred operating the service if its use were limited in this way. We believe, therefore, the boat ought to be used to collect and transport fish from other states in order to guarantee that the service breaks even. And if the service loses money despite this change, the government will have to provide a subsidy to make up the for the loss.

We have concluded that the Project, one that will make a significant contribution to the establishment of a stable supply of fresh fish and the stimulation of regional economies, satisfies all conditions for grant-aid support. We also foresee no problems with the upkeep and operation of the facilities, machinery, equipment, and supplies that will be supplied to Palau, because we believe that the PFFA and the Ngeremlengui State Fishing Co-op can manage these without outside assistance. And we are also confident that once the questions referred to above are resolved, the Project can be implemented smoothly and efficiently.





[A p p e n d i x]



**[Appendix]**

- 1. Member List of Survey Team**
- 2. Survey Schedule**
- 3. Member List of Party Concerned in the Recipient Country**
- 4. Minutes of Discussion (Copy)**

1. Member List of Survey Team

Charge	Name	Belonging
Leader	Kiyoshi Sumita	Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs
Fisheries Development plan	Kanehiro Makino	Office of the Overseas Fisheries Cooperation, Fisheries Agency
Chief consultant, Fish marketing facilities plan	Toshio Hosonuma	Maruha Corporation
Fish transportation plan	Eiji Higuchi	Maruha Corporation

## 2. Survey Schedule

No	Date (1994)	Activities	
		Government officials	Consultant
1	Dec.11 (Sun)	Lv. Tokyo 10:00, Ar. Guam 15:50, CO-962 Lv. Guam 18:25, Ar. Koror 19:25, CO-953	
2	12 (Mon)	Courtesy call on the Ministry of Resources & Development(MRD), Site survey in Koror	
3	13 (Tue)	Site survey in Ngeremlengui and Melekeok by car	
4	14 (Wed)	Site survey in Ngerchelong and Ngeremlengui by boat	
5	15 (Thu)	Discussion with Ministry of Resources & Development and Palau Fishing Authority(PPA)	
6	16 (Fri)	Discussion with Palau Federation of Fishing Associations(PFFA)	
7	17 (Sat)	Measurement of project site in Koror	
8	18 (Sun)	Inner meeting	
9	19 (Mon)	Discussion and signing of Minutes with MRD	
10	20 (Tue)	Courtesy call on the President Lv. Koror 14:10, Ar. Guam 17:05 CO-864	Courtesy call on the President Data collection of construc- tion cost, etc.
11	21 (Wed)	Report to Consulate General of Japan in Agana Lv. Guam 16:10, Ar. Tokyo 19:55 CO-967	Data collection of construc- tion cost, etc.
12	22 (Thu)		Ditto
13	23 (Fri)		Ditto
14	24 (Sat)		
15	25 (Sun)		
16	26 (Mon)		Lv. Koror 11:00, Ar. Guam 14:50 CO-952
17	27 (Tue)		Lv. Guam 07:05, Ar. Tokyo 10:55 CO-963

### 3. Member List of Party Concerned in the Recipient Country

Name	Title
Mr. Kunio Nakamura	President of the Republic of Palau
Mr. Koichi Wong	National Planner
Mr. Marcelino Melairei	Minister, Ministry of Resources & Development
Mr. Demei O. Otobed	Acting Director, Bureau of Natural Resources & Development, Ministry of Resources & Development
Mr. Noah Idechong	Chief, Division of Marine Resources, Bureau of Natural Resources & Development
Mr. Theo Isamu	Assistant Chief, Division of Marine Resources, Bureau of Natural Resources & Development
Mrs. Nancy Wong	Chairperson, Palau Fishing Authority
Mr. Flanny Reklai	Manager, Palau Fishing Authority & Palau Federation of Fishing Associations
Mr. Jonathan Maui	Staff, Palau Fishing Authority
Mr. Blau J. Skebong	Chairman, Ngeremlengui Fishing Co-operative
Mr. Rudimch J. Titiml	Governor, Ngerchelongs State
Mr. Harper Skang	Advisor, Ngerchelongs State
Mr. Abraham Oshima	Treasurer, Ngerchelongs Fishing Co-operative
Mr. Katsumi Kira	Overseas Fishery Cooperation Foundation
Mr. Ryo Nishii	Overseas Fishery Cooperation Foundation
Mr. Minoru Hatano	Overseas Fishery Cooperation Foundation