MINISTRY OF RESOURCES AND DEVELOPMENT
REPUBLIC OF PALAU

BASIC DESIGN STUDY REPORT
ON
THE SMALL SCALE FISHERIES DEVELOPMENT PROJECT
IN
THE NORTHERN STATES OF THE REPUBLIC OF PALAU

MARCH 1996

JAPAN INTERNATIONAL COOPERATION AGENCY

OVERSEAS AGRO-FISHERIES CONSULTANTS CO.LTD.

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PREFACE

In response to a request from the Government of the Republic of Palau, the Government of Japan decided to conduct a basic design study on the Small Scale Fisheries Development Project in the Northern States and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Palau a study team from November 29 to December 28, 1995.

The team held discussions with the officials concerned of the Government of Palau, and conducted a field study at the study area. After the team returned to Japan, further studies were made, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Palau for their close cooperation extended to the teams.

March, 1996

Kimio Fujita
President
Japan International Cooperation
Agency

LETTER OF TRANSMITTAL

March, 1996

We are pleased to submit to you the basic design study report on the Small Scale Fisheries Development Project in the Republic of Palau.

This study was conducted by Overseas Agro-Fisheries Consultants Co., Ltd., under a contract to JICA, during the period from November 22, 1995 to March 29, 1996. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Palau and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

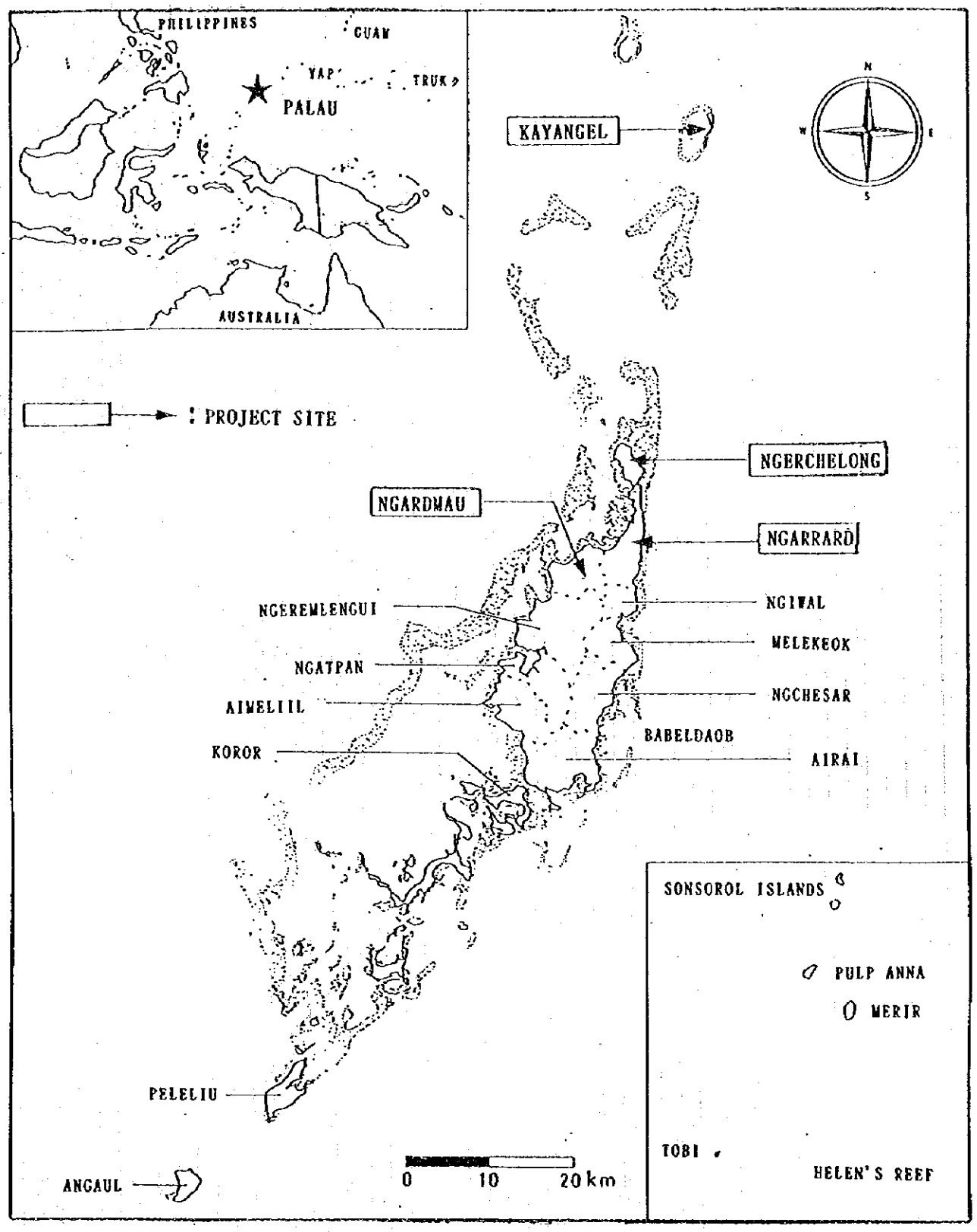
Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

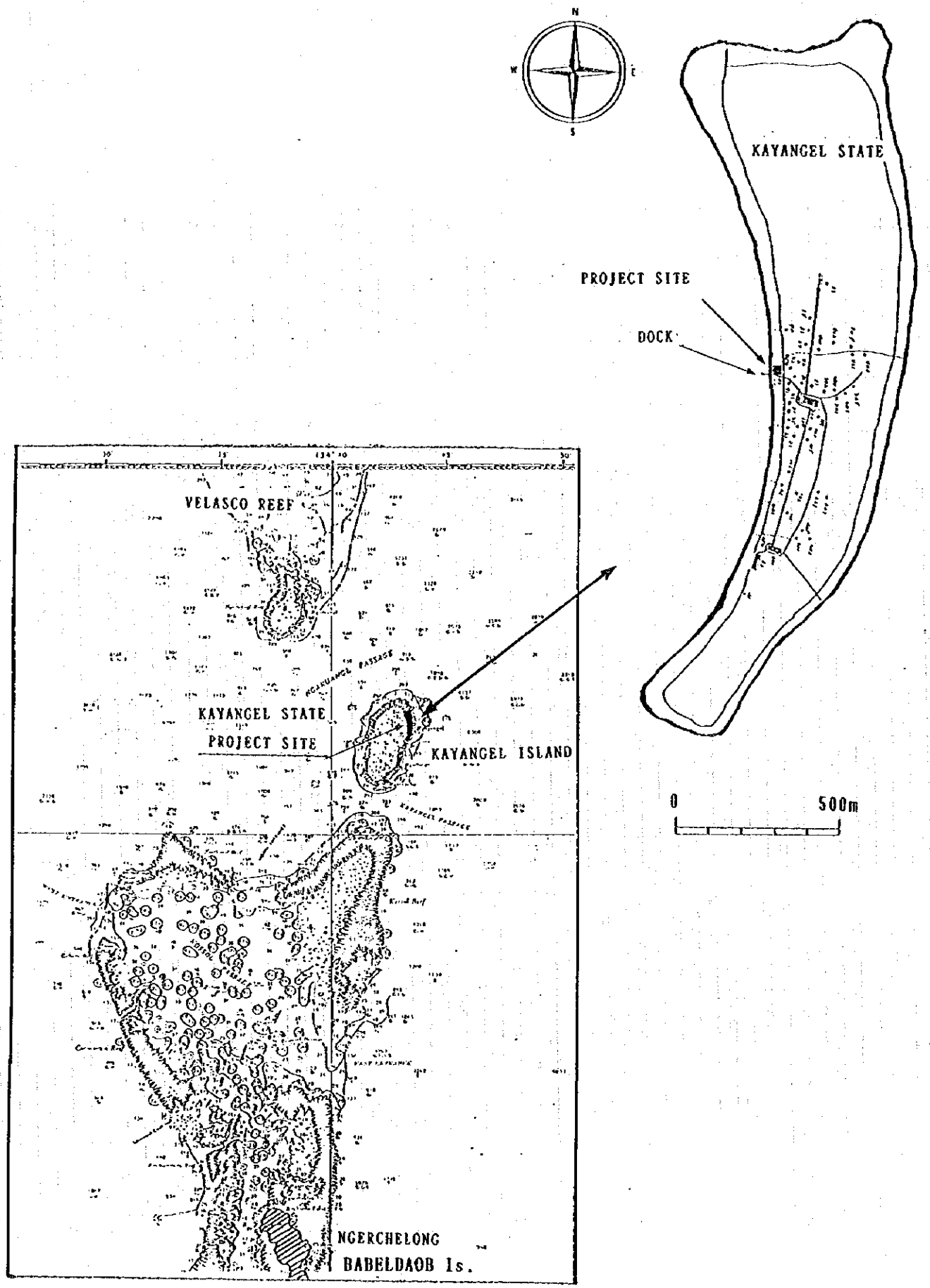
Nobuo Itoi
Project manager,
Basic design study team on
the Small Scale Fisheries Development Project
in the Northern States
Overseas Agro-Fisheries Consultants Co., Ltd.

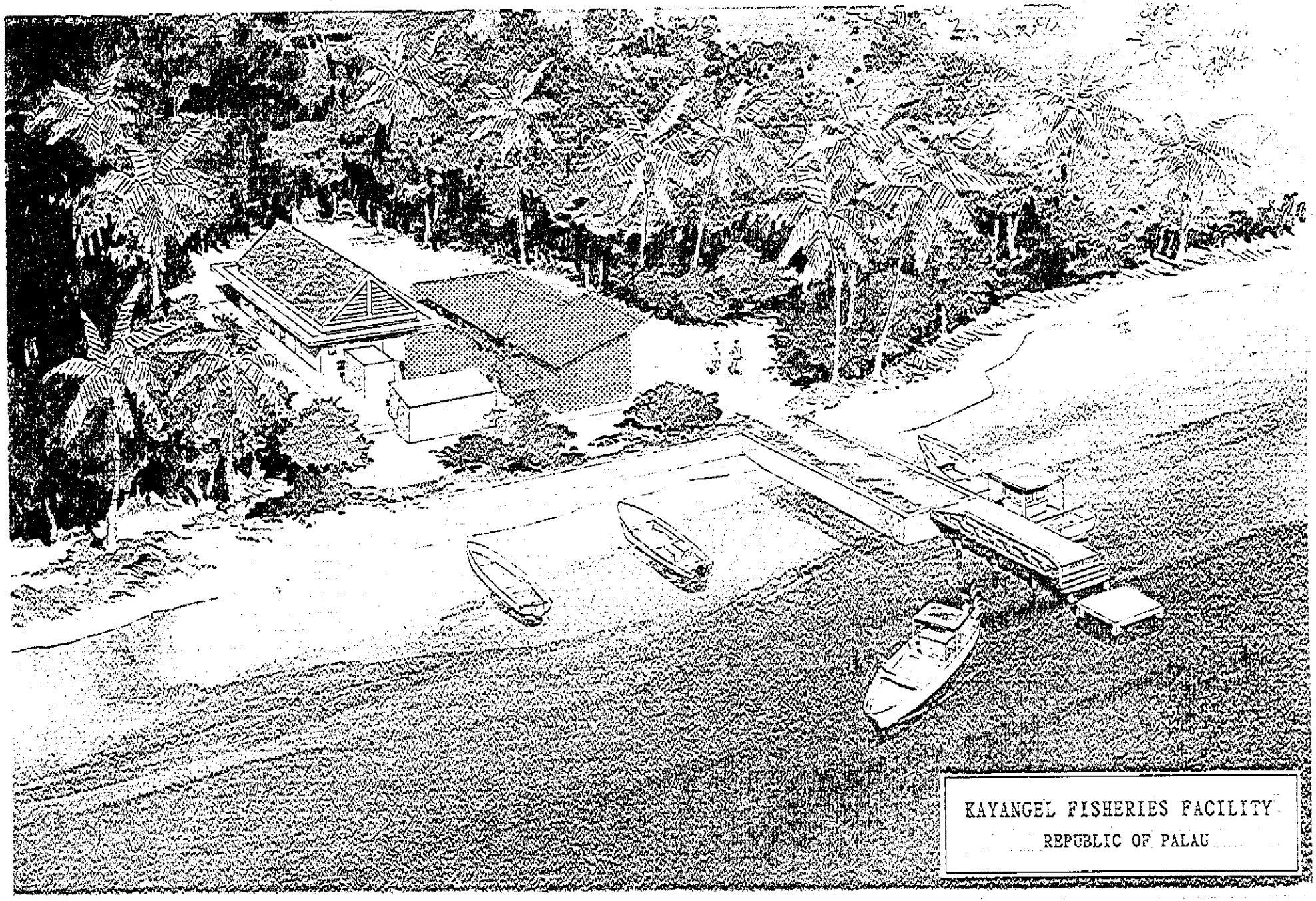
THE REPUBLIC OF PALAU

(1) LOCATION MAP



(2) PROJECT SITE





KAYANGEL FISHERIES FACILITY
REPUBLIC OF PALAU

Contents

Chapter 1. Background of the Project

The Republic of Palau is situated on the western tip of the Micronesian Caroline Islands in the western Pacific Ocean, and it consists of a narrow chain of islands running from north to south which cover a combined land area of 458 km^2. The national population is approximately 16,000, the bulk of which lives on the islands of Koror, which contains the capital city, and Babeldaob.

Following the Second World War, Palau was placed under the administration of the United States of America as a trust territory of the United Nations, however, in 1978 it broke away from the Micronesia Federation and in 1981 established a self ruling government under its own constitution in anticipation of future economic independence. As a result of a national referendum held to determine whether or not to enter into a free association with the United States in 1993, the country decided to enter into the free association and put an end to its status of being the last trust territory in the world. The country became independent of the United States in October 1994.

The Government of Palau has made marine resources and tourist resources the most important resource areas within its Economic Development Plan (1995-1999), and it has raised the following development targets for the fisheries sector:

1) More local employment and income opportunities,
2) Resource management,
3) Development of bonito and tuna resources by national fishermen,
4) Cultivation and the increased export of untapped resources,
5) Introduction of effective methods in all areas from catching through to distribution,
6) Greater use and improvement of existing fishery facilities,
7) Satisfying of domestic demand for marine products, etc.

Like other countries in the Pacific, Palau possesses a wide expanse of the Exclusive Economic Zone (approximately 600,000 km2) in comparison to its limited land area, and these waters contain rich bonito and tuna fishing grounds. However, offshore fishing in these waters is dominated by foreign fishing vessels, and the domestic fishing industry, which is centered largely around coastal fisheries, mainly consists of small scale commercial activities dominated by subsistence fishing.

With respect to the tourist industry, on the other hand, the number of tourists visiting Palau has increased approximately tenfold over the past 10 years and, together with the fisheries sector, this has become an important means of obtaining foreign currency. However, a large proportion

of Palau's foreign income is reliant on fund assistance (1995-2000) based on the Free Association Agreement signed with the United States, and the country's economy would not be able to exist in the short term by itself without the aid it receives from America and other foreign countries.

The fisheries sector in Palau is broadly divided into the coastal fishery which targets fishing grounds within 12 nautical miles of the coastline, and the offshore fishery, which takes place in the waters beyond 12 nautical miles and within the 200 nautical mile Exclusive Economic Zone. The coastal fishery consists of small scale fishing performed mainly in the regional villages for subsistence or cash income purposes. Coastal fishing has become an important factor in the supply of food to the country's population and the promotion of regional industries. As for the offshore fishery, except for some minor activity by joint concerns, this mainly consists of tuna long line fishing by foreign vessels within the country's waters, and the fishing ground entry charges from this plus the export tax placed on fish landed within the country contribute to the fiscal income of Palau.

The coastal fishery in Palau has mainly consisted of subsistence fishing with some progress made in the direction of commercial fishing, however, because the fishery has mainly been based around inner reef fishing grounds up until now, a decline in the amount of resources has come to be noticed, especially in the area around the capital, Koror, in line with increasingly active fisheries activity and higher production levels, and a need has developed for the introduction of operating regulations and resource management.

In response to this situation, the Government of Palau reviewed its development policy towards coastal fisheries (within 12 nautical miles of its shores), and carried out a partial revision of the constitution and established the Marine Protection Act of 1994. The Government is now aiming to maintain fishery resources for the subsistence of regional fishermen, protect and develop specialist fishermen, and preserve and expand fisheries production levels for supply to not only the domestic market but also foreign export markets.

Japan has so far conducted the following fisheries grant aid projects from before the time when Palau gained its independence:
The Project for the Development of Small Scale Fisheries (1981),
Fishing Community Development Project (Phases I, II and III) (1987-1989),
The Project for the Promotion of Small Scale Coastal Fisheries (1992),
The Project for Peleliu State Small Scale Fisheries Development (1993),
The Fish Marketing Improvement Project (under implementation) (1994).
However, the realization of commercial fisheries in the regional areas and remote islands of

Palau is still a long way off due to the lack of fishery facilities and ice-making and refrigeration facilities, and insufficient means of marine product transportation to Koror. It was against this background that the Government of Palau in May 1995 made a request to the Government of Japan for the provision of grant aid, in order to support small scale fishing activities and promote outer reef fishing in the country's northern states, where development has so far been particularly slow.

The items contained in the request are described in outline form below.

Request contents

1) Equipment (4 states of Kayangel, Ngarchelong, Ngaraard, Ngardmau)
   1. Fishing vessels (to also act as transport vessels), 2. Fishing tackle, 3. Outboard engines
2) Facilities (3 states of Kayangel, Ngaraard, Ngardmau)
   1. Fishery facilities (ice-making machines, generators, water storage tanks, fuel tanks, offices)
   2. Expansion of docking facilities, etc.

Chapter 2. Contents of the Project

2-1 Objectives of the Project

The northern states of Palau, i.e. Kayangel, Ngarchelong, Ngaraard and Ngardmau, which are the targeted areas of the Project, are located far away from Koror, which forms the sole market for small scale fisheries within the country, and the basic social infrastructure such as water supply, power supply and roads, etc. in these states is not well developed. For this reason, the people in these states are very closely tied to the sea, as it provides them with a means of bringing in daily supplies, a means of transport and a means of obtaining food and a cash income from the taking of its products. Indeed, fisheries production levels in these states are high compared even to standards within the rest of Palau.

As concern over the drying up of in-reef marine resources grows in recent years, the Government of Palau is aiming to exploit marine resources in reef and offshore waters through commercial fishing (designed to earn cash income), in order to preserve the subsistence fishery resources within the inner reef waters.

The Project aims to preserve inner reef marine resources and make fishing in so far untapped reef and offshore waters possible and, in doing this, aims to increase the supply of marine products to Koror and encourage local fishermen to practice small scale fishing, in the northern states of Palau.

2-2 Basic Concept of the Project

The Project shall involve the building of fishery support facilities (in Kayangel State only) and the provision of fishing vessels and fishing gear and equipment suited to outer reef and offshore fishing to the northern states of Palau, including Kayangel and Ngarchelong, which possess abundant reef and offshore fishing grounds and resources, are heavily reliant on fisheries, and which already boast high fisheries production levels within the said country. In doing this, the Project will give substance to the policy of achieving a small scale and balanced form of fisheries development, which the Government of Palau has raised as its target.

(1) Examination of the Request Contents

Upon examining the contents of the request, it was decided to omit the following items, which were included in the list of requested materials and equipment described in Chapter 1, from the bounds of the Project.

1) Fisheries Facilities in Ngaraard and Ngardmau States

There are plans for ice to be supplied to the states of Ngaraard and Ngardmau from the ice-making equipment in Ngeremlengui State, which is currently under construction under the grant aid project of 1994 (The Fish Marketing Improvement Project), which is scheduled for completion in February 1996. It was therefore judged that, so long as the supply capacity of the said equipment is not exceeded by demand, the two said states will be able to receive a supply of ice, and that the necessity and urgency of the ice-making (and related generator, water storage and fuel storage) facilities requested by Ngaraard and Ngardmau were both low.

With respect to the multi-purpose houses (offices, equipment stores, etc.), it is considered that these will become necessary if the plans for fishing port transfer and expansion under each state's budgets are advanced, however, because the sites for these facilities would require reclamation from the sea and sufficient preparation has not been made, these too have been omitted from the Project components.

2) Expansion of Docking Facilities, etc.

With respect to the expansion of docking facilities, etc. in the states of Kayangel, Ngaraard and Ngardmau (as well as the ice-making facilities and multi-purpose buildings in Ngaraard and Ngardmau), these would involve civil engineering works and it was judged that implementation of such plans would be impossible under this Project because surveys of natural and geological conditions, etc. would be necessary and because the aforementioned fishery support facility plans have not yet been finalized and design at the present point in time would be difficult. Thus, the said components were removed from the Project upon first obtaining the understanding of the Government of Palau side.

Moreover, concerning the said dock facility expansion works, the Governor of Ngaraard State indicated the preparation and leveling of land for such facilities by the state itself would be possible, and Ngardmau State also stressed that it could prepare such land through the Ngardmau State Dock Facilities Rehabilitation and Improvement Project (five-year project), which was commenced from 1995.

3) Outboard Engines

Currently all the fishing vessels (multi-purpose vessels) being used in the small scale fisheries in and around reefs use gasoline outboard engines. With regard to the requested outboard engines, it was planned that they be procured as substitutes for the engines (with a service life of usually three or four years) which do not last as long as

the durable FRP vessels, that they be sold to fishermen at below market prices, and that the funds obtained from the sales be used to purchase future engines and fishing tackle. (Engines were provided in the fisheries grant aid projects of fiscal 1993 and 1994).

The number of fishing vessels in use in each of the targeted states are as follows: 9 in Kayangel, 30 in Ngarchelong, 22 in Ngaraard and 15 in Ngardmau, and although it is recognized that some fishermen have trouble purchasing vessels and outboard engines because they have no collateral or witnesses required for obtaining bank loans, many of them are able to buy the said things with the aid of private sector bank loans, so it was judged that the necessity of procuring engines and vessels as grant aid equipment was low. Moreover, because, as a result of the consultations and confirmations, no major shortages were recognized to exist in the numbers of fishing vessels engaged in inner reef and nearshore fisheries, it was decided not to procure fishing vessels as part of the Project.

(2) Scale and Quantities of the Facilities and Equipment

Coastal fisheries in Palau has traditionally been carried out by fishery cooperative associations and communities composed of the fishermen in each of the states, and the administrative aid to these organizations is conducted individually by each of the state governments. Incidentally, the fishery cooperative associations and communities have established deposit systems which they use to mainly provide working funds for, among other things, payment for any caught fish sold to them.

Each boat captain, who is the owner of the fishing vessel, usually takes two or three fishermen with him when he goes out fishing and, after fuel, ice, selling and other necessary expenses are deducted from the sales receipts, the remaining money is divided equally between the captain and the other fishermen, with one vessel converted into one fisherman (the captain's take).

In determining the quantities of fishing vessels and fishing gear to be provided as fisheries production equipment under the Project, in view of the above-mentioned form of organization and management among fishermen and the desires to provide equal opportunity for Project participation among the fishing cooperatives and fishermen in the target areas, to aid the establishment of an operating setup based on the organizational strengthening and independent accounting of the cooperatives and communities, and to make equipment maintenance possible with existing technical levels among the fishermen, it was decided to provide one fishing vessel and a two-year supply of fishing gear to each of the four states. These shall be the target quantities of fishing vessels and fishing gear to

be provided under the Project.

Table 2-1 indicates the populations, numbers of fishermen and numbers of outboard engine boats that can be used as fishing vessels in the Project target areas at the time of the study.

Table 2-1 Numbers of Fishermen and Fishing Vessels in the Northern States

State	Population (*1)	Fishermen (*2) (commercial base landing fishermen)	Fishing Vessels (*3)	Fishermen per Vessel
Kayangel	137	23	9	2.5
Ngarchelong	354	101	30	3.4
Ngaraard	310	54	22	2.5
Ngardmau	149	29	15	1.9

Origin: Division of Marine Resources materials (1994)

(*1): 1990 National Census, (*2) 1994 materials, (*3) Study time materials

Note: (*2) indicates the numbers of fishermen who land fish at PFFA (Palau Federation of Fishing Associations) and the private PMCI, and actual numbers of fishermen are higher than this.

The ice-making equipment, which is needed to support the fisheries sector, shall be given a production capacity of one ton per day, which means that it can easily produce the annual ice demand in the said area of approximately 133 tons. The office shall be big enough to allow two staff members to work, and the store shall be made large enough to store bottom fishing, trolling, taru nagashi and other fishing gear. The roof area shall be made as large as possible in order to collect sufficient rainwater, and the water storage tank shall be designed to hold a total of 10 tons of water, i.e. six tons for ice-making purposes (1 ton x 6-day supply) plus four tons for local residents and miscellaneous purposes (0.1 ton x 135 people x 3-day supply).

2-3 Basic Design

2-3-1 Design Concept

(1) Design Concept

In conducting the basic design for the Project, in accordance with the basic concept of the Project, design policies that fit with the current conditions of the fisheries sector, in consideration of the natural and social conditions in Palau and the construction and

procurement situation in the said country, shall be established. Specifically speaking, the basic design shall be carried out with the following items kept in mind.

1) Fisheries Facilities

1. The design of the fisheries support facilities including ice-making functions shall ensure that the facilities are easy to use for the fishermen, that they contribute to increased production and that utilization by local residents is taken into consideration.

2. Because the Project site faces onto the sea and is only around 20 m away from the coastline, buildings shall be designed to have good durability and resistance against salt damage.

3. The Project area has a wet, tropical climate with an annual rainfall in excess of 3,000 mm. Moreover, as there is no infrastructure for water and power supply on the islands of Kayangel State, natural water is the only available water source, so the design shall give ample consideration to the fact that rainwater collected on the roofs of buildings is utilized to the full in the local area.

2) Fishing Vessels and Fishing Gear and Equipment

1. The fishing vessels shall be the same as or slightly smaller than the inboard motor vessels provided in the grant aid project of 1981. Some of the fishermen have experience of handling such vessels and it is possible for them to be moored and anchored at the docking facilities in the northern states. The operation of the vessels shall, in this way, be made efficient, simple and safe.

2. With respect to the design of the fishing vessels, they shall be given higher speed to raise operating efficiency and ample width to ensure durability and stability when sailing offshore. Moreover, in order to improve course keeping capacity while anchored at sea or traveling slowly, and to keep the fishing work as simple as possible, the boat bottoms shall be the center keel (with skeg) type.

3. Because bottom fishing, trolling and taru nagashi fishing, which were the methods favored as a result of the resources survey conducted by the Marine Resources Division, will be carried out, the fishing gear required for this shall be procured, and fishing methods which enable fishing in wider waters and which are not influenced so much by ocean and climatic conditions shall be introduced and spread among the fishermen.

2-3-2 Basic Design

(1) Site and Facilities Layout Plan

1) Kayangel Fisheries Facilities

As the basic design concept, in addition to the ice-making facilities (including the generators), an office and equipment and materials store shall be established to raise the functions of the facilities, the roof area shall be made large to collect more rainwater, and the facilities shall be given enough rainwater collection and ice storage capacity to allow them to supply water not only for ice-making purposes but also to local residents and visitors to the island. Moreover, because the procurement and storage of gasoline (in drum cans) for use in the fishing vessels and generators are such important activities due to the remoteness of the island, a fuel store shall be established in a separate building. In view of the need for strong durability against salt and wind and heat resistance against the strong rays of the sun and also the desire to use materials that can be procured locally, the buildings shall be made of reinforced concrete (with blocks partly used) and they shall be single story in order to ensure inexpensive construction costs and a short works period.

2) Facilities Design Policies

1. Fisheries support facilities with ice-making capacity shall be established, and the facilities design shall ensure that they are easy to use for the local fishermen, that they contribute to higher production levels and that they take utilization by local residents into consideration.

2. The design shall take salt damage countermeasures into full consideration because the Project site faces out onto the sea and is only about 20 m from the coastline.

3. The Project area has a wet, tropical climate with an annual rainfall in excess of 3,000 mm. Moreover, as there is no infrastructure for water and power supply on the island of Kayangel, natural water is the only available water source, so the design shall give ample consideration to the fact that rainwater collected on the roofs of buildings is utilized to the full in the local area.

4. The fisheries facilities site is located on a remote island approximately 90 km away from the capital of Koror and, because large boats cannot approach the island due to it being surrounded by a reef, limitations will be placed on the transportation of

materials to the site. Therefore, ample consideration will need to be given to the selection of equipment and materials to ensure that no holdups occur in the implementation schedule.

5. Applicable Standards and Review of Drawings

a) Applicable Standards

Because Palau possesses no regulations or design standards relating to buildings, the design shall be conducted in accordance with Japanese regulations and design standards.

However, with respect to wind force and seismic force, the design shall be conducted with reference given to past meteorological and design data.

b) Standards Relating to Electricity

Normally the Public Utilities Corporation (PUC) conducts reviews based on the National Electric Code (US Standard). However, this only applies to those facilities which receive their power supply from the PUC and, because there are no standards for other types of facilities, none will be applied to the Project facilities.

c) Review of Drawings

As a rule, application for confirmation involves presenting the necessary documentation to the Public Works Bureau in each state for review. Thus, the drawings and other documentation concerning the Project shall be presented to the Kayangel State Public Works Bureau.

Incidentally, however, the above-mentioned review does not cover technical matters but is simply concerned with the rights of ownership of the land involved. The Public Works Department of Palau does not directly carry out reviews but merely offers advice whenever the need arises.

3) Layout Plan

The Project site is located in one corner of state government-owned land known as Bai, which contains Kayangel State's only dock (the sole gateway to the state) and the state assembly facilities, existing ice-making equipment and 22 ton large water tank, etc. The layout plan shall give ample consideration to the mutual relationship of the Project facilities with these existing facilities.

The Project buildings shall be situated approximately 3.4 m away from and parallel to

the assembly hall, the approach road shall be placed to the southern side of the said assembly hall, and the layout shall also take the traffic lines from the existing ice-making machine and water tank into consideration.

Building structures including foundations shall be planned within the land owned by the state government, but part of the roofing shall be planned so that it protrudes onto land owned by the local tribe.

The adjoining land owned by the said tribe has a thick covering of trees which will act as a wind break and thus prove useful. However, in consideration of problems that may occur due to fallen leaves, some of the trees within the Project site and close to the buildings shall be cut down.

(2) Building Plan

1) Floor Plan

1. The ice-making machine, fishing gear store and administration office shall be positioned on the north boundary side, and the southern side shall be in the form of a pilotis and be made into a work space for the fishermen. Moreover, the floor plan shall be designed to ensure that the roof area is maximized to enable rainwater (the only source of water) to be collected.
2. The ice-making machine and ice store shall be put into a separate room from the generators for reasons of efficiency.
3. The water tank shall be positioned next to the existing water tank on its north side, and mutual complementing by the tanks shall be made possible.
4. The oil tank store shall be placed on the west side of the site near the oil tank of the existing ice-making machine, in consideration of haulage traffic lines. Moreover, this shall be positioned as far away from the buildings as possible due to the dangerous nature of the substances being stored.

5. Room Areas

Room	Area (m^2)	Remarks
Ice-making machine room	14.4	Ice-making capacity: 1 ton/day
Generator room	7.2	
Fishing gear store	7.2	
Office	14.4	
Pilotis	21.6	
Drum can store	16.8	(separate building)
Total	81.6	

2) Sectional Plan

Using the height of the ice store building and the height of its foundations as criteria, the floor height (from slabs to beam ceiling) shall be set at ..... m.

The roofing shall be made the same as the sloping roof of the neighboring assembly hall. Moreover, in order to make expulsion of the heat generated by the ice-making machine compressor easy, the roof shall be a gable roof with the gables on either side being made into openings.

3) Finishing Plan

The finishing materials to be used are listed below. Locally procurable materials shall be adopted as much as possible in order to make maintenance easier.

Exterior Finishing

Roof		
Exterior walls	Concrete blocks, mortar and paint finish	
	Concrete placing repair and paint finish	
Gutters		
Earth boundary	Concrete, irons and urethane dust proof coating	

Interior Fishing

Ceilings	Cement board and paint finish	
Interior walls	Concrete blocks, mortar and paint finish	
Crossbeams	Mortar and paint finish	
Fittings	Windows	Aluminum louvers
	Doors	Aluminum

4) Structural Plan

A frame structure shall be adopted with the foundations, pillars, beams and slabs all

being made from reinforced concrete and the walls made from concrete blocks. Roofing shall be of a wooden truss structure and shall be made as light as possible in order to reduce the load placed on the foundations.

Although the Project buildings are small scale, the reinforced concrete structure shall be adopted in view of the fact that they will be close to the sea and prone to salt damage, and the fact that almost all the public facilities in Kayangel State are made of reinforced concrete and are highly durable.

The Project site is where the old assembly hall used to stand and the ground is firm with no indications of uneven settlement or other instability apparent. Thus, spread foundations shall be adopted.

Because all the sand that is procurable in Palau is sea sand, it will have to be sufficiently washed before use in order to reduce its salt content to the level indicated below.

5) Electrical Equipment and Water Supply, Drainage and Sanitary Equipment

1. Electrical Equipment

   There are no public electricity generation facilities in Kayangel State. Electricity shall be fed from the ice-making machine's generators at 60 HZ 220 V/115 V as general lighting socket electricity to each of the rooms.

2. Water Supply, Drainage and Sanitary Equipment

   Rainwater is utilized in Kayangel State due to the absence of any public water supply and sewerage facilities. Rain shall be collected from the building roofs and stored in a concrete holding tank, from where it shall be supplied to each area. The water tank shall be given a capacity of 10 tons. Six tons (2 tons x 3 days) shall be for ice making purposes and the remaining four tons (0.1 tons x 135 people x 3 days) shall be for the benefit of the local residents.

   Wastewater shall be treated in underground permeation drains. septic tanks shall not be provided because polluted water will not be produced.

(3) Equipment and Materials Plan

Table 3-2 List of Facilities and Equipment

(1) Fisheries Production Equipment	
1. Fishing boats 4 vessels	FRP, discharge type, approximately 3 tons, total length: approx. 10.5 m, width: approx. 2.8 m, depth: 1.6 m, main engine output: approx. 130 hp Installed equipment: small line hauler, small power reel, magnetic compass, fish detector, SSB wireless, etc.
2. Fishing gear 4 sets	1) Bottom fishing gear: 1,075 x 4 reels of fishing line, 18,000 x 4 fishing hooks, 3,800 x 4 swivels, 800 x 4 weights 2) Trolling fishing gear: 2 x 4 pole assembled sets, 4 x 4 fishing line sets (line, flies, hooks, weights, swivels) 3) Taru nagashi fishing gear: 30 x 4 assembled sets (taru, line, weights, submersible lights, swivels, snaps) 4) Ice boxes: 10 x 4 (approximately 160 liters)
(2) Fisheries Support Facilities	
1. Ice-making equipment 1 set	One plate ice-making machine with capacity of 1 ton/day; one ice store cum refrigerator with capacity of approximately 10 m^3; two 12 KVA generators; one water tank with capacity of 10 tons; one fuel service tank with capacity of 300 liters
2. Multi-purpose house 1	Ice-making room: approx. 15 m^2, generator room: approx. 8 m^2, office: approx. 15 m^2, materials store: 6 m^2, drum can store: approx. 8 m^2

1) Fishing Vessels

1. The fishing vessels shall be the same as or slightly smaller than the inboard motor vessels provided in the grant aid project of 1981. Some of the fishermen have experience of handling such vessels and it is possible for them to be moored and anchored at the docking facilities in the northern states. The operation of the vessels shall, in this way, be made efficient, simple and safe.

   The main specifications of the fishing vessels provided as part of the 1981 grant aid project are as follows.

Length (over all)	11.16 m
Width (over all)	2.67 m
Depth (over all)	1.63 m
Gross tonnage	3.2 tons (domestic)
Main engine output	70 hp (design)
Velocity	7 knots

Because the slow vessel speed of 7 knots indicated above would mean that it would take approximately eight hours to reach Koror from Kayangel, that the vessels could only sail during the day, and also make the vessels prone to the effects of low tides, the operating range of the vessels is extremely limited. Moreover, in the case of offshore fishing, much time would be required simply going to and from the fishing grounds, and there would be some risk in that the vessels could not return to port in a hurry if the weather conditions suddenly turned for the worse. The Tekuu, which is used as an outer reef fishery training vessel and which had its engine upgraded in December 1995, has also had the emphasis put on higher speed and now has an engine output of 105 hp.

2. With respect to the design of the fishing vessels, they shall be given higher speed to raise operating efficiency and ample width to ensure durability and stability when sailing offshore. Moreover, in order to improve course keeping capacity while anchored at sea or traveling slowly, and to keep the fishing work as simple as possible, the boat bottoms shall be the center keel (with skeg) type.

   Below are shown the main specifications of the fishing vessels designed for the Project.

1) Boat type : Displacement type, with keel
2) Material : FRP
3) Dimensions : Total Length (over all): approx. 10.5 m, Width (over all):

approx. 2.8 m, Depth (over all): approx. 1.6 m
(draft: approx. 1.1 m in center)
Gross tonnage: approx. 3 tons (domestic)

4) Main engine : Approx. 120-130 hp (design velocity: approx. 14 knots)

5) Installed equipment : 1 magnetic compass, 1 water depth gage, 1 SSB wireless, 1 GPS, 1
small electric line hauler, 3 electric reels (detachable)
Deck awning, stern spanker, lifesaving equipment (1 set)

2) Fishing Gear

Because bottom fishing, trolling and "taru nagashi" fishing, which were the methods favored as a result of the resources survey conducted by the Marine Resources Division, will be carried out, the fishing gear required for this shall be procured, and fishing methods which enable fishing in wider waters and which are not influenced so much by ocean and climatic conditions shall be introduced and spread among the fishermen.

Below are listed the items of fishing gear that will be provided with each fishing vessel.

1) Bottom Fishing Gear----------1 set

Fishing line (nylon mono-filament)	:	No. 12 x 100 m x 100 rolls
		No. 20 x 100 m x 100 rolls
		No. 30 x 100 m x 200 rolls
		No. 40 x 100 m x 200 rolls
		No. 50 x 100 m x 75 rolls
		No. 60 x 100 m x 50 rolls
(polyester with nylon core)	:	No. 60 x 100 m x 150 rolls
		No. 80 x 100 m x 150 rolls
		No. 120 x 100 m x 50 rolls
Fish hooks: Mutsu hooks (with hole)	:	No. 15 x 4,000 pcs
		No. 17 x 4,000 pcs
		No. 19 x 4,000 pcs
		No. 21 x 3,000 pcs
		No. 23 x 3,000 pcs

Swivels	:	Three way swivels (with nickel balls)	4 x 5 x 3,000 pcs
		Box swivels (nickel)	3/0 x 800 pcs
Weights	:	Lead	200 g x 800

2) Trolling Fishing Gear----------1 set

Poles	:	5 m L x 55 m/m, insert type x 2 poles
Fishing line sets	:	4 sets (breakdown given below)
Main line	:	Nylon mono-filament # 200, 6 m x 2.39 x 4 lines
Snaps	:	2.6 x 100 with swivel x 4 pcs
Rubber shock cord	:	8 m/m x 1 m x 2 pcs
Main line	:	# 60 (1.73) nylon braid, polyester core, resin processed x 50 m x 4 lines
Crane swivels	:	Small break strength, 360 kg x 4 pcs
Main line	:	Nylon mono-filament # 28, 3 m x 0.87 m/m x 4 lines
Diving boards	:	Approx. 300 m/m L x 2 pcs
Air plane model	:	Approx. 300 m/m L x 2 pcs
Three way swivels, Matsuba	:	5 x 6, break strength 65 kg x 4 pcs
Branch tegs nylon mono-filament	:	# 20.3 m x 0.74 m/m x 4 lines
Branch tegs nylon mono-filament	:	# 20.3 m x 0.74 m/m x 4 lines
Artificial lures with lead	:	Approx. 90 m/m L x 8 pcs
Stainless steel double barb hooks	:	8 pcs
Assembled sets	:	4 sets
Rod fittings	:	2 sets
Standby Equipment and Materials	;	3 sets (breakdown of one set given below)
Main line	:	Nylon mono-filament # 200, 6 m x 2.39 x 4 lines
Snaps	:	2.6 x 100 with swivel x 4 pcs
Rubber shock cord	:	8 m/m x 1 m x 2 pcs
Main line	:	# 60 (1.73) nylon braid, polyester center, resin processed x 50 m x 4 lines
Crane swivels	:	Small break strength, 360 kg x 4 pcs
Main line	:	Nylon mono-filament # 28, 3 m x 0.87 m/m x 4 lines
Diving boards	:	Approx. 300 m/m L x 2 pcs
Air plane models	:	Approx. 300 m/m L x 2 pcs
Three way swivels, Matsuba	:	5 x 6, break strength 65 kg x 4 pcs
Branch tegs nylon mono-filament	:	# 20.3 m x 0.74 m/m x 4 lines
Branch tegs nylon mono-filament	:	# 20.3 m x 0.74 m/m x 4 lines
Artificial lures with lead	:	Approx. 90 m/m L x 500 pcs
Stainless steel double barb hooks	:	500 pcs

3) Diamond Back Squid Taru Nagashi Fishing Gear----------1 set

Complete set of taru nagashi fishing gear	:	30 sets/boat (breakdown of one set given below)
Barrel x 1 pc		
S. toto, No. 80 x 500 m x 1 pc		
Tegs	:	No. 60 x 24 m x 1 line
Swivels	:	Crane swivel x 3 pcs
Lock bearings	:	No. 7 x 2 pcs
MJ submersible lights	:	2 pcs
Ika-tuno	:	Large 33 cm x 2 pcs
Moon-shape weight	:	750 g x 1 pc
Snap with SBL	:	1 pc
Standby Equipment and Materials	:	1 set (breakdown given below)
MJ submersible lights	:	20 pcs
Contact springs	:	20 pcs
Foots	:	20 pcs
Packing	:	20 pcs
Light bulbs	:	500 pcs
Ika-tuno	:	large 33 cm x 100 pcs
Moon-shaped weights	:	562.5 g x 50 pcs
		750 g x 50 pcs
		1,125 g x 50 pcs
SBL swivels	:	S6 x 100 pcs
Snaps with SBL	:	100 pcs
Crane swivel	:	3/0 x 3/0 x 1,000 pcs
Lock bearings	:	No. 7 x 100 pcs
Interlocks	:	5/0 x 100 pcs

5) Ice Boxes ---------- 10 boxes

FRP freezer structure

Capacity	:	Approx. 160 liters

3) Ice-Making Equipment

With respect to the ice-making equipment, a plate ice making machine shall be selected because, in comparison with flake ice, plate ice does not melt so easily and also such equipment does not require much manual labor in the manufacture and storage of the ice. As for the ice store, in addition to having enough space to hold a three-day supply of ice (ice-making capacity is one ton per day), it shall be given approximately three cubic meters of refrigerator space (+2 C - +5 C) to enable it to temporarily store fish, ice

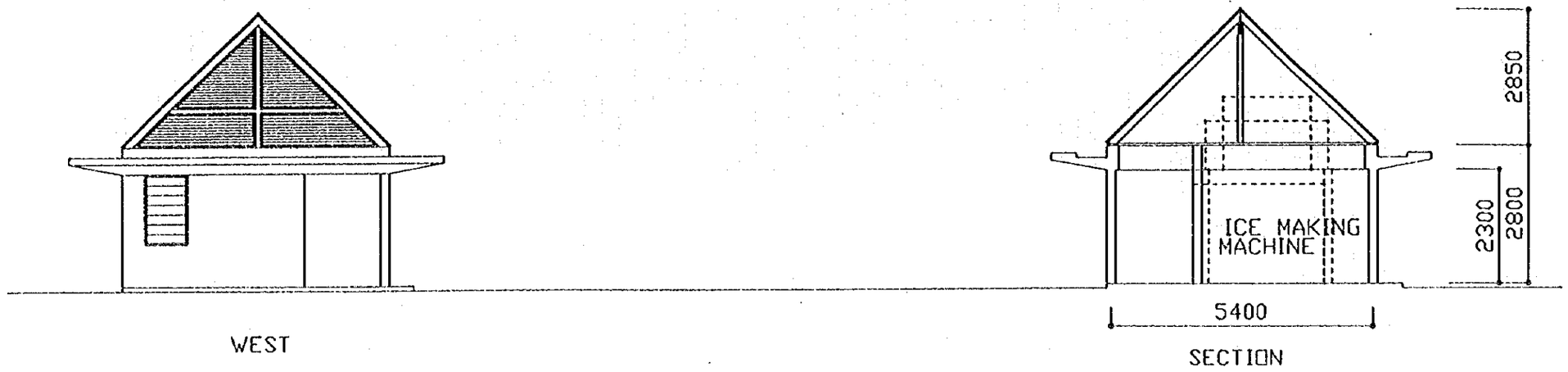
boxes and foodstuffs prior to shipping.

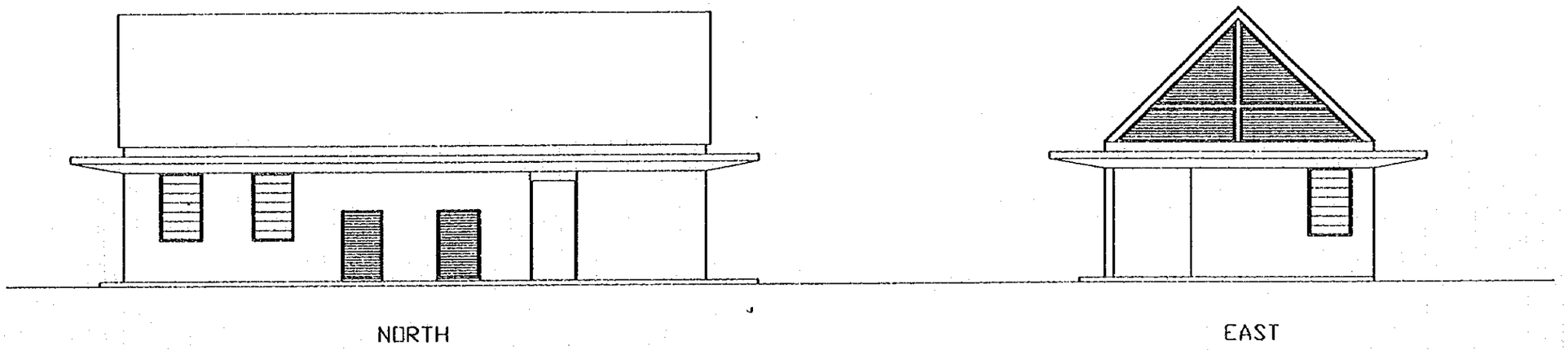
With respect to the generators, by installing a start-up compensation device on the ice-making machine motor, the required power generation output will be kept to a minimum, load balance will be good, fuel consumption will be reduced and running costs will also be kept down.

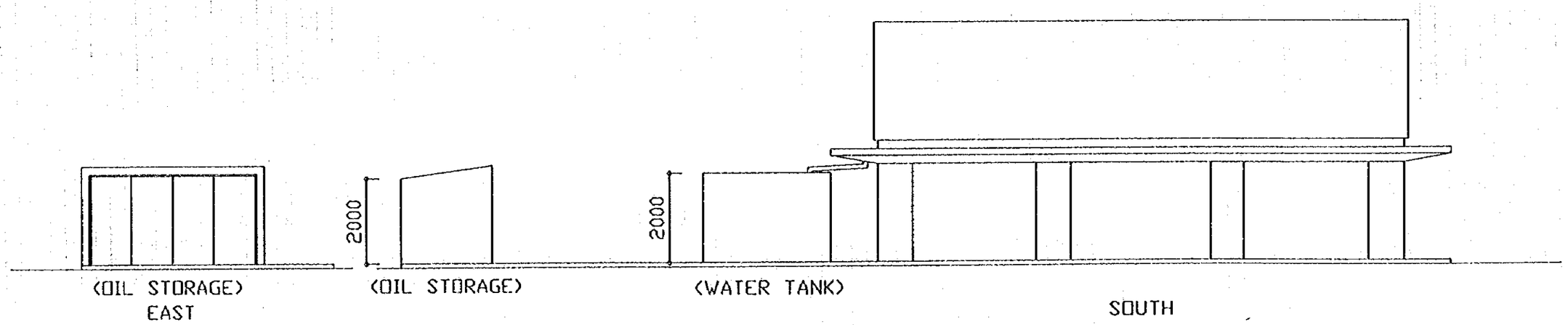
Moreover, in consideration of the fact that the Project site is a remote island, two generators shall be installed to allow generator maintenance to be carried out and to reduce the risk of stoppage of ice making functions due to generator breakdown. Alternately operating the generators will also extend their useful lives. (Total overhauls shall be performed based on the assumption that the generators will be taken to Koror and worked on by private companies and engineers with the necessary facilities. However, because the general rule concerning parts is that the ordering party supplies them, a two-year supply of expendable spare parts together with enough parts to enable two semi-open overhauls and one total overhaul to be carried shall be provided for standby purposes).

(4) Basic Design Drawings

The design drawings for the facilities and equipment are shown on the following pages.

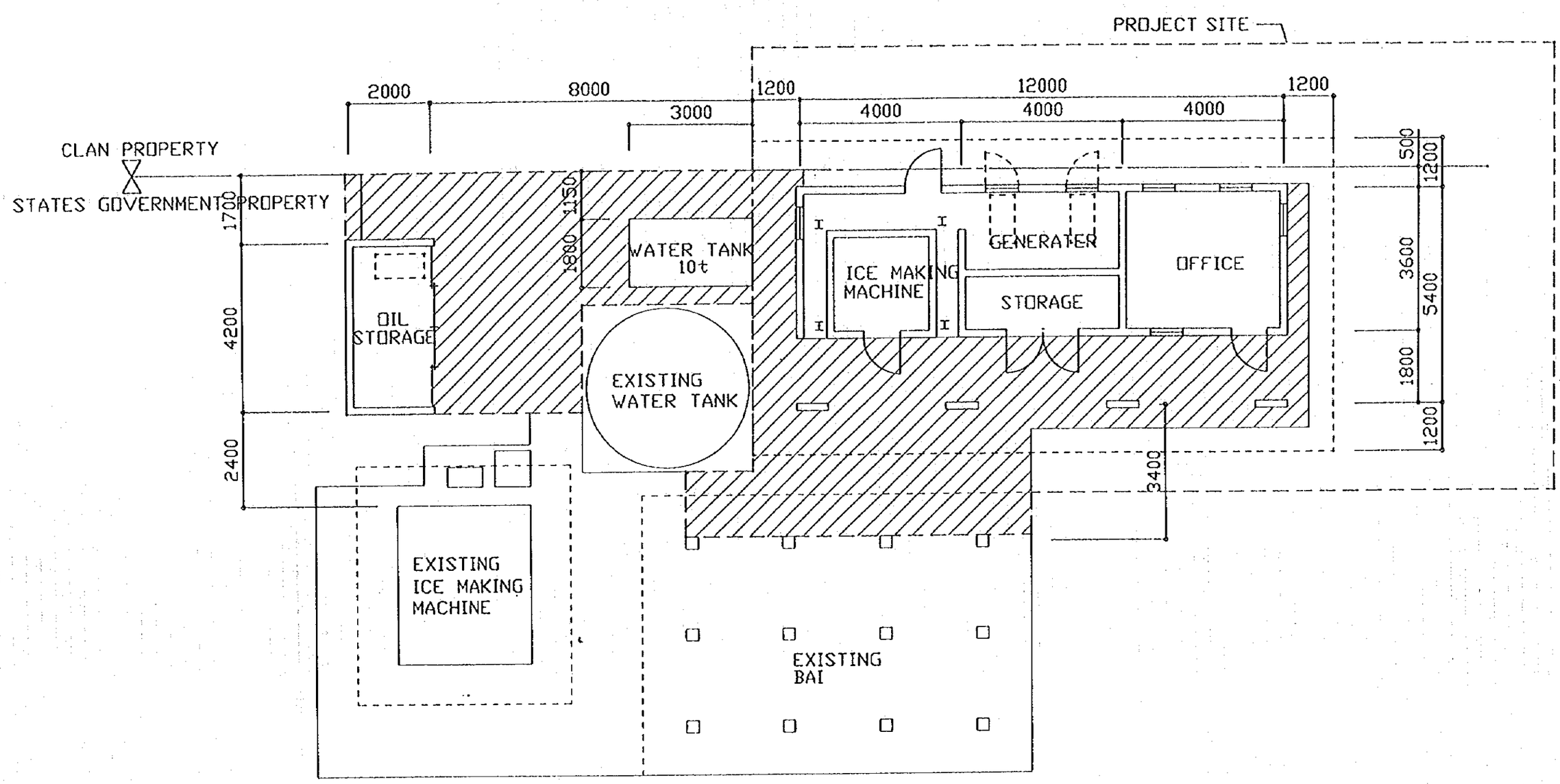






KAYANGEL Fisherly Facilities

ELEVATION · SECTION 1:100



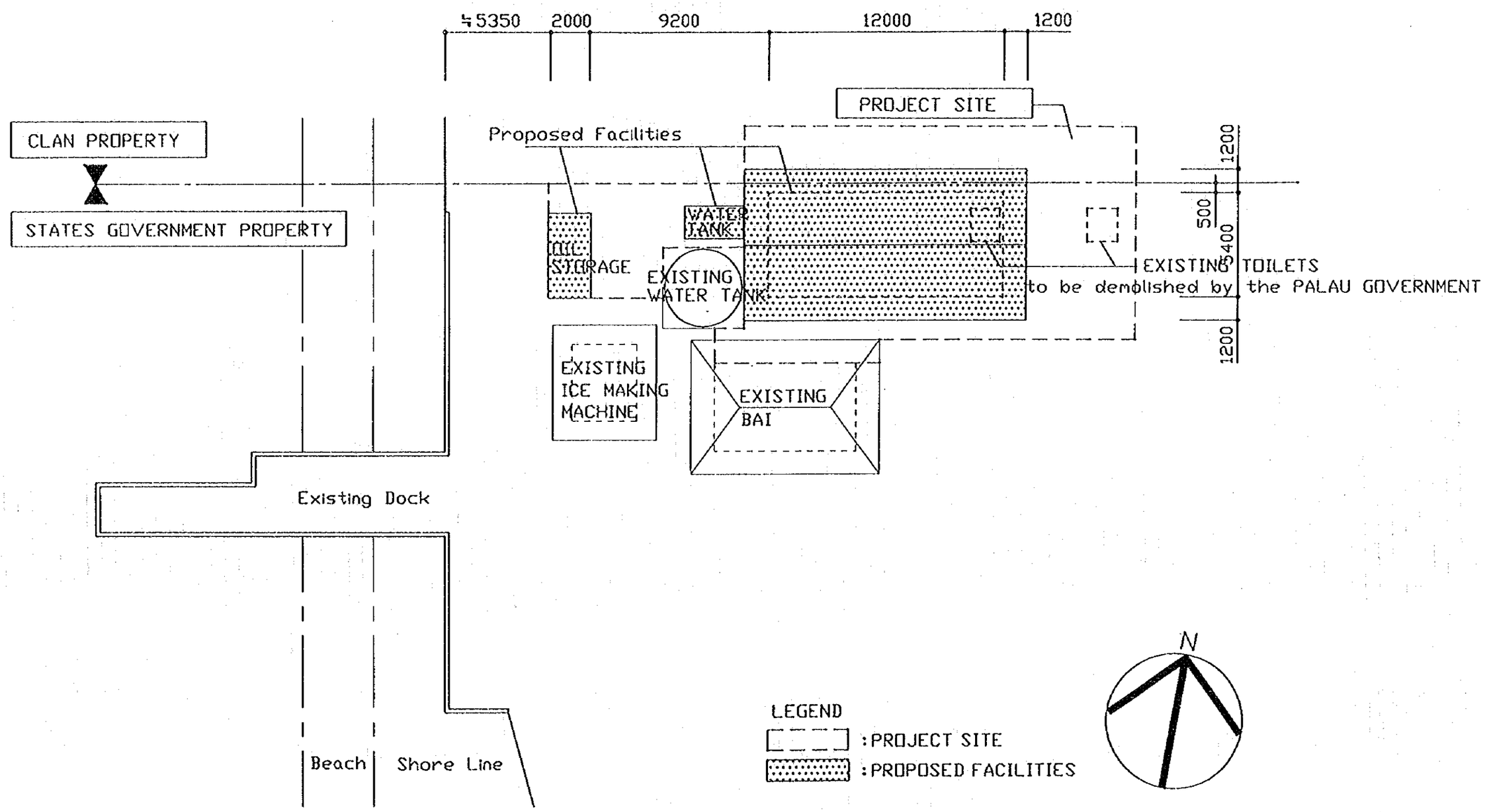
LEGEND

[- - -] : PROJECT SITE

[////] : FLOOR PAVEMENT AREA

KAYANGEL Fisherly Facilities

PLAN 1:100



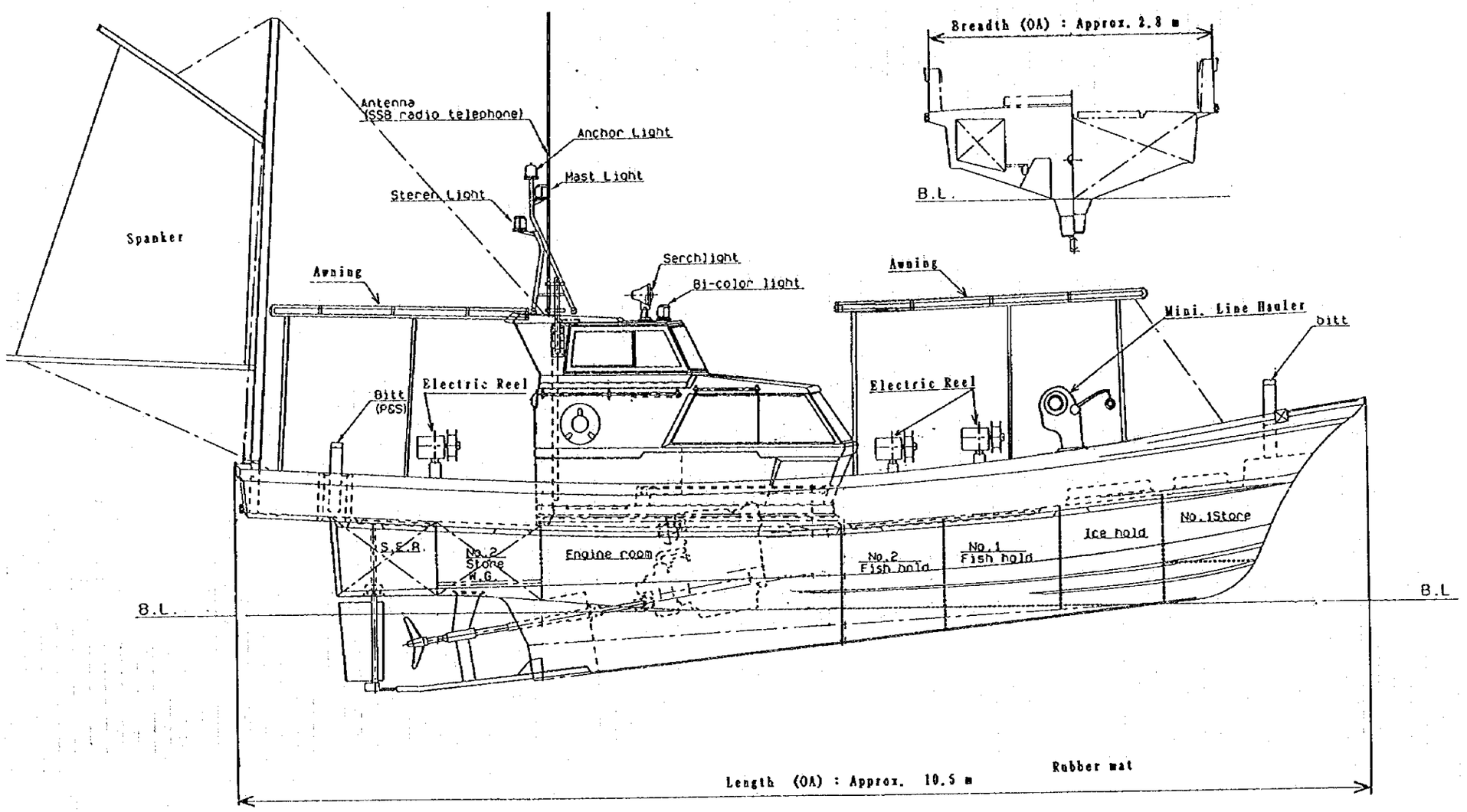
KAYANGEL Fisherly Facilities

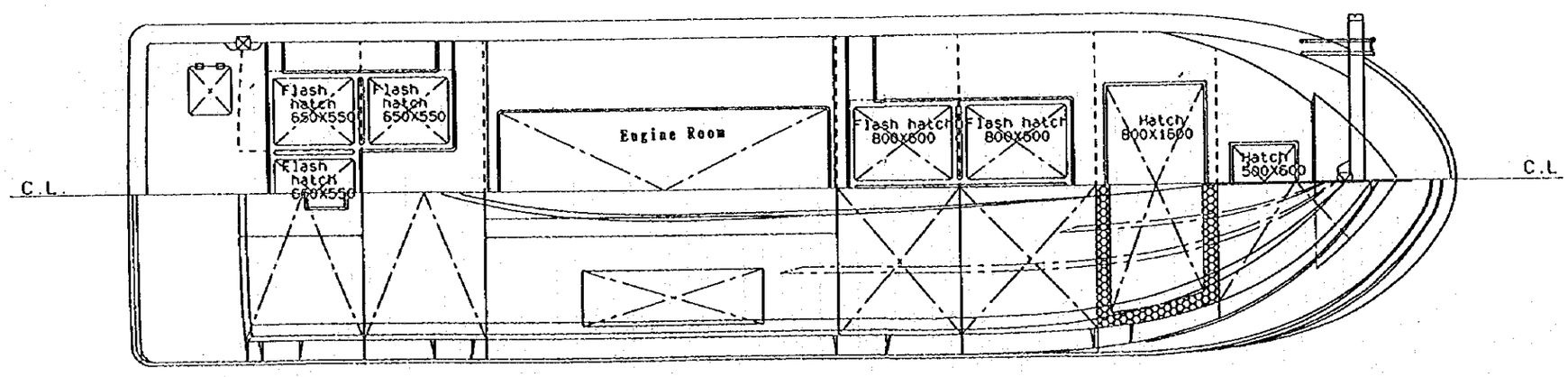
SITE PLAN 1:200

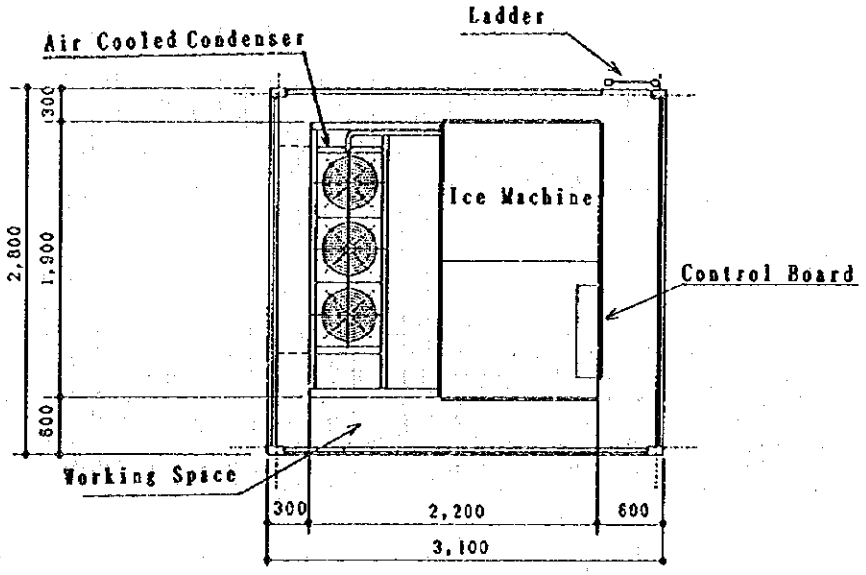
FISHING BOAT

GENERAL ARRANGEMENT

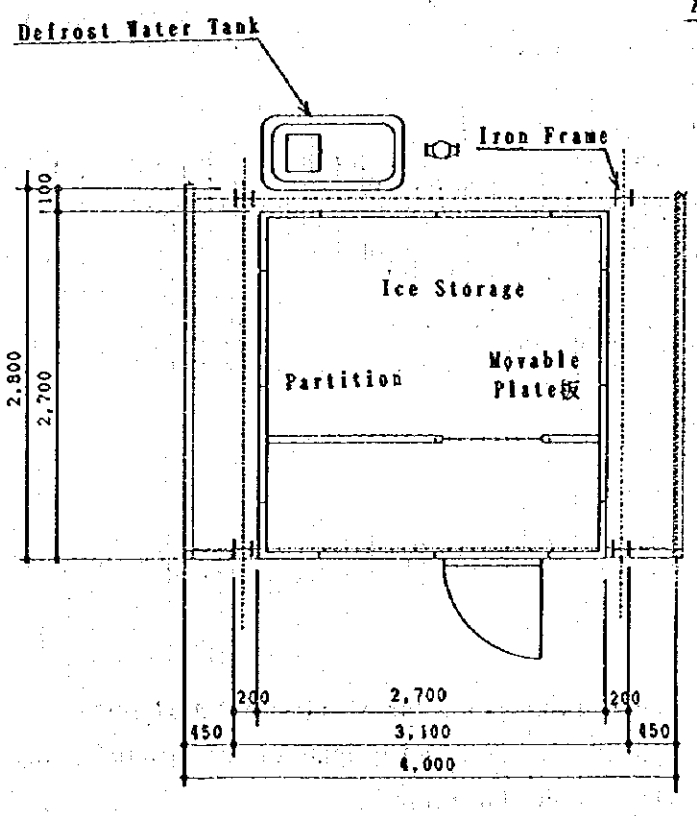
Length Overall : Approx. 10.5 m
Breadth Overall : Approx. 2.8 m
Depth Ocerall : Approx. 1.6 m
Gross Tonnage : Approx. 3.0 m
Main Engine : Approx. 130 PS



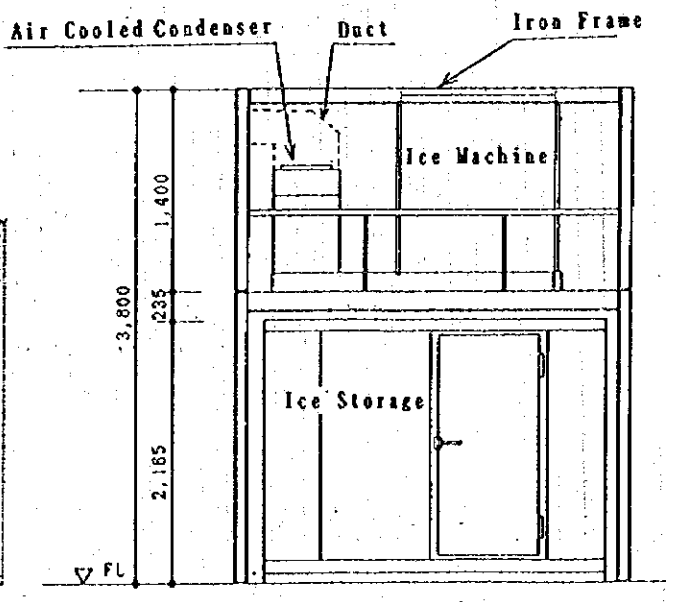




2F PLANE



1F PLANE



ELEVATION

Chapter 3 Implementation Plan

3-1 Execution Plan

3-1-1 Execution Policies

The Project facilities shall be contained in a relatively small single story building with an area of approximately 65 m2 and, because structure and frame will use those construction methods most commonly adopted in the local area, it should be possible to execute the work without any particular problems.

However, the Project site is located on a remote island some 90 km away from the capital of Koror and because small barges will have to be used due to the fact that the island is surrounded by a reef and has no docking facilities, it is forecast that the transportation of materials will be seriously limited. Moreover, the bringing in of heavy machinery and construction machinery will also be restricted.

Thus, the construction methods, and scale and specifications of the works shall be matched with local conditions to enable the maximum possible utilization of local contractors and materials, and the execution policies shall be set in such a way to allow the works to be advanced in a safe and efficient manner under the guidance of construction engineers dispatched from Japan.

A building engineer, also acting as foreman, shall be dispatched for the whole period of the works and, according to necessity, ice-making machine installation engineers and electrical engineers shall also be dispatched to raise the level of accuracy of the works. Regarding that equipment that will require maintenance following the handing over, technical guidance shall be provided to the counterparts on the Palau side during the period of installation and trial operation of the equipment.

3-1-2 Attention Points in Execution

In consideration of the fact that the Project site is on a remote island, execution shall be planned with attention paid to the following points.

1) Because the barges (13 m x 4.5 m) which can dock at the island's dock are limited and restrictions will be placed on the maximum sizes and weights of the materials, the transportation plan shall be thoroughly examined in advance.

2) As the average wind velocity is in excess of 10 mph in August and September, the transportation plan shall be compiled with plenty of time set aside as a safety margin.

3) The implementation schedule shall be planned with consideration given to the fact that the annual rainfall is more than 3,000 mm and the fact that the average monthly rainfall from May to August in particular reaches around 450 mm.

4) The execution plan shall give ample consideration to the environmental impact of, for example, discharging muddy water into the sea and treating non-used materials, paints and oil, etc.

3-1-3 Scope of Works

Regarding the scope of works, the buildings to be constructed on the Project site shall all be constructed by the Japan side. The divisions of work between the Japan and Palau sides are as follows.

(Work to be borne by the Palau side: to be implemented voluntarily by local residents)

* Partial cutting of the trees growing in and around the Project site
* Transfer of the toilets and removal of the remaining foundation concrete of old buildings on the Project site

(Work to be borne by the Japan side)

* All of the works, equipment and materials procurement and consulting work required for Project implementation not mentioned above

3-1-4 Execution Supervision Plan

In accordance with the procedures laid out in the Grant Aid Scheme of the Government of Japan, the Japanese consultant shall, under the recommendation of the Japan International Cooperation Agency, conclude a detailed design and execution supervision contract for Project implementation with the supervisory agency (Ministry of Resource Development M.O. Road D) and Project operation and management agencies (state governments), and then obtain the attestation of the Government of Japan.

It is forecast that schedule management will be difficult due to the fact that, as was mentioned in the execution plan, the site of the multi-purpose building is on a remote island and because the

transportation of equipment and materials may well be affected by climatic and sea conditions. Thus, during the period of execution supervision, detailed drawing reviews shall be conducted in Japan and thorough discussion of the schedule shall be held with the contractors to prevent the occurrence of delays on site. Furthermore, a building engineer shall be dispatched to the site from an early stage in order to maintain close communications with the government officials and contractors and so ensure efficient progress of the works.

The consultant shall dispatch an execution planning engineer to conduct spot supervision and carry out inspections, trial operation and technical guidance on the fishing vessels, fishing gear, ice-making equipment and generators when the said items are to be subject to confirmation and handing over.

3-1-5 Equipment and Materials Procurement Plan

1) Outline

Almost all of the fishing vessels, fishing gear and ice-making equipment currently used in Palau are made in Japan and, because the local fishermen and machine engineers are used to handling Japanese equipment, the Project equipment shall also be manufactured and procured in Japan.

As for the multi-purpose building, locally procurable materials shall, as a rule, be used, however, items for which procurement in Palau or surrounding countries is difficult shall be manufactured and procured in Japan, and no items shall be procured from third-party countries.

2) Attention Points Concerning Equipment and Materials to be Procured

Below are stated the points that require attention regarding the procurement of the Project equipment and materials.

1. Fishing Vessels

a) The vessels shall be procured from a Japanese boat builder that has experience of building FRP fishing vessels of the size of the Project vessels and that possesses the molds equivalent to the shape and size of the Project vessels, in consideration of lead time shortening and cost reduction.

b) In addition to the above criteria, procurement shall be carried out from a boat builder that has experience of building fishing vessels that are equipped with the fishing equipment required in the target fishing methods of bottom fishing,

trolling and taru nagashi fishing.

2. Fishing Gear

There are no particular problems regarding the fishing gear and equipment because many of the items are general purpose and standard items. However, whereas the bottom fishing gear will involve the individual procurement of fishing line, fish hooks and other gear, the trolling and taru nagashi fishing gear items come as complete assembled sets. Therefore, the procurement of this fishing gear shall have to be done from a fishing gear maker that has a thorough knowledge of this gear and possesses past experience of manufacturing and supplying such gear in the form of finished products.

3. Ice-Making Equipment

The ice-making equipment will, broadly speaking, consist of the ice-making machine, the ice store and the diesel generators. These items of equipment will require installation, pipe laying and electrical wiring work, etc. on site. Moreover, because the equipment installation site is a remote island and the transportation, communication and use conditions are poor, the equipment shall be procured from a maker that has past experience of works in the local area.

4. Building Equipment and Materials

Basically speaking, locally distributed construction materials shall be procured. However, those items which do not match with the required specifications and standards, as well as those items for which delivery and inventory uncertainties may exist if procured locally, they shall be procured from Japan.

The procurement sources of the main items of construction materials are as follows.

1. Procurement of Construction Materials

Main Construction Material Item	Source
Sand	Palau
Gravel	Palau
Cement	Palau
Reinforcing steel	Palau
Concrete blocks	Palau
Timber, veneer	Palau
Fittings, windows	Japan
Doors	Japan
Paint	Japan
Main Equipment Materials	
Electric wire	Japan
Lighting fixtures	Palau
Distribution panel	Japan
Water supply and sewerage pipes	Palau

Note) With regard to the selection and procurement of the following items, special handling shall be given judging from the local conditions.

1. Reinforcing Steel

Due to the fact that the Project buildings are small and the fact that salt may be contained in the locally procurable concrete aggregate, there may be problems concerning the quality control of the concrete. Thus, for the purposes of the Project, steel reinforced structures are being considered and, for the above reasons, epoxy-covered reinforcing steel shall be brought in from Japan to make the structures resistant to salt damage.

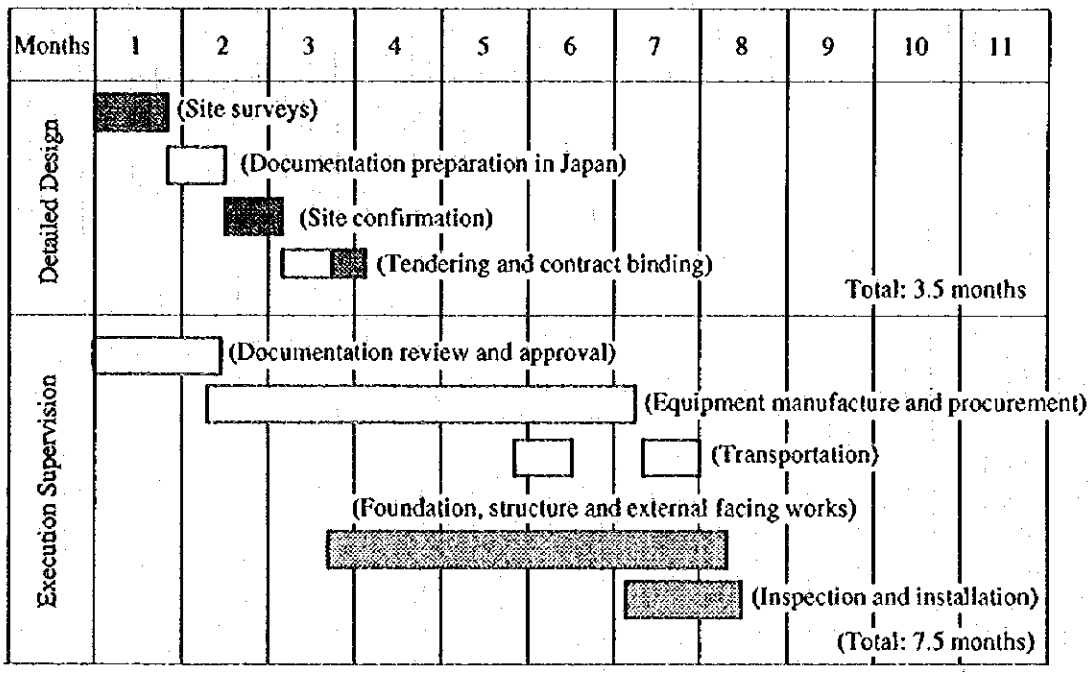
2. Roofing Material

The most commonly used roofing material in the local area is zinc covered steel plate, however, this is not desirable due to the fact that it rusts easily. For the purposes of the Project, aluminum shall be used as the roofing material because its lightness means that it won't put too much of a load on the wooden roof frame and because it is resistant to salt damage.

3-1-6 Implementation Schedule

Table 3-2 indicates the rough work implementation schedule for the Project.

Table 3-2 Work Implementation Schedule



3-1-7 Items to be Borne by the Palau Side

The work areas to be borne by the Government of Palau are as follows.

1) To secure the land required for the Project and to remove all obstructions, level the ground and prepare an access road for it.

2) To procure and establish outdoor incidental features and equipment (for example, gardens, fences, lights, etc.) if such items are required in and around the Project site.

3) To ensure that the equipment and materials to be procured under the Project are speedily landed, passed through customs and transported to the Project site.

4) To exempt the equipment and materials to be procured under the Project from any tariffs and domestic taxes that may otherwise be charged.

5) To exempt those Japanese corporate persons and national concerned with the Project from any domestic taxes that may other wise be levied.

6) To issue permits for the entry to and stay in Palau of any Japanese nationals who may be required to visit Palau for Project implementation.

7) To bear the payment authorization notice charges, payment commission and any other expenses arising from bank work based on the bank agreement with Japanese foreign exchange banks.

8) To obtain the permits, exemptions and authorizations required for Project implementation.

9) To ensure the effective maintenance and operation of the equipment and materials to be provided through the grant aid.

10) To bear any other necessary expenses that may not be covered in the scope of the grant aid.

3-2 Operation and Maintenance Plan

The fishery support facilities to be established in Kayangel under the Project shall be operated and managed by the state government, however, this should place no burden on the state government budget because, according to trial calculation of the operating balance, the annual sales revenue obtained from selling 133 tons of ice per year comes to US $ 13,296, whereas the annual expenditure comes to just US $ 12,039.

With regard to the Project fishing vessels to be supplied to the four states, according to the trial calculation of the operating balance in the case where the vessels are jointly operated by the fishing cooperative associations, the annual income comes to US $ 61,610, as also does the expenditure, which breaks down in the following way:

1. Sailing expenses : US $ 10,405,
2. Fishermen's wages : US $ 10,241 x 4,
3. Fishing vessel and gear maintenance costs (collateral reserve fund) : US $ 10,241 x 1 vessel.

This means that it would be possible for the fishing cooperative associations to operate and manage the vessels and fishing gear through a system of self accounting.

In conclusion, it is judged that there is a high possibility that the local side will be able to carry out the maintenance work required for the Project facilities and equipment.

The following pages indicate the trial calculations of the operating balance in both the cases of the ice-making equipment in Kayangel State and the fishing vessels in all four states.

Trial Calculation of the Kayangel Ice-Making Equipment Operating Balance

1. Ice-Making Equipment

1) Demand

Current annual demand	94,000 kg/year
Annual demand of Project vessels	39,000 kg/year
Total annual demand	133,000 kg/year

2) Ice-making capacity : 1 ton/24 hours
   Operating conditions : Operating time per day = 12 hours, operating days per year = 313 days (6 days per week), yield = 85%

Annual production : 1 ton x 12/24 hours x 313 days x 00.85 = 133 tons/year

[1] Income

Ice retail price: 10 c/kg, Annual sales: 133,000 kg/year

[A] Annual sales turnover : 10 c/kg x 133,000 kg/year = US $ 13,300/year (US $ 1,108/month)

[2] Expenditure

Generator capacity	:	13 KVA x 17 PS, Annual operating time: 3,756 hours/year
Fuel price = US $ 0.40/liter; Lubricating oil price	:	US $ 4.00/liter
Generator fuel consumption	:	3.8 liters/hour (when load is 75%)
Annual fuel consumption	:	3.8 liters/hour x 3,756 hours = 14,273 liters/year
Annual lubricating oil consumption	:	0.8 g PS/hour + (7 liters x 3 times/year) = 90 liters/year

(1) Annual fuel cost = US $ 0.40/liter x 14,272.8 liters/year = US $ 5,709/year

(2) Annual lubricating oil cost = US $ 4.00/liter x 90 liters/year = US $ 360/year

(3) Maintenance cost = (equipment cost (US $ 100,000 x 3%/year) = US $ 3,000/year

(4) Personnel costs = US $ 320/month x 1 operator x 12 months = US $ 3,840/year

[B] Total annual cost = US $ 12,909/year

Annual balance = [A] - [B] = 13,300 - 12,909 = US $ 391/year

Trial Calculation of Fishing Vessels Operating Balance

[1] Annual Income

(1) Time spent outer reef and offshore fishing: 4 months/year

Annual operating hours = 10 hours/day x 3 days/week x 4.3 weeks/month x 4 months/year = 516 hours
Daily catch = 4 fishermen x 7 kg/person/hour x 10 hours/day = 280 kg
Annual catch = 280 kg/day x 3 days/week x 4.3 weeks/month x 4 months/year = 14,448 kg

Daily catch sales turnover = US $ 3.3/kg x 280 kg = US $ 924
Annual catch sales turnover = US $ 3.3/kg x 14,488 kg = US $ 47,678 ..... [1]

(2) Time spent on inner reef fishing: 4 months/year

Annual operating hours = 5 hours/day x 3 days/week x 4.3 weeks/month x 4 months/year = 258 hours
Daily catch = 4 fishermen x 5 kg/person/hour x 5 hours/day = 100 kg
Annual catch = 100 kg/day x 3 days/week x 4.3 weeks/month x 4 months/year = 5,160 kg

Daily catch sales turnover = US $ 2.7/kg x 100 kg = US $ 270
Annual catch sales turnover = US $ 2.7/kg x 5,160 kg = US $ 13,932 ..... [2]

[A] Total annual sales turnover (income) = [1] + [2] = US $ 61,610

[2] Annual Expenditure

[B] Sailing Costs

Fuel cost (1) : 22 liters/hour x US $ 0.4/liter x 6 hours actual sailing/day x 61.6 days/year = US $ 2,724
Fuel cost (2) : 22 liters/hour x US $ 0.4/liter x 3 hours actual sailing/day x 61.6 days/year = US $ 1,362
Lubricating oil cost : 60 liters/year x US $ 4.00/liter = US $ 240
Ice cost (1) Ice for operating : US $ 0.1/kg x 14,448 kg = US $ 1,445
(2) Ice for operating : US $ 0.1 kg x 5,160 kg = US $ 516
(3) Ice for transportation : US $ 0.1 kg x 19,608 kg = US $ 1,961

Subtotal = US $ 10,405

[C] Personnel Costs

Annual fisherman's salary = US $ 10,241 x 4 fishermen = 40,964 (approximately US $ 850 per fisherman per month)

Fishing vessel and gear maintenance cost = US $ 10,241 (collateral fund)

Subtotal = US $ 51,205

Total annual expenditure = [B] + [C] = US $ 61,610

Annual balance [A] = [B] + [C]

Chapter 4 Project Evaluation and Recommendations

(1) Kayangel State Fishery Support Equipment

The operating efficiency of the existing ice-making equipment, which was provided as part of the grant aid project of 1981, is extremely low due mainly to the obsolescence of the equipment itself and high temperature of the water used during the daytime. For these reasons, efficient operation is limited to the nighttime hours. As a result, the ice-making capacity of the existing equipment is approximately 90 tons per year, which is only barely managing to satisfy the demand level. Moreover, as the ice store is only able to hold one ton of ice at most, the ice runs out at times when four or five vessels need ice for fishing all at once.

Following the provision of the Project vessel and fishing gear to the state, the demand for ice will rise by approximately 39 tons. Moreover, because approximately 300 kg of ice for fishing purposes and another 300 kg for fish transportation to Koror will be required for each fishing trip made by the Project vessel, the existing ice making capacity will not be able to respond to the new requirement.

The introduction of new ice-making equipment will make it possible to achieve a stable and economic supply of more than 200 tons of ice per year. At the same time, by installing an ice store with a maximum capacity of approximately three tons, and creating a setup in which ice can be supplied in concentrated amounts, it will be possible to sufficiently respond to the increased demand for ice from existing fishing vessels, the Project vessel and any other future increases in fishing vessel and fishermen numbers.

Moreover, through installing an efficient ice-making machine and low fuel consumption generators, fuel costs will be lowered by approximately 30% from the present 6.4 cents per kilogram of ice made to 4.5 cents, and this will make it possible to improve the ice-making equipment operating balance and remove it as a burden from the state government budget.

As the ice-making equipment is on a remote island, much time is taken on overhauls and breakdown repairs that cannot be handled by the stationed engineer, and the ice supply is interrupted during these periods, thus often having a great impact on the daily lives of the local citizens.

By supplying two generators for the ice-making equipment in the Project, the ice-making machine will not have to stop operating if one of the generators is undergoing maintenance

or is broken down. Moreover, through designing the overall ice-making equipment with a longer useful life, it will be possible to secure the long term supply of ice and thus stabilize the small scale fishery activities within the immediate area.

As a result of the above-mentioned effects, the Project will contribute to the stabilization of subsistence fishing in Kayangel State and the promotion of small scale fisheries intended to secure a cash income, and it is anticipated that the Project will preserve the living standard of the local residents (13 residents) and raise the desire to work among the local fishermen (23 fishermen).

(2) Fishing Vessels and Fishing Gear

The introduction of the four fishing vessels and fishing gear to the four northern states will allow offshore fishing to be conducted in addition to inner reef and reef fishing and enable both operating waters and periods to be expanded.

Each of the Project vessels will enable fish hauls to be increased by approximately 20 tons per year (14.4 tons (73%) from outer reef fishing and 5.2 tons (27%) from inner reef and nearshore fishing), thus allowing an additional 80 tons in all to be supplied on to the domestic market. Moreover, this will also make a contribution to the management and preservation of resources within the reef waters.

The following kinds of improvements are anticipated in the ratios of the small scale fishery production areas in Palau.

Supply Market	Now (1994) (Inner reef and nearshore fishing grounds)	After Project Implementation (inner reef and nearshore) (outer reef)		
1) Subsistence (self supply)	Approx. 750 tons	Approx. 750 tons (production level maintained)	100%	
2) Small scale commercial (cash conversion) fishing (domestic)	Approx. 110 tons	Approx. 170 tons (60 ton or 54% increase)	74%	26%
3) Small scale commercial (cash conversion) fishing (export)	Approx. 31 tons	Approx. 50 tons (20 ton or 64% increase)	72%	28%
Total	Approx. 891 tons	Approx. 971 tons (80 ton or 9% increase)	93%	7%

Note 1: (*) indicates the exports officially recognized by the PFFA, however, the total amount of marine product exports including fish, crustaceans and shells, etc. by other individuals and agents comes to approximately 150 tons per year.

Note 2: The figures in 2) and 3) have been calculated based on the annual sales turnover (fish in 1994) of the PFFA.

It will be possible to raise the annual haul from small scale fishing (including subsistence fishing) by approximately 80% by increasing inner reef and nearshore catches by roughly 22 tons (2%) and outer reef and offshore catches by around 58 tons (7%).

Furthermore, instead of the reef fish for which fishing prohibition seasons are established (fishing of sandfish is banned from March to July, and fishing of rabbit fish is banned from March to May), it will be possible to catch outer reef migratory fish such as bonito, tuna, Spanish mackerel and barracuda, and deep sea fish such as diamond back squid. This will increase the supply of fish on to markets and also create more working opportunities for the fishermen.

4-1 Project Effect

(1) Method of Verifying Appropriateness

1) Kayangel State Fishery Support Facilities

1 Ice-Making Equipment

The existing ice-making machine was installed as part of the 1981 grant aid project and it was overhauled together with the generator in 1993. However, the machine is growing obsolete and, whereas the freezer motor output is 5.5 KW, the generator engine is extremely large with an output of 31 hp (generator output is 25 KVA). The annual average ice production between 1993-1995 (actual value) was 93 tons and the fuel consumption was 16,000 liters, however, in the case of this Project, through installing a start-up compensation device and a generator engine with an output of 17 hp (generator output 12.5 KVA) for the same freezer motor output of 5.5 KW, it will be possible to reduce the fuel consumption by approximately 30% (US $ 1,800/year).

The service life of an ice-making machine with few drive parts is generally imagined to be approximately 12 years (36,000 hours) in the case where normal maintenance is carried out. However, the service life of a generator engine, which is a small fuel engine, is only put at approximately six years or half that of the ice-making machine, even if normal maintenance is carried out.

Thus, by installing two generators, ice making will still be possible in cases where one of the generators requires lengthy overhauls or breakdown repairs, and it will be possible to effectively utilize at a lower cost and for a longer period the ice-making equipment in general.

2. Fishing Vessels and Fishing Gear

Calculation of the annual haul of each Project vessel was carried out based on the following actual values obtained in trial operations conducted by the Marine Resources Division in the survey and training vessel, Elechel, between 1994-1995 in the offshore waters of the Project target areas. Also, calculation of the small scale fishery production level was carried out using materials published by the Planning and Statistics Bureau in 1994 (GDP 1992-1993) and statistics from the Marine Resources Division.

Catch 8,117 kg ÷ Survey time 416 hours ÷ Average number of fishermen 2.5 people = 7.8 kg

(One of the average number of fishermen was an instructor).

4-2 Recommendation

It is desirable that the following measures be taken in order to ensure that implementation of the Project is both smooth and effective.

1. Need to Increase Technical Levels of Fishermen

The fishermen have until now practiced fishing in relatively calm waters in and around reefs with small outboard engine vessels. Some of the fishermen have received training in vessels installed with the sailing instrumentation, fishing devices and fishing gear required for offshore fishing as part of the regional fishing village development project being implemented under the guidance of the Marine Resources Division, however, many of the fishermen have had no such experience. Even for those fishermen who have received training, it is considered that the operation of the Project fishing vessels installed with various instrumentation will prove difficult for some time without any instructors (skilled fishermen) to guide them. It is thus desirable that the fishermen in the Project areas actively take part in the survey and training programs currently being implemented by the Ministry of Resource Development, and master the knowledge and technology required for operating the Project vessels and conducting offshore fishing before the Project enters the implementation stage.

2. Establishment of the Fishing Cooperative Association Setup

Because ice-making and other fishery support equipment has come to be regarded

4. Establishment of a Fishing Vessel Emergency Refuge Setup

Because the docking facilities in Kayangel State are located almost in the center of the inner side of an atoll and the area has calm tides and winds, small outboard engine fishing vessels are usually moored around the jetty and inboard motor fishing vessels are moored slightly out to sea. However, because there are no ports of distress in and around this area, the small outboard engine vessels have to be manually hauled up onto the beach and the inboard motor vessels and other larger vessels have to find refuge within the safer atoll of the main island of Babeldaob, some 40 km away, in cases where typhoons or other abnormal weather conditions occur.

When a large typhoon struck in 1990, the small, inboard motor vessel, Tekuu, failed to find refuge in time and had its hull damaged when it went aground on a sand beach. The reasons for why this accident was allowed to happen were that the fishermen at that time had little awareness of finding refuge because typhoons are so rare, there was no setup for communicating typhoon and other meteorological information, and there was no system for issuing advisories and evacuation warnings, etc. to fishing vessels and fishermen.

Consequently, in the case where fishing vessels are provided under the Project, it shall be requested that, in preparation for situations like that described above, a system be established for communicating information and issuing warnings regarding the finding of refuge by fishing vessels during times of abnormal weather.

Moreover, because the number of fishing vessels operating in outer reef waters will increase in future and the occurrence of more accidents due to stormy weather is forecast, it is desirable that communications and rescue setups necessary to avert danger and secure safety be expanded in addition to the emergency refuge setup.

APPENDIX

Appendix I. Member List of the Survey Team

Katsumi YOSHIDA	Team Leader	Second Basic Design Study Division, Grant Aid Study and Design Department, JICA
Takeshi TAHARA	Technical Advisor	Coastal Fisheries Division, Promotion Departmen, Fisheries Agency Ministry of Agriculture, Forestry and Fisheries
Nobuo ITOI	Project Manager, Fisheries Development/ Material Planner	Overseas Agro-Fisheries Consultants, Co., Ltd.
Toru FUKUBAYASHI	Facilities Planner	ditto
Wataru IWASAKI	Archatect / Facility Planner Quantity Surveyor	ditto

Appendix II. Survey Schedule

No.	Date	Activities	
		Consultant members	Government members
1	Nov. 29 (Wed)	Leave Tokyo 09:45 (JL741), arrive Manila 13:25 (stay overnight)	
2	30 (Thu)	Leave Manila 10:00 (CO864), arrive Palau (Koror) 13:30 Afternoon: Courtesy visit to Bureau of Foreign Affairs, Minstry of State and	
3	Dec. 1 (Fri)	Meeting with Division of Marine Resources, Ministry of Resources and Development (explination of Inception Report, schedule adjustment), Meeting with Governor of Kayangel State at Kayangel State Office, Meeting with Governor of Ngerchelong State at Ngerchelong State Office	
4	2 (Sat)	Ngardmau - Ngerchelong - Ngaraard Survey of Marine fisheries facilities	
5	3 (Sun)	Koror - Kayangel, survey of planned site at Kayangel State, Meeting at Kayangel State Office. (stay: Kayangel)	
6	4 (Mon)	Kayangel - Ngatpang State survey of existing Marine Fisheries Facilities - Koror, Afternoon: Discussions at Ngaraard State Office	
7	5 (Tue)	Discussions with Governor of Kayangel State Discussions with Governor of Ngardmau State Discussions with Governor of Ngerchelong State	
8	6 (Wed)	Meeting with Division of Marine Resources, Ministry of Resources and Development (discussion of basic conception)	
9	7 (Thu)	Meeting as above, Discussion of Minutes	
10	8 (Fri)	Signing of the Minutes	
11	9 (Sat)	Group meeting	
12	10 (Sun)	Organization of data	Leave Koror 10:25 (CO952), arrive Guam 14:15
13	11 (Mon)	Bureau of Public Works, construction contractor in Koror, etc. data collection	Report to Consulate General of Japan in Agana Leave Guam for Tokyo
14	12 (Tue)	Survey of grant aid projects in Ngeremlengui and Ngatpang	
15	13 (Wed)	National Planning Bureau, Republic of Palau, data collection	
16	14 (Thu)	Data collection at PFFA, Division of Marine Resources	
17	15 (Fri)	Survey of Kayangel Project Site	
18	16 (Sat)	Organization of Data	
19	17 (Sun)	(Archatect/Facility Planner/Quantity Surveyor arrives) Group meeting	
20	18 (Mon)	Koror government office, data collection, estimation, surveying	
21	19 (Tue)	Bureau of Public Works, Government tourism bureau, data collection	

22	20 (Wed)	Survey of Angaur, Peleliu grant aid facilities	
23	21 (Thu)	Palau Fishing Authority, information / data collection	
24	22 (Fri)	Final survey of Kayangel Project Site	
25	23 (Sat)	Organization of Data	
26	24 (Sun)	Group meeting	
27	25 (Mon)	(National holiday of Palau), Discussion of facilities and equipment	
28	26 (Tue)	Final discussion with Division of Marine Resources, Ministry of Resources and Development	
29	27 (Wed)	Leave Koror 10:25 (CO952), Arrive Guam 14:15 Report to Consulate General of Japan in Agana	
30	28 (Thu)	Leave Guam 15:20 (JL942), Arrive Tokyo 18:00	

Appendix III. List of Persons Interviewed

1. Republic of Palau, Office of the President

Mr. Koichi Wong	National Planner

2. Bureau of Foreign Affairs, Ministry of States

Mr. Steven Kanai	Director
Mr. Ramon Rechebei	Chief, Tenchical Assiatance Division
Mr. Beckwin Mechol	Fishery Expert (PFA)

3. Ministry of Resources and Development

Mr. Demei O. otobed	Director, Bureau of Natural Resources and Development
Mr. Theofanes Isam	Assistant Cheif, Division of Marine Resources, Bureau of Natural Resources and Development

4. Palau Federation of Fishing Associations (PFFA)

Mr. Frany Reklai	Manager
Mr. Hideo Rdialul	Chairperson, Palau Fishing Authority (PFA)

5. Bureau of Public Works, Ministry of Resources and Development

Mr. Singeru Nigiramolau	Director
Mr. Vivian Mad	Vice Director
Mr. Techur Regulbai	Manager, Public Facilities Division
Mr. Masasinge Arurangu	Head of Office for Technical Planning, Capital Improvement Plan
Mr. Steven Swords	Head of Office for Technical Construction, (in charge of Electrical Power Development)
Mr. John L. Barnett	(in charge of material procurement)
Mr. Haruo Willter	Official in charge of Palau Compact Road (Island Affairs Office)

6. Ministry of Commerce and Trade

Mr. August Ngirmang	Auditor (Tax Audit Division), Revenue Bureau
Mr. Aruin Raymond	Director, Transportation Bureau (Ministry of Trade and Commerce)

7. State Governors

Mr. Harris Kambalang	Kayangel State
Mr. Rudimch J. Titiml	Ngerchelong State
Mr. John K. Rechucher	Ngardhau State
Mr. Tadashi Sakuma	Ngaraard State
Mrs. Theodosia F. Blailes	Angaur State
Mr. Jackson R. Ngiraingas	Peleliu State
Mr. Okada Techitong	Ngatpang
Mr. Antonio L. Cortes	Lawyer (Koror State, Public Law Committee)
Mr. Adalbert Eldiu	Chief of Marine Transport Division (Koror State Marine Patrol Department)

8. Overseas Fishery Cooperation Foundation Dispatched Experts

Mr. Katsumi Kira	Fishery Development Expert
Mr. Ryo Nishii	Fishing Technology Expert
Mr. Minoru Hatano	Marine Mechanical and Refridgeration Expert

9. Consulate-General of Japan in Agana

Mr. Takashi Matsumura	Consulate General

APPENDIX 4. MINUTES OF DISCUSSION

MINUTES OF DISCUSSIONS

BASIC DESIGN STUDY
ON THE
SMALL SCALE FISHERIES DEVELOPMENT PROJECT
IN THE NORTHERN STATES
OF THE REPUBLIC OF PALAU

In response to a request from the Government of the Republic of Palau, the Government of Japan has decided to conduct a Basic Design Study on the Small Scale Fisheries Development Project in the Northern States (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (JICA)

JICA has sent to Palau a Basic Design Study Team headed by Mr. Katsumi YOSHIDA, 2nd Basic Design Study Division, Grant Aid Study & Design Department, JICA, and the Team is scheduled to stay in the country from November 30 to December 27, 1995.

The team held a series of discussions with the officials concerned of the Government of Palau and conducted a field survey at the study area.

In the course of the discussions and field survey, both parties have confirmed the main items described on the attached sheets. The Team will proceed to further works and prepare the Basic Design Study Report.

Koror, December 8, 1995

KATSUMI YOSHIDA
Leader
Basic Design Study Team
JICA

DEMEI O. OTOBED
Director
Bureau of Natural Resources & Development
Ministry of Resources & Development
Government of Palau

ATTACHMENT

1. **Objective**

The objective of the Project is to enhance the production capability of small scale fishery, with associated with the relevant projects, by provision of improved facility and equipment to the northern states of Palau.

2. **Project Sites**

1) Equipment supply
The sites, where such equipment as fishing gears will be supplied to fishery cooperatives and/or fishermen are located in the following four (4) states; Kayangel, Ngarchelong, Ngaraard and Ngardmau, as shown in ANNEX I.
2) Facility construction
The site for the construction of shore-based facility is located in Kayangel State, as shown in ANNEX II.

3. **Executing Agency**

The Ministry of Resources and Development (MRD) is responsible for administration and execution of the Project.

4. **Items requested by the Government of Palau**

The items requested by the Government of Palau are listed in ANNEX III.

5. **Japan's Grant Aid System**

1) The Government of Palau has understood the system of the Japan's Grant Aid explained by the Team; the main feature is described in ANNEX IV.
2) The Government of Palau will take the necessary measures, described in ANNEX V for the smooth implementation of the Project on condition that the Grant Aid by the Government of Japan is extended to the Project.

6. **Operation & Maintenance**

The facility constructed and equipment purchased under the Japan's Grant Aid will be operated and maintained by the respective State Governments with the guidance and support of MRD.

7. **Proper Use of Equipment and the Counterpart Fund**

If and when the products, such as fishing equipment purchased under the Japan's Grant Aid, are sold or leased to fishermen, the Government of Palau shall take necessary measures incorporated with the State Governments as follows:
1) to inform the plan of sale or lease of such products to the Government of Japan;
2) to ensure that such products be used by fishermen properly and effectively for their own fishing operations;

3) to deposit, in local currency, the amount generated from such sale or lease in a suitable account of the respective State Governments as a counterpart fund;
4) to utilize the counterpart fund for the purpose of the fisheries development in Palau or the maintenance of such products; and
5) to consult and report to the Government of Japan for the use of the counterpart fund and its balance periodically and/or upon the request of the Government of Japan.

8. Issues to be Noted

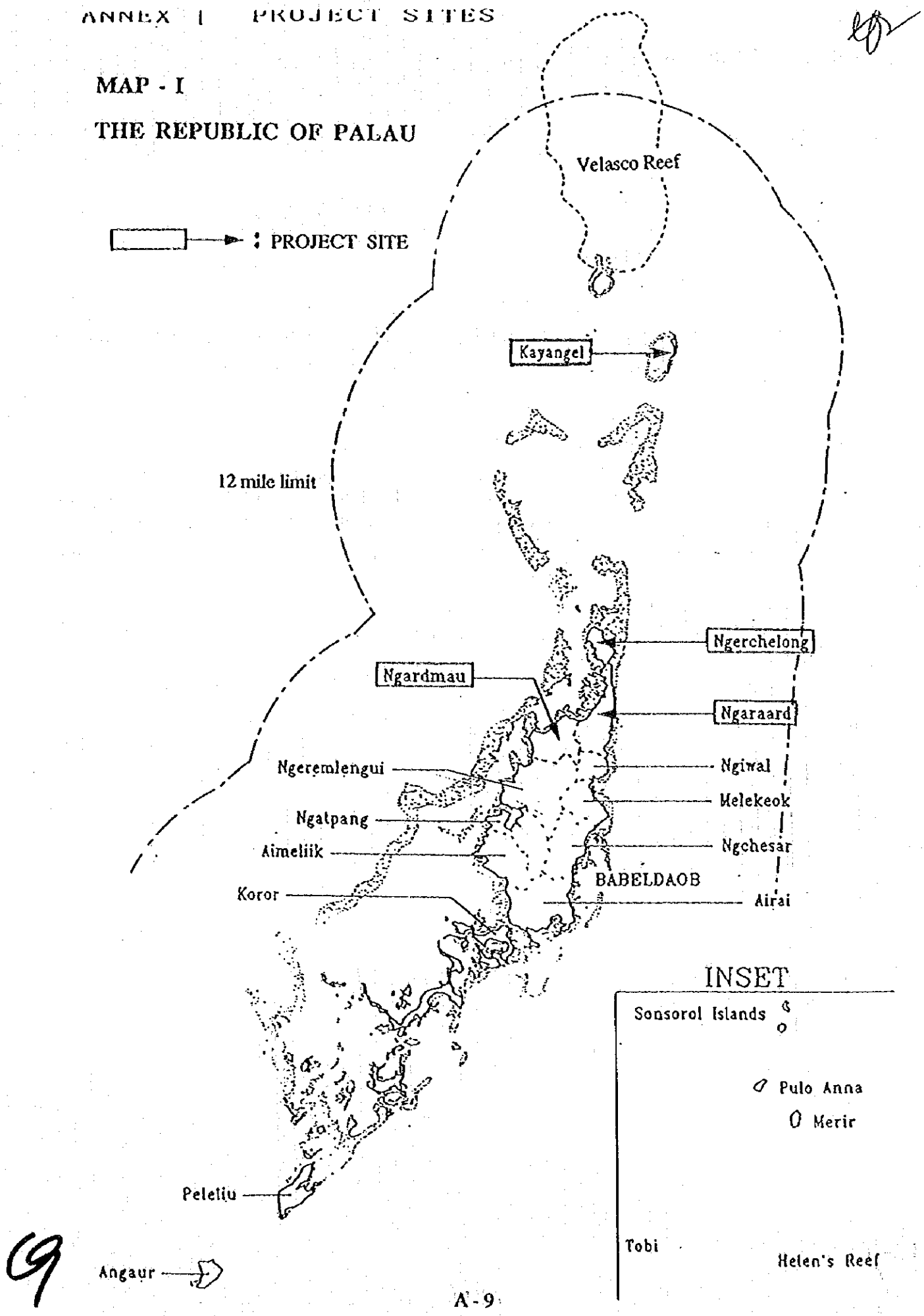
1) Both the Governors of Ngaraard and Ngardmau, and the Palau Government representative reiterated that ice-making facilities at their respective sites will certainly enhance not only the preservation and quality of their catch for maximum returns, but also the conveniences of their communities, taking into account the present local conditions.
   The Team suggested that existing and newly constructing ice-making-facilities in neighbouring states (Ngarchelong and Ngaremlengui) would have the capacity to supply ice to fishermen even in Ngaraard and Ngardmau, and therefore, the State Governments together with the National Government would coordinate such matter as to make it possible to supply necessary ice to individual fishermen in respective states.
2) The Team also emphasized that continuous efforts should be made to improve the marketing system from the outlying islands/areas to PFA (Palau Fishing Authority) and/or local markets in Koror in response to the increasing fish productions.

9. Further Schedule of the Study

1) The consultants will proceed to further studies in Palau until December 27, 1995
2) Based on the Minutes of Discussions and technical examination of the study results, JICA will complete the Basic Design Study Report and send it to the Government of Palau by March, 1996.

MAP - I

THE REPUBLIC OF PALAU



ANNEX III: ITEMS REQUESTED BY THE GOVERNMENT OF PALAU

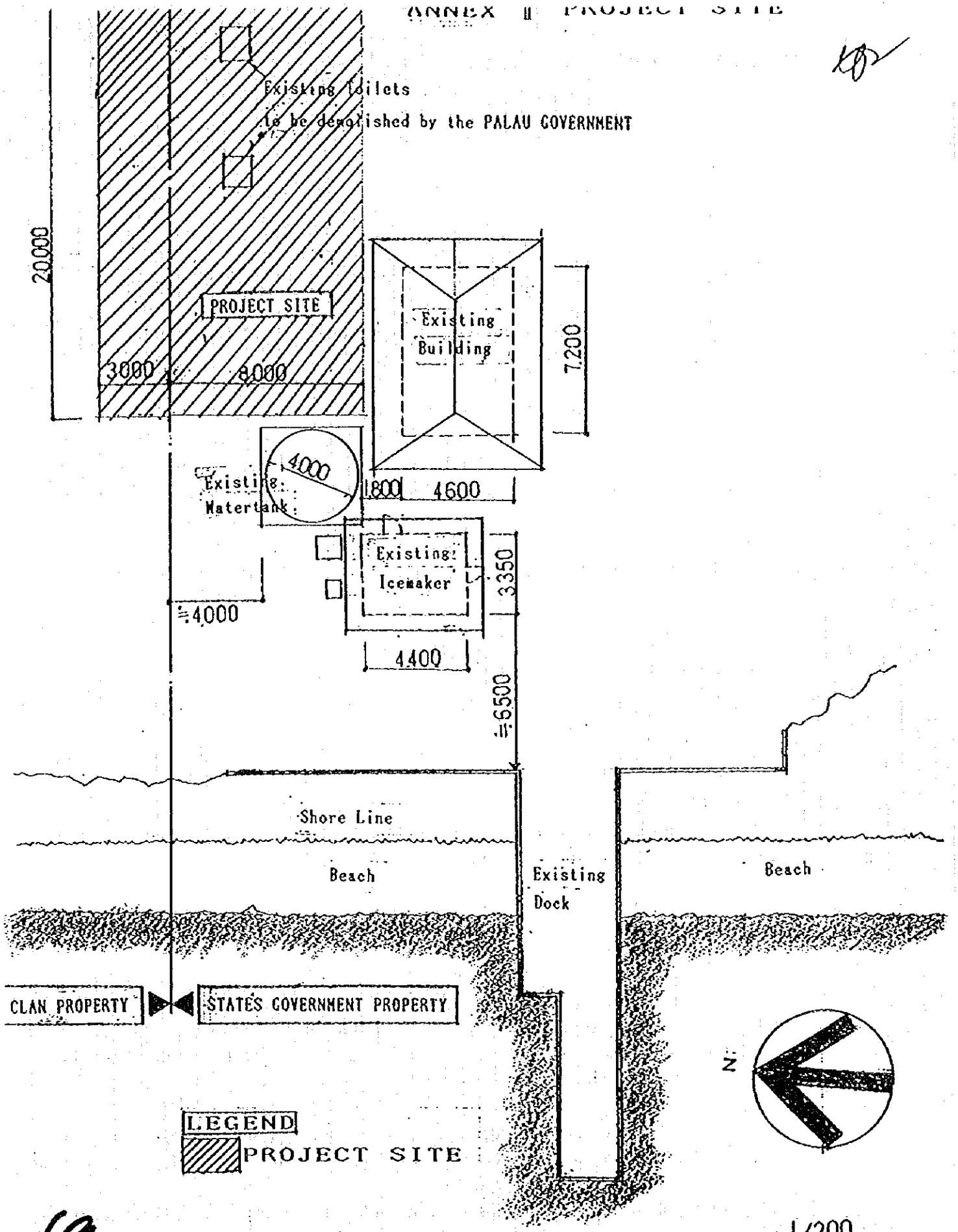
1. **Building in Kayangel State**

   1) Shore-Based Facility
      The facility would accommodate a small office, toilet, a fuel storage and a spare parts storage.
   2) Ice making machine with ice storage
   3) Diesel engine power generator
   4) Rain water catchment tank/s
      The tank/s would supply water to ice making machine as well as utilities of shore-based facility but also to the fishing community as supplement.

2. **Equipment to be supplied to Four (4) Northern States**

   1) FRP fishing boat with inboard engine one (1) set for each state
      The descriptions of fishing boats would be determined by further studies, but especially the size and engine (inboard or outboard) of the boat for Kayangel Sate should be carefully examined taking account into the present conditions of the State.
   2) Fishing gears for trolling, bottom angling and "taru-nagashi"
      The descriptions of fishing gears would be determined by further studies.

ANNEX II PROJECT SITE



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Project Site in KAYANGEL STATE

ANNEX IV: JAPAN'S GRANT AID SCHEME

1. Grant Aid Procedure

1) Japan's Grant Aid Program is executed through the following procedures.

Application	(Request made by a recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and Approval by Cabinet)
Determination of Implementation	(The Notes exchanged between the Governments of Japan and the recipient country)

2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using Japanese consulting firms.

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project"), is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:

a) confirmation of the background, objectives and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation;

b) evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from the technical, social and economic points of view;

c) confirmation of items agreed on by both parties concerning the basic concept of the Project;
d) preparation of a basic design of the Project; and
e) estimation of costs of the Project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even through they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For the smooth implementation of the Study, JICA uses a consulting firm selected through its own procedure (competitive proposal). The selected firm participate the Study and prepare a report based upon the terms of reference set by JICA.

At the beginning of implementation after the Exchange of Notes, for the services of the Detailed Design and Construction Supervision of the Project, JICA recommends the same consulting firm which participated in the Study to the recipient country, in order to maintain the technical consistency between the Basic Design and Detailed Design as well as to avoid any undue delay caused by the selection of a new consulting firm.

3. Japan's Grant Aid Scheme

1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

3) "The period of the Grant" means the one fiscal year which the Cabinet approves the project for. Within the fiscal year, all procedure such as exchanging of the Notes, concluding contracts with consulting firms and contractors and final payment to them must be completed.
However, in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

4) Under the Grant, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However, the prime contractors, namely consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

5) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability of Japanese taxpayers.

6) Undertakings required to the Government of the recipient country

a) to secure a lot of land necessary for the construction of the Project and to clear the site;
b) to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities outside the site;
c) to ensure prompt unloading and customs clearance at ports of disembarkation in the recipient country and internal transportation therein of the products purchased under the Grant Aid;
d) to exempt Japanese nationals from customs duties, internal taxes and fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts;
e) to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such as facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work;
f) to ensure that the facilities constructed and products purchased under the Grant Aid be maintained and used properly and effectively for the Project; and
g) to bear all the expenses other than those covered by the Grant Aid, necessary for the Project.

7) "Proper Use"

The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign the necessary staff for operation and maintenance of them as well as to bear all the expenses other than those covered by the Grant Aid.

8) "Re-export"

The products purchased under the Grant Aid shall not be re-exported from the recipient country.

9) Banking Arrangement (B/A)

a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank". The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the verified contracts.

b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay (A/P) issued by the Government of recipient country or its designated authority.

ANNEX V: UNDERTAKINGS BY THE GOVERNMENT OF PALAU

1. To secure a lot of land necessary for the Project;

2. to clear, level and reclaim the site for the Project prior to the commencement of the construction;

3. to provide a proper access road to the Project site;

4. to undertake incidental outdoor works, such as gardening, fencing, exterior lighting, and other incidental facilities in and around the Project site, if necessary;

5. to ensure prompt unloading, tax exemption and customs clearance at ports of disembarkation in Palau and internal transportation therein of the products purchased under the Japan's Grant Aid;

6. to exempt Japanese nationals from customs duties, internal taxes and fiscal levies which may be imposed in Palau with respect to the supply of the products and services under the verified contracts.

7. to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such facilities as may be necessary for their entry into Palau and stay therein for the performance of their work.

8. to bear commissions, namely advising commissions of an Authorization to Pay (A/P) and payment commissions, to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement (B/A);

9. to provide necessary permissions, licenses, and other authorization for implementing the Project, if necessary;

10. to ensure that the facilities constructed and equipment purchased under the Japan's Grant Aid be maintained and used properly and effectively for the Project; and

11. to bear all the expenses, other than those covered by the Japan's Grant Aid, necessary for the Project.

JICA