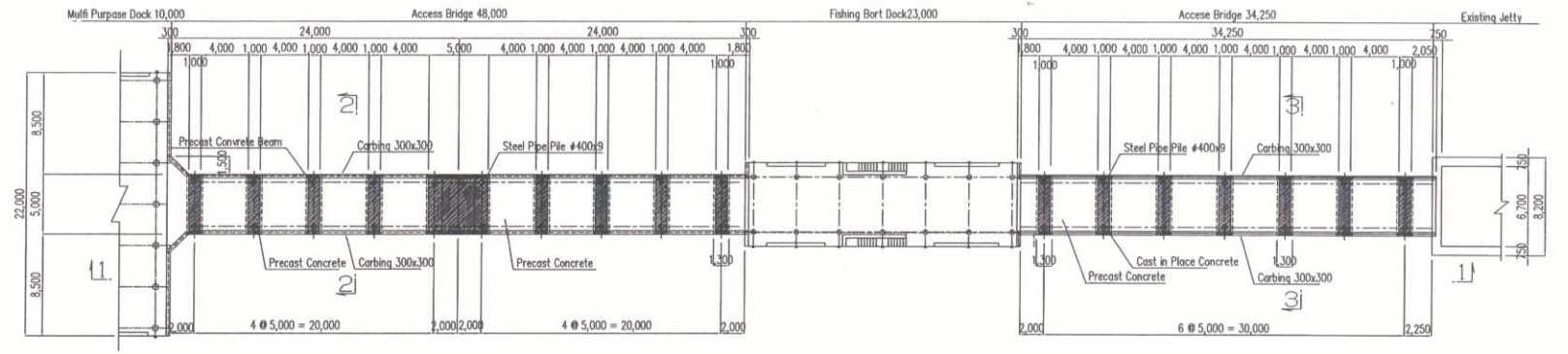
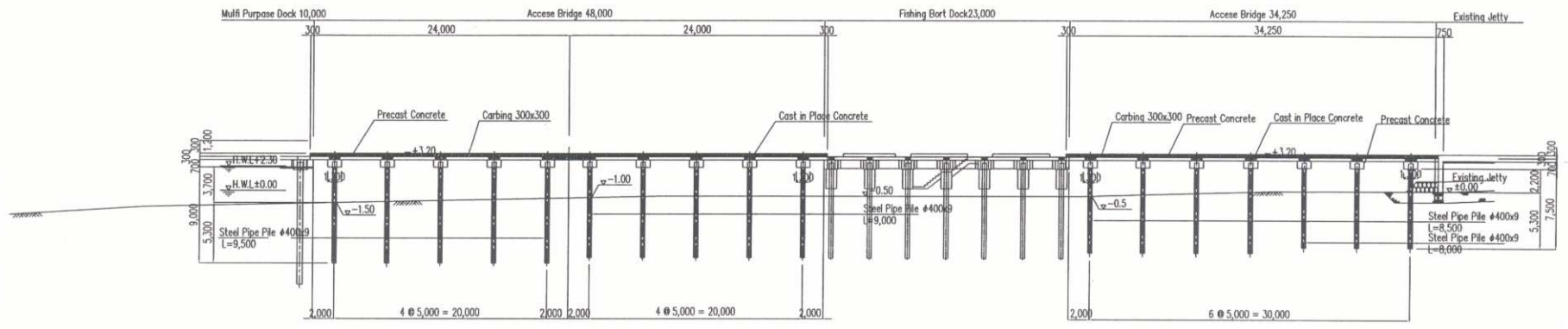


Figure 2.2.3-3 Details of Fishing Boat Dock

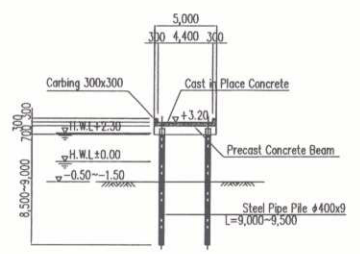
PLAN



1 - 1



2 - 2



3 - 3

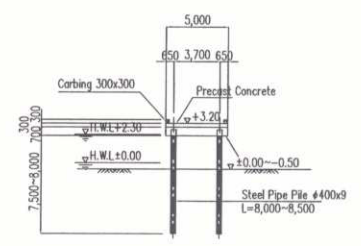


Figure 2.2.3-4 Details of Access Bridge

2-40

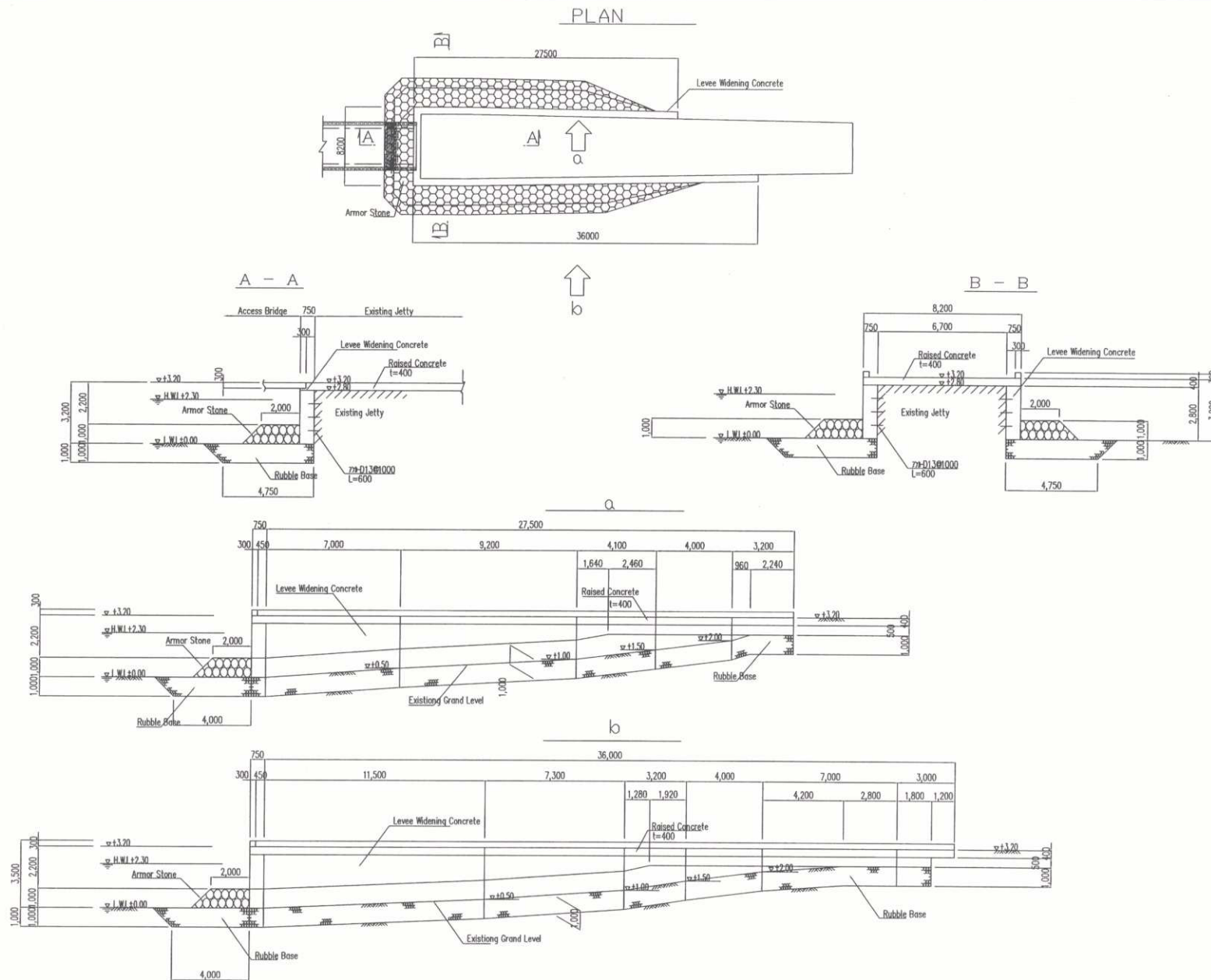


Figure 2.2.3-5 Details of Abutment



Access Channel

Depth: D.L. - 2.2m

Width 20.0m

Extension 380m

Existing Access Channel

Dredged Area

Alignment of New Access Channel

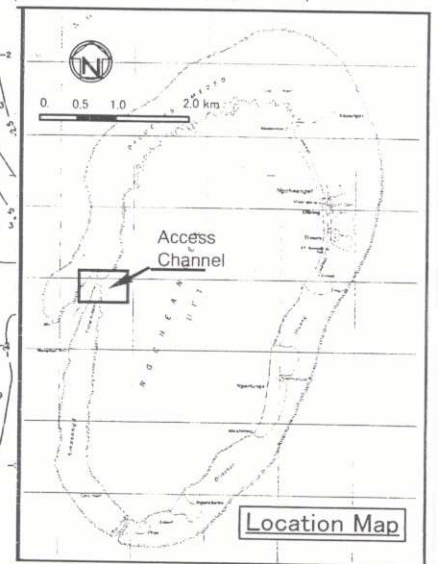
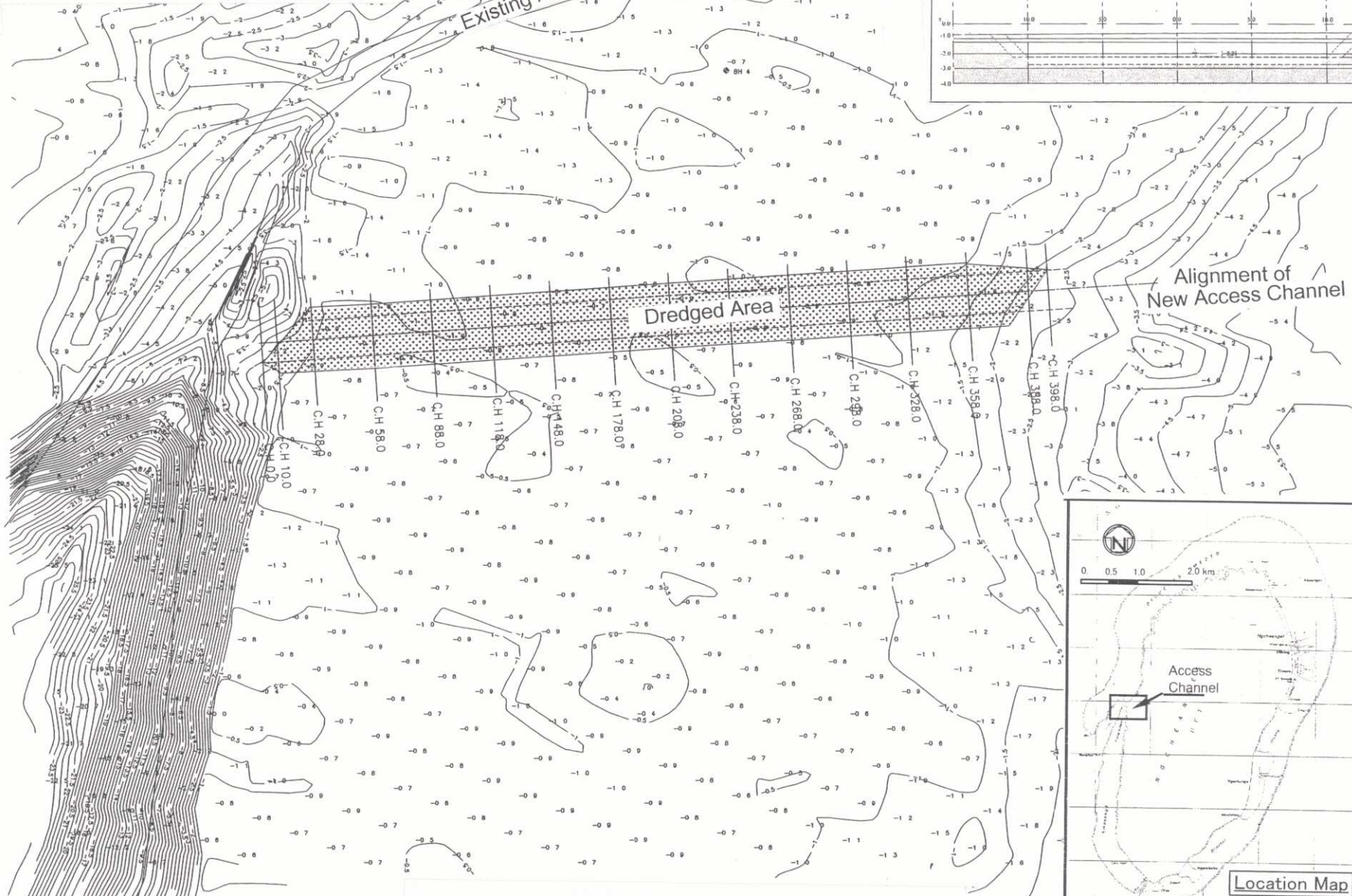
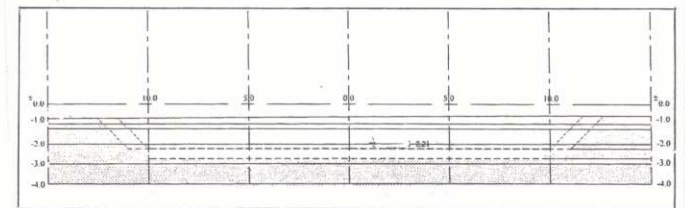
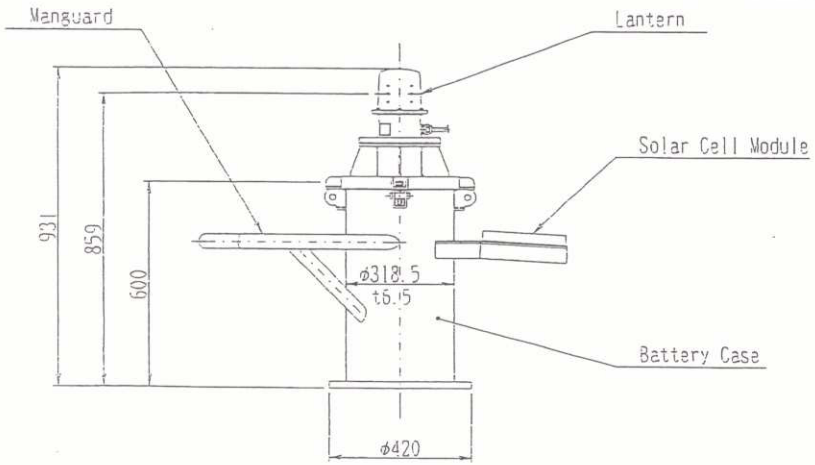
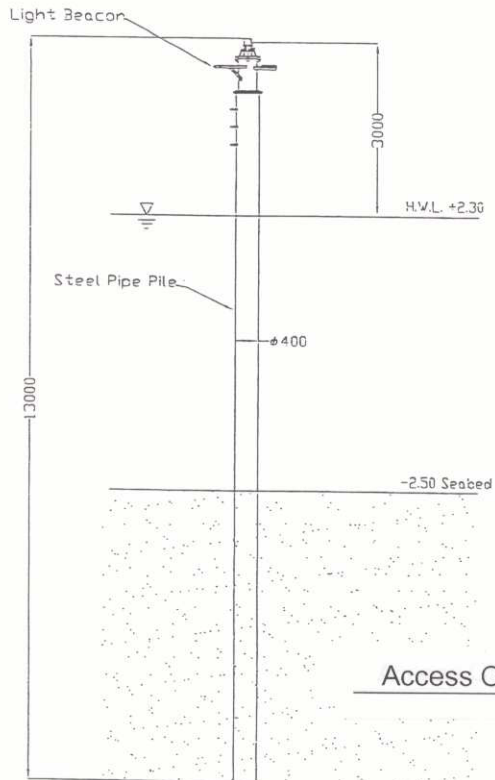


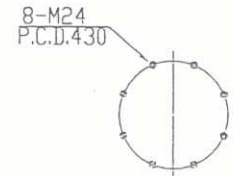
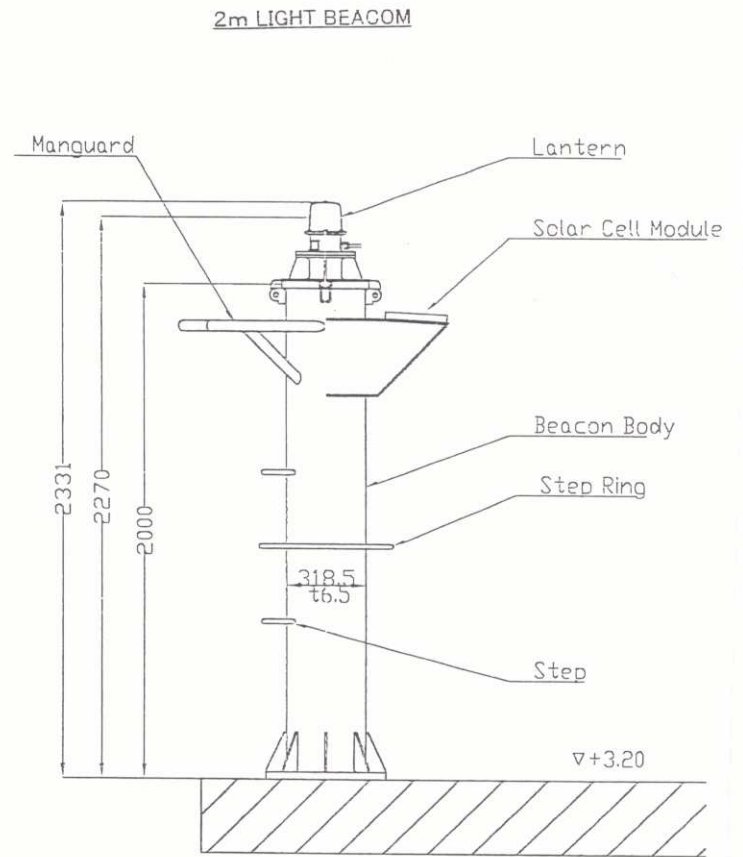
Figure 2.2.3-6 Alignment Plan of Access Channel



LIGHT BEACOM



Access Channel



Multipurpose Dock

Figure 2.2.3-7 Details of Navigation Aids

2-2-4 Implementation Plan

(1) Implementation Concept

1) Basic Concept

- i) For the implementation of the Project, after the Exchange of Notes (E/N) is signed between the Government of Japan and the Government of Palau, a contract for undertaking consulting services will be concluded between the Government of Palau and the Japanese Consulting Firm.
- ii) The Consulting Firm will prepare all the tender documents such as the drawings of the fishing port facilities, technical specifications, cost estimations, conditions of contract and so forth required for the tender and the construction contract. After the approval of these documents by the Government of Palau, the contractor for this project will be selected from and among Japanese construction companies through the procedure of pre-qualification and the tender.
- iii) The construction work will be performed by the selected construction company in accordance with the construction contract concluded between the Government of Palau and the construction company.
- iv) The construction period is expected to be 9 (nine) months necessary taking into considerations of the scale and contents of the Project as well as the site conditions.

2) Implementation Concept

- i) Considering that the construction works in the Project will be construction of the jetty and dredging of the access channel (Ulach Channel) that are the port infrastructure linking Kayangel State and Koror State, it will be implemented taking into consideration of existing fishery activities and safe navigation of boats. Furthermore, a temporary jetty will be installed for temporary use during the construction period so as not to impair the functions of fish catch landing, embarkation / disembarkation of passengers and loading and unloading of cargo.
- ii) The maritime area in the vicinity of the project site has a high degree of water transparency and a rich natural environment. Although the coral reefs in the vicinity of Ulach Channel have been damaged

already by the influence of the El Niño phenomenon, careful attention will be taken in the dredging works of the access channel to avoid diffusion of turbid materials so as to protect the growth of coral and other natural environment.

- iii) In consideration of the environmental aspects of the project site and the procurement and transportation of construction materials and machinery / equipment, the local work volume will be minimized in construction of the jetty by applying the use of pre-casted segments that can be made separately in Koror State.
- iv) Besides limited availability of construction machinery and equipment, some construction machinery and work vessels procured locally are very high in costs. They will be procured locally in Palau only in cases of the cost less than procuring them from Japan or another third country. As for general labor, they will be hired from local construction companies.
- v) As a monitoring survey during the construction period, sounding of the adjacent bathymetry will be carried out before commencement of the work and at its completion.

3) Executing Agency in the Government of Palau

Executing agencies, which will be involved in the Project on the part of the Government of Palau, will be as follows.

- i) Responsible Agency:
Ministry of Resources and Development
- ii) Executing Agency:
Ministry of Resources and Development
- iii) Implementation Agency:
Ministry of Resources and Development
- iv) Agency for Management after Completion:
Kayangel State Government

(2) Implementasion Conditions

1) Construction Conditions

i) Construction Company

In Palau, there are several construction companies, including foreign-capital contactors, that are capable for small-scaled maritime construction works, onland construction works, building works, etc., but do not have the capability to do the kind of big-scaled maritime construction works included in the Project, but nevertheless it will be quite possible for the Japanese construction company to employ their services as subcontractors.

ii) Construction Machinery and Equipment

Although several construction companies in Palau have construction machineries and work vessels, such as cranes, backhoes, dump trucks and other general construction machinery and equipment as well as barges, tugboats and other work vessels, where the quantity of them is very limited. Local procurement of the most general construction machinery is possible, but in case of the higher price, consideration will be given to procurement from Japan or third country in order to reduce construction cost. Among maritime construction work, vessels of backhoe dredgers are not available locally, so that it will have to be procured in Japan or third country.

In a selection of pile-driving machine for construction of the jetty, consideration will be given to the residential environment in the vicinity of the construction site from aspects of noise and vibration.

iii) Construction Materials

The construction materials required by the Project will be concrete aggregate, cement, water, re-bars, riprap, etc., mainly for improvement of the jetty. Such construction materials are not available in Kayangel State. And, besides that, it will be difficult to secure the amount of water needed for construction purposes since rainwater is the only source of water. They will therefore have to be brought in from Koror State. Furthermore, in order to minimize the local construction works, the concrete segments of the jetty structure will be precasted in Koror State and brought in by sea transportation.

iv) Labor

Skilled labors can not be procured locally in Palau. As for all kinds of construction works comprising dredging of coral reef areas using backhoe

dredgers and steel pipe pile driving for the jetty construction, it is necessary by the Japanese skilled experts and technicians to instruct local labors. Common laborers and unskilled labor can be procured from local construction companies and others.

v) Safety Control

Considering that the construction works included in the Project will be carried out along the existing access channel and on the fishing port facility of only the Kayangel State owned, a temporary jetty will be provided adjacent to the existing jetty so as not to affect the current fishing and commercial port activities during the construction period. Because of that, it will be necessary to pay a particular attention to safety considerations in the dredging works, jetty and other marine construction works so as not to interfere navigation of fishing boats and other calling boats.

The hinter area of the adjacent beach can be used as a dumping site for dredged and excavated materials. The Kayangel State Government will make use of such materials in the future for filling works, leveling of roads and other uses.

2) Requirements for Construction Works

- i) Since the project site is located in maritime area with an outstanding natural environment, careful attention must be given to environmental preservation. In particular, regarding turbidity generated in the dredging work, the silt protectors equipped on the dredger will be adopted as indicated in Figure 2.2.4-1 as a measure for prevention of turbidity diffusion.
- ii) A temporary jetty located as shown in Figure 2.2.4-2 will be installed during the construction period to replace the activities at the existing jetty where the construction works will be undergoing. Another temporary jetty for construction work purposes will be installed to be used as a quay for landing dredged materials, construction materials and construction machinery / equipment.
- iii) Appropriate temporary construction work plans, construction implementation plan and work scheduling plans must be formulated taking local natural conditions into full account, particularly sea conditions such as stormy wave condition.

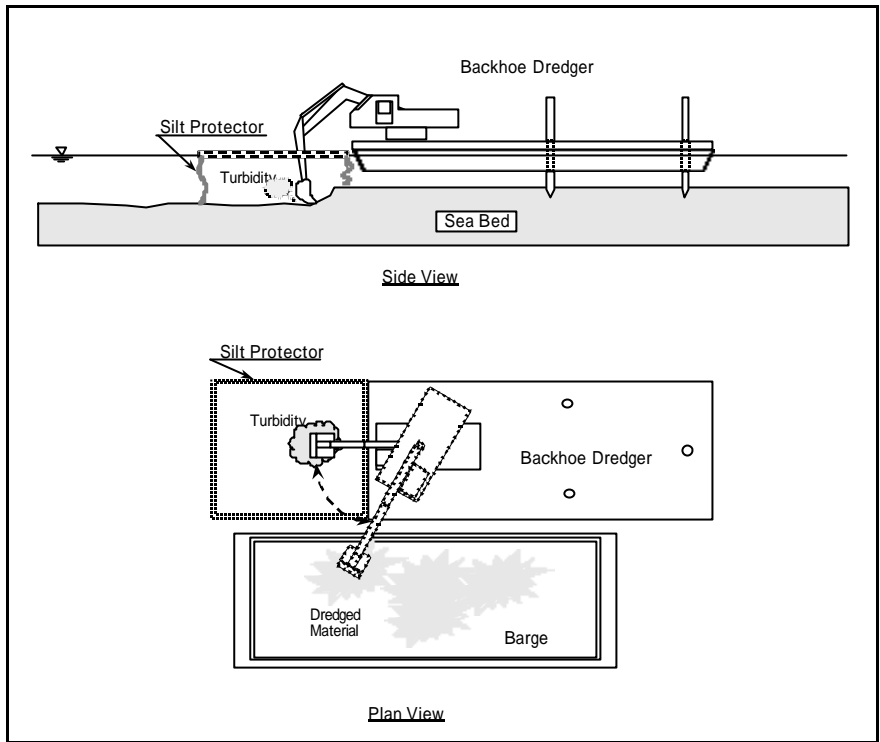


Figure 2.2.4-1 Image of Dredging Work with Silt Protector

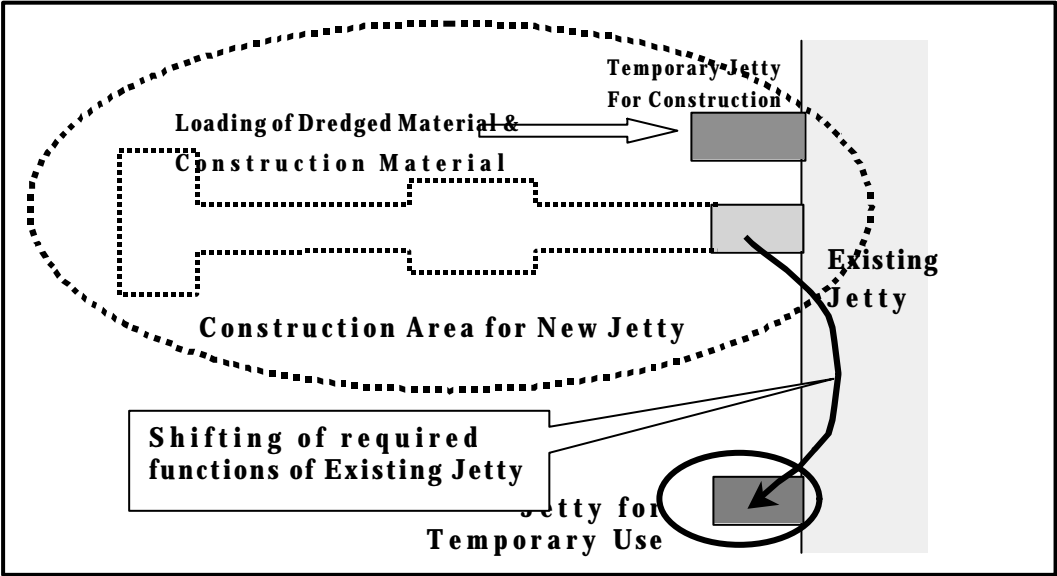


Figure 2.2.4-2 Layout Plan of Temporary Onshore Facility

iv) Dispatch of the Japanese staffs and technical experts should be planned carefully considering the appropriate number of persons, timing and duration in accordance with the progress of the construction works.

- v) Sounding survey to monitor the bathymetric change will be carried out by the construction company.

(3) Scope of Works

The scopes of works allocated to the Government of Japan and the Government of Palau will be respectively as follows:

1) Scope of Works Undertaken by Government of Japan

- Construction of Jetty
- Dredging of Access Channel
- Installation of Navigation Aids
- Introduction of Cargo Handling Equipment

2) Scope of Works Undertaken by Government of Palau

- Provision of Construction Yard and Dumping Sites in Kayangel State and Temporary Construction Yard in Koror State
- Disposal of Dredged Materials and Excavated Materials due to Construction Works at Dumping Sites in Kayangel Island
- Construction of Garage for the Cargo Handling Equipment

(4) Construction Supervision

It is the policy of the Government of Japan that a grant aid project will be implemented under the strict supervision of the consulting firm which is fully aware of technical details of works during the whole period of the project. The consulting firm will supervise the construction work through the close contact and communications with local engineers in regard to the design, inspection and schedule of work.

Since the construction work will be carried out in both Kayangel State and Koror State, the resident supervisor will have to accomplish supervision of the work at the sites in both of them. According to the work schedule and progress, expertise engineer will be dispatched to instruct and inspect the construction works.

1) Supervisory Concepts

- i) Control of the work progress in accordance with the construction schedule and with maintaining close contact and communication between the responsible organizations in both countries.

- ii) Provision of prompt and appropriate guidance and advices being essential for the contractor as to the construction of the facilities in compliance with the drawings and specifications.
- iii) Provision of instruction for maximum adoption of local materials and local construction methodology.
- iv) Promotion of technology transfer in construction and engineering to make the most of the grant aid project.
- v) Provision of adequate instruction and advices on maintenance of delivered facilities and equipment for smooth operations.

2) Supervisory Works

i) Assistance on Contracting

Providing assistance on selection of contractor, determining the type of contract, drafting contract documents, evaluating a bill of quantities and witnessing contract awarding.

ii) Evaluation and Approval of Shop Drawings

Evaluating and approving shop drawings as well as materials and equipment proposed and submitted by the contractor.

iii) Instruction to Construction Works

Reviewing construction plans and schedule, etc., providing instructions to contractor and reporting the progress of works to the client.

iv) Assistance in Procedure of Payment

Evaluation and approval of the bills for the payment to the contractor during the work will be carried out taking into account the progress of the work and upon the completion of the work.

v) Inspection and Witness

The consultant inspect where necessary the work in progress and gives instructions to the contractor. The consultant, upon the confirmation of completion of the works and fulfillment of requirements of the contract, witness the delivery of the objects of the contract and confirm the client's

acceptance thereof to complete his obligations.

The consultant also provides reports to the Government of Japan in relation to the progress of the works, payment procedures and delivery of completed facilities and equipment.

(5) Quality Control Plan

1) Quality Control of Construction Material

The construction materials used for the Project will be managed according to “Common Specification for Fishing Port Construction” published by National Fishing Port Association, Japan and shall be used by receiving prior manufacturing approval.

2) Quality Control of Concrete Mixing

Mixture of the concrete and mortar, which are used for this construction will be determined upon test mixing of concrete contents. In the trial mixing, the strength of the concrete, mixing time and method of casting will be carefully examined.

Moreover, data sheets of necessary concrete test results, control tables for a concrete strength management analysis and control figures (X-R management figure etc.) will be prepared. Referring to these test results, quality control of concrete will be managed and be performed.

(6) Procurement Plan

In the process of procuring materials and equipment required for the Project, special attentions will be paid as indicated followings.

1) Procurement Concepts

Priority should be given, as far as possible, to procurement of locally available materials and equipment, examining the quality including the inspection method and supply condition to meet the necessary capacity, delivery date and quantities. Procurement from Japan should be minimized considering cost and disadvantages due to delivery time and others.

i) Procurement from Japan

A detailed procurement and transportation plan must be prepared well in advance for the material and equipment to be procured from Japan. This normally will take a long period of time for manufacturing, packing and shipping

ii) Local Procurement

Rubble stones and aggregates, which can be locally procured, should be carefully examined as to the quarry site, quality and transportation capability.

iii) Cost

The cost is an important factor to be taken into account in the selection of materials from local sources, neighboring countries and Japan. It should be borne in mind that the prices of procurement from Japan include the charges for packing, transportation, insurance and the port charges, while import and local taxes are to be exempted.

2) Procurement Items

On the basis of the above principles and rules, the following plans will be established preliminary for the procurement of construction materials and equipment.

i) Materials

Local Procurement : aggregate, sand, cement, re-bar, riprap, etc.
Procurement from Japan : steel pipe pile, concrete admixtures, etc.

ii) Construction Machinery

Local Procurement : barges (500 ton, 300 ton), tugboats (500 ps, 300 ps), crawler cranes (50 ton, 25 ton), truck crane (25 ton), dump truck (10 ton), concrete mixer truck, backhoes (1.5 m³, 0.7 m³), bulldozer, trailers (40 ton, 20 ton), vibration hammers (70 kVA, 40 kVA), generators (125 kVA, 70 kVA)

Procurement from Japan : backhoe dredger (2.0 m³), crane truck and others

iii) Equipment

Local Procurement : None
Procurement from Japan : Crane truck

(7) Implementation Schedule

Implementation of the Project under the Japanese Grant Aid Program will proceed in the following manners.

After the Exchange of Notes (E/N) concluded between the two countries, the Japanese consulting firm will be appointed by the Government of Palau and the consulting agreement will be concluded between the said government and the consulting firm. The Project will be implemented in accordance with the conditions stated in the E/N.

And the Project will be completed in two stages of the execution of tender including detailed design and contract and the execution of construction works.

1) Preparation of Detailed Design Documents

After the consulting agreement will be concluded between the executing agency of Palau and the Japanese consulting firm and the agreement will be verified by the Government of Japan, the consultant will start detailed design. In the detailed design stage, the tender documents consisting of design drawings, technical specifications, instruction to tenderers, etc. will be prepared on the basis of the Basic Design Study Report. In the meantime, consultations will be held with the Government of Palau regarding the details of the fishing port facilities and equipment. And eventually the tender documents will be approved by the Government of Palau.

About 3 (three) months will be required for the detailed design.

2) Execution of Tender and Construction Contract

The contractor (the Japanese construction company) who will be involved in the construction of the project facilities will be selected through the tender. The tender procedures will be as following order: the notification, the invitations to tender, the pre-qualifications, the distribution of tender documents, the tender, the evaluation of the tender, designation of the contractor and conclusion of a construction contract.

The whole procedures will take 2 (two) months.

3) Execution of Construction Work

Construction work will start after the conclusion of the contract and verification by the Government of Japan. The construction period is expected to last about 9 (nine) months considering the scale and size of the Project and local construction conditions. However, unforeseen situations, which might

occur in the course of the work, are excluded.

Table 2.2.4-1 shows the project implementation schedule from conclusion of the Exchange of Notes (E/N) to completion of the construction works.

Table 2.2.4-1 Project Implementation Schedule

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Remarks
Detailed Design and Tender	■														Consultant Agreement, Field Survey
	□	□	□												Detailed Design, Cost Estimate, Tender Documentation
			■ □												Tender Document Approval by ROP Govrn't & Announcement
				□											Tender, Contacting Approval by JPN Govm't
Construction and Procurement					■	■	■	■	■						Preparation and Mobilization
						■	■	■	■						Temporary Works
							■	■	■						Dredging of Access Channel
								■	■	■					Jetty Segment Precasting Works (Koror)
									■	■	■	■	■		Jetty Construction Works (Kayangel)
										■					Navigation Marker Installation Work (Kayangel)
													■	■	Procurement of Cargo Handling Equipment (Kayangel)
											■			■	Clean-up Works (Koror, Kayangel)
															■ Hand Over

- Work in Japan
- Works at Site
- Field Survey

(8) Environmental Aspects

3) Dredging Works and Dumping Site

Most of the coral observed on the atoll reef in Ulach Channel has been annihilated by abnormal warming of sea water due to the past Niño phenomenon. Any rare and preservative species of the coral are not observed in the vicinity area of the project site. Considering the current condition of the coral and the scale of the channel dredging, the maritime environment with respect to the coral preservation does not place any restriction on the access channel dredging work.

Temporary dredging and filling in the vicinity area of the existing jetty will be required for the new jetty construction. Extensive seaweed grounds are distributed in the adjacent area of the jetty construction site, which serve as a habitat for growth of fry and other forms of marine life. However, considering the scale of dredging and filling volume and area for jetty construction, corresponding to only a small part of the total area and the limited period of dredging works, a temporary lost of the partial sea grass ground is presumed not to affect so much to the maritime environment. As well, the seaweed ground to be found there are comparatively resistant to turbidity due to dredging works and their growth is based on underground stems to be expected to recover rapidly after completion of the construction work.

Therefore, the impact on the maritime environment due to the dredging works in Ulach Channel and the adjacent area to the existing jetty dredging is expected to be very a small magnitude, as considered above. However, a silt protector is recommended to introduce to the dredging works to prevent turbidity diffusion to the adjacent area.

Since the dredged materials are prohibited to dump in sea area in Palau, the dredged material will be dumped in an appropriate sites acquired on Kayangel Island.

4) Jetty Construction Works

Because of the construction site condition on the small isolated island, the environmental condition is susceptible to be affected by the construction works. In order to minimize the impact by the construction works to the surrounding environment, the work volumes conducted at the project site will be reduced as far as possible by allocating the required works to Koror State,

such as introducing precast segments of the jetty structure.

For protection of the maritime environment, devise measures will be adopted to prevent falling of oil, concrete pieces, other construction materials and the like into the surrounding area.

With respect to the residential environment, considerations on the construction methodology will be paid to minimize the impact of the construction works in view of the proximity of residential area located at rear of the project site. For piling works, an appropriate pile driving machine be necessary to be selected to reduce noises and vibration.

2-3 Obligations of Recipient Country

The obligations of the Palau Government are confirmed by the Minutes of Discussions during the Basic Design Study.

- i) To carry out the environmental impact assessments required for applying construction permits, including permits for the dredging and other maritime construction works, and accomplishment of the formalities for obtaining them.
- ii) To secure land necessary for the project site prior to commencement of the construction work.
- iii) To secure temporary construction yard in Koror State.
- iv) To secure construction site and necessary dumping sites with removal of trees and other obstacles for dumping of dredged and excavated materials near the project site.
- v) To construct a garage for the cargo handling equipment (crane truck).
- vi) To ensure all the expenses and prompt execution for unloading, customs clearance at the ports of disembarkation and internal transportation of the products purchased under the Grant Aid.
- vii) To bear commissions to the Japanese foreign exchange bank for its banking services based upon the Banking Arrangement, namely the

advising commission of the “Authorization to Pay” and other payment commissions.

- viii) To exempt Japanese nationals from customs duties, internal taxes and fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.
- ix) To provide necessary permissions, licenses and other authorizations for implementing the Project, if necessary; and,
- x) To bear all the expenses other than those covered by the Grant Aid, necessary for the Project.

2-4 Project Operation and Plan

(1) Operation Organization

After implementation of the project comprising a jetty facility, an access channel facility and navigation aids as well as a crane truck of cargo handling equipment, Kayangel State will be responsible for operation and maintenance of the granted facilities and equipment.

Regarding the fishery facilities already granted Kayangel State by the Japanese Grant Aid Program in 1997, which includes an ice-making facility, an ice-making facility officer has been assigned the duties of operation and maintenance of the facilities.

Among the facilities and equipment provided in the Project, those that will require daily maintenance are the navigation aids and the crane truck. Regarding the navigation aids, they should be practically maintenance-free for certain long years since lanterns are equipped with light emitting elements (LED) that can operate for a long time without maintenance. Nevertheless, since occurrence of trouble resulting from, for example, vessels bumping into them would impair safe navigation of boats, it will be necessary to check that the navigation beacons are operating properly on a day-to-day basis. As for the crane truck, it will also need an operator and maintenance personnel.

Regarding such personnel newly required due to the Project, personnel already employed by the State Government can also assign those additional duties, eliminating the new employment for any new maintenance and

operation. In other words, the above-mentioned ice-making facility officer will be in charge of maintenance of the navigation beacons and crane truck as well, and the road repairs officer, who is capable of operating construction equipment, will have the additional responsibility of operating the crane truck.

(2) Jetty and Access Channel Maintenance Plans

If appropriate use of the jetty facilities, no maintenance expenses for them will be required. Nevertheless, it is possible that they might be partially damaged by, for instance, boats colliding onto them. Regarding repairing works for such damage, the State Government will take care of it in minor small damage, and the National Government will carry out at the request of the State Government in a severe case.

As for the access channel facility, there is some possibility of siltation or sand deposition due to inflow of sediment from the surrounding area. And there could also be bathymetric change around the jetty facility caused by littoral drift since it is located on a sandy beach. After completion of the Project, it will therefore be necessary to carry out periodical sounding survey to detect possible siltation of the access channel or bathymetric change in the vicinity of the jetty. Periodical sounding survey is an important measure in determination of the characteristics of siltation phenomena of the access channel and the characteristics of seabed bathymetric change in the vicinity of the jetty, and countermeasures such as maintenance dredging will be formulated on the basis of these field data. Sounding survey can be accomplished by surveyors of the Public Works Bureau of the Ministry of Resources and Development. The frequency of sounding survey will be about once a year until the characteristics of the situations in the access channel and bathymetric change in the vicinity of the jetty will be evaluated.

Since it would be some difficulty for the State Government to accomplish maintenance dredging in the access channel and in the vicinity of the jetty, the National Government will carry out at the request of the State Government.

In case of ship accident such as grounding and sinking in the access channel and around the jetty, functions expected to these facilities would be impaired. Immediate recovery works for ship accident will be required.

(3) Operation and Maintenance Cost

Since existing personnel of Kayangel State Government will cover the

personnel required for the project operation and maintenance organization as indicated above, there will be no additional cost for maintenance and operation. Fees for use of the jetty and entry to the State are already being collected as a part of the revenues of the general account of State Government. As a result of implementation of this project, there will, however, be additional operation and maintenance cost for the crane truck, including the cost of fuel. But since that additional cost will not amount to much, State Government can charge some fees for use of the crane truck just as it does for use of the speed boat owned by State Government and incorporate those revenues into the general account, from which it can disburse the maintenance costs.

(4) Matters Considered for Implementation of Project

The following matters should be appropriately considered for implementation of the Project.

- i) The recipient country will carry out the environmental impact assessments required for application for construction permits including maritime construction and dredging and will obtain the permit before commencement of the construction works.
- ii) For implementation of the Project, a temporary construction yard in Koror State for precastings of jetty segments and a temporary construction yard and some dumping sites for dredged and excavated materials in Kayangel State are obtained. It is essential that National Government and State Government will take necessary arrangement to secure the said yards in Koror State and Kayangel State.
- iii) Since a garage for the crane truck is required for long service life of that equipment, it will be necessary to secure the land for construction of such a garage and to carry out its construction in a sure manner.

CHAPTER 3

PROJECT EVALUATION AND RECOMMENDATIONS

Chapter 3 Project Evaluation and Recommendations

3-1 Project Effect

Palau consists of 16 states with a total population of 19,128 (census 2000), about 70% of which are concentrated to Koror State. Thus, it is important for the outlying states suffering from weak economic foundations to strengthen and vitalize the relationship with Koror State with respect to the supply of fishery products and distribution activities of goods and commodities. In this way, they may be able to get out of a self-sufficiency economic structure and facilitate regional development by enhancing the market economy.

Kayangel State is an isolated island state located 40 km off the north tip of Palau's largest island, Babelthup, and 83 km from Koror State accommodating the country's capital functions. The main industry of Kayangel State is fishing. The fishing activities such as preparation of fishing operation, landing of fish catch and shipping of fishery products are carried out at the sole jetty facility in the state, located in the central part of Kayangel Island. The jetty facility, which plays an important role as well in the function of a physical distribution base, can be considered to be the lifeline of Kayangel.

However, in recent years, a number of problems have been identified. The water depth of the dock, the basic fishing port facility, is not sufficient for berthing of fishing boats and other boats while the tide level is low, since the jetty does not extend offshore enough. And the structure of the jetty is suffered considerably by super-attenuation and deterioration. The existing jetty fails to undertake normal fishing port functions with regard to preparation works for fishing trips, unloading of fish catches, etc. as well as commercial port functions such as berthing of other boats and handling of cargoes. Furthermore, the access channel located on atoll reef does not have a sufficient water depth, which makes difficult for fishing boats and other boats to navigate through channel and approach the port inside the lagoon particularly during low tide. In addition, safe navigation is threatened since the beacons of navigation aids installed along the access channel are damaged.

Implementation of the project comprising construction of a jetty, dredging of the access channel will enable the fishing boats and other boats to safely call port and berth at any tide level and will improve the efficiency of works at the jetty. The development of the state through promotion of the fishery industry and vitalization of physical distribution related with Koror

State will be expected by the implementation of the Project.

The present project to be implemented under such a background will therefore have the following direct and indirect effects

【Direct Effects】

- 1) New jetty facility of sufficient water depth for both fishing boats including other boats will enable to be utilized at any tide level, where boats currently are anchored offshore due to insufficient water depth of the dock. This will greatly improve the work efficiency of fishery activities and other port-related activities.
- 2) Function of fishing port and commercial port will be improved by implementation of the new jetty. Landing of fish catches and handling of cargo as well as embarkation and disembarkation of passengers, which are currently limited during high tide can take place at any tide level.
- 3) The state-owned middle size fishing boat and passenger boat, which currently can berth at the dock not very often through a year, will be able to berth at any time. This will contribute to the effective use of the state owned boats and to the convenience of the users.
- 4) Dredging of the access channel will enable fishing boats and other boats including the state-owned boats to pass through the atoll of shallow water area at any tide level without tide waiting and will ensure safety of navigation.
- 5) Installation of the navigation aids indicating the alignment and location of the access channel and the jetty will ensure navigation safety of boats in the access channel and inside the atoll.
- 6) Introduction of the cargo handling equipment for heavy cargoes and fish catch will make the cargo handling work at the jetty more efficient and safer.

【Indirect Effects】

- 1) According to the facility improvements by the Project, fishery products produced by Kayangel State will be supplied in good quality to Koror State,

where about 70% of the nation's population of 19,128 is concentrated.

- 2) With the facility improvements in the Project, improvement of physical distribution between Koror State and Kayangel State will be promoted.

The implementation effects expected through the Project and the extent to improvement from the present situation are summarized in Table 3.1-1.

Table 3.1-1 Effects of Project Implementation and Extent of Improvement

Present Situation and Problems	Countermeasures / Project Components	Effects and Extent of Improvement
Fishing boats and other boats are moored offshore and are grounded during low tide due to insufficient water depth of the dock.	Improvement of jetty (Extension of 116 m)	Extension of the jetty enable to moor the boats along at any tide level, which promote efficiency of fishery port activities and related works.
Utilization the jetty is restricted during high tide due to insufficient water depth of the dock.	Improvement of jetty (Extension of 116 m)	Extension of the jetty with sufficient water depth enable to land fish catches and handle cargo at any tide level and to introduce cargo handling equipment including crane truck onto the jetty, which enhance fishing port and related port functions.
The state-owned middle size fishing boat and other boats with deep draft can not berth along the existing jetty almost throughout a year.	Improvement of jetty (Extension of 116 m)	State-owned middle size fishing boat and other boats will be able to berth at any tide level, which enhances effective utilization and passenger's convenience.
Since water depth of the existing access channel is not sufficient for navigating boats, the boats passing through the channel have to wait until high tide as well as obliging dangerous operation.	Improvement of access channel (Water depth of D.L.-2.2m)	Safe navigation through the access channel will be secured for fishing boats and other state-owned boats with deep draft at any tide level.
Because of the damage of the existing navigation aids, boats passing through the channel is very dangerous and have a risk of grounding on the shoals of atoll reef.	Installation of navigation aids (Channel entrance, exit and jetty)	Navigation aids indicating the position of the access channel and the jetty facility will ensure navigation safety of boats in the access channel and inside the lagoon.
Handling of fish catches and cargoes at the dock is mainly done by man power, and construction machinery is used for heavy cargoes, which making the cargo handling work dangerous and inefficient.	Introduction of cargo handling equipment (Crane truck)	Crane truck will make cargo handling works at the dock much easier and will enhance efficiency and safety of cargo handling works.

3-2 Recommendations

It is recommended that both Central Government and Kayangel State Government will responsible for management and operation of the project facilities. Utmost care should be taken to ensure the effective use of the jetty facility, the access channel facility and other project components.

1) Appropriate Operation and Management

Proper guidance for fishermen and other users of the facilities will be required to ensure appropriate and smooth management and operation of the project facilities. In this context, guideline should be prepared.

2) Appropriate Maintenance

Shoaling of the access channel and bathymetric change in the vicinity of the jetty are likely to occur after completion. Periodical sounding survey will be necessary to observe and examine the siltation phenomena of the access channel and bathymetric change due to littoral drift. When the shoaling of the access channel and bathymetric change adjacent to the jetty are observed, maintenance dredging should be immediately carried out.

3) Restriction on the Jetty Use

Since the jetty facility has been designed on the basis of the state-owned middle size fishing boat and other larger boats, any boats larger than the design boat size must not use the jetty. Beside, any vehicle larger than the crane truck introduced by the Project must not be allowed to access.

4) Restriction of Navigation along the Access Channel

The access channel is planned and designed on the basis of the state-owned middle size fishing boats and other boats to navigate at any tide level. It should be noted that somewhat larger boats will be possible to navigate through the channel depending on the tide level. In such case, they must pass through at their own responsibility, taking into full account of the channel depth including tide level as well as channel width.

5) Rough Sea Condition

During rough sea condition, fishing boats and other boats mooring along the jetty must hurriedly evacuate to safe areas. Small boats can be pulled up onto the surrounding beach.

6) Ship Accidents

In case of ship accidents in the access channel, the channel should be closed instantly. Therefore urgent recovery works will have to be taken to maintain the lifeline of Kayangel State.

7) Statistics on Fishery and Other Relevant Activities

The number of fishing operations, the amount of fish catches and the volume of fish shipped to Koror State will be recorded to compile fishery activity statistics. In addition, the ship particulars, number of calling boats and the volume of cargoes as well as the number of passengers including tourists will be also collected in order to study situation on physical distribution of goods, tourist visits and other relevant matters.

APPENDICES

Appendix-1 Member List of the Survey Team

Field Survey

Assignment	Name and Position
Leader	Mr. Motoyuki UEGAKI Deputy Director, Office of Technical Coordination and Examination, Grant Aid Management Department Japan International Cooperation Agency
Technical Advisor	Mr. Toshinori MAKINO Construction Division, Fisheries Infrastructure Department, Fisheries Agency
Chief Consultant / Fishing Port Planner	Mr. Yutaka OCHI ECOH Corporation
Port Engineer / Equipment Planner	Mr. Yasuhiro MIYATA ECOH Corporation
Environmental and Natural Condition Surveyor	Mr. Michihiko KODAMA ECOH Corporation
Construction Planner / Cost Estimator	Mr. Kenji KUROKI ECOH Corporation
Fish Marketing Specialist	Mr. Masamichi HOTTA ECOH Corporation

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Assignment	Name and Position
Leader	Mr. Naoto TANIGUCHI Grant Aid Division, Bureau of Economic Cooperation Ministry of Foreign Affairs
Technical Advisor	Mr. Toshinori MAKINO Construction Division, Fisheries Infrastructure Department, Fisheries Agency
Project Coordinator	Mr. Masayuki HAYASHI Fourth Project Management Division Grant Aid Management Department Japan International Cooperation Agency
Chief Consultant / Fishing Port Planner	Mr. Yutaka OCHI ECOH Corporation
Port Engineer / Equipment Planner	Mr. Yasuhiro MIYATA ECOH Corporation

Appendix-2 Study Schedule

Field Survey

No.	Date	Day	Itinerary	Accommodation	Activities
1	7	1 Sun	1030 Narita(CO962) 1505 Guam 1815 Guam (CO953) 1925 Koror	Koror	All Mission Members
2	7	2 Mon		Koror	AM: Courtesy Call to the Embassy of Japan and JICA PM: Courtesy Call to Ministry of Resources and Development, President Office
3	7	3 Tue		Koror	AM: Discussion w/ Officials Concerned & Government of Kayangel State PM: Site Survey
4	7	4 Wed		Koror	AM: Discussion w/ Environmental Quality Protection Board PM: Data Collection and Preparation for Site Survey
5	7	5 Thu		Koror	AM: Discussion w/ Officials Concerned PM: Data Collection and Preparation for Site Survey
6	7	6 Fri		Koror	AM: Signing on the Minutes of Discussion PM: Report to the Embassy of Japan and JICA Data Collection and Preparation for Site Survey
7	7	7 Sat	Koror Kayangel Koror	Koror Kayangel	All Mission Members: Site Survey Consultant Member of Mr. Kodama & Mr. Kuroki Remain in Kayangel
8	7	8 Sun	Official Member 0145 Koror(CO954) 0445 Guam 0630 Guam(CO961) 0910 Narita Consultant Member: Kuroki Kayangel Koror	Koror Kayangel	Official Members: Uegaki & Makino Leave Koror for Tokyo Consultant: Ochi, Miyata & Hotta Data Collection Consultant: Kodama & Kuroki: Field Survey Kuroki Move to Koror
9	7	9 Mon	Consultant Member: Kuroki Koror Kayangel	Koror Kayangel	Ochi, Miyata & Hotta: Discussion w/ Officials Concerned & Data Collection Kodama & Kuroki: Field Survey Kuroki Move to Kayangel
10	7	10 Tue		Koror Kayangel	Ochi, Miyata & Hotta: Discussion w/ Officials Concerned & Data Collection Kodama & Kuroki: Field Survey
11	7	11 Wed		(Ditto)	(Ditto)
12	7	12 Thu	Kayangel Koror	Koror	Ochi, Miyata & Hotta Data Collection Kodama & Kuroki Field Survey, Move to Koror
13	7	13 Fri		Koror	All Consultant Member Discussion w/ Officials Concerned & Data Collection
14	7	14 Sat	Hotta: 0145 Koror(CO954) 0445 Guam 0630 Guam(CO961) 0910 Narita Kodama & Kuroki: Koror Kayan.	Koror Kayangel	Hotta: Leave for Tokyo Ochi & Miyata: Data Collection Kodama & Kuroki: Move to Kayangel, Field Survey
15	7	15 Sun		Koror Kayangel	Ochi & Miyata: Data Collection Kodama & Kuroki: Field Survey
16	7	16 Mon		(Ditto)	(Ditto)

No.	Date	Day	Itinerary	Accommodation	Activities
17	7 17	Tue	Kuroki: Kayangel Koror	Koror Kayangel	Kuroki: Move to Koror Ochi, Miyata & Kuroki: Data Collection Kodama: Field Survey
18	7 18	Wed		Koror Kayangel	Ochi, Miyata & Kuroki: Data Collection Kodama: Field Survey
19	7 19	Thu	Ochi, Miyata & Kuroki: Koror Kayangel Koror Kodama: Kayangel Koror	Koror	Ochi, Miyata & Kuroki: Move to Kayangel & Return to Koror Kodama: Move to Koror All Consultant Member: Field Survey
20	7 20	Fri		Koror	All Consultant Member: Data Collection
21	7 21	Sat	Kodama: Koror Kayangel	Koror Kayangel	Ochi, Miyata & Kuroki: Data Collection Kodama: Move to Kayangel, Field Survey
22	7 22	Sun	Ochi & Miyata: Koror Kayangel Koror	Koror Kayangel	Ochi & Miyata: Move to Kayangel & Return to Koror, Field Survey Kodama: Field Survey Kuroki: Data Collection
23	7 23	Mon		Koror Kayangel	Ochi, Miyata & Kuroki: Data Collection Kodama: Field Survey
24	7 24	Tue	Kuroki: Koror Kayangel	Koror Kayangel	Ochi & Miyata: Data Collection Kuroki: Move to Kayangel, Field Survey Kodama: Field Survey
25	7 25	Wed		Koror Kayangel	Ochi & Miyata: Data Collection Kodama & Kuroki: Field Survey
26	7 26	Thu	Kodama & Kuroki: Kayangel Koror	Koror	Ochi & Miyata: Data Collection Kodama & Kuroki: Field Survey, Move to Koror
27	7 27	Fri		Koror	All Consultant Member: Report to the Embassy and JICA, Meeting w/ Officials Concerned
28	7 28	Sat		Koror	All Consultant Member: Data Processing
29	7 29	Sun	0145Koror (CO954) 0445 Guam	Guam	All Consultant Member: Move to Guam Data Collection & Discussion w/ Sub-consultant
30	7 30	Mon	1715Guam (CO963) 1955 Narita		All Consultant: Discussion w/ Sub-consultant Move to Tokyo

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No.	Date	Day	Itinerary	Accommodation	Activities
1	10/21	Sun	1000 Narita(JO941) 1425 Guam 1815 Guam (CO953) 1925 Koror	Koror	All Mission Members
2	10/22	Mon		Koror	All Mission Members AM: Courtesy Call to the Embassy of Japan and JICA PM: Courtesy Call to Ministry of Resources and Development, President Office, Kayangel State
3	10/23	Tue		Koror	All Mission Members AM: Discussion w/ Officials Concerned PM: Inner Meeting
4	10/24	Wed	Koror Kayangel Koror	Koror	All Mission Members Move to Kayangel State Field Survey Return to Koror
5	10/25	Thu		Koror	All Mission Members AM: Discussion w/ Officials Concerned PM: Inner Meeting
6	10/26	Fri		Koror	All Mission Members AM: Signing on the Minutes of Discussion PM: Report to the Embassy of Japan and JICA
7	10/27	Sat	Official Member 0145 Koror(CO954) 0445 Guam 0630 Guam(CO963) 1940 Narita	Koror	Official Members: Taniguchi, Makino & Hayashi Leave Koror for Tokyo Consultant Member: Ochi & Miyata Inner Meeting
8	10/28	Sun		Koror	Consultant Member: Inner Meeting Preparation for Field Survey
9	10/29	Mon	Consultant Member Koror Kayangel Koror	Koror	Consultant Member: Move to Kayangel State Field Survey Explanation to State Government Officials Return to Koror
10	10/30	Tue		Koror	Consultant Member: Discussion w/ Officials Concerned Data Collection
11	10/31	Wed	Consultant Member 0230Koror (CO954) 0530 Guam	Guam	Consultant Member: Move to Guam Discussion w/ Sub-consultant
12	11/1	Thu	Consultant Member 1540Guam (CO963) 1820 Narita		All Consultant: Discussion w/ Sub-consultant Move to Tokyo

Appendix-3 List of Parties Concerned in the Recipient Country

1. Office of President
 - Mr. Koichi L. Wong National Planner,
Office of Planning and Statistics
 - Mr. Secukuk Eldebechel Project Manager,
UNDP Sector Development Project
 - Mr. Bernard Pullon Statistician
 - Ms. Visia Alonz Statistician
 - Ms. Yi Yi Thein Statistician
2. Ministry of Resources and Development
 - Mr. Fritz Koshiba Minister
 - Mr. Herman Francisco Director,
Bureau of Natural Resources and Development
 - Mr. Masasinge Arurang Director,
Bureau of Public Works
 - Mr. Theo Isamu Chief,
Division of Marine Resources
 - Ms. Evelyn Oiterong Fisheries Specialist,
Division of Marine Resources
 - Mr. Angelo Udui Out by State Power & Water Specialist,
Bureau of Public Works
 - Mr. Uchel Naito Environmental Specialist,
Office of Minister
 - Mr. Jerrold E. Knight Acting Director,
Bureau of Land & Surveys
 - Ms. Kelly L. Raleigh-Otobed Palaris Project Manger,
Bureau of Land & Surveys
3. Ministry of Commerce and Trade
 - Mr. Arvin C. Raymond Chief,
Division of Transportation
4. Ministry of Administration
 - Mr. Secilil Eldebechel Project Manager,
Public Sector Development Project
5. Ministry of Justice
 - Mr. Thomas Tutii Lt. Officer-in-Charge,
Marine Law Enforcement Division
Bureau of Public Safety
 - Mr. Ian Tervet Lt. Captain of Remeriik,
Marine Law Enforcement Division,
Bureau of Public Safety

6. Environmental Quality Protection Board
Mr. Marhence Madranchar Executive Officer
7. National Emergency Management Board
Mr. Hazime T. Telei Coordinator
8. Palau Maritime Agency
Mr. Silas D. Orrukem Manager
9. Foreign Investment Board
Mr. Encely L. Ngiraiwet Executive Officer
10. Palau Visiting Agency
Ms. Mary Ann Delemel
11. Palau Public Utilities Corporation
Mr. Paul W. Ueki Power Distribution Manager
12. National Weather Service
Mr. Hirao Kloulchad Officer-in-Charge
13. Kayangel State Government
Mr. Rdechor Mutsuo Delkuu High Chief
Mr. Harris Kambalang Governor
Mr. Johnson Bandarii Speaker
Mr. Teruo Chokai Vice Speaker
Mr. Francisca Skiwo Legislature
Mr. Roman Mongami Legislature
Mr. Ricky Ngiraked Legislature
Mr. Brian Akira Legislature
Mr. Noah Kemesong Legislature
Mr. Stevenson Mokisang Legislature
Mr. Grand Tkoel Legislature
Mr. Jack Ngiraked Legislature
Mr. Jeffrey Fitiml Treasurer
Mr. Harrington Olebu Floor Leader
Mr. Edwin T. Chiokai Chairman, Kayangel State Planning Board
Mr. Delmel F. Ruluked Captain of North Star
Mr. Jones Hosei Kayangel State
Mr. Florencio Yamada Kayangel State
14. Koror State Government
Mr. Adalbert Eledui Director
Department of Conservation and Law Enforcement
Mr. Herbert Decherong Chief, Division of Patrol
15. Pelilieu State Government
Mr. Timarona Sision Governor
16. Angaur State Government
Mr. Horace Rafael Governor