

CHAPTER 3 IMPLEMENTATION PLAN

3.1 Implementation Plan

After signing an Exchange of Note (E/N) between both Governments, the project implementation will officially commence. For the project implementation, the contacts for the consulting services and for the construction will be concluded between The Ministry of Resources and Development (MRD) and a Japanese consultant, and a Japanese contractor respectively. These contacts will be effective after verification by the Government of Japan.

MRD is responsible for the project implementation and is implementing agency. Hence, MRD shall engage in the coordination, adjustment, preparation, etc. of the administrative matters on the Grant Aid and technical cooperation agreed between the two countries as well as management, supervision and maintenance of the Project.

A Japanese Consultant will be involved in the following services as the Engineer on behalf of the Government of Palau.

- Detailed engineering design including preparation of tender documents.
- Pre-construction activities for the pre-qualification and tendering
- Construction supervision

A Japanese contractor to be selected by open tender according to Japan's Grant Aid system shall undertake the construction in accordance with the work program and schedule of the project.

The contractor should be responsible for maintenance of the completed works until the final acceptance.

3.1.1 Implementation Concept

Taking into account that the project will be implemented under Japan's Grant Aid Scheme, the implementation concepts are established as follows:

- Maximize the procurement of local labor, materials and equipment in Palau so as to increase employment opportunities, to facilitate technology transfer and to provide positive impact to the local economy.

- Establish good communication between the Government of Palau, the consultant, and the contractor for the project implementation as smooth as possible.
- Prepare a practical construction plan taking into account the local rainfall pattern, period required for materials and equipment procurement, and application of appropriate construction methods.
- Establish secure camp and plant yard, and field operations that meet the present environmental requirements in Palau.
- Formulate field work programs preventing any inconvenience and temporary bridge closure to the present vehicular and pedestrian traffic.

3.1.2 Implementation Conditions

(1) Demolition of Failed Bridge

The Government of Palau shall totally demolish the existing failed bridge except the foundation piles before commencement of the project for the following reasons:

- The new bridge site location is at the same location as the existing, and
- The recipient country is responsible for site clearance in Japan Grant Aid System.

(2) Unloading Places of Concrete Aggregates

Malakal Port, which is the only international port available in Palau, has limited port facilities of 155 m bath length with 8.9m water depth and is congested. Furthermore, its demurrage is quite expensive. Under such conditions, concrete aggregates which will be imported from the third world country and of which unloading takes long time shall be unloaded directly at the project site from the barge carrying the aggregates. However, the other construction materials and equipment imported for the project will be unloaded at Malakal port.

(3) Conditions of Local Procurement

The construction materials available in Palau are very limited and these are

coral sand, concrete aggregates, asphalt, emulsion, lubricant, gasoline, timber and plywood. Among these, sand and aggregates are good only for poor concrete but are of substandard quality for high strength concrete. The other materials are also limited in terms of quantity.

There are two operational concrete batching plants and one under construction in Palau. Among the two operational plants, one is owned by Malakal Cement Co., Ltd. with a capacity of 30 m³/hr and the other has a capacity of 60m³/hr and belongs to Palau Transport Company. Both business are selling pre-mix concrete for building construction projects. Furthermore, an asphalt batching plant with a capacity of 40 t/hr is also available in Palau and will be used in the project.

(4) Capability of Local Contractors

Among about 30 contractors available in Palau, only 6 are undertaking civil construction projects and the remaining are for building construction. However, the civil contractors' business scale is small in general. In the civil construction projects, Filipino workers are involved at many positions from superintendents to common labors. These companies own commonly used equipment such as road rollers, motor graders, track cranes, trailers, cargo trucks and they are willing to lease these equipment to a contractor of the project.

(5) Environmental Constraints During Construction

Natural resources in Palau have been well preserved with initiative of GOP and GOP has several regulations and guidelines for environmental protection. Under such conditions, special attention shall be paid for the environmental protection measures in order to eliminate any adverse effects derived from the project implementation.

(6) Relevant Laws of Procurement From the Third Countries

General Information on Tax Laws and Business Licenses is applicable law in Palau for procurement from the third countries and Japan. It has been confirmed that Gross Revenue Tax, Import Tax and other Taxes imposed in Palau are exempted in the Project.

3.1.3 Scope of Work

The scope of work for which the Japanese Government and the Government of

Palau are responsible respectively are as follows:

(1) Works and facilities to be provided by the Japanese Side

- Construction of the new KB bridge with the incidental facilities such as drainage, expansion joints, railings, and bearings,
- Construction of approach roads 15 m in length on each side and miscellaneous facilities such as traffic sign boards, lane markers, and drainage,
- Construction of shore protections by steel sheet piles and seal concrete,
- Temporary construction facilities such as camp & plant yard, and parking yard, and
- Other such as transportation of the construction materials and equipment from Japan and the third countries to Palau and the consulting services.

(2) Works and facilities to be provided by the Palau Side

- Removal of the failed KB bridge and completely clearing the site before the commencement of the construction of the new KB bridge.
- Obtaining environmental permits from the Environmental Quality Protection Board, preparation of environmental assessment with assistance from a consultant and submission of environmental impact statements, if required.
- Provision of the construction camp / office yards and plant / storage yards including compensation, if necessary, for the execution of the Project.
- Inspection and maintenance of the floating bridge until completion of the new bridge and demolition of the bridge after completion of the new bridge.
- Relocation / removal and installation of the utilities.

The cost required for removal of the failed KB bridge and relocation of the utilities is shown in the Appendix.

3.1.4 Consultant Supervision

(1) Consulting Services Schedules

The Project will commence after signing an Exchange of Notes (E/N) pertaining to the engineering services for detailed design between the Governments of Japan and Palau. The contract for the detailed design will be

concluded between MRD and the Japanese Consultant who will provide the following engineering services within the limits of the Grant Aid.

a) Detailed Design Phase

The consultant shall carry out the detailed engineering design of the bridge and approach roads in compliance with specifications and concepts in the basic design.

- Design criteria and standard
- Design report
- Drawings
- Quantity and cost estimate
- Construction planning
- Tender and relevant documents

b) Pre-Construction Phase

After signing an Exchange of Notes (E/N) pertaining to the engineering service for constructions supervision and the construction, MRD shall initiate to select a Japanese contractor to implement the project through an open tender. The consultant shall assist MRD on the following tasks:

- Bid announcement
- Pre-qualification of contractors
- Pre-bid conference and site inspection
- Tender and the tender evaluation
- Contract negotiation

c) Construction Supervision Phase

The engineering services for construction supervision will begin, after issuance of the Notice to Proceed to the contractor by MRD.

The consultant shall perform his duties in accordance with criteria and standards applicable to the construction works and shall exercise the powers vested in him as the Engineer under the contract to supervise the field works by the contractor.

The consultant within his capacity as the Engineer shall directly report

to MRD about the field activities and shall issue field memo or letters to the contractor regarding various matters in terms of progress, quality, safety, and payment.

(2) Organization of Project Implementation

a) Staffing for Detailed Design

In the preparation of the detailed design including the tender documents, Japanese staff with the following expertise are needed;

- Team Leader
- Bridge Engineer
- PC Girder Design Engineer
- Steel Girder Design Engineer
- Substructure Engineer
- Highway Engineer
- Geologist
- Utility Engineer
- Construction Planner/Cost Estimator
- Specification Writer

b) Staffing for Construction Supervision

With reference to the major field works required for close supervision during the construction period, the following consulting staff are considered during the construction supervision stage:

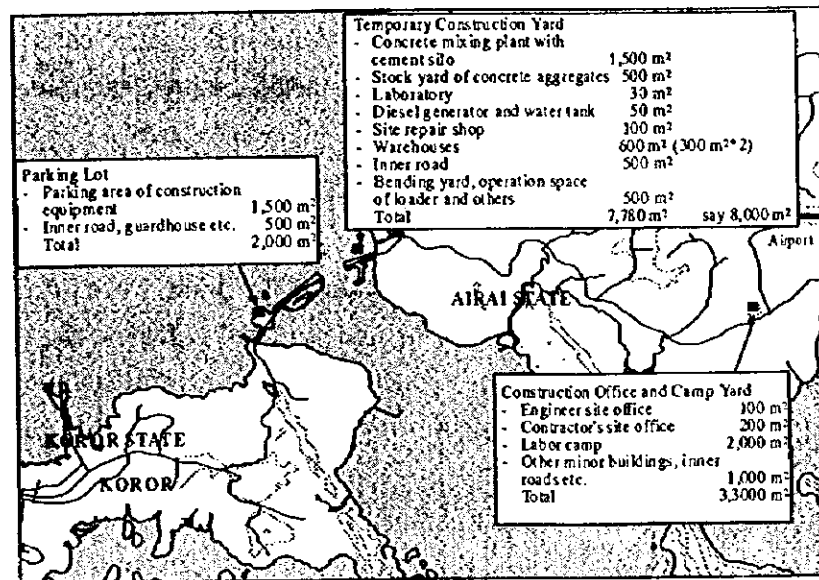
- Team Leader
- Resident Engineer
- Material Engineer
- Bridge Engineer for Superstructure
- Bridge Engineer for Substructure
- Foundation Specialist
- Utility Engineer

(3) Construction Implementation Plan

a) Temporary Work

- Camp and plant yard

Immediately after issuance of the Notice to Proceed to the contractor by MRD, the contractor shall mobilize the project equipment, materials and staff. At the beginning, the contractor shall establish camp and plant yard within the locations as shown in below.



Temporary Yard

- Power supply

Power supply required for the field work and concrete plant is provided with generators but the existing power supply is used for the office and camp.

- Water supply

Drinking water is obtained from the present water supply. For mixing and curing of the concrete in the construction, filtered water from the river will be used.

b) Construction of Substructure

- Provision of Cofferdams

The cofferdams are provided at each side pier using steel sheet piles

in order to de-water the foundation. The steel sheet piles which are procured in Japan are driven using crawler cranes and vibro hammers. After completion of the work, the sheet piles will remain and be used as shore protection.

- Piling of Cast In Place Concrete Piles

Cast-in-place concrete piles are driven by means of the all casing method. The bored holes 2.0 m in diameter are made with casings and drilled down to the bed rock of andesite to form a socket length up to 2.5 times the pile diameter. After slime at the borehole tip is removed, the required concrete volume for one pile is poured with tremie pipes.

- Construction of Pile Caps and Piers

After completion of the piling work for piers, the bad concrete at the pile top shall be removed to expose the rebars in the piles. Sequence of the construction of the pile cap embeded the piles is firstly installation of rebars and forms and after concrete with strength of 24 Mpa is placed using pump and distribution pipes. The construction of piers from the top of pile cap to the soffit of pier head follows after the pile cap construction.

- Construction of Abutments

The bank seat type abutments rested on cast-in-place piles are constructed applying the same work sequence as that of the piers described above.

- c) Construction of PC Girders and Pylons

After the completion of the substructures, the superstructure is constructed. The construction sequence is as follows: first the construction of side span with provision of staging and scaffolding method, second the construction of the pier heads on bracket type staging anchored to the pier and after construction of the pylons with provision of scaffolding proceeds. The construction of center span by cantilever erection method follows and finally the steel box girder is launched by erection noses. All of these works consist of form work, reinforcing bar work, installation of PC cables, concrete pouring, and

tensioning and grouting as briefly described below:

- Form-work

Steel form is used for outer face and waterproof plywood form for inner face of the PC box girder for the PC girder. Two sets of steel form is prepared as well as a number of sets of a traveling wagon. Skilled carpenters from a neighboring country will be employed to give special training to the local labor.

- Reinforcing bar work

Reinforcing bars fabricated in the construction yard are transported to the site and positioned in place using truck cranes. The work is done by local labor under the supervision of skilled workers from a neighboring country such as the Philippines.

- Installation of PC cables

Pre-fabricated prestressing cables are installed by crane. The sheaths and anchorages for the post-tensioning method are arranged so as to satisfy the construction accuracy and fixed so tightly as not to move during placing the concrete. High experience is required for placing, tensioning, grouting of the PC cables and installation, fixing, moving of travelling wagon for erection of the center span of the main girders.

- Placing Concrete

Concrete with 28 days strength of 40 MPa is produced by the concrete batching plant and transported by transit mixers. Water reducing agent/plasticizer is used to lower water cement ratio together with air entraining agent to maintain workability of the concrete.

- Tensioning and Grouting

The compressive strength of the concrete at stage of the pre-stressing shall be more than 1.7 times the maximum compressive stress generated immediately after pre-stressing. The concrete around anchorage zones shall have enough compressive strength to resist bearing stress caused by anchorage.

Before the injection of the grout, the inside of sheaths generally is flushed to ensure that sheaths are thoroughly wetted. The grout shall slowly be injected by a grouting pump immediately after mixing. The grouting pump have enough capability to inject the grout without intermixing the air.

d) Construction of Steel Box Girder

- Procurement of steel plates

After approval by the consultant for the shop drawings prepared by the contractor, the contractor can order the steel plates and shaped steels specified in the drawing.

- Fabrication of Steel Bridge

Based on the full scale drawings of the steel bridge, the contractor initiate to fabricate the structural members such as box girders, bracings, steel decks by cutting and welding to be done by licensed welders. After completion of the fabrication, the contractor should carry out the shop assembly for the Engineer's inspection.

- Marine Transportation of Steel Box Girder

Prior to ocean transportation of the steel box girders, wave and weather conditions along the route must be studied and the transportation schedule shall be prepared and submitted by the contractor for the consultant's approval. After that, the fabricated steel box girders of the joint sections and the remaining whole sections shall be transported by barges from the fabrication shop to the site directly. After marine transport, the joint sections and the remaining whole sections will be launched directly using erection noses.

- Erection of Steel Girder

Erection method of the girders applied in the study is firstly to install the erection noses anchored at the pointed end of the PC girder, and secondly to position the barge carrying the steel girder just beneath the final position of the main girder, and thirdly to lift up the girder. After launching the girders, the connection bolts are tightened. After erection of all the sections, field painting will be carried out.

- Incidental facilities

After completion of the erection, sidewalk and curbs, expansion joints, bridge railings, protection fences and drainage basins with pipes will be installed at the same time.

e) Shore Protection Works

The steel sheet piles used as cofferdams are permanently used as shore protection after pouring seal concrete for room between the sheet piles and the face of footing

f) Approach Roads

The fill materials resulting from the roadway excavation of the existing embankment are utilized for widening the roadway. On the fill materials, proper graded coral materials are spread and thoroughly compacted for base course. The compacted coral is sealed by emulsified asphalt and fine graded asphalt concrete is placed in two layers.

3.1.5 Procurement Plan

(1) Construction Materials

Lubricant/oil, gasoline, asphalt and emulsion, and sand and gravel for poor concrete are available locally for the project. Plywood and timber for the form work available locally are used in the project. However, other construction materials, reinforcing bars, admixture, structural steel, shaped steel, catch basin bridge railing, bearing pads, etc. will be procured from Japan. Cement, aggregate and sand for high quality concrete, PC strands, PC anchorage, sheaths, steel materials for support and scaffolding are procured in the neighboring countries.

The sources of construction materials to be procured are listed below:

Procurement of Major Construction Materials			
Item	Procured in Palau	Procured in third world Country	Procured in Japan
Cement		0	
Aggregate and sand for high quality concrete		0	
Reinforcing bar			0
Structural Steel			0
Shaped steel			0
PC strand			0
PC Bar			0
PC Anchorage			0
PC Sheath			0
Paint			0
Straight asphalt	0		
Emulsion	0		
Concrete admixture			0
Bearing pad			0
Welding lot			0
Gasoline	0		
Sand & Gravel for Poor Concrete	0		
Timber	0		
Plywood	0		
Laboratory Equipment			0

(2) Construction Equipment

There are minor and commonly used construction equipment owned by local contractors available in Palau. The equipment will be lent to the Japanese contractor. Hence, these equipment are scheduled to be used in the project but major construction equipment required for use long term period will be procured in Japan from the cost aspect.

The procurement of the construction equipment is shown below:

Procurement for Major Construction Equipment

Item	Capacity	Procured in Palau	Procured in third Country	Procured in Japan
Bulldozer	15 t			0
Pay Loader	1.4 m3			0
Dump Truck	8 t			0
Back Hoe w/long arm	0.6 m3			0
Vibrating Roller	3 - 4 t			0
Road Roller	10 t	0		
Motor Grader	3.1 m	0		
Clamshell	0.6 m ³			0
Asphalt Distributor	2,000 lit	0		
Crawler Crane	50 t			0
Truck Crane	50 t	0		
Truck Mixer	3 m3	0		0
Trailer	40 t	0		
Cargo Truck	8 t	0		
Generator	75 kVA			0
Generator	100 kVA			0
Air Compressor	7 m3/min			0
Welding Machine	300 A			0
Hydraulic Jack	500-100 t			0
Grout mixer	MG-100			0
Grout pump	S-38F			0
Tamper	60 - 100 kg			0
Water Pump	4" dia., 30 m			0
Water Pump	6" dia., 30 m			0
Vibrator	45 mm			0
Lane Marker	2 lit/min.			0
Vibro-Hammer	60 kW			0
Rotary Cutting Excavator	119-207 ton/m			0
Barge	5,000 t		0	
Barge	3,000 t	0		
Tug Boat	500 ps		0	
Tug Boat	200 ps		0	
Traveler Wagon	Large			0
Concrete Batching Plant	60 m3/h			0

(3) Labors

Because of small population in Palau, labor forces available in Palau are also very limited and so involvement of some foreign workers in the project implementation is un-avoidable in order to complete the project on schedule. In the Study procurement schedule of labor forces is considered as follows:

Procurement for Major Construction Workers

Item	Procured in Palau	Procured in third Country	Procured in Japan
Superintendent			0
Foreman		0	
Common laborer	0		
Operator for heavy equipment		0	
Operator for light equipment	0		
Driver	0		
Carpenter	0		
Timber man		0	
Concrete Worker		0	
Rebar man		0	
Steel worker		0	
Rigger			0
Pile driver			0
Welder		0	
Mechanican			0
Painter		0	
Plumber		0	

3.1.6 Implementation Schedule

After signing a Exchange of Note for the detailed design, the project implementation will officially commence. The detailed design will takes 6 months including one (1) month site survey. After the detailed design is completed, the Notes for the construction and the engineering services for construction supervision are exchanged by the two Governments, and pre-construction activities such as pre-qualification of the contractors, selection of the contractor, contract award, etc. will follow and takes about three (3) months.

Following those, the construction will commence and it will take twenty six (26) months to complete the project. The total implementation period is estimated at 35 months as shown in Table 8.

Table-8 Implementation Schedule of the Project

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26		
Detailed Design	Site Survey	█																										
	Detailed Design		▬	▬	▬																							
	Preparation of Tender Document			▬	▬																							
	Approval of Tender Documents			▬																								
	Temporary Works			▬																								
	Coffering (P1 & P2)				█	█																						
	Piling Work (P1&P2)					█	█																					
	Pile Cap Work (P1&P2)						█	█																				
	Pier construction (P1&P2)							█	█																			
	Piling Work (A1&A2)								█	█																		
Construction	Abutment shaft (A1&A2)							█	█																			
	Side spans by staging method								█	█																		
	Pier heads									█	█																	
	Pylons and struts										█	█																
	Center span by traveling form																			█	█							
	Erection of joint sections																											
	Fabrication of steel girders																											
	Transportation of steel girders																											
	Erection of steel girder																											
	Field painting																											
	Bridge surfacing																											
	Incidental facilities																											
	Approach roads																											
	Site cleaning																											

3.1.7 Obligations of Recipient Country

The following necessary measures should be undertaken by the Government of Palau on condition that the Grant Aid by the Government of Japan is extended to the Project:

1. To provide data and information necessary for the Project.
2. To secure the land for the execution of the Project, such as land for approach road, bridge construction, working areas, storage yard, etc.
3. To demolish the failed KB bridge and clear the sites prior to the commencement of the construction.
4. To bear commissions to a Japanese foreign exchange bank for its banking services based upon the Banking Arrangement, namely the advising commission of the "Authorization to Pay" and payment commission.
5. To ensure prompt unloading, tax exemption, customs clearance at the port of disembarkation in Palau and prompt international transportation therein of the materials and equipment for the Project purchased under the Grant Aid.
6. To exempt Japanese juridical and physical nationals engaged in the Project from customs duties, internal taxes and other 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 the services under the verified contract such facilities as may be necessary for their entry into Palau and stay therein for the performance of their work.
8. To provide necessary permissions, licenses and other authorizations for implementing the Project, if necessary.
9. To maintain and use properly and effectively the facilities constructed under the Project.
10. To bear all the expenses other than those to be borne by the Japan's Grant Aid within the scope of the Project.
11. To coordinate and solve any issues related to the Project which may be raised from third parties or inhabitants in the Project area during implementation of

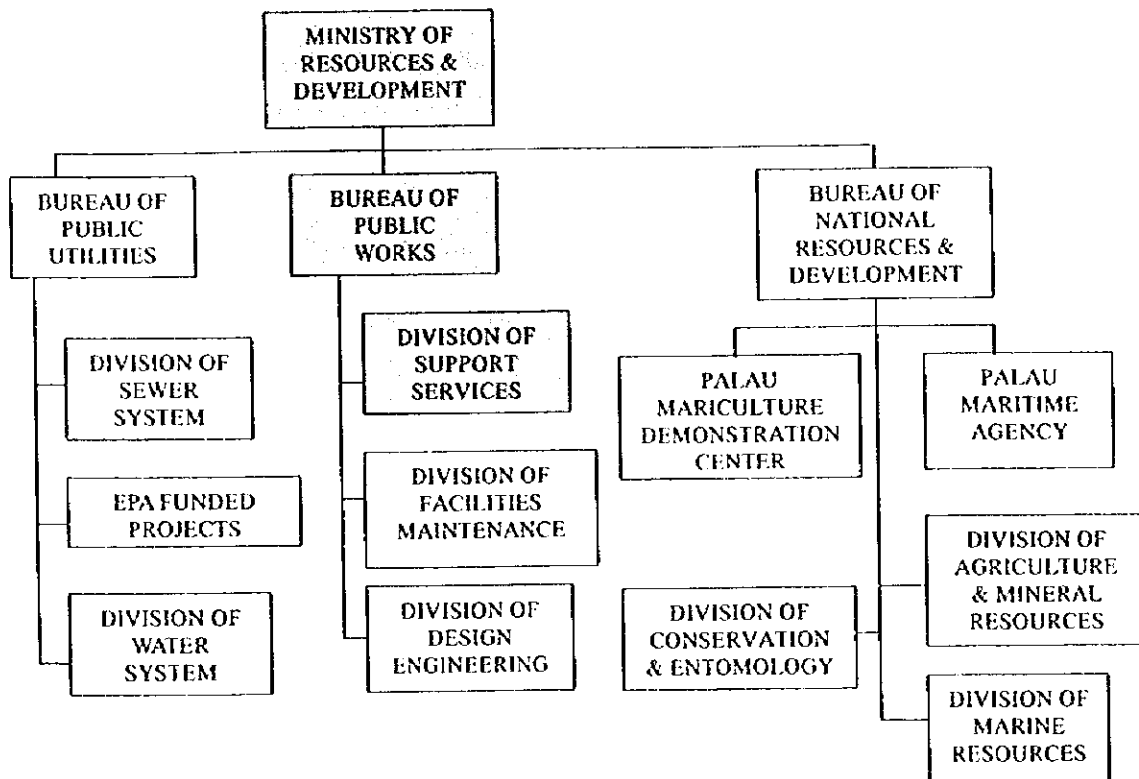
the Project.

12. To secure the safety of Japanese nationals including the other personnel engaged in the Project.

3.2 Operation and Maintenance Plan

3.2.1 Operation and Maintenance Organization

The Minister of Resources and Development is responsible for overall operation and maintenance of the project. Under the Minister, the Director of Public Works who is in charge of the Divisions of Facilities Maintenance, Support Services and Design Engineering in the Ministry is directly responsible for the project operation and maintenance as shown in below:



The present staffing of the Bureau of Public Works under the Director, which is the key bureau for project implementation, is only 3 civil engineers, 8 technicians and 98 casual laborers. Among the three engineers, two belong to the Division of Design Engineering. For maintenance works, practically only one overseer with 36 casual laborers are available at present.

3.2.2 Need of Technical Cooperation

In general, well experienced government staff are very limited in Palau and this situation is not exceptional in MRD, especially in the Bureau of Public Works which is one of the key functional bureaus as mentioned earlier.

This situation provides the opportunity to transfer various technologies to the local government staff on the occasion of the project implementation. The transfer of technology will be done in the following manner.

(1) Overseas Training in Japan for one trainee from the Bureau of Public Works.

- Bridge Engineering Technology
- Bridge Planning
- Bridge Design
- Construction Management of Bridge Projects
 - Quality control
 - Progress control
 - Safety control
- Bridge Inspection and Maintenance
 - Bridge inspection technique
 - Bridge maintenance technique

(2) On the job Training for five trainees from the Bureau of Public Works

- Construction management of the bridge project
 - Quality control
 - Progress control
 - Safety control
- Bridge Inspection and Maintenance
 - Bridge inspection technique
 - Bridge maintenance technique

3.2.3 Operation and Maintenance Plan for New Bridge

After the completion of the project, the following operation and maintenance with the corresponding frequency are required to keep the structures in sound condition.

Category	Frequency	Items to be Inspected	Scope of Works
Inspection/Maintenance for the Bridge	Once a year	Expansion Joint	Cleaning of expansion joints, photographing deterioration if any.
		Drainage	Cleaning of drainage pipes, photographing any damages if any.
		Bearing	Cleaning of the bridge seats especially around the bearings.
		Bridge railings and fences	Detect damages if any and recording and the repair work
		Stay Cables	Cleaning of stay cables, photographing deterioration if any.
		Lighting Facilities	Cleaning of lamps, replacement with new one if required.
Inspection for the Steel Girder	During strong wind and normal wind with rain	Steel Girder	Observe aerodynamic stability and report to the Engineer.
		Stay cables	Observe rain vibration and report to the Engineer.
Inspection/Maintenance for the Road	Once a year	Pavement	Patching work if there are potholes
		Shoulder	Grass cutting and leveling
		Embankment Slope	Detect any surface erosion and repair
		Ditch	Removal of sediments
Periodical Maintenance for the Steel Girder	Every 5 year or less when requires	Steel Members	Spot repainting
Routine Maintenance for the Steel Girder	Every 10 year	Steel Members	Repainting and minor repair

The aerodynamic stability of the stay cables and the steel girders such as vortex excitation, galloping, flutter, rain vibration has been analyzed in this study using the latest Aerodynamic Assessment Manual in Japan. Furthermore wind tunnel test will be carried out to ensure the stability. However, natural wind conditions are widely varied and excessive phenomena could be occurred. Under these conditions, MRD is requested to periodically inspect the steel girder and cables from aerodynamic aspect under strong wind and rain conditions and to report to a Specialist any excessive vibration and deformation deflection of these members, if any.

3.2.4 Maintenance Cost

Based on the maintenance works mentioned above, the periodical maintenance cost required by MRD is estimated at US \$ 8,260 /every year, US \$ 4,400 /every five year or less and US \$ 178,000 /every 10 year or less. Annual average of the cost is US \$ 26,900, which is equipment to 0.7 % of MRD annual budget in 1996, and the cost breakdown of those is as follows;

Maintenance Cost in US Dollar

Category	Frequency	Approx. Estimated Cost
Electrical cost for lighting facility	Every year	2,500
Inspection/Maintenance for the Bridge	Once a year	1,100
Inspection for the steel girder	Four times a year	1060
Inspection/Maintenance for the Road	Once a year	3,600
	Total	8,260
Periodical Maintenance for the Steel Structure	Every 5 year or less when required	4,400
Periodical Repainting of the Steel	Every 10 year	178,000

(Sept. 1998 price)

CHAPTER 4 PROJECT EVALUATION AND RECOMMENDATION

4.1 Project Effect

As a result of the socioeconomic and field survey and the basic design carried out in the Study, the direct and indirect impacts and effects generated by the project implementation are as follows:

(1) Direct Impact and Effects

Present Condition and Problems	Countermeasures taken in the Study	Direct Impact and Effects
1. After collapse of the old KB bridge on Sept.1996, the temporary floating bridge has been completed to data. However, the life span of the temporary bridge is 5 years up to 2002 and its load limit is 25 ton. Hence, the temporary bridge has less durability against heavy vehicles and high risk of the bridge to be washed out.	The new bridge has been designed with application of HS 20-44 which is live load standard in Palau and with a 50 year life span.	<ul style="list-style-type: none"> - Decreasing the probability of bridge collapse generates socio-economic stability in Koror and Babeldaob Island. - The temporary bridge requires considerable amount for the further maintenance. The construction of new bridge generates the maintenance cost saving derived from balance(16,000 US\$ per annual) of maintenance cost between the temporary and new bridge.
2. The temporary bridge with limited running speed of 5 km/h is a traffic bottleneck in the road connecting Koror and Babeldaob island. Furthermore, traffic accidents such as vehicles collision and vehicles falling into sea frequently occur.	In the basic design, the new bridge has been designed with design speed of 50 km/h and a dual lane of 8.0 m width which is the same width as the old KB bridge in accordance with the requirements from A Policy on Geometric of Highways and Streets by AASHTO.	<ul style="list-style-type: none"> - Both time and operation cost saving are generated. - It is expected to reduce accidents resulting in injury or death. - It is also expected to increase driving comfort, and to reduce drivers' physical fatigue.
3. The opening of temporary bridge is of only 4.5m height and 17m wide. Therefore, the temporary bridge almost close the navigation clearance for sea traffic.	The bridge opening of new bridge is designed to cope with passing vessels available in Palau and with a height of 17m and a width of 70m.	<ul style="list-style-type: none"> - Accessibility of sea traffic is improved and subsequently both time and operation cost saving are generated.

(2) Indirect Effects and Impact

The indirect effects and impact derived from the project implementation are likely acceleration of the agricultural and tourism development in Babeldaob island, improvement of the stability of production and transportation schedule, correction of regional disparities, and expansion of market spheres.

Furthermore, it is expected to improve the stabilization of people's livelihood and national consciousness in Babeldaob island and accessibility to medical /educational facilities in that region.

(3) Verification of Effects and Impact

The effects and impact mentioned above were verified or measured by traffic volume and beneficiary population.

- **Traffic Volume**

The daily traffic volume counted in the Study on 1st of April, 1998 at the site is 4,400 vehicles and the annual growth rate of traffic volume in Palau is reportedly about 5%.

- **Beneficiary Population**

The total beneficiary population who are mainly living in Koror State and Babeldaob island are estimated at 16,202 based on 1995 census data and furthermore visitors from abroad are anticipated.

	Name of States	Population in 1995
Babeldaob Island	Ngerchelong	253
	Ngarrard	421
	Ngiwal	176
	Melekeok	261
	Ngchesar	228
	Airai	1,481
	Aimeliil	419
	Ngatpan	221
	Ngermlengui	162
	Ngardmau	281
	Koror	12,299
Total	16,202	

4.2 Recommendation

Socio-economic activities in Palau are still suffering various adverse effects in a wide range such as increase of transportation cost and time, traffic accident and retrogression of Babeldaob development even though the temporary floating bridge has been installed after the collapse of old KB bridge. At the present, the temporary floating bridge with 5 years life span which is now the most important structure in ROP connecting islands of Koror and Babeldaob is a traffic bottleneck and of high risk of being washed out. A new permanent and safe KB bridge should be, therefore, constructed urgently. This project coincides with the Government's objectives and strategies in the current Economic Development Plan. Moreover, it is presumed that

the project would be implemented without any special problems in Japan's Grant Aid system and will be maintained properly by MRD after completion of the project. Considering the project scheme and the enumerated impact and effects derived from the project implementation, it is concluded that the project implementation through the cooperation of the Japan's Grant Aid Program would be very meaningful and thus its early implementation is most desirable.

Appendices

- 1. Member List of the Survey Team**
- 2. Survey Schedule**
- 3. List of Party Concerned in the Recipient Country**
- 4. Minutes of Discussion**
- 5. Cost Estimation Borne by the Recipient Country**
- 6. References**

Appendix-1. Member List of the Survey Team

The First Field Survey (March 18-April 16, 1998)

Team Leader	Hiroshi MANABE	Assistant Director of Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs
Technical Advisor	Masanobu MURATA	Director of Maintenance Department, Honshu-Shikoku Bridge Authority
Coordinator	Tatsuya IMAI	Staff of Second Project Study Division, Grant Aid Project Study Department, JICA
Chief Consultant/ Road Traffic Planner	Junji MASHIBA	Nippon Koei Co., Ltd.
Bridge Designer	Tetsu NAKAGAWA	Nippon Koei Co., Ltd.
Bridge Designer	Kiminori MATSUMOTO	Nippon Koei Co., Ltd.
Facilities Planner	Toshiyuki ARITA	Nippon Koei Co., Ltd.
Topographical and Geological Surveyor	Tadao OHNO	Oriental Consultants Co., Ltd.
Meteorological Surveyor	Shubun ENDO	Nippon Koei Co., Ltd.
Construction Schedule Planner/ Cost Estimator	Toru KAWAKAMI	Nippon Koei Co., Ltd.

The Second Field Survey (July 5-July 29, 1998)

Team Leader	Teruyoshi KUMASHIRO	Director of Second Project Study Division, Grant Aid Project Study Department, Japan International Cooperation Agency
Grant Aid	Hiroyuki IRIE	Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs
Technical Advisor	Masanobu MURATA	Director of Maintenance Department, Honshu-Shikoku Bridge Authority
Coordinator	Yoshihisa KASUYA	Staff of General Affairs Department, JICA
Chief Consultant	Hisashi OSHIMA	Nippon Koei Co., Ltd.
Bridge Designer	Tetsu NAKAGAWA	Nippon Koei Co., Ltd.
Bridge Designer	Kiminori MATSUMOTO	Nippon Koei Co., Ltd.
Facilities Planner	Toshiyuki ARITA	Nippon Koei Co., Ltd.
Construction Schedule Planner/ Cost Estimator	Kiyohito YAMAZAKI	Nippon Koei Co., Ltd.

Explanation of Draft Report (October 14-October 23, 1998)

Team Leader	Tetsuo YABE	Deputy Director of Second Project Study Division, Grant Aid Project Study Department, Japan International Cooperation Agency
Technical Advisor	Masanobu MURATA	Director of Maintenance Department, Honshu-Shikoku Bridge Authority
Coordinator	Yoshihisa KASUYA	Staff of General Affairs Department, JICA
Chief Consultant	Hisashi OSHIMA	Nippon Koei Co., Ltd.
Bridge Designer	Tetsu NAKAGAWA	Nippon Koei Co., Ltd.
Bridge Designer	Kiminori MATSUMOTO	Nippon Koei Co., Ltd.
Facilities Planner	Toshiyuki ARITA	Nippon Koei Co., Ltd.
Construction Schedule Planner/ Cost Estimator	Kiyohito YAMAZAKI	Nippon Koei Co., Ltd.

Appendix -2. Survey Schedule

(1) The First Field Survey (March 18- April 6, 1998)

Day	Date	Week	Activities	Stay
1	March 18	Wed	Transfer from TYO to Koror	Koror
2	March 19	Thu	Courtesy Call to Office of President, Ministry of State and Ministry of Resources and Development, JICA office	Koror
3	March 20	Fri	Field Inspection and Meeting with MRD	Koror
4	March 21	Sat	Data collection	Koror
5	March 22	Sun	Internal Meeting	Koror
6	March 23	Mon	Site Inspection with MRD and data collection	Koror
7	March 24	Tue	Discussion on the Minutes of Discussion w/MRD, and Site survey /data collection	Koror
8	March 25	Wed	Signing of the Minutes of Discussion, and site survey / data collection	Koror
9	March 26	Thu	Site survey /data collection and Internal Meeting	Koror
10	March 27	Fri	Site survey / data collection	Koror
11	March 28	Sat	Site survey and data collection	Koror
12	March 29	Sun	Site survey and data collection	Koror
13	March 30	Mon	Preparation of technical notes, and site survey	Koror
14	March 31	Tue	Preparation of technical notes, and site survey	Koror
15	April 1	Wed	Preparation of technical notes, and site survey	Koror
16	April 2	Thu	Meeting on the technical notes w/MRD and site survey	Koror
17	April 3	Fri	Signing of technical notes, and site survey	Koror
18	April 4	Sat	Data collection and site survey	Koror
19	April 5	Sun	Data collection and site survey	Koror
20	April 6	Mon	Data collection and site survey	Koror
21	April 7	Tue	Preparation of field survey report	Koror
22	April 8	Wed	Preparation of field survey report	Koror
23	April 9	Thu	Preparation of field survey report	Koror
24	April 10	Fri	Preparation of field survey report	Koror
25	April 11	Sat	Preparation of field survey report	Koror
26	April 12	Sun	Internal Meeting	Koror
27	April 13	Mon	Data collection and site survey	Koror
28	April 14	Tue	Data collection and site survey	Koror
29	April 15	Wed	Data collection and site survey	Koror
30	April 16	Thu	Transfer from Koror to Tokyo	Tokyo

(2) The Second Field Survey (July 5-July 29, 1998)

Day	Date	Week	Activities	Stay
1	July 5	Sun	Transfer from TYO to Koror	Koror
2	July 6	Mon	Courtesy Call to Office of President, Ministry of State and Ministry of Resources and Development, JICA office	Koror
3	July 7	Tue	Explanation of Interim Report to OP & MRD	Koror
4	July 8	Wed	Explanation of Interim Report to OP & MRD	Koror
5	July 9	Thu	Explanation of Interim Report to OP & MRD and Site survey	Koror
6	July 10	Fri	Site survey / data collection	Koror
7	July 11	Sat	Site survey / data collection	Koror
8	July 12	Sun	Government Members arrive at Koror	Koror
9	July 13	Mon	Courtesy Call to Office of President, Ministry of State and Ministry of Resources and Development, JICA office	Koror
10	July 14	Tue	Discussion on the Interim Report with OP &MRD	Koror
11	July 15	Wed	Discussion the Minutes of Discussion with OP &MRD	Koror
12	July 16	Thu	Signing of the Minutes of Discussion, and site survey	Koror
13	July 17	Fri	Government Members leave Palau	Koror
14	July 18	Sat	Data collection and site survey	Koror
15	July 19	Sun	Data collection and site survey	Koror
16	July 20	Mon	Data collection and site survey	Koror
17	July 21	Tue	Data collection and site survey	Koror
18	July 22	Wed	Data collection and site survey	Koror
19	July 23	Thu	Data collection and site survey	Koror
20	July 24	Fri	Data collection and site survey	Koror
21	July 25	Sat	Preparation of field survey report	Koror
22	July 26	Sun	Preparation of field survey report	Koror
23	July 27	Mon	Preparation of field survey report	Koror
24	July 28	Tue	Preparation of field survey report	Koror
25	July 29	Wed	Transfer from Koror to Tokyo	Tokyo

(3) Explanation of Draft Report (October 14-October 23, 1998)

Day	Date	Week	Activities	Stay
1	Oct 14	Wed	Transfer from TYO to Koror	Koror
2	Oct 15	Thu	Courtesy Call to Office of President, Ministry of State and Ministry of Resources and Development, JICA office	Koror
3	Oct 16	Fri	Explanation of Draft Final Report to OP & MRD	Koror
4	Oct 17	Sat	Explanation of Draft Final Report to OP & MRD	Koror
5	Oct 18	Sun	Site survey / data collection	Koror
6	Oct 19	Mon	Discussion on Draft Final Report with OP &MRD	Koror
7	Oct 20	Tue	Discussion on Draft Final Report with OP &MRD	Koror
8	Oct 21	Wed	Discussion the Minutes of Discussion with OP &MRD	Koror
9	Oct 22	Thu	Signing of the Minutes of Discussion, and site survey	Koror
10	Oct 23	Fri	Transfer from Koror to Tokyo	Tokyo

Appendix-3. List of Party Concerned in the Recipient Country

Mr. Kuniwo NAKAMURA	President	The Government of Palau
Mr. Marcelino MELAIREI	Minister of Resources & Development	The Government of Palau
Mr. Sabino ANASTACIO	Minister of State	The Government of Palau
Mr. Koichi L. WONG	National Planner	The Government of Palau
Mr. Elias OKAMURA	Special Assistant for the President	The Government of Palau
Mr. Steven KANAI	Director, Bureau of Foreign Affairs	Ministry of State
Mr. Ramon RECHEBEL	Chief, Technical Assistance Division, Bureau of Foreign Affairs	Ministry of State

Appendix-4. Minutes of Discussion

Minutes of Discussions
Basic Design Study
on
the Project for Construction of A New Koror-Babeldaob Bridge
in
the Republic of Palau

In response to a request from the Government of Palau, the Government of Japan has decided to conduct a Basic Design Study on the Project for Construction of A New Koror-Babeldaob Bridge (hereinafter referred to as "the Project"), and had entrusted the study to the Japan International Cooperation Agency (JICA).


JICA sent to the Republic of Palau a Basic Study Team headed by Mr. Hiroshi MANABE, Assistant Director of Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs, which is scheduled to stay in the country from March 18 to April 15, 1998.

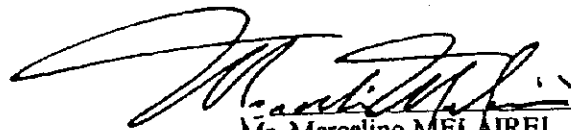
The team held a series of discussions with the concerned officials of the Government of Palau and conducted a field survey at the study area.

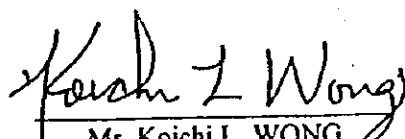
In the course of discussions and field survey, both parties have confirmed the main items described in the attached sheets.

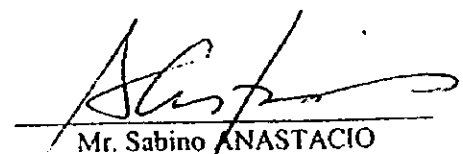
The team will proceed to further works including bridge alternative study and prepare the Draft Basic Design.

Koror, March 25, 1998.


Mr. Hiroshi MANABAE
Leader
Basic Design Study Team
JICA


Mr. Marcelino MELAIREI
Minister of Resources &
Development


Mr. Koichi L. WONG
National Planner


Mr. Sabino ANASTACIO
Minister of State

ATTACHMENT

1. ATTENDANTS OF THE DISCUSSIONS

Attendants of the discussions are listed in Annex-1.

2. OBJECTIVE

The objective of the project is to construct a new and permanent Koror-Babeldaob Bridge (KB Bridge).

3. RESPONSIBLE ORGANIZATION AND IMPLEMENTING AGENCY

Responsible / Implementing Agency: The Ministry of Resources and Development (MRD)

The organization chart of MRD is shown in Annex-2.

4. PROJECT SITE

The project site is shown in Annex-3.

5. MAJOR ITEMS REQUESTED BY THE GOVERNMENT OF PALAU

After discussion with the Basic Design Study team, the Government of Palau (herein after referred to as "GOP") has finally requested as follows: However, the final components of the project will be decided after further study.

- (1) Planning/Design of A New K-B Bridge with two(2) lane, one side sidewalk and provision (space) of utility lines (water, sewer, power, telephone and TV cables) including the alternative bridge study, cost estimates, maintenance manual, implementation schedule.
- (2) Construction of A New Bridge (with the approach roads if the alignment is deviated from the original).
- (3) An appropriate bridge type shall be selected from low cost maintenance, long term durability / safety and aesthetic aspects

6. BRIDGE LOCATION

GOP requests the Study Team that the new bridge shall be located at the same location as the existing failed bridge taking into account land available at present, GOP's financial situation, preventing from interfering with existing utility lines and traffic flow, minimizing adverse environmental effect and maximum usage of existing facility available.

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However, the Study Team replied that the bridge location would be determined based on the alternative bridge location study, including the alignment of the existing failed bridge, taking into consideration construction cost, construction period, progress of lawsuit and other elements mentioned above.

7. NECESSARY MEASURES TO BE UNDERTAKEN BY PALAU SIDE

Necessary measures to be undertaken by Palau side are described in Annex-4.

In the event that the Government of Japan does not honor the GOP's request specified in Article 6 of this Minutes, GOP has to comply with the fundamental requirements of Japan Grant Aid System which requires the recipient country to be responsible for project site clearing including:

- Demolition of the collapsed bridge components above the ground
- Inspection and maintenance of the floating bridge until completion of the new bridge.
- Relocation/removal and installation of utilities
- Land acquisition and compensation, if necessary.

8. JAPAN'S GRANT AID SYSTEM

GOP has understood the system of Japan's Grant Aid explained by the Study Team; the main feature is described in Annex-5

9. FURTHER SCHEDULE OF THE STUDY

- 1) The Study team will proceed to further studies in the Republic of Palau until April 15, 1998.
- 2) JICA will analyze the natural conditions of the project site and prepare the Interim Report. JICA will dispatch the second Study Team with the Report in June 1998 in order to mainly explain the study results of bridge location and bridge alternatives.
- 3) Based on the results of the second Basic Design Study, JICA will prepare the Draft Basic Design Report and dispatch a Team in August 1998 in order to consult with the GOP on its contents.
- 4) Upon acceptance of the Draft Basic Design by GOP, JICA will complete the Final Report and forward it to GOP.

10. OTHER RELEVANT ITEMS

1) GOP has secured the Study Team to carry out the following survey at the bridge site.

- Visual inspection and deformation survey of the failed KB bridge.
- Topographic survey including longitudinal profile and cross section survey and Bathymetric survey at KB channel.
- Geotechnical survey including mechanical boring at 4 sites and Sonic prospecting survey at KB channel.
- Seabed observation at the failed KB bridge site
- Tidal level and tidal current survey at the bridge site
- Vehicular and ship traffic survey at the bridge site
- Reconnaissance of existing utilities such as water main, power line, telephone and TV cable lines.

2) GOP confirmed that the site survey undertaken by the Study Team and witnessed by officials of GOP is purely to examine technical and financial feasibility of the Project, and assured that Basic Design Study, Detailed Design and Implementation of the Project would not affect in any means the status of structure of the failed bridge as the evidence in the court trials. In this connection, GOP promised the mission that the President of Palau would issue a letter endorsed by the Supreme Court to Consulate-General of Japan in Agana, Guam to confirming that the court schedule does not interfere with the project implementation schedule.

3) GOP strongly requests the Study Team that demolition of the failed bridge will be born by the Government of Japan.

The Study Team said, although the Team shall convey its request to Home Government, demolition should be, in accordance with the principle of Grant Aid of Japan, undertaken by Palau side before commencement of actual implementation of the Project whichever the alignment is selected, of which the schedule will be informed to Palau side in due course.

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Annex-1 PARTICIPANTS LIST

Palau SIDE

Mr. Kuniwo NAKAMURA	President	The Government of Palau
Mr. Marcelino MELAIREI	Minister of Resources & Development	The Government of Palau
Mr. Sabino ANASTACIO	Minister of State	The Government of Palau
Mr. Koichi L. WONG	National Planner	The Government of Palau
Mr. Elias OKAMURA	Special Assistant for the President	The Government of Palau
Mr. Steven KANAI	Director, Bureau of Foreign Affairs	Ministry of Sate
Mr. Ramon RECHEBEI	Chief, Technical Assistance Division, Bureau of Foreign Affairs	Ministry of Sate

JAPANESE SIDE

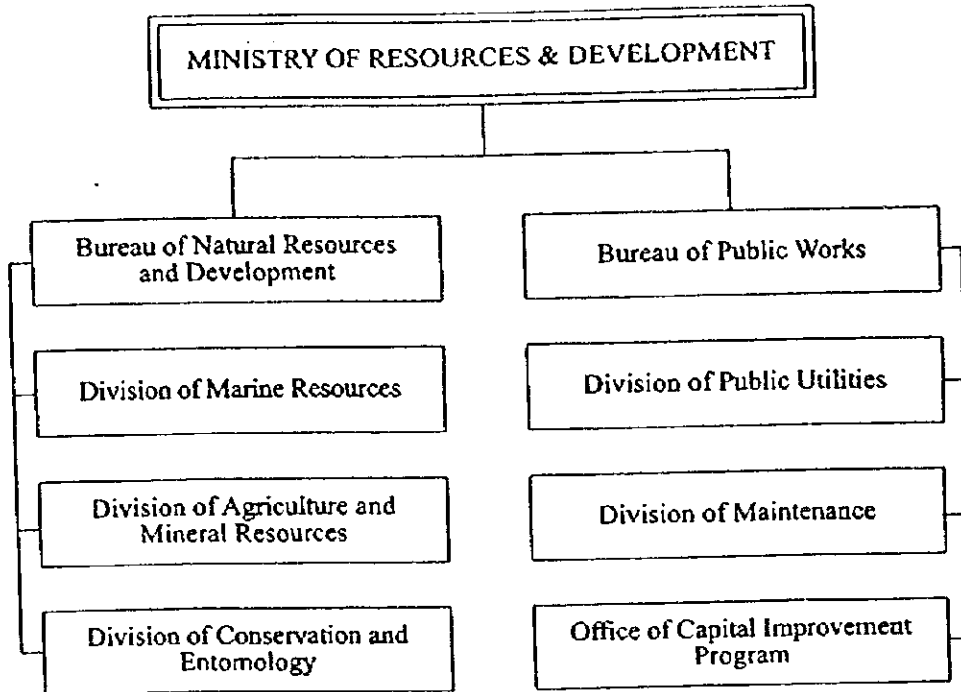
Mr. Hiroshi MANABE	Leader	Assistant Director of Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs
Mr. Masanobu MURATA	Technical Advisor	Director of Maintenance Department, Honshu-Shikoku Bridge Authority
Mr. Tatsuya IMAI	Coordinator	Staff of Second Project Study Division, Grant Aid Project Study Department, JICA
Mr. Junji MASHIBA	Chief Consultant/ Road Traffic Planner	Nippon Koei Co., Ltd.
Mr. Tetsu NAKAGAWA	Bridge Designer	Nippon Koei Co., Ltd.
Mr. Kiminori MATSUMOTO	Bridge Designer	Nippon Koei Co., Ltd.
Mr. Tadao OHNO	Topographical and Geological Surveyor	Oriental Consultants Co., Ltd.
Mr. Shubun ENDO	Meteorological Surveyor	Nippon Koei Co., Ltd.

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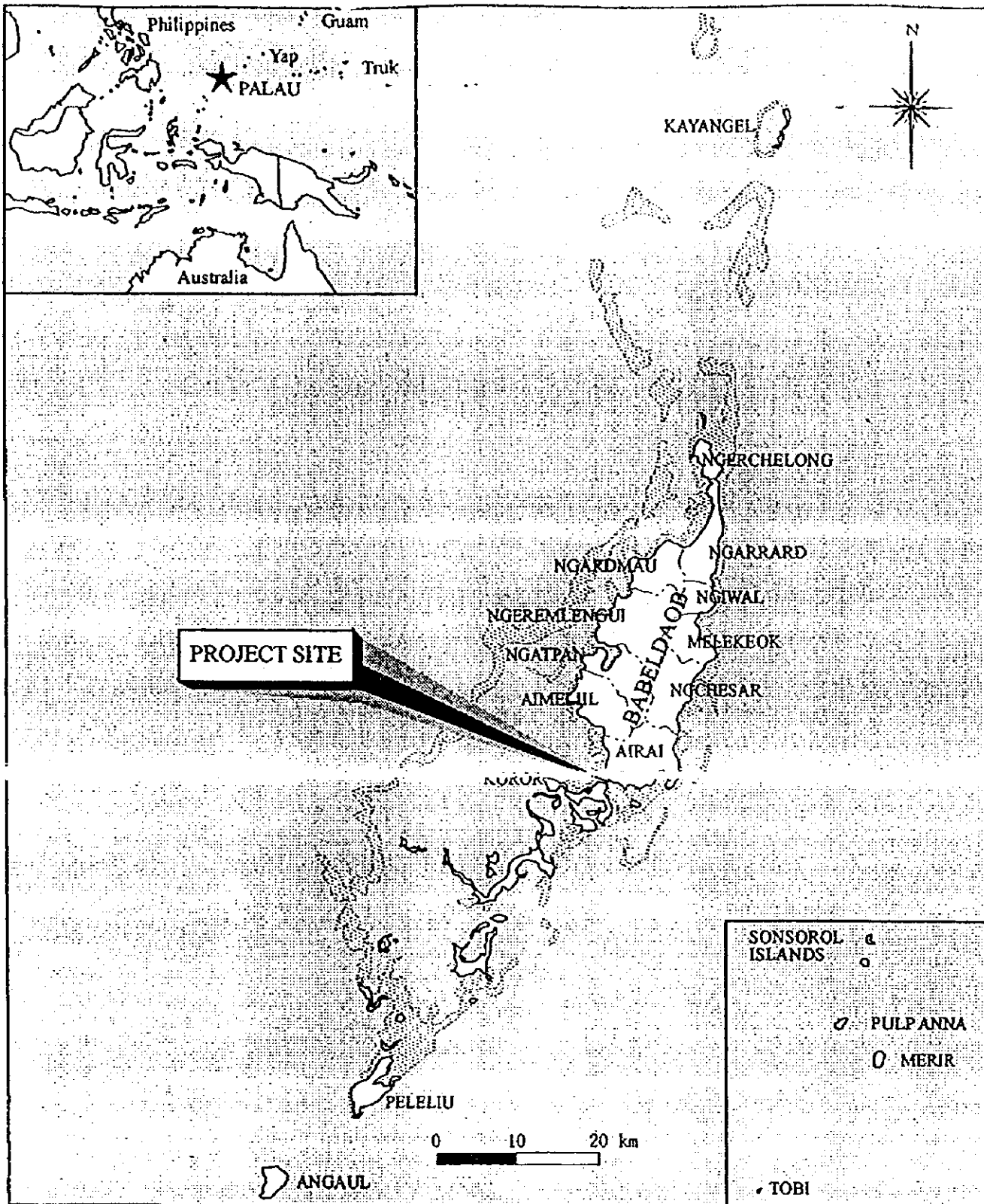
Annex-2 Organization Chart of Project Responsible/Implementing Agency

Ministry of Resources and Development



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BASIC DESIGN STUDY ON THE PROJECT FOR
CONSTRUCTION OF
A NEW KOROR-BABELDAOB BRIDGE IN
THE REPUBLIC OF PALAU

Annex-3
LOCATION MAP

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Annex-4 Necessary Measures to be undertaken by the Government of Palau

The following necessary measures should be undertaken by the Government of Palau on condition that the Grant Aid by the Government of Japan is extended to the Project:

1. To provide data and information necessary for the Project.
2. To secure the land for the execution of the Project, such as land for approach road, bridge construction, working areas, storage yard, etc.
3. To clear the sites prior to the commencement of the construction.
4. 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 payment commission.
5. To ensure prompt unloading, tax exemption, customs clearance at the port of disembarkation in Palau and prompt internal transportation therein of the materials and equipment for the Project purchased under the Grant Aid.
6. To exempt Japanese juridical and physical nationals engaged in the Project from customs duties, internal taxes and other 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 the services under the verified contract such facilities as may be necessary for their entry into Palau and stay therein for the performance of their work.
8. To provide necessary permissions, licenses and other authorizations for implementing the Project, if necessary.
9. To maintain and use properly and effectively the facilities constructed under the Project.
10. To bear all the expenses other than those to be borne by the Japan's Grant Aid within the scope of the Project.
11. To coordinate and solve any issues related to the Project which may be raised from third parties or inhabitants in the Project area during the implementation of the Project.

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Annex-5 Japan's Grant Aid Scheme

1. Grant Aid Procedures

1) Japan's 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 Government of Japan and 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 (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm(s).

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 result 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

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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 Japanese Government. The contents of the Study are as follows:

a) Confirmation of the background, objectives, and benefits of the requested project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.

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- b) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point 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.
- 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 guideline of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whether measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though 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 smooth implementation of the Study, JICA uses (a) registered consultant firm(s). JICA selects (a) firms (s) based on proposals submitted by interested firms. The Firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA.

The consulting firm(s) used for the Study is (are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency.

3. Japan's Grant Aid Scheme

1) What is Grant Aid

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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 Government concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid. etc., are confirmed.

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- 3) "The period of the Grant Aid" means the one fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consultant firm(s) and (a) contractor(s) 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 Government.

- 4) Under the Grant Aid, 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 the 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 or Japanese nationality.)

- 5) Necessity of "Verification"

The Government of 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 to Japanese taxpayers.

- 6) Undertaking required of the Government of the Recipient Country

In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the following:

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- (1) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction.
 - (2) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites.
 - (3) To secure buildings prior to the procurement in case the installation of the equipment.
 - (4) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.
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(5) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.

(6) 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 the recipient country and stay therein for the performance of their work.

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 staff necessary for this operation and maintenance 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 not be re-exported from the recipient country.

9) Banking Arrangements(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 of the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.

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MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY II ON THE PROJECT FOR CONSTRUCTION
OF A NEW KOROR-BABELDAOB BRIDGE
IN THE REPUBLIC OF PALAU

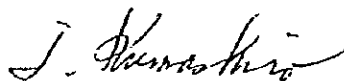
In response to the request from the Government of the Republic of Palau, the Government of Japan decided to conduct the Basic Design Study on the Project for the Construction of a New Koror-Babeldaob Bridge (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA")

JICA sent to the Republic of Palau the Basic Design Study Team II (hereinafter referred to as "the Team)", which is headed by Mr. Teruyoshi KUMASHIRO, Director of Second Project Study Division, Grant Aid Project Study Department, JICA and the Team is scheduled to stay in the country from July 5 to July 29 1998.

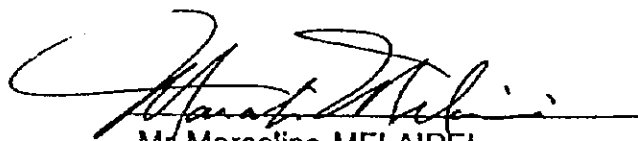
The Team held a series of discussions with the officials concerned of the Government of the Republic of Palau and conducted field surveys at the study areas.

In the course of discussions and field surveys, both parties confirmed the main items described on the attached sheets. The Team will proceed to further works and prepare the Draft Report.

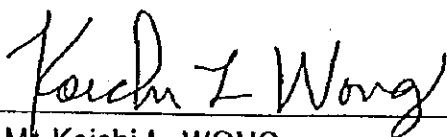
Koror, July 16, 1998



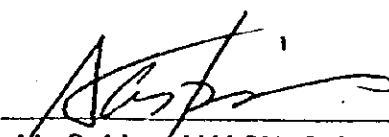
Mr. Teruyoshi KUMASHIRO,
Leader,
Basic Design Study Team,
JICA



Mr. Marcelino MELAIRES
Minister of Resources and Development



Mr. Koichi L. WONG,
National Planner



Mr. Sabino ANASTACIO
Minister of State

ATTACHMENT

1. Attendants of the Discussions

Attendants of the discussions are listed in ANNEX 1.

2. Objective

The objective of the project is to construct a new Koror-Babeldaob Bridge (K-B Bridge).

3. Responsible Organization and Implementing Agency

Responsible / Implementing Agency : The Ministry of Resources and Development (MRD)

The organization chart of MRD is shown in ANNEX 2.

4. Project Site

The Project site is shown in ANNEX 3.

5. Major components of the Project

(1) After the series of discussions, the Government of Palau (hereinafter referred to as "GOP") has agreed in principle to the contents of the Interim Report submitted by the Team and also agreed that an appropriate bridge type will be decided among the selected types in the Interim Report after further study.

(2) Major components of the Project is as follows.

- a) A Detailed Design of a New K-B Bridge with two lane, one sidewalk and space for utility lines (water, power, telephone and TV cables) including detailed cost estimates, maintenance manual, construction schedule.
- b) Construction of a New K-B Bridge

6. Bridge Location

The new bridge shall be located at the same location as the existing failed bridge.

7. Necessary Measures to be Taken by Palau Side

(1) Necessary Measures to be Taken by GOP are described in ANNEX-4:

(2) GOP especially confirmed that it is responsible for the following items

- a) Demolition of the collapsed bridge components.
- b) Land acquisition including compensation , if necessary, for the execution of the Project, such as the land for temporary offices, working areas, storage yards and others.
- c) Inspection and maintenance of the floating bridge until completion of the new bridge.
- d) Relocation/Removal and Installation of utilities

8. Japan's Grant Aid System

GOP has understood the system of the Japan's Grant Aid explained by the Team; the main feature is described in ANNEX 5.

9. Further Schedule of the Study

- (1) The Team will proceed to further studies in the Republic of Palau until July 29, 1998 in order to gather the data and information .
- (2) Based on the results of the Basic Design Study, JICA will prepare the Draft Basic Design and dispatch a team in October, 1998 in order to consult with GOP on the outline of the Draft Basic Design.
- (3) Upon acceptance of the Draft Basic Design by GOP, JICA will complete the Final Report and forward it to GOP.

10. Other Relevant Items

- (1) Concerning the on-going lawsuit of failed K-B bridge, GOP promised the Team to issue a letter to Consulate-General of Japan in Agana, Guam to inform GOP's official response to the settlement offer by the end of August, 1998.
- (2) GOP promised the Team to issue a letter to Consulate-General of Japan in Agana, Guam to confirm that acceptance of the settlement offer ensures that the lawsuit does not interfere with the implementation of the Project.
- (3) Concerning demolition work of the collapsed bridge components, GOP confirmed that it will provide some evidence by October, 1998 to prove that the preparation of the work is started .
- (4) GOP also confirmed that it will finish the demolition work before the commencement of the construction of the new bridge.
- (5) The site for the campyard shall be discussed continuously.

ANNEX-1 : LIST OF ATTENDANTS

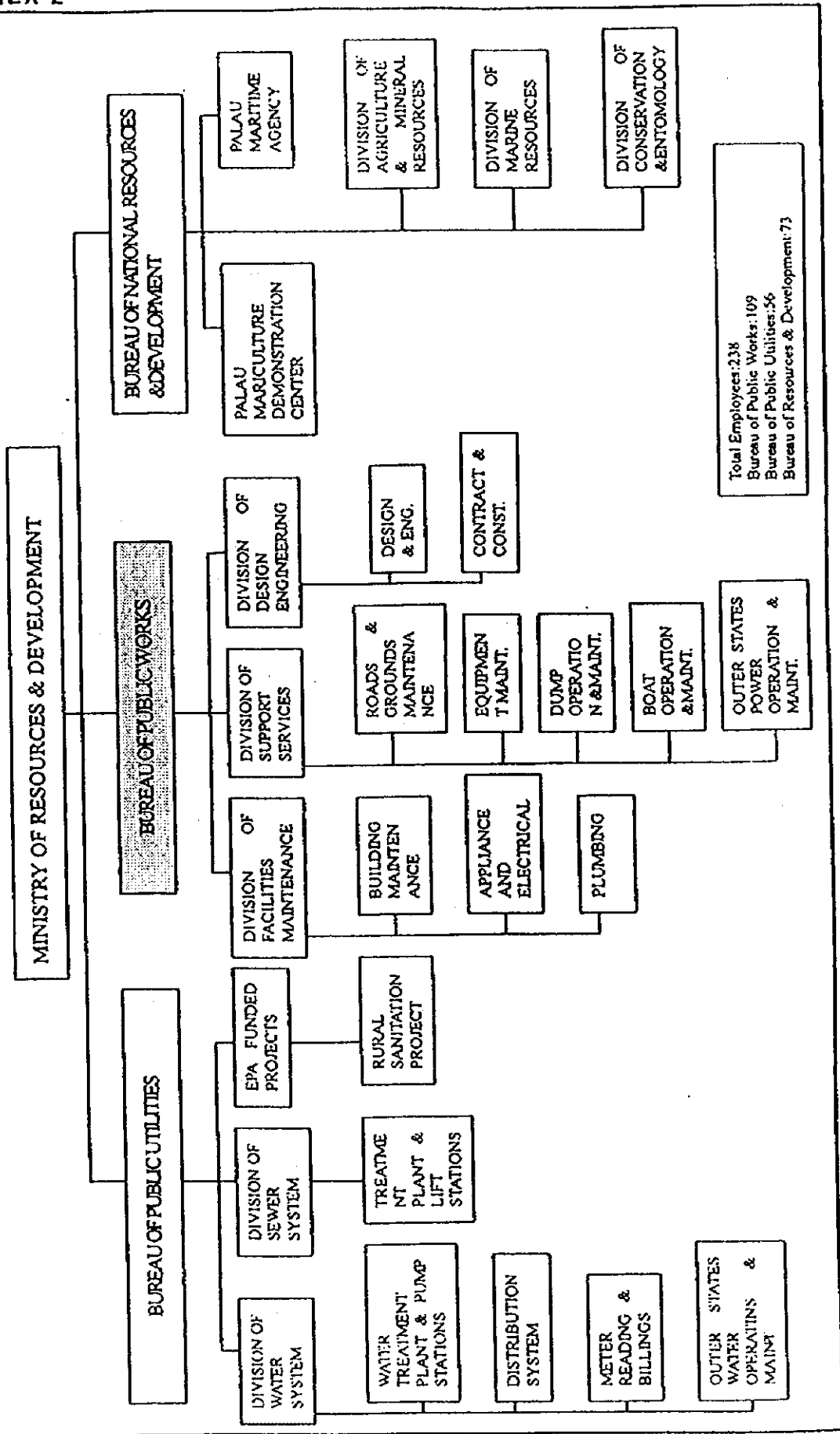
Palau Side

Mr. Kuniwo NAKAMURA	President	The Government of Palau
Mr. Marcelino MELAIREI	Minister of Resources & Development	The Government of Palau
Mr. Koichi L.WONG	National Planner	The Government of Palau
Mr. Temmy L. SHMULL	Chief of Staff	Office of the President
Mr. Steven KANAI	Director, Bureau of Foreign Affairs	Ministry of State
Mr. Charles UONG	Special Assistant of the President	Office of the President

Japanese Side

Mr. Teruyoshi KUMASHIRO	Leader	Director of Second Project Study division, Grant Aid Project Study Department, JICA
Mr. Hiroyuki IRIE	Grant Aid	Grant Aid division, Economic Cooperation Bureau, Ministry Of Foreign Affairs
Mr. Masanobu MURATA	Technical Advisor	Director of Maintenance department, Honshu-Shikoku Bridge Authority
Mr. Yoshihisa KASUYA	Coordinator	General Affairs Department, JICA
Mr. Hisashi OSHIMA	Chief Consultant	Nippon Koei co., Ltd
Mr. Tetsu NAKAGAWA	Bridge Designer	Nippon Koei co., Ltd
Mr. Toshiyuki ARITA	Facility Planner	Nippon Koei co., Ltd
Mr. Kiminori MATSUMOTO	Bridge Designer	Nippon Koei co., Ltd
Mr. Kiyohito YAMAZAKI	Construction Schedule planner/ Cost Estimator	Nippon Koei co., Ltd
Mr. Tadayuki KUSANO	Resident Representative	JICA JOCV in Palau
Ms. Junko YOSHIDA	Coordinator	JICA JOCV in Palau

ANNEX-2 ORGANIZATION AND IMPLEMENTING AGENCY

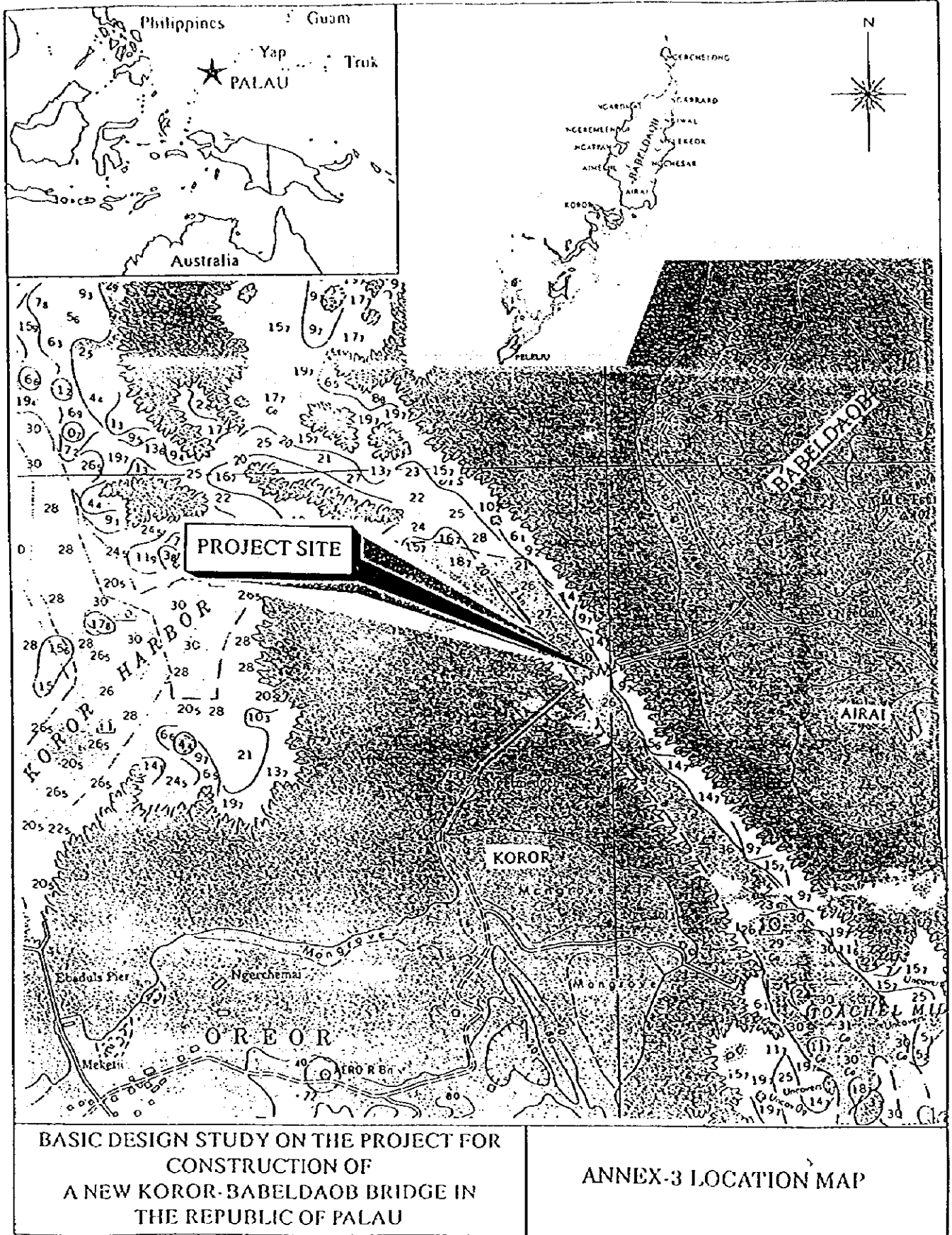


Total Employees: 238
 Bureau of Public Works: 109
 Bureau of Public Utilities: 56
 Bureau of Resources & Development: 73

few

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ANNEX-3



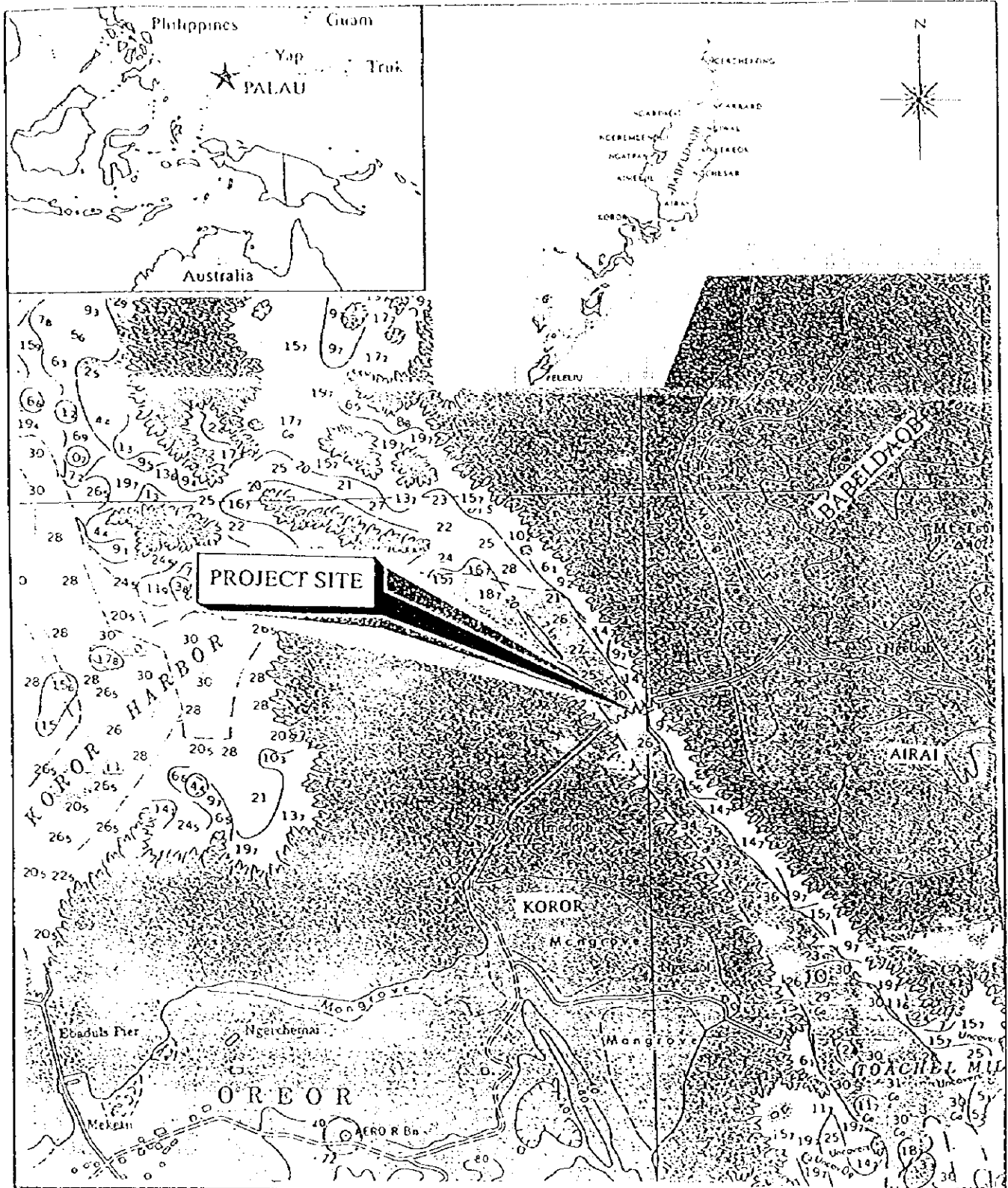
BASIC DESIGN STUDY ON THE PROJECT FOR
CONSTRUCTION OF
A NEW KOROR-BABELDAOB BRIDGE IN
THE REPUBLIC OF PALAU

ANNEX-3 LOCATION MAP

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ANNEX-3



BASIC DESIGN STUDY ON THE PROJECT FOR
CONSTRUCTION OF
A NEW KOROR-BABELDAOB BRIDGE IN
THE REPUBLIC OF PALAU

ANNEX-3 LOCATION MAP

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ANNEX-4: NECESSARY MEASURES TO BE TAKEN BY PALAU SIDE

The following necessary measures should be taken by the Government of Palau on condition that the Grant Aid by the Government of Japan is extended to the Project.

1. To provide data and information necessary for the Project.
2. To secure the land for the execution of the Project, such as the land for bridges, temporary offices, working areas, storage yards and others;
3. To clear the sites prior to the commencement of the construction.
4. 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 payment commissions;
5. To ensure prompt unloading and customs clearance at ports of disembarkation in Palau and internal transportation therein of the products purchased under the Grant;
6. To exempt Japanese juridical and physical nationals engaged in the Project from customs duties, internal taxes and other 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 provide necessary permissions, Licenses and other authorization for implementing the Project, if necessary.
9. To maintain and use facilities constructed under the Grant properly and effectively for the Project;
10. To bear all the expenses, other than those covered by the Grant, necessary for the Project; and
11. To coordinate and solve any issues related to the Project which may be raised from third parties or inhabitants in the Project area during implementation of the Project.

ANNEX-5: 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 participates the Study and prepares 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 .

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.

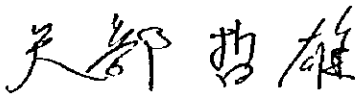
MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY ON THE PROJECT FOR CONSTRUCTION
OF A NEW KOROR-BABELDAOB BRIDGE
IN THE REPUBLIC OF PALAU
(DRAFT REPORT CONSULTATION)

In March and July 1998, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched Basic Design Study Teams on the Project for Construction of a New Koror-Babeldaob Bridge (hereinafter referred to as "the Project") to the Republic of Palau, and through discussions, field survey and technical examination of the results in Japan, has prepared the draft report of the study.

In order to explain and to consult with Palau side on the components of the draft report, JICA sent to Palau a Study Team, headed by Mr. YABE Tetsuo, Deputy Director of Second Project Study Division, Grant Aid Project Study Department, JICA, and is scheduled to stay in the country from October 14 to 23, 1998.

As a result of discussions, both parties confirmed the main items described on the attached sheets.

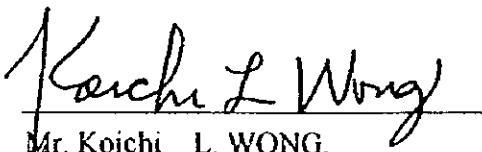
Koror, October 22, 1998



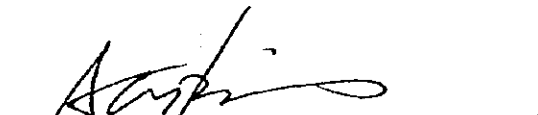
Mr. Tetsuo YABE,
Leader,
Draft Report Explanation Team,
JICA



Mr. Marcelino MELAIREI
Minister of Resources and Development



Mr. Koichi L. WONG,
National Planner



Mr. Sabino ANASTACIO
Minister of State

ATTACHMENT

1. Components of the Draft Report

The Government of Palau has agreed and accepted in principle the components of the Draft Report proposed by the team.

2. Japan's Grant Aid System

The Government of Palau has understood the system of the Japan's Grant Aid described in ANNEX-I and explained by the Study Team.

3. Necessary Measures to be Taken by Palau Side

(1) Necessary Measures to be Taken by the Government of Palau are described in ANNEX-II:

(2) The Government of Palau especially confirmed that it is responsible for the following items

- a) Demolition of the failed bridge
- b) Land Acquisition including compensation, if necessary, for the execution of the Project, such as the land for temporary offices, working areas, storage yards and others.
- c) Inspection and maintenance of the floating bridge until completion of the new KB bridge.
- d) Relocation / Removal and Installation of utilities consisting of power line, water main, telephone line and TV cable.
- e) Environmental Impact Assessment for the Project.

4. Further Schedule

JICA will complete the Final Report in accordance with the confirmed items and send it to the Government of Palau around February, 1999.

5. Other Relevant Items

(1) The Government of Japan has received the letters subject on official acceptance of the lawsuit settlement offer dated August 31, 1998 and on the budgetary bill for demolishing the failed bridge dated July 13, 1998 from the Government of Palau, which were requested in Article 10 (1) & (3) of the Minutes of Discussions on July 16, 1998.

(2) The Government of Palau has submitted an implementation schedule of the demolition of the failed bridge as shown in Annex-III to the Study Team and

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ensured the Team that the preparatory work is on schedule.

- (3) The Government of Palau promised the Team to send some evidence by mid. November, 1998 to the Government of Japan through the Consulate- General of Japan in Agana to prove that the bill for removal of the failed bridge proposed by the President was approved by the Palau National Congress.
- (4) The Study Team requested the Government of Palau to reclaim the area specified in Annex-IV using the concrete fragments resulting from the demolition work for which the Government of Palau is responsible.
- (5) The Government of Palau is requested to prepare and submit an Environmental Impact Assessment Report in accordance with the Regulations, and subsequently obtain the environmental permits for the Project including the demolition work from the Environmental Quality Protection Board before commencement of the Project.

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ANNEX-I: 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)
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1) Contents of the Study

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- 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

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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.

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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;

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- 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 a 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.

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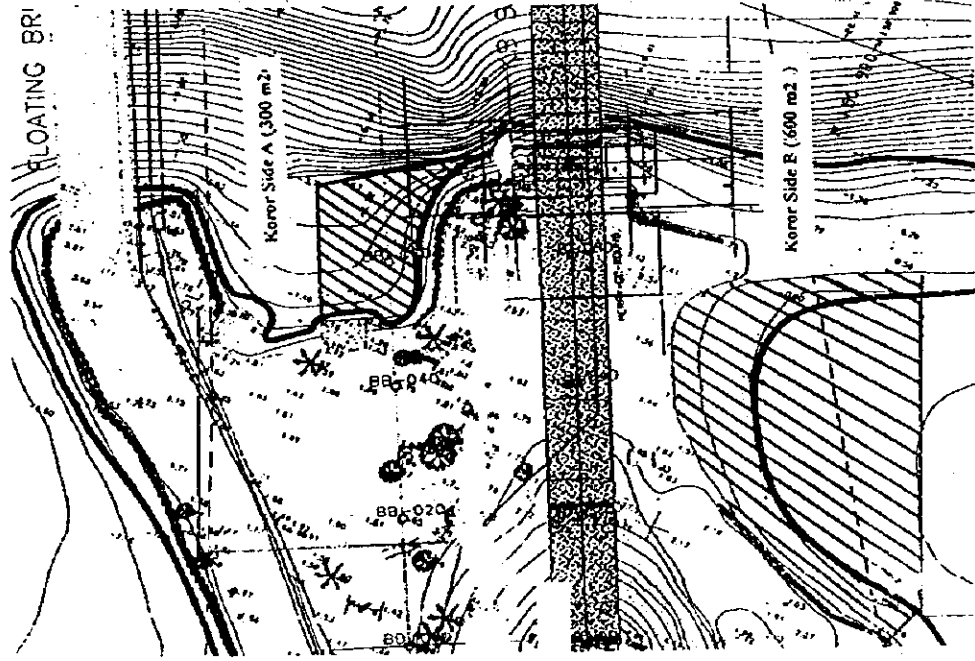
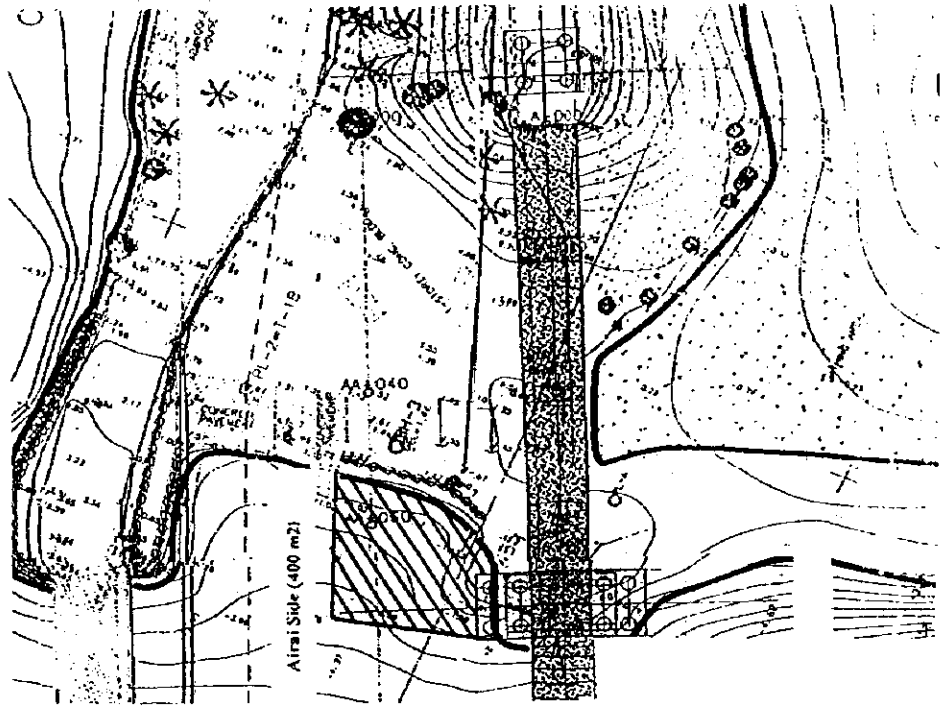
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ANNEX-II: NECESSARY MEASURES TO BE TAKEN BY GOP

The following necessary measures should be taken by GOP on condition that the Grant Aid by the Government of Japan is extended to the Project.

1. To provide data and information necessary for the Project.
2. To secure the land for the execution of the Project, such as the land for bridges, temporary offices, working areas, storage yards and others;
3. To clear the sites prior to the commencement of the construction.
4. To bear commissions to the Japanese bank for its banking services based upon the Banking Arrangement, namely the advising commission of the "Authorization to Pay" and payment commissions;
5. To ensure prompt unloading and customs clearance at ports of disembarkation in Palau and internal transportation therein of the products purchased under the Grant;
6. To exempt Japanese juridical and physical nationals engaged in the Project from customs duties, internal taxes and other 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 as such facilities as may be necessary for their entry into Palau and stay therein for the performance of their work;
8. To provide necessary permissions, Licenses and other authorization for implementing the Project, if necessary.
9. To maintain and use facilities constructed under the Grant properly and effectively for the Project;
10. To bear all the expenses, other than those covered by the Grant, necessary for the Project; and
11. To coordinate and solve any issues related to the Project which may be raised from third parties or inhabitants in the Project area during implementation of the Project.

Filling Area By Using Demolished Concrete Fragment of Old Bridge



▨ : The Area To Be Reclaimed

ANNEX-IV RECLAMATION AREA

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PARTICIPANTS LIST

Palau SIDE

Mr. Kuniwo NAKAMURA	President	The Government of Palau
Mr. Marcelino MELAIREI	Minister of Resources & Development	The Government of Palau
Mr. Sabino ANASTACIO	Minister of State	The Government of Palau
Mr. Koichi L. WONG	National Planner	The Government of Palau
Mr. Elias OKAMURA	Special Assistant for the President	The Government of Palau

Japanese SIDE

Mr. Tetsuo YABE	Leader	Deputy Director of Second Project Study Division, Grant Aid Project Study Department, JICA
Mr. Masanobu MURATA	Technical Advisor	Director of Maintenance Department, Honshu-Shikoku Bridge Authority
Mr. Hisashi OSHIMA	Chief Consultant/ Road Traffic Planner	Nippon Koei Co., Ltd.
Mr. Tetsu NAKAGAWA	Bridge Designer	Nippon Koei Co., Ltd.
Mr. Kiminori MATSUMOTO	Bridge Designer	Nippon Koei Co., Ltd.
Mr. Kiyohito YAMAZAKI	Cost Estimator	Nippon Koei Co., Ltd.
Mr. Toshiyuki ARITA	Facility Planner	Nippon Koei Co., Ltd.

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Appendix-5. Cost Estimation Borne by the Recipient Country

Demolition Work of Failed KB Bridge

A Plan

1 Scope of Works

The extent of removal for the failed KB Bridge shall cover spans at both sides and all the concrete members including ballast inside the girders above -2.0m from mean sea level including pile caps and abutments but excluding foundation piles. The work shall cover demolition of the concrete including cutting PC bars and reinforcing bars, loading and unloading the concrete fragments resulting from the removal work, hauling the concrete fragments to proposed camp yard (about 800m apart from the site), spreading and compacting the fragments at the yard.

2 Prestressed or Reinforced Concrete Quantity To Be Removed

Structural Components	Unit	Quantity		
		Koror side	B'daob side	Total
Superstructure (1) (Prestressed Concrete)	qu.m	3,025	2,915	5,940
Substructure (2) (Reinforced Concrete)	qu.m			
Abutment		53	53	106
Inter. Pier		38	38	76
Main Pier		722	722	1,444
Sub total (1)+(2)	qu.m	3,838	3,728	7,566
Ballast	qu.m	1,019	1,019	2,038
Total	qu.m	4,857	4,747	9,604

3. Applicable Removal Method

For removal of prestressed or reinforced concrete there are several possible methods as listed in below:

- Mini blasting method
- Hand breaker method
- Giant breaker method
- Nibbler method
- Cutter method
- Wiresaw method
- Shuttered pauder method
- High pressure and fire jet method
- Core boring method

- Abrasive water jet method

The following combination of methods were selected to be applied for the demolition work based on the structure characteristics, maximum usage of equipment available in Palau, construction cost economy, shorter construction period, and safety requirements.

Structural Components	Applicable Method
Superstructure	Combination of Nibble method and Giant breaker method
Substructure	Mini blasting method by cracker type explosive

4. Re Use of Concrete Fragments

The concrete fragments resulting from the demolition shall be re-utilized for shore protection and fill materials for the base camp yard and temporary stock yard at Ngetmeduch island.

5. Major Equipment and Materials To be Mobilized

Equipment & Material	Specification	Purpose	Q'ty
- Concrete nibbler	50-100 ton	Concrete & re-bar nibbling	2
-Giant hydraulic breaker,	600-800 kg	Breaking concrete	2
-Backhoe	0.6 m3	Base machine for nibbler & breaker	4
-Wheel crane	25 ton	Loading broken concrete	2
-Backhoe	0.6 m3	Loading broken concrete	2
-Dump truck	10 ton	Hauling broken concrete	2
-Air compressor	5m3/min	Compressed air for leg hammer	2
-Leg hammer	30 kg	Drilling for blasting hole	2
-Explosive cracker type	40-60 m/s	Footing and other mass concrete	7500
-Bulldozer	21 ton	Dozing and compaction at camp yard	1
- Gas cutter	150kg/cm2	Cutting PC bars and rebars	8
-Bit and rod	LS		LS

B Schedule

The demolition work should be completed before commencement of the Project for Construction of a New KB Bridge, say in August 1999. In order to meet this requirement, for preparatory work of the demolition work such as preparation of the

tender documents, bidding and contract negotiation, it will take about 7 months and the demolition work will take about 4 months. Consequently, the whole period of the demolition is about 11 months after budget arrangement as depicted below:

Year	1998						1999									
	Month	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
Item																
Budget Preparation																
Preparation of Tender Documents																
International Competitive Bidding																
Negotiation and Contract																
Demolition Work of Failed Bridge																
Commencement of KB Bridge Project																▼

Standard progress of the concrete demolishing works are assumed as follows excluding demolishing the ballast of 1,444m³.

-Total volume of concrete demolition: 7,566 m³

-Production rate of equipment

Concrete nibbler: 24m³/day

Giant breaker: 18m³/day

Combination: 42m³/day

-Required work period

$7,566\text{m}^3 / 42 * 2 \text{ sets} = 90 \text{ days}$, say 4 months including Sunday and Holidays

C Cost Estimate

The cost of the demolition work is estimated on a unit price basis at 1,324,007 US\$ and is summarized below:

Cost Items	Amount in US \$
A- General Item	250,000
B- Demolition Work	895,006
C- Indirect Cost	179,001
D- Total	1,324,007

The breakdown of this cost estimate is shown in following page.

Priced Bill of Quantities for Old K-B Bridge

Item No.	Work Items	Unit	Q'ty	Unit Price (US\$)	Amount (US\$)	Remarks
A	General items					
1)	Temporary fence	m	500	40	20,000	w/removal cost
2)	Temporary building	mth	4	7,500	30,000	Rental basis
3)	Electrical charge	mth	4	500	2,000	Site/office
4)	Water charge	mth	4	200	800	Site/office
5)	Car, equipment & others for site office	mth	4	5,000	20,000	level, transit etc
6)	Safety apparatus	L.S	-	-	5,200	lighting etc.
7)	Transportation cost, equipment and materials	L.S	-	-	140,000	sea transport
8)	Removal cost, private cable etc.	L.S	-	-	2,000	
9)	Barge, 100 ton class	mth	2	15,000	30,000	rental basis
	sub total				250,000	
B	Demolishing (1st and 2nd crushing)					
1)	Nibbling and breaking of concrete for superstructure by concrete nibbler and giant breaker	m3	5,940	98	582,120	50-100 t nibbler, & 600-800 kg breaker
2)	Nibbling and breaking of concrete for substructure, abutment by concrete nibbler and giant breaker	m3	106	98	10,388	
3)	Nibbling and breaking of concrete for substructure, small pier by concrete nibbler and giant breker	m3	76	98	7,448	
4)	Blasting for substructure main pier	m3	1,444	28	40,432	vibration, 40-60 m/s
5)	Breaking by giant breaker for blasted main pier	m3	1,444	50	72,200	600-800 kg breker
6)	Loading, hauling & spreading of broken concrete, L=1.0 km	m3	7,566	10	75,660	0.6 m3 back hoe 10 t dump truck
7)	Dozing and compacting of broken concrete at camp yard	m3	7,566	4	30,264	21 t bulldozer
8)	Loading, hauling & spreading of ballst, L=1.0 km	m3	2,038	9	18,342	0.6 m3 back hoe 10 t dump truck
9)	Dozing and compacting of ballast at camp yard	m3	2,038	4	8,152	21 t bulldozer
10)	Cutting, large diameter of PC bar and reinforcement bar	L.S	-	-	50,000	Gas cutting
	Sub total				895,006	
	Contractor's site expenses, overhead & profit on demolishing work (item B)	%	20	-	179,001	
	Total of B				1,074,007	
	Total of A+B (as direct cost for demolishing)				1,324,007	

Utility Relocation To Be Undertaken By Palau Side

Item No.	Particulars	Unit	Q'ty	Unit Price		Amount	
				Yen	US\$	Yen	US\$
1.	Installation of Water Supply Pipe						
	Materials (CIF Koror)						
	Bridge Part						
	Straight pipe (SII Class 3, W.T. : 6 f 300 x 6000	Nos.	124	104,925		13,010,700	
	Straight pipe (SII Class 1, W.T. : 7 f 300 x 6000	Nos.	18	115,219		2,073,942	
	Double Socket Bend (SII Type) f 300 x 45-	Nos.	16	59,584		953,344	
	Socket Spigot Tee with Flanged Br f 300 x f 75	Nos.	2	52,400		104,800	
	Collar (S II type) f 300	Nos.	8	58,730		469,840	
	Accessories for SII Type f 300	Nos.	184	16,446		3,026,064	
	Liner (SII Type) f 300	Nos.	2	11,584		23,168	
	Ring for Spigot (S II Type) f 300	Nos.	56	8,953		501,368	
	Air Valve f 75	Nos.	2	142,625		285,250	
	Accessories for Flange f 75	Nos.	2	1,411		2,822	
	Underground part						
	Straight pipe (K Class 3, W.T. : 6m f 300 x 6000	Nos.	8	79,925		639,400	
	Straight pipe (K Class 1, W.T. : 7.5 f 300 x 6000	Nos.	4	88,328		353,312	
	Socket Spigot Bend (K Type) f 300 x 90-	Nos.	8	79,059		632,472	
	Flanged Spigot (K Type) f 300	Nos.	4	44,457		177,828	
	Gate Valve f 300	Nos.	4	399,529		1,598,116	
	Restrained Grand (K Type) f 300	Nos.	20	18,512		370,240	
	Accessories for Flange f 75	Nos.	2	1,411		2,822	
	Accessories for Flange f 300	Nos.	8	4,799		38,392	
	Others						
	Bracket	Nos.	135	66,858		9,025,830	
	Paint	m ²	980	2,000		1,960,000	
	Sub total (1)					35,249,710	0.00
	Erection						
	Foundation	Nos.	2		6,148.16	0	12,296.32
	Piping f 300 x 6000	m	924	271	32.14	250,404	29,697.36
	Painting f 300 x 6000	m ²	980		32.20	0	31,556.00
	Sub total (2)					250,404	73,549.68
	Indirect Cost						
	30 % of above	lot	1			10,650,034	22,064.90
	Total					46,150,148	95,614.58
2.	Relocation of Communication Line Note : Estimated by PNCC	lot	1				17,000.00
3.	Relocation of TV Line Note : Estimated by ICTV	lot	1				11,000.00
4.	Relocation of T/D Lines Note : Estimated by PPUC	lot	1				400,000.00
	Subtotal					46,150,148	523,614.58
					1US\$ = 141.7	325,689	(2)
						(1)	
	Ground Total (1) + (2)						849,303.70

Appendix-6. References

No.	Title of Reference Data	Publication by
	Development Plan	
1	Economic Development Plan Fiscal Years,1995-1999	Office of Planning and Statistic (OPS)
2	PALAU 2020 National Master Development Plan	Office of Planning and Statistic
3	Economic Report November 1997	Bank of Hawaii
	Environment	
4	Guide To Permits	EQPB
5	Application Form of Environmental Permit	EQPB
6	Guide to Environmental Impact Assessment	EQPB
7	Regulations	EQPB
	Engineering	
8	Evaluating Quality Defects of Specific Projects, Final Report by Louis Berger	Louis Berger
9	Maintenance Manual by Alfred Yee	Alfred Yee
10	Preliminary Assessment of KB Bridge Failure for US Army Corps of Engineers	US Army Corps.
11	As built Drawings of KB bridge	Alfred Yee
	Statistic	
12	Statistical Yearbook,1998	Office of Planning and Statistics
13	1995 Census of Palau(Population)	Office of Planning and Statistics
14	Vehicles Statistics (1991-1997)	Bureau of Public Safety
15	Meteorological Data for 1996-1986	National Climatic Data Center ,USA
16	Monthly Summary of Local Climatological Data(1952-1996)	Department of Commerce, USA
	Others	
17	Micronesia Handbook	David Stanley
18	Micronesia	Lonely Planet
19	1998 Telephone Directory	Palau National Communication Corporation
20	Company Profile of Surangel & Sons	Surangel & Sons

