

CHAPTER 3 IMPLEMENTATION PLAN

3.1 Implementation Plan

3.1.1 Implementation Concept

The following are the basic conditions for implementing this Project:

- This Project, if approved, will be implemented in accordance with the provisions of Japan's Grant Aid Program after the signing of the Exchange of Notes between the Governments of Japan (GOJ) and the Federated States of Micronesia.
- The Department of Public Works and Transportation (PW & T) of the State of Yap is the responsible agency for implementing the Project.
- The detailed design, tenders and construction supervision of the Project will be undertaken by a Japanese consulting firm in accordance with a contract between the State of Yap and the consultant.
- The construction of the road will be undertaken by the successful Japanese tenderer in awarding the contract with the State of Yap.

The following are the main concepts in the implementation plan:

- The construction will be undertaken by the Japanese contractor under its direct management, employing labors and leasing available equipment from local subcontractors.
- Materials and equipment necessary for the Project will be procured in the State of Yap as far as available. Items unavailable locally will be procured from Japan or third countries. Third countries will be selected on the basis of cost, with the conditions that the quality and supplying capacity meet the requirements.
- The construction method and schedule of the Project will be planned reflecting local conditions of climate, topography, geology, and so on.
- Easy and commonly used methods of construction, not needing special equipment or technology, will be adopted for the project as much as possible.
- Organization for construction management by the contractor and construction supervision by the consultant will be proposed meeting the standardized construction management methods.
- At least one lane shall be opened to traffic during construction and necessary measures for safety shall be taken.
- Full attention shall be paid to the environmental preservation, especially prevention of outflow of mud water and water pollution in excavation of coral materials.

- Coral materials will be quarried from the lagoon along Central Yap Road which is designated by the State government.
- Waste soil which will be generated as a result of replacement with suitable materials in the marsh areas is nutritious and suitable for cultivation and therefore wanted by many people. It will be dumped properly, selecting the applicants in consultation with the State government.

3.1.2 Considerations on Implementation

(1) Securing of Traffic during Construction

The following measures are taken to secure the traffic:

- Construction Sequence of Reconstruction of Quatliw Bridge (Box Culvert)

- ① Provide detour and temporary bridge and shift the river,
- ② Construct a cofferdam closure,
- ③ Remove the existing bridge,
- ④ Construct the box culvert, and
- ⑤ Restore the existing road and remove the detour.

- Construction of Pavement

A space of one lane is open on one side during subgrade, subbase course, base course and surface course works. Traffic control and safety control shall be done properly disposing traffic control men and traffic signs.

(2) Environmental Conservation in Quarrying Coral

Coral is quarried from the lagoon at about eight kilometers from the beginning point of Central Yap Road. The materials shall be quarried with due cautions not to pollute the lagoon.

The quarrying method is as follows:

- Place a pollution diffusing protection curtain in the lagoon from the coast,
- Excavate coral and construct an embankment by filling thereof up to the position meeting the required volume as shifting the curtain,
- Excavate the embankment with coral backward from the end as shifting the curtain, and stockpile the materials on a temporary storage yard on the seashore which is also surrounded by the curtain, and
- Transport the stored materials to a crushing plant after draining off.

(3) Land Acquisition

The State government has gotten the written agreements with village chiefs and land owners to use the private lots for road and to exempt the compensation for damages during construction. The effectiveness thereof will be reconfirmed.

3.1.3 Scope of Works

The undertakings of both governments, Japan and the Federated States of Micronesia are listed in Table 3.1.3-1.

TABLE 3.1.3-1 UNDERTAKINGS OF BOTH GOVERNMENTS

Item	Contents	Undertaken by		Remarks
		Japan	Micronesia	
Procurement of Materials and Equipment and Repair of Transportation Road	Procurement	⊙		
	Customs Clearance		⊙	
	Repair of Inland Transport Road		⊙	
	Repair of Aggregate Transport Road	⊙		
Preparation Work	Acquisition of Lots for Construction		⊙	Lots for site office, storage yards, plants and work shops
	Other works than the above	⊙		
Removal/Relocation of Existing Facilities			⊙	Houses, stores, power poles, telephone cable, water pipes
Acquisition of Right-of-way and Quarry Site			⊙	
Road Construction Works		⊙		

3.1.4 Consultant Supervision

A Japanese consulting firm will supervise the implementation of the Project on behalf of the Government of Micronesia. The works to be undertaken by the consultant are as follows:

(1) Detailed Design

The major works in the detailed design to be carried out by the consultant are as follows:

- Supplementary site survey
- Detailed design of the road and related structures
- Preparation of drawings and specifications
- Construction planning and cost estimation
- Preparation of tender documents

The necessary time for the detailed design is 3 months.

(2) Assistance in Tendering

This task includes the following items:

- Tender publication

- Pre-qualification
- Tendering
- Tender evaluation
- Contract facilitation

The necessary time for assistance in tendering is 3 months.

(3) Construction Supervision

The main work items to be executed by the consultant are as follows:

- Inspection and approval of site surveys
- Inspection and approval of construction plan
- Quality control
- Progress control
- Measurement of work
- Inspection of safety aspects
- Final inspection and turnover

The construction period is 17 months. To successfully carry out the supervision, a resident engineer of the consultant is required to be stationed on the site during the entire construction period. Additionally, a pavement engineer is required for about one month at the beginning of the pavement work.

3.1.5 Procurement Plan

(1) Construction Materials

The construction materials produced in Yap State are only sand and aggregates for subbase/base courses. All other items are imported.

Principles on procurement of construction materials are as follows:

- Locally available materials will be used as far as their quality and quantity are acceptable.
- Imported materials which are constantly available in the local market will be procured regarded as local items.
- Materials which are not available in the local market will be procured from Japan or third countries. Countries of the material source will be decided comparing quality, price and other points of the materials.

Procurement plan of the major construction materials is shown in Table 3.1.5-1.

TABLE 3.1.5-1 MATERIAL PROCUREMENT PLAN

	Procured from			Remarks
	Micronesia	Japan	Third Country	
Crushed stones	⊙			
Sand	⊙			
Aggregate for asphalt concrete			⊙	
Straight asphalt			⊙	
Asphalt emulsion			⊙	
Plywood	⊙			Imported
Lumber	⊙			Imported
Cement			⊙	
Reinforcing steel bar	⊙			Imported
Concrete pipes			⊙	
Road marking paint			⊙	
Traffic sign boards			⊙	
Guard rail			⊙	
Rolled steel		⊙		
Sand bag	⊙			Imported
Steel sheet pile		⊙		
Square pipes	⊙			Imported
Form tie	⊙			Imported
Support pipes	⊙			Imported
Release agent			⊙	
Ready-mixed concrete	⊙			Cement and aggregate imported

(2) Equipment

There is no equipment lease firm in Yap State. However, equipment owned by local contractors is available to be leased, although the models of the equipment are old and common types only.

Principles on procurement of construction equipment are as follows:

- Equipment commonly owned by local contractors will be leased from them.
- Equipment which is not available in Yap State and equipment which will seriously affect the construction schedule once broken down will be procured from Japan or third countries.

Procurement plan of the major equipment is shown in Table 3.1.5-2.

TABLE 3.1.5-2 EQUIPMENT PROCUREMENT PLAN

Equipment	Capacity	Procured from			Remarks
		Micronesia (Lease)	Japan	Third Country	
Bulldozer	15t			⊙	Guam
Backhoe excavator	0.6m ³			⊙	Guam
Dump truck	10t			⊙	Guam
Wheel loader	2.1m ³		⊙		
Road roller	10-12t		⊙		
Tire roller	8-20t		⊙		
Vibration roller	3-5t		⊙		
Asphalt finisher			⊙		
Motor grader	3.1m		⊙		
Water tank truck	6kLtr		⊙		
Hand guided roller	1t		⊙		
Crane mounted truck	4t		⊙		
Stabilizer	2.0m		⊙		
Concrete breaker		⊙			
Air compressor	3m ³ /min	⊙			
Agitator truck	3m ³	⊙			
Concrete vibrator		⊙			
Generator	300kVA		⊙		
Tamper			⊙		
Truck crane	20t	⊙			
Line marker & mixer			⊙		
Vibro-hammer	46kV		⊙		
Asphalt plant			⊙		
Crushing plant			⊙		

3.1.6 Implementation Schedule

The implementation schedule of the Project is proposed as shown in Table 3.1.6-1.

3.1.7 Obligations of the Federated States of Micronesia

The following necessary measures should be taken by the Federated States of Micronesia on condition that the grant aid by the Government of Japan is extended to the Project:

- To provide data and information necessary for the Project.
- To secure the land necessary for the execution of the Project, such as the right-of-way, quarry site, land for temporary offices, working areas, storage yards, plant facilities and others.
- To make passable all roads and bridges leading to the Project sites before the commencement of inland transportation of materials and equipment.
- To remove existing obstacles such as houses, stores, etc. within the right of way.

TABLE 3.1.6-1 IMPLEMENTATION SCHEDULE

Work Item		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
D/D	Site Survey	█																	
	Detailed Design	█	█																
	Approval on D/D			█														(Total 3.0 months)	
Construction	Preparation Works	█																	
	Temporary Works	█	█																
	Road	Earth Works		█															
		Pave- ment	Subbase Course				█	█	█	█	█	█	█	█	█	█	█	█	█
			Base Course																
			Surface Course																
	Sidewalk									█									
	Drainage	Box Culvert																	
		Extension of Existing Culverts																	
		Side Ditches																	
	Other Facilities	Road Marking																	█
		Traffic Signs																	█
		Others																	(Total 17.0 months)

- To relocate existing utilities such as power poles, power cable, water pipes, etc. outside the road structures to be constructed.
- 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.
- To ensure prompt unloading, tax exemption, customs clearance at the port of disembarkation in the Federated States of Micronesia and prompt internal transportation of the materials and equipment for the Project.
- To exempt Japanese nationals engaged in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in the Federated States of Micronesia with respect to the supply of the products and services under the verified contracts.
- 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 the Federated States of Micronesia and stay therein for the performance of their work.
- To provide necessary permission, licenses and other authorizations for implementing the Project, if necessary.
- To maintain and use properly and effectively the facilities constructed under the Project.
- 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.
- To dig out and carry out the archaeological antiquities which may be discovered at the construction site.
- To bear all the expenses, other than those covered by the Japanese grant aid, necessary for the Project.

3.2 Project Cost Estimation

Project cost born by the Federated States of Micronesia is estimated at US\$304,000 (refer to Appendix 5).

3.3 Operation and Maintenance Cost

Maintenance of the road facilities to be constructed under this Project will be carried out by Department of Public Works and Transportation of Yap State.

Maintenance activities are composed of routine inspection, periodic cleaning and repair when necessary. A maintenance plan for the road facilities to be constructed under this Project is proposed as shown in the Table 3.3-1. The annual cost for the maintenance is estimated at about US\$18,000.

TABLE 3.3-1 MAINTENANCE PLAN FOR THE PROJECT ROAD

1. Routine Inspection

(Total road length: 14.4Km)

Facility	Inspection Item	Interval	Number of Staff	Equipment/Material	Quantity	Cost (US\$/year)
Ditches	Presence of mud, sand, obstacles, etc.	Once a month (1 day/time)	2 persons	Scoop, Brooms, Pick-up truck	Inspector 24 man-day Truck 12 veh-day	768
Pavement	Crack, deformation, potholes, etc.					
Embankment slopes	Collapse, erosion, etc.					
Culverts	Presence of mud, sand, obstacles, etc.					
Road marking	Stain, discolor					
Sign boards	Damage, deformation, stain, discolor				Sub-total	1,656

2. Cleaning

Facility	Cleaning Item	Interval	Number of Staff	Equipment/Material	Quantity	Cost (US\$/year)
Ditches	Removal of deposit of mud, sand, obstacles	Once a month (6 days/time)	4 persons	Scoop, Sickle, Hand ax, Saw, Chain saw, Broom, Mowing machine, Barricade, Pick-up truck	Cleaner 288 man-day Truck 72 veh-day	9,216
Pavement	ditto					
Embankment slopes	Cutting grass					
Culverts	Removal of deposit of mud, sand, obstacles					5,328
Road marking	ditto					
Sign boards	ditto					
					Sub-total	14,544

3. Repair

Facility	Repair Item	Interval	Number of Staff	Equipment/Material	Quantity	Cost (US\$/year)
Ditches	Repair of damages	Once a year (4 days/time)	4 persons	Chain hoist, Plate tamper, Barricade, Crusher-run, Sealing materials, Tool set, Pick-up truck	Workman 16 man-day Truck 4 veh-day Materials	640
Pavement	Sealing of cracks, potholes					
Embankment slopes	Repair of damages					
Culverts	Repair of damages					
Road marking	Repainting					
Sign boards	Repair of dam ages					296
					Sub-total	1,936

Grand total:	18,136
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CHAPTER 4 PROJECT EVALUATION AND RECOMMENDATION

4.1 Project Effect

Central Yap Road is the only road serving the area in the west and north of Marabao hills. It is an important component of the road network in the state and, so to speak, a life line for the inhabitants. The road is however insufficient in serviceability, reliability and steadiness due to bad surface condition and blockade in some sections during heavy rain, causing the constraint for sound socio-economic activities. This Project aims to improve the road and secure its function as a basic infrastructure for socio-economic activities.

Direct beneficiaries of the Project are the population in Yap, Tamil Gagil and Maap Islands, being about 6,800 in 1994.

The major direct effects of the Project are as follows:

Shortening of Travel Time

- Travel time will be shortened by improvement of vertical alignment and pavement from about 30 minutes at present to about 15 minutes after improvement.

Savings in Transport Cost

- Vehicle operating cost will be reduced by improvement of running conditions (smoothened surface and gentler slopes).
- Loss and damages of goods during transportation will be decreased.

Improvement of Riding Comfort and Traffic Safety

- Riding comfort and traffic safety will be improved by eliminating potholes and road surface deformation.
- Safety for pedestrians will be improved as two-lane carriageway and shoulders on both sides are secured for entire length, except for the Raeng Bridge (one-lane) and the transition sections before and after the bridge with a total length of about 80 m.

Savings in Road Maintenance Cost

- Road maintenance cost will be significantly reduced by construction of durable pavement with little possibility of surface damage, while presently the road is unpaved and therefore requires the frequent maintenance to keep the road in passable condition such as refilling of gravel, grading of road surface and compaction.

Elimination of Blockade and Improvement of Inhabitants' BHN

- Presently the road becomes impassable about 30 days in a year due to the presence of flood sections. This situation will be eliminated.
- The school bus, which is the only public transportation and utilized not only by schoolchildren but also by public, stops the operation while the water remains on the road even if the water level goes down to the passable level because the water is mixed with salty seawater. Number of days of stopping operation is about 90 days in a year. This situation will be eliminated and steady operation will be secured.
- Daily life of inhabitants such as attending school, commuting, shopping, etc. will be facilitated by the steady operation of the school bus.
- Arrival of emergency vehicles such as ambulance, police patrol car, etc. will always be possible.

Prolongation of Service Life of Vehicles

- Service life of vehicles will be prolonged because of the smoothed road surface resulting in decrease in vehicle damages.
- Especially the vehicles passing through the flood section are easily damaged on their bodies because of incorporation of salty seawater and the service life of such vehicles is not more than five years. This situation will be eliminated.

Environmental Improvement

- Dust due to passage of vehicles will be remarkably decreased by paving the road.
- Water pollution of lagoon due to muddy water drained from the road will be prevented by paving the road.

As mentioned above, the Project, in addition to the economic effects, will contribute to the improvement of the basic human needs, securing the means of attending school, removing the obstacle to daily life and enabling emergency patients to be treated quickly by elimination of blockade. Furthermore, the Project will have indirect effects such as enhancement of the quality of inhabitants' life and activation of socio-economic activities. Thus, the Project will contribute to the development of the State of Yap and support the economic reforms.

4.2 Recommendation

The Project will contribute to the improvement of the basic human needs and support the economic reforms as well as it will have many direct effects. It is therefore concluded to be appropriate that the Project be implemented under Japan's Grant Aid.

The system, personnel and budget of the State of Yap for implementation of the Project and its maintenance after completion are considered to be well arranged and no problem is expected.

To realize and sustain the effects of the Project, specific matters to be undertaken by the State of Yap are as follows:

- To carry out routine inspection / maintenance and repair works as necessary to keep the road in good condition. Especially, cleaning of drainage facilities is of vital importance.
- To secure the budget for the above.