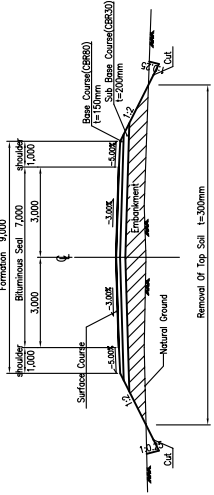
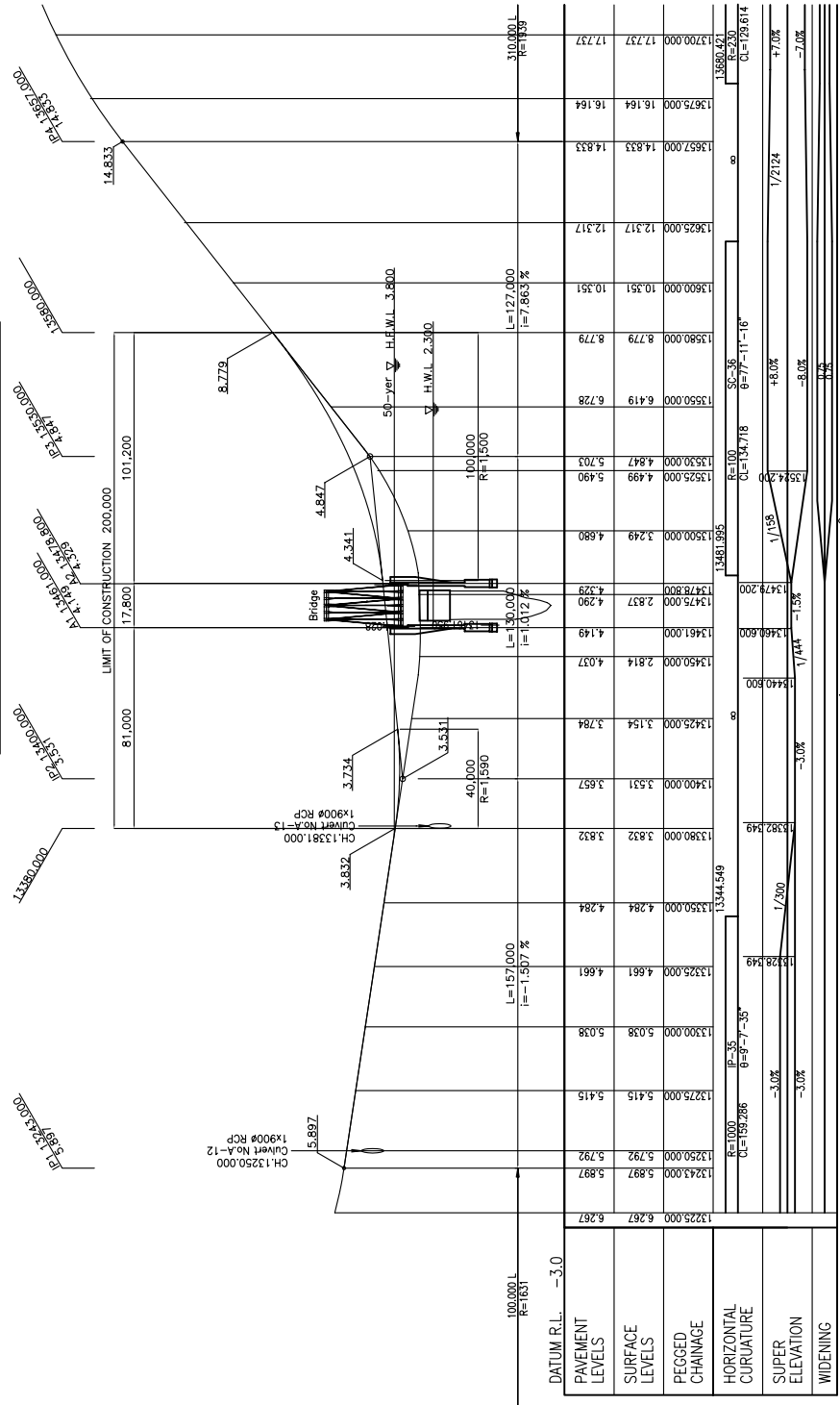
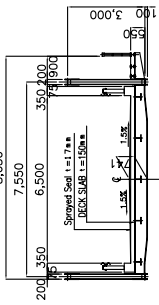


PROFILE (RENTAPAO BRIDGE)

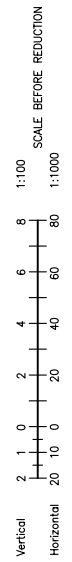
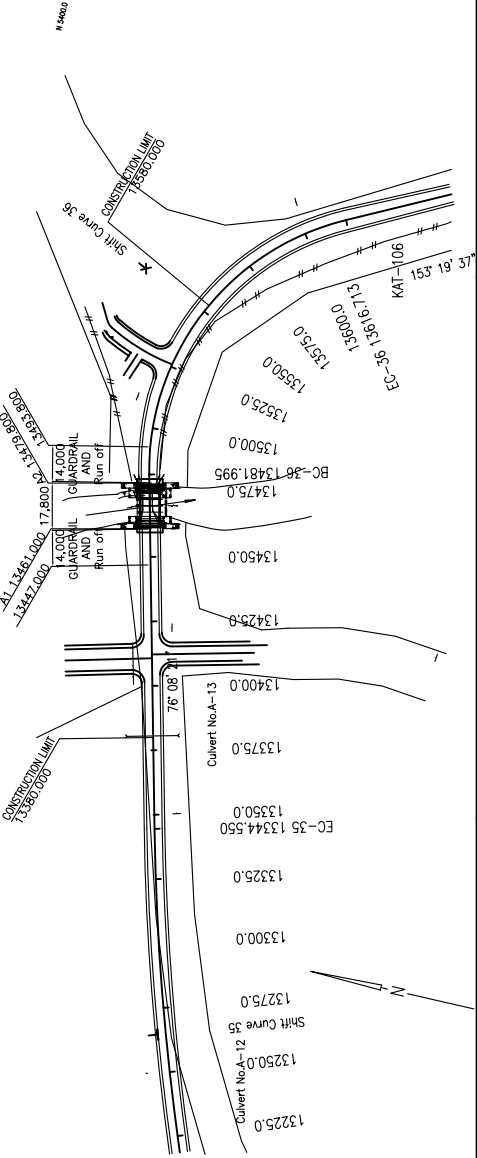


TYPICAL CROSS SECTION

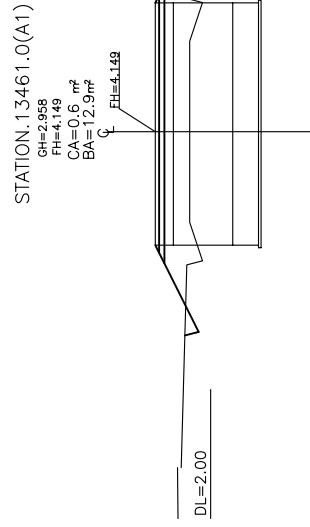
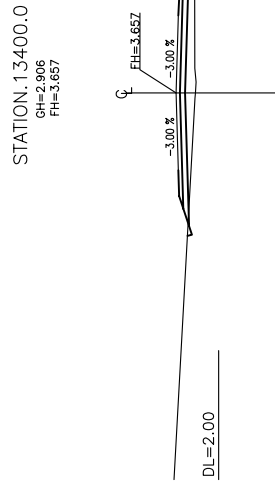
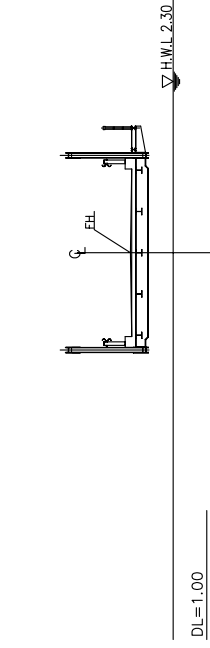
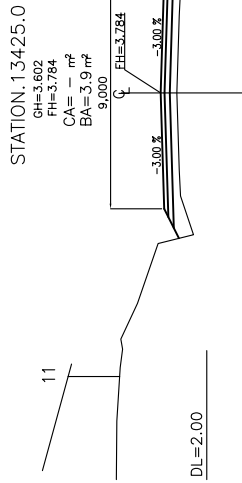
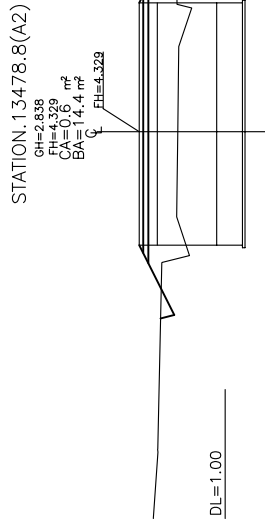
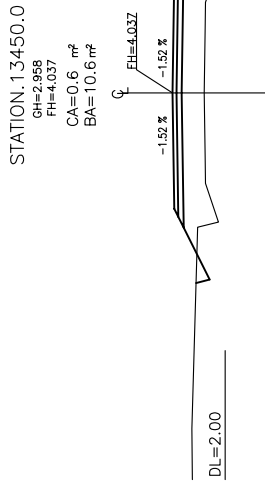


BRIDGE CROSS SECTION

ITEM	BEGINNING SIDE	ENDING SIDE	TOTAL
CUT	14.1 m	57.4 m	71.5 m
BANK	359.4 m	846.6 m	1206.0 m



CROSS SECTION(1) SCALE 1:100



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JAPAN INTERNATIONAL COOPERATION AGENCY
 KATAHIRA & ENGINEERS INTERNATIONAL

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 THE REHABILITATION OF BRIDGES
 ON THE RING ROAD IN THE EFATE ISLAND

TITLE : CROSS SECTION(1)
 (RENTAPAO BRIDGE)

DRAWING No.

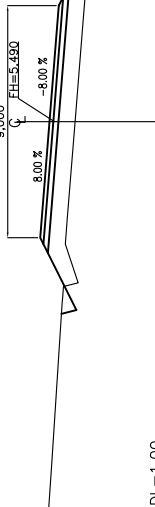
41

No.

CROSS SECTION(2) SCALE 1:100

STATION.13525.0

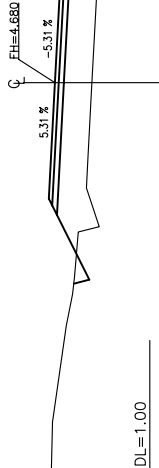
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FH=5.490
CA=0.6 m²
BA=8.3 m²
9.000



DL=1.00

STATION.13500.0

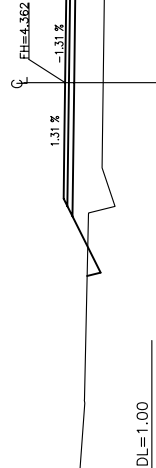
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BA=13.4 m²



DL=1.00

STATION.13481.995

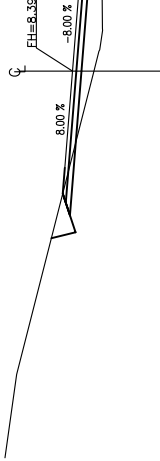
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BA=13.9 m²



DL=1.00

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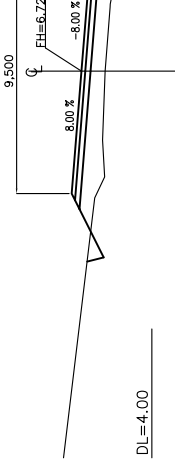
GH=7.563
FH=8.394



DL=4.00

STATION.13550.0

GH=5.813
FH=6.728
CA=0.5 m²
BA=7.3 m²
9.500



DL=4.00



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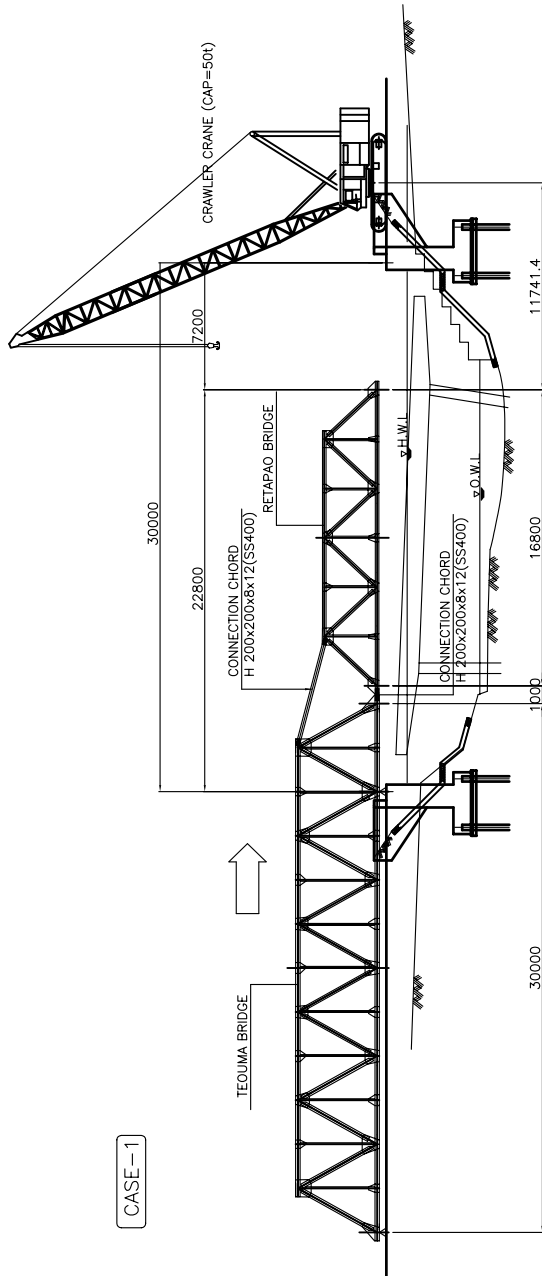
TITLE :
CROSS SECTION(2)
(RENTAPOO BRIDGE)

DRAWING No. 42

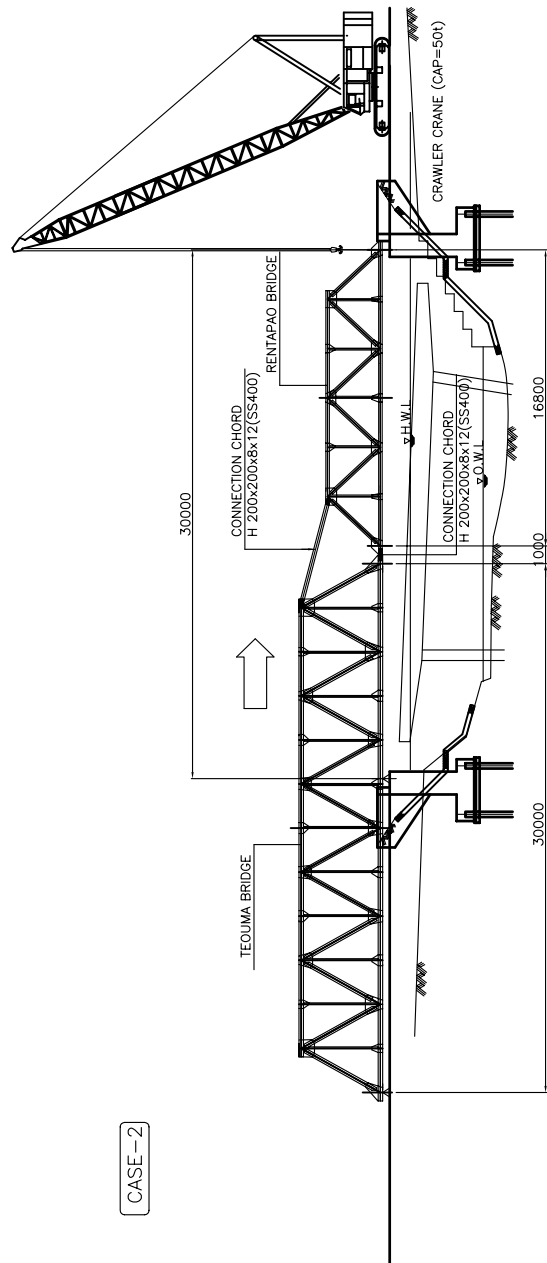
Rev.

ERECTION PLAN (TEOUMA BRIDGE)

CASE-1



CASE-2



CRAWLER CRANE (CAP=50t)
LOADING TABLE

WORK RADIUS(m)	BOOM LENGTH	
	12.19 m	15.24 m
3.7	50.0	18.29 m
4.0	46.0	—
4.5	39.5	39.3
5.0	33.2	32.8
5.5	28.5	28.3
6.0	25.0	24.7
7.0	20.0	19.7
8.0	16.6	16.4
9.0	14.2	13.9
10.0	12.4	12.1
12.0	10.2	9.5
14.0	—	7.8
16.0	—	6.0
18.0	—	6.1

ERECTION MEMBER

MATERIAL	TYPE	SIZE(mm)			QTY	WEIGHT(kg)		REMARKS	
		W	T	L		kg/m	kg/each		
CONNECTION CHORD									
SS400	H	H200x200x8x12			6249	2	49.9	311.8	624 U.CHORD
SS400	PL	200	25	305	4	4	39.3	12.0	48 FILL
F10T	HTB	M22		95	32	32	0.630	20	
F10T	HTB	M22		75	32	32	0.570	18	
SS400	H	H200x200x8x12			650	2	49.9	32.4	65 L.CHORD
SS400	PL	200	25	305	4	4	39.3	12.0	48 FILL
F10T	HTB	M22		95	32	32	0.630	20	
F10T	HTB	M22		75	32	32	0.570	18	
RENTAPAO BRIDGE ERECTION BOLTS									
F10T	HTB	M22		80	304	304	0.585	178	GUSS A
F10T	HTB	M22		80	192	192	0.585	112	GUSS B
F10T	HTB	M22		80	160	160	0.585	94	GUSS C
F10T	HTB	M22		80	288	288	0.585	168	GUSS D
F10T	HTB	M22		80	144	144	0.585	84	GUSS E
F10T	HTB	M22		80	336	336	0.585	197	GUSS F
F10T	HTB	M22		80	96	96	0.585	56	GUSS G
TOTAL								1750	kg



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ERECTION PLAN
(TEOUMA BRIDGE)

DRAWING No. 43

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

The followings are the basic conditions for implementing this Project:

- This Project, if approved, will be implemented in accordance with the Guidelines of Japan's Grant Aid after the signing of the Exchange of Notes between the Government of Japan and the Government of Vanuatu.
- The Public Works Department (PWD) of the Ministry of Infrastructure and Public Utilities is the implementation agency of this Project.
- The detailed design, assistance in tendering, and construction supervision of the Project will be undertaken by a Japanese consulting firm in accordance with a contract between Government of Vanuatu and consultant.
- The construction works of the bridges will be undertaken by the successful Japanese tenderer in awarding the contract with the Government of Vanuatu.

The followings are the basic concept in the implementation plan:

- Materials, equipment and labors necessary for the Project will be procured in Vanuatu as far as available. Items unavailable locally will be procured from Japan or a third country, which 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 to reflect local climatic conditions, topography, geology and so on.
- Easy and commonly used methods of construction, not needing special equipment or technology, will be adopted for the Project.
- Organization for construction management by the contractor and construction supervision by the consultant will be proposed which meets the standardized construction management method.
- Detours shall be secured to traffic during construction and necessary measures for safety shall be taken.
- Full attention shall be paid to the environmental preservation, especially water pollution.
- The waste generated by construction shall be disposed of at a place approved by the Government of Vanuatu.

2-2-4-2 Implementation Condition

- 1) Securing of safety for the road users and construction staff

At least one lane shall be provided on the detour beside the existing bridges. Necessary safety facilities such as notice signage, barricades, detour sign, safety

cones, and traffic control men shall be properly placed to clearly delineate the construction site.

2) Environmental Consideration

In accordance with the laws and regulations of Vanuatu, the approval of the Environmental Impact Assessment (EIA) shall be obtained by PWD prior the signing of the Exchange of Notes. The mitigation measures, which are a requirement of the approval of EIA, shall be taken and observed during the works. Full attention shall be paid to drain the water during the foundation work and prevent water pollution by muddy water.

3) Securing Land

The right of way for the Ring Road is 20m in width and further land acquisition is not required due to preserving the existing horizontal road alignment, even though the vertical alignment will be raised. However it is necessary to lease land for the detour and works area. The necessary land shall be secured by the PWD and returned at the completion of the Project after the restoration work to the original state which will be done by the contractor.

4) Tax Exemption

Tax for locally procured goods will be exempted by the letter issued by the implementing agency and approved by the Department of Economic and Social Development. Regarding the imported material / equipment, the customs clearance and tax exemption shall be made by the implementing agency.

2-2-4-3 Scope of Works

The undertakings of both governments, Japan and Vanuatu, are listed in Table 2-2-5.

Table 2-2-5 Undertakings of Both Governments

Item	Contents	undertaken by		Remarks
		Japan	Vanuatu	
Procurement	Procurement & Delivery	O		
	Customs clearance		O	
	Maintenance of delivery route		O	
Preparatory work	Securing Land		O	Detour, Works Area
	Removal of Existing Bridges	O		
	Other preparatory works	O		
Obstructions	Removal of obstructions		O	Power pole & cables
Permission/Approval	Approval of EIA		O	
Construction	Bridge Construction	O		

2-2-4-4 Consultant Supervision

A Japanese consultant will carry out the detailed design, assistance in tendering and construction supervision in accordance with the contract between the Government of Vanuatu and the consultant.

1) Detailed Design

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

- Site survey for the detailed design
- Detailed design of the bridge, road and subsidiary facilities
- Preparation of drawings and specifications
- Preparation of construction plan, procurement plan and cost estimation
- Preparation of tender documents

The necessary time for the detailed design is 2 months.

2) Assistance in Tendering

Major items of the services in the assistance in tendering are as follows:

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

The necessary time for the assistance in tendering is 2.5 months.

3) Construction Supervision

The consultant will carry out the supervision of the construction work executed by the contractor. Major items of the construction supervision are as follows:

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

The necessary construction period is 10 months. For the construction supervision, a resident engineer is required to be stationed on the site.

2-2-4-5 Quality Control Plan

Quality control plan for materials and concrete is shown in Table 2-2-6.

Table 2-2-6 Quality Control for Materials and Concrete

Item	Test Item	Specification	Frequency of Test
Cement	Physical property	JIS R 5201	Once before trial mix. Once every 10,000 bags or when material brand is changed
Fine Aggregate	Sieve analysis	JIS A 1102	Once a month
Coarse Aggregate	Physical property	JIS A 5005	Once before trial mix. Once every 1,500 m ³ or when the quarry is changed.
	Sieve analysis	JIS A 1102	Once a month
Water	Quality	AASHTO T26	Once before trial mix.
Steel bar	Quality	JIS G 3112	Once when delivered with mill sheet
Shaped steel	Quality	JIS G 3101	Once when delivered with mill sheet
Concrete	Slump	JIS A 1101	Twice a day
	Air Content	JIS A 1128	Twice a day
	Compressive strength	JIS A 1108	6 specimens per placement or 6 specimens per 75 m ³ when concrete volume in one placement is big (3 specimens for 7days strength test and 3 specimens for 28days strength test)
	Temperature	-	Twice a day

2-2-4-6 Procurement Plan

1) Construction materials

The only construction materials locally available in Vanuatu are sand, aggregate for base course (coral) and aggregate for concrete (coral). All others are imported.

The method of procurement of materials is as follows:

- Imported materials which are constantly available in the local market will be procured regarded as local materials.
- Materials which are not available in the local market will be procured from Japan or neighbouring countries. The selection of the country for sourcing material will be decided by comparing price, quality and so on.

Procurement plan of the major materials is shown in Table 2-2-7.

Table 2-2-7 Material Procurement Plan

Items	Procured from			Remarks
	Vanuatu	Japan	Others	
<u>Construction materials</u>				
Reinforcing steel bar	O			Imported
Truss parts			O	
Bearing			O	
Expansion Joint			O	
Guardrail			O	
Cement	O			Imported
Admixture	O			Imported
Sand	O			
Aggregate (coral)	O			
Aggregate (DBST)	O			Imported
Bitumen	O			Imported
Boulder (coral)	O			
Gabion	O			Imported
PVC pipe	O			Imported
<u>Material for temporary work</u>				
Timber for forms	O			Imported
Plywood	O			Imported
Timber for staging	O			Imported
Nail	O			Imported
Shaped steel			O	
Welding rod	O			Imported
Sand bag	O			Imported
Safety devices	O			Imported
Fuel, oil	O			Imported

2) Equipment

There is no equipment lease firm in Vanuatu and most equipment in the island is owned by local contractors. The availability of larger size equipment is limited due to the intermittent nature of the construction industry within Vanuatu. However it is possible to lease general purpose equipment from local contractors, although the available equipment is limited, the price of leasing is high compared with neighbouring countries and the equipment is generally old. The pile driving equipment and vibro hammer are not available even from local contractors, and it is necessary to procure equipment from Japan or neighbouring countries.

The method of procurement of equipment is as follows:

- Imported procurement with the increased transport cost will be avoided where possible. Basically local procurement, which will be economical even with high

leasing prices, will be adopted because the project scale is small and the construction period is short.

- Only the equipment which is not available in Vanuatu will be procured from Japan or neighbouring countries.

Procurement plan of equipment is shown in Table 2-2-8.

Table 2-2-8 Procurement Plan of Major Equipment

Equipment	Specification	Procured from			Remarks
		Vanuatu	Japan	Others	
Backhoe	0.6 m ³	O			
Bulldozer (dry)	15 t				
Jumbo Breaker	800 kg	O			
Crawler Crane (hydro)	50 t			O	Australia
Trailer	30 t	O			
Dump Truck	10 t	O			
Concrete Mixer	0.5 m ³	O			
Vibro Hammer	60 kW			O	Australia
Motor Grader	3.1 m	O			
Vibration Roller	0.8 - 1.1 t	O			
Tire Roller	8 - 20 t	O			
Asphalt Distributor	3 kL	O			
Aggregate Spreader	tail gate	O			
Road Sprinkler	6 kL	O			
Tractor Shovel	1.2 - 1.3 m ³	O			
Generator	200 kVA			O	Australia
Generator	15 kVA	O			
Submersible Pump	φ 100 mm	O			

2-2-4-7 Implementation Schedule

The project will be executed with a single fiscal year's budget. The implementation schedule executing by the Japanese side is shown in Table 2-2-9.

Table 2-2-9 Implementation Schedule

Work Items		month	1	2	3	4	5	6	7	8	9	10	11	
Detailed Design	Site Survey		■											
	Works in Japan			■	■									
	Approval				■					(Total 2.0 months)				
Construction	Preparatory Works		■	■										
	Fixing & Demolition of Detour			■	■	■						■		
	Demolition of Existing Bridges				■	■								
	Sub-Structure	Foundation Work				■	■	■						
		Abutment Work					■	■	■					
	Super-Structure	Manufacturing & Delivery		■	■	■	■	■	■					
		Erection Work							■	■				
		Deck Slab Work								■	■	■		
	Approach Road	Earth Works						■	■					
		Base Course							■			■		
		Surface Course										■		
	Revetment Work							■	■	■				
	Subsidiary	Road Marking										■		
Woks	Restoration & Demobilization								(Total 10.0 months)			■		