CHAPTER 3

CHAPTER 3 IMPLEMENTATION PLAN

3-1 Implementation Plan

3-1-1 Implementation Concept

Based on the above-mentioned field surveys, it is recommended that the following project implementation plan will be prepared:

1) Construction Period

The construction work will consist of the following main work items;

- Mobilization
- Preparation work
- Road rehabilitation work including drainage system
- Temporary detour work
- Removal of existing bridges
- Bridge work (sub-and superstructure)
- Miscellaneous work

The construction period is expected to last thirty (30) months from March 1997 to August 1999. In Cambodia, the five-month period from June to October is the rainy season in which, in principle, neither bridge construction nor earth work is conducted, as it is almost impossible to carry out bridge construction work across a river at flood level.

But subbase course work, for example, may be carried out even during the rainy season.

2) Construction Methods of Individual Work Items

(1) Road Rehabilitation Work

The project requires an enormous amount of earth material (approx. 650,000m^3) for embankment of roadbed and road shoulder. However, the local material is chiefly lateritic soil, which easily metamorphises into an uncontrollable material when it contains water. Therefore, the earthwork needs to be executed during the dry season. The earth material should be transported from borrow pits nearer to the construction site to keep expenses down. The drainage work should also be executed during the dry season.

The pavement work follows the subbase course work, and the pavement material (asphalt concrete) will be transported from plants in Phnom Penh and its suburbs. The pavement work may be conducted to some extent even in the rainy season, therefore earlier execution of the pavement work will help the project to be completed within the expected period.

(2) Detour Construction Work.

During the period of the bridge construction work, eleven detour routes are to be used for general traffic. The detour route is paved with crushed stone and will need to be repaired once during the service period of four to five months. (Note: No detour is required for replacement work of Bridges No.6 and No.8, because the two new bridges are to be constructed adjacent to the existing ones.)

With regards to Bridge No.2, it will be impossible to complete the entire structure within the dry season in 1998, as the overall bridge length is 150m.

Therefore, all the substructures should be completed before the rainy season of 1998 and the existing Bailey bridge will tentatively be used for the general traffic. After the rainy season of 1998, the superstructure of Bridge No.2 will be constructed, which means the detour for Bridge No.2 will be used in the early period of 1998 and 1999, and is to be repaired twice during the service period.

(3) Removal of Existing Bridges

After completion of the individual detour routes above, a temporary road is to be constructed on the river bed for removal of the existing bridges. With regards to the existing bridge foundation, only the portions projecting from the riverbed will be removed.

(4) Bridge Construction Work

Construction work of the bridge superstructures except Bridge No.2 will be executed shortly after the individual substructures are completed. Taking into account the limited construction period and quality control, all the bridges except Bridge No.2 are to be of reinforced concrete whose superstructures are constructed on the staging built on the riverbed.

Bridge No.2 is expected to be 150m long with six spans and will be a continuous prestressed concrete bridge due to economic and maintenance considerations.

Each span of the bridge has four I-shaped prestressed concrete beams with a length of 26.5m and weighing approximately 50t. There are a total of twenty-four (24) beams for the entire bridge.

According to site investigation, it will be quite difficult to keep space for manufacturing the prestressed concrete beams near Bridge No.2. Generally speaking, prestressed concrete products require high quality-control skill. Therefore, it is recommended to build a temporary workshop for production of prestressed concrete blocks in Phnom Penh where ready-mixed concrete supply is stable.

In the workshop, required number of I-shaped concrete blocks (72 pieces) with a length of approximately 9m, which are I-beams to be used in sets of three to form a length of 27 meters, will be produced and tentatively prestressed for safety in transportation to the assembly yard near Bridge No.2. In the assembly yard, three blocks will be laid in a row, fixed together and finally prestressed into a complete beam. Then the final products (complete beams) will be placed on the piers and abutments with the erection girder. After placing of precast concrete panel, which utilized instead of form, between I-beams, the concrete slab will be placed and other auxiliary bridge surface work follows.

3) Availability of Local Engineers and Construction Resources

It goes without saying that there is a shortage of experienced Cambodian engineers both in the government offices and private sectors, as the long civil war did not give the country any chance to train them.

The project aims for technology transfer to Cambodia and it is, therefore, practical to make maximum use of employees of the MPWT (Ministry of Public Works and Transport) and the RCC (Road Construction Center) together with the latter's machinery supplied by Japan's grant aid.

4) Utilization of Local Contractors

Local contractors are not technically competent enough to handle the construction work of the project by themselves. Therefore, they will have chance to work for the project as sub-contractors under the supervision / control of Japanese contractors except for work items which require special engineering skills. This work arrangement will help Cambodia develop its construction technology.

5) Japanese Engineers

The project will require engineers from Japan in such work items as production / assembly of prestressed concrete beams, prestressing work, bridge erection, earth work and pavement work.

6) Local Executing Agency

The Department of Major Construction (DMC), will be the local executing agency of the Project. The DMC is one of the organizations under the Ministry of Public Works and Transport (MPWT).

7) Land Acquisition for the Project

Land for the project was already acquired 20m from existing centerline to each

side except for the access road to Mekong Bridge. According to a report from the Cambodian side, as it has obtained consensus from local residents in regards to land aquisition in connection with the Mekong Bridge Project, it can be expected that resettlement will be executed smoothly in this project.

3-1-2 General Consideration for Construction Work

A practical construction schedule should be prepared based on the distinct meteorological conditions (the dry and rainy seasons) in Cambodia and the local market of machinery / materials procurement.

1) Work Items to Execute During the Dry Season

In Cambodia, there are two extreme seasons in a year, namely the dry and rainy seasons mentioned above; the latter lasting from June to October.

There are some work items whose efficiency would be very poor if executed during the rainy season and should be handled during the dry season. Consequently, it is necessary to establish a machinery operation schedule and materials procurement plan suitable for intensive work during the dry season. Such work items as mobilization and preparatory work should be done as soon as possible after the construction contract is concluded between the Cambodian Government and a Japanese contractor.

Some equipment and materials are to be imported from Japan and it will take two to three months before they arrive at the Sihanoukville Part. Therefore, the contractor may make the best use of some equipment held at the Road Construction Center.

2) Land Acquisition

The contractor should be always ready to keep necessary land space required for the site office, prestressed concrete fabrication yard, etc, shortly after having entered into the construction contract with the Cambodian Government.

3) Customs Clearance Procedure

Machinery and materials procured in Japan will be unloaded at the Port of Sihanoukville. It is of utmost importance that the contractor get the Cambodian Government to ensure that the cargo is smoothly processed by the customs.

4) Safety Measure

Since the construction of Bridge No.2 includes transportation of heavy prestressed concrete beams and their arrangement on high piers / abutments, full safety measures should be secured.

Traffic safety measures are also required as there will be many vehicles along the National Road Routes 6 and 7.

As telephone contact is impossible between the site office in Skun and Phnom Penh, radio facilities should be installed in Skun and Phnom Penh offices for emergencies.

3-1-3 Scope of Works

The following work items should be executed by the Cambodian side.

① Land Acquisition
② Property Compensation
③ Property Demolition
④ Construction Yard Leasing

3-1-4 Detailed Design and Construction Supervision

Japanese consultants will handle the detailed design, tender documents preparation and bidding after completion of consultancy services contract. The Japanese consultants consist of the following professionals;

① Project Manager
② Bridge Substructure Engineers
③ Bridge Superstructure Engineers
④ Road Engineers
⑤ Surveyor and Geologist
⑥ Tender / Contract Specialist
⑦ Quantity Surveyor / Construction Planner
⑧ Resident Engineer

The individual works of the above engineers / specialists are as follows;

1) Project Manager

The project manager will manage and supervise all the jobs in connection with the detailed design, bidding, construction supervision and relevant works.

2) Bridge Engineers

Bridge engineers will be responsible for handling the detailed design of the bridges; relevant structures such as river revetment, bridge approach cushion slab, temporary equipment and the preparation of the working drawings and quantity

surveying. During the construction, they will supervise the temporary works, confirmation of geological conditions, foundations, bridge substructures, superstructure, river revetments work, and other auxiliary works.

3) Road Engineers

Road engineers will be responsible for the detailed design of the road and road-related structures and the preparation of the working drawings and quantity surveying in connection with their jobs.

During the construction work, they will supervise the earth work, base-course work and pavement work.

4) Surveyor and Geologist

The surveyor and geologist will be responsible for conducting additional topographic surveys, geological investigation and CBR test required for the detailed design based on the field engineering survey data during the basic design work.

5) Tender / Contract Specialist

The tender / contract specialist will be responsible for the preparation of tender and contract documents.

6) Quantity Surveyor / Construction Planner

The quantity surveyor / construction planner will be responsible for the study of detailed construction plans and preparation of the final cost of the project based on the tentative construction cost estimate prepared during the basic design study.

7) Resident Engineer

The resident engineer will be responsible for both the technical aspect of schedule and quality control of the project and the administration aspect of the site office management throughout the entire construction period.

He will also be responsible for the supervision of earth work, road work, pavement work , bridge works and other auxiliary works.

3-1-5 Procurement Plan

1) General Condition of Labor Force

An enormous number of educated people and engineers were lost during the long civil war in Cambodia and nowadays there is an insufficient number of engineers and skilled laborers available. Therefore, most of the local Cambodians have been employed simply as "unskilled laborers", even though many projects financed by international organizations are being conducted in the country. Some local contractors, however, have shown good business performance as subcontractors.

The main work items of the project are to rehabilitate the 73km length of National Roads Routes 6 and 7 and to construct thirteen bridges along the routes. Bridge No.2, one of the new bridges, will be of a prestressed concrete structure and others of a reinforced concrete structure with spans of 10 to 20m. With regards to the construction of Bridge No.2, a high-standard degree of quality and construction control skill are required and therefore Japanese engineers are employed as specialists on pre-stressed concrete technology.

The main part of the road rehabilitation work is to widen and pave the existing routes and the work itself is not complicated. Therefore, the technology transfer will be easily realized by the maximum use of local engineers and laborers and especially the introduction of operators and equipment of the Road Construction Center.

2) Equipment and Material Procurement Conditions

A procurement survey of local equipment and materials was made during the basic design phase in order to maximize their use for the project. Locally available resources were surveyed in connection with their types / kinds, quality, reliability and procurability.

When the field survey commenced in June 1996, it was found that most of the equipment and materials had to be imported. Since the project is of large scale, it requires a great amount of construction resources.

The following are the present conditions of the local supply of equipment / materials.

(1) Cement

In Cambodia, cement is produced at a private plant along National Route 3, but the capacity is still small and of poor quality. Therefore, the domestic demand of cement is supplied with imported products, mainly from Thailand. Some amount of cement is also imported from Vietnam, China and Korea.

With regard to cement imported from countries other than Thailand, supply is not stable and the quality is poor due to careless transportation, handling, and

storage. Twenty thousand (20,000) tons of Elephant Cement, which is the best brand made in Thailand and used in Cambodia, is imported every month by truck.

(2) Ready Mixed Concrete

There are two ready-mixed concrete plants in Phnom Penh City. Siam Cement Co., Ltd., the exclusive distributor of Elephant Cement, is operating a plant with a production capacity of $55m^3$/hr, while KC Enterprise Co., Ltd. has a plant with a production capacity of $40m^3$/hr in addition to a portable mixing plant with a production capacity of 25 m^3/hr.

The Road Construction Center (RCC) has four (4) sets of portable concrete mixers ($0.8m^3$/batch) and some domestic contractors own the same types.

Portable concrete mixers may be used for the construction of reinforced concrete structures of a low allowable stress under the condition that the contractor construct the structures paying the greatest attention to quality of concrete.

(3) Reinforcement

No reinforcement or steel bar is produced in Cambodia. But, there are various deformed bars available imported from Thailand and Singapore, avilable in local market.

(4) Crushed Stone and Sand

There are two crushing plants near the project site; one at the extreme end of National Road Ex-6A (daily production capacity $150m^3$) and the other along National Road No.6, 17km north of Skun (daily production capacity $300m^3$). The latter is being used for the emergency rehabilitation of National Road No.6 and may be closed after completion.

There are two other crushing plants operated by private firms; one in Kampong Speu along National Road No.4, 60km southwest of Phnom Penh City (daily production capacity $900m^3$) and the other along National Road No.5, 30km northern of Phnom Penh, daily production $1000m^3$. In addition to the above-mentioned plants, there are several private plants in operation, but the total production capacity is very low. Even if the plant along National Road No.6 is closed, the two plants at Compong Speu and along National Roads Nos.4 and 5 may supply the necessary demand of crushed stone for the project.

As for river sand, it is procurable from the Mekong River during the dry season, but no sand from land borrow pits is available.

(5)Materials for Roadbed and Subgrade

There are two borrow pits near the project site. One is at Batheay about 10km toward Kompong Cham from Thnolkens and the other is at Phnom Penh operated by the MPWT. The latter may supply several tens to hundreds of thousand cubic meters of earth material. The MPWT are renting several pieces of private land for laterite quarry, but the production volume seems small.

A clay layer is to be applied to slope of embankment for the purpose of the slope protection work. Clay materials may be supplied from privately-owned land between Skun and Kompong Cham, and the government estate south of Bridge No.2 may also provide the material during the dry season.

(6) Asphalt

There is no asphalt production in Cambodia and the MPWT stocks only small amounts of asphalt, contained in drum cans. There are two asphalt concrete plants in and near Phnom Penh (hourly production capacity, 40t and 100t) and one in Kampong Speu (60t). The total hourly production capacity amounts to 200t and a full operation of those three plants may fulfill the necessary demand of asphalt concrete required for the project.

(7) Steel Products

Steel materials are not manufactured in Cambodia. But some kinds of steel materials such as H-beam are avilable in local market.

(8) Other Construction Materials / Equipment

Table-3-1-1 shows a plan for procuring construction materials / equipment including those mentioned above.

Table-3-1-1 Procurement Plan of Construction Materials/Equipment

	Cambodia	Japan	Thailand	Reason
Cement	O			Obtainable on site
Reinforcing bar	O			Obtainable on site
Crushed stone / sand	O			Domestically obtainable
Embankment material	O			Domestically obtainable
Asphalt / Asphalt emulsion	O			Obtainable on site
Steel	O			Obtainable on site
Prestressed steel wire			O	Domestically unobtainable
Prestressed steel bar			O	Domestically unobtainable
Asphalt concrete	O			Domestically obtainable
Concrete additive		O		Good quality unobtainable
Expansion joint (rubber system)		O		Good quality unobtainable
Shoe (rubber system)		O		Good quality unobtainable
Brick	O			Domestically obtainable
Form (steel)		O		Domestically unobtainable
Timber	O			Domestically obtainable
Frame support work / scaffolding		O		Domestically unobtainable
Concrete pipe	O			Domestically obtainable

4) Construction Equipment

Some construction equipment may be available on lease in Cambodia from private firms or the Road Construction Center, though the types and numbers are limited. Most of the contractors in the country keep their own construction equipment. In Cambodia no reliable leasing market for machinery has been yet established, due to the fact that general demand for machinery use is still low. Therefore, prime contractors employ subcontractors together with their machinery.

Some of the necessary machinery should be procured from third countries or Japan in order to be able to complete the earth work, bridge work, pavement work, etc. within the period limited by the advent of the rainy season.

In Thailand, as in Cambodia, there is no market for construction machinery lease, so time will be needed to procure machinery from there, due to the fact that the owner of the machinery requires time to contract insurance in Cambodia and prepare a large amount of paper work before shipment of machinery.

On the other hand, past records show that no trouble has been observed with regard to import of machine from Japan and its compensation (insurance) against loss or damage.

The following items should be considered in connection with the selection of which machinery will be procured in Cambodia and imported from abroad.

- Small and medium size equipment of ordinary type is to be procured in Cambodia, being available in the country.

- Some equipment is to be imported from third countries or Japan, if their availability is limited in Cambodia.

- Important equipment is to be imported from third countries or Japan, if they affect the work schedule, requires them.

Taking into account the above remarks, Table-3-1-2 shows the main equipment to be used for the project and their supply source.

Table-3-1-2 Construction Machinery Supply Plan

Name of Equipment	Capacity	Cambodia	RCC	Japan
Bulldozer	21ton		O	
Bulldozer	15ton			O
Bulldozer	3ton	O		
Back-Hoe	0.2m3	O		
Back-Hoe	1.35m3	O		
Back-Hoe	0.3m3		O	O
Dump Truck	2ton	O		
Dump Truck	4ton	O		
Dump Truck	10ton	O	O	O
Truck Crane	4.8 - 9ton	O		
Truck Crane	15 - 16ton	O		
Truck Crane	20 - 22ton	O		
Truck Crane	30ton		O	
Truck Crane	60ton		O	O
Crawler Crane	35ton			O
Electric Generator	35KVA		O	
Electric Generator	60KVA		O	
Electric Generator	100KVA	O		
Electric Generator	150KVA	O		
Electric Generator	300KVA		O	
Truck	2ton	O		
Truck with Crane	4ton		O	
Asphalt Finisher	2.4 - 4.5m			O
Asphalt Finisher	3 - 8.5m			O
Asphalt Finisher	1.6 - 3m			O
Asphalt Distributer	4,000l		O	O
Stabiliser	1.7m			O
Asphalt Kettle	6,000l		O	
Water Tank Lorry	5,500 - 6,500l		O	
Water Tank Lorry	3,800l			
Vibration Roller	0.8 - 1.1ton		O	
Vibration Roller	3 - 4ton		O	
Motor Grader	3.1m		O	
Road Roller	10 - 12ton		O	
Giant Breaker	600 - 800kg			O
Concrete Breaker	20kg			O
Air Compressor	7.5 - 7.6m3/min			O
Rammer	60 - 100kg		O	
Tire Roller	8 - 20ton			O
Water Pump	ϕ 100		O	
Water Pump	ϕ 50		O	
Concrete Mixer	1.0m3		O	
Concrete Mixer	0.3m3	O		
Concrete Cutter	30cm		O	O
Jack	200ton			O
Fixed Crane	3ton			O
				O
Rail	30kg/m			O
Welding Plant	200A	O		
Winch		O		
Grout Pump	15 - 30l/min			O
Grout Mixer	100l/min			O
Concrete Bucket	1m3	O		
Vibrator	1KW	O	O	O
Vibrator for Form	0.7KW			O
Trailer	30ton		O	O
Trailer	10ton	O		
Concrete Bucket		O		O
Line Marker			O	
Fixed Crane	40ton			O

3-1-6 Implementation Schedule

After the Exchange of Notes, the project will be executed in accordance with the following procedures. (See Table 3-1-3)

1) Consultancy Services Contract and Detailed Engineering

After conclusion of the consultancy services contract, the detailed engineering is to be carried out, followed by the preparation of drawings, specifications and tender documents.

2) Construction Bidding and Contract

A construction contract is made directly between the Cambodian Government and a Japanese contractor. In selecting a Japanese contractor, a competitive tendering system is open only to Japanese construction firms. In advance of the invitation of tenderers, the consultants will help the Cambodian Government consult with JICA about the criteria for examining the qualifications of contractors. The consultants will handle the qualification work on behalf of the Cambodian Government. Government officials of Cambodia, the consultants and tenderers need to examine the tenders and determine a successful bidder in the presence of JICA officials. After approval by the Japanese Government, the construction contract follows.

Parallel to the signing of the construction contract, the Cambodian Government will conclude a banking arrangement with an authorized foreign exchange bank in Japan to open a special account for the purpose of receiving the funds granted by Japan and make the payments to the Japanese contractor.

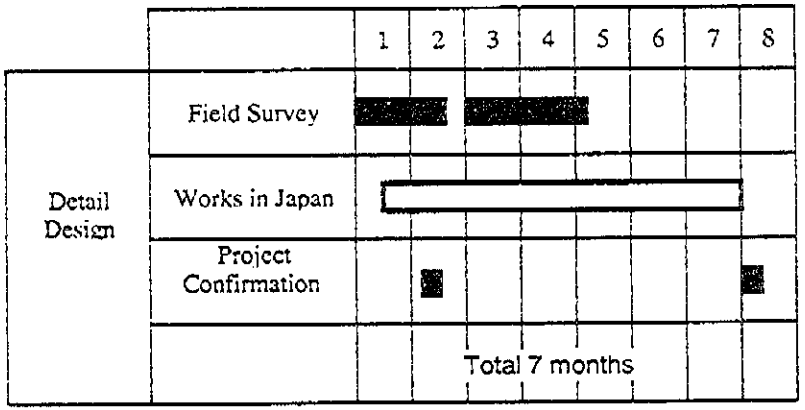
The banking arrangement serves as the basis for the Cambodian Government to issue the Authorization to Pay (A/P). The A/P is indispensable for applications to be submitted by the Japanese contractor to the Ministry of International Trade and Industry of Japan to obtain approvals for exports of products, as well as for receipt of advance payments described in the contract.

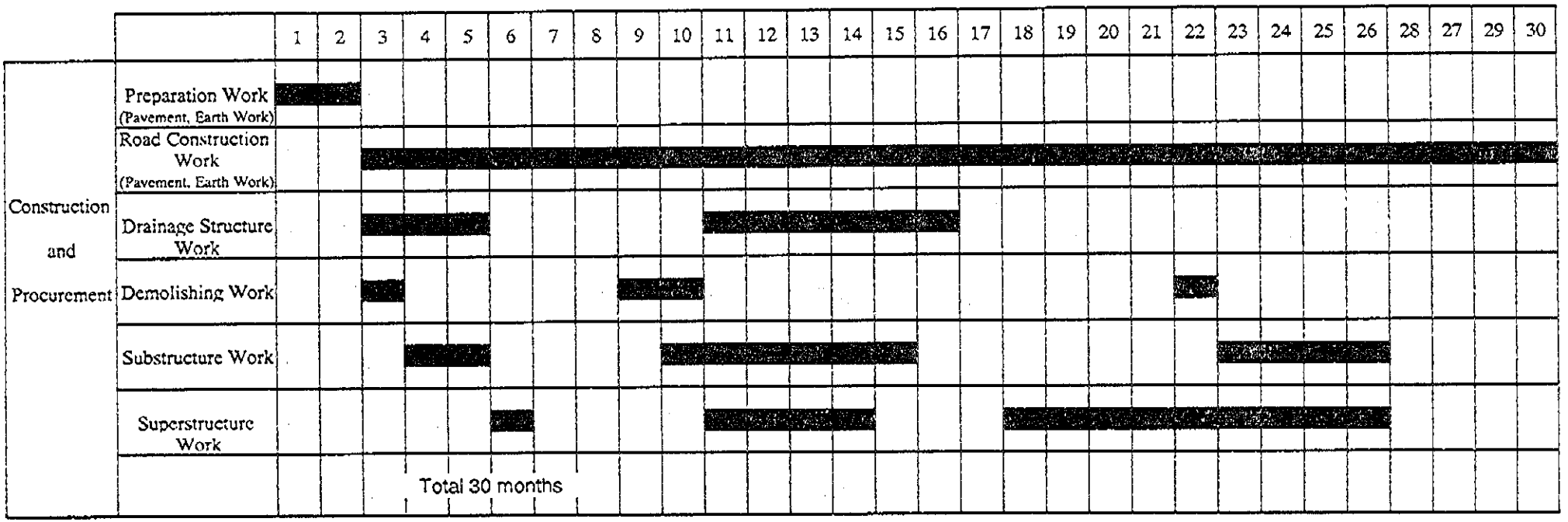
Following this, verification of the contract by the Japanese Government is required. The contract verification means that the Japanese Government confirms the contract and its appropriateness as a subject for grant aid. The official verification is one of the requirements which give authorization to the contract.

The Japanese Ministry of Foreign Affairs receives the written contract from the recipient country (Cambodia), usually through the Japanese Embassy of the recipient country and ,makes a decision regarding the verification of the contract.

Then, the Japanese contractor fulfills the contract after receiving the verified written contract and Authorization to Pay (A/P).

Table 2-1-3 : Implementation Schedule





3) Construction Work

The construction work starts with preparatory work, road work including drainage, detour work, removal of the existing bridges, sub- and superstructure work and relevant work such as river revetment, and ends with removal of construction machinery and temporary materials. As the rainy season is from June to November, the construction work around the river and earth work will be restricted during that period.

Table-3-1-3 shows implementation schedule. Overall construction period is assumed as 30 months.

3-2 Project Cost Estimation

The expenditure to be borne by the Royal Government of Cambodia in connection with the implementation of the Project is estimated as shown below;

1)	Land Acquisition	:	US$ 450,000.-
2)	Property Compensation	:	US$ 76,500.-
3)	Property Demolition	:	US$ 25,500.-
4)	Construction Yard Leasing	:	US$ 157,500.-
	Total	:	US$ 709,500.-

These costs are derived by the following estimation;

1) Land Acquisition

Land acquisition is necessary at Kompong Cham for the construction of new road.

Area : 90,000m^2 (Approximately 2,250m long and 40m wide)
Unit Cost : US$5.-/$m^2$ (Data by DMC)
Total Cost : US$450,000.- (90,000 x 10.-)

2) Property Compensation

There are 85 houses in the area to be acquired.

Average floor size	: 300m^2/house (one to two stories)
Total floor area for compensation	: 25,500m^2
Compensation unit cost/m^2	: US$3.- (Data by DMC)
Total compensation cost	: US$76,500.- (25,500 x 3.-)

3) Property Demolition

There are 85 houses in the area to be acquired.

Average floor size	: 300m^2/house (one to two stories)

Total floor area for demolition	: 25,500m^2
Demolition unit cost/m^2	: US$1.- (Data by DMC)
Total demolition cost	: US$25,500.- (25,500 x 1.-)

4) Construction Yard Leasing

There are two yards planned, one near Phnom Pen and the other near Skun.

Total yard area	: 52,500m^2 (200 x 150 + 150 x 150m)
Unit lease cost	: US$1.-/m^2/year (Data by DMC)
Total lease cost	: US$157,500.- (52,500 x 1.- x 3 years)

3-3 Operation and Maintenance Costs

1) Maintenance Costs

Following the completion of this project, maintenance and management of the improved roads will become the responsibility of the RCC. After the civil war, road projects chiefly concentrated upon the rehabilitation of the existing network and maintenance work has not been carried out. Cambodian road authorities therefore have little experience in this field and there is need for a maintenance manual to be put together during the detailed design stage. The manual will include recommendations on routine inspection, maintenance / management methods, and organization of such.

Types of required maintenance / management foreseen for the next ten years and costs are shown below.

① Maintenance work and expenses

Table 3-3-1 : Contents and Expenses of Maintenance Works

Period	Work	Frequency	Expense
First to five years	① Cleaning, grass removal on shoulders, embankment	once a year	0.15$ x320,000m^2 = 48,000$
	② Cleaning of drainage facilities	once a year	40$ x 2km
	③ Shoulder repairs	once a year	0.25$ x 75,000m^2 = 19,000$
	④ Light repair of embankment (treated areas) (approx. 10% of total area)	when necessary	1.5$ x 3,000m^2 = 5,000$
			Total 72,000$/year
Fifth to tenth years	①②③ of above	once a year	
	④ Pavement repair (Approx. 0.1% of total area per year)	when necessary	5.0$ x 600m^2 = 3,000$/year
	⑤ Minor bridge repairs (expansion joint, railing, etc.)	when necessary	
	⑥ Medium-scale repairs of embankment (treated area)	once every 5 years	4.5$ x 20,000m^2 = 90,000$/5year
Tenth year	Overlay	after 10 years once every 7 years	5.0$ x 525,000m^2 = 2,625,000$
		10 year total	**US$ 3,540,000**

② Operation costs

Costs estimated for routine inspection and periodic inspections (weeding, etc.) are shown below.

- Wages : US$ 25,000/year
- Vehicle fuel : US$ 5,000/year

Total US$ 30,000/year

This is the expense to operate inspection unit which is recommended to be established in the RCC. The inspection unit will be responsible for all improved roads such as National Route 4, 5, 6 and 7. Accordingly, around 20% of the total operation cost is shared for the road rehabilitated in the Project.

2) Maintenance Methods

In order to utilize a limited budget effectively, early discovery of damage and early repair should be the central theme of routine and/or periodic inspections as a maintenance policy. In this way "dragon holes" and other major damage can be prevented altogether.

① Routine inspection

A routine check-up is conducted by travelling over the assigned route, looking out for any irregularities in road surface, shoulders by three staff members are required: one inspector, one recorder, one driver.

② Periodic inspection

This inspection should take place after the general water level has reached post-rainy season levels over the stretch of road between Thnolkeng and Pha Ap as the inspector inspects for damage and draws up plans for repairs

Based on these inspections, the engineer judges necessity of repair and where necessary conducts immediate repair to prevent further degradation.

3) Maintenance Organization

In order to apply the maintenanace method mentioned in 2), there must be a coherent organization of staff in the RCC to implement it and raise up efficient new staff, as described below.

① An inspection team is to be formed within the RCC, composed as below:

- Engineer : 1
- Inspectors, recorders, drivers : 15 (3 teams)
- Inspection vehicles : 3 (3 teams)
- Record keeper :

② When minor repairs are deemed necessary as a result of routine inspection, a repair team must be organized to be prepared for immediate response.

③ Based on the maintenance manual, JICA experts sent to the RCC will consciously train and educate staff for inspection and recording.

④ Records of routine inspection will be made into a data base for future reference, useful for making proper estimations of necessary maintenance expense.

⑤ Preserve drawings as records of road improvement project and form a system to be useful for future repairwork.

CHAPTER 4

CHAPTER 4 PROJECT EVALUATION AND RECOMMENDATION

4-1 Project Effect

The proposed Project comprises of rehabilitation of the National Roads Route 6 (Thnalkeng to Skun) and 7 (Skun to Kompon Cham) and construction of the bypass road connecting the Route 7 and an approach road of the proposed Bridge at Kompong Cham. The objective of the Project is to improve access to Phnom Penh from the North-east districts via Kompong Cham and from the northwestern districts Siemreap. The implementation of the Project will create favourable effect to the road transportation system and encourage socio-economical development in the northern hinterland of Phnom Penh.

Present Situation and Problems	Measures Proposed by the Study Team	Effects
Temporary bridges and severely deteriorated pavement, Bridges and culverts prevent smooth traffic flow.	Improvement of the Pavement, bridges, culverts and road embankment.	Reviving the function of the national highways contributes to development of economy both nationally and locally.
Narrow and poorly paved carriageway prevents heavy commercial traffic from running safely and smoothly.	Upgrading of the road by implementation of bituminous pavement and widening.	Handling of log, rubber and rice which are nation's main products will increase due to the improvement of the traffic conditions. This encourages regional development in agriculture and forestry.
Traffic is interrupted frequently every rainy season by floods. This seasonal incident causes unsafe living conditions in the isolated areas, especially in emergency cases.	Raising road level at the inundated areas.	People in rural areas will be able to receive emergency medical treatments and security aide even in the flood season. This will promote the stabilization of livelihood and improvement of the living standards.
No separate lanes for vehicles, motorcycle, bicycle, wagons and pedestrians are provided. This results in increased traffic accident potential.	Providing special lane for the bicycles at the both shoulders which will be widen and improved by the bituminous surface treatment.	Provision of separate traffic lanes will lower drastically traffic accident potential.

The Study Team recognizes that this Project is appropriate as a grant aid project for the following reasons;

(1) The implementation of the Project will increase the transportation capacity in Compong Cham district which has largest population, about 1,4 million, in Cambodia and the conter of agriculture and forestry.

(2) The Project promotes the stabilization of livelihood and improvement of the living standard. Nearly half a million people living along the Project routes will receive benefits in terms of emergency medical treatment, security aid and

economy.

(3) Road and Bridge Construction Department of Ministry of Public Works and Transport has the ability of administration for maintenance management of the Project roads.

(4) The rehabilitation of the National Roads No 6 and No 7 forms a part of the national transportation system improvement programme. The implementation of the Project contributes to the programme.

(5) The implementation of the Project will not yield any direct returns but improve income of the Cambodia.

(6) The social and environmental concerns arising out of the Project are noise pollution during the construction stage and human resettlement along the proposed bypass road. The noise pollution can be controlled within tolerable level. The route of the bypass road can be selected to minimize the relocation, and the Government of Cambodia implemented the relocation plan.

(7) The Project satisfies the requirement of the Japan's Grant Aid System.

4-2 Recommendation

It is concluded that the implementation of the project by Japanese grant aid system is evaluated as appropriate.

It is expected to produce the benefits mentioned above, which will greatly contribute towards meeting the basic needs of the local people. Road and Bridge Departments of Ministry of Public Works and Transport has sufficient personnel and equipment to maintain the project roads.

DRAWING

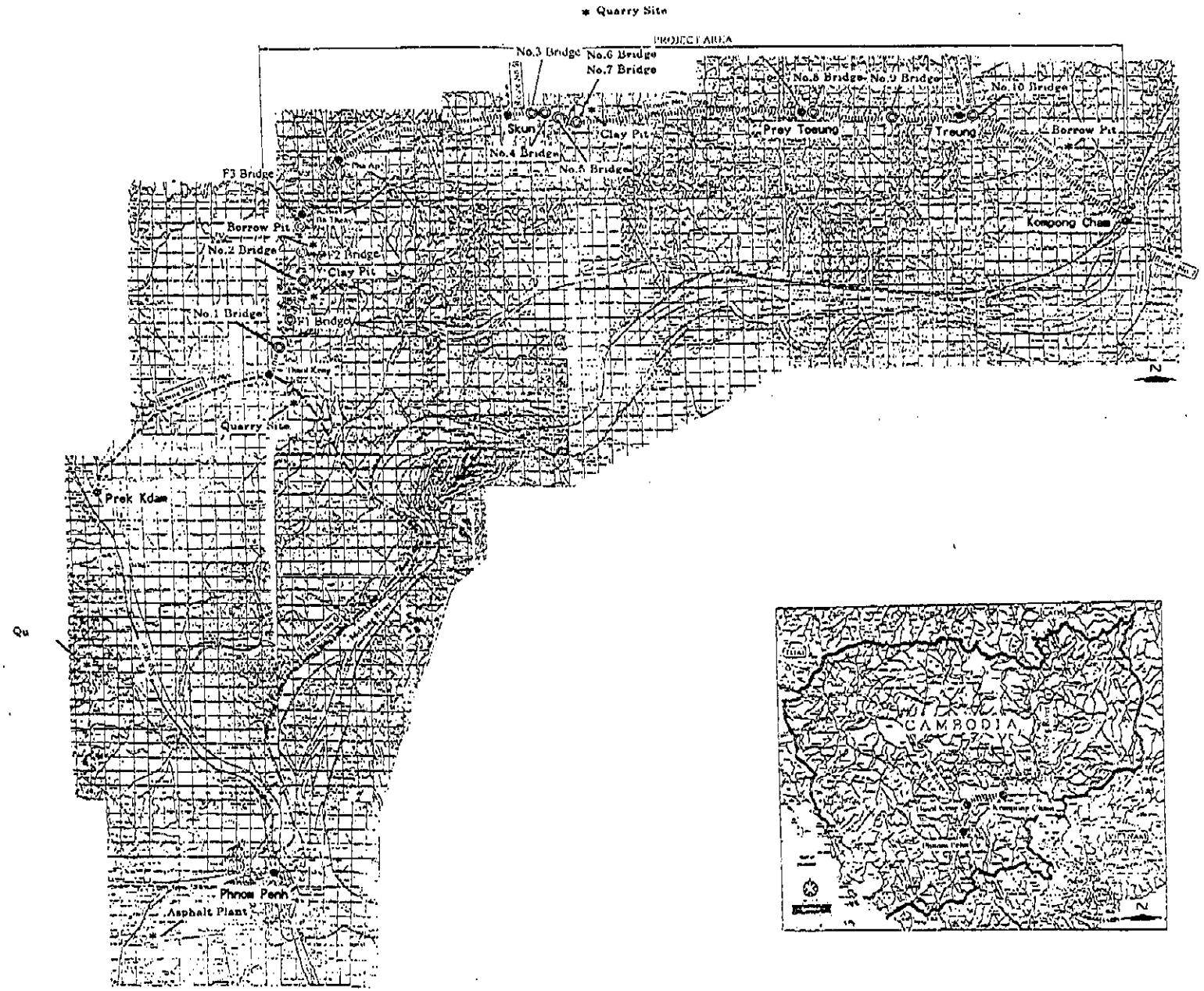
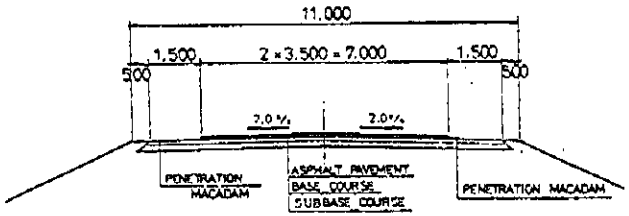


Figure 2-3-10

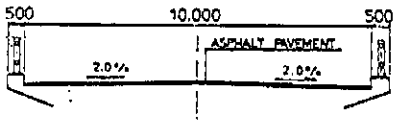
THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7	TITLE : LOCATION MAP		JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997	DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

STANDARD CROSS SECTION

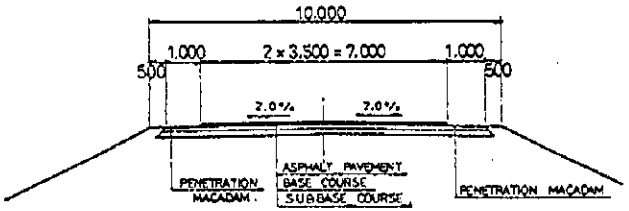
(EARTH WORK SECTION)



(BRIDGE SECTION)



(EARTH WORK RURAL AREA SECTION)



Note: Thickness of pavement is not decided

Road Width

Station	Road Width
Sta. 15 + 600 ~ Sta. 18 + 000	W = 10.0 m
Sta. 18 + 000 ~ Sta. 19 + 000	W = 11.0 m
Sta. 19 + 000 ~ Sta. 25 + 600	W = 10.0 m
Sta. 25 + 600 ~ Sta. 28 + 000	W = 11.0 m
Sta. 28 + 000 ~ Sta. 30 + 600	W = 10.0 m
Sta. 30 + 600 ~ Sta. 32 + 600	W = 11.0 m
Sta. 32 + 600 ~ Sta. 42 + 000	W = 10.0 m
Sta. 42 + 600 ~ Sta. 45 + 000	W = 11.0 m
Sta. 45 + 000 ~ Sta. 64 + 000	W = 10.0 m
Sta. 64 + 000 ~ Sta. 66 + 000	W = 11.0 m
Sta. 66 + 000 ~ Sta. 74 + 700	W = 10.0 m
Sta. 74 + 700 ~ Sta. 76 + 200	W = 11.0 m
Sta. 76 + 600 ~ Sta. 81 + 600	W = 10.0 m
Sta. 81 + 800 ~ Sta. 90 + 400	W = 11.0 m

Pavement Structure

Station	Design CBR Value	Thickness of Pavement Layer		
		Asphalt Concrete	Base Course	Sub - base
Sta. 15 + 600 ~ Sta. 24 + 000	6	5 cm	20 cm	25 cm
Sta. 24 + 000 ~ Sta. 30 + 000	20	5 cm	10 cm	15 cm
Sta. 30 + 000 ~ Sta. 38 + 000	12	5 cm	15 cm	20 cm
Sta. 38 + 000 ~ Sta. 45 + 000	20	5 cm	10 cm	15 cm
Sta. 45 + 000 ~ Sta. 50 + 000	4	5 cm	20 cm	25 cm
Sta. 50 + 000 ~ Sta. 60 + 000	20	5 cm	10 cm	10 cm
Sta. 60 + 000 ~ Sta. 75 + 000	2	5 cm	25 cm	30 cm
Sta. 75 + 000 ~ Sta. 87 + 700	6	5 cm	20 cm	20 cm
Sta. 87 + 700 ~ Sta. 90 + 400	8	5 cm	15 cm	20 cm

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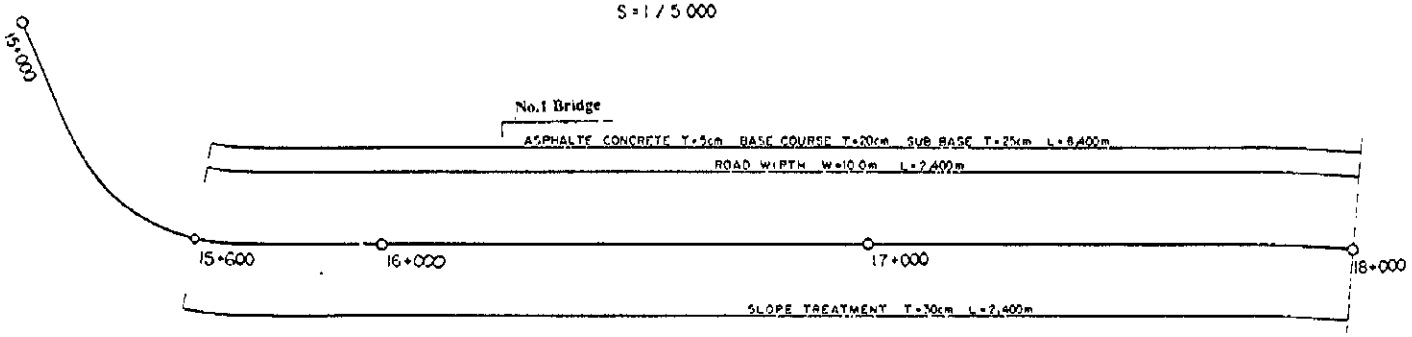
Figure 2-3-11

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7	TITLE : TYPICAL CROSS SECTION DATE : January 1997 / DRAWING NO :	JAPAN INTERNATIONAL COOPERATION AGENCY ORIENTAL CONSULTANTS CO., LTD

PLAN

S=1/5 000



PROFILE

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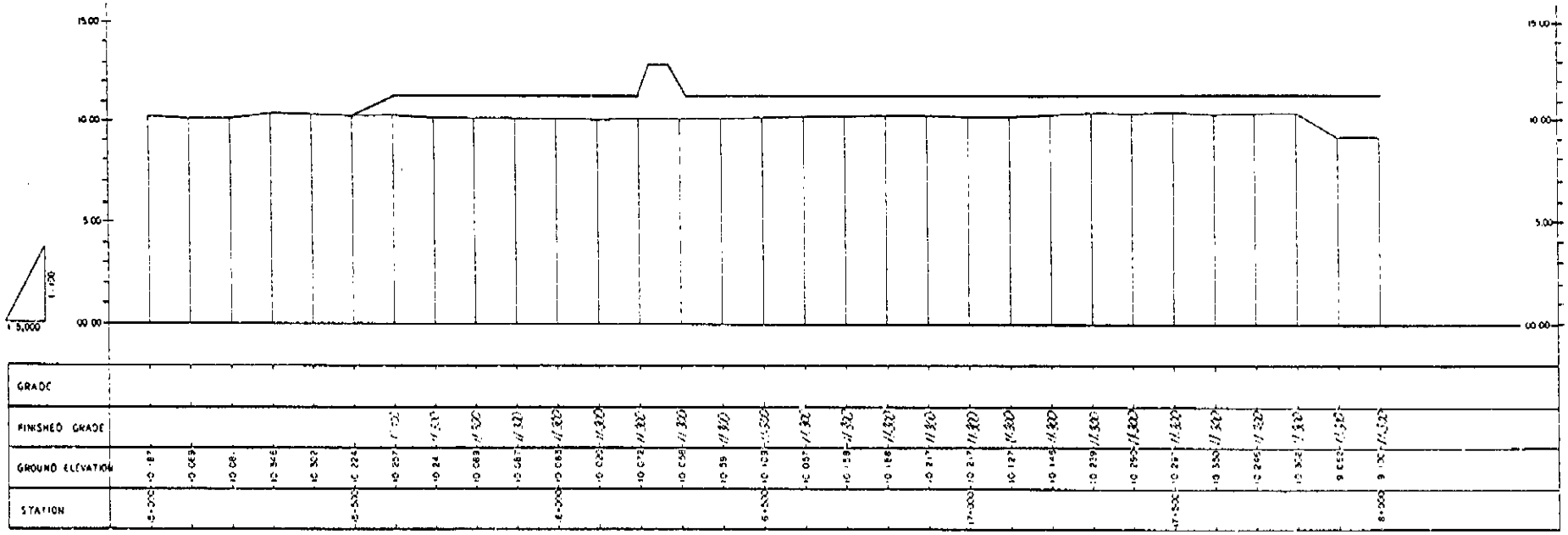
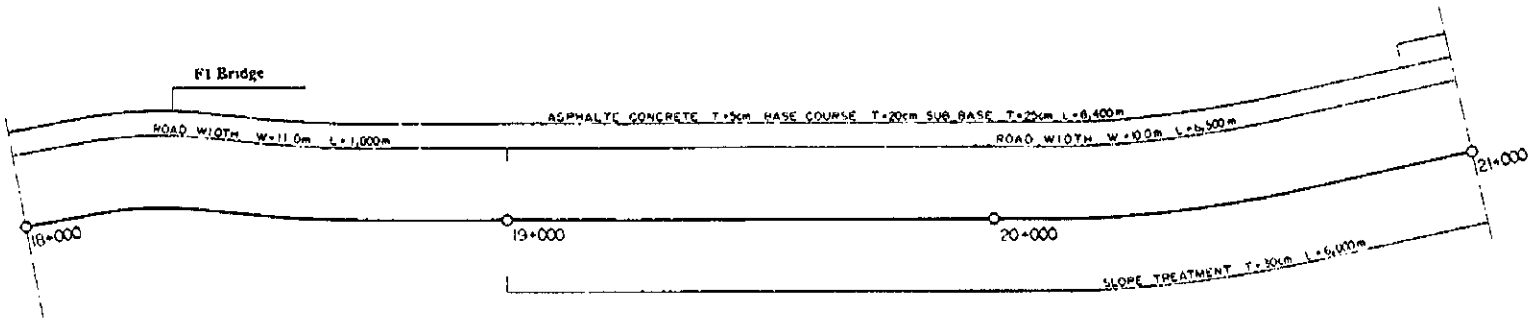


Figure 2-3-12

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (1)		JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997	DRAWING NO :	ORIENTAL CONSULTANTS CO., LTD

PLAN

S=1/5 000



PROFILE

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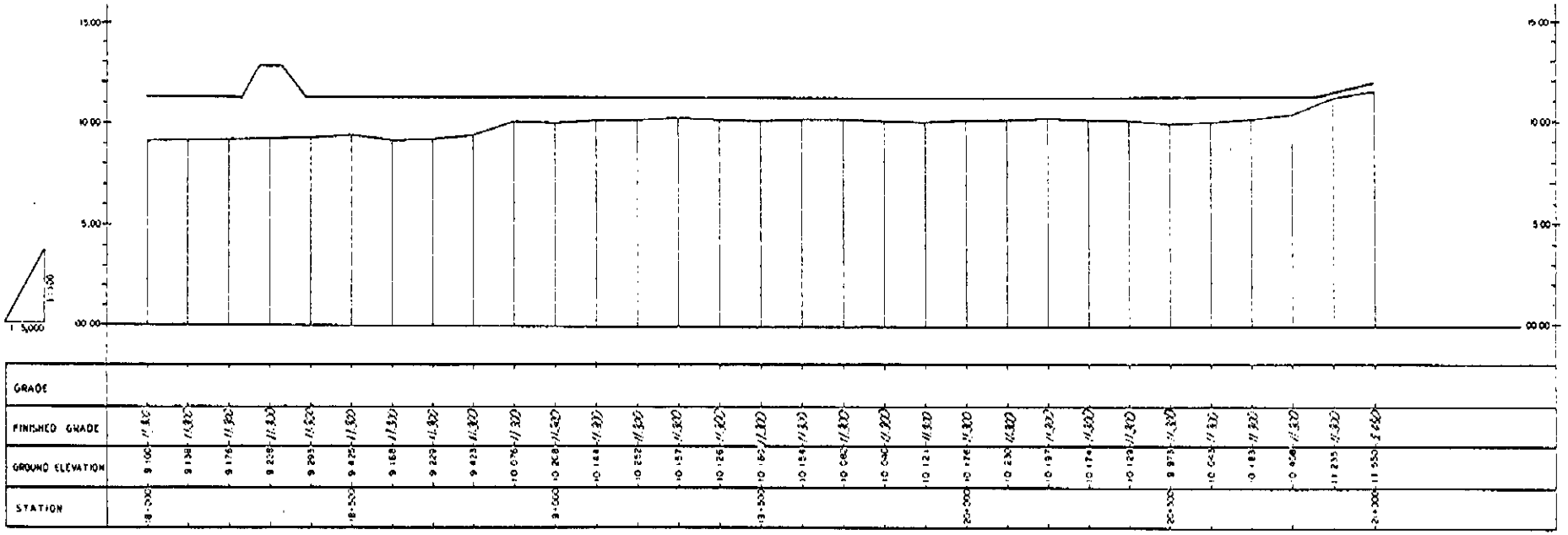
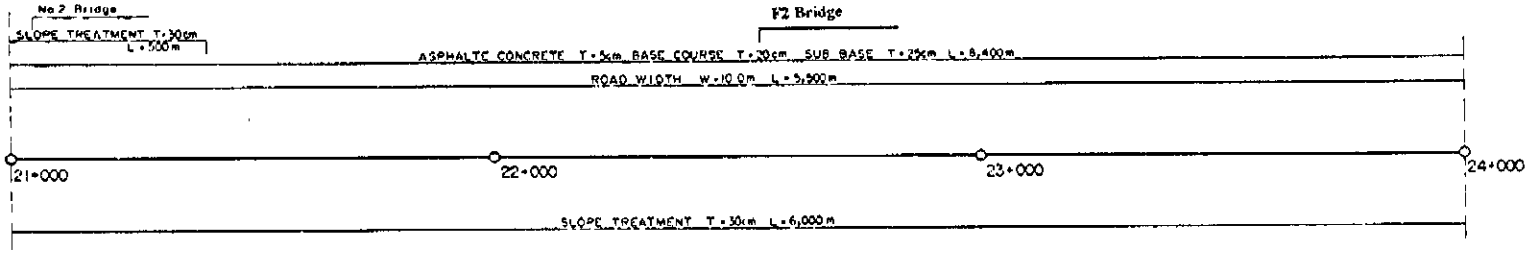


Figure 2-3-13

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (2)		JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997	DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

PLAN

S = 1 / 5 000



PROFILE

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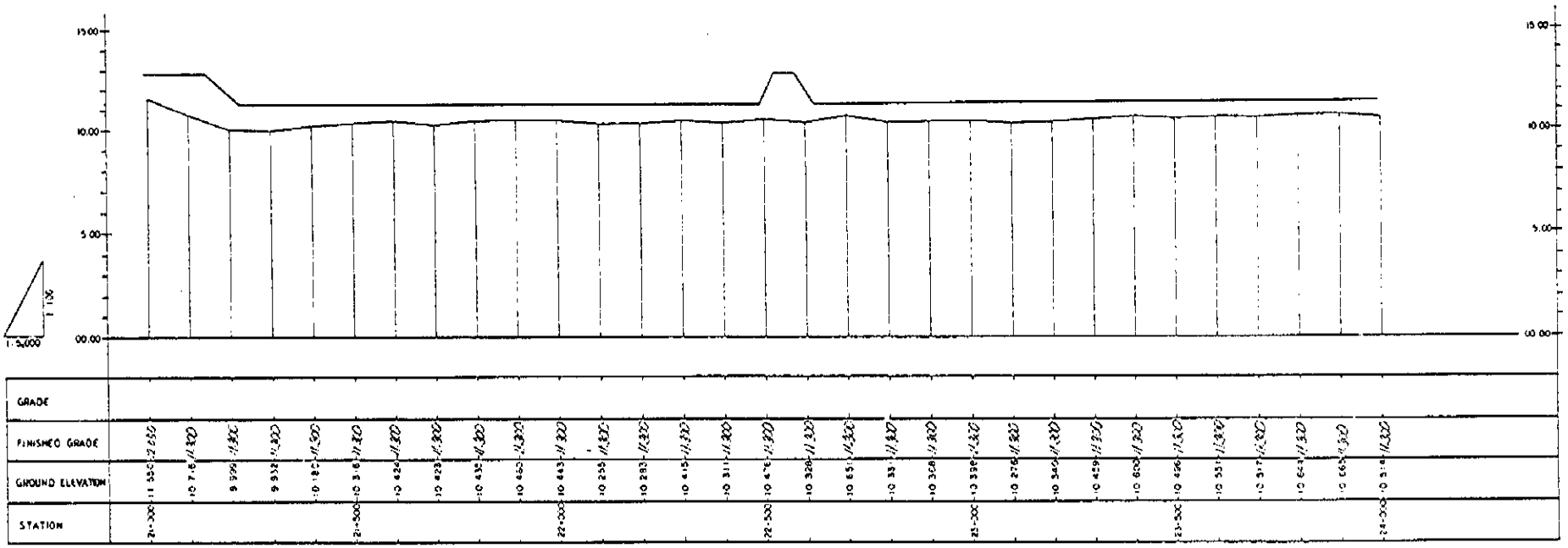


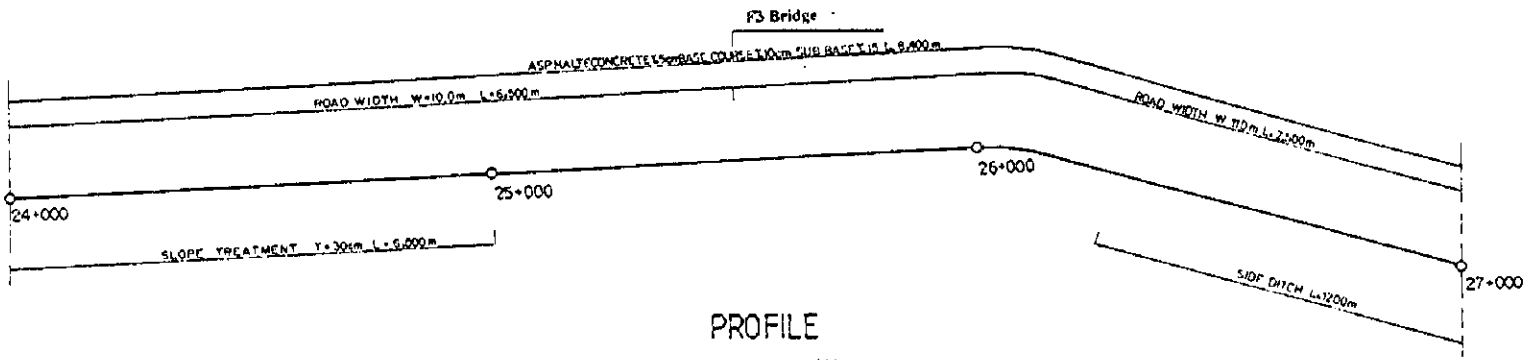
D - 5

Figure 2-3-14

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (3)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO., LTD

PLAN

S.1/5000



PROFILE

H.1/5000 W.1/100

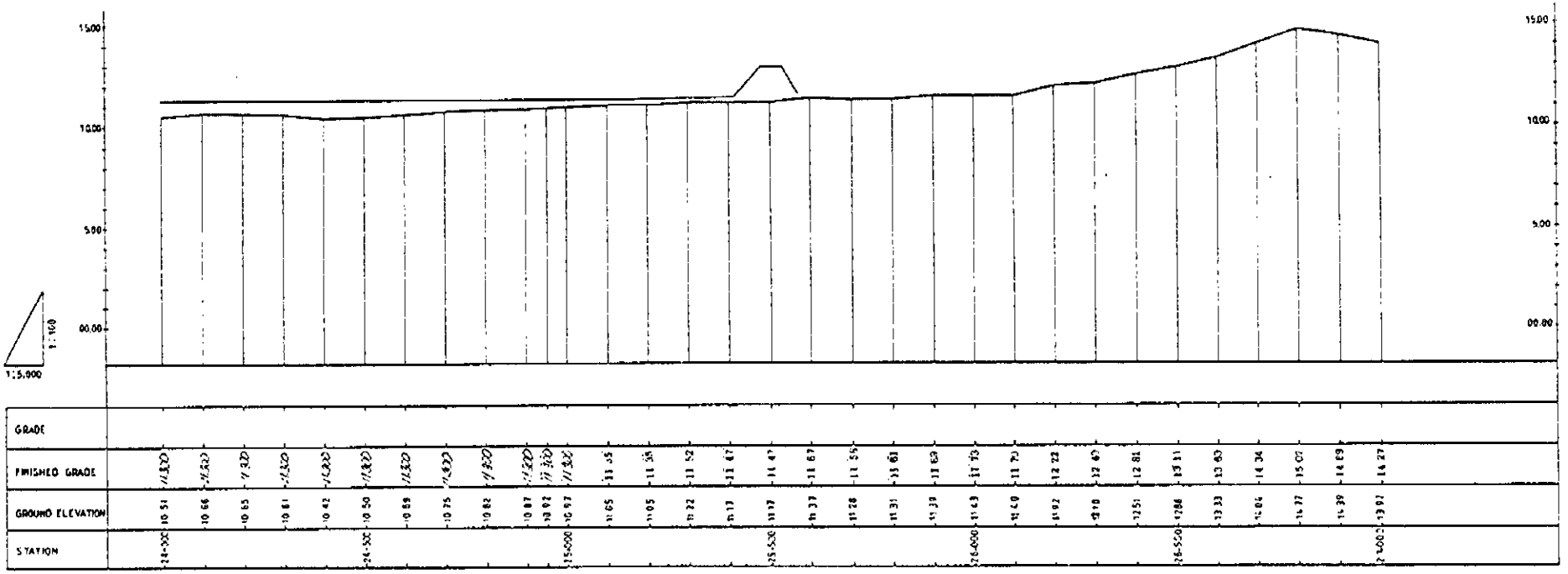


Figure 2-3-15

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (4)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO., LTD

PLAN

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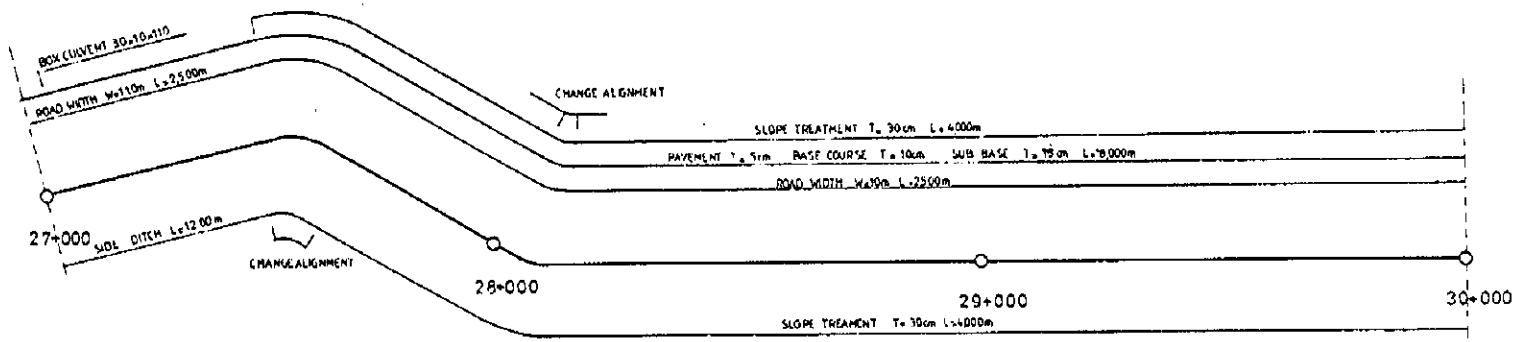

PROFILE

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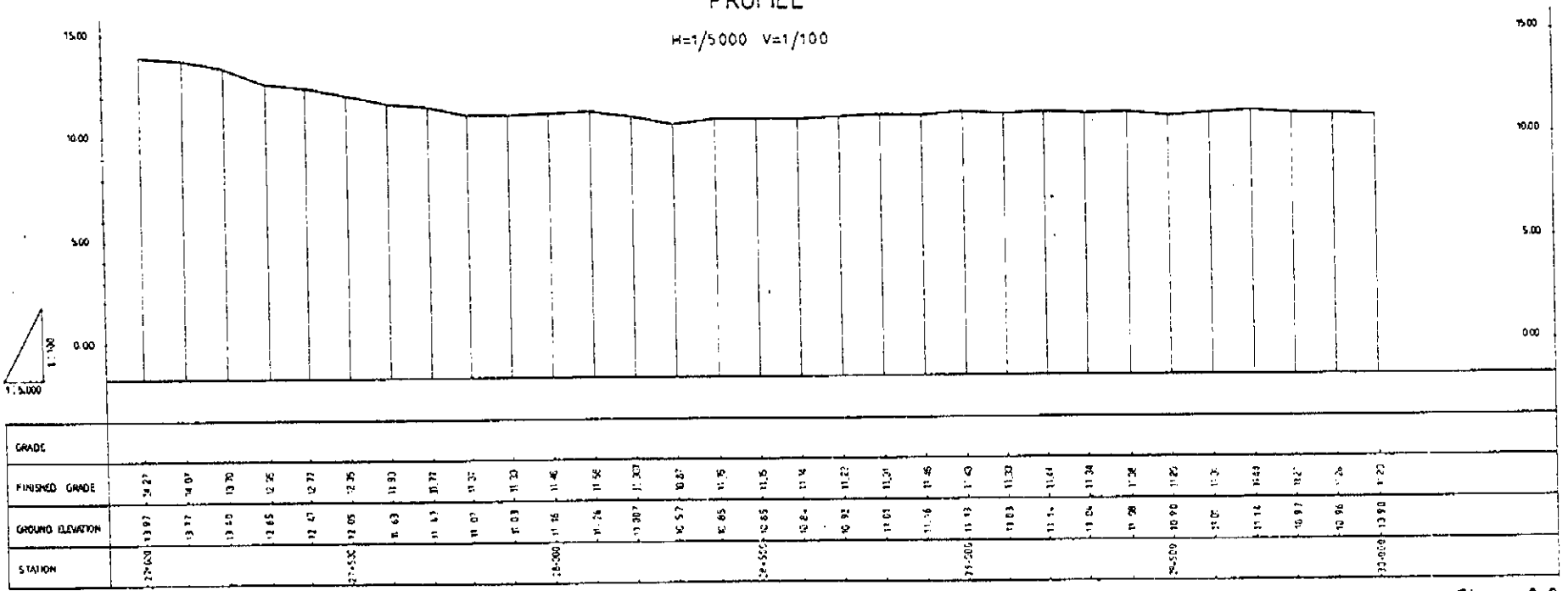
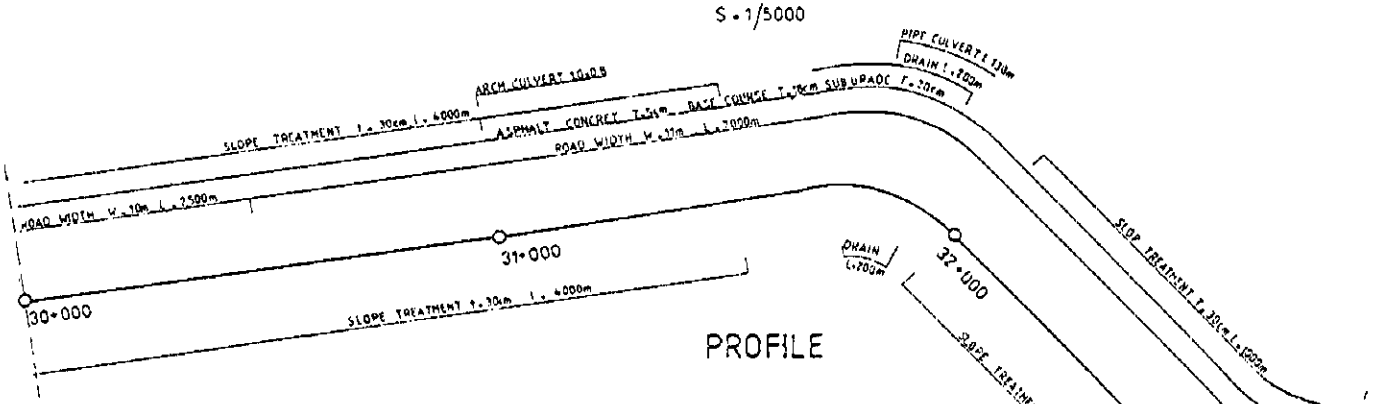


Figure 2-3-16

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (5)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

PLAN

S . 1/5000



PROFILE

H . 1/5000

V . 1/100

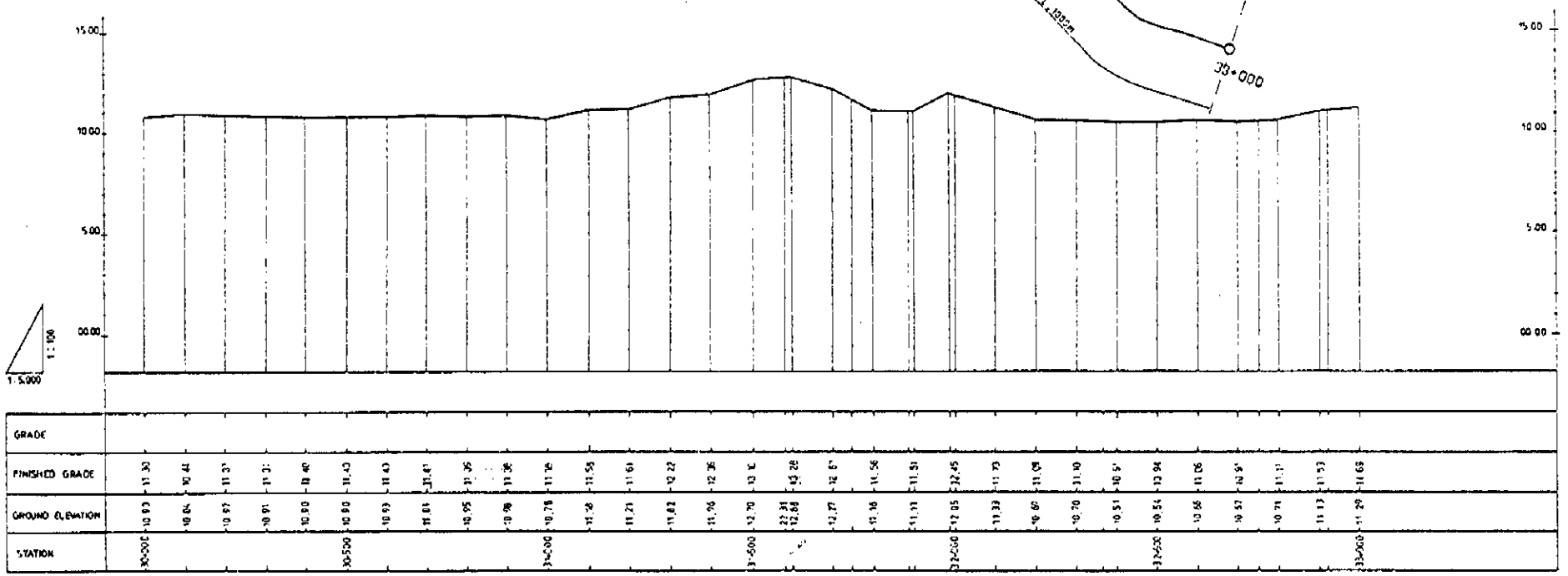
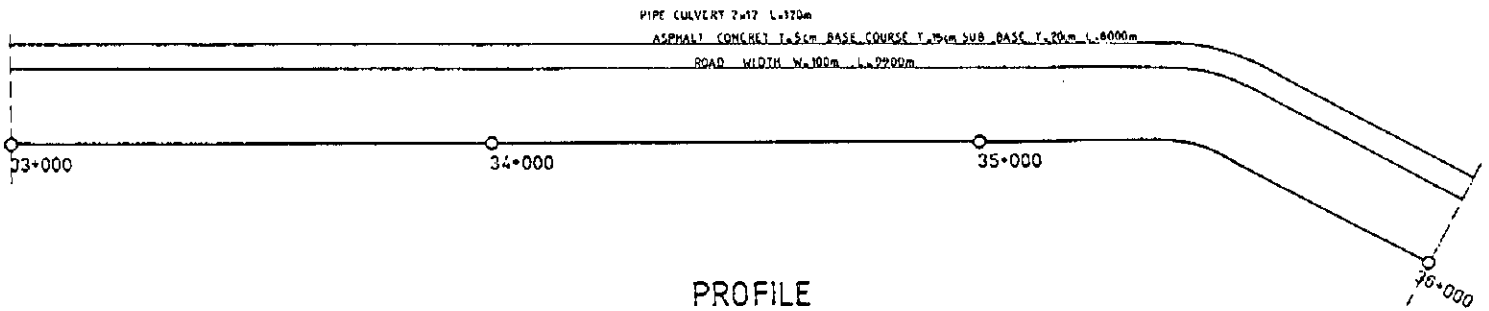


Figure 2-3-17

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (6)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

PLAN

S. 1/5000



PROFILE

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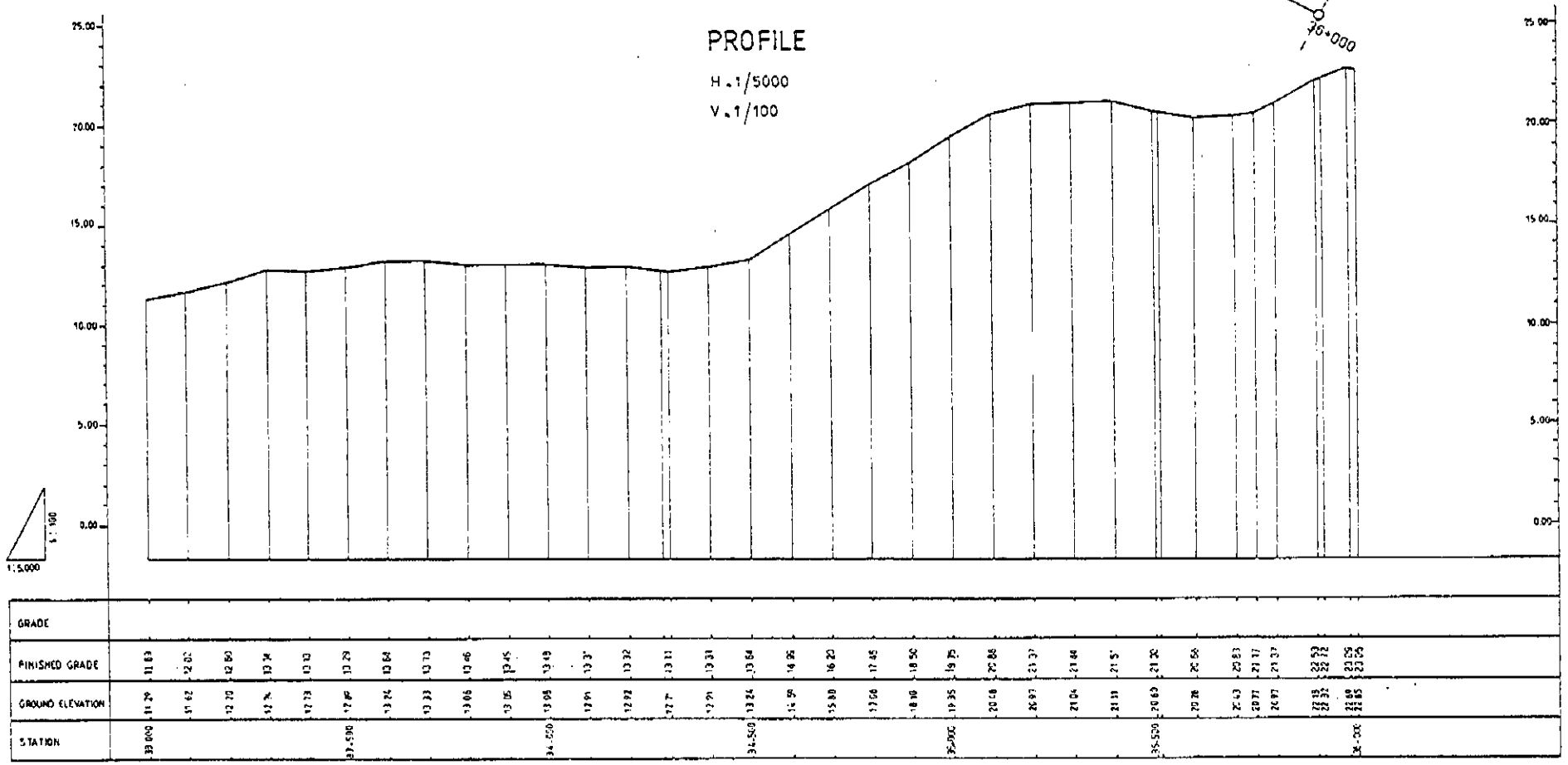

Figure 2-3-18

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (7)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO., LTD

PLAN

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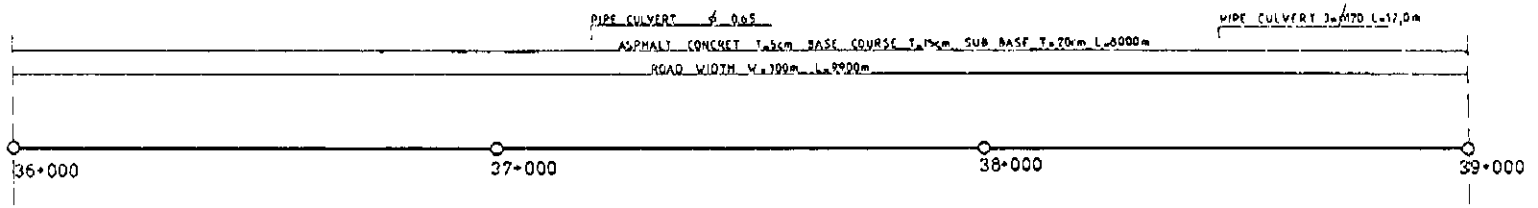

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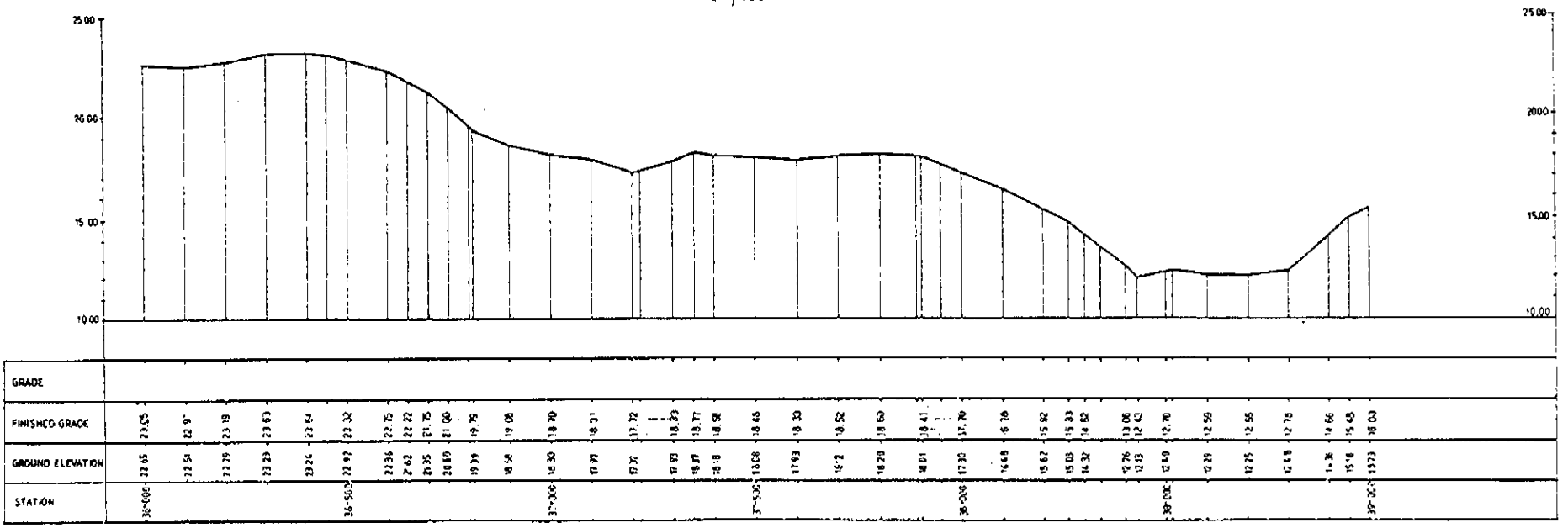


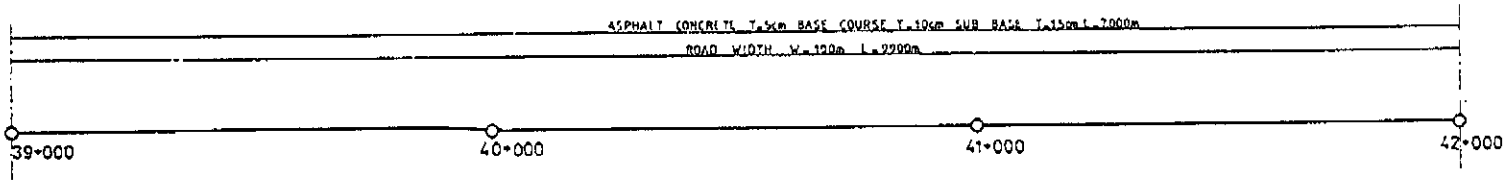
Figure 2-3-19

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (8)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO., LTD

(9)

PLAN

S = 1/5000



PROFILE

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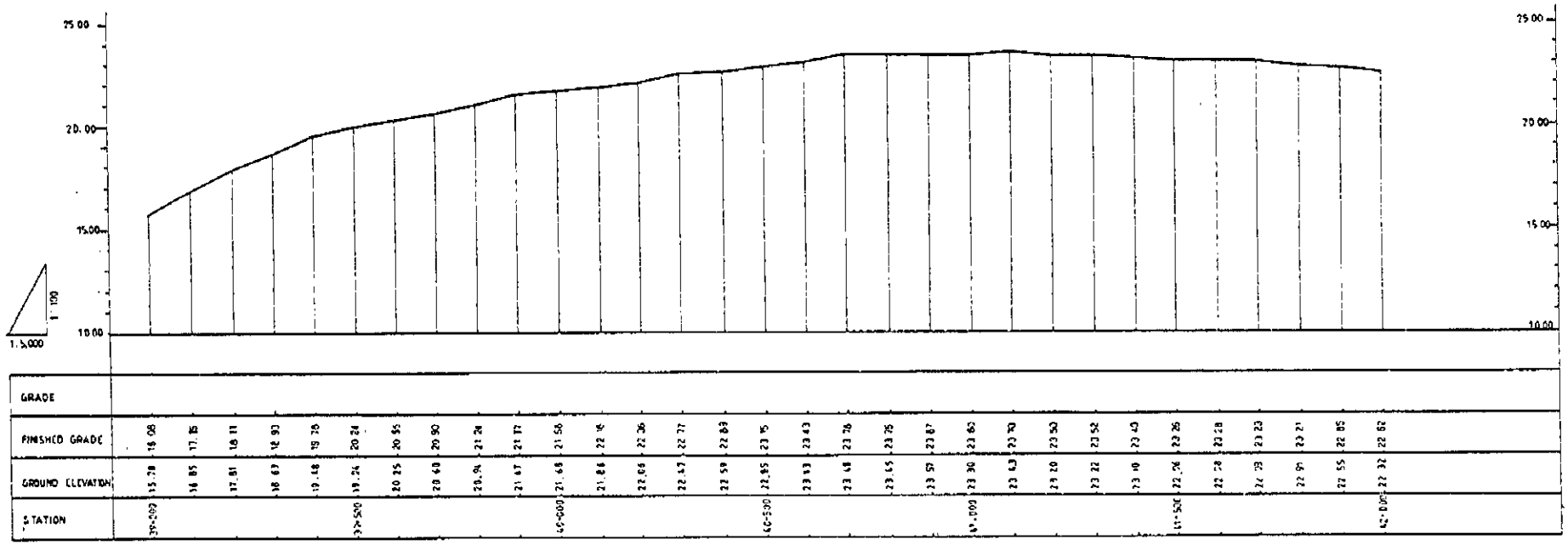

Figure 2-3-20

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (9)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO., LTD

PLAN

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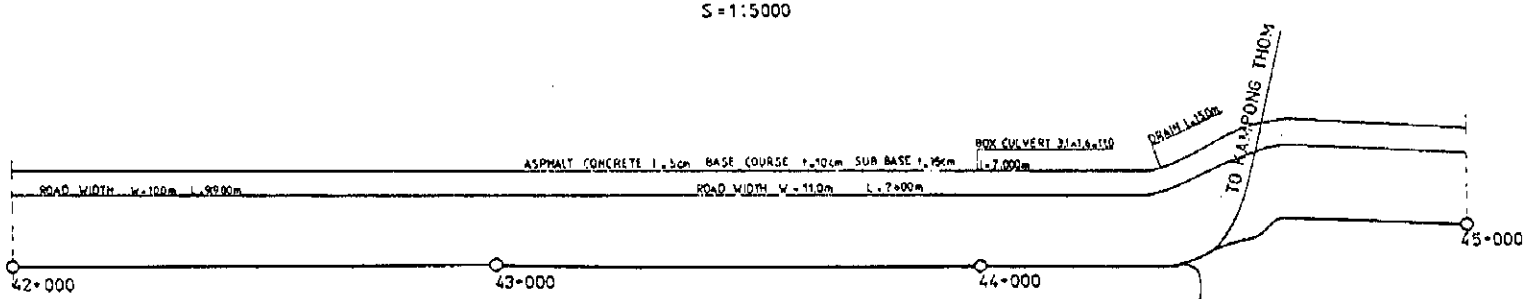

PRO FILE

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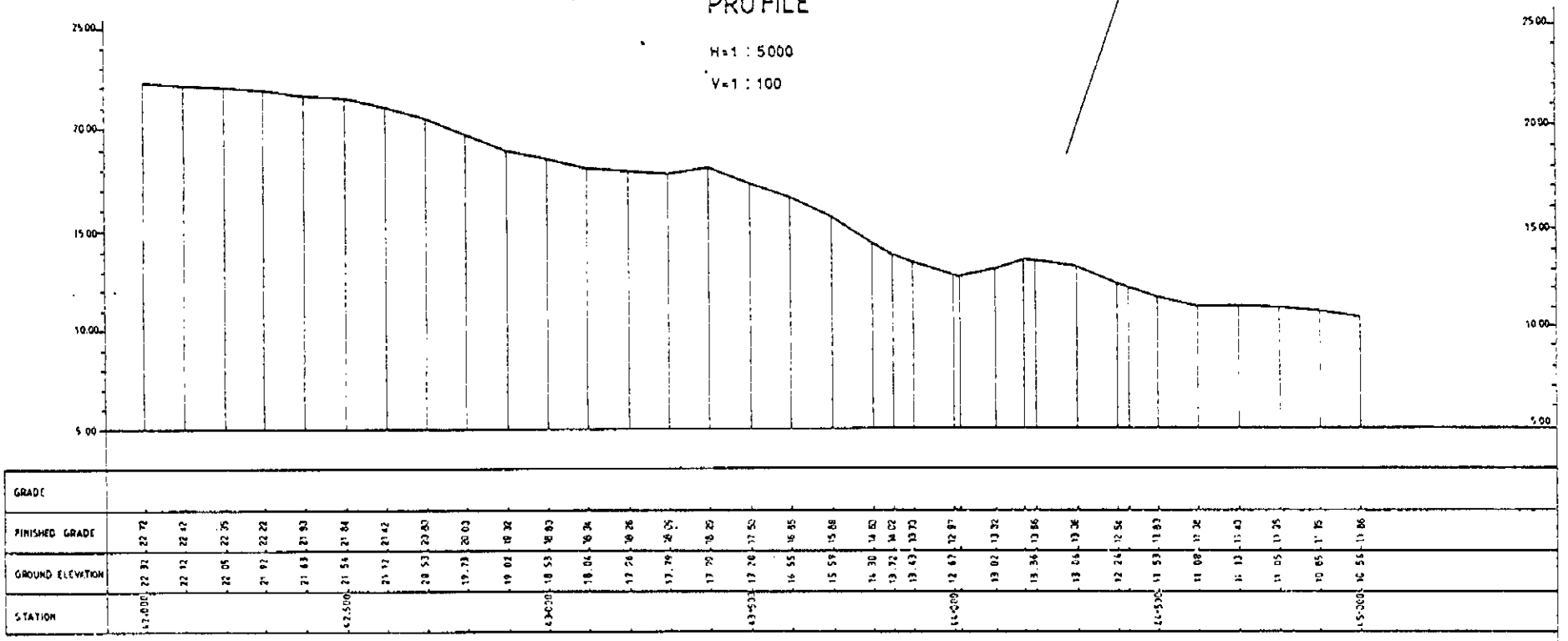
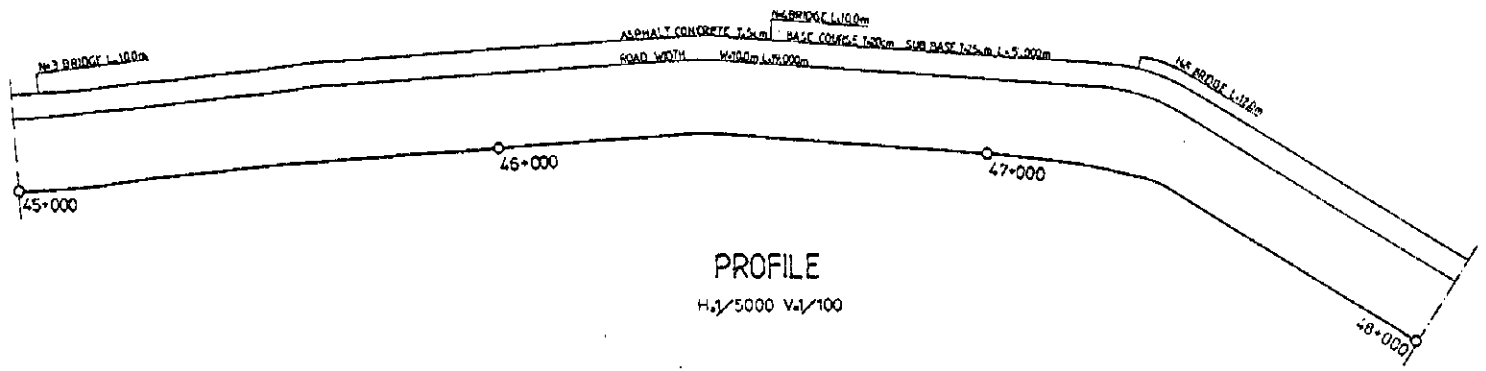


Figure 2-3-21

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (10)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

PLAN

S=1/5000



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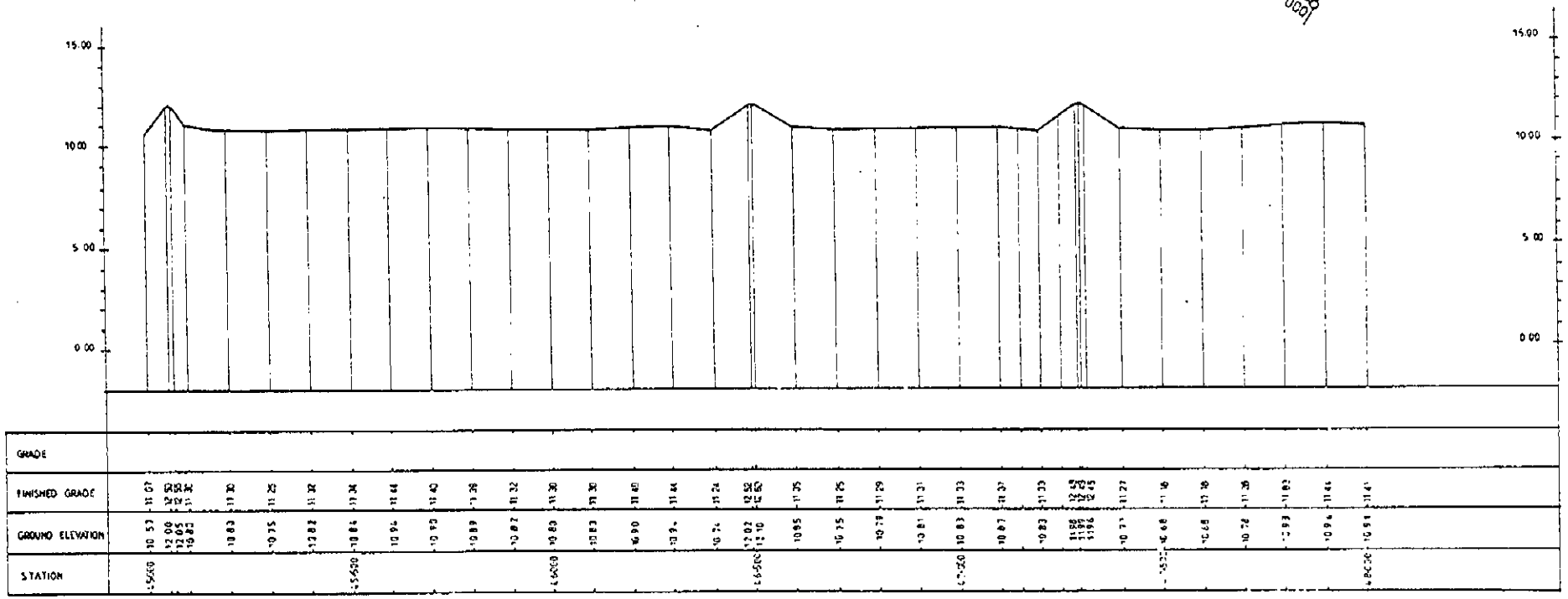
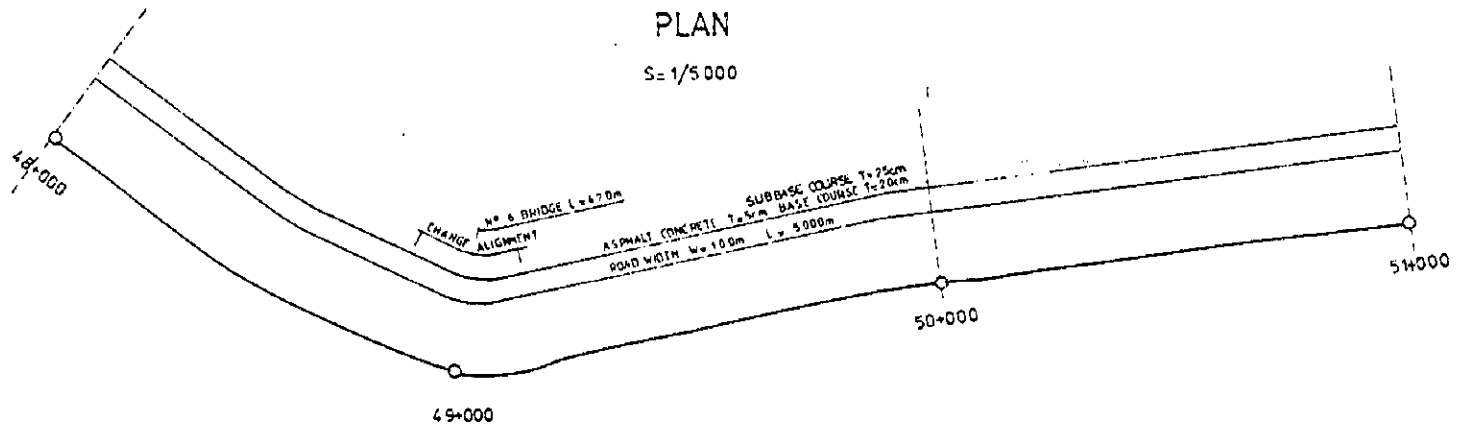


Figure 2-3-22

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (11) DATE : January 1997 / DRAWING NO :	JAPAN INTERNATIONAL COOPERATION AGENCY ORIENTAL CONSULTANTS CO.,LTD



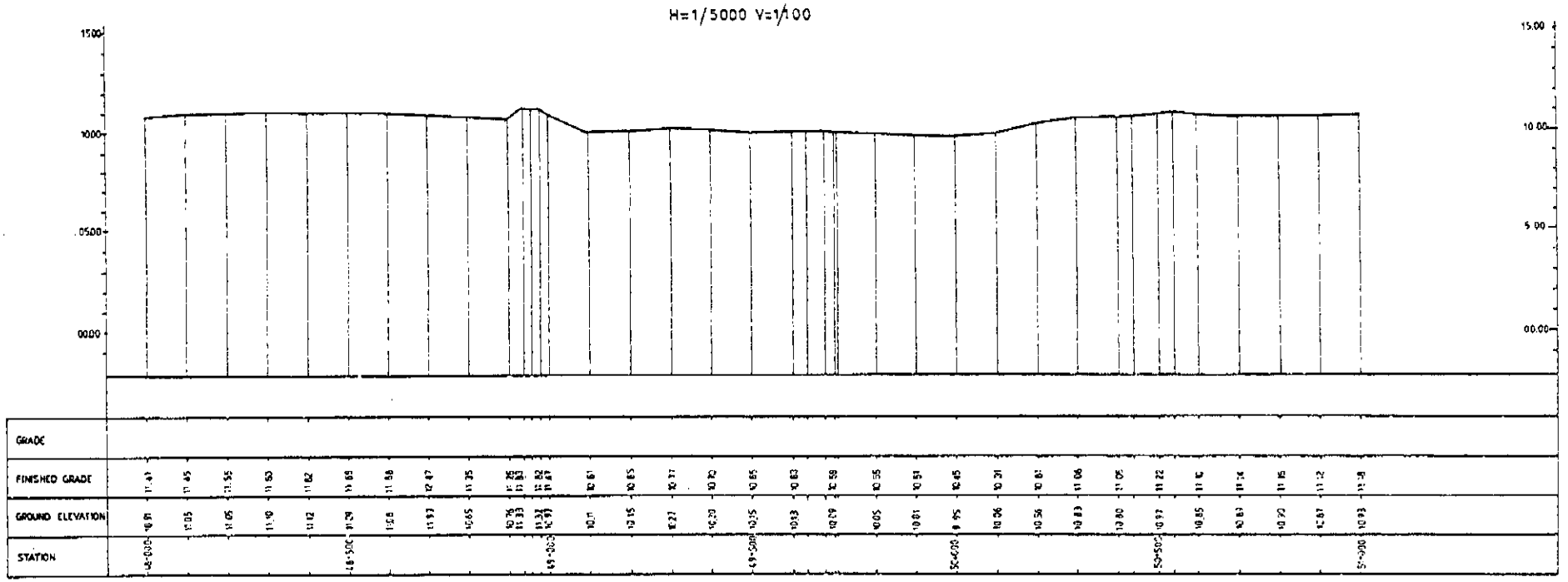
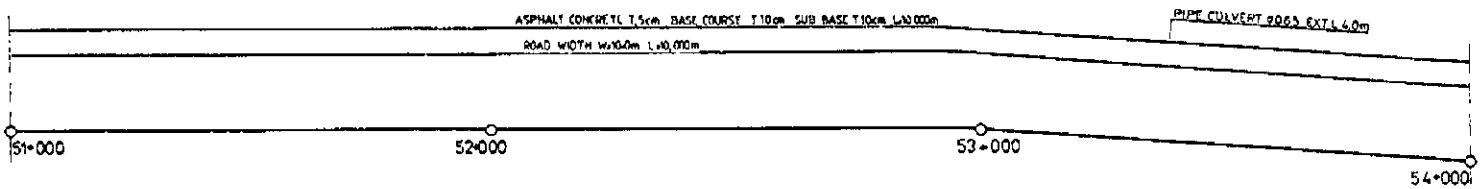


Figure 2-3-23

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (12)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

PLAN

S = 1/5000



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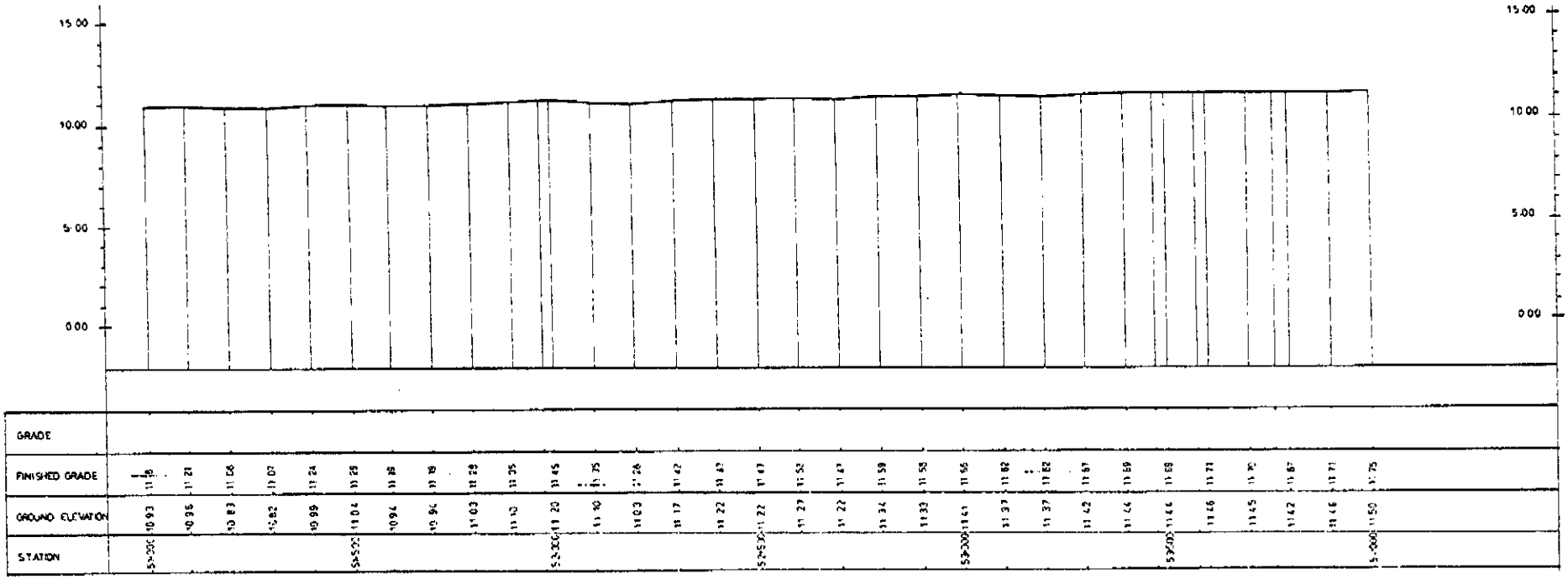
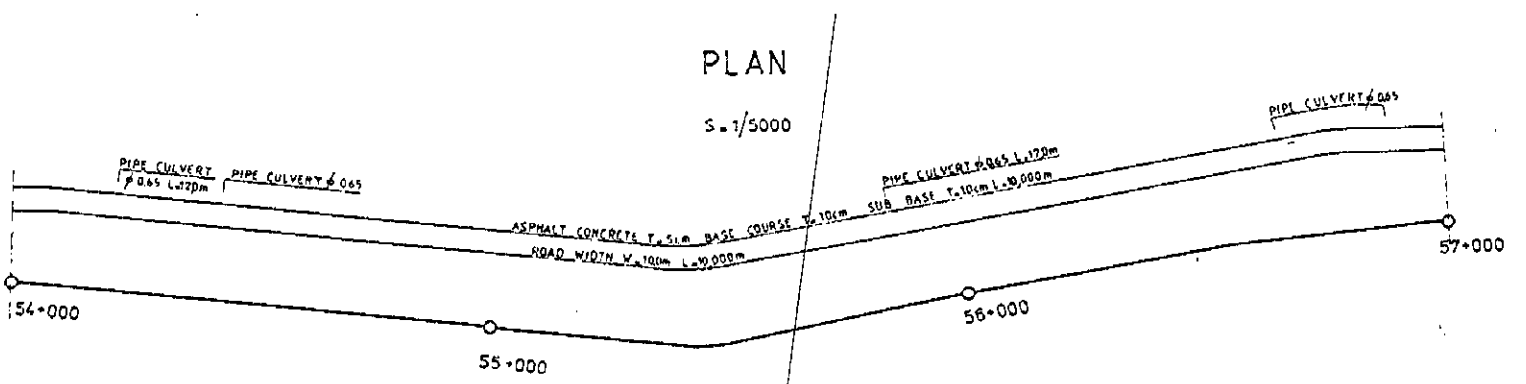


Figure 2-3-24

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (13)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD



PROFILE

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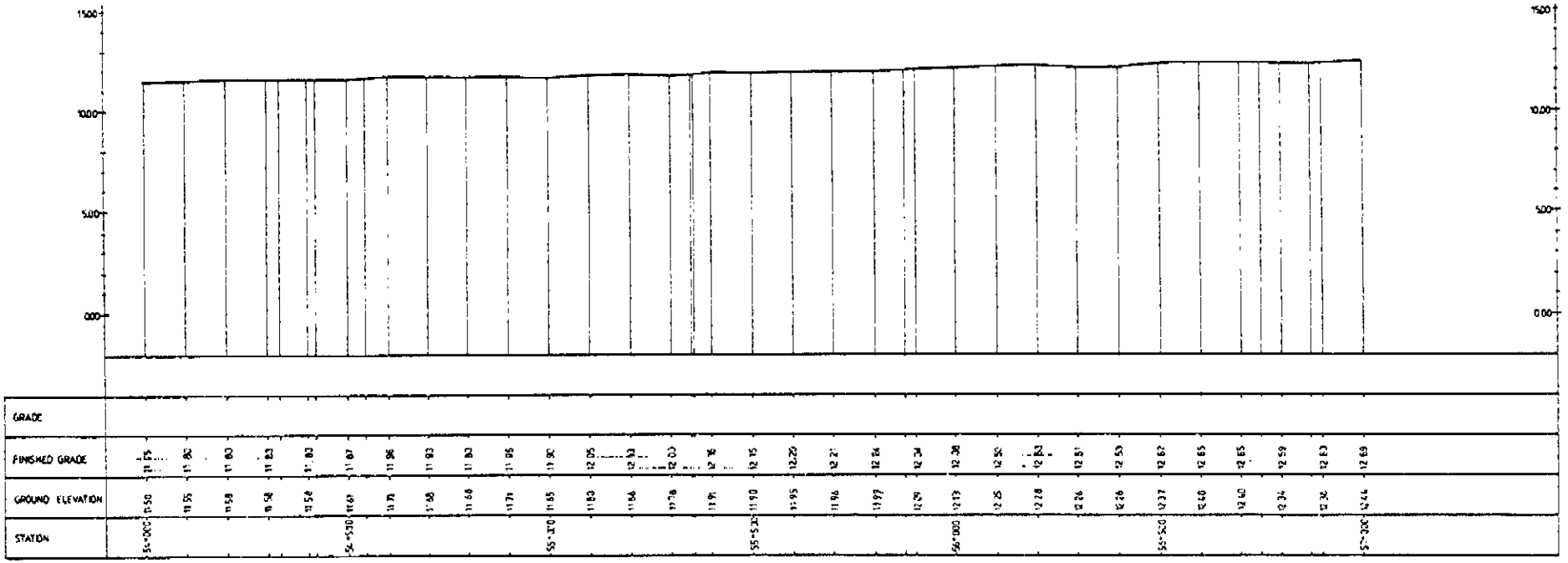
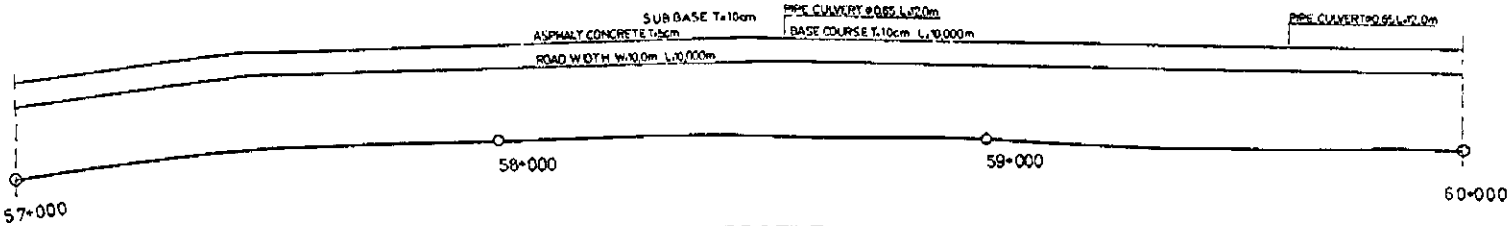


Figure 2-3-25

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (14)		JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997	DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

PLAN

S=1/5000



PROFILE

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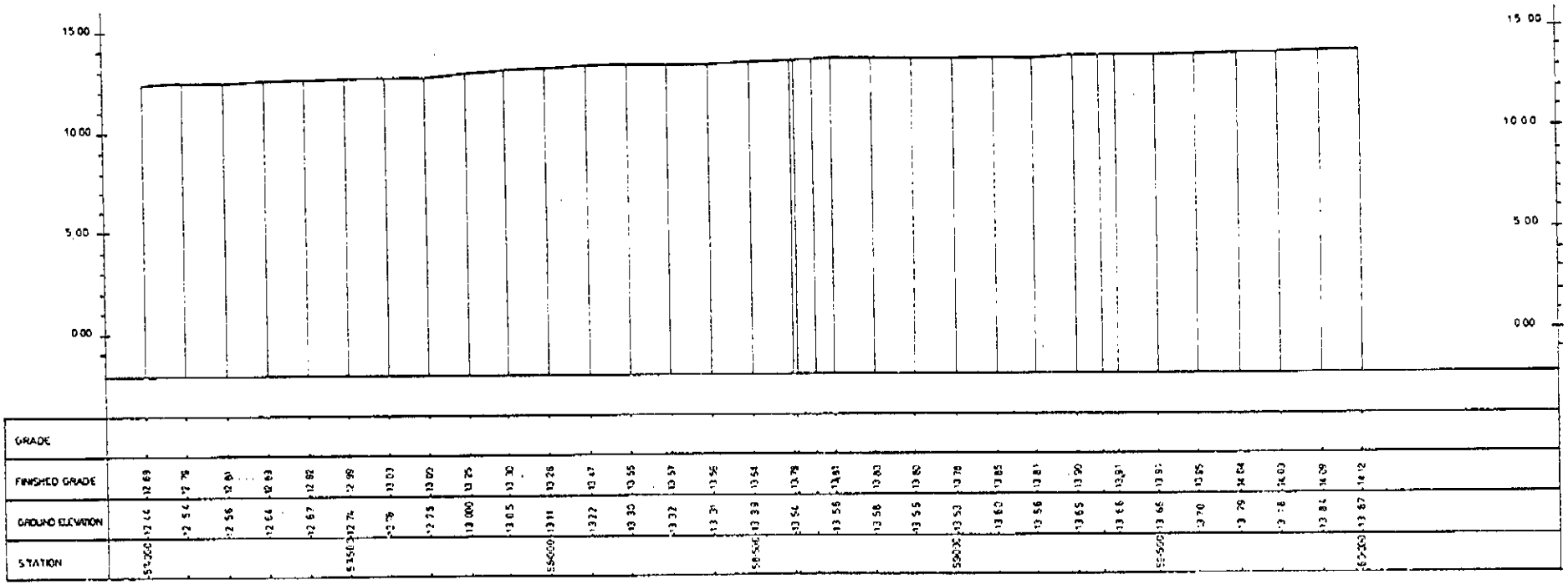
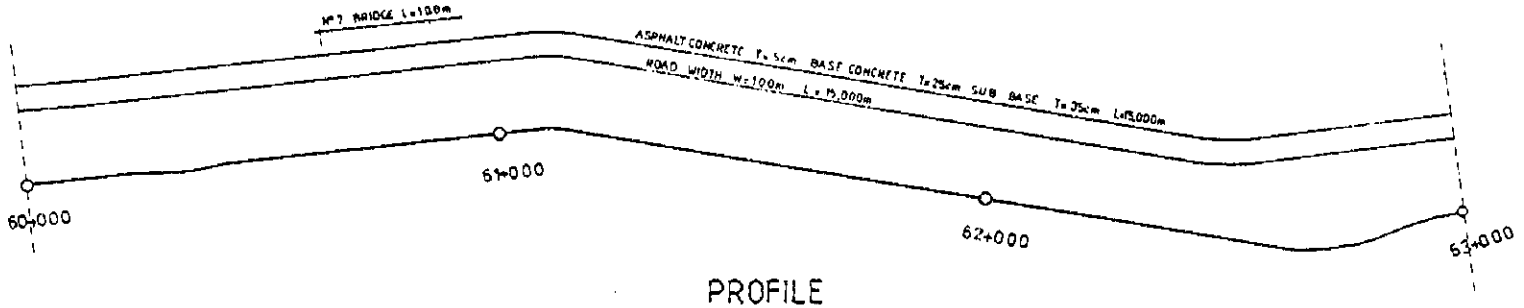


Figure 2-3-26

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (15)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO., LTD

PLAN

S=1/5000



PROFILE

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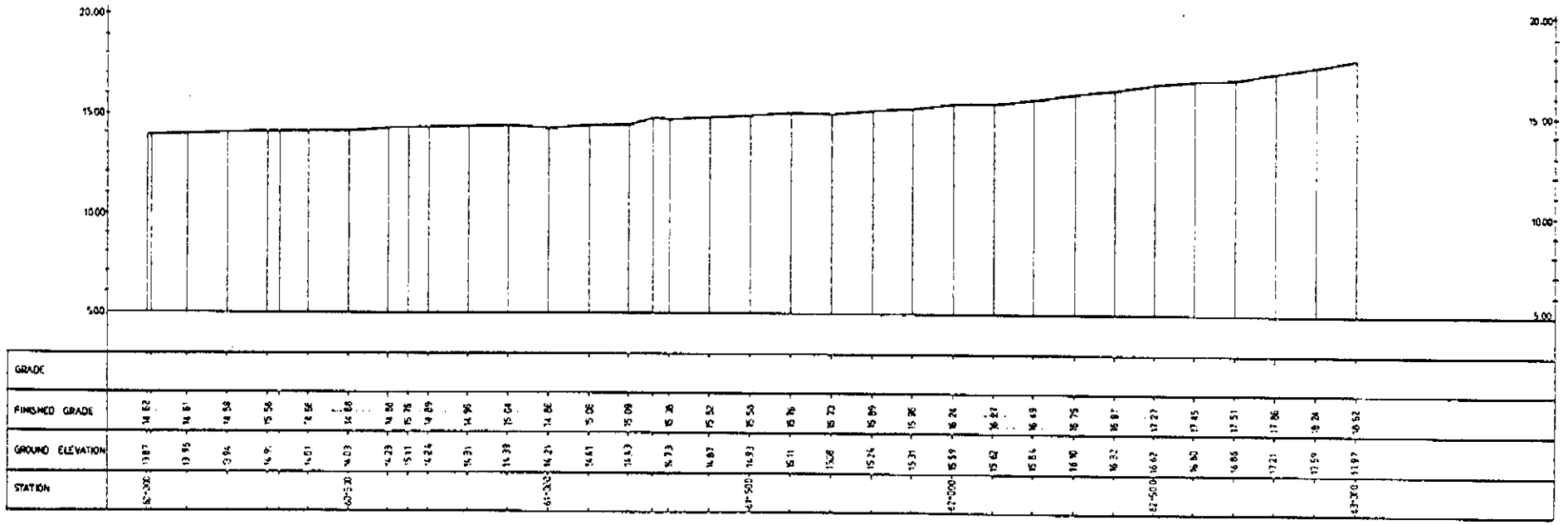

Figure 2-3-27

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (16)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

PLAN

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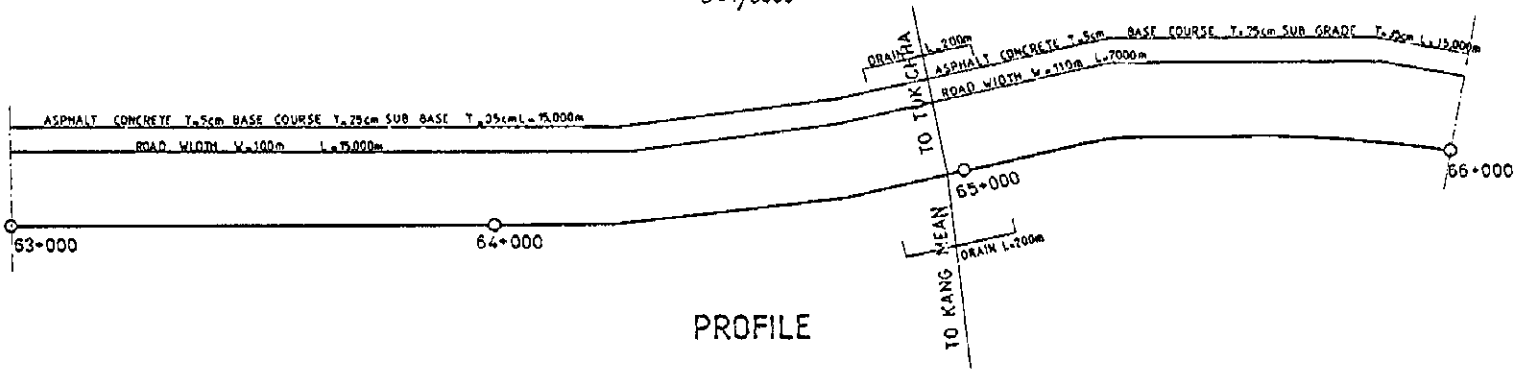

PROFILE

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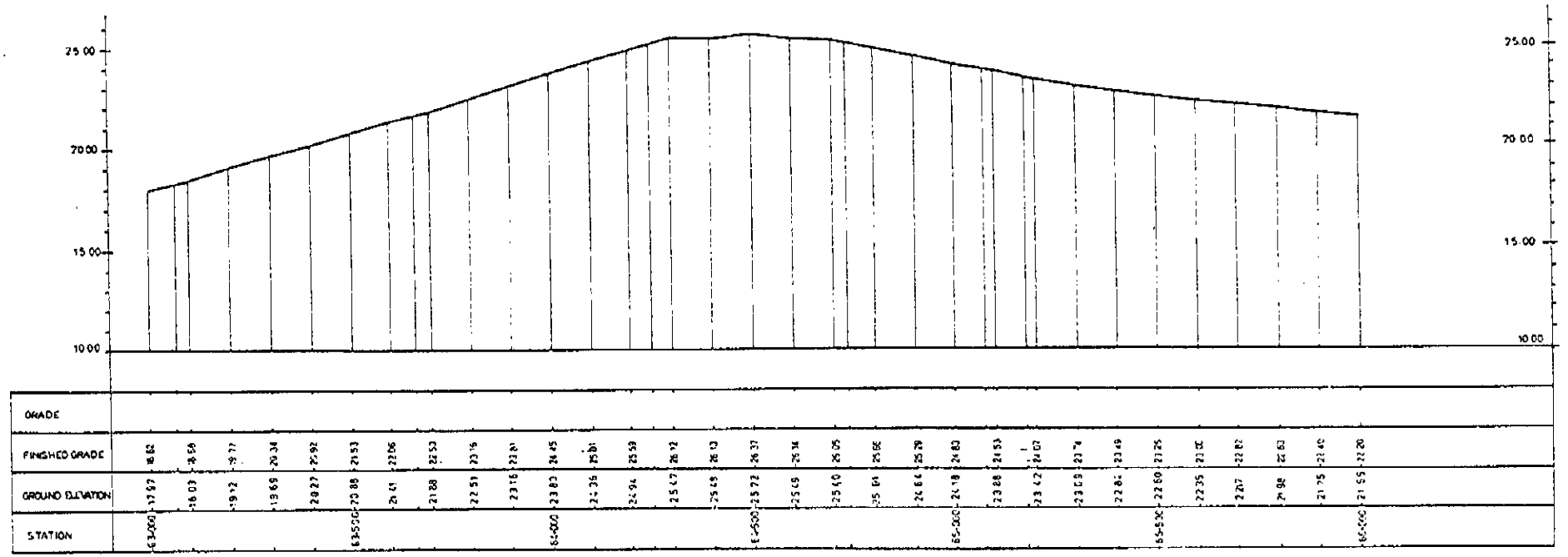
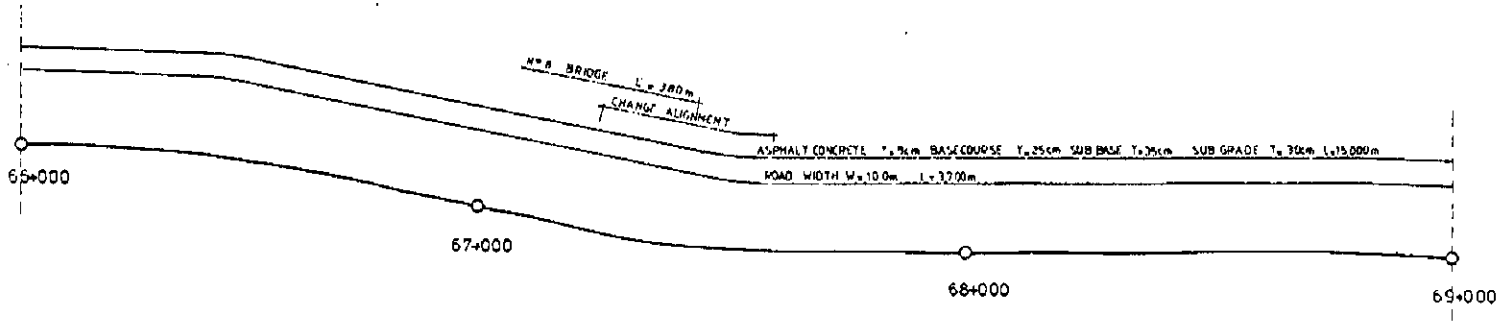


Figure 2-3-28

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (17)		JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997	DRAWING NO :	ORIENTAL CONSULTANTS CO., LTD

PLAN

S=1/5000



PROFILE

H=1/5000 V=1/100

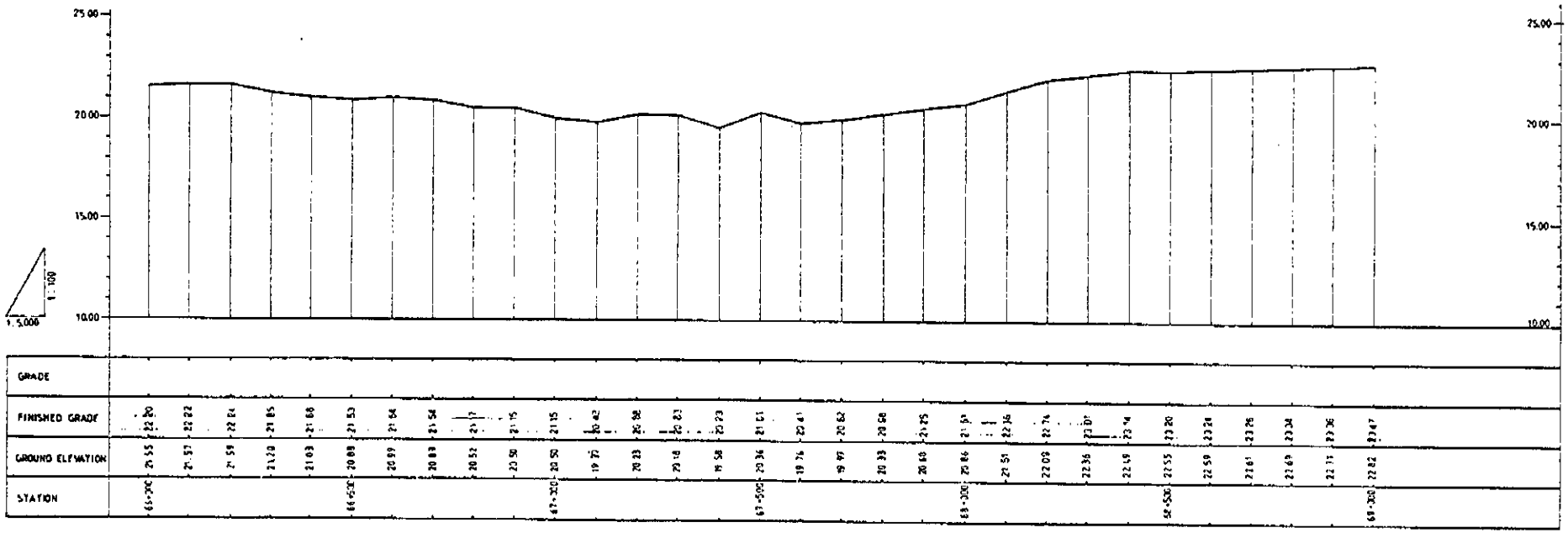
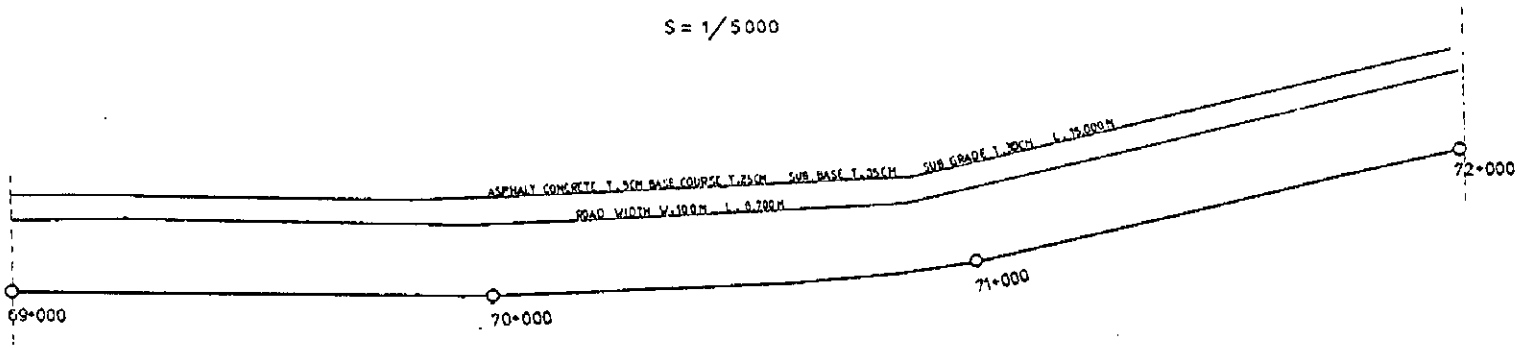


Figure 2-3-29

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (18)		JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997	DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

PLAN

S = 1/5000



PROFILE

H=1/5000 V=1/100

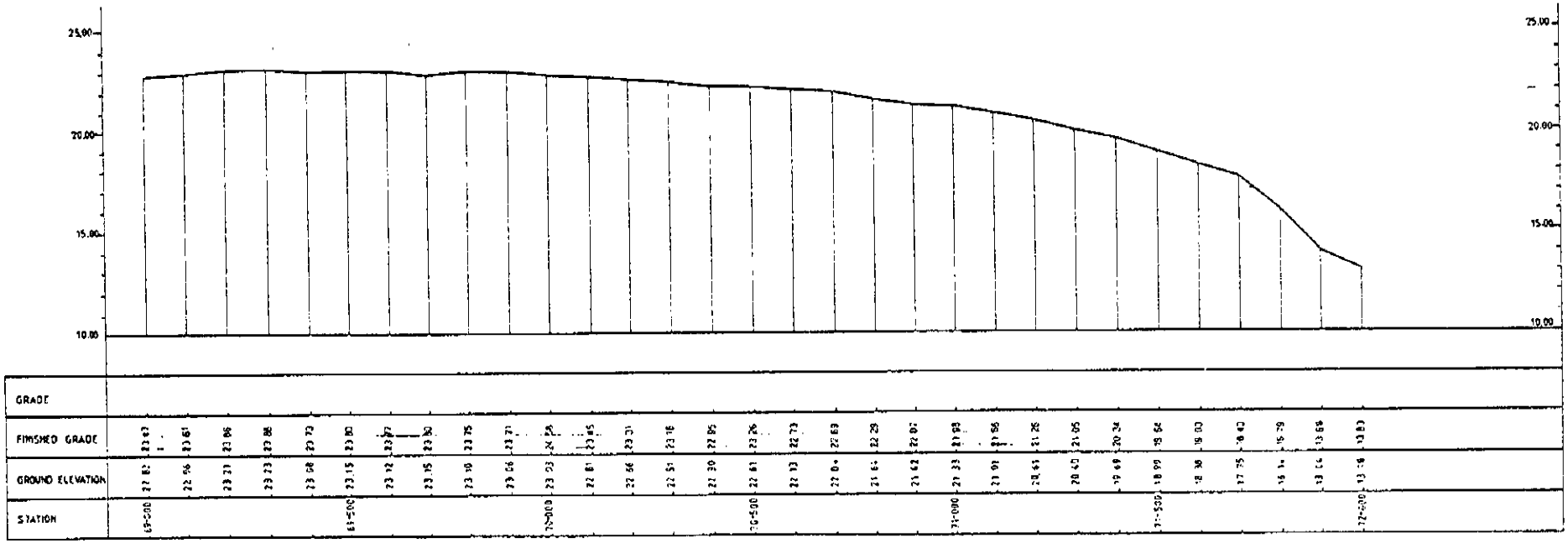
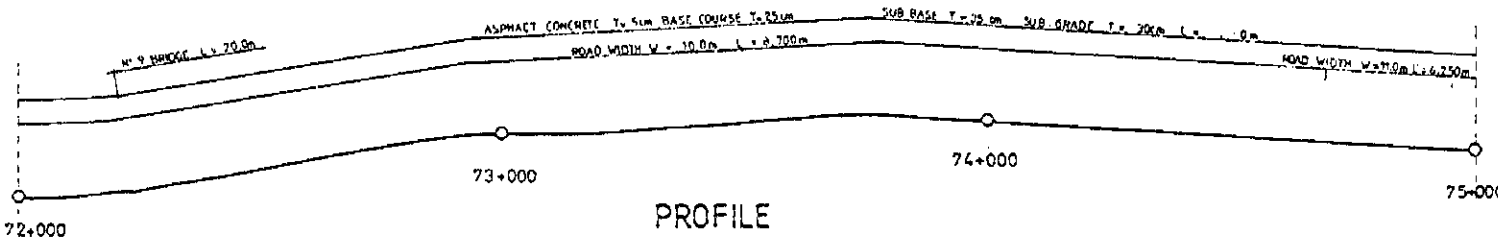


Figure 2-3-30

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (19)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

PLAN

S = 1/5000



PROFILE

H=1/5000 V=1/100

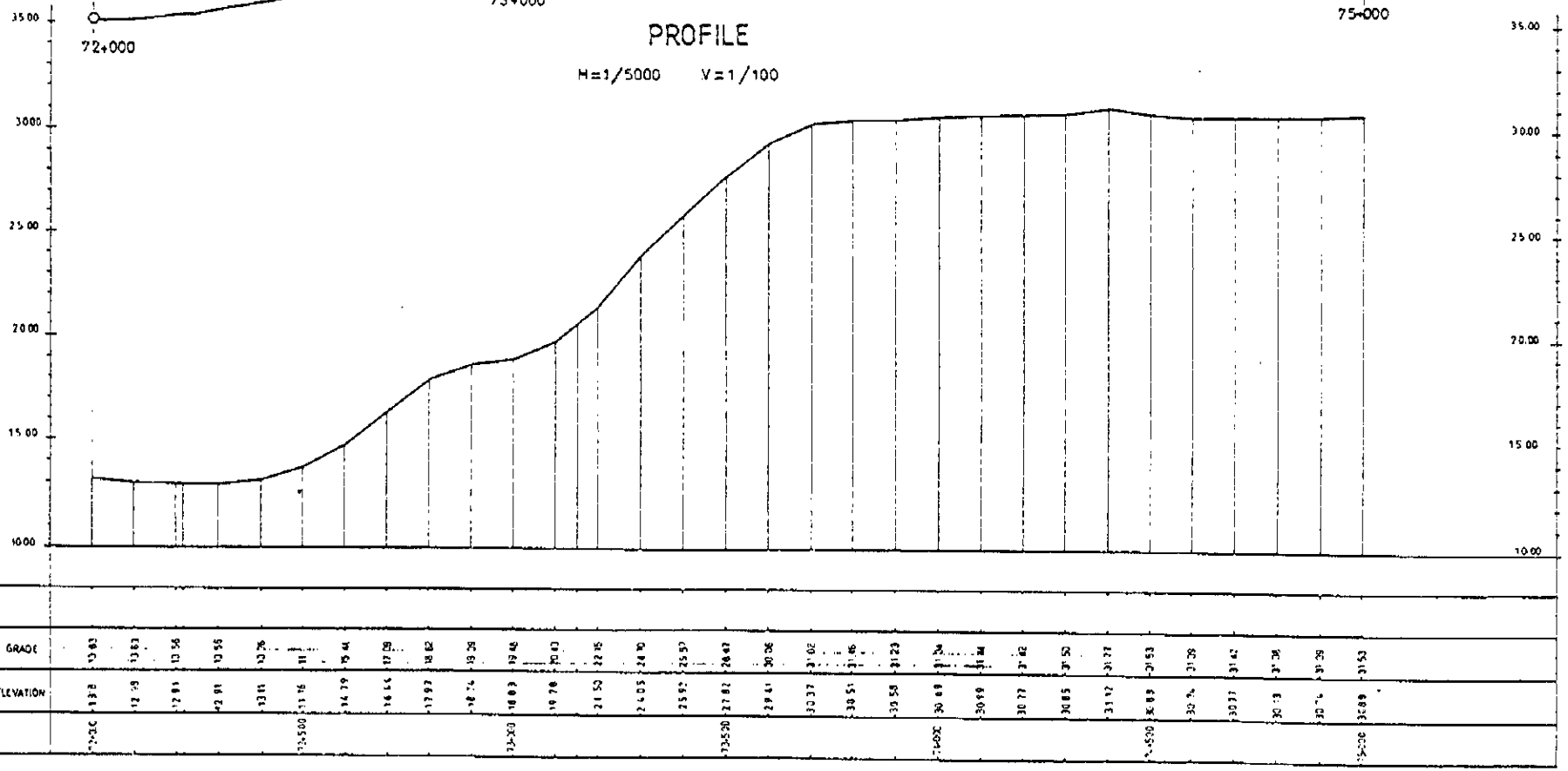


Figure 2-3-31

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (20)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO., LTD

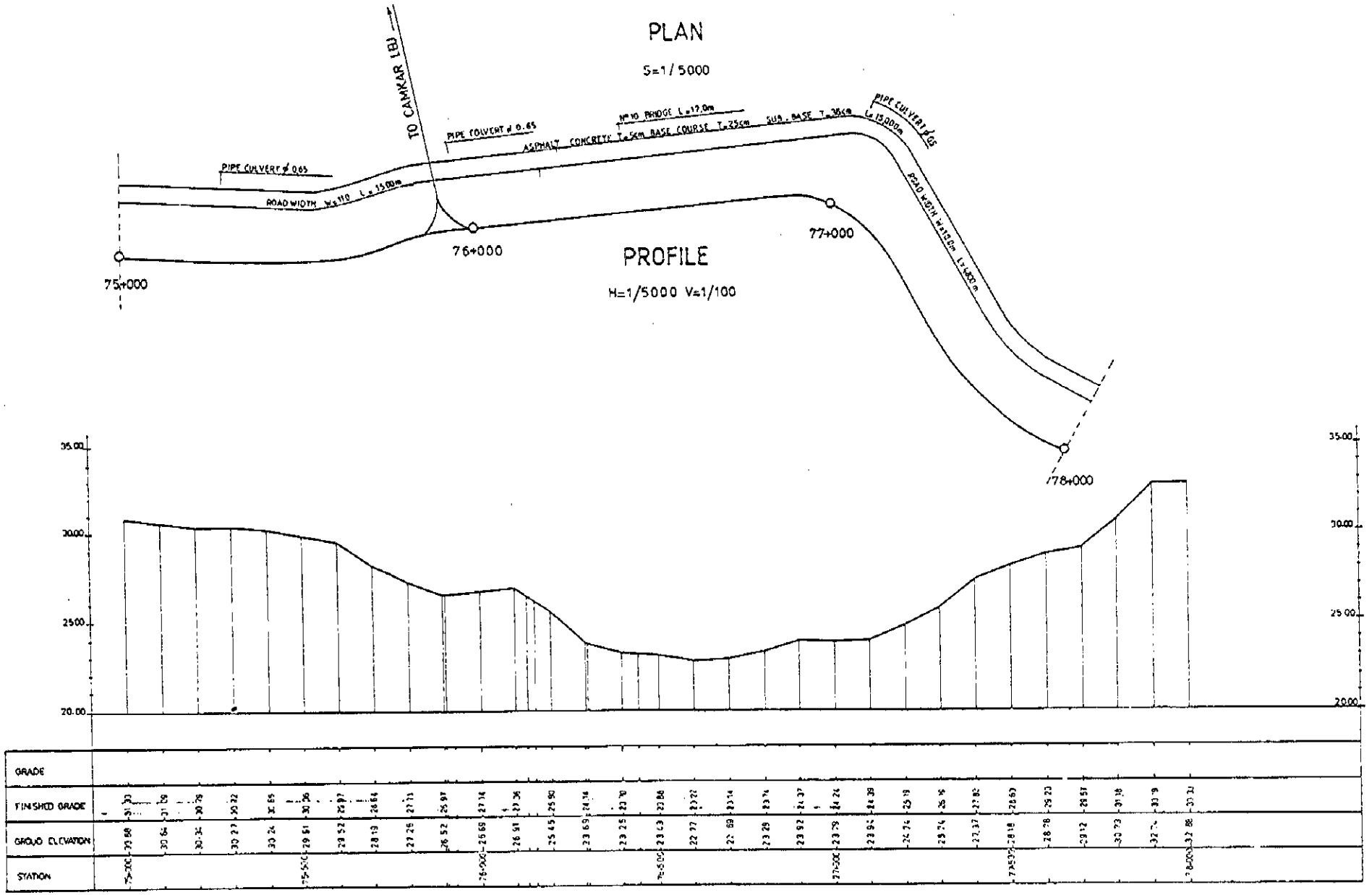
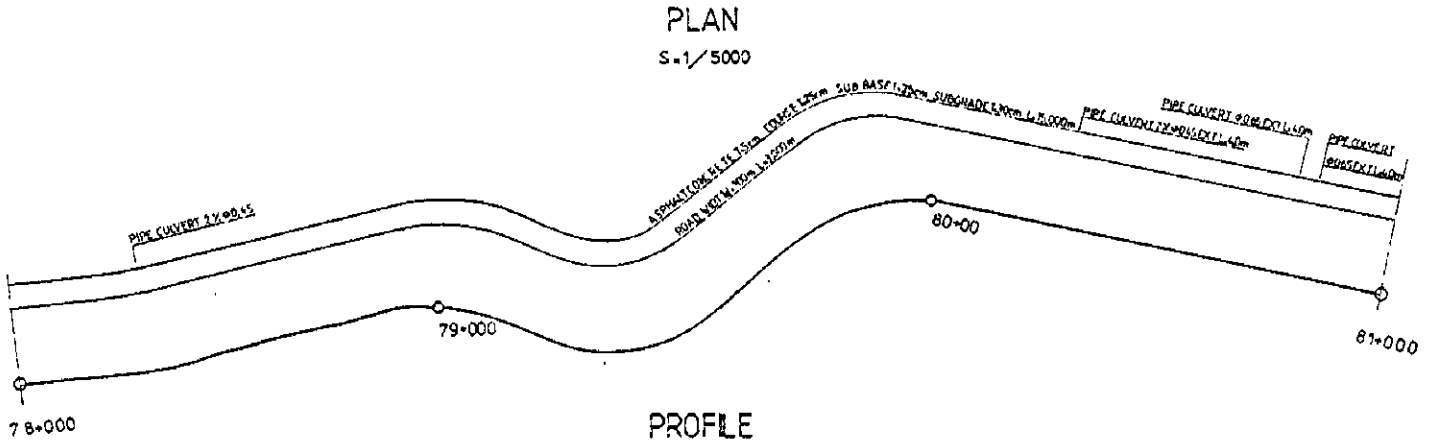


Figure 2-3-32

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (21)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD



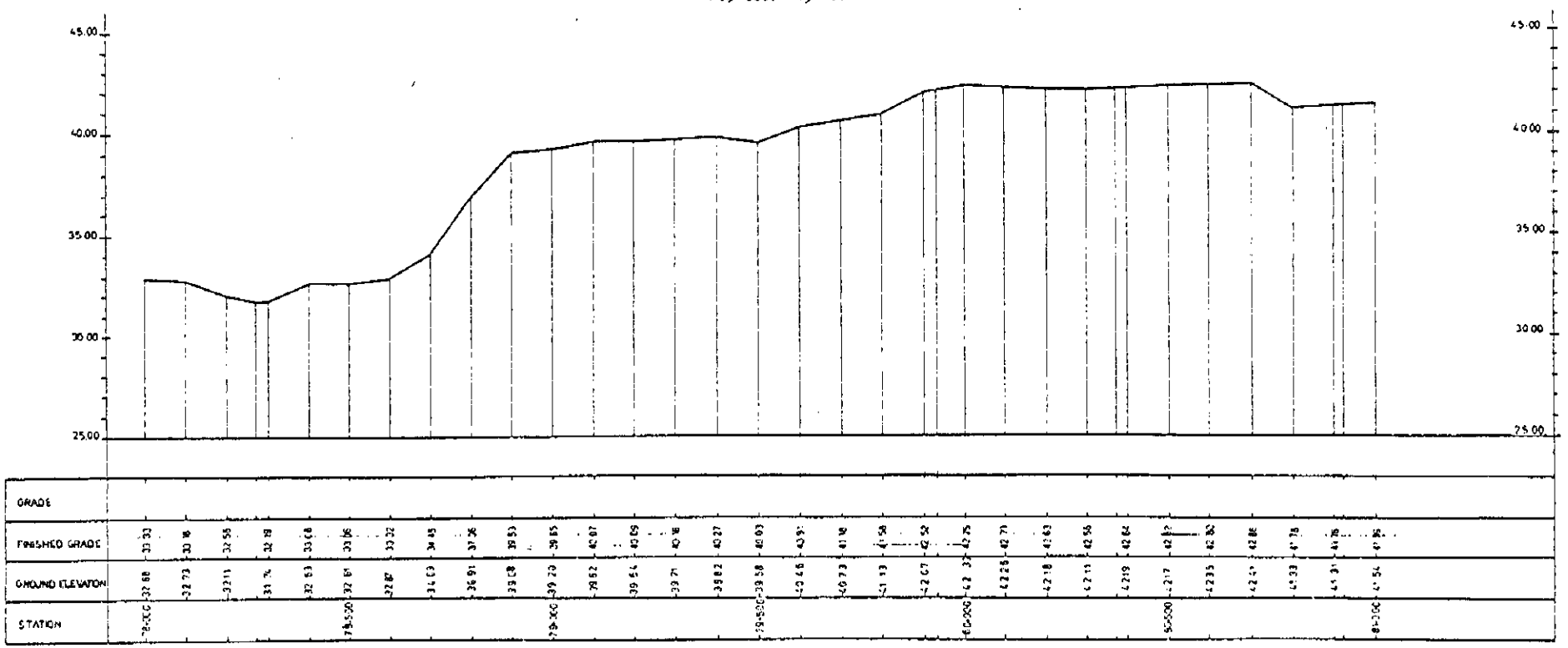
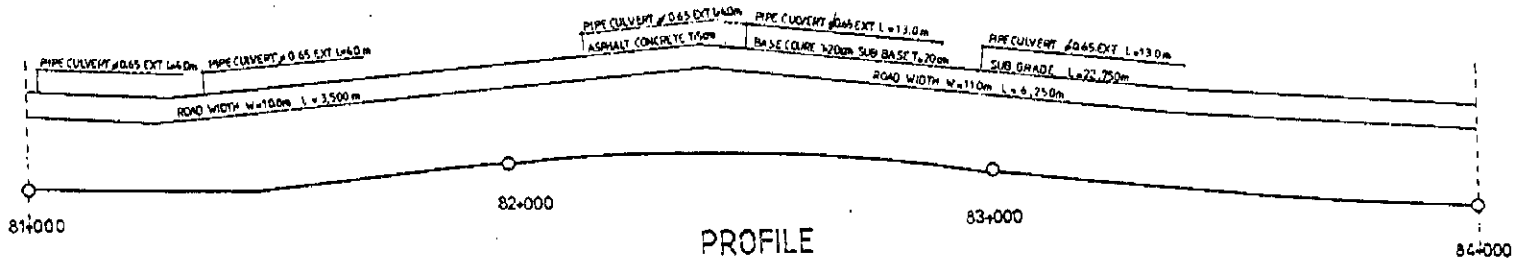


Figure 2-3-33

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (22)		JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997	DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

PLAN

S = 1/5000



PROFILE

H=1/5000 V=1/100

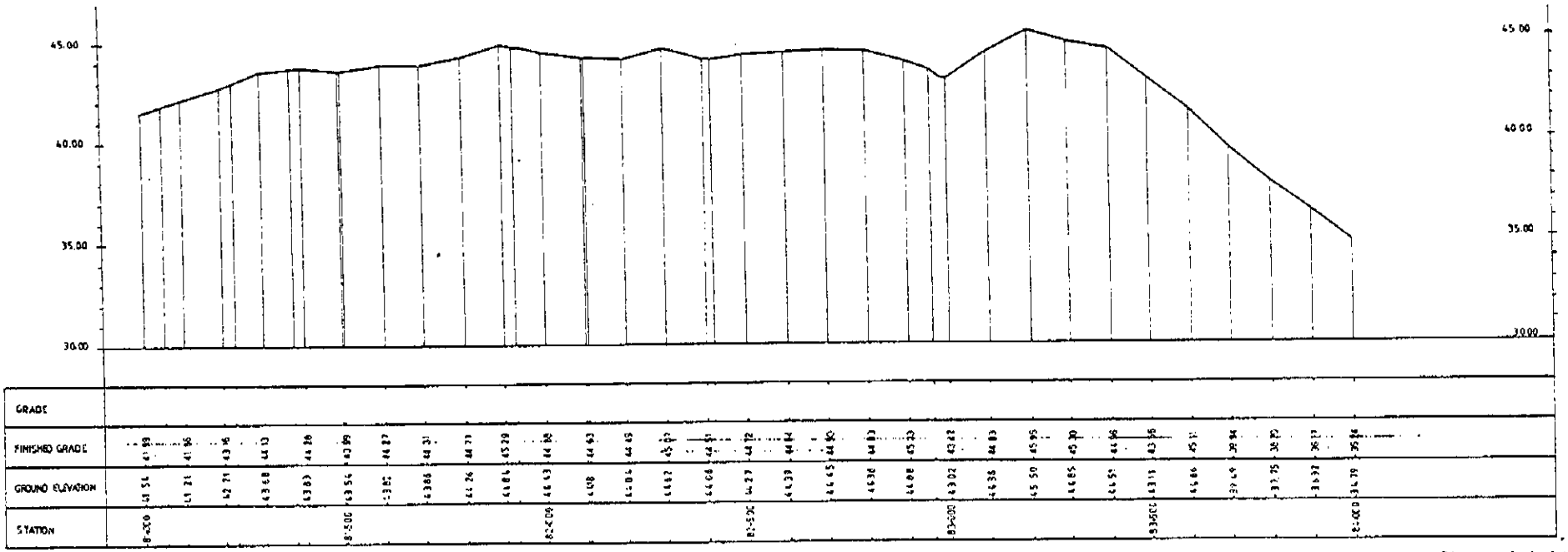
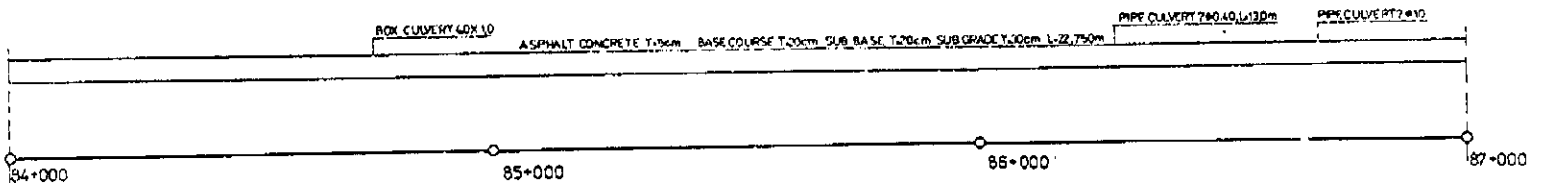


Figure 2-3-34

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (23)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

PLAN
S.1/5000



PROFILE
H.1/5000
V.1/100

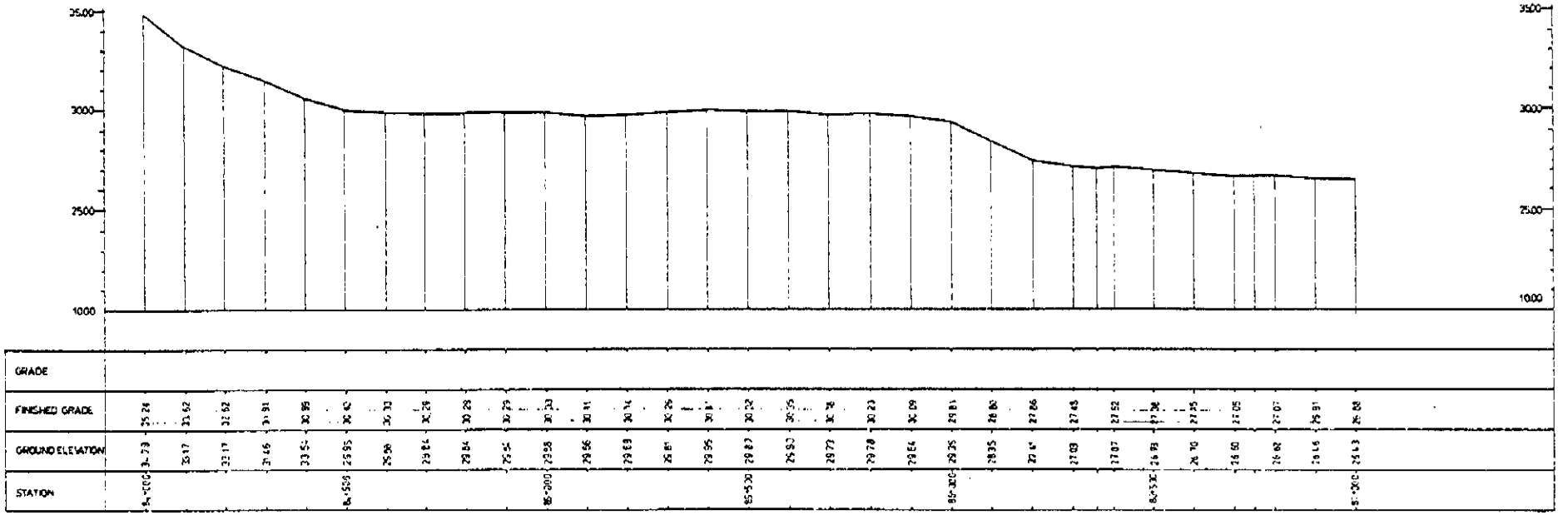
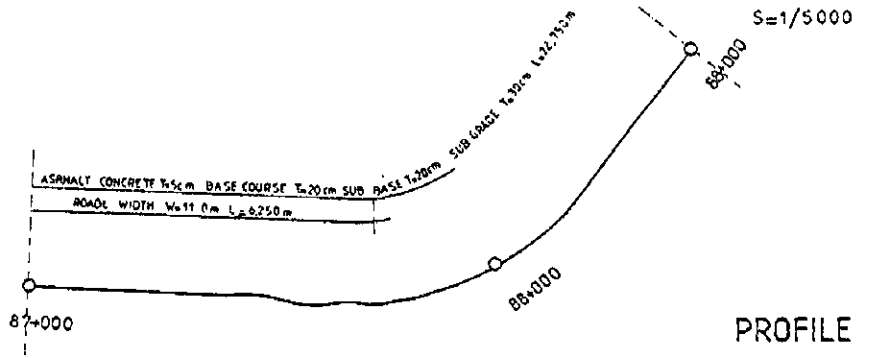


Figure 2-3-35

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (24)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

PLAN

S=1/5000



PROFILE

H=1/5000 V=1/1000

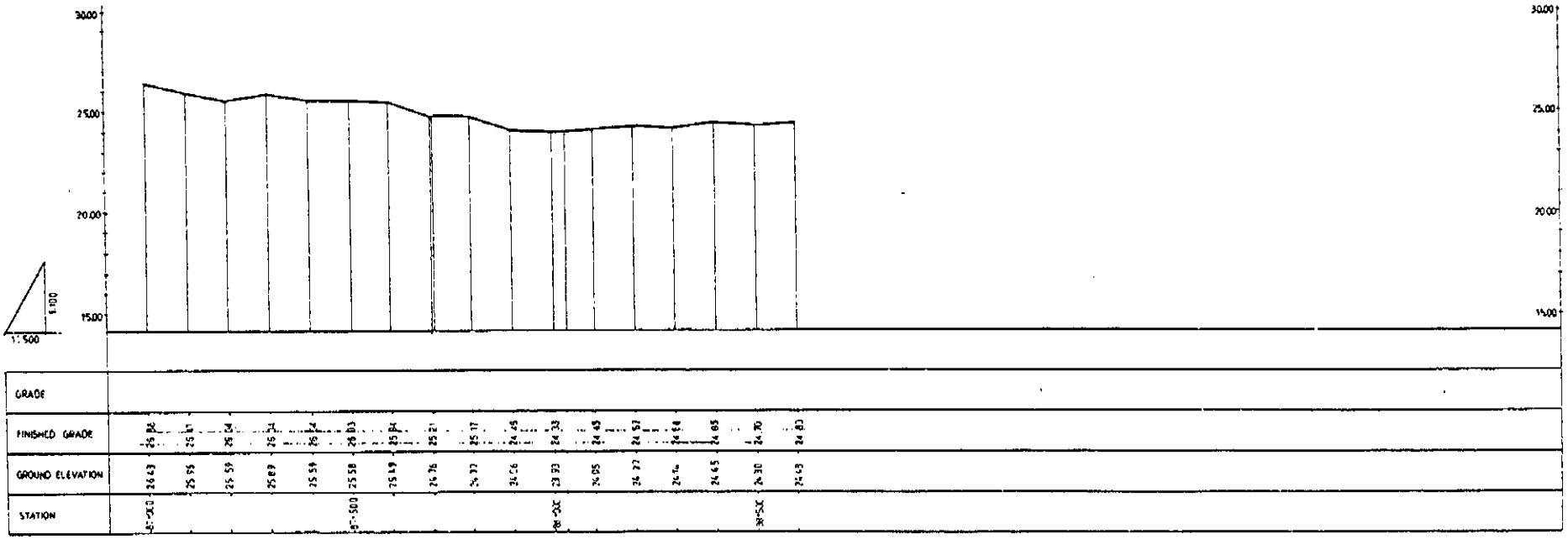
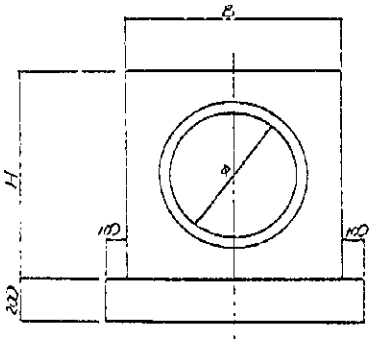


Figure 2-3-36

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROAD ROUTE 6 AND 7	TITLE : PLAN AND PROFILE (25)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

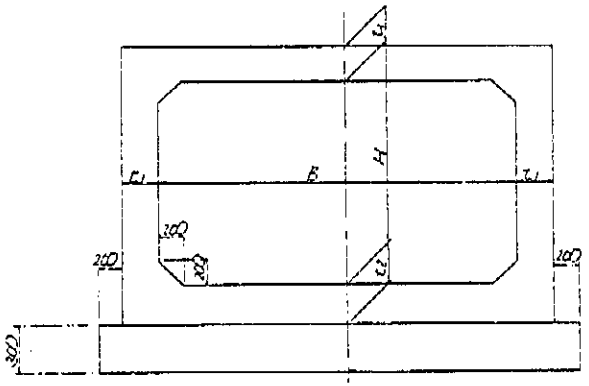
Pipe Culvert



Pipe Culvert

Station	ϕ	B	H	L	Remark
31 + 800	1,000	1.30m	1.30m	13.0m	
32 + 284	2 × 1,000	3.00m	1.60m	17.0m	
38 + 515	3 × 1,000	3.50m	1.60m	17.0m	
53 + 574	600	1.00m	1.00m	4.0m	Extension
54 + 202	650	1.00m	1.00m	12.0m	
55 + 873	650	1.00m	1.00m	12.0m	
68 + 600	650	1.00m	1.00m	12.0m	
69 + 700	650	1.00m	1.00m	12.0m	
78 + 300	650	1.00m	1.00m	12.0m	
80 + 373	650	1.00m	1.00m	4.0m	Extension
80 + 600	650	1.00m	1.00m	4.0m	Extension
80 + 921	650	1.00m	1.00m	4.0m	Extension
81 + 001	650	1.00m	1.00m	4.0m	Extension
81 + 374	650	1.00m	1.00m	4.0m	Extension
82 + 105	650	1.00m	1.00m	4.0m	Extension
82 + 421	650	1.00m	1.00m	12.0m	
82 + 960	650	1.00m	1.00m	12.0m	
86 + 360	800	1.30m	1.30m	13.0m	
88 + 000	650	1.00m	1.00m	12.0m	
88 + 600	2 × 1,000	3.00m	1.60m	17.0m	
89 + 900	2 × 1,000	3.00m	1.60m	13.0m	

Box Culvert



Box Culvert

Station	B	H	t1	t2
27 + 044	3.00m	1.00m	0.30m	0.45m
43 + 938	3.10m	1.60m	0.20m	0.35m

Figure 2-3-37

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7	TITLE : CULVERT		JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997	DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

PROFILE

SCALE: HOR 1/1000
VER 1/100

SHEET No.1

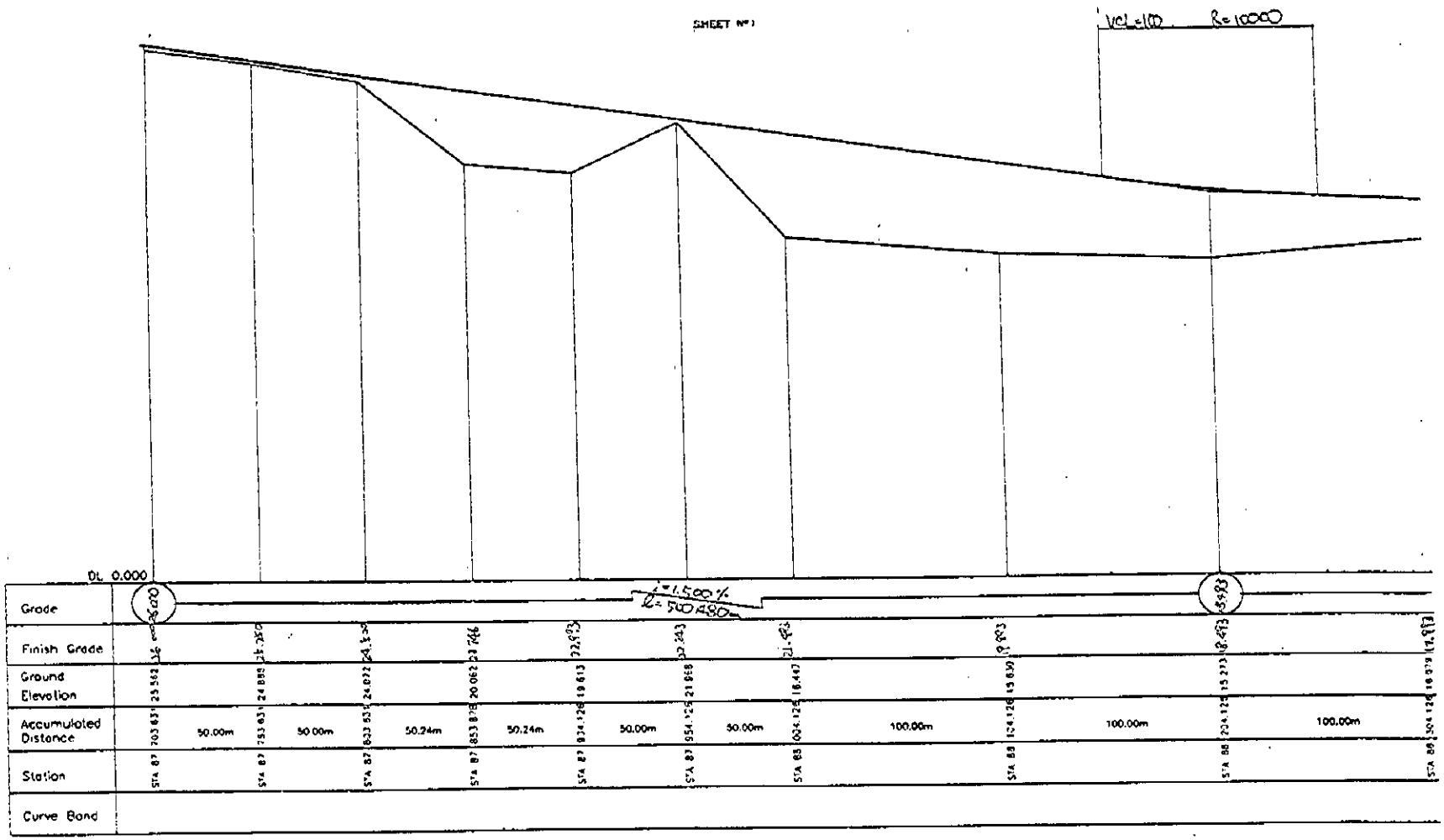


Figure 2-3-38

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7	TITLE : PROFILE OF ACCESS ROAD TO MEKONG BRIDGE (1)		JAPAN INTERNATIONAL COOPERATION AGENCY ORIENTAL CONSULTANTS CO., LTD
		DATE : January 1997	DRAWING NO :	

PROFILE

SCALE: HOR 1/1000
VER 1/100

SHEET Nº 2

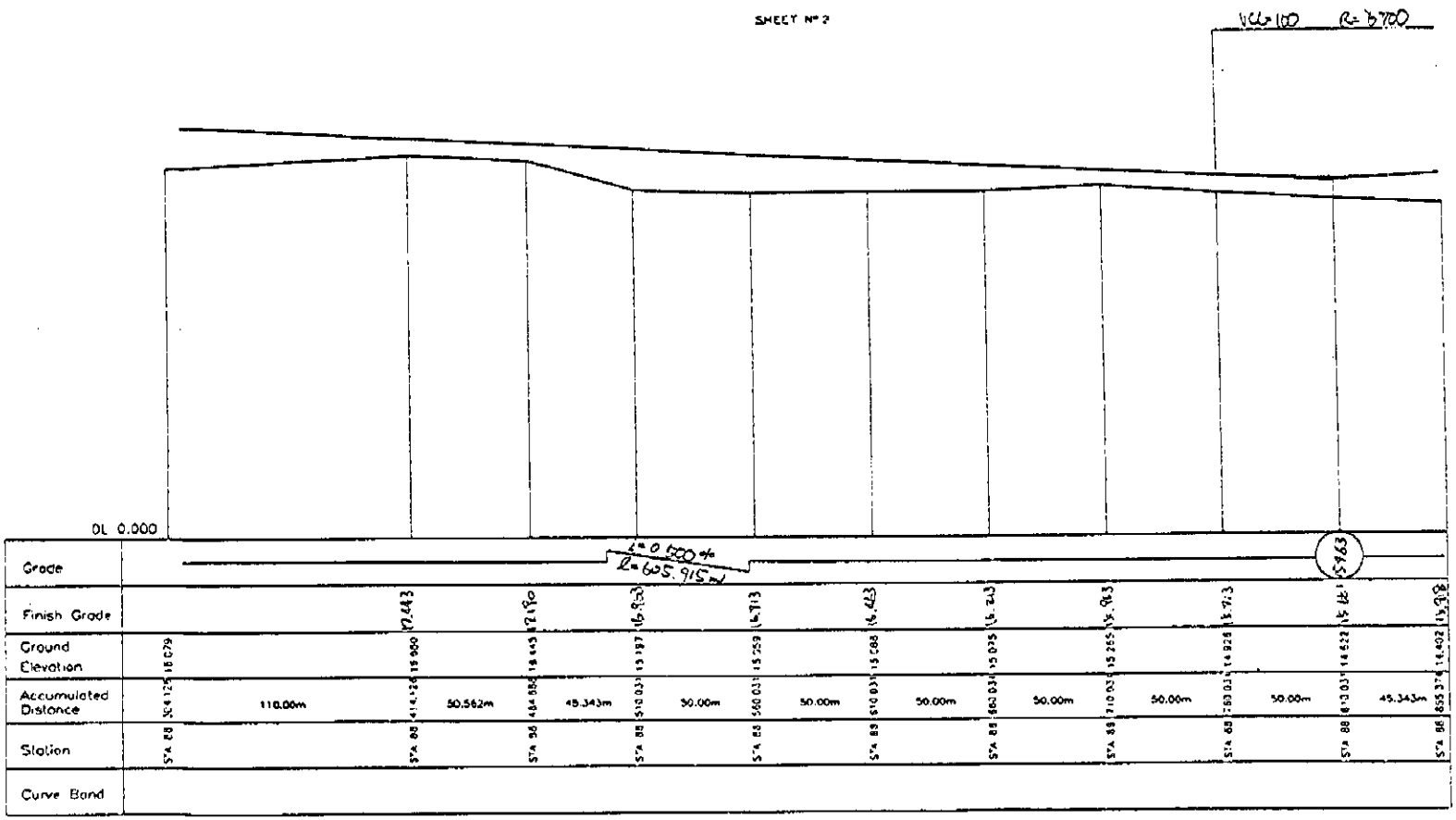


Figure 2-3-39

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7	TITLE : PROFILE OF ACCESS ROAD TO MEKONG BRIDGE (2)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO., LTD

PROFILE

SCALE: HOR 1/1000
VER 1/100

SHEET N° 3

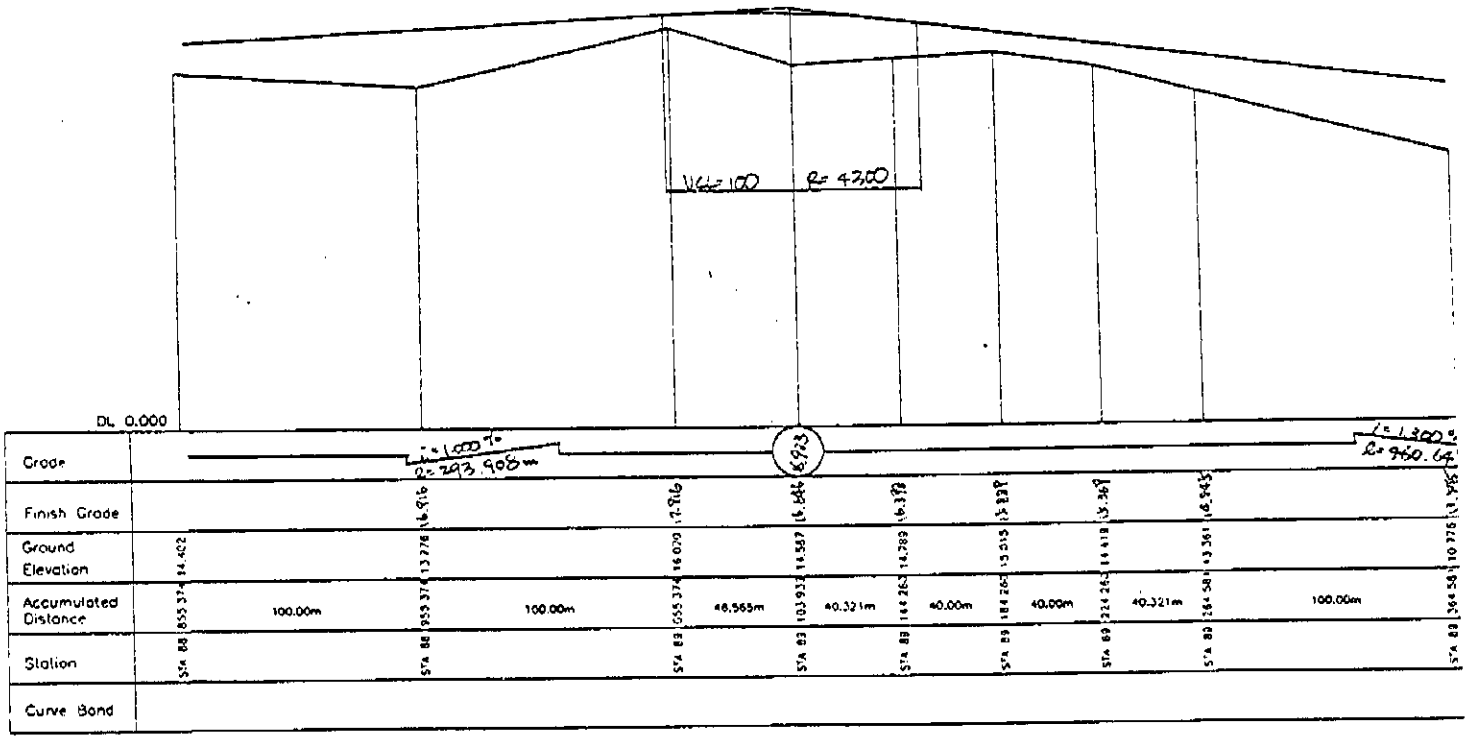


Figure 2-3-40

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7	TITLE : PROFILE OF ACCESS ROAD TO MEKONG BRIDGE (3)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

PROFILE

SCALE: HOR 1/1000
VER 1/100

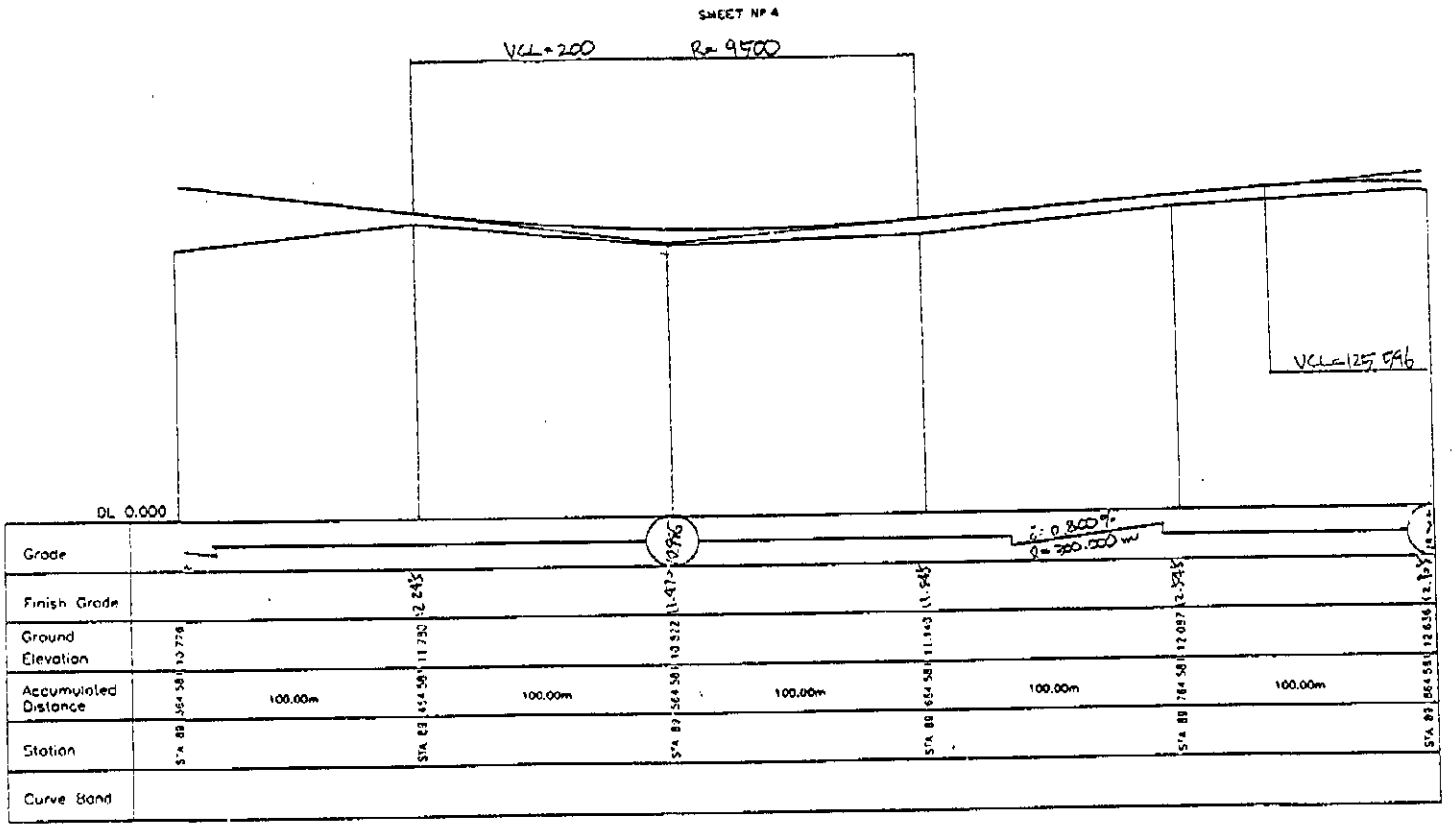


Figure 2-3-41

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7	TITLE : PROFILE OF ACCESS ROAD TO MEKONG BRIDGE (4)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO., LTD

PROFILE

SCALE: HOR 1/1000
VER 1/100

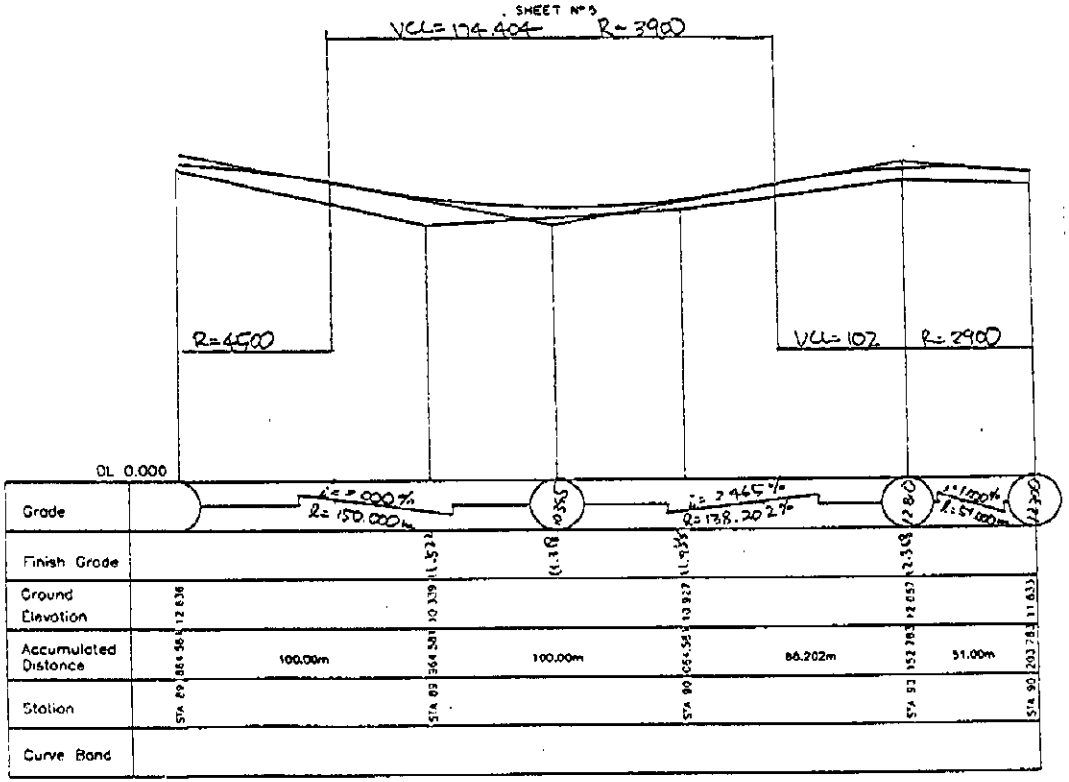
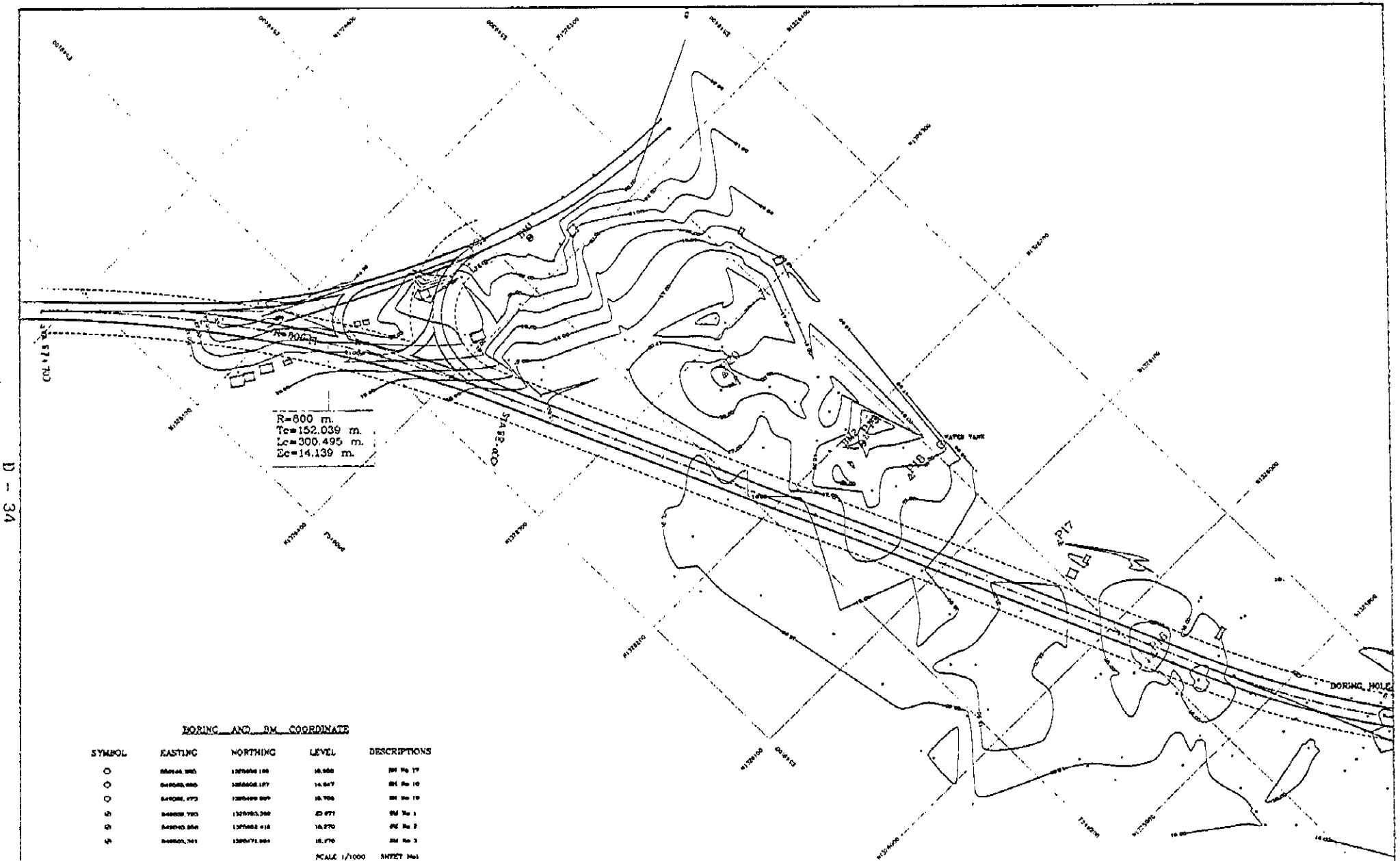


Figure 2-3-42

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7	TITLE : PROFILE OF ACCESS ROAD TO MEKONG BRIDGE (5)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO., LTD



BORING AND BM COORDINATE

SYMBOL	EASTING	NORTHING	LEVEL	DESCRIPTIONS
○				
○				
○				
◇				
◇				
◇				

SCALE 1/1000 SHEET No.1

Figure 2-3-43

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7	TITLE : PLAN OF ACCESS ROAD TO MEKONG BRIDGE (1)		JAPAN INTERNATIONAL COOPERATION AGENCY ORIENTAL CONSULTANTS CO.,LTD
		DATE : January 1997	DRAWING NO :	

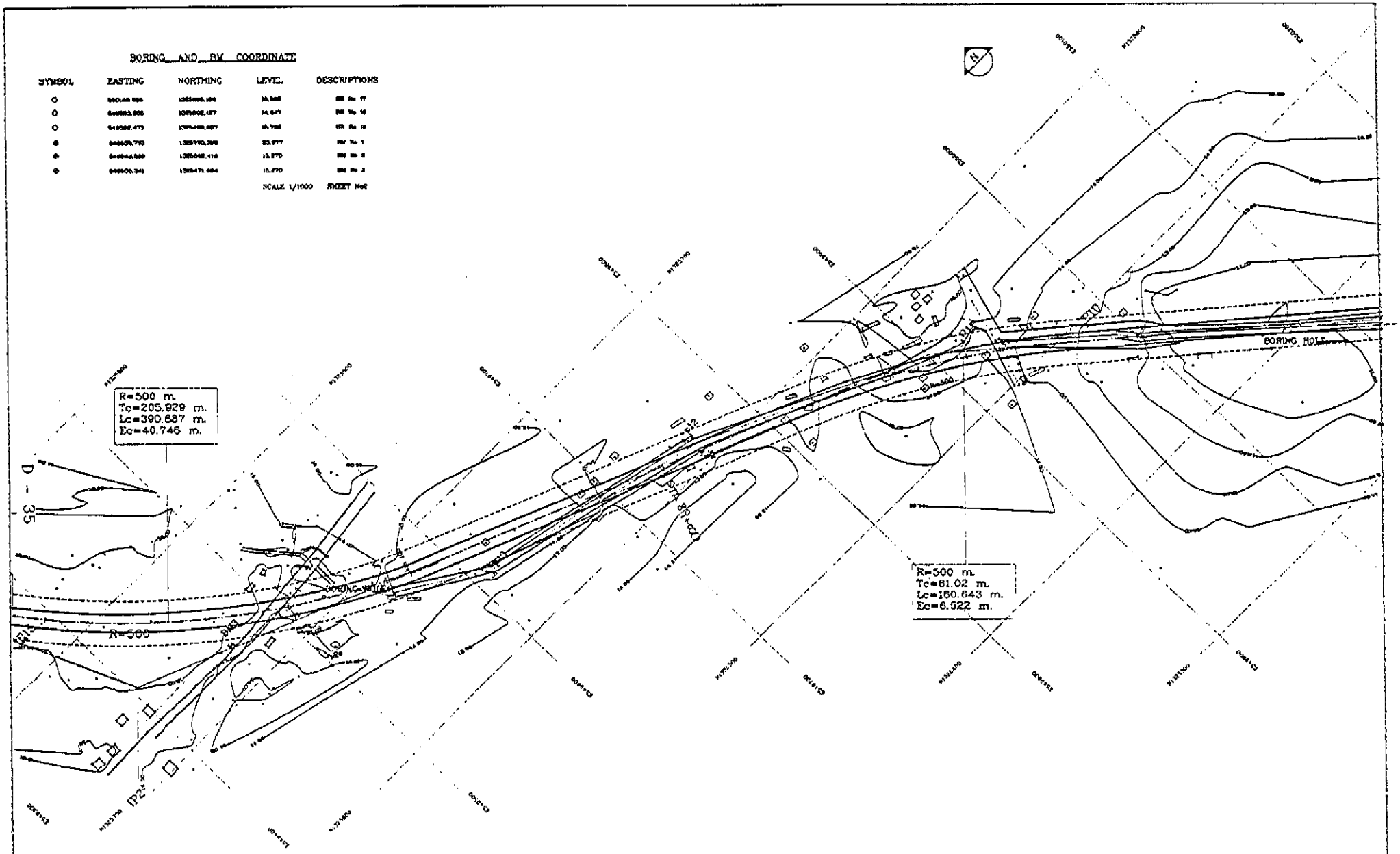
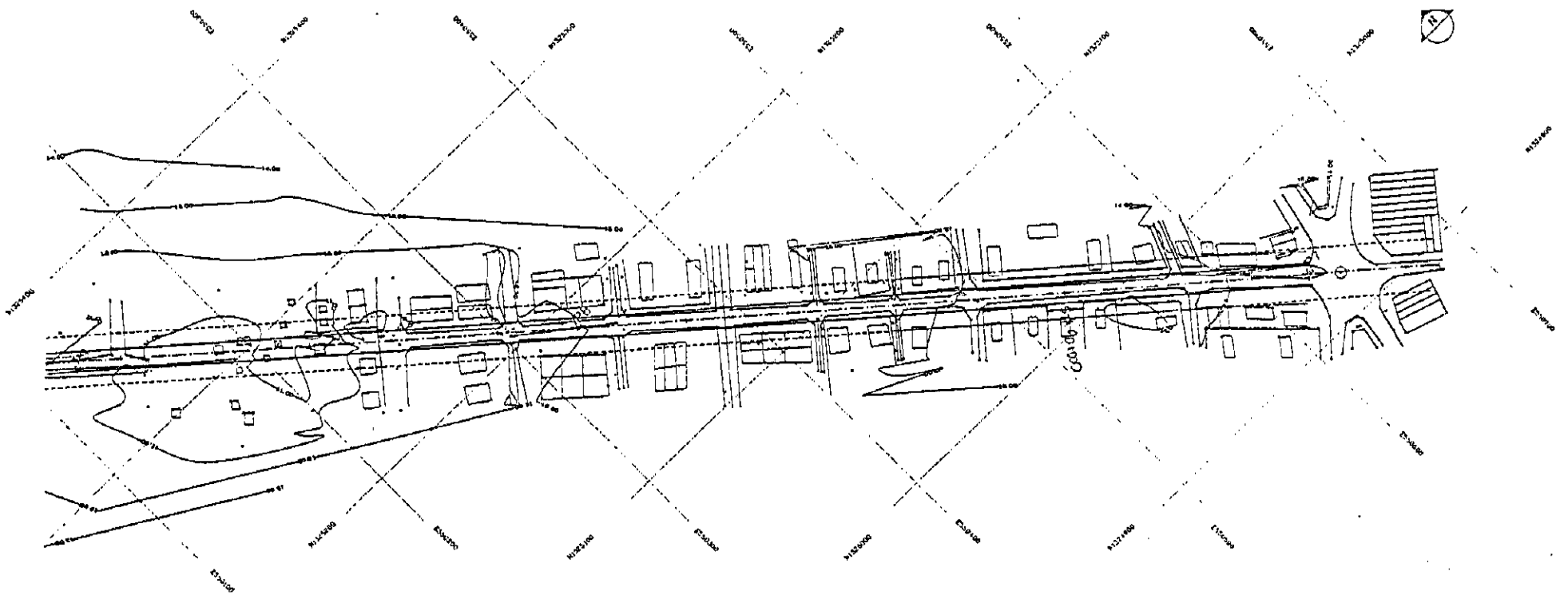


Figure 2-3-44

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7	TITLE : PLAN OF ACCESS ROAD TO MEKONG BRIDGE (2)		JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997	DRAWING NO :	ORIENTAL CONSULTANTS CO., LTD



BORING AND BM COORDINATES

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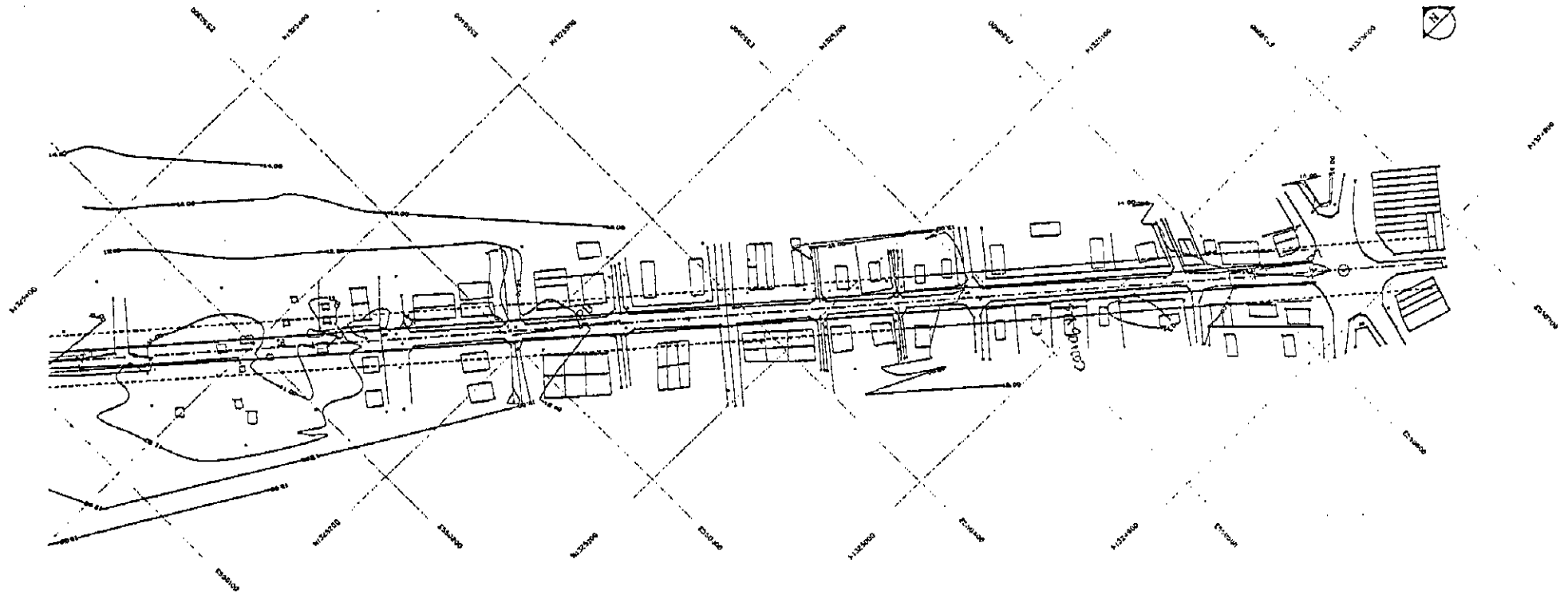
○	[illegible]	[illegible]	14.647	BM No 18
○	[illegible]	[illegible]	16.708	BM No 19
⊕	[illegible]	[illegible]	23.177	BM No 1
⊕	[illegible]	[illegible]	16.270	BM No 2
⊕	[illegible]	[illegible]	10.270	BM No 3

SCALE 1/1000 SHEET No.3

Figure 2-3-45

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7	TITLE : PLAN OF ACCESS ROAD TO MEKONG BRIDGE (3)		JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997	DRAWING NO :	ORIENTAL CONSULTANTS CO., LTD



DORING AND PM COORDINATE

SYMBOL	EASTING	NORTHING	LEVEL	DESCRIPTIONS
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○	[illegible]	[illegible]	[illegible]	[illegible]
○	[illegible]	[illegible]	[illegible]	[illegible]
⊕	[illegible]	[illegible]	[illegible]	[illegible]
⊕	[illegible]	[illegible]	[illegible]	[illegible]
⊕	[illegible]	[illegible]	[illegible]	[illegible]

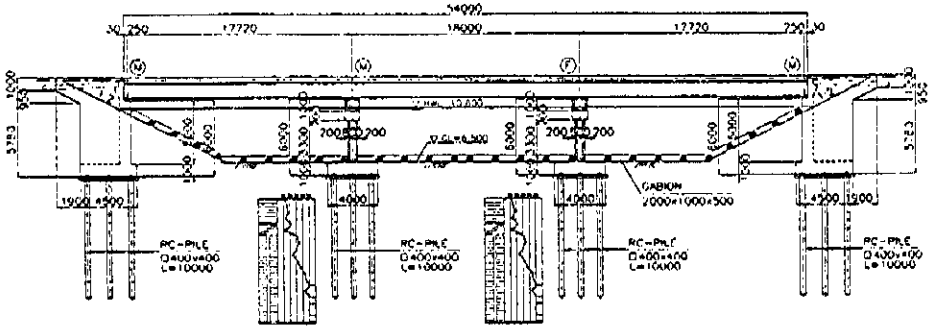
SCALE 1/1000 SHEET No.3

Figure 2-3-46

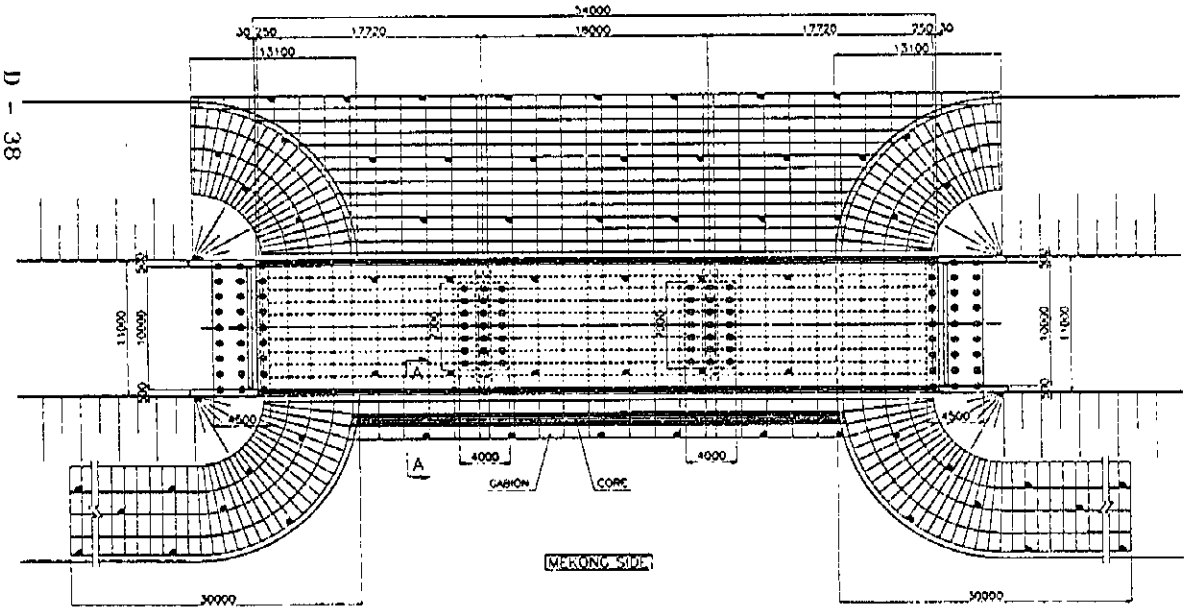
THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7	TITLE : PLAN OF ACCESS ROAD TO MEKONG BRIDGE (3)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

NO. 1 BRIDGE

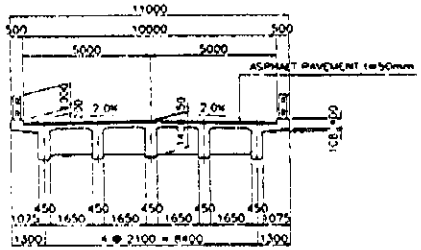
SIDE VIEW S=1:200



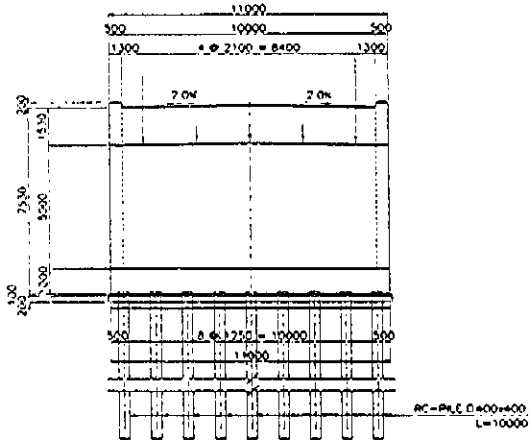
PLAN S=1:200



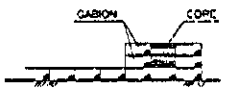
TYPICAL SECTION S=1:100



PROFILE OF ABUTMENT S=1:100



SECTION A – A S=1:100



PROFILE OF PIER S=1:100

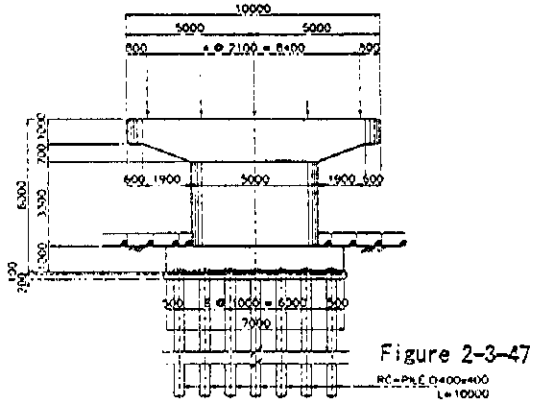
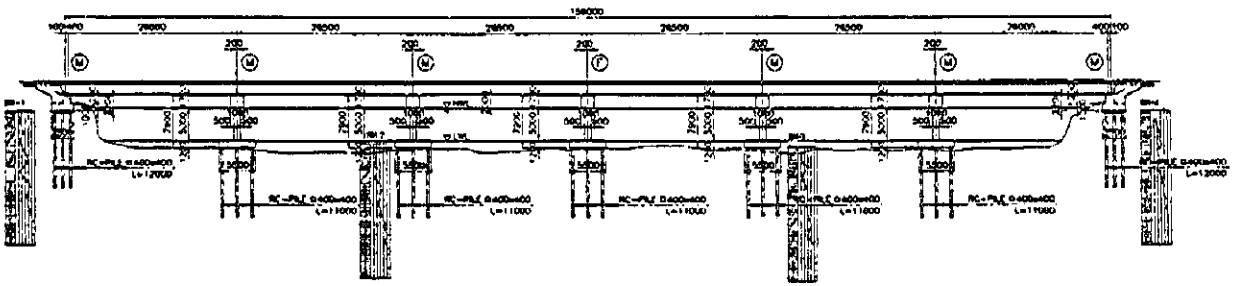


Figure 2-3-47

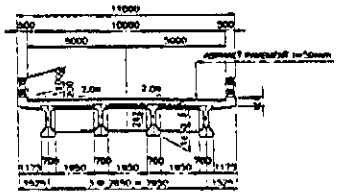
THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7	TITLE : GENERAL VIEW OF NO.1 BRIDGE (1)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

NO. 2 BRIDGE

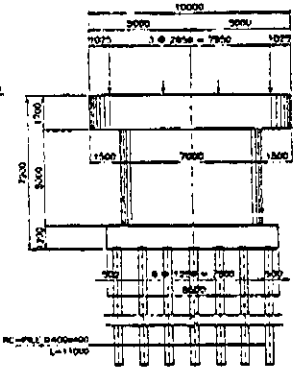
SIDE VIEW S=1:300



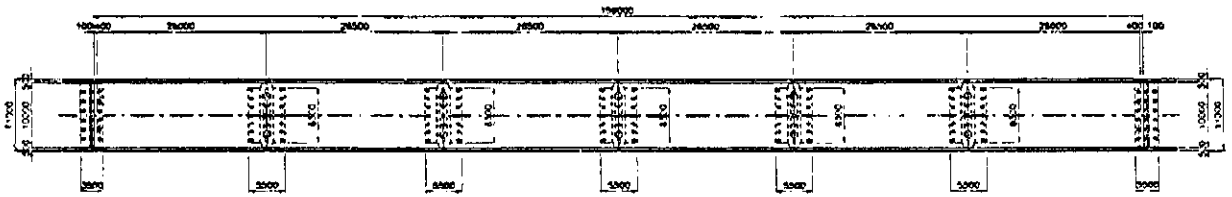
TYPICAL SECTION S=1:100



PROFILE OF PIER S=1:100



PLAN S=1:300



PROFILE OF ABUTMENT S=1:100

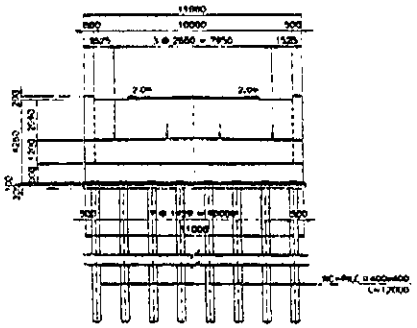
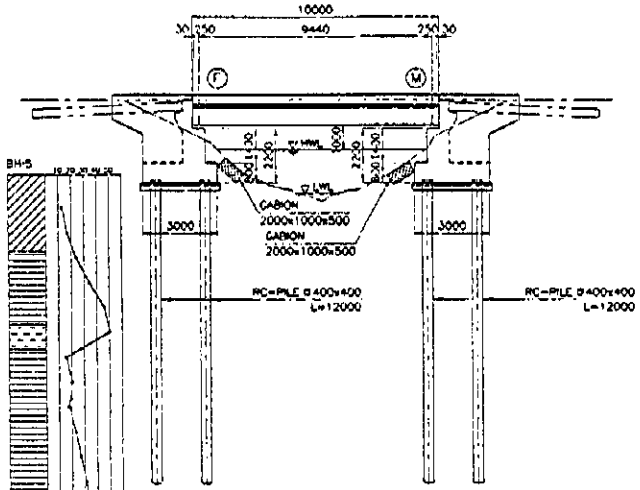


Figure 2-3-48

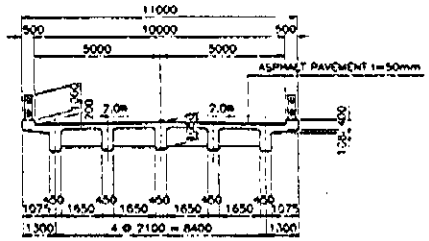
THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7	TITLE : GENERAL VIEW OF NO.2 BRIDGE (1)		JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997	DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

NO. 3 BRIDGE

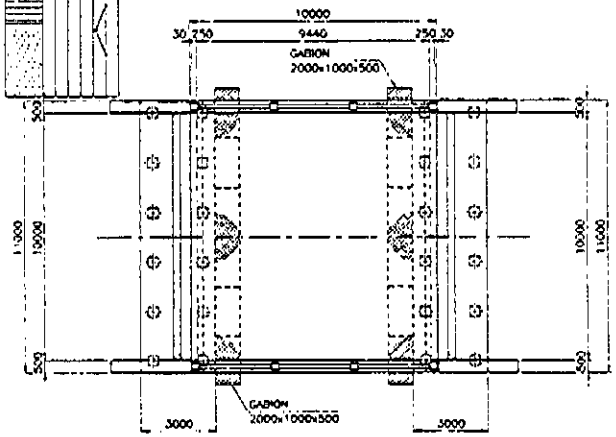
SIDE VIEW S=1:100



TYPICAL SECTION S=1:100



PLAN S=1:100



PLOFILE OF ABUTMENT S=1:100

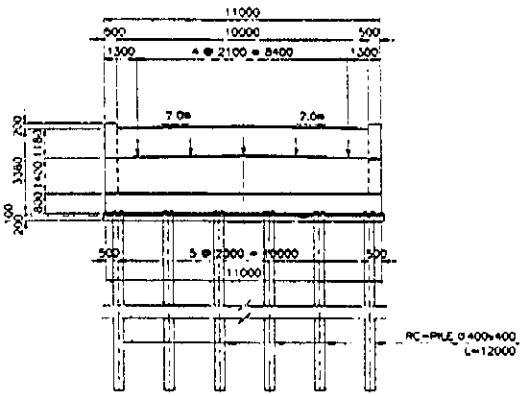
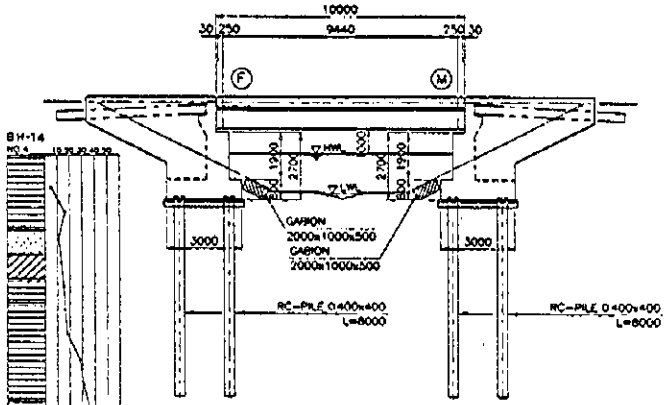


Figure 2-3-49

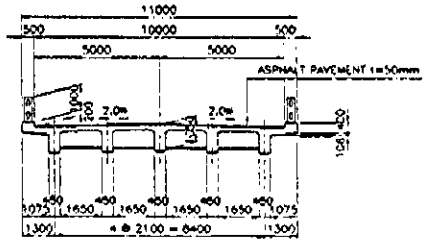
THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7	TITLE : GENERAL VIEW OF NO.3 BRIDGE (1)		JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997	DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

NO. 4 BRIDGE

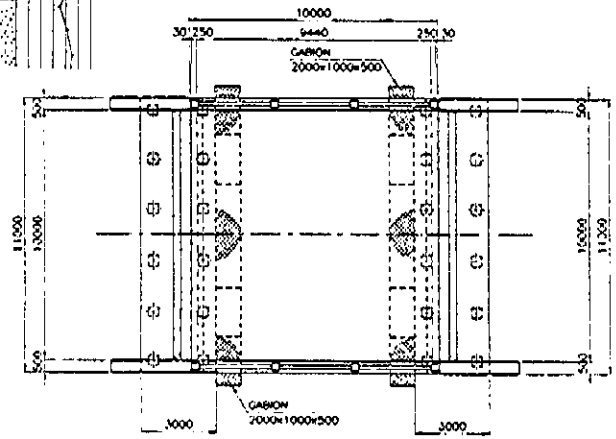
SIDE VIEW S=1:100



TYPICAL SECTION S=1:100



PLAN S=1:100



PLOFILE OF ABUTMENT S=1:100

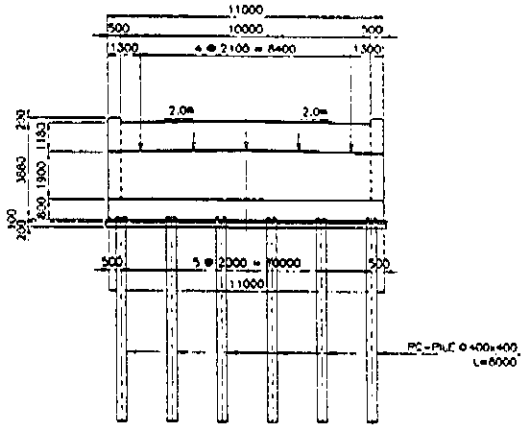
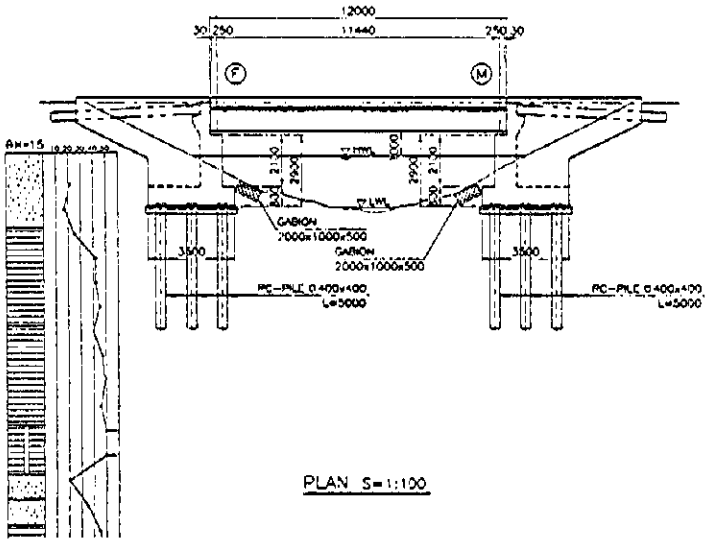


Figure 2-3-50

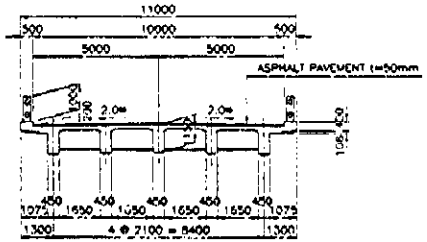
THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7	TITLE : GENERAL VIEW OF NO.4 BRIDGE (1)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

NO. 5 BRIDGE

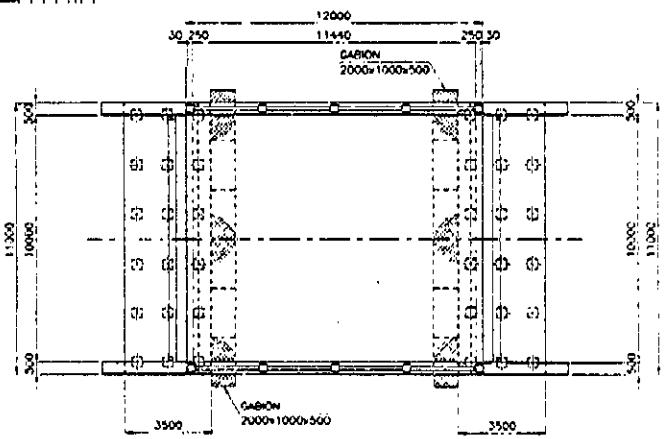
SIDE VIEW S=1:100



TYPICAL SECTION S=1:100



PLAN S=1:100



PLOFILE OF ABUTMENT S=1:100

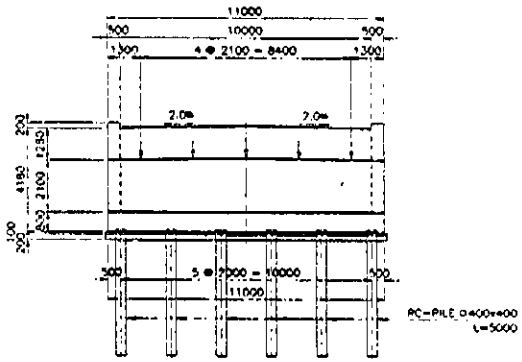
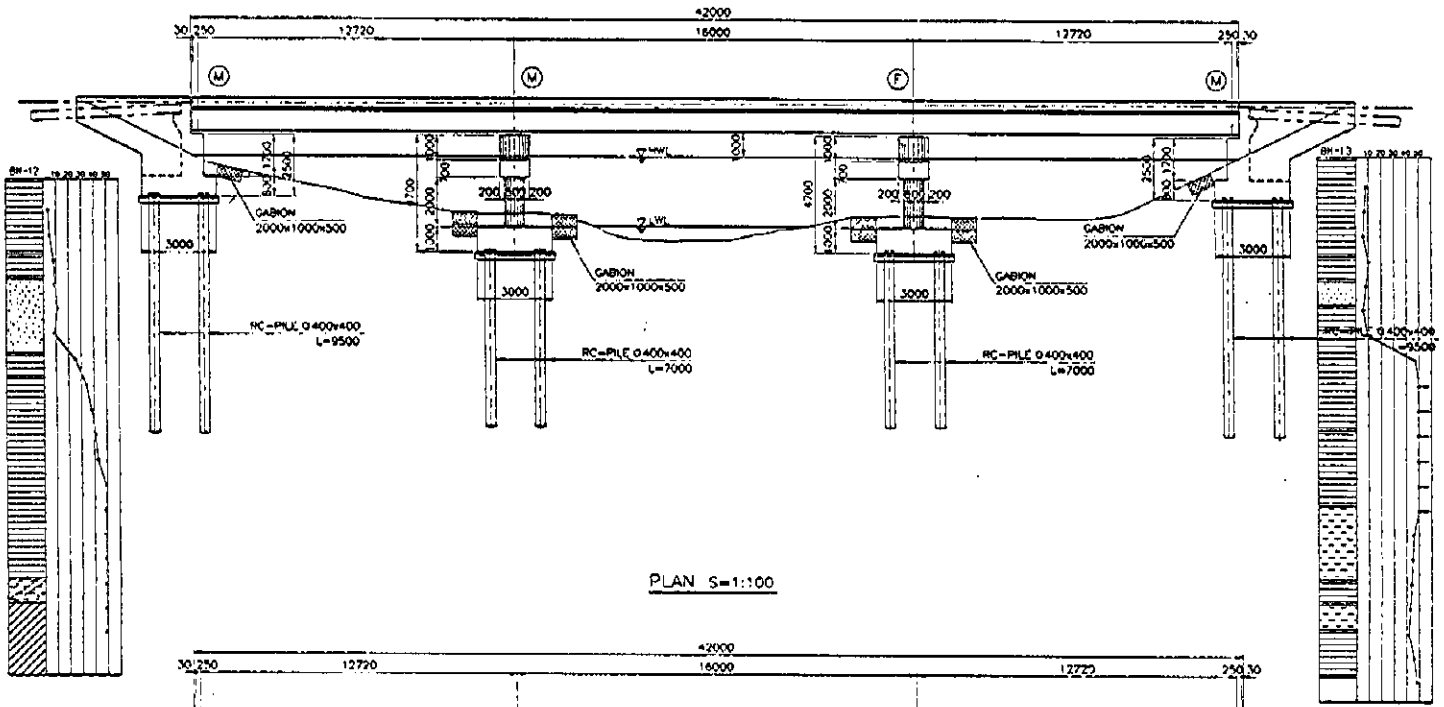


Figure 2-3-51

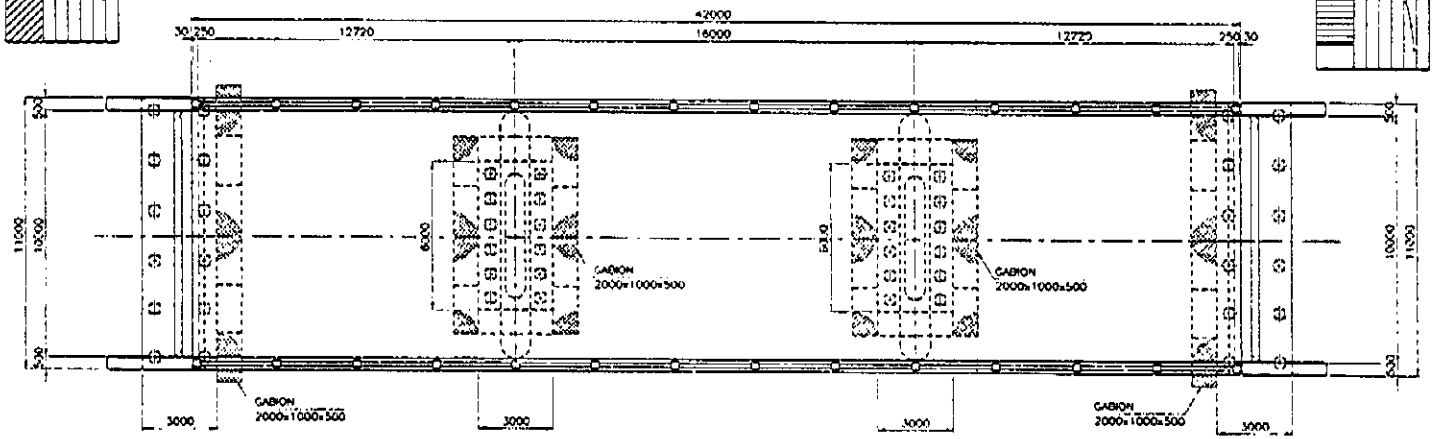
THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7	TITLE : GENERAL VIEW OF NO.5 BRIDGE (1)		JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997	DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

NO. 6 BRIDGE

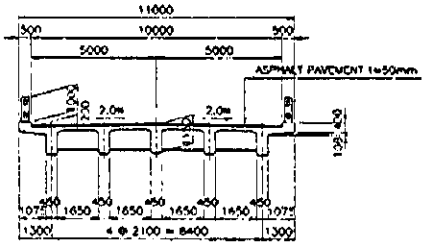
SIDE VIEW S=1:100



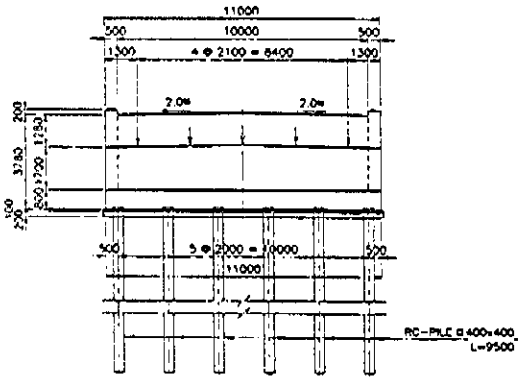
PLAN S=1:100



TYPICAL SECTION S=1:100



PLOFILE OF ABUTMENT S=1:100



PLOFILE OF PIER S=1:100

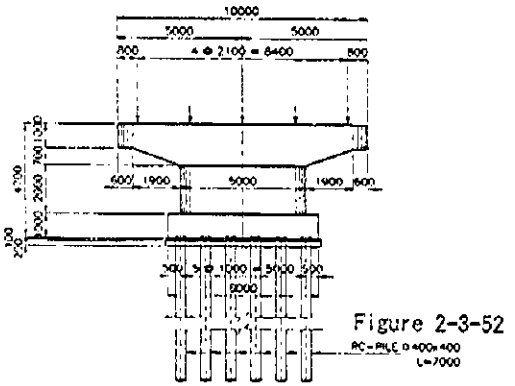
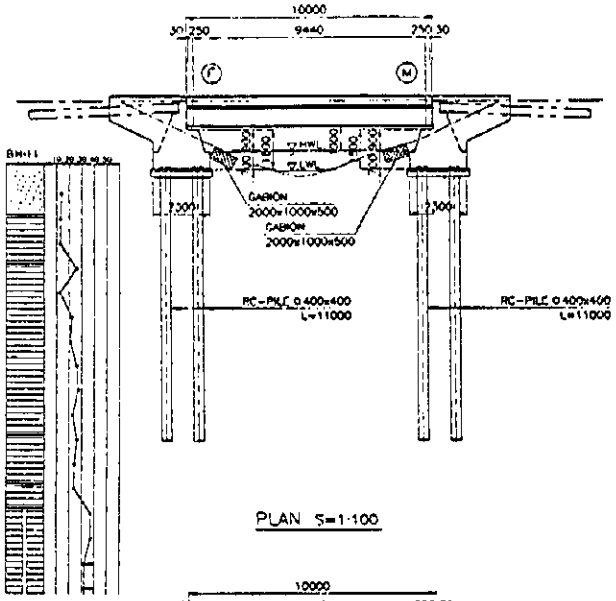


Figure 2-3-52

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7	TITLE : GENERAL VIEW OF NO.6 BRIDGE (1)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

NO. 7 BRIDGE

SIDE VIEW S=1:100



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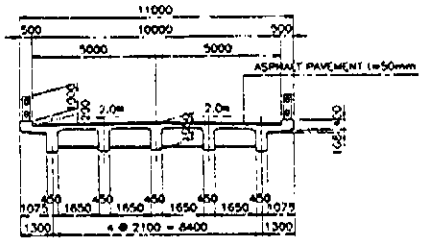
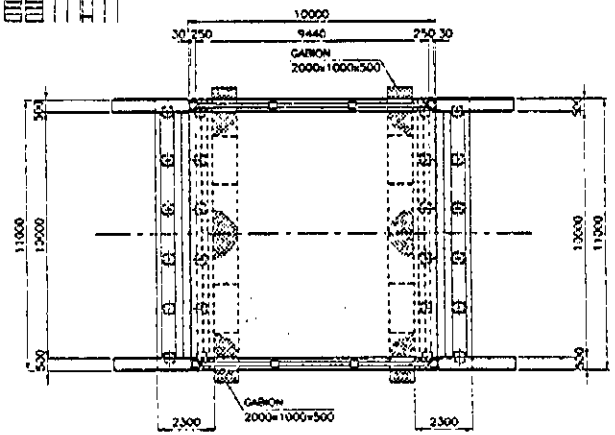


PLAN S=1:100



PLOFILE OF ABUTMENT S=1:100

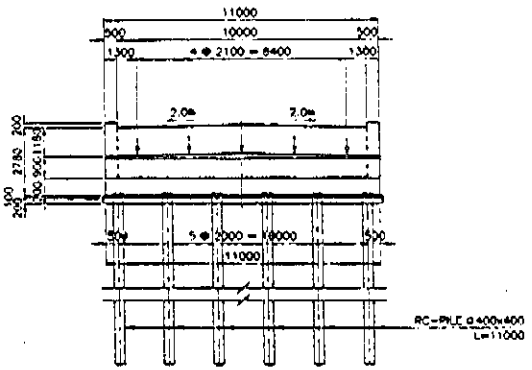
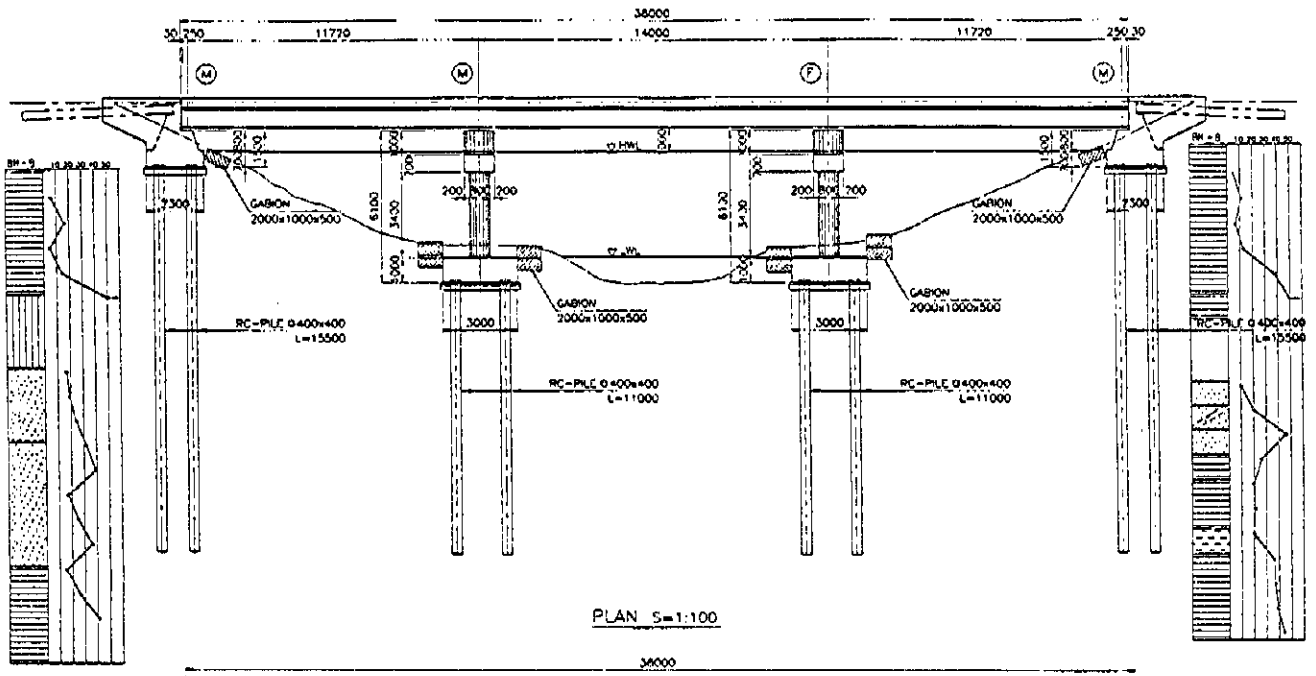


Figure 2-3-53

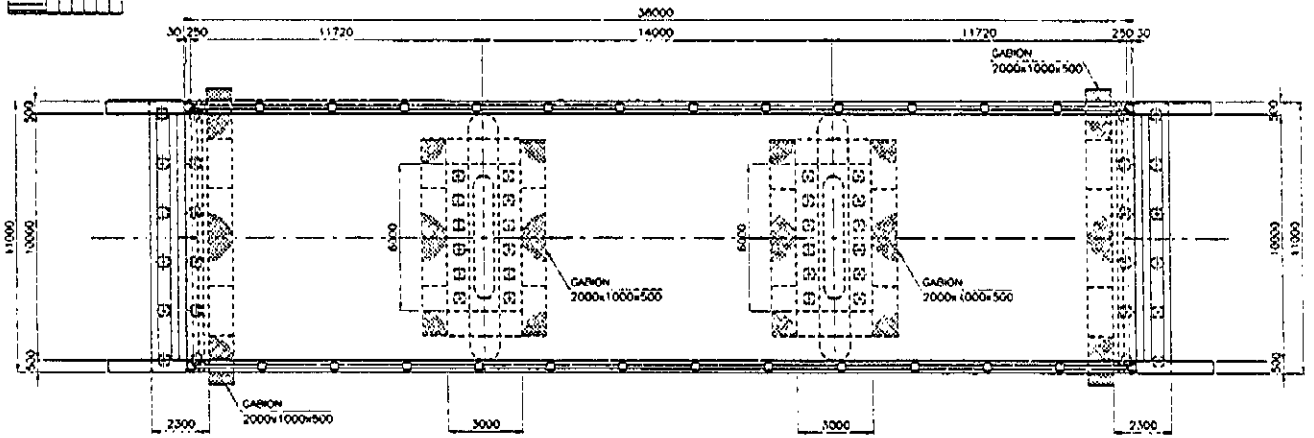
THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7	TITLE : GENERAL VIEW OF NO.7 BRIDGE (1)		JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997	DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

NO. 8 BRIDGE

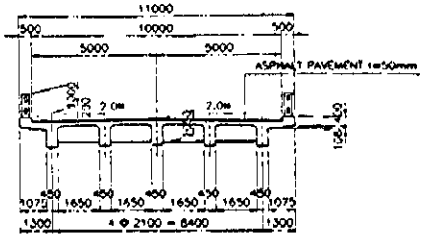
SIDE VIEW S=1:100



PLAN S=1:100



TYPICAL SECTION S=1:100



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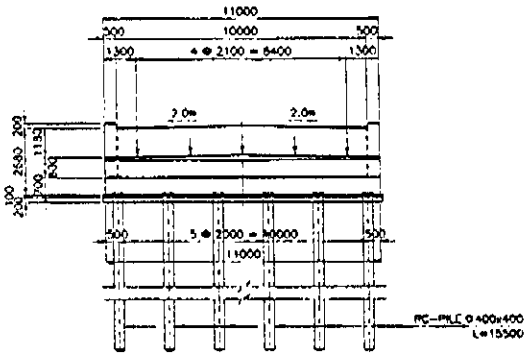


PLOFILE OF PIER S=1:100

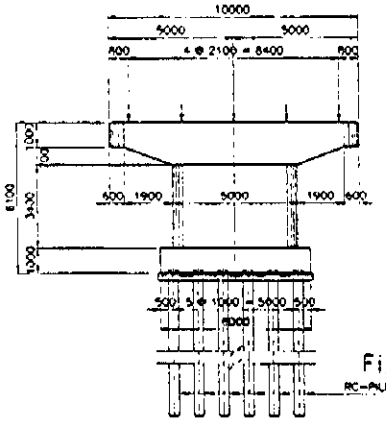
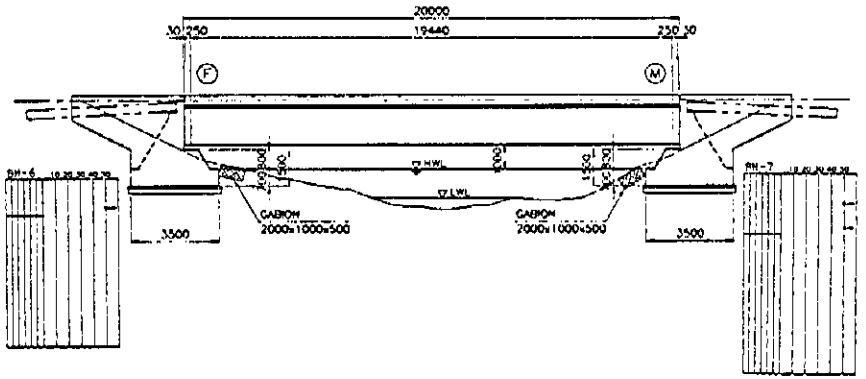


Figure 2-3-54

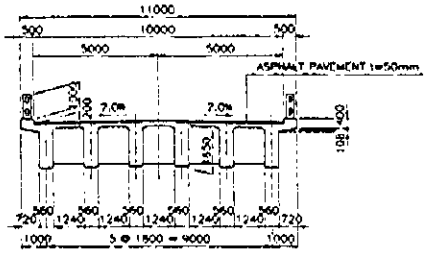
THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7	TITLE : GENERAL VIEW OF NO.8 BRIDGE (1)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

NO. 9 BRIDGE

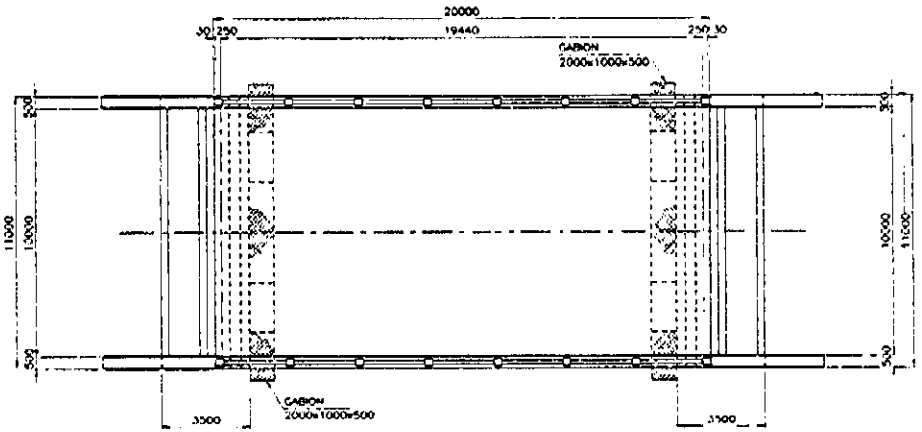
SIDE VIEW S=1:100



TYPICAL SECTION S=1:100



PLAN S=1:100



PLOFILE OF ABUTMENT S=1:100

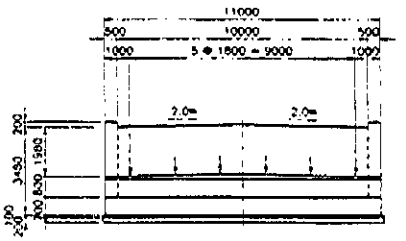
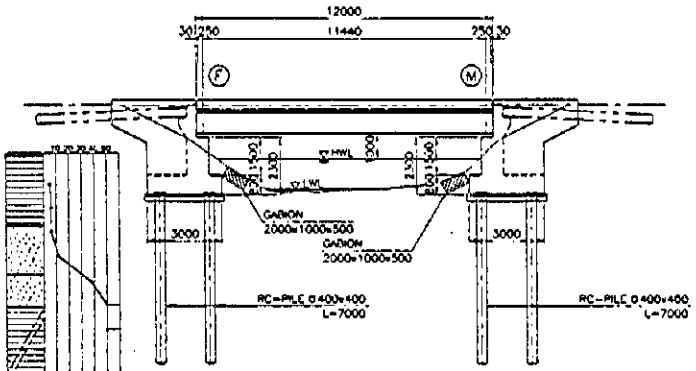


Figure 2-3-55

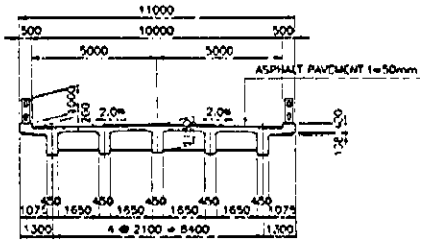
THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7	TITLE : GENERAL VIEW OF NO.9 BRIDGE (1)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

NO.10 BRIDGE

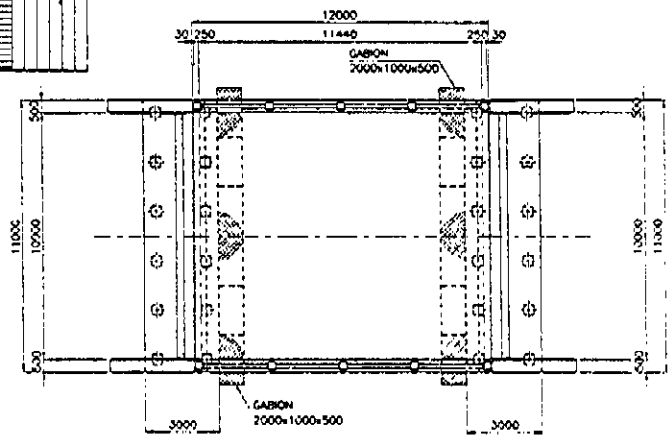
SIDE VIEW S=1:100



TYPICAL SECTION S=1:100



PLAN S=1:100



PLOFILE OF ABUTMENT S=1:100

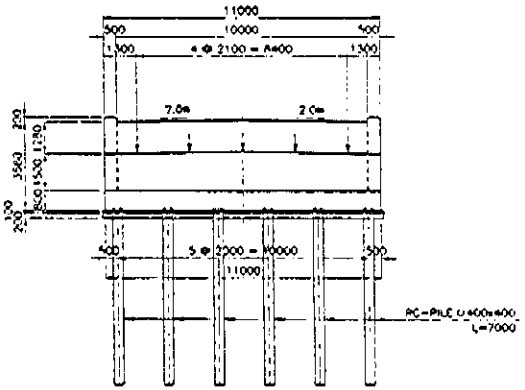
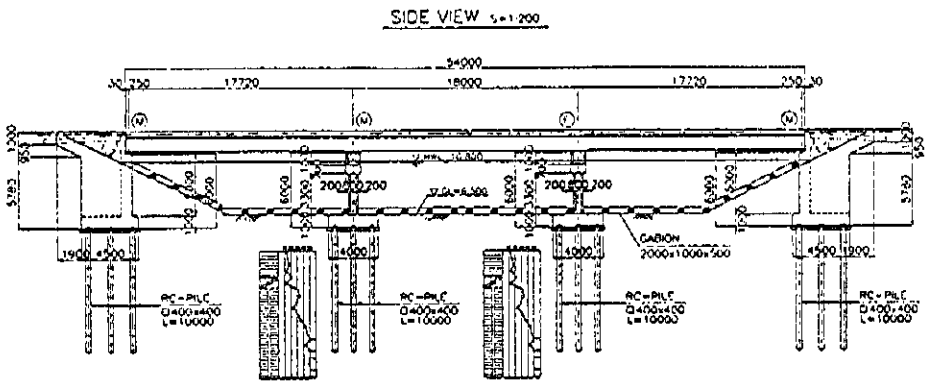
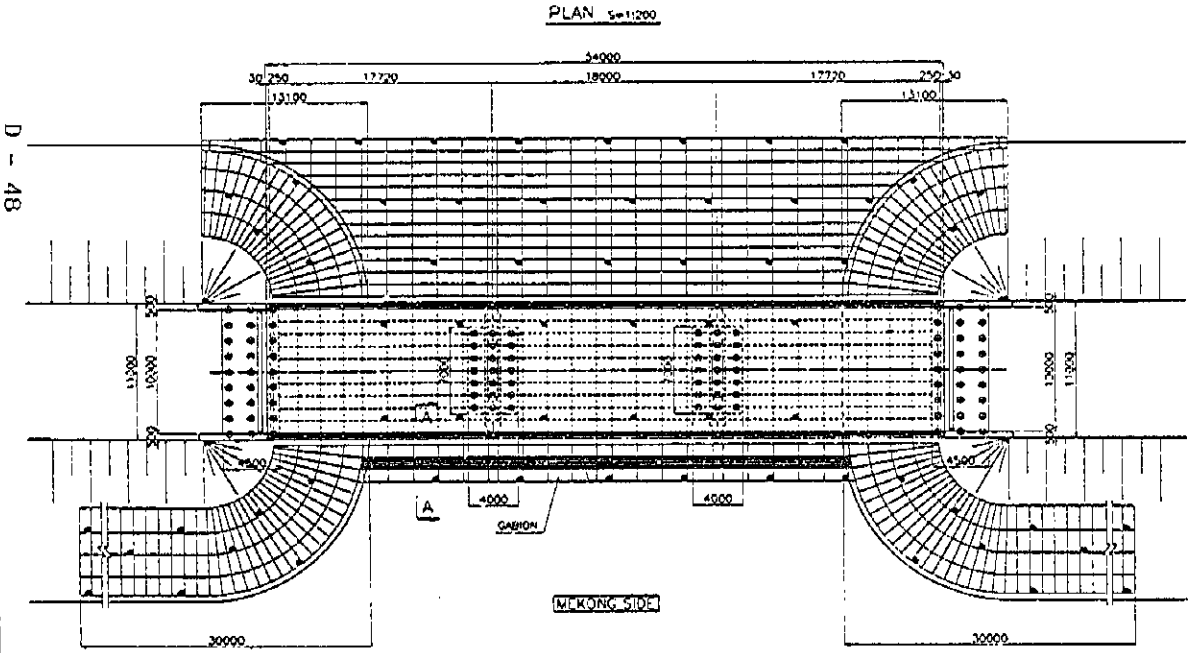


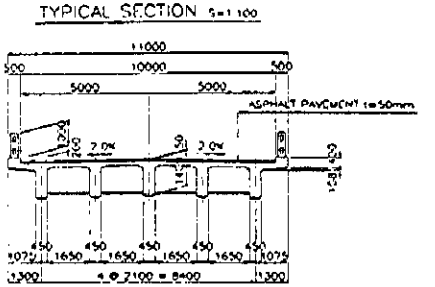
Figure 2-3-56

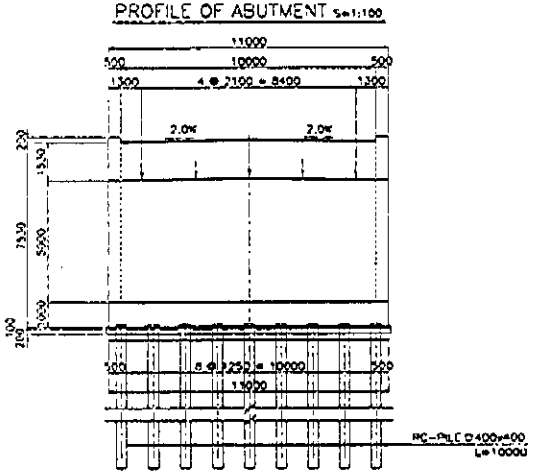
THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7	TITLE : GENERAL VIEW OF NO.10 BRIDGE (1)	JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997 / DRAWING NO :	ORIENTAL CONSULTANTS CO.,LTD

F1~F2 BRIDGE









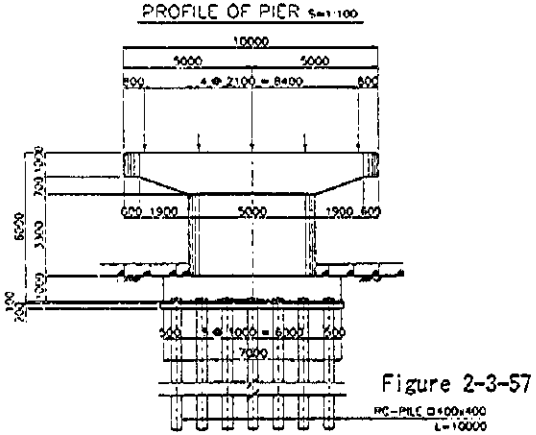
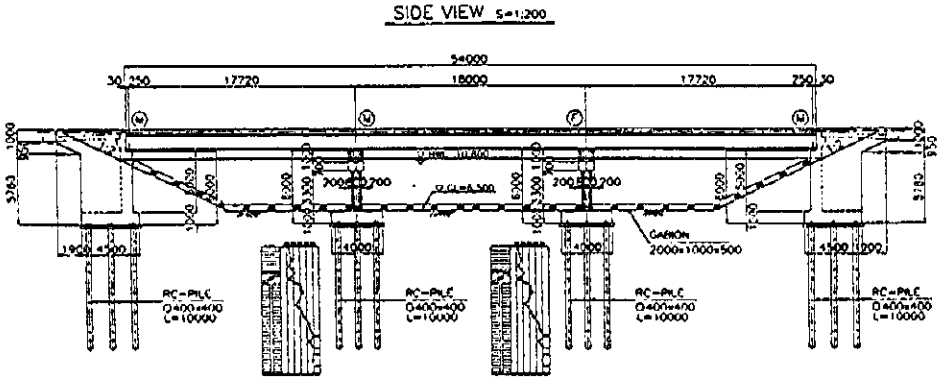
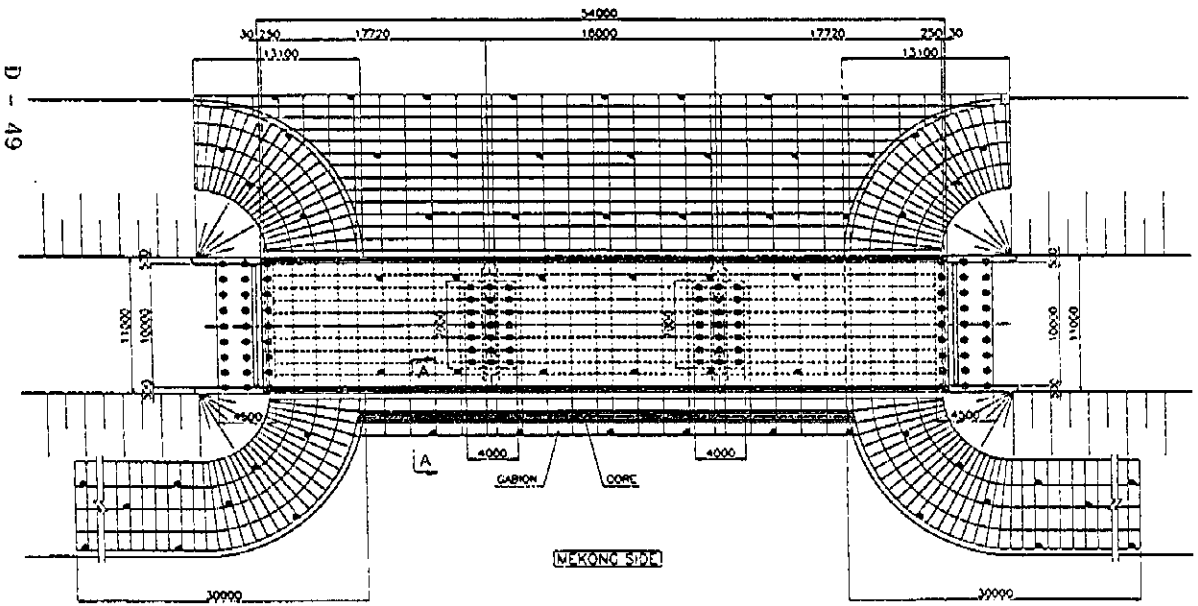


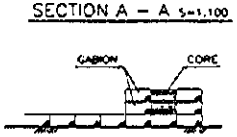
Figure 2-3-57

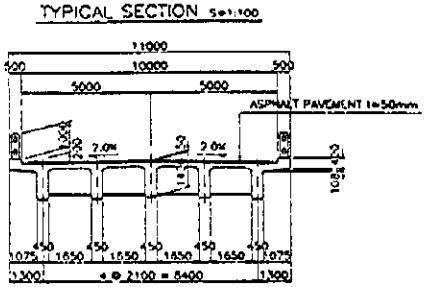
THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7	TITLE : GENERAL VIEW OF F1 ~ F2 BRIDGE		JAPAN INTERNATIONAL COOPERATION AGENCY
		DATE : January 1997	DRAWING NO :	ORIENTAL CONSULTANTS CO., LTD

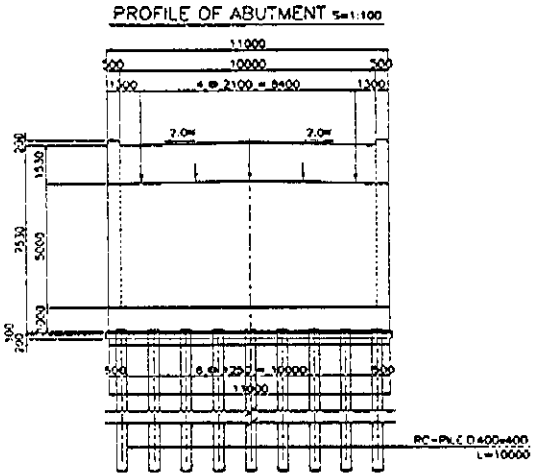
F3 BRIDGE











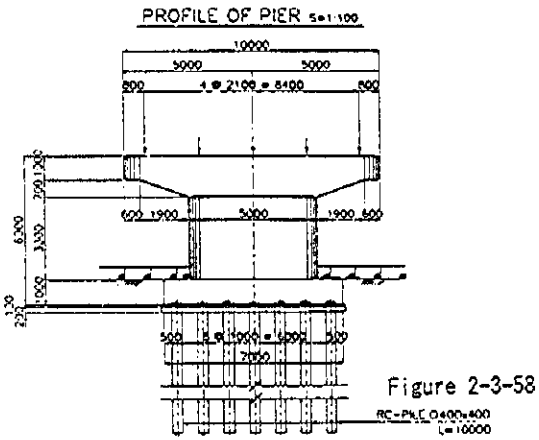


Figure 2-3-58

D - 49

THE KINGDOM OF CAMBODIA	THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7	TITLE : GENERAL VIEW OF F3 BRIDGE DATE : January 1997 / DRAWING NO :	JAPAN INTERNATIONAL COOPERATION AGENCY ORIENTAL CONSULTANTS CO.,LTD

APPENDIX

Appendix-1 : Members of the Survey Team

(a) For the Study

Mr. Nobuo TOIDA	Team Leader	Managing Director, Hachioji International Center, JICA
Mr. Takuya MITANI	Team Member for Grant Aid Cooperation	Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs
Mr. Tatsuo AKAISHI	Technical Advisor	Vice Manager, Maintenance Div. 2, Maintenance and Traffic Dep., Japan Highway Public Corporation
Mr.Kazuo YANAGIDA	Chief Consultant / Road Maintenance Planner	Executive Director Oriental Consultants Co., Ltd.
Mr. Shinsuke KUBO	Road Rehabilitation Planner / Road Designer	Chief Engineer, Engineering Dep. Oriental Consultants Co., Ltd.
Mr. Akihiko HIROTANI	Bridge Designer	Executive Director Oriental Consultants Co., Ltd.
Mr. Hitoshi OKITA	Natural Conditions Surveyor	Chief Engineer, International Dep. Oriental Consultants Co., Ltd.
Mr.Iwao YOKOKAWA	Natural Conditions Surveyor	Chief Engineer, Engineering Dep. Oriental Consultants Co., Ltd.
Mr. Yoshiki MIYAZAKI	Construction Planner / Cost Estimator	Manager, International Dep. Oriental Consultants Co., Ltd.

(b) For Explanation Draft Final Report

Mr. Nobuo TOIDA	Team Leader	Managing Director, Hachioji International Center, JICA
Mr. Msatoshi TERAMOTO	Project Coordinator	First Project Management Division Grant Aid Project Management Department
Mr.Kazuo YANAGIDA	Chief Consultant / Road Maintenance Planner	Executive Director Oriental Consultants Co., Ltd.
Mr. Yoshiki MIYAZAKI	Construction Planner / Cost Estimator	Manager, International Dep. Oriental Consultants Co., Ltd.

Appendices-2: Survey Schedule

(a) For the Study

No	Date	Day	Accommodation	Activities
1	6/9	Sun.	Phnom Penh	Tokyo-Bangkok TG641 (11:00-15:40) Bangkok-Phnom Penh VJ052 (17:20-18:25) (3 consultants: Hirotani, Okita, Miyazaki)
2	6/10	Mon.	Phnom Penh	Meeting at JICA Office, Courtesy call at authorities concerned (Ministry of Public Works and Transport, Major Construction Department)
3 ↓ 7	6/11 ↓ 6/15	Tue. ↓ Sat.	Phnom Penh	Site survey (3 consultants: Hirotani, Okita, Miyazaki)
8	6/16	Sun.	Phnom Penh Bangkok	Site survey (3 consultants: Hirotani, Okita, Miyazaki) Tokyo-Bangkok (3 officials: Toida, Mitani, Akaishi+ 1 consultant: Yanagida) TG641 (11:00-15:40)
9	6/17	Mon.	Phnom Penh	Site survey (3 consultants: Hirotani, Okita, Miyazaki) Bangkok-Phnom Penh (3 officials: Toida, Mitani, Akaishi + 1 consultant: Yanagida) TG698 (14:30-15:45)
10	6/18	Tues.	Phnom Penh	Site survey (1 consultant: Okita) Meeting at JICA Office, Courtesy call at Japan Embassy, Courtesy call at authorities concerned (Ministry of Public Works and Transport, Major Construction Department), explanation of the Inception Report. (3 officials: Toida, Mitani, Akaishi + 3 consultants: Yanagida, Hirotani, Miyazaki)
11	6/19	Wed.	Phnom Penh	Meeting (3 officials: Toida, Mitani, Akaishi + 3 consultants: Yanagida, Hirotani, Miyazaki) Site survey (1 consultant: Okita)
12	6/20	Thur.	Phnom Penh	Meeting and Visiting the Site (3 officials: Toida, Mitani, Akaishi + 3 consultants: Yanagida, Hirotani, Miyazaki) Site survey (1 consultant: Okita)
13	6/21	Fri.	Phnom Penh	Visiting the Site (3 officials: Toida, Mitani, Akaishi + 3 consultants: Yanagida, Hirotani, Miyazaki) Site survey (1 consultant: Okita)
14	6/22	Sat.	Phnom Penh	Visiting the Site (3 officials: Toida, Mitani, Akaishi + 3 consultants: Yanagida, Hirotani, Miyazaki) Site survey (1 consultant: Okita) Tokyo-Bangkok TG641 (11:00-15:40) Bangkok-Phnom Penh VJ052 (17:20-18:25) (1 consultant: Kubo)
15	6/23	Sun.	Phnom Penh	Meeting Study Team (3 officials: Toida, Mitani, Akaishi + 3 consultants: Yanagida, Hirotani, Miyazaki) Site survey (2 consultant: Okita, Kubo)
16	6/24	Mon.	Phnom Penh	Discussion (3 officials: Toida, Mitani, Akaishi + 3 consultants: Yanagida, Kubo, Hirotani, Miyazaki) Site survey (2 consultant: Okita, Kubo)

17	6/25	Tues.	Phnom Penh	Minutes of Discussion (3 officials: Toida, Mitani, Akaishi + 4 consultants: Yanagida, Kubo, Hirotani, Miyazaki)
				Site survey (2 consultant: Okita, Kubo)
			Bangkok	Tokyo-Bangkok TG641 (11:00 - 15:40)
				(1 consultant: Yokokawa)
18	6/26	Wed.	Phnom Penh	Signing of Minutes of Discussion (3 officials: Toida, Mitani, Akaishi + 3 consultants: Yanagida, Hirotani, Miyazaki)
				Meeting at JICA Office, Courtesy call at Japan Embassy
				Site survey (5 consultants: Yanagida, Kubo, Hirotani, Okita, Miyazaki)
				Bangkok-Phnom Penh TG696 (11:00-12:15)
				(1 consultant: Yokokawa)
			Bangkok	Phnom Penh-Bangkok TG699 (16:45 : 17:50)
				(3 Officials: Toida, Mitani, Akaishi)
19	6/27	Thur.	Phnom Penh	Site survey (5 consultants: Yanagida, Kubo, Okita, Yokokawa, Miyazaki)
				Bangkok-Tokyo TG640 (10:45-19:00)
				(3 Officials: Toida, Mitani, Akaishi)
			Bangkok	Phnom Penh-Bangkok (1 consultant: Hirotani) TG697 (13:15-14:20)
20	6/28	Fri.	Phnom Penh	Consultants continue investigation
				Bangkok-Tokyo (1 consultant: Hirotani) TG640 (10:45-19:00)
21	6/29	Sat.	Bangkok	Phnom Penh-Bangkok (1 consultant:Yanagida) TG697 (13:15-14:20)
22	6/30	Sun.		Bangkok-Tokyo TG640 (10:45-19:00)
↓	↓	↓	↓	↓
31	7/9	Tue.	Bangkok	Tokyo-Bangkok (1 consultant:Hirotani) TG641 (11:00-15:40)
32	7/10	Wed.	Phnom Penh	Bangkok-Phnom Penh TG696 (11:00-12:15)
36	7/14	Sun.	Bangkok	Phnom Penh-Bangkok (1 consultant: Kubo) TG697 (13:15-14:20)
37	7/15	Mon.		Bangkok-Tokyo JL734 (08:40-20:20)
39	7/17	Wed.	Bangkok	Phnom Penh-Bangkok (4 consultants: Hirotani, Okita, Yokokawa, Miyazaki) TG699 (16:45-17:50)
40	7/18	Thur.		Bangkok-Tokyo TG640 (10:45-19:00)

(b) For Explanation of Draft Report

No	Date	Day	Accommodation	Activities
1	8/24	Sat.	Bangkok	Narita-Bangkok TG641 (11:00-15:40)
2	8/25	Sum.	Phnom Penh	Bangkok-Phnom Penh VJ052 (17:20-18:25)
3	8/26	Mon.	Phnom Penh	8:00 Meeting at JICA Office 10:00 Courtesy call at Embassy of Japan 11:00 Courtesy call at Ministry of Foreign Affairs and International Cooperation 15:00 Courtesty call at Ministry of Public Works and Transport
4	8/27	Tue.	Kompons Cham	8:00 Site Survey at Kompong Cham 16:00 Courstesy call to Governor of Kompong Cham Province
5	8/28	Wed.	Phnom Penh	8:00 Move to Phnom Penh 12:00 Meeting Study Team
6	8/29	Thur.	Phnom Penh	9:00 Minutes of Discussion 15:00 Signing of Minutes of Discussion
6	8/30	Fri.	Bangkok	9:00 Courtesy call at Embassy of Japan 10:00 Meeting at JICA Office
8	8/31	Sat.		Phnom Penh-Bangkok TG697 (13:15-14:20) Bangkok-Narita TG640 (10:45-19:00)

Appendix-3: List of Party Concerned in the Cambodian Side

1. Ministry of Public Works and Transport

No.	Name	Position
01	H.E. Mr. Ing Kieth	Deputy Prime Minister and Minister of Public Works and Transport
02	H.E. Mr. Tram Iv Tek	Secretary of State
03	H.E. Mr. Chin Kim Sreng	Undersecretary of State
04	H.E. Mr. Measketh Caimirane	Undersecretary of State
05	Mr. Tan Sim Khorn	Advisor to Deputy Prime Minister
06	Mr. Trac Thai Sien	Advisor to Minster
07	Mr. Tan Hay Sien	Director of Department of Infrastructure
08	Mr. Chun So Kun	Director of Planning Department
09	Mr. Tauch ChanKosal	Director of Department of Major Construction
10	Mr. Chea Sieng Hong	Director, Road Construction Center.
11	Mr. Yi Song Ngorn	Director of Cabinet
12	Mr. Van Than	Chief of International Bureau
13	Mr. Yim Reach Linh	Director of Department of Administration and Finance

2. Ministry of Foreign Affairs

14	Ms. You Ay	Director General, ASEAN Department
15	Mr. Kem Mongkol	Director of International Cooperation Department
16	Mr. Hoy Kim An	Chief Officer

3. Ministry of Economy and Finance

17	Ms. Pith Nimul.	Deputy Director, Investment Office.

4. Council for Development of Cambodia

18	Mr. Chhieng Yanara	Secretary General, Cambodian Rehabilitation and Development Board
19	Ms. Chhin Rem.	Deputy Director, Cambodian Rehabilitation and Development Board

APPENDIX-4:Estimation of Cost which is to be borne by the Cambodian Side

The expenditure to be borne by the Royal Government of Cambodia in connection with the implementation of the Project is estimated as shown below;

1)	Land Acquisition	:	US$ 450,000.-
2)	Property Compensation	:	US$ 76,500.-
3)	Property Demolition	:	US$ 25,500.-
4)	Construction Yard Leasing	:	US$ 157,500.-
5)	DMC Annual Maintenance Cost	:	US$354,000.-
6)	DMC Annual Administration Cost	:	US$ 30,000.-

Those cost are derived by the estimation as follow;

1) Land Acquisition

Land acquisition is necessary at Kompong Cham for the construction of new road.

Area : 90,000m2 (Approximately 2,250m long and 40m wide)
Unit Cost : US$5.-/m2 (Data by DMC)
Total Cost : US$450,000.- (90,000 x 10.-)

2) Property Compensation

There are 85 houses in the area for acquisition.

Average floor size	: 300m2/house (one to two stories)
Total floor area for compensation	: 25,500m2
Compensation unit cost	: US$3.- (Data by DMC)
Total compensation cost	: US$76,500.- (25,500 x 3.-)

3) Property Demolition

There are 85 houses in the area for acquisition.

Average floor size	: 300m2/house (one to two stories)
Total floor area for demolition	: 25,500m2
Demolition unit cost	: US$1.- (Data by DMC)
Total demolition cost	: US$25,500.- (25,500 x 1.-)

4) Construction Yard Leasing

There are two yards planned, one near Phnom Pen and other near Skun.

Total yard area	: 52,500m2 (200 x 150 + 150 x 150m)
Unit lease cost	: US$1.-/m2/year (Data by DMC)

Total lease cost : US$157,500.- (52,500 x 1.- x 3 years)

5) DMC Annual Maintenance Cost

Types of required maintenance / management foreseen for the next ten years and costs are shown below.

Maintenance work and expenses

Table 2-3-1 : Contents and Expenses of Maintenance Works

Period	Work	Frequency	Expense
First to five years	① Cleaning, grass removal on shoulders, embankment	once a year	0.15$ x320,000m^2 = 48,000$
	② Cleaning of drainage facilities	once a year	40$ x 2km
	③ Shoulder repairs	once a year	0.25$ x 75,000m^2 = 19,000$
	④ Light repair of embankment (treated areas) (approx. 10% of total area)	when necessary	1.5$ x 3,000m^2 = 5,000$
			Total 72,000$/year
Fifth to tenth years	①②③ of above	once a year	
	④ Pavement repair (Approx. 0.1% of total area per year)	when necessary	5.0$ x 600m^2 = 3,000$/year
	⑤ Minor bridge repairs (expansion joint, railing, etc.)	when necessary	
	⑥ Medium-scale repairs of embankment (treated area)	once every 5 years	4.5$ x 20,000m^2 = 90,000$/5year
Tenth year	Overlay	after 10 years once every 7 years	5.0$ x 525,000m^2 = 2,625,000$
		10 year total	**US$ 3,540,000**

6) DMC Annual Administration Cost

Operation costs

Costs estimated for routine inspection and periodic inspections (weeding, etc.) are shown below.

- Wages : US$ 25,000/year
- Vehicle fuel : US$ 5,000/year
  Total US$ 30,000/year

This is the expense to operate inspection unit which is recommended to establish in the RCC. The inspection unit will be responsible for all improved roads such as National Route 4, 5, 6 and 7. Accordingly, around 20% of the total operation cost is share for the road rehabilitated in the project.

No.	DISCRIPTION	Year OF Implemaitat	Distance	Cost Estimation	Fund	Cost Per Kilomete MillanDollar	Year OF Completion				
							96	97	98	99	2000
1	RepairNR#2 (From Takao TO V.N Boder)	1996-1997	47km	1.41	ADB	0.03/km	23	24			
2	RepairNR#3(From Kampot To Veal Ring)	1996-1997	54km	8.1	World Bank	0.15/km	27	27			
3	RepairNR#6(From Preakdam To Skun)	1997-1998	30km	4.5	Japan AID	0.15/km		15	15		
4	RepairNR#6(From Skun To Siem Reap)	1998-2000	234km	35.1	World Bank	0.15/km	30	66	67	35	36
	* From Skun To Tang Kauk	1996-	30km	4.5	"	0.15/km	30				
	* From Tang Kauk To Kampong Tom	1997-1998	63km	9.45	"	0.15/km		31	32		
	* Kampong Tom To Siem Reap	1997-2000	141km	21.15	"	0.15/km		35	35	35	36
5	RepairNR#3(From Phnom Penh To Kampot)	1997-1999	135km	20.25	Japan AID	0.15/km		45	45	45	
	* From Phnom Penh To Ang Ta Som	1997-1999	63km	9.45	"						
	* From Ang Ta Som To Kampot	1997-1999	72km	10.8							
6	RepairNR#7(From Skun To Kampong Cham)	1997-1999	50km	7.5	Japan AID	0.15/km		25	25		
7	RepairNR#7(Kampong Cham To Steng Treng)	1996-2000	412km	12.36	ADB	0.15/km	108	103	69	97	30
	* From Kampong Cham To Mamot	1996-1997	81km	2.43	"		40	41			
	* From Memot To Krachesh	1996-1999	132km	3.96	"		33	33	33	33	
	* From Krachesh To Steng Treng	1996-1999	141km	4.23	"		35	35	35	36	
	* From Steng Treng To LAO Boder	1999-2000	58km	1.73	"					28	30
8	RepairNR#21	1996-	40km	1.2	"	0.03/km	40				
9	RepairNR#51(FromJunction#5 To Junction#4)	1996-1997	40km	6	World Bank	0.15/km	20	20			
10	RepairNR#78(FromJunction#7 To Banlung)	1996-1999	142km	4.26	Not Yet	0.03/km	35	35	35	37	
	* From Banlung To Vietnam Boder	1996-1997	61km	1.83	"	0.03/km	30	31			
11	RepairNR#73(From PrasatChlong To Krachesh)	1996-1997	100km	3	"	0.03/km	71	29			
	* Prasat Chlong	1996-1997	58km	3	"	0.03/km	42	16			
	* From Chlong To Krachesh	1996-	42km	3	"						
12	RepairNR#76(From Khem To Senmonorom)	1996-1999	130km	3.9	"	0.03/km	32	32	32	34	
13	RepairNR#64(From KampongTom To Ravieng)	1996-1998	91km	2.73	"	0.03/km	30	30	31		
14	RepairNR#48(Junction#4 To Kok kong)	1996-1999	171km	5.13	"	0.03/km	56	33	38	39	
	* From Kok Kong To Thai Boder	1997-	13km		"			13			
15	RepairNR#64(Ravieng To Thbeng Meanchey)	1998-2000	66km	1.98	"	0.03/km			33	33	
16	RepairNR#76(Senmonorom To Kok Ngek)	1999-2000	100km	3	"	0.03/km			33	33	34
17	RepairNR#31(Kush To Kampong Trach)	1996-1997	55km	1.65	"	0.03/km	27	28			
18	RepairNR#32(RalushkhsarTo Bouk kor)	1998-	34km	1.02		0.03/km	34				
19	RepairNR#11(Neak Loueng To Prey veng)	1996-	30km	9	ADB	0.03/km	30				
20	Maintenance All National Route In Country	1996-2000	1750km	8.75		0.005/km	450	400	350	300	250
21	Maintenance All Province/TownRoadsInCountry	1996-2000	1,200,000m	4.8		4$/km	2E+05	2E+05	259000	3E+05	300000
22	Maintenance All Province/TownRoadsInCountry	1996-2000	1700km	5.1		0.03/km	300	300	350	350	400
23	Maintenance and Bviet New Bride In County										
	* Maintenance	1996-2000	7000km	1.4		0.0002/km	1000	1000	1500	1500	2000
	* New Constuction	1996-2000	3500km	21.5		0.007/km	1000	1000	500	500	500
24	Maintenance Sewer pipe In City andProvince										
	For entire County					0.0001/km					
25	MaintenanceBride In Province For entire country	1996-2000	12500km	1.25		0.0001/km	2500	2500	2500	2500	2500
26	MaintenanceEquipment and Spare Parts	1996-2000		2.5			500	500	500	500	500
27	Fixed and Repaired Office/Building For MPW.T										
28	Researched and Study proposal For National										
	Route and Province Road For entire County										
29	Emergency Work										
30	RepairNR#33(Kampot To Kampong Trach)	1996-1997	52km	1.56		0.03/km	36	23			
	* Bodet Vietname										
	* Kampot To Kampong Trach	1996-1997	46km	1.38			20	26			
	* Kampong Trach To Bodet Vietnam	1997-	16km	0.48			16				

APPENDIX-5:Minutes of Discussions

(a) For Explanation of Inception Report

MINUTES OF DISCUSSIONS

BASIC DESIGN STUDY
ON
THE PROJECT FOR REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7
IN
THE KINGDOM OF CAMBODIA

In response to a request from the Royal Government of Cambodia, the Government of Japan decided to conduct a Basic Design Study on the Project for Rehabilitation of National Roads Route 6 and 7 (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 Kingdom of Cambodia (hereinafter referred to as "Cambodia") a study team, which is headed by Mr. Nobuo Toida, Managing Director, Hachioji International Center, JICA, and is scheduled to stay in the country from 10th of June to17th of July, 1996.

The team held a series of discussions with the relevant officials of the Royal Government of Cambodia and conducted a field survey at the study area. List of attendants is as attached.

As a result of discussions and field survey, both sides have confirmed the main items described in the attached sheets.

The team will proceed to further works and prepare the Basic Design Study report.

Phnom Penh, June 26, 1996

Mr. Nobuo TOIDA
Leader
Basic Design Study Team
JICA

H.E.Mr. Ing Kieth
Deputy Prime Minister and
Minister for Public Works and Transport

ATTACHMENT

1. OBJECTIVES

The objective of the Project is to provide stable road transport between Phnom Penh and Kompong Cham by rehabilitating National Roads Route 6 and 7 and to contribute toward the enhancement of the nation's economy.

2. PROJECT SITE

The Project site is shown in ANNEX-I.

The extent of road rehabilitation is from the point of intersection of Thnolkeng (Route 6 with Route 61) to the intersection at Kompong Cham, as shown in ANNEX-I.

The total length is approximately 73 kilometers.

It is noted, however, that the Cambodian side strongly requested to connect Route 7 and Mekong river by a new road. The Japanese side promised to convey the request to the Government of Japan and JICA.

3. EXECUTING AGENCY

Department of Major Construction, Ministry of Public Works and Transport is responsible for the administration and execution of the Project.

4. ITEMS REQUESTED BY THE ROYAL GOVERNMENT OF CAMBODIA

As a result of the series of discussions, the following items were finally requested by the Cambodian side.

(1) Rehabilitation of Damaged and/or Deteriorated Pavement

(2) Rehabilitation of Damaged Road Embankment
- Failure of slope and shoulder

(3) Rehabilitation of Culverts and Bridges
- Eight Bridges
- Two Culverts

The outlines of the Project are shown in ANNEX-II

However, the site where the risk of safety is foreseen will be neglected from the list.

The final components of the Project will be decided after further studies.

5. CONCEPT OF BASIC DESIGN

The Basic Design shall refer to the Japanese standard and specifications, while local material and construction practice shall be utilized as much as possible. In this regard, the width of carriageway shall be 7.0 meters.

6. JAPAN'S GRANT AID SYSTEM

The Royal Government of Cambodia has understood the system of Japan's Grant Aid explained in ANNEX-III.

7. NECESSARY MEASURES TO BE TAKEN BY THE CAMBODIAN SIDE

The Royal Government of Cambodia is responsible to the items such as; to make the site clear of mines and bombs; to acquire and clear the site of project; and will also take necessary measures described in ANNEX-IV for smooth implementation of the Project on condition that the Grant Aid by the Government of Japan is extended to the Project.

8. MAINTENANCE MANAGEMENT

The Royal Government of Cambodia shall prepare enough budget and staff for the maintenance management of National Roads Route No.6 & 7 on condition that the Grant Aid by the Government of Japan is extended to the Project.

9. UTILIZATION OF ROAD CONSTRUCTION CENTER

The Royal Government of Cambodia shall exercise at most effort to involve the Road Construction Center with the construction of the Project on condition that the Grant Aid by the Government of Japan is extended to the Project.

10. THE SCHEDULE OF THE STUDY

(1) The consultants will proceed to further studies in Cambodia until July 17, 1996.

(2) Based on the results, JICA will prepare the Draft Basic Design Report in English and dispatch a team in the end of August 1996 in order to explain and confirm the contents.

(3) In case that the contents of the report is accepted in principle by the Royal Government of Cambodia, JICA will complete the Basic Design Report and forward it to the Cambodian side by the end of December.

11. OTHER RELEVANT ISSUES

(1) The Cambodian side will take all possible measures to secure the safety of the team during the field survey.

(2) The Royal Government of Cambodia shall provide all necessary information and data in case that the Basic Design Team request.

PARTICIPANTS LIST

CAMBODIAN SIDE

Ministry of Public Works and Transport

H.E.Mr. Ing Kieth	Deputy Prime Minister and Minister for Public Works and Transport
H.E.Mr. Tram Iv Tek	Secretary of State
H.E Mr. Chin Kim Sreng	Undersecretary of State
H.E.Mr. Measketh Caimirane	Undersecretary of State
Mr. Tan Sim Khorn	Advisor to Deputy Prime Minister
Mr. Tan Hay Sien	Director, Department of Infrastructure
Mr. Chun So Kun	Director, Planning Department
Mr. Tauch Chan Kosal	Director, Department of Major Construction (DMC)
Mr. Chea Sieng Hong	Director, DMC, Road Construction Center (RCC)
Mr. Akira KANEKO	JICA Expert, Senior Advisor to the Minister
Mr. Kazuo MURAKAMI	JICA Expert, RCC
Ms. Sras Lisa Sokha	Secretary, RCC

Council for Development of Cambodia

Ms. Chhin Rem	Deputy Director, Cambodian Rehabilitation and Development Board

Ministry of Economy and Finance

Ms. Pith Nimul	Deputy Director, Investment Office

Ministry of Foreign Affairs

Mr. Hoy Kim An	Chief Officer

JAPANESE SIDE

Basic Design Study Team

Mr. Nobuo TOIDA	Leader (Managing Director, Hachioji International Center, JICA)
Mr. Takuya MITANI	Grant Aid Cooperation (Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs)
Mr. Tatsuo AKAISHI	Technical Advisor (Vice Manager, Maintenance Division 2, Maintenance and Traffic Department, Japan Highway Public Corporation)
Mr. Kazuro YANAGIDA	Chief Consultant (Executive Director, Oriental Consultants Co., Ltd.)
Mr. Akihiko HIROTANI	Deputy Chief Consultant, Bridge Planner (Executive Director, Oriental Consultants Co., Ltd.)
Mr. Shinsuke KUBO	Road Rehabilitation Planner (Senior Engineer, Oriental Consultants Co., Ltd.)
Mr. Hitoshi OKITA	Surveyor I (Engineer, Oriental Consultants Co., Ltd.)
Mr. Iwao YOKOKAWA	Surveyor II (Engineer, Oriental Consultants Co., Ltd.)
Mr. Yoshiki MIYAZAKI	Construction Planner / Cost Estimator (Manager, Oriental Consultants Co., Ltd.)

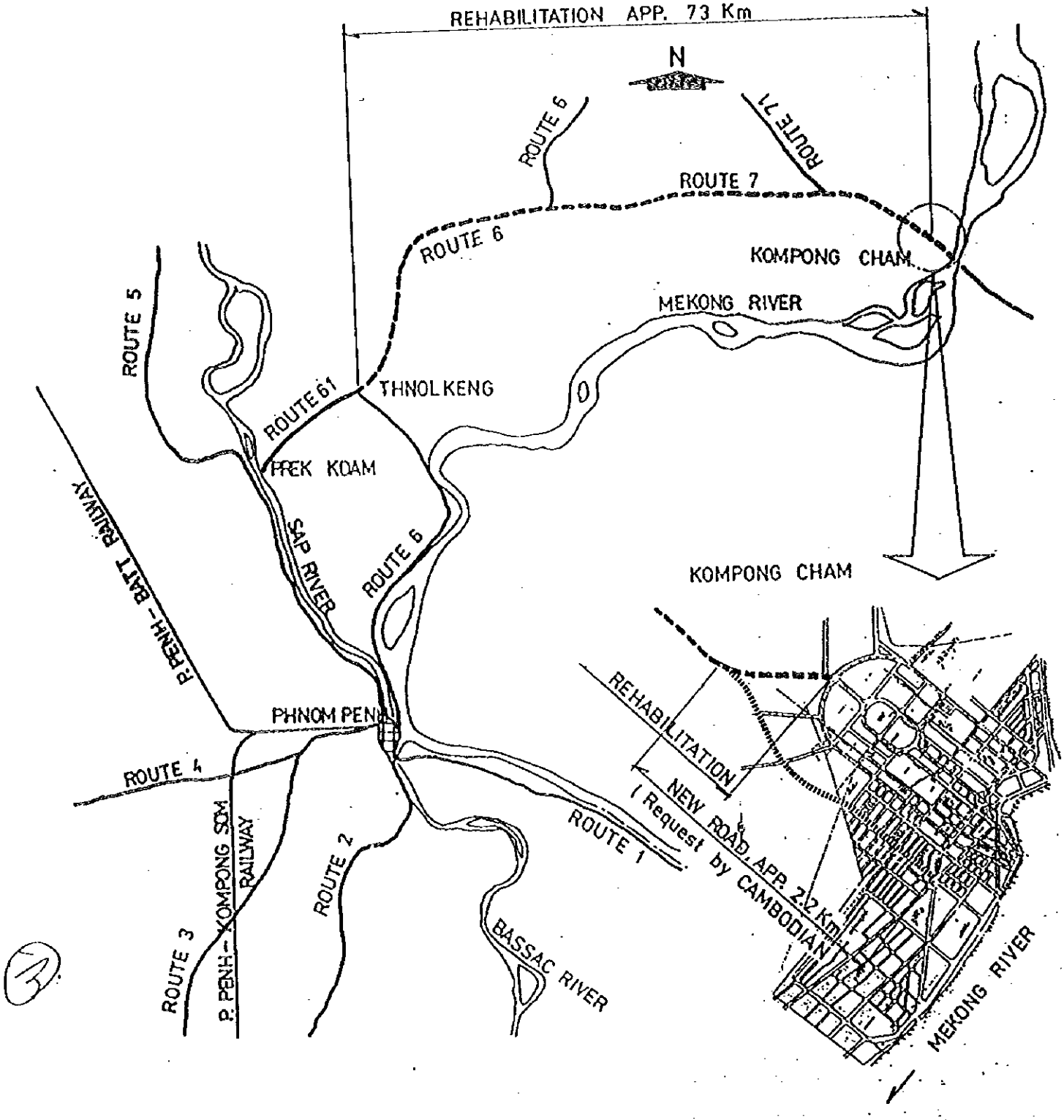
Embassy of Japan in Cambodia

Mr. Shigenobu KATO	Minister - Counsellor
Mr. Shigetsugu TSUKAMOTO	First Secretary

Japan International Cooperation Agency, Cambodia Office

Mr. Hiroyuki ARAI	Resident Representative
Mr. Hiroshi ENOMOTO	Assistant Resident Representative
Mr. Yoichi YAMAGIWA	Assistant Resident Representative

ANNEX - I Project Site



PROJECT LOCATION MAP

ANNEX - II Outline of Project

Rehabilitation of Existing Road		Approximately 73km
Bridges and Culverts		
No.1 (Chea Lea Bridge)	Culvert	Replace (tentative resolve)
No.2 (Tros River Bridge)	Bridge	Replace (tentative resolve)
No.3 (An Long Chrey Bridge)	Bridge	Replace (tentative resolve)
No.4 (Trapaing Trep Bridge)	Bridge	Replace (tentative resolve)
No.5 (Tonsorng Slab Bridge)	Bridge	Replace (tentative resolve)
No.6 (An Long Char Bridge)	Bridge	Replace (tentative resolve)
No.7 (Trapaing Sangke Bridge)	Bridge	Replace (tentative resolve)
No.8 (Oda Bridge)	Bridge	Replace (tentative resolve)
No.9 (Stung Pro Yorl Bridge)	Bridge	Replace (tentative resolve)
No.10 (Troeung Bridge)	Culvert	Replace (tentative resolve)
Other Culverts		Replace where necessary

Note : The Project is still under study and minor changes are expected before the final component of the Project is determined.

ANNEX - III Japan's Grant Aid System

Japan's Grant Aid Scheme

1. Grant Aid Procedures

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 (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 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 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.

b) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a 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

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 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) firm(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 and also to avoid any undue delay in implementation should the selection process be repeated.

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 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 Governments.

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 a third country.
However the prime contractors, namely, consulting, constructing 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 recipient country or its designed 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) Undertakings 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:

(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.

(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

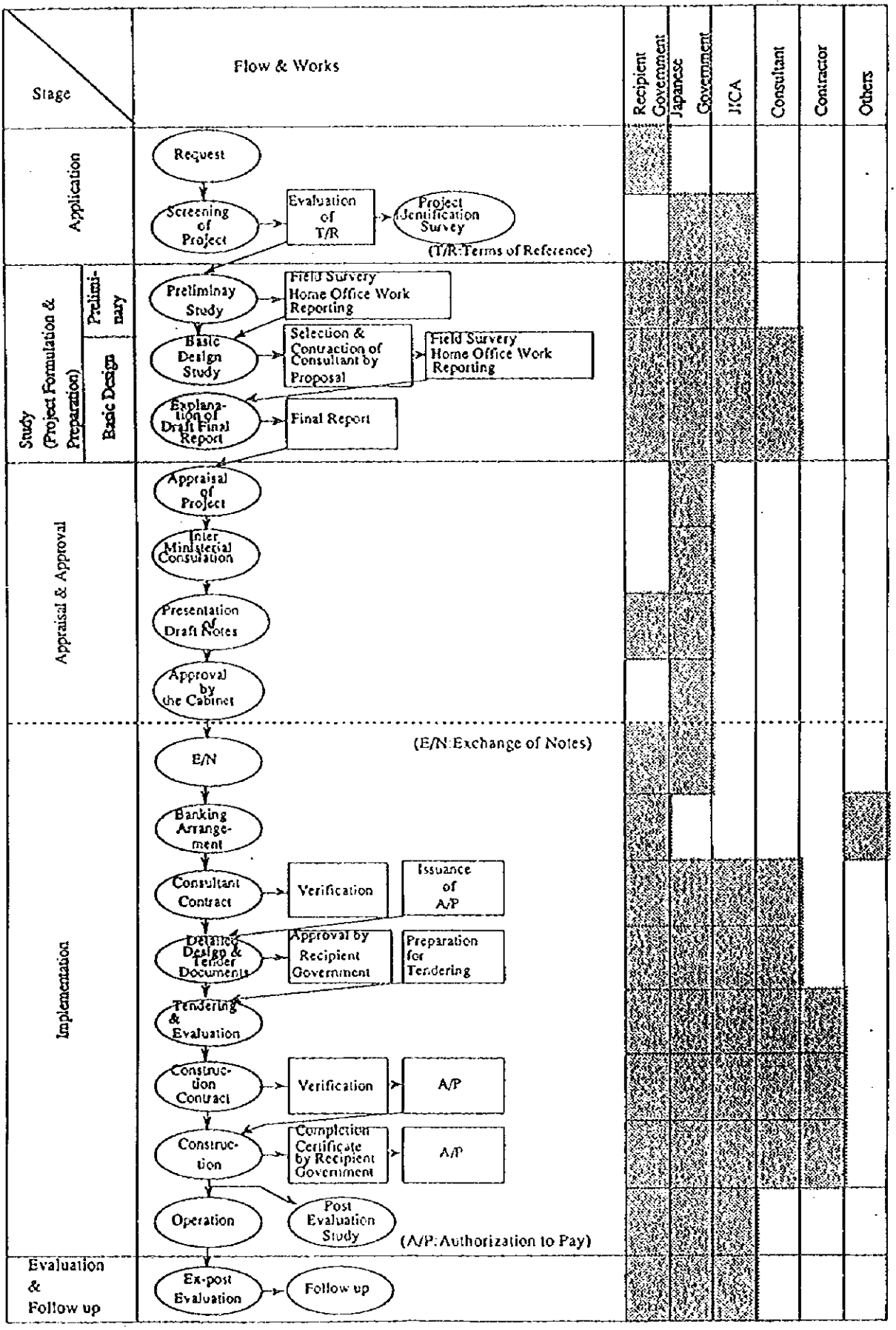
equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

(8) "Re-export"
The products purchased under the Grant Aid should 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 to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.

Flow Chart of Japan's Grant Aid Procedures



ANNEX - IV Major Undertakings to be taken by Each Government

No.	Items	To Be Covered By Grant Aid	To Be Covered By Cambodian Side
(1)	To acquire and secure land.		●
(2)	To clear, level, and reclaim the site when needed.		●
(3)	To demolish and clear the property when needed.		●
(4)	To compensate the property when needed.		●
(5)	To rehabilitate pavement for the Project.	●	
(6)	To rehabilitate slope and embankment for the Project.	●	
(7)	To rehabilitate bridges and culverts for the Project.	●	
(8)	To control traffic during the construction of the Project.		●
(9)	To provide security control for powder magazines for blasting.		●
(10)	To exempt taxes and to take necessary measures for customs clearance of the materials and equipment brought for the Project at the port of disembarkation.		●
(11)	To exempt study members from income taxes and other fiscal charges payable under the legislation of Cambodia in respect of any emoluments or allowances remitted to them from overseas.		●
(12)	To accord Japanese nationals whose services may be required in connection with the supply of products and the services under the verified contract such facilities as may be necessary for their entry into Cambodia and stay therein for the performance of their work.		●
(13)	To maintain and use properly and effectively the facilities rehabilitated under the Grant.		●
(14)	To bear all expenses, necessary for the Project, other than those to be borne by the Grant.		●
(15)	To ensure prompt processing of required internal formalities to secure the timely implementation of the Project.		●
(16)	To ensure the safety of the Study Team members when and as it is required in the course of the study.		●

(b) For Explanation of Draft Report

MINUTES OF DISUCUSSIONS
BASIC DESIGN STUDY ON THE PROJECT
FOR
REHABILITATION OF NATIONAL ROADS ROUTE 6 AND 7
IN
THE KINGDOM OF CAMBODIA
(Explanation of Draft Basic Design Report)

From June to July 1996, Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Basic Design Study team on the Project for Rehabilitation of National Roads Route 6 and 7 (hereinafter referred to as "the Project") to the Kingdom of Cambodia (hereinafter referred to as "Cambodia"), 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 the Cambodian side on the components of the draft report, JICA sent to Cambodia a study team, which is headed by Mr. Nobuo Toida, Managing Director of Hachioji International Center, JICA, and is scheduled to stay in the country from 25th to 30th of August, 1996.

As a result of discussions, both sides have confirmed the main items described in the attached sheets.

Phnom Penh, August 29. 1996

Mr. Nobuo TOIDA
Leader
Basic Design Study Team
JICA

H. E. Mr. Tram Iv Tek
Secretary of State for the Minister
Ministry of Public Works
and Transport

ATTACHMENT

1. COMPONENTS OF DRAFT REPORT

The Royal Government of Cambodia has agreed on and accepted the components of the Draft Report proposed by the team.

With regard to a new access road between Route 7 and Mekong River Bridge, the total length is 2.2km, which is strongly requested by the Cambodian side at the Minutes of Discussion in July 1996, the Japanese side conveyed the request to the Government Japan and JICA. As a result of careful consideration, Japanese side decided to include this section into this Project . With regard to the right of way of the new access road, both sides have agreed that approximately, 1.7km in the swamp area will be 40m wide and 0.5km in the area which connects Mekong River Bridge will be 20m wide.

The final Project site is shown in ANNEX-I.

2. NECESSARY MEASURES TO BE TAKEN BY THE CAMBODIAN SIDE

1) The Royal Government of Cambodia is responsible for the items such as; to make the site clear of mines and bombs; to secure the land for the new access road construction and necessary construction yards and will also take necessary measures described in ANNEX-II for smooth implementation of the Project on condition that the Grant Aid by the Government of Japan is extended to the Project.

2) Especially, with regard to the new access road which connects Route 7 and Mekong River Bridge, the Royal Government of Cambodia will execute required land acquisition, compensation and relocation of the effected residents on the following schedule.

   (1) To agree on required land acquisition and compensation with concerned residents by May 1997.
   (2) To allocate budget for the cost of required land acquisition and compensation by August 1997.
   (3) To complete required land acquisition, compensation and relocation of concerned residents by the end of October 1997 before the construction work of new access road to Mekong River Bridge will start.

3) If the above mentioned land acquisition and compensation are not executed by the Royal Government of Cambodia on schedule and if it affects the implementation schedule, it will be difficult to implement the construction of the new access road to Mekong River Bridge.

4) If any problems are encountered during the land acquisition and compensation process, the Cambodian side is wholly responsible for solving the problems.

3. JAPAN'S GRANT AID SYSTEM

The Royal Government of Cambodia has understood the system of Japan's Grant Aid explained in ANNEX- III.

4. FUTURE SCHEDULE

The team will make the Final Report in accordance with the confirmed items, and send it to the Cambodian side by the end of January, 1997.

5. MAINTENANCE AND MANAGEMENT

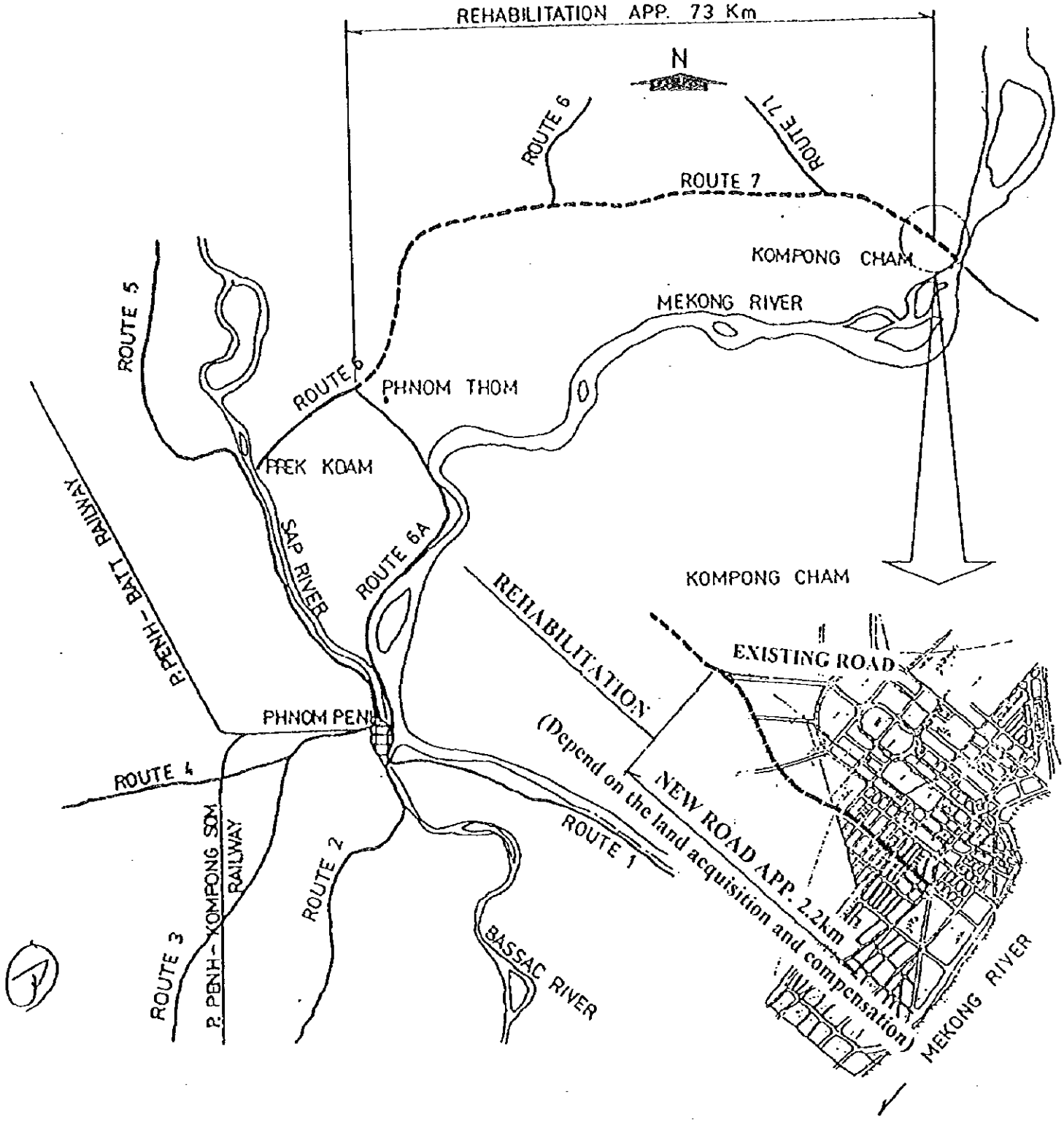
1) The Royal Government of Cambodia shall prepare enough budget and staff for the maintenance and management of National Roads Route 6 and 7 after completion of the construction work. The maintenance and management shall be done by Road Construction Center. The Cambodian side shall build up maintenance capability in Road Construction Center including through on the job training during the Project implementation and through technical transfer from Japanese side.

2) Both sides confirmed the content and cost estimation of the required maintenance and management works of National Roads Route 6 and 7 shown in the Draft Report.

6. OTHER RELEVANT ISSUE

The Cambodian side will take all possible measures to secure the safety of the concerned people during the project implementation.

ANNEX - I Project Site



PROJECT LOCATION MAP

ANNEX-II Major Undertakings to be taken by Each Government

No.	Items	To Be Covered By Grant Aid	To Be Covered By Cambodian Side
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(16)	To ensure the safety of the Study Team members when and as it is required in the course of the study.		●

ANNEX-III Japan's Grant Aid Scheme

Japan's Grant Aid Scheme

1. Grant Aid Procedures

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 (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 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 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.

b) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a 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

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 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.

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Flow Chart of Japan's Grant Aid Procedures