MINISTRY OF TRANSPORTS
VIET NAM

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR RECONSTRUCTION OF BRIDGES
IN
THE NORTHERN DISTRICT
IN
THE SOCIALIST REPUBLIC OF VIET NAM

JANUARY 1996

JAPAN INTERNATIONAL COOPERATION AGENCY
PACIFIC CONSULTANTS INTERNATIONAL
ORIENTAL CONSULTANTS

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PREFACE

In response to a request from the government of the Socialist Republic of Viet Nam the government of Japan decided to conduct a basic design study on the Project for Reconstruction of Bridges in the Northern District in the Socialist Republic of Viet Nam and entrusted the study to the Japan International Cooperation Agency (JICA).

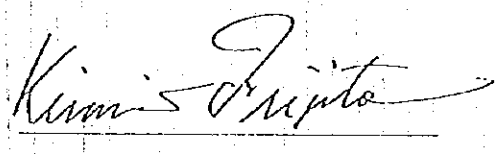
JICA sent to Viet Nam a study team from June 25 to July 18, 1995 and from August 7 to September 15, 1995.

The team held discussions with the officials concerned of the Government of Viet Nam, and conducted filed studies at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Viet Nam in order to discuss a draft basic design, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Socialist Republic of Viet Nam for their close cooperation extended to the teams.

January, 1996



Kimio Fujita
President
Japan International Cooperation Agency

January, 1996

Letter of Transmittal

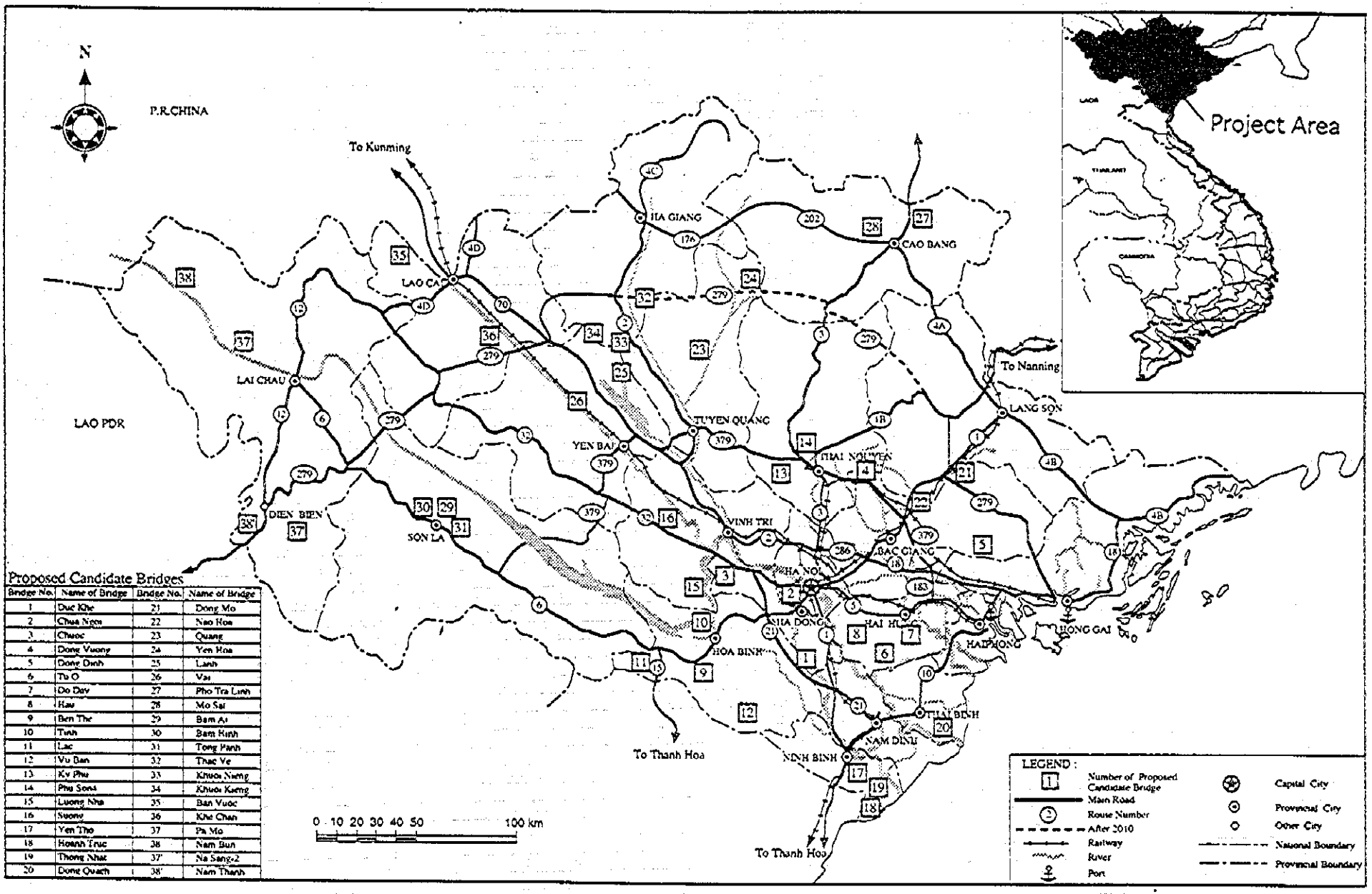
We are pleased to submit to you the basic design study report on the Project for Reconstruction of Bridges in the Northern District in the Socialist Republic of Viet Nam.

This study was conducted by Pacific Consultants International and Oriental Consultants, under a contract to JICA, during the period from June 20, 1995 to January 22, 1996. In conducting the study , we have examined the feasibility and rationale of the project with due consideration to the present situation of Viet Nam and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

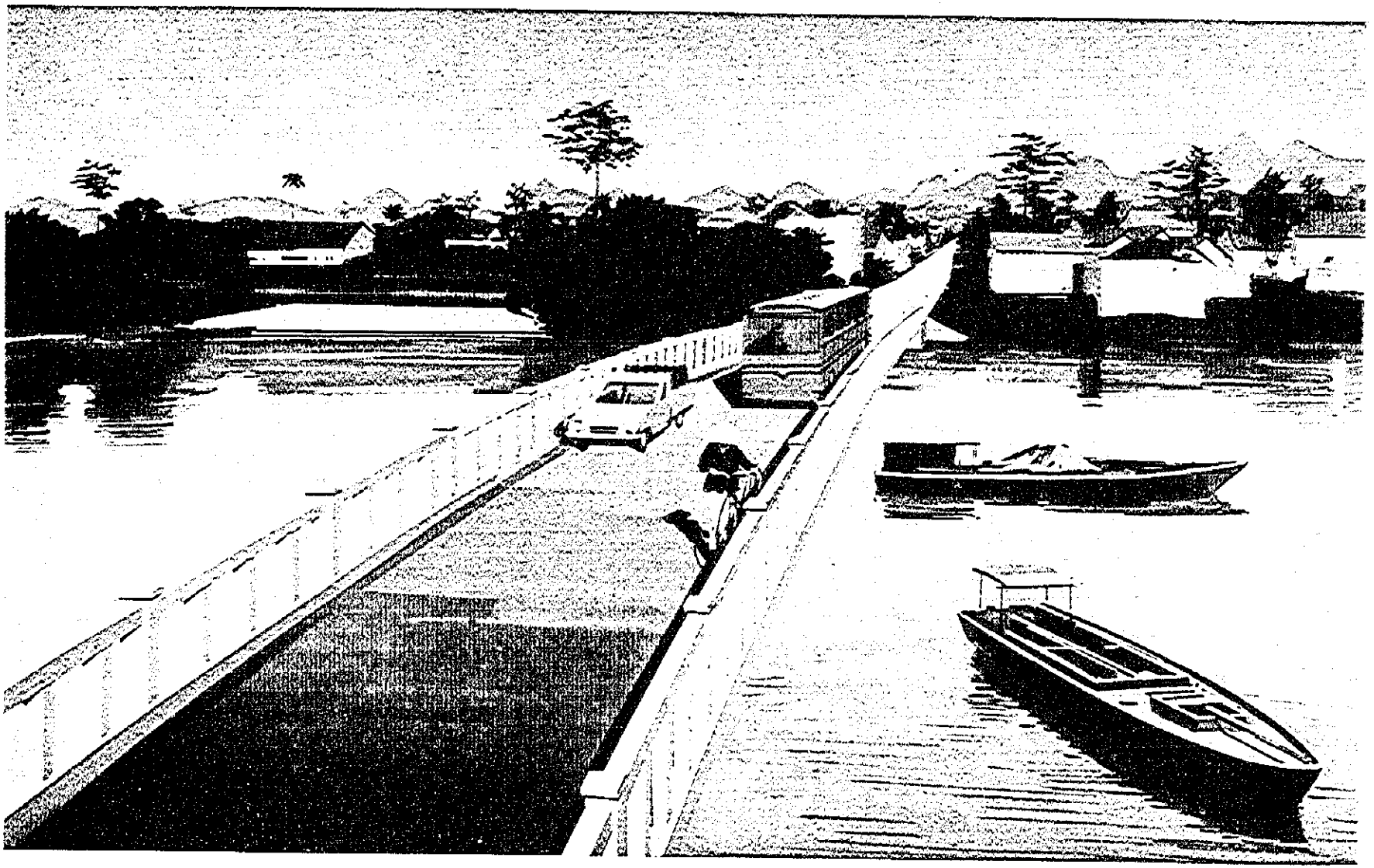
Hiroyuki ENDO
Project Manager,
Basic Design Study Team on the Project for
Reconstruction of Bridges in the Northern District
in the Socialist Republic of Viet Nam
Pacific Consultants International
Oriental Consultants

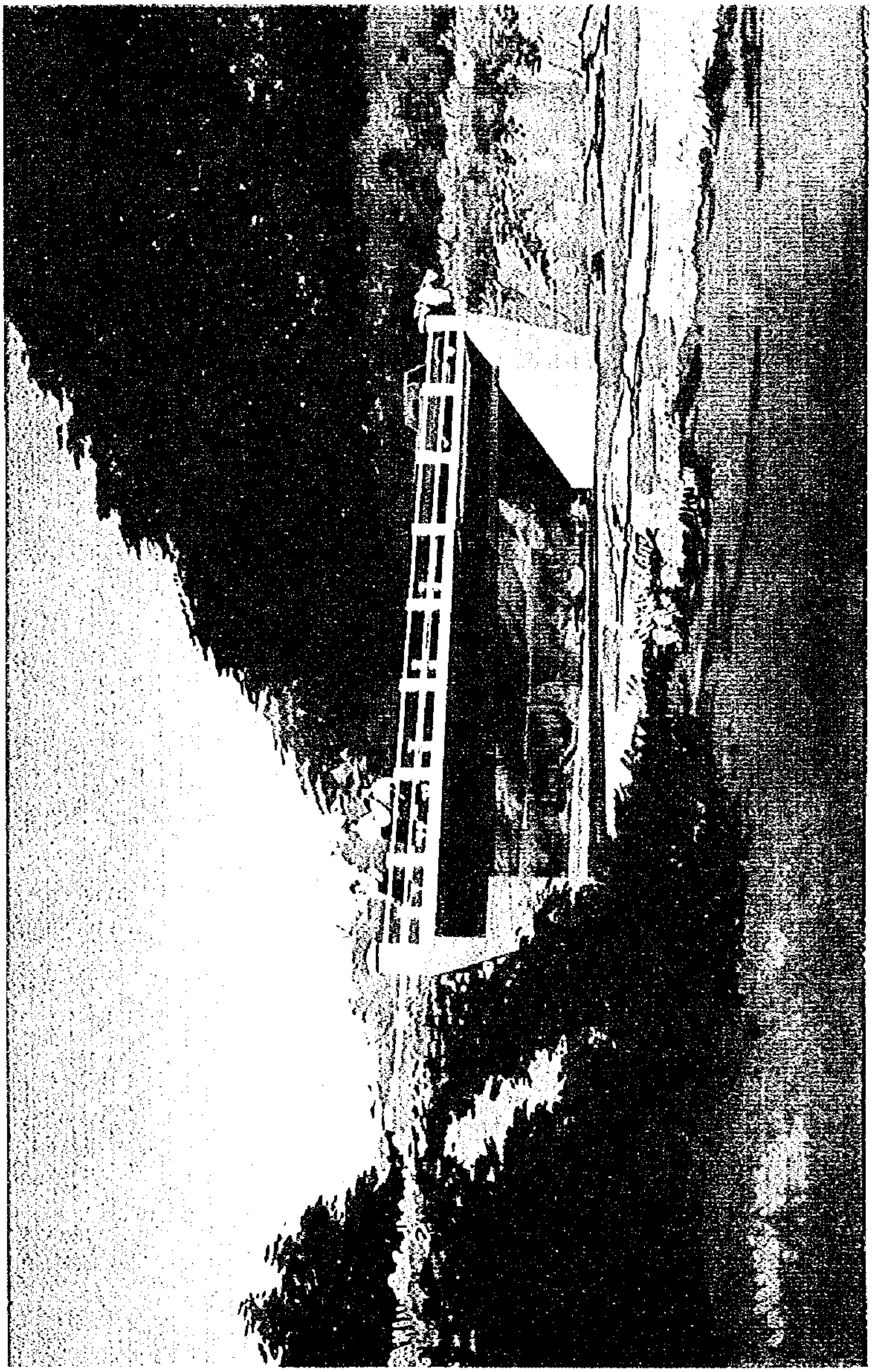


Proposed Candidate Bridges

Bridge No.	Name of Bridge	Bridge No.	Name of Bridge
1	Duc Khe	21	Dong Mo
2	Chua Ngoi	22	Nao Hoa
3	Chuoc	23	Quang
4	Dong Vuong	24	Yen Hoa
5	Dong Dinh	25	Lanh
6	Ta O	26	Vai
7	Do Day	27	Pho Tra Linh
8	Hau	28	Mo Sai
9	Ben The	29	Bam Ai
10	Tinh	30	Bam Hinh
11	Lac	31	Tong Panh
12	Vu Ban	32	Thac Ve
13	Ky Phu	33	Khuoi Nueng
14	Phu Song	34	Khuoi Kueng
15	Luong Nha	35	Ban Vuoc
16	Suong	36	Khe Chan
17	Yen Tho	37	Pa Mo
18	Hoanh Truc	38	Nam Bun
19	Thong Nhat	37'	Na Sang-2
20	Dong Quach	38'	Nam Thanh

PROJECT LOCATION MAP





ABBREVIATIONS

A. Authorities and Agencies

AASHTO : American Associayion of State Highway and Transportation Officials
JICA : Japan International Cooperation Agency
MOPI : Ministry of Planning & Investment
MOT : Ministry of Transport
PMU : Project Management Unit
SPC : State Planning Committee

B. Other Abbreviations

A : Ampere
A/P : Authorization to Pay
ave. : avarage
B : Breadth
Br : Bridge
CBR : Califomia Bearing Ratio
cm : centi meter
m³ or cu.m : cubic metre
ϕ : Diametre
$: Dollar
DBST : Double Bituminous Surface Treatment
GDP : Gross Domestic Product
H : Height
HP : Horse Power
k ℓ : kilolitre
km : kilometre
km／h : Kilometre per hour
kvA : Kilovolt-ampere
kw : kilowatt
ℓ : litre
Max. : Maximum
m, M : metre
mm : Millimetre

Min. : Minimun
min. : minute
No. : Numbers
% : Per cent
PC : Prestressed Concrete
RC : Reinforced Concrete
km² or sq.km : Square kilometre
m² SQ.M : Square metre
mm² : Square Millimeter
sub-str. : sub-structure
t : Ton
t／h : Ton per hour
t／m² : Ton per square metre
VND : Vietnamese Dong
Veh. : Vehicles
VpD or VPD : Vehicles Per Day
PVC pipe : vinyl chloride pipe
W : Width
¥ : Yen

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Chapter 1 Background of the Project

Road networks and road system in Viet Nam have not been well developed because of low motorization and a delay in developing infrastructures, and in addition, because of its topographical restrictions where the land is long and narrow and is surrounded by mountainous areas. The road system of Veit Nam comprises following three components:

- The northern network that is radial road networks covering the Red River delta with a center in the Capital, Hanoi.
- The southern network that is radial road networks covering the Mekong delta, with a center in Ho Chi Min.
- The national highway No. 1 that runs along coastal areas of the central parts of Viet Nam, connecting the above two road networks.

While the northern delta areas have relatively high density road networks that include rural road system, road networks in the mountainous areas located around the delta are considerably low due to their topographical restrictions. Most of these roads in the Northern Part were constructed before the Second World War and have not been maintained properly. In particular, secondary trunk and rural road systems that are connected to trunk roads are in poor maintenance conditions; some bridges are left being destroyed and loading limitation of crossing vehicles are required in some bridges. Although a small ferry is operated at some river crossing points where destroyed bridges have not been reconstructed, this is causing bottle neck the traffic. The economic structure of the Northern part depends on mono-cultural agriculture and its economic growth rate is strongly limited by poor maintenance conditions of transport infrastructures, such as roads and bridges. Among them, poor maintenance conditions of bridges cause delay in regional development, stagnation of local economic activities and hindrance to people's daily life by cutting off the area traffic in flood season.

The northern part of Viet Nam, centered in Hanoi and bordering on China, is primarily agricultural and basically underdeveloped. It is also considered a high-priority area for development due to the large numbers of minority peoples which reside there in need of improved welfare. In spite of the great need for development, the road network is in great need of improvements; ruined bridges, aging temporary bridges awaiting repair, many points uncrossable in high water represent the problems of the area. For the economic development of the region, improvements are vital.

In light of this situation the Vietnamese government drew up the project for Reconstruction of Bridges in the Northern District in the Socialist Republic of Viet Nam in which supplementary roads would be provided in addition to replacement or new construction of intermediate or small bridges which follow routes of importance to the daily living of residents of agricultural and/or mountain areas of the sixteen northern provinces. These improvements would vitalize the economy and contribute to the welfare of the minority peoples, one of the major issues at hand, therefore the Vietnamese government has requested the Japanese government for financial aid for procurement of steel girders for bridge construction, and the bridge construction itself.

Chapter 2 Contents of the Project

2-1 Objectives of the Project

In the Northern part of the country, its economic structure depends on mono-cultural agriculture and economic growth rate is strongly limited by poor maintenance conditions of transport infrastructures, such as roads and bridges. Higher productivity and infrastructures developed before socialism in the Southern part result in inter-regional gap between the Northern and the Southern parts (North-South Gap).

The Government of Viet Nam confronts overcoming of the North-South Gap as one of the most important issues to be addressed together with up-grading of welfare of minorities living in the Northern part.

The purpose of this project is the reconstruction or new construction of small-to-medium-sized bridges on secondary roads in the agriculture or mountainous areas in 16 Northern Provinces in the Socialists Republic of Viet Nam, to provide basic transport facilities in the rural area, relieve the inconveniences of local people in their daily living, including the minorities living in the area, and thereby contribute greatly to the socio-economic development of the project area.

2-2 Basic Concept of the Project

2-2-1 Basic Concept

Necessities of construction or new construction for each bridge based on the requests from the Government of Veit Nam would be confirmed by site surveys. Then river crossing routes, sizes of bridges, bridge materials, types of super-and sub-structures would be studied and compared to determine the most suitable location and type of each bridge.

The results of the study and examination are discussed in section 2-2-3 and later.

2-2-2 The Request

Due to heavy rains, it was impossible to reach and investigate the sites of bridges No. 37 and No. 38 in Lai Chau Province in first field survey. Also, the study team could not approach to the sites again because of landslides along the access road to the sites in second field survey. The ministry of Transports immediately nominated two other bridges for survey in place of these. These bridges are in the same province and have high priority (Appendix 6). The Study Team judged construction and execution of the field survey possible in accordance with time schedule and surrounding conditions of the sites. These bridges were named No. 37 and 38, respectively.

2-2-3 Study and Examination of the Request

In order to determine the justification of the request for the reconstruction of bridges, all bridge sites were surveyed in the field. Main items of the survey are as follows;

- confirmation of the importance of the project in the national, regional and/or sectoral development plan,
- confirmation of the priority of the candidate bridges in the each province,
- identification of the present problems of the roads and bridges,
- identification of the present socio-economic condition of the project area,
- examination of the environmental impact of the construction of bridges and the expectation of the project by the surrounding people,
- confirmation of land acquisition and compensation, and
- examination of the condition of access roads for construction of the bridges.

The survey results of the above mentioned items are shown in Overview of Bridge Site Survey Result. According to the survey results, the importance of the sites was recognized from the geographical and economical points of view. It is deemed that the inhabitants desire for the bridges to be constructed and they are co-operative to the study. Negative environmental impacts in this project are not anticipated and the local People's Committee plans to take charge of the land acquisition and related compensation. According to the discussion with officials concerned and the analysis of the survey results through first and second field survey, the project candidates are as follows;

Bridge Construction	21 bridges
Supply of Steel Girders	8 bridges
Deleted Bridges from the Project	11 bridges

1) Bridge Construction

Design and construction of bridges, approach road, river bank protection and replacement of the existing bridges will be carried out under the Japanese Grant Aid Programme. The construction of these bridges will give much benefit to the surrounding communities and are selected because the construction of the bridge is comparatively difficult and the accessibility to the sites is fair. The list of the candidate bridges is shown in Table 2-1.

2) Supply of Steel Girder

Steel girders for construction of bridges will be supplied under the Japanese Grant Aid Programme. The Government of Viet Nam is responsible for the design and construction of the bridges to utilize the girders supplied, access roads and associated structures. These are bridges which have been planned for construction by the Ministry of Transports, Viet Nam and are comparatively small-scale bridges. The list of the candidate bridges is shown in Table 2-2.

Table 2 - 1 Bridge Sites for Bridge Construction

	Bridge No.	Province	Name of Bridge	Road Classificatio	Design Length	Design Width	Area (SQ.M)	Remarks
1	1	Ha Tay	Duc Khe	Provincial	99.46	5.5	547.03	navigation
2	3		Chuoc	District	74.30	5.5	408.65	
3	5	Ha Bac	Dong Dinh	District	83.30	5.5	458.15	
4	6	Hai Hung	Tu O	Provincial	68.30	5.5	375.65	
5	8		Hau	Provincial	83.30	5.5	458.15	
6	9	Hoa Binh	Ben The	Provincial	43.55	4.5	195.98	
7	11		Lac	District	30.80	4.5	138.60	embankment protection
8	12		Vu Ban	Provincial	99.05	7	693.35	
9	13	Bac Thai	Ky Phu	District	24.80	4.5	111.60	embankment protection
10	15	Vinh Phu	Luong Nha	District	49.32	4.5	221.94	access road enlargement
11	16		Suong	Provincial	51.66	5.5	284.13	embankment protection
12	17	Ninh Binh	Yen Tho	District	24.80	4.5	111.60	navigation
13	18		Hoanh Truc	District	38.03	4.5	171.14	navigation
14	20	Thai Binh	Dong Quach	District	92.30	7	646.10	navigation
15	22	Lang Son	Nao Hoa	Provincial	92.30	7	646.10	
16	23	Tuyen Quang	Quang	District	92.30	5.5	507.65	navigation
17	27	Cao Bang	Pho Tra Linh	District	30.80	7	215.60	
18	31	Son La	Tong Panh	District	30.60	4.5	137.70	embankment protection
19	33	Ha Giang	Khuoi Nieng	District	43.55	4.5	195.98	
20	34		Khuoi Kieng	District	74.30	4.5	334.35	
21	37'	Lai Chau	Na Sang - 2	Provincial	74.30	5.5	408.65	
				Total	1,301.12		7,268.09	

Table 2 - 2 Bridge Sites for Provision of Steel Girder

	Bridge No.	Province	Name of Bridge	Road Classification	Design Length	Design Width	Area (SQ.M)
1	4	Ha Bac	Dong Vuong	District	61.15	5.5	336.33
2	10	Hoa Binh	Tinh	District	24.60	4.5	110.70
3	21	Lang Son	Dong Mo	Provincial	64.70	5.5	355.85
4	25	Yen Bai	Lanh	District	27.60	4.5	124.20
5	26		Vai	Provincial	27.60	5.5	151.80
6	29	Son La	Ban Ai	Provincial	21.60	5.5	118.80
7	30		Ban Hinh	Provincial	21.60	5.5	118.80
8	35	Lao Cai	Ban Vuoc	District	43.03	5.5	236.67
				Total	291.88		1,553.14

Table 2 - 3 Deleted Bridge Sites of the Project

	Bridge No.	Province	Name of Bridge	Road Classification	Design Length	Design Width	Area (SQ.M)	Remarks
1	2	Ha Tay	Chua Ngoi	District	36	10.5	378	Located in urban area; deleted.
2	7	Hai Hung	Do Day	District	152.80	5.5	840.40	Pontoon bridge for pedestrians, bicycles, motercycles
3	14	Bac Thai	Phu Son 4	District	40	4	160	Located in urban area; deleted.
4	19	Ninh Binh	Thong Nhat	District	27.32	7	191.24	Located in urban area; nearby bridges usable; deleted.
5	24		Yen Hoa	Provincal	43.55	4.5	195.98	No access road; access in rainy season difficult (35 km)
6	28	Cao Bang	Mo Sat	Provincial	82.70	5.5	454.85	Manpowered ferry (rainy season only)
7	32	Ha Giang	Thac Ve	District	55	6	330	Extremely poor access; construction difficult
8	36		Khe Chan	District	97.70	5.5	537.35	Manpowered ferry
9	37	Lai Chau	Pa Mo	Provincal	80	9	720	Road flooded; unsurveyable due to landside
10	38		Nam Bun	Provincal	70	9	630	Road flooded; unsurveyable due to landside
11	38'	Lai Chau	Nam Thanh	District	64.70	5.5	330.00	Suspension bridge passable by small vehicles; nearby bridges usable; no major problem
				Total	749.77		4,767.82	

3) Deleted Bridges from the Project

These are confirmed as not meeting the criteria and are not recommended for the project. The list of the bridges is shown in Table 2-3.

The objectives of this project, as stated in 2-1, are ① to repair secondary roads which feed into main highways, ② to supply improved market access for agricultural produce, and ③ to improve living standards of minorities. Therefore, bridges which do not meet any of these purposes, are greater than 100 m in length, are unaccessible for survey, or require high construction expenditures due to special conditions have been deleted from the project. The chief reasons for each are stated below.

Br. No. 2: (* Deleted from project as result of first survey)

Located in the suburbs of Hanoi, the area around the bridge is urbanized, therefore not in agreement with objectives ① and ③.

Br. No. 7: (** Deleted from candidate bridges for steel girder supply as result of second survey)

The span of the bridge exceeds 100 m and the access road is a farm road not over 2 m in width over several kilometers on one side of the bridges. Even if a bridge spans the river, in order to function as part of a road network, great amounts must be invested in road construction.

Br. No. 14: (*) This bridge is located in the suburbs of Thai Nien where the major source of road use apparently stems from a number of brick factories found in the vicinity, thus not in agreement with the project objectives.

Br. No. 19: (**) The proposed location for this bridge is in the main part of the city of Phat Dien, therefore not in agreement with project objectives. Furthermore, there are bridges both upstream and downstream which can be used in its place, further reducing the necessity for a new bridge.

Br. No. 24: (*** Deleted from candidate bridges for construction as result of second survey)

This site meets with the above-stated objectives, but due to the following reasons, there are a number of negative and/or unconfirmed elements which have led to its deletion from the project.

- The 35 km of access road leading to the bridge is in extremely poor condition, and access in the rainy season is next to impossible.

- Access to the bridge includes a stretch of 3 km where there is not even a road at present. Before a bridge is constructed, a road will be necessary, therefore increasing improbability in meeting the time schedule.

Br. No. 28: (**) The condition of the access road is quite poor and probably too narrow to permit access of equipment necessary for construction. In addition, determination of the most appropriate crossing point for the bridge is difficult and would require further detailed study. Because of these reasons, this spot has been deleted from the project.

Br. No. 32: (***) This site meets the objectives of the project, but the access road is extremely poor, and approach during the rainy season is virtually impossible. Furthermore, due to access problems, it was not possible to gather information regarding the terrain and geological conditions of the proposed site. Without such basic information, deletion from the project is unavoidable.

Br. No. 36: (**) This site is approximately 30 km from the main highway, and the access road itself is not easily maneuverable, very likely causing great difficulty in transportation of building equipment. Furthermore, in order to keep the bridge span under 100 m, problems arise regarding pressure on abutments of both sides. These factors have led to the deletion from the project.

Br. No. 37, No. 38: These sites were unreachable for both the first and second surveys, due to poor road conditions. They were deleted due to lack of ability to gather pertinent information.

Br. No. 38': This bridge was deleted for the project due to lack of major problems in existing bridge and proximity of usable bridges.

2-2-4 Basic Concept of the Project

Bridge Construction

It is necessary to construct the 21 bridges at the proposed sites by Japanese Grant Aid Project from the importance of socio-economic and economical point of view. Design criteria for the proposed bridges will be adopted as far as possible applying Vietnamese Standard.

The Construction Plan was established based on the following conditions:

- Construction Materials will be procured in Vie Nam as much as possible.
- Local contractors in Viet Nam will be involved as much as possible.

This will make to reduce total construction cost and to expect technical transfer effects through implementation of the project.

The bridge planning was made based on the survey results in order to avoid uneconomic design. Finally, design loads, bridge length, width, span length, clearance under the bridge, approach road length and foundation types were determined.

The detailed study results are described in 2-3 Basic Design.

Supply of Steel Girders

The 8 locations of proposed bridges which will be constructed by supply of steel girders were selected. These locations were thoroughly investigated by the Government of Viet Nam and chosen as sites of minimized economic burden. The bridge planning has been conducted in consideration of constructability by the Vietnamese authorities.

2-2-5 Outline of the Project

Bridge Construction

Outline of 21 bridge conditions is shown in Table 2-4.

Supply of Steel Girders

Outline of 8 bridge constructions from supply of steel girders is shown in Table 2-5.

2-3 Basic Design

2-3-1 Design Policy

(1) Main Consideration for Design

The basic design for the project bridges will be considered based on the following matters;

1) River Cross Section

The cross-sectional area of flow will be procured at each location of bridge construction. The bridge will be designed to retain the original cross-sectional area of flow.

2) Flood Clearance under Girder

Sufficient clearance between flood level and bottom of girder will be kept to avoid damage of the bridge from floodwater and pressure of driftwood. Generally, determination of clearance depends upon volume and area of flow. However, due to lack of pertinent data, such as flood run-offs, flood-velocities, etc. bridges in mountainous areas will set clearance at 1 m; those in plains areas at 0.5 m.

Table 2-4 Outline of the Bridge Construction

	Bridge No.	Province	Name of Bridge	Road Classification	Design Length	Design Width	Area (SQ.M)	Type of Superstructure	Span (M)	Type of Substructure	Access Road (M)	Existing Bridge Replacement Temporary Bridge
1	1	Ha Tay	Duc Khe	Provincial	99.46	5.5	547.03	Steel Girder	18+37+25+18	Steel Pile	129.842	Pontoon Removal
2	3		Chuoc	District	74.30	5.5	408.65	PC Beam	24 + 24 + 24	Spread F.	96.411	Bamboo Bridge Removal
3	5	Ha Bac	Dong Dinh	District	83.30	5.5	458.15	PC Beam	21 + 30 + 30	Spread F.	135.000	
4	6	Hai Hung	Tu O	Provincial	68.30	5.5	375.65	PC Beam	21 + 24 + 21	RC Pile	113.000	
5	8		Hau	Provincial	83.30	5.5	458.15	PC Beam	27 + 27 + 27	RC Pile	131.286	
6	9	Hoa Binh	Ben The	Provincial	43.55	4.5	195.98	PC Beam	21 + 21	Spread F.	100.000	Existing Bridge Removal
7	11		Lac	District	30.80	4.5	138.60	PC Beam	30 x 1	Spread F.	120.000	Existing Bridge Removal
8	12		Vu Ban	Provincial	99.05	7	693.35	PC Beam	21+27+27+21	Spread F.	158.000	
9	13	Bac Thai	Ky Phu	District	24.80	4.5	111.60	PC Beam	24 x 1	Spread F.	129.691	Existing Bridge Removal
10	15	Vinh Phu	Luong Nha	District	49.32	4.5	221.94	Steel Girder	15 + 18 + 15	RC Pile	77.283	Temporary Bridge
11	16		Suong	Provincial	51.66	5.5	284.13	PC + RC	10 + 30 + 10	Spread F.	92.000	
12	17	Ninh Binh	Yen Tho	District	24.80	4.5	111.60	PC Beam	24 x 1	RC Pile	134.266	Existing Bridge Removal
13	18		Hoanh Truc	District	38.03	4.5	171.14	Steel Girder	27 + 10	Steel Pile	111.000	Bamboo Bridge Removal
14	20	Thai Binh	Dong Quach	District	92.30	7	646.10	PC Beam	30 + 30 + 30	Steel Pile	189.432	
15	22	Lang Son	Nao Hoa	Provincial	92.30	7	646.10	PC Beam	30 + 30 + 30	Spread F.	187.000	
16	23	Tuyen Quang	Quang	District	92.30	5.5	507.65	PC Beam	30 + 30 + 30	Spread F.	154.135	Pontoon Removal
17	27	Cao Bang	Pho Tra Linh	District	30.80	7	215.60	PC Beam	30 x 1	Spread F.	96.282	Existing Footpath Removal
18	31	Son La	Tong Panh	District	30.60	4.5	137.70	Steel Girder	30 x 1	Spread F.	176.771	Existing Bridge Removal
19	33	Ha Giang	Khuoi Nieng	District	43.55	4.5	195.98	PC Beam	21 + 21	Spread F.	147.198	
20	34		Khuoi Kieng	District	74.30	4.5	334.35	PC Beam	24 + 24 + 24	Spread F.	149.000	
21	37	Lai Chau	Na Sang - 2	Provincial	74.30	5.5	408.65	PC Beam	24 + 24 + 24	Spread F.	161.253	
				Total	1,301.12		7,268.09				2,788.850	

Table 2 - 5 Outline of Girder Supply

	Bridg No.	Province	Name of Bridge	Road Classification	Design Length	Design Width	Area (SQ.M)	Span
1	4	Ha Bac	Dong Vuong	District	61.15	5.5	336.33	30+30
2	10	Hoa Binh	Tinh	District	24.60	4.5	110.70	24x1
3	21	Lang Son	Dong Mo	Provincial	64.70	5.5	355.85	21x3
4	25	Yen Bai	Lanh	District	27.60	4.5	124.20	27x1
5	26		Vai	Provincial	27.60	5.5	151.80	27x1
6	29	Son La	Ban Ai	Provincial	21.60	5.5	118.80	21x1
7	30		Ban Hinh	Provincial	21.60	5.5	118.80	21x1
8	35	Lao Cai	Ban Vuoc	District	43.03	5.5	236.67	18+24
				Total	291.88		1.553.14	

Still Girder Supply is including Main girder ,Lateral girder ,Spread plate (high tensile bolt), Shoe and Joints.

3) Navigation Clearance

The navigation clearance of the width and height shall ensure the bridge design according to the scale of navigable ships on rivers and canals. The values of the navigation clearance are shown on Table 2-6 as the result of concerned discussion.

Table 2-6 Navigation Clearance

Bridges No.	Bridge Name	River Name	Clearance (m x m)	Datum Plane (m)
1	Duc Khe	Day	30 x 6.0	8.8
17	Yen Tho	Moi	10 x 2.5	3.4
18	Hoanh Truc	Ca Mau	20 x 2.5	4.2
20	Dong Quach	Lan	15 x 2.5	3.4
23	Quang	Ba	10 x 2.5	16.2

Note: The height of datum plane for the navigation clearance show following the temporary Bench Mark of field survey.

4) Alignment

Design of the bridge and approach road will satisfy the horizontal and vertical alignment. In case of province road, design speed of 40 km/h will be adopted according to the design standard. Design speed for the county road will generally be 25 km/h. When the traffic volume increases following bridge construction, design speed will be modified to 40 km/h from 25 km/h.

5) Constructability

The bridge will be designed to consider easier construction.

The Bridge design will pay attention to the following items;

a) Relationship between girder weight and span length
b) Relationship between pier location and water level in river
c) Relationship between possibility of transportation for materials and bridge type and scale

6) Land Acquisition

The land acquisition and the compensation cost resulting from bridge construction will be minimized. To do so, horizontal alignment will be determined to avoid existing houses as much as possible.

(2) Basic Design Policy

The basic design policy will be performed placing special care on the following matters.

1) Natural Conditions

The project bridges are located on mountain areas, plain areas and estuary deltas. Bridge design will be considered to satisfy the following conditions:

- Rainfall: The rainy season in the northern districts in Viet Nam is from May to October as investigated by rainfall statistical yearbook. The monthly maximum rainfall was recorded of 250 to 400 mm/month in July and August at mountain sites, August and September at estuary delta sites.
  The above data will be considered upon arranging the construction schedule.
  The approach road and foundation of sub-structure will be constructed during the dry season, and super-structure will be constructed during rainy season.
- Geology, Topography:

<Foundation Design>

The soft deposit is distributed at the 7 bridges (No. 1, 6, 8, 15, 17, 18 and 20) located at the Red river delta. Pile foundation can be recommended for these bridges. Especially, very thick soft deposit is distributed at No. 18 and 19, reliable bearing stratum is located at the deep depth. However, relatively big friction bearing capacity can be expected in such soft soil and load intensity on the pile is not so big. Therefore, bridge length will be determined considering factors of friction capacity.

Hard stratum is distributed from shallow depth at mountain area, hill area and river valley area. District foundation (or short pile foundation) supported on such hard stratum can be employed in this area.

<Earthquakes>

Earthquake activity has been observed somewhat in the Northern Vietnam. Based on the earthquake zoning map by institute of Geographic Vietnam, the following earthquake activity was estimated along the Red river area.

- Maximum magnitude 6.1 to 6.5
- Maximum seismic intensity 8 (by MKS-64 scale) at epicenter

Therefore, seismic force will be considered in the design. However the estimated seismic intensity is relatively small, and all project sites are of smaller scale and located only in rural areas. Considering the above, horizontal seismic force = 0.05 can be applied.

-River: The bridges have sustained great damage due to flood. Therefore, water clearance will be planned checking the height to assure protection, according to flood history.

2) Social Conditions

The project bridge will be designed according to the following points:

- Land acquisition: The alignment of the proposed bridges will be planned accordingly so as to complement the utilization of houses, farmlands and ponds, and discussion between Communist Party and PMU.

- Approach road: The scope of approach road in the project is to be arrange in accordance with PMU's Construction stage.

3) Construction Condition

On the basic design, bridge construction will be carried out upon investigation of conditions of this country.

The project bridges are to be planned according to bridge type in consideration of structural, constructability and safety aspects resulting from the following investigation:

- Construction materials (cement, steel, aggregate, temporary materials)
- Construction machine parts (erection girder, crane, pile-driver)
- Level of manpower (level and volume of skilled workers)

4) Utilization of Local Contractors and Local Materials

The group of the government agency is operating the bridge construction in the country at present.

The construction materials and machine parts shall be utilized in scattered with sites in northern districts for the bridge construction.

5) Implementation Ability of Government Agency

The construction and maintenance of national roads have been implemented by MOT, and other roads are under the auspices of the Communist Party of each province and/or county.
PMU - No. 18 will conduct this project with overseas aid. PMU - No. 18 has staff and the technical level to implement the project.
In order to stimulate the local economy with overseas aid, the type of bridge, construction methods that will utilize the materials, supplies, goods, equipment or services of local origin will be taken into consideration.

6) Scope of Bridge Construction and Girder Supply, Establishment of Grade

The design for bridge construction and girder supply will be planned on a scale less than 100 meters in length corresponding to the project scope, Based on the topographic and geological survey, the scale of bridge will be assigned. And, grade of design condition is to be applied to the international standard level even on provincial and/or county roads.

7) Construction Period

The project bridges are scattered throughout the northern districts. The bridges will be divided into four or five groups according to their distance from Hanoi.
As mentioned under "Natural Conditions" Construction periods depend on rainy and dry seasons.

The construction of the bridge structure shall be conducted according to the following cycle:

- Dry season: approach road, foundation and sub-structure
- Rainy season: super-structure

In case all construction is conducted at the same time, it is important to consider the contractor, worker, volume of materials , quality of supervision and economical aspects.
Based on the above basic policies, the following steps will be considered in the bridge design.

- The span length will be standardized in combination with Vietnamese criterion
- The protection in the river will be designed with stone pitching. The cover of stone pitching into the river bed will be determined by checking existing conditions.
- Based on the Vietnamese geometrical design standard and discussion with PUM, the approach road will be planned following PMU consideration.

(3) Study and Examination Design Criteria

Based on the Vietnamese design criteria and the conditions below, the program was discussed with MOT and PMU. (The results of basic design criteria are shown in Appendix 8)

1) Applied Design Criteria

- Design Criteria of Highway TCVN 4054-85 (VIET NAM)
- Vietnamese Bridge Design Code 22 TCN 018-79 (VIET NAM)
- Ministry of Transport and Communication No. 2057 QD/Kt4 1979 (VIET NAM)
- Road Bridge Standards (JAPAN)
- Road Geometric Standards (JAPAN)

2) Design Method

The bridge will calculate the stress of members according to the theory of elasticity, and verify the allowable stress by design strength and tensile strength.

3) Design Traffic Volume and Design Speed

The design traffic volume related design speed based on Design Criteria of Highway TCVN 4054-85 is shown on Table 2-7.

Table 2-7 Design Traffic Volume and Design Speed

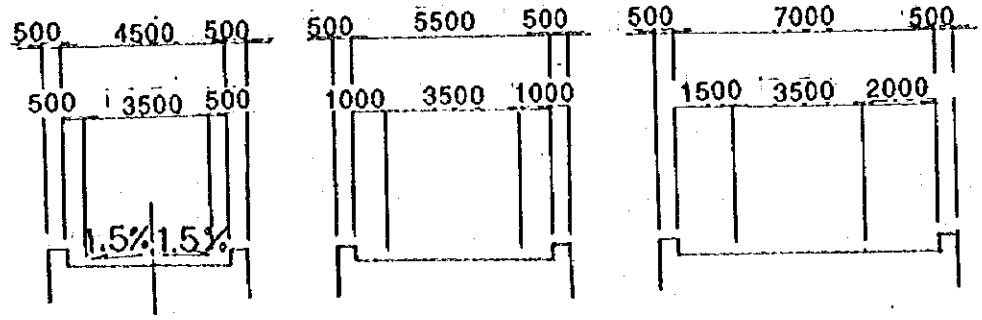
Road Classification	Design Traffic Volume (per day)	Design Speed (km/h)	
		Plain	Mountain
I	More than 6,000	120	
II	3,000~6,000	100	80
III	1,000~3,000	80	60
IV	300~1,000	60	40
*V	50~300	40	25
*VI	Less than 50	40	25

In accordance with site investigation and discussion, design speed applies 40km/h maximum with 300 vehicle/day maximum of traffic volume (show *) for bridges in northern districts. Therefore, width of bridges and approach roads conform to the following case.

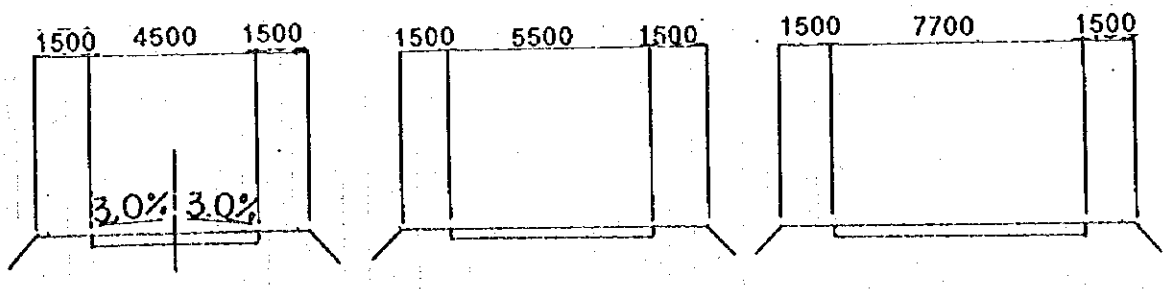
4) Width

The clear width for bridges and approach roads shall adopt 3 classifications of 4.5 m, 5.5 m and 7.0 m as shown in table, taking account of importance of road, traffic volume based on investigation and discussion.

Case	Clear Width	Bridge No. of Construction	Bridge No. of Girder Supply	Total
1	4.5 m	No. 9, 11, 13, 15, 17, 18, 31, 33, 34	No. 10, 25	11Br
2	5.5 m	No. 1, 3, 5, 6, 8, 16, 23, 37'	No. 4, 21, 26, 29, 30, 35	14Br
3	7.0 m	No. 12, 20, 22, 27		4Br
Total		21Br	8Br	29Br



Bridge Section:Concrete Pavement(5cm thickness)



Approach Road Section:Double Bituminous Treatment

Fig. 2-1 Planning Width for Bridge and Approach Road

5) Design Level Load

Viet Nam Live Load H-13, X-60

6) Seismic Load

Horizontal seismic coefficient kh = 0.05

7) Other requirements

The loads to be used for the design are the load frequencies, and for the influence on the bridges, the loads will consist of principal loads, subsidiary loads, and particular loads.

1) Principal Loads:

a) Dead load

b) Live Load

c) Impact

d) Influence of creep on concrete

e) Influence of dry shrinkage on concrete

f) Earth pressures

g) Water pressures

h) Floatation or displacement forces

2) Subsidiary Loads:

In addition to dead loads and primary live loads, the bridge components will be designed to resist subsidiary loads, which include the following:

a) Wind loads

b) Influence of temperature change

c) Seismic loads

3) particular Load:

X-60 (Viet Nam Design Load)

8) Detailed Design Condition

a) Construction Material

- Unit Weight per Unit Volume of Materials

Material	Specific Gravity	Material	Specific Gravity
Steel, Cast Steel, Forged Steel	7.850	Concrete, Non-reinforced	2.350
Cast Iron	7.250	Mortar, Portland Cement	2.150
Aluminum	2.800	Asphalt Pavement	2.300
Concrete, Reinforced	2.500	Concrete Pavement	2.350
Prestressed Concrete	2.500	Timber	0.800

- Strength

  - Concrete

    Specified compressive strength

    Prestressed Concrete Beam } σck = 350 kg/cal
    Slab, Cross-beam } σck = 300 kg/cal
    Reinforced Concrete Beam
    Abutment, Pier, } σck = 200 kg/cal
    Surface on the girder
    Leveling concrete, } σck = 150 kg/cal
    Stone pitching concrete

  - Reinforcing Steel

    - Round steel bar yield strength σpy = 24 kg/mm² (SR24)
    - Deformed steel bar yield strength σpy = 30 kg/mm²(SD30)

  - Steel for Prestressed Concrete

Grade	Nominal size	Yield Load (kg/mm²)	Ultimate Load (kg/mm²)
SWPR1, SWPD2	7 m	135	155
SWPR7A	T12.4 m	150	175
	T12.7 m	160	190

  - Steel plate

SM50YA, SM50 Tensile strength 50-62 kg/mm²
SS41 Tensile strength 41-52 kg/mm²

b) Road Geometric Design

The geometric design for approach road shall apply following standard. Basically, design speed 40 km/h will be used for clear width of 7.0 m, and design speed 25 km/h for clear width of 4.5 m, 5.5 m.

Item	Unit	Design	Standard
Design Speed	km/h	40	25
HORIZANTAL ALLIGNMENT			
Min. radius	m	50	25
Min. curve length	m	70	45
Min. transition curve length	m	35	25
Superelevation runoff		1/100	1/65
Min. stopping sight distance	m	40	25
VERTICAL ALIGNMENT			
Max. gradient	%	9	10
Min. vertical curve radius			
Crest	m	450	175
Sag	m	450	175
Min. vertical curve length	m	30	25
CROSS SECTION			
Cross fall	%	3	3
Max. superelevation	%	11.5	11.5

c) Clearance

- Vertical height on road — H = 4.50 m
- Clearance between flood stage and bottom of girder — Plain: H = 0.50 m; Mountain: H = 1.00 m
- Navigation clearance — refer to Table 2-6

2-3-2 Basic Design

(1) Design for Bridge Facilities

1) Applied Superstructural Type

The bridges in the project are classified bridge construction and girder supply as below.

a) Bridge Construction

The bridges will be constructed in the various northern districts of Viet Nam such as mountain, plain, and delta.

The type of the bridge will be determined considering the following items:

- Use of materials in Viet Nam
- Transportation for machine parts
- Manpower and technical level for construction
- Economical elements
- Constructability of erection machine, etc.
- Maintenance

In view of the above mentioned and existing structure in the country, concrete girder will mainly apply. The bridges are planned for more than 20 m in length except particular bridges. Therefore, prestressed concrete girder will be designed for this project, and combine the number of girders.

Basic span length: 21, 24, 27, 30 m (3 m pitch from 21 m)

Structural form for PC girder: The form for PC girder compared 3 cases in light of the beam height, stability of structure, economical, pouring concrete and tensioning cable. From result of the comparison in Fig. 2-2, the reasonable structural form to be used will be case 2 by Japanese standard form 1.

Bridges over 30 meter span length will use built-up steel girder by virture of the constructability for erection and influence to the sub-structure.

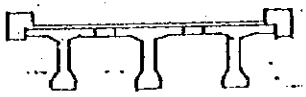
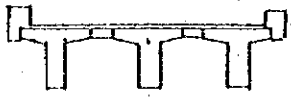
	Case 1 Vietnamese Standard	Case 2 Japanese Standard 1	Case 3 Japanese Standard 2
Section			
Structural	Girder Height/Span 1/18.5	1/19.5	1/16.5
	Stability ○	○	△
Cost	△	○	▲
Construct-ability	Tension ▲	○	○
	Form ▲	△	○
Evaluation	△	○	△

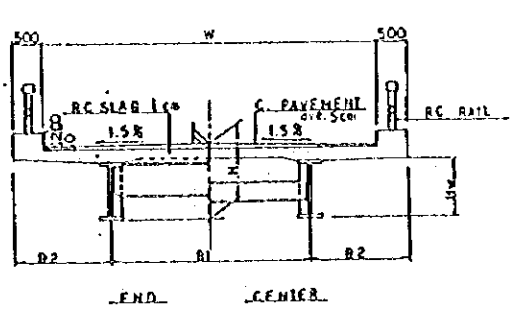
Fig. 2-2 Comparison of Prestressed Concrete T-Beam Section

b) Girder Supply

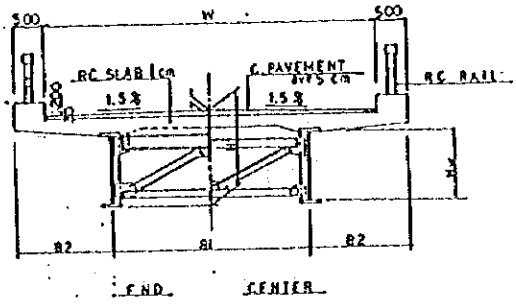
The steel girder will be supplied to MOT of each province via Hanoi from overseas market. Based on the site investigation and inspection, the type of girder and bridge length is standardized as follows. The span length is used 3.0 meter pitch from 15 meter length in accordance with Vietnamese standard. Therefore, bridge length will be combined the span length. The type of girder is to be considered structural and economic aspects depending on width, live load and bridge length.

Span length: 15, 18, 21, 24, 27, 30 m

Type of girder: Composite steel H-beam (applied span length less than 18 m)
Composite steel built-up (applied span length 21 - 30 m)
(Refer to Fig. 2-3)



Composite H-Beam Girder



Composite Built-up Steel Girder

Fig. 2-3 Steel Girder Section

Hereupon, the result of comparison between girder type, span length and unit price of the girder for 5.5 m width is shown Fig. 2-4 (Steel girder will be supplied from Japan).

Therefore, the composite H-beam girder shall be applied less than 18 m. And, the composite built-up girder shall be applied more than 21 m in view of economic aspect.

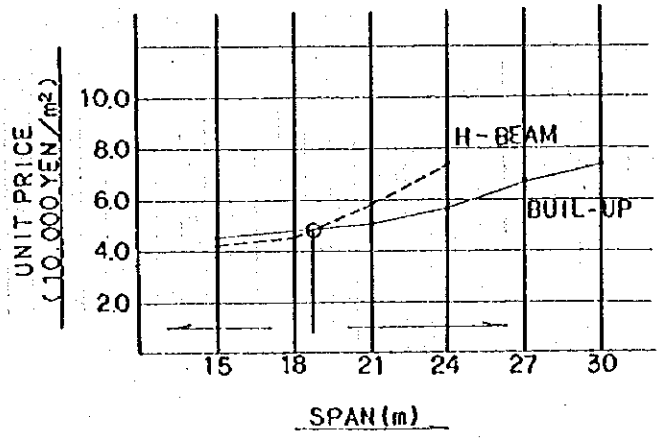


Fig. 2-4 Relationship between Girder-Type, Span Length and Unit Price

Further, the bending moment due to live load of Vietnamese H 13, X 60, Japanese TL-14 and international AASHTO H15-44 are similar to the above condition.

Therefore, the live load for the project shall adopt Vietnamese H 13 and X 60. (Refer to Fig. 2-5).

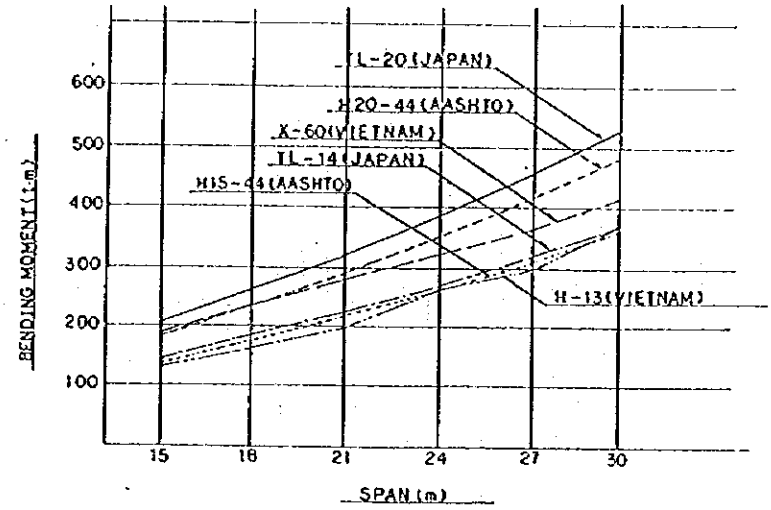


Fig. 2-5 Live Load Systems of the World between Span Length and Bending Moment

2) Bridge Length and Decisions Regarding Span Pitch

The length of the bridge will depend upon topographical, geological and flooding conditions of the site as well as considerations based on construction records of previous sties in Viet Nam; employing and standardizing the previously mentioned basic span lengths of 15 m ~ 30 m.

However, Bridges less than 15 meter span length will unavoidably have to use reinforced concrete slab by reason of limitation of topographical conditions on the site.

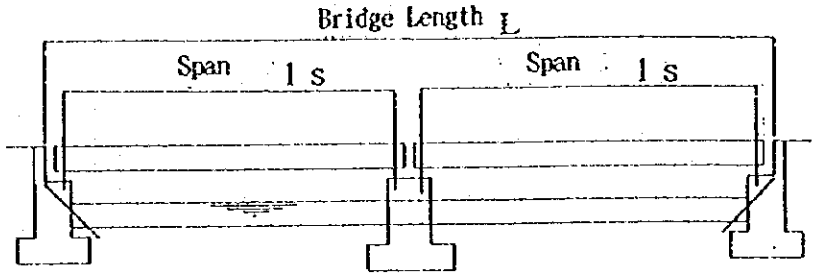
The scale and type of particular bridges will be planned taking into account the geographical and topographical conditions with full discussion.

Furthermore, the bridge length will be determined considering the flood marks, navigation clearance and circumstances of approach road.

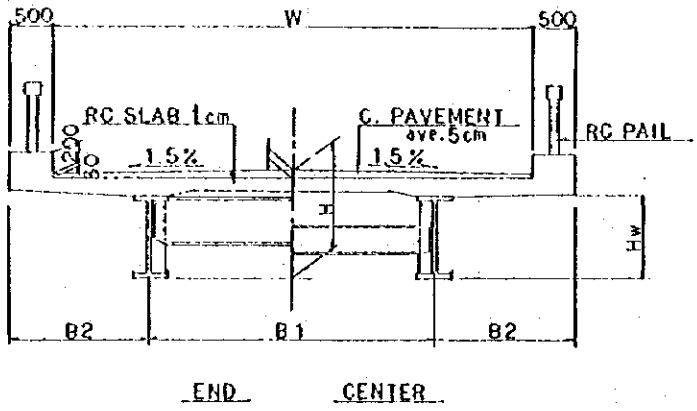
The relationship between standard span and steel and PC girder numbers for the bridge is shown on Table 2-8.

The standard cross section for steel and PC girder is also shown on Fig. 2-6.

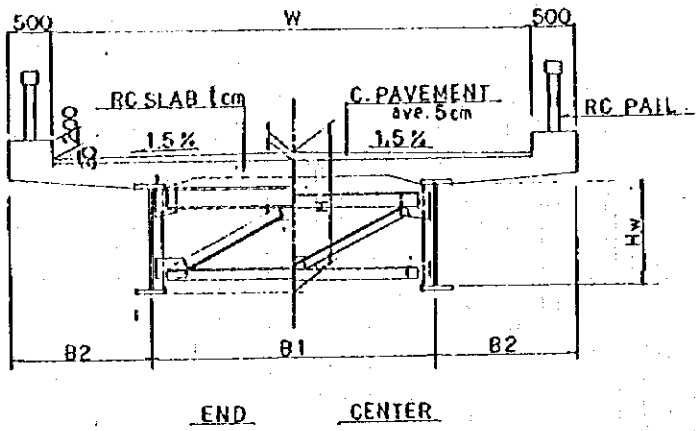
Table 2-8 Standard Bridge Span and Length for Steel and PC Girder



Girder Type	Span ls (m)	Number of Span (n)	Bridge Length L (m)	Girder Type	Span ls (m)	Number of Span (n)	Bridge Length L (m)
H-Beam	15	1	15.46	PC	21	1	21.80
		2	30.89			2	43.55
		3	46.32			3	65.30
	18	1	18.46		24	1	24.80
		2	36.89			2	49.55
		3	55.32			3	74.30
Built-up	21	1	21.60		27	1	27.80
		2	43.15			2	55.55
		3	64.70			3	83.30
	24	1	24.60		30	1	30.80
		2	49.15			2	61.55
		3	73.70			3	92.30
	27	1	27.60				
		2	55.15				
		3	82.70				
	30	1	30.60				
		2	61.15				
		3	91.70				



Composite Built-up Steel Girder



Prestressed Concrete Post-Tensioned T-Beam

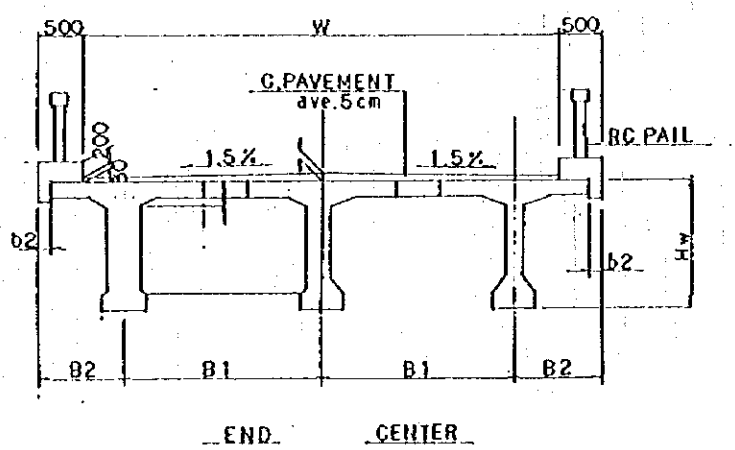


Fig. 2-6 Standard Section for Steel and PC Girder

3) Applied Substructure and Foundation Type

The superstructure of bridges in this project is small or middle class of bridges in which one span is limited between 15 m and 30 m, except in special cases. The types of substructure and foundation should be selected from the alternative study based on the constructability and construction cost considering the topography and geotechnical conditions of the sties and the procurement conditions of the construction materials and equipment also referring to past execution in Viet Nam.

The type of the substructure and foundation are as follows in this project.

Foundation

- Spread Foundation
- Pile Foundation
  - Reinforced Concrete Pile (Square 40 ~ 45 cm)
    - Construction: Fabrication and driving on the sites.
    - Foundation: Shallow pile and pile length is less than 30 ~ 40 m. (3 ~ 4 pieces x 10 m)
    - Application to superstructure: One span is less than 24 m.
  - Reinforced Concrete Pile (or Prestressed Concrete Pile) (circular, diameter Ø50 ~ 60 cm.
    - Construction: Fabricated in the factory, transportation and driving.
    - Foundation: Deep pile and pile length is normally less than 40 m.
    - Application to superstructure: one span is less than 27 m.
  - Steel Pipe Pile Diameter Ø60 ~ 100 cm
    - Construction: Fabricated in the factory, transportation to the sits and driving.
    - Foundation: Deep Pile and pile length is over 40 m.
    - Application to superstructure: One span is more than 27 m and for the heavy superstructure.

Substructure

The types of substructure were selected considering constructability inside the river location and construction cost, except in special cases. The following types were adopted to this project:

a) Abutment

Reversed T-type abutment with spread foundation

- The abutment height should be less than 12 m. If the height becomes more than 12 m, the abutment height should be within 5 m and with shallow pile foundation.

- In case of spread foundation, excavation will be made based on open excavation method. Cofferdam method with steel sheet pile will not be applied because it is very difficult to transport materials and the equipment, therefore, it is disadvantageous regarding constructability, construction period and cost. Cofferdam will be constructed with temporary embankment inside of the river.

Pile Bent Type

- Pile Bent Type should be applied with the following conditions,

  * The height of body is less than 5 m with pile foundation.
  * The front of abutment should be protected with embankment and river revetment.

b) Pier

Reversed T-Type Pier with spread foundation

As the pier will be constructed on the shallow bearing stratum in the river, the type of pier was designed as reversed T-Type with one elliptical column and one cantilever beam, however, it is limited to be bale to excavate by open excavation method. Also, if water depth is shallow and it is possible to divert water stream during construction, cofferdam will be constructed with embankment or with timbers, after which construction will be executed.

Pile Bent Type

The superstructure will be supported with reinforced concrete substructure beam with pile foundation. if the pile length between pile head and existing ground level is long, intermediate beam in horizontal direction will be installed for the structural stabilization.

The piles will be driven using pontoon and quay.

The standard type of abutment and pier are shown in Fig. 2-7.

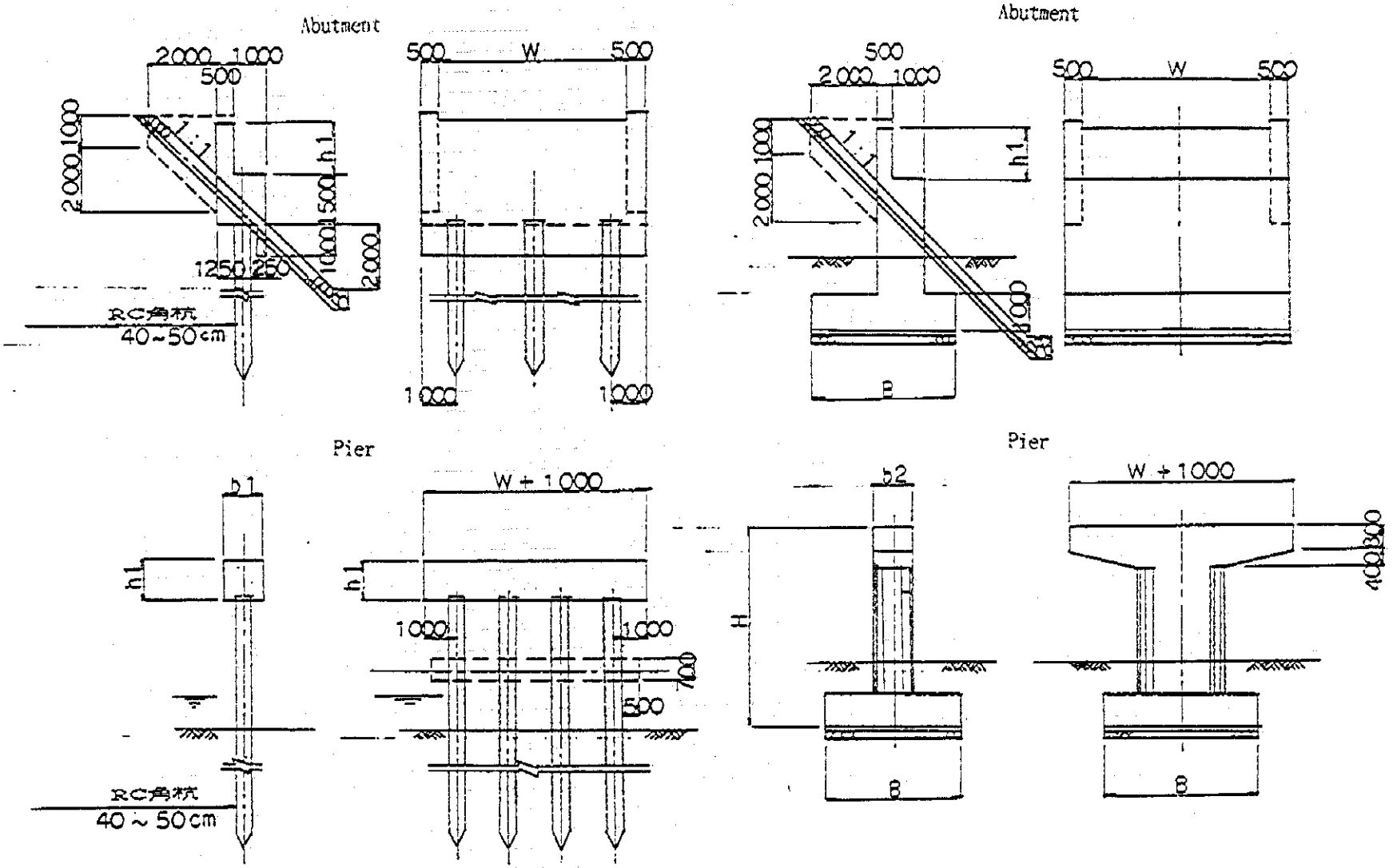


Fig. 2-7 Structural Type for Abutment and Pier (1)

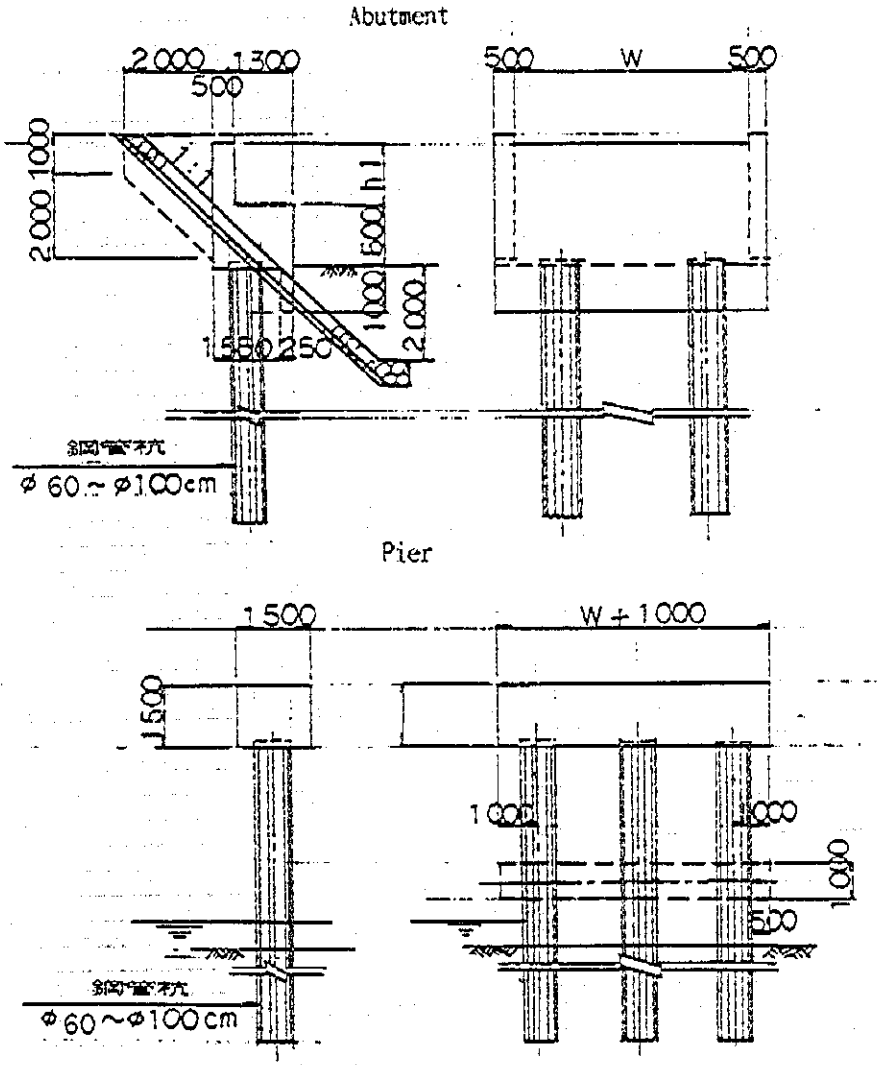


Fig. 2-7 Structural Type for Abutment and Pier (2)

Comparison of Pile Foundation

According to the results of the alternative study for the standard type of bridges, selection of pile foundation are determined as follows,

- reinforced concrete pile (square pile 45 x 45 cm)
  in case that pile length is less than 40 m.
- Steel Pipe Pile (60 cm)
  in case that pile length is more than 45 m.

However, finally, pile foundations were determined considering geotechnical conditions and superstructure conditions. The results of alternative study were shown in Table 2-9.

4) Approach Road and River Revetment

a) Approach Road

The width of approach road consists of three types, namely, 4.5 m, 5.5 m and 7.0 m. The length, vertical gradient and linear alignment of approach road were planned based on above-mentioned criteria, topography and existing land use conditions surrounding each bridge.

Typical cross section of approach road was planned based on local road design criteria of Viet Nam. Pavement structure is as follows, and the slope is determined depending on the embankment height.

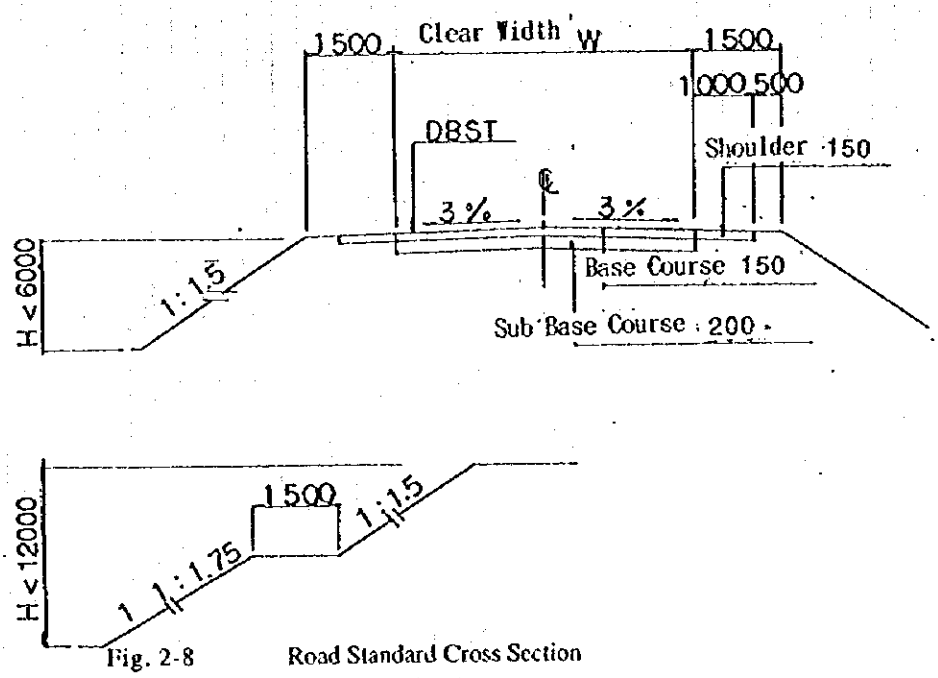
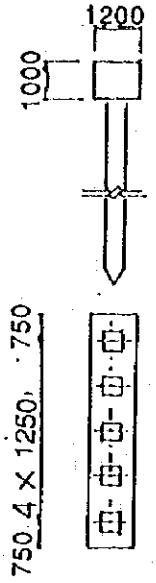
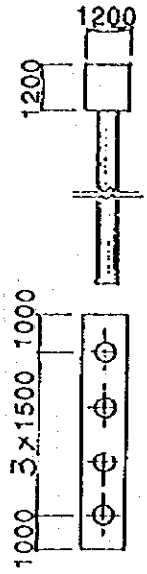
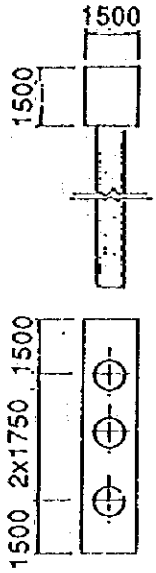


Fig. 2-8 Road Standard Cross Section

Table 2-9 Comparison of Pile Foundation

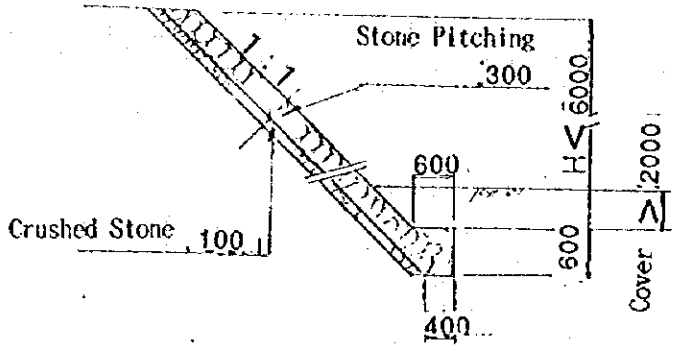
	Alt. A. Reinforced Concrete Pile (square 45cm x 45cm)	Alt. B. Centrifugal Reinforced Concrete Pile (diameter Ø 55cm)	Alt. C. Steel Pipe Pile (diameter Ø 60cm)
Substructure			
Structural Characteristics	- It is easy to respond for the rariation, of loads due to the small size of piles - Pile length is less than 10m and number of piles is less than 4. Piles are connected with steel plates and welding. - Allowable bearing capacity of pile is 60t/each, Qa = 60t/each.	- Quality control will be handled in the factory. Connection of piles will be done with bolts. - Allowable bearing capacity of pile is 70t/each, Qa = 70t/each.	- Material is homogeneous. Therefore strength is reliable. Connection of piles will be made by welding. - Allowable bearing capacity of pile is Qa = 90t/each.
Constructability	- Transportation time will be spared because of fabrication on site. - Construction period is longer than Alt. C due to quantity of piles. - Generally, total pile length is less than 40m.	- Pile length is limited because of transportation from factory to site. - Construction period is longer than Alt. C due to quantity of piles - Generally, total pile length is less than 40m.	- Pile length is limited because of the transportation from the factory to the site. - Construction period is shortest of the three. - It is necessary to paint above the water level. - Total pile length is approximately up 60m.
Comparative Construction Cost	1.0	1.3	1.4
Evaluation	○	▲	△
Comments	- It is assumed that girder length of PC girder bridge is 24m, width 55m, pile length 30m (bearing stratum, cohesive soil N value = 20). - If PC girder length is less than 24m and pile length is 30m, reinforced concrete pile (square) will be applied. If pile length is more than 40m, steel pipe pile will be adopted.		

b) Stone Masonry

The revetment as protection of abutment and groyne to the river current is one of the most important supplementary structures, therefore, stone masonry will be constructed as protection considering topography and the current experience of flood damage for the abutments and approach road for each bridge.

Based on Vietnamese design criteria, the overburden from the existing ground level is more than 2 m. The typical cross section is shown in Fig. 2-9.

The river revetment related to river protection should be constructed by stone masonry. (Fig. 2-10)



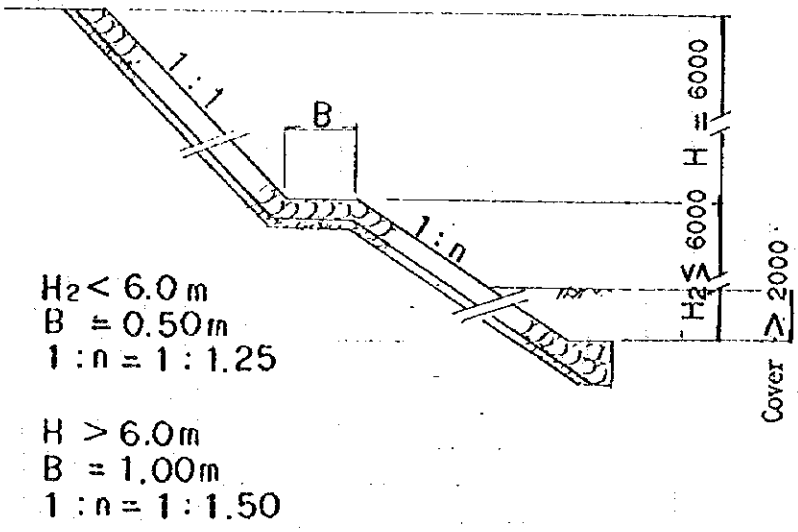


Fig. 2-9 Standard Type of Stone Pitching

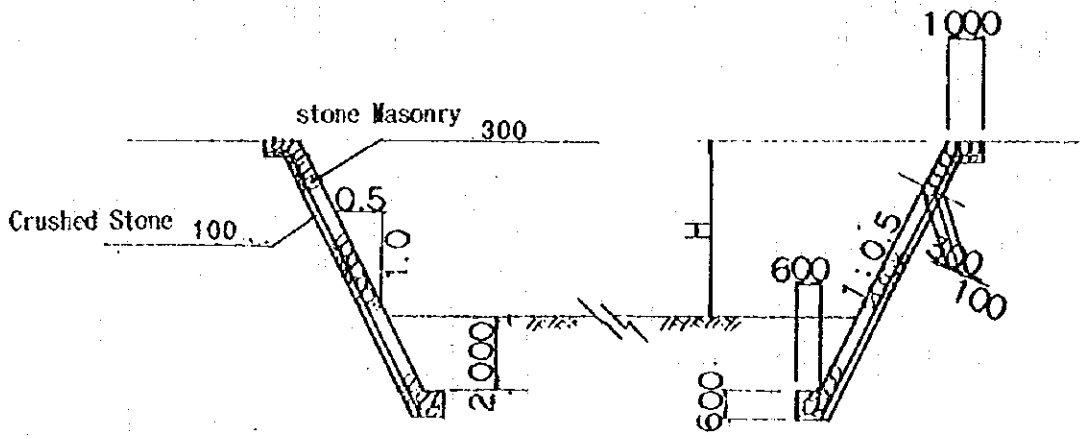


Fig. 2-10 Stone Masonry Type for Rivers

(2) Planning of the Bridge

Results of the bridge planning for the Bridge Construction Projects are summarized in Table 2-10. and for the Provision of Steel Girder Projects are also summarized in Table 2-11.

Table 2-10 (1) Outline of Bridge Construction Projects

Bridge No.			1	3	5	6	8	9
Name of Bridge			Duc Khe	Chuoc	Dong Dinh	Tu O	Hau	Ben The
Condition of Bridge Site			50 km south of Hanoi. New bridge in place of temporary bridge	New bridge in place of existing bamboo bridge	New bridge in between flat area and mountainous area	New bridge crosses the canal in deltaic area	New bridge crosses the canal in deltaic area	New bridge as a replacement of an old pedestrian bridge in a farm area
Horizontal Alignment			Straight	Straight	Straight	Straight	Straight	Straight
Vertical Alignment			5 % ▲ ▼ 5 %	level	6 % ▲ ▼ 6 %	6 % ▲ ▼ 6 %	6 % ▲ ▼ 6 %	8.3 % ▲ ▼ 6 %
Bridge Length (m)			99.46	74.30	83.30	68.30	83.30	43.55
Span Length (m)			18 + 37 + 25 + 18	24 + 24 + 24	21 + 30 + 30	21 + 24 + 21	27 + 27 + 27	21 + 21
Clear Width (m)			5.5	5.5	5.5	5.5	5.5	4.5
Type of Structure	Super-Structure		Steel Composite Simple H-Beam Steel Non-Composite Continuous I-Beam	PC Simple T-Beam	PC Simple T-Beam	PC Simple T-Beam	PC Simple T-Beam	PC Simple T-Beam
	Sub-Str.	Abutment	Pile-bent	RC Reversed T-Type	RC Reversed T-Type	Pile-bent	Pile-bent	RC Reversed T-Type
		Pier	Pile-bent	RC Circular Column with Cantilever Beams	RC Oval Sectional Column with Cantilever Beams	Pile-bent	Pile-bent	RC Oval Sectional Column with Cantilever Beams
	Foundation		Steel Pipe Pile	Spread Foundation	Spread Foundation	RC Square Pile	RC Square Pile	Spread Foundation
	Abutment Protection		Stone Pitching	Stone Pitching	Stone Pitching	Stone Pitching	Stone Pitching	Stone Pitching
Length of Approach Roads (m)			129.842	96.411	135.000	113.000	131.286	100.000

Table 2-10 (2) Outline of Bridge Construction Projects

Bridge No.			11	12	13	15	16	17
Name of Bridge			Lac	Vu Ban	Ky Phu	Luong Nha	Suong	Yen Tho
Condition of Bridge Site			New bridge replacing an old bridge destroyed by river bank erosion	New bridge as a replacement of an old suspension bridge	New bridge replacing an old bridge destroyed by scouring	New bridge in the area surrounded by Red River tributary and mountains	New bridge as a replacement of a bridge destroyed by bombing	New bridge in between communities in deltaic area
Horizontal Alignment			Straight	Straight	Straight	Straight	Straight	Straight
Vertical Alignment			9 % ▲ ▼ 9 %	6 % ▲ ▼ 6 %	8.8 % ▲ ▼ 9 %	level ▲ ▼ 9 %	3 % ▲ ▼ 3 %	9 % ▲ ▼ 9 %
Bridge Length (m)			30.80	99.05	24.80	49.32	51.66	24.80
Span Length (m)			30 x 1	21 + 27 + 27 + 21	24 x 1	15 + 18 + 15	10 + 30 + 10	24 x 1
Clear Width (m)			4.5	7.0	4.5	4.5	5.5	4.5
Type of Structure	Super-Structure		PC Simple T-Beam	PC Simple T-Beam	PC Simple T-Beam	Steel Composite Simple H-Beam	PC Simple T-Beam RC Slab Beam	PC Simple T-Beam
	Sub-Str.	Abutment	RC Reversed T-Type	RC Reversed T-Type	RC Reversed T-Type	Pile-bent	RC Reversed T-Type	Pile-bent
		Pier	-	RC Oval Sectional Column with Cantilever Beams	-	Pile-bent	RC Oval Sectional Column with Cantilever Beams	-
	Foundation		Spread Foundation	Spread Foundation	Spread Foundation	RC Square Pile	Spread Foundation	RC Square Pile
	Abutment Protection		Stone Pitching	Stone Pitching	Stone Masonry, Stone Pitching	Stone Pitching	Stone Pitching	Stone Pitching
Length of Approach Roads (m)			120.000	158.000	129.691	77.283	92.000	134.266

Table 2-10 (3) Outline of Bridge Construction Projects

Bridge No.			18	20	22	23	27	31
Name of Bridge			Hoanh Truc	Dong Quach	Nao Hoa	Quang	Pho Tra Linh	Tong Panh
Condition of Bridge Site			New bridge in deltaic area a few kilometers inland from the coast	New bridge in deltaic area 10 kilometers inland from the coast	New bridge as replacement of ferry system at hillside	New bridge in the mountains region	New bridge as a replacement of temporary bridge adjacent to China border	New bridge as a replacement of a destroyed bridge by flood
Horizontal Alignment			Straight	Straight	Straight	Straight	Straight	Straight
Vertical Alignment			9 % ▲ ▲ 9 %	6 % ▲ ▲ 6 %	9 % ▲ ▲ 2 %	8.6 % ▼ ▲ 9 %	level ▲ 5 %	7 % ▲ ▲ 5 %
Bridge Length (m)			38.03	92.30	92.30	92.30	30.80	30.60
Span Length (m)			27 + 10	30 + 30 + 30	30 + 30 + 30	30 + 30 + 30	30 x 1	30 x 1
Clear Width (m)			4.5	7.0	7.0	5.5	7.0	4.5
Type of Structure	Super-Structure		Steel Composite Simple I-Beam Steel Composite Simple H-Beam	PC Simple T-Beam	PC Simple T-Beam	PC Simple T-Beam	PC Simple T-Beam	Steel Composite Simple I-Beam
	Sub-Str.	Abutment	Pile-bent	Pile-bent	RC Reversed T-Type	RC Reversed T-Type	RC Reversed T-Type	RC Reversed T-Type
		Pier	Pile-bent	Pile-bent	RC Oval Sectional Column with Cantilever Beams	RC Oval Sectional Column with Cantilever Beams	-	-
	Foundation		Steel Pipe Pile	Steel Pipe Pile	Spread Foundation	Spread Foundation	Spread Foundation	Spread Foundation
	Abutment Protection		Stone Masonry	Stone Pitching	Stone Pitching	Stone Pitching	Stone Pitching	Stone Pitching
Length of Approach Roads (m)			111.000	189.432	187.000	154.135	96.282	176.771

Table 2-10 (4) Outline of Bridge Construction Projects

Bridge No.			33	34	37			
Name of Bridge			Khuoi Nieng	Khuoi Kieng	Na Sang-2			
Condition of Bridge Site			New bridge replacing an existing submerged bridge in mountainous region	New bridge crossing the river along the valley				
Horizontal Alignment			Straight	Straight	Straight			
Vertical Alignment			level ▲ ▲ 3 %	6 % ▲ ▲ 6 %	level			
Bridge Length (m)			43.55	74.30	74.30			
Span Length (m)			21 + 21	24 + 24 + 24	24 + 24 + 24			
Clear Width (m)			4.5	4.5	5.5			
Type of Structure	Super-Structure		PC Simple T-Beam	PC Simple T-Beam	PC Simple T-Beam			
	Sub-Str.	Abutment	RC Reversed T-Type	RC Reversed T-Type	RC Reversed T-Type			
		Pier	RC Oval Sectional Column with Cantilever Beams	RC Oval Sectional Column with Cantilever Beams	RC Circular Column with Cantilever Beams			
	Foundation		Spread Foundation	Spread Foundation	Spread Foundation			
	Abutment Protection		Stone Pitching	Stone Pitching	Stone Pitching			
Length of Approach Roads (m)			147.198	149.000	161.253			

Table 2-11 (1) Outline of the Steel Girder Provision Projects

Bridge No.	4	10	21	25	26	29
Name of Bridge	Dong Vuong	Tinh	Dong Mo	Lanh	Vai	Ban Ai
Condition of Bridge Site	New bridge in between flat area and mountainous area	A bridge as a part of inter-community road	As a replacement of an old existing bridge in a town	A bridge as a part of inter-community road in farm area	New bridge on the provincial road along the Red River	New bridge on inter-community road
Horizontal Alignment	Straight	Straight	Straight	Straight	Straight	Straight
Vertical Alignment	level	level	level	level	3%	level
Bridge Length (m)	61.15	24.60	64.70	27.60	27.60	21.60
Span Length (m)	30 + 30	24 x 1	21 + 21 + 21	27 x 1	27 x 1	21 x 1
Clear Width (m)	5.5	4.5	5.5	4.5	5.5	5.5
Super-Structure	Steel Composite Simple I-Beam	Steel Composite Simple I-Beam	Steel Composite Simple I-Beam	Steel Composite Simple I-Beam	Steel Composite Simple I-Beam	Steel Composite Simple I-Beam

Table 2-11 (2) Outline of the Steel Girder Provision Projects

Bridge No.	30	35				
Name of Bridge	Ban Hinh	Ban Vuoc				
Condition of Bridge Site	New bridge on inter-community road	As a replacement of an existing temporary suspension bridge				
Horizontal Alignment	Straight	Straight				
Vertical Alignment	level	3%				
Bridge Length (m)	21.60	40.03				
Span Length (m)	21 x 1	18 + 24				
Clear Width (m)	5.5	5.5				
Super-Structure	Steel Composite Simple I-Beam	Steel Composite Simple I-Beam Steel Composite Simple H-Beam				

(3) Basic Design Drawings

General view of each bridge for bridge construction is shown in the Appendices 9.

General view of each bridge for steel girder supply is shown in the Appendices 9.

Chapter 3 Implementation Plan

3-1 Implementation Plan for Construction of bridges

3-1-1 Implementation Concept

The project consists of the construction of 21 small-to-medium-sized bridges which are located in 14 province of northern Viet Nam. The implementation concept of this project under the grant aid can be summarized as follows.

(1) The project has been considered for implementation over three fiscal years (31 months).

(2) In order to complete the project within above period, these bridges are divided into 8 groups, and many bridges will be planned for simultaneous construction. (refer to Table 3.1 & 3.4)

(3) In order to decrease construction costs, construction equipment and temporary construction materials will be shifted from project to project. Furthermore, local materials and equipments will be procured when certain quality and quantity is possible.

(4) Since there are several bridge construction contractors in Hanoi and at least one medium scale contractor in each state, this project will be planned to obtain cooperation from these contractors as much as possible.

(5) Considering the lack of civil engineers who have sufficient experience in bridge construction, the supervisors to work under the Japanese engineers will be procured from third countries.

(6) The necessary training supervisors for the skilled structural steel works requiring a high degree of accuracy and for the production of high quality PC girder and the erection by the full operation of minimum number of equipment, will be brought in from Japan.

(7) The central offices of the construction contractor and consultant will be established in Hanoi. Furthermore, the construction contractor will set up 8 site offices each bridge group in main towns where the living environment inclusive communication is in a good condition. (refer to Table 3.1)

(8) In the case where removal of the existing bridge is required, temporary pedestrian bridge will be constructed for the residents, and the maintenance works will be carried on for the safety control through the construction period.

(9) The bridges have been grouped into site offices as shown in Table 3.1.

Table 3.1 Grouping of Bridges

Group	Site Office	Bridge No.	Bridge Name
A	HANOI	No. 1	Duc Khe
		No. 3	Chuoc
		No. 6	Tu O
		No. 8	Hau
		No. 13	Ky Phu
		No. 16	Suong
B	HOABINH	No. 9	Ben The
		No. 11	Lac
		No. 12	Vu Ban
		No. 15	Luong Nha
C	BAC GIANG	No. 5	Dong Dinh
		No. 22	Nao Hoa
D	NAM DINH	No. 17	Yen Tho
		No. 18	Hoanh Truc
		No. 20	Dong Quach
E	TUYEN QUANG	No. 23	Quang
		No. 33	Khuoi Kieng
		No. 34	Khuoi Kieng
F	TRA LINH	No. 27	Pho Tra Linh
G	SON LA	No. 31	Tong Panh
H	LAI CHAU	No. 37'	Na Sang - 2

3-1-2 Implementation Conditions

As the result of comparative study on construction conditions, maintenance and operation works and construction cost, PC girder (steel girder in part) and concrete deck for the superstructure, pile bent type abutment and pier with concrete square pile (steel pile in part) or reserved T-type abutment and wall type pier with spread foundation for the substructure are adopted, which are general types in Viet Nam.

The peculiar points of this project are that the bridge sites are located at the rural route under the provincial road which have difficult access, and that all bridges scattered in a wide area will be completed within short term. Therefore, in the event that this project be implemented under grant aid, schedule control and quality control by the contractor will be given priority. Especially, sufficient preparation works will be required for the construction work in rainy season and the shifting of construction machines from project to project. Proper planning and supervising is indispensable for the whole schedule.

The foreign contractor who has not been registered by the government must obtain permission a process, which takes several months. Prior coordination with agency concerned is important for smooth commencement.

3-1-3 Scope of Works

The implementation of the project under the grant aid of the Japanese government will require the share of the works between the Japanese and Viet Namese government as described hereafter.

(1) The Share to be Borne by the Japanese Government

- Construction of bridge
- Construction of approach road
- Removal of existing bridge and construction of temporary pedestrian bridge
- Installation and removal of construction roads (bridges) and temporary buildings required for the project works
- Procurement of the materials, equipments and labor required for the above construction works
- Field management costs for the above construction works
- The necessary consultant's services to implement the works

(2) The Share to be Borne by the Government of Viet Nam

- Acquisition of the construction sites, and supply of the land necessary to perform the temporary works
- Compensation for houses removed in the construction sites

- The exemption of tax on the materials and equipment imported for the project, and the expeditions processing of the custom procedures
- The exemption of custom fees for the Japanese and third party nationals entering Viet Nam to work on the project, and exemption of other financial obligations

3-1-4 Consultant Supervision

(1) Basic Policy of Detailed Design and Consultant Supervision

The basic policy of Detailed Design is as follows:

1) The necessary design data will be collected during the field survey when preparing the detailed design, and the basic design can be confirmed during this operation; the construction methods and cost data can be confirmed, and the desires of the client can be reflected in the detailed design drawings.

2) After the design operations for the detailed design has been completed, the contents of the work will be explained to the Viet Namese government authorities, and discussions will be held.

The basic policy for the construction supervision will be as follows:

1) Since a number of bridge constructions will be carried out simultaneously, the construction management will be performed by Japanese engineers and local engineers. As the local engineers lack sufficient experience in consulting works, Japanese engineers will endeavor to pass their technology to the local engineers.

2) The construction supervision engineers will be in accordance with the requirements of paragraph 3-1-4 (2) and endeavor to perform the "construction supervision operations" as smoothly as possible.

3) Since the construction sites are located in 14 provinces, the consultant's office will be provided in Hanoi. The permanent engineers will be dispatched to each construction sites and PC girder production yard regularly and according to the progress.

(2) Consultant Supervision

A supervisor will be required to perform the following construction supervision works.

1) Approval of the Construction Schedule and the Construction Drawings

Supervisor inspects and approves the construction scheme, time schedule and shop drawing submitted by the contractor, according to the contract document, contract drawings, specifications, and others.

2) Schedule Control

Supervisor receives the progress report from the contractor, and gives the adequate instructions to complete the project on time.

3) Quality Control

Supervisor examines and approves the quality of construction materials and construction methods, according to the contract drawings and specifications.

4) Inspection of Completed Construction Works

Through the inspection of the final sections, plane figures, and others, the supervisor checks the completed construction works according to the criteria and also certifies the quantity.

5) Issue of Certification as Requested by the Contractor

Supervisor issues the necessary certificates for payment of contractor, the completion of construction and the expiration of warranty term.

6) Submittal of Reports

Supervisor inspects the monthly report, final drawings and final pictures prepared by the contractor and submits them to the Viet Namese authorities, JICA and others. Furthermore, the supervisor prepares the final report after the completion of the construction according to "Guideline for Final Report on Grant Aid Project", and submits it to JICA.

(3) Construction Supervisory System

Considering the construction contents and time schedule, the number and the term of Japanese engineers who perform the construction supervision services will be as follows:

1) Overall Supervisor, 1 Person

The overall supervisor will make spot checks at times of starting and completion of major construction works.

2) Chief Bridge Engineer, 1 Person

The chief bridge engineer will be assigned permanently for the duration of construction period. Additionally, the engineer should be familiar with the superstructure.

3) Bridge Engineer (in change of substructure), 1 Person

The bridge engineer will make spot checks during the substructure construction period.

4) Road Engineer, 1 Person

The road engineer will make spot checks during the approach road construction period.

3-1-5 Procurement Plan

(1) Materials

1) Basic Policy

As a general rule, local materials that can be procured for the bridge construction will be procured from local sources. Imported materials which can be procured in Viet Nam easily, will be considered as local materials. However, when the quality of the material is questionable, or the volume in circulation will not permit the procurement in sufficient time, then the material will be obtained from Japan or third country (Singapore).

2) Procurement Plan of Materials

The procurement methods of major construction materials are shown in table 3.2 in accordance with the result of field survey as below:

- Cement

Cement can be procured from local suppliers. But the present supply is slightly lower than the demand, and the imported cement from Indonesia and others supply this shortage. The major cement plants in the northern area are Hoang Thach corporation (Thanh Hoa province) and Bim Son corporation (Hai Phong City) at present. Additionally, cement

plant with large production capacity is under construction at Hai Phong City through the introduction of foreign capital.

- Reinforcing Steel Bars

  The domestic production of reinforcing steel bar is approximately half the demand. As a result, any shortage depends on imports from Japan, Singapore, Korea and Russia. At present, no high tensile steel is manufactured in Viet Nam, and the supply of local steel of required section, size and quality cannot be guaranteed. However, two steel mills introduced foreign capital, VSC-POSCO (Hai Phong City) and NASTEEL-VINA (Bac Thai province), are operating and two more mills, VINAUSTEEL (Bac Thai province) and VINAKYOUEI (Ba Ria-Vung Tau province) will be commenced operation within this year.

- PC Wire/Sheath

  As PC Wire/Sheath cannot be produced in Viet Nam, these materials have been imported from Japan by way of Singapore in each project. Therefore, procurement of Japanese products is possible.

- Steel Girder

  Although manufacturing of steel girder is possible in Viet Nam by using of imported steel plate, it will be procured from overseas (Japan) for quality and stable supply. Additionally, a Viet Nam - Japan joint is to manufacture Steel girders from around May 1995, but the production capacity and the price is not clear at the moment.

- Steel Pipe Pile

  Steel pipe pile imported from overseas is available in Viet Nam.

- Steel Sheet Pile/L-beam/H-beam

  Although these materials imported from Russia are available in Viet Nam, it will be procured from overseas (Japan) for quality and stable supply.

- Aggregates

  Aggregates for the use of concrete and road can be procured from local quarries located in the mountains (hills) and rivers. The distance from these quarries to construction sites located in Red River delta is larger than the other cases, and the maximum is about 50 km maximum.

- Materials for Concrete Forms

  Timber for temporary works is available from local sources. However, plywood for general concrete works is procured from overseas. In considering sift from project to project and high accuracy of products, the steel forms procured from overseas (Japan) will be used in this project for PC girders.

- Banking Materials

  Banking materials for approach road can be procured from mountains around the construction sites. However, at the construction sites in coastal area, river sand will be used for banking material (about 20 km transfer).

Table 3.2 Supply of Construction Materials

Item	Vietnam	Japan	Third country	Remarks
Banking material	O			
Crushed stone	O			
Sand	O			
Gravel	O			
Boulder	O			
Asphalt emulsion	O			Imported
Cement	O			
Admixture			O	Supplied from Singapore
Reinforcement	O			
PC Wire			O	Supplied from Singapore
Sheath			O	Supplied from Singapore
Steel girder		O		
Steel pipe	O			Imported
Steel sheet-pile		O		Supplied from Singapore
L-shaped steel		O		Supplied from Singapore
H-shaped steel		O		Supplied from Singapore
Colgate pipe		O		
Welded wire mesh		O		
PVC pipe	O			Imported
Plywood	O			Imported
Timber	O			
Steel form		O		
Rubber shoe		O		
Shoe mortar		O		
Expansion apparatus		O		
Gully (Street inlet)		O		
Paint		O		
Fuel	O			

(2) Construction Equipment

1) Basic Policy

Construction equipments will also be procured basically in Viet Nam . However, considering the feature of this project that all bridges located in the area including those difficult to access must be completed successfully within a short term; and the condition of local equipment which is limited in type and schedule, most construction equipments were considered to be procured from Singapore or Thailand. But, these countries do not provide leasing service to Viet Nam, and offers pay-back method only in case of long-term use. Subsequently, considering economically, these equipments will be procured from Japan. The amount of such equipment will be reduced to a minimum by shifting from project to project.

2) Condition of Local Construction Equipment

There is no leasing company for construction equipment in Viet Nam. However the national construction company keeps the equipment which are to be used in this project, and leasing is available. The problems of leasing are as follows:

- Due to the present, construction rush in Viet Nam, there is no guarantee for leasing necessary equipments when needed.
- Most construction equipment is the large-sized for dam or airport projects. The wide use equipment is insufficient.
- Most construction equipment had been procured from the Soviet Union or China and is superannuated. Therefore, procurement of spare parts is so hard that many repair shops are manufacturing these parts in their own.
- Most construction equipment belongs to the contractors in Hanoi. However, the present number of erection girder machine for PC girder works and such crane as lifting PC girder (30 m) is insufficient when may bridges are constructed at the same time.

3) Procurement Plan of Construction Equipment

Procurement plan of construction equipments is shown in Table 3.3.

Table 3.3 Supply Plan of Construction Equipment

Items	Specification	Vietnam	Japan	Remarks
Bulldozer	11 t, 12 t	O	O	If insufficient in Vietnam
Back hoe 0.35, 0.6 m^3	0.7, 1.2 m^3	O	O	If insufficient in Vietnam
Shovel tractor	1.4 m^3		O	
Clamshell	0.6 m^3	O		
Road-sprinkler	5,500 *l*	O		
Motor grader	2.7 m		O	
Tire roller	8 ~ 20 t	O		
Macadam roller	10 ~ 20 t	O		
Vibration roller	1 t		O	
Rammer		O		Purchase locally
Asphalt engine sprayer		O		
Dump truck	4 t, 8 t	O		
Trailer	32 t		O	
Truck	8 t	O		
Truck crane	25 t		O	
Tour crane	20 t, 25 t, 40 t		O	
Pile driving machine	35 t, 40 t	O	O	35 t - - - Japan
Vibration hammer	40 kw		O	
Diesel hammer	4.5 t	O		Pile work (subcontractor)
Erection girder			O	
Girder hoisting apparatus			O	
Side-feed apparatus			O	
Launching apparatus			O	Shifting machine
Pot mixer	0.35 m^3	O		Purchase locally
Concrete mixer (mobile)	0.5 m^3		O	
Truck mixer	0.3 ~ 3.2 m^3		O	
Fork lift	1 t		O	
Grout mixer	600 ~ 800 *l*		O	
Grout pump			O	
Tension jack • pump	40 t, 80 t, 195 t		O	
Air compressor	5 m^3, 7 m^3		O	
Concrete vibrator	ϕ 45 mm	O		Purchase locally
Concrete breaker	20 kg		O	
Under water pump (electric)	ϕ 80 ~ ϕ 100 mm		O	
Under water pump (engine)	ϕ 50 ~ ϕ 75 mm	O		Purchase locally
Generator	35 ~ 350 kvA		O	
Electric welding machine	300 A	O		Purchase locally
Reinforcement process machine		O		Purchase locally
Base ship	5.1 x 2 x 1.0 m	O		

(3) Transport Routes

1) Ocean Shipping

Hai Phong Port is the unloading sea port for this project, which is located 100 km east of the capital Hanoi by way of the national road No. 5.

The regular sea lines are listed below:

Port	Ship kind	Frequency	Ship kind	Frequency
Yokohama	Local	2/month	container	1/week
Singapore	Local	1/month	container	1/week

The lines from other loading ports are irregular and extra charge (800 ~ 1,000 FT) will be required.

2) Inland Transport

Material and equipment from overseas or Hanoi and its suburbs, will be transported to each construction sites and site offices.

3-1-6 Implementation Schedule

(1) Flow of Implementation Schedule

The flow from the detailed design to the completion of construction is as follows. Furthermore, the exchange of notes will be exchanged twice, namely for the detail design before the designing work and for the construction and supervision works after the designing work.

1) Detailed Design

After the contract of consulting, the detailed design will be performed and the detailed design drawings and tender documents will be prepared.

2) Evaluation of Contractor

After getting the approval through discussion with JICA about the evaluation items, evaluation of the contractor will be performed by the consultant in the name of the Government of Viet Nam.

3) Tendering/Contract

a) Tendering/Contract

Evaluation of tender and determination of the successful tenderer will be performed with attendance of consultant, staff to the Government of Viet Nam, Tenderers and JICA staff, and signing of the Contract will be conducted. The Contract is the direct style with the Government of Viet Nam and Japanese contractors (consultant and construction contractor). Open tender system will be adopted for Japanese contractors.

b) Bank Arrangement

In parallel with conclusion of contract, the Government of Viet Nam will make arrangement with Japanese foreign exchange bank to open the account for receiving of Japanese assistant fund and paying to Japanese contractors. This bank arrangement will be the ground for Authorization to Pay (A/P) issued by the Government of Viet Nam, which is necessary for the application to get the export approval from the Ministry of International Trade and Industry and to receive the advanced payment under the clause of Contract payment.

c) Attesting of Contract

"Attesting of Contract" means the Japanese government confirms that the contract above mentioned is eligible as the object of this grant project, which is the condition for effectuation of this contract. In specific terms, the Japanese Ministry of Foreign Affairs obtains the contract documents from the Government of Viet Nam by way of Japanese diplomatic establishments abroad.

d) Execution of Contract

Japanese contractor will execute the contract after receiving attested contract documents and Authorization to Pay (A/P).

4) Construction

Construction work can be roughly divided into total preparation work and each bridge construction. The total preparation work after the conclusion of contract consists of procurement and transport of materials and equipments and construction of the temporary structures in the sites. The each bridge construction works consist of the preparation work (clearance work), removal of existing bridge, construction of the temporary pedestrian bridge,

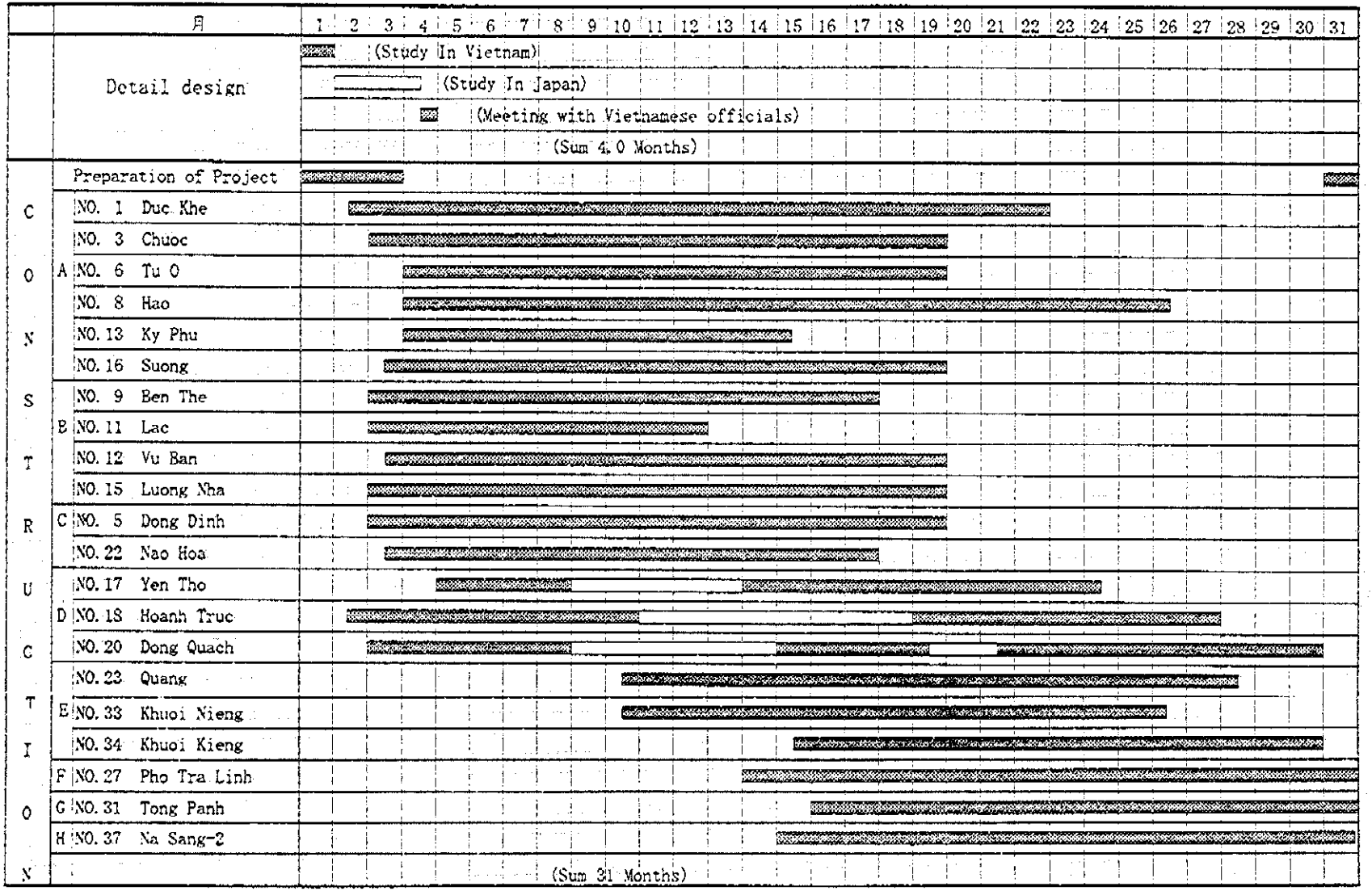
foundation work (pile), substructural work, superstructural work, approach road and revetment work.

The rainy season in the sites extend from May to October. They have heavy rainfall in July and August in northern area and in August and September in southern area. Therefore, a work arrangement considering flooding will be required during these periods.

(2) Implementation Schedule

Implementation schedule is shown in Table 3.4.

Table 3-4 Construction Schedule (Bridge)



3-2 Implementation Plan for Steel Girder Supply

3-2-1 Implementation Concept

The project consists of supplying the steel girders for the construction of 8 bridges located in 6 provinces of northern Viet Nam. The implementation concept of this project under the grant aid can be summarized as follows:

(1) The project has been considered for implementation within a single fiscal year (12 months).

(2) The steel girder will be determined at every bridge in accordance with the detailed design by the consultant.

(3) The deliverer of steel girders will be in charge of manufacturing, loading, ocean transport, inland transport and handing over (warehouse of the Ministry of Transport in each states).

(4) The government of Viet Nam will take the responsibility of executing the bridge construction with steel girders granted.

3-2-2 Scope of Works

The implementation of the project under the grant aid of the Japanese government will require the share of the works between the governments of Japan and Viet Nam as described hereinafter.

(1) The Share to be Borne by the Japanese Government

- Steel girder supply for bridge construction
- Materials supply consists of main girder, cross-beam, splice plate (high strength bolt), shoe, expansion joint, gully, coating and erection materials.
- Transport of materials to warehouse of the Ministry of Transport in each province
- The necessary consultant's services to implement the works

  (Detailed design costs for the superstructure)

(2) The Share to be Borne by the Government of Viet Nam

- Construction of bridge
- Construction of approach road
- Removal of existing bridge

- Installation and removal of construction roads (bridges) and temporary buildings required for the project works
- Procurement of the materials, equipments and labor required for the above construction works
- Field management costs for the above construction works
- The necessary consultant's services to implement the works (detailed design costs for the substructure and the approach road).
- Acquisition of the construction sites, and supply of the land necessary to perform the temporary works
- Compensation of houses removed in the construction sites
- The exemption of tax on the materials and equipment imported for the project, and the expeditions processing of the custom procedures
- The exemption of custom fees for the Japanese entering Viet Nam to work on the project, and exemption of other financial obligations

3-2-3 Procurement Plan

(1) Basic Policy of Detailed Design and Procurement Management

The basic policy of Detailed Design is as follows.

1) It will be best for the consultant who performed the basic design to perform the detailed design services. The reason for this is that the consultant who performed the basic design is fully acquainted with the design policy and will be able to complete the detailed design in a relative short time and realize savings in the project cost. Moreover, further cost down will be expected by using the same consultant who have charge of the detailed design of the bridge project conducted simultaneously.

2) The necessary meetings about field work and design conditions considering the basic design will be held with Viet Nam authority in charge of the detail design. The desires of the client can be reflected in the detailed design drawings.

3) After the domestic works for the detailed design and tender document have been completed, the contents of the works will be explained to the Government of Viet Nam, and discussions will be held.

The basic policy for the procurement management will be as follows.

1) Procurement management work consist of tendering, evaluation, attendance to the workshop inspection of steel girder.

2) The monitoring of the bridge construction with supplied steel girder will be included in the supervision work for the bridge construction.

(2) Procurement of Materials

Steel girder will be procured from Japan as mentioned in paragraph 3-1-5.

The materials attended on steel girder will also be procured from Japan.

(3) Transport Route

Transport routes are the same as mentioned in paragraph 3-1-5. Considering the local road condition and transportation, the maximum length of steel girder must be less than 10 m.

3-2-4 Implementation Schedule

(1) Flow of Implementation Schedule

The flow from the Detailed Design to the handing over of steel girder is as follows. Besides, the exchange of notes will be exchanged once for the Detail Design and steel girder supply before the designing works.

- Detailed Design
- Evaluation
- Tendering/Contract
- Manufacturing/Transport/Hand over

(2) Implementation Schedule

Implementation schedule is shown in Table 3.5.

Table 3.5 Implementation Schedule (Steel Girder supply)

Month		1	2	3	4	5	6	7	8	9	10	11	12
Detailed Design					(Field Survey)								
					(Domestic Work)								
							(Site Certificate)						
									(Total 4 Months)				
Girder Supply	Manufacturing												
	Ocean Transport												
	Inland Transport												
	Hand Over												
										(Total 5 Months)			

3-3 Operation and Maintenance Plan

(1) Operation and Maintenance System

The bridges in this project will be constructed on the common road other than the national road. Therefore, maintenance and operation works will be performed by the Division of Transportation in each province. Although each province must maintain and operate 1 ~ 3 new bridges in accordance with this project, the burden of each province will be minimal if following the maintenance and operation method mentioned below.

(2) Operation and Maintenance Method

This project consists of not only bridge construction which is the main work of this projects, but also the approach road connecting existing road with abutment. The maintenance and operation after the completion of the bridges must be performed in line with Table 3.6.

Table 3.6 Maintenance and Operation Schedule

	Item	Maintenance and Repairing Works	Period
Bridge	① Drain Pipe	Cleaning of sediments	3 months
	② Expansion Joint	Repairing of shrieked metal and seal rubber	3 months
	③ Pavement	Repairing of cracks	3 months
	④ Handrail	Repairing the damage by traffic accidents	3 months
	⑤ Shoe	Removal of earth deposit	6 months
	⑥ Substructure	Removal of flood deposit	1 year
	⑦ Steel Girder	Painting	1 year
Road	① Road Surface	Surface treatment, patching, smoothing	1 month
	② Shoulder/Slope	Planting, reinforcement, repairing masonry	1 month

1.0 (man/month/bridge) will be enough for periodical checking and slight maintenance in ① ~ ⑥ of bridge and ① ~ ② of approach road. Painting work in ⑦ will be performed every 10 years as a general rule.

The large-scale repair work will not be necessary for 20 ~ 30 years after the completion of bridges by following the maintenance and operation method mentioned above. But it will be important to record the result of periodical checking on the road register and grasp the condition of damage to establish the repair schedule and its scale. The periodical checking system must be established at the initial stage.

The approach road will be banked 1.5 m or 2.0 m higher than the general road section. Therefore, it must be recognized that the stability of embankment is lower than the general road section. The periodical checking for the approach road will be performed at the same time as bridge. But maintenance work will be required earlier.

(3) Operation and Maintenance Cost

Operation and maintenance cost is estimated as below.

1) Bridge Construction

4 out of 21 bridges proposed in this project are steel girder type.

periodical checking and slight maintenance	:	25 Million VND/Month (0.2 Million Yen/Month) (= 1.2 Million VND/Bridge x 21 Bridges)
painting of steel girder	:	419 Million VND/10 years (3.5 Million Yen/10 Years) (= 2,600 m^2/4 Bridges x 161 Thousand VND/m^2)

2) Steel Girder Supply

Steel girder supply will be performed to 8 bridges.

periodical checking and slight maintenance	:	10 Million VND/Month (0.1 Million Yen/Month) (= 1.2 Million VND/Bridge x 8 Bridges)
painting of steel girder	:	483 Million VND/10 Years (4.0 Million Yen/10 Years) (= 3,000m^2/8 Bridges x 161 Thousand VND/m^2)

(3) Operation and Maintenance Cost

Operation and maintenance cost is estimated as below.

1) Bridge Construction

4 out of 21 bridges proposed in this project are steel girder type.

periodical checking and slight maintenance	:	25 Million VND/Month (0.2 Million Yen/Month) (= 1.2 Million VND/Bridge x 21 Bridges)
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Chapter 4 Project Evaluation and Recommendation

4-1 Project Effect

Regarding the under development of roads and bridges of the farming villages and mountain areas of the 16 northern provinces, the stopping of traffic flow during high water periods in the rainy season has been a major cause of sluggish social economic activities and poor living standards of local residents. This project intends to add supplementary main routes and newly build or replace small or intermediate bridges. Through its execution, transportation can be guaranteed throughout the year, stoppage of traffic along certain routes during the rainy months of May to October will be eliminated; and by replacing older bridges, load limits will be relaxed and more comfortable transportation enjoyed. Agricultural products can be conveyed throughout the year, the need for stocking of goods over long periods will be eliminated, market access will improve considerably and standards of living will rise. Furthermore, residents of the concerned areas will be freed from uncertainties regarding health and educational opportunities, making possible a more peaceful and healthy lifestyle. The project effects are listed below:

(1) Contribute to the vitalization of the local agricultural industry by providing year-round market access of agricultural products through the development of the road network in the northern region.

(2) Facilitate the safe transport of necessities to residents of the northern regions, particularly minorities, by providing year-round transport availability.

(3) Promote the upgrading of social welfare by providing improved access to marketplaces, schools, and hospitals.

(4) Bring favorable economic effects to not only citizens benefiting directly from the project, but also to the entire province through the development of supplementary main routes as well as community roads for local residents.

4-2 Recommendation

Through this project, favorable effects are greatly anticipated and in view of the scope of contribution to the daily life of local residents, it is judged that this project is deserving of financial aid. Furthermore, the Ministry of Transports and PMU-18 are deemed to have sufficient capabilities at present to operate and manage the project.

However, if necessary maintenance is neglected following the execution of the project, the project's function cannot be maintained for long. In particular, such maintenance must include: inspection of cross-section of water flow under bridge prior to the rainy season, removal of driftwood, etc., to alleviate blockage of flow, watching for damage of bank fortifications during floods, making immediate repairs of even the smallest damage. At the very least, funds for such repair and inspection must be provided.

APPENDICES

1. Member List of the Survey Team

This survey team consists of the team leaders, project coordinators, technical advisors and seven consultants as shown below.

- Team Leaders

First On-site Survey

Name : Mr. Shigeki Kobayashi

Title : Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs

Second On-site Survey

Name : Mr. Kazuchika Sato

Title : Development Specialist in Industrial Management Institute for International Cooperation (JICA)

On-site Explanation of Basic Design

Name : Mr. Eiichi Kawahara

Title : Assistant Director, Grant Aid Division, Economic Cooperation Bureau

- Project Coordinators

Fist On-site Survey

Name : Mr. Nobuhiko Hanazato

Title : Second Basic Design Study Division, Grant Aid Study & Design Department, JICA

Second On-site Survey

Name : Mr. Takuya Mitani

Title : Grant Aid Division, Bureau of Economic Cooperation, Ministry of Foreign Affairs

On-site Explanation of Basic Design

Name : Mr. Itsu Adachi

Title : Administration Division, Procurement Department, JICA

- Technical Advisor

Name : Mr. Toshimi Moritani

Title : Manager, Engineering Department, Honshu - Shikoku Bridge Authority

- Consultants

Name	Assignment	Firm
Mr. Hiroyuki ENDO	Chief Consultant	Pacific Consultants International
Mr. Masashi OSHITARI	Road & Bridge Planner	Oriental Consultants
Mr. Yoshimi TAKAI	Bridge Planner	Pacific Consultants International
Mr. Satoshi NAKAMURA	Surveyor A	Pacific Consultants International
Mr. Atsushi KAMIYAMA	Surveyor B	Oriental Consultants
Mr. Kazuo MIZUKOSHI	Construction Schedule & Quantity Surveyor	Pacific Consultants International
Mr. Akihisa HIRASHIMA	Interpreter	Pacific Consultants International

2. Survey Schedule

First Field Survey (June 25, 1995 to July 17, 1995)

Day	Date	Day of Week	Survey Contents
1	6/25	Sun.	Travel (Narite ~ Bangkok)
2	6/26	Mon.	Arrive in Hanoi, Courtesy call on Japanese embassy, JICA office
3	6/27	Tue.	Courtesy call on SPC, MOT Explanation, discussion of Inception Report
4	6/28	Wed.	Courtesy call on PMU-18 Explanation, discussion of Inception Report
5	6/29	Thu.	Discussion of survey schedule and minutes with PMU-18
6	6/30	Fri.	Field survey (Bridge Nos. 2, 3)
7	7/1	Sat.	Gathering of related materials Arrival of Team Leader Mr. Kobayashi, Signing of Minutes
8	7/2	Sun.	Field survey
9	7/3	Mon.	Field survey
10	7/4	Tue.	Gathering of related materials
11	7/5	Wed.	Gathering of related materials Departure of Mssrs. Kobayashi and Hanazato Arrival of team member Mr. Mizukoshi
12	7/6	Thu.	Field survey
13	7/7	Fri.	Field survey Departure of advisor Mr. Moritani
14	7/8	Sat.	Discussion of schedule with PMU-18
15	7/9	Sun.	Inspection and sorting of related materials
16	7/10	Mon.	Field survey
17	7/11	Tue.	Field survey
18	7/12	Wed.	Field survey
19	7/13	Thu.	Gathering of related materials
20	7/14	Fri.	Report of survey results to MOT Report of survey results to Japanese embassy
21	7/15	Sat.	Report of survey results to PMU-18
22	7/16	Sun.	Inspection and sorting of related materials
23	7/17	Mon.	Report of survey results to JICA office Return travel
24	7/18	Tue.	Travel

Survey Team consisting three parties conducted field survey on 35 bridge sites.

Second Field Survey (August 7, 1995 to September 15, 1995)

Day	Date	Day of Week	Survey Contents
1	8/7	Mon.	Travel, Arrival in Hanoi
2	8/8	Tue.	Courtesy call on Japanese embassy and JICA offices Interim Reports given to SPC, MOT and explained
3	8/9	Wed.	Explanation, discussion of Interim Report with PMU-18
4	8/10	Thu.	Field survey with all members (Bridge Nos. 11, 12)
5	8/11	Fri.	Reports to Japanese embassy, JICA office
6	8/12	Sat.	Departure of Mssrs. Mitani and Moritani Discussion of survey with PMU-18
7	8/13	Sun.	Inspection and sorting of related materials
8	8/14	Mon.	Field survey
9	8/15	Tue.	Field survey
10	8/16	Wed.	Discussion of technical content with PMU-18
11	8/17	Thu.	Field survey
12	8/18	Fri.	Meeting of survey team, Gathering of related materials
13	8/19	Sat.	Field survey
14	8/20	Sun.	Inspection and sorting of related materials
15	8/21	Mon.	Discussion with PMU-18 Arrival of team leader Mr. Sato
16	8/22	Tue.	Courtesy call on Japanese embassy, JICA office, SPC, MOT
17	8/23	Wed.	Discussion of contents of Interim Report with PMU-18 Discussion of contents of minutes
18	8/24	Thu.	Field survey with all members (Bridge No. 1)
19	8/25	Fri.	Report of contents of minutes to Japanese embassy and JICA office Signing of Minutes (15:30)
20	8/26	Sat.	Departure of team leader Mr. Sato
21	8/27	Sun.	Inspection and sorting of related materials
22	8/28	Mon.	Technical considerations, Gathering of related materials, Field survey
23	8/29	Tue.	Technical considerations, Gathering of related materials, Field survey
24	8/30	Wed.	Travel, Hanoi to Haiphong harbor Survey of transport routes
25	8/31	Thu.	Departure of team member Mr. Nakamura
26	9/1	Fri.	Technical considerations, Gathering of related materials, Field survey
27	9/2	Sat.	Technical considerations, Gathering of related materials, Field survey
28	9/3	Sun.	Inspection and sorting of related materials
29	9/4	Mon.	Technical considerations, Gathering of related materials, Field survey
30	9/5	Tue.	Technical considerations, Gathering of related materials, Field survey

Day	Date	Day of Week	Survey Contents
31	9/6	Wed.	Technical considerations, Gathering of related materials, Field survey
32	9/7	Thu.	Bridge planning
33	9/8	Fri.	Bridge planning
34	9/9	Sat.	Departure of team member Mr. Kamiyama
35	9/10	Sun.	Inspection and sorting of related materials
36	9/11	Mon.	Bridge planning
37	9/12	Tue.	Bridge planning
38	9/13	Wed.	Discussion of bridge plans with PMU-18
39	9/14	Thu.	Report of survey results to JICA office, Japanese embassy, MOT, PMU-18
40	9/15	Fri.	Return to Japan

Field survey includes additional 2 bridge sites.

On-site Explanation of Bridge Plan (October 29, 1995 to November 6, 1995)

Day	Date	Day of Week	Survey Contents
1	10/29	Sun.	Travel (Narita ~ Hong Kong)
2	10/30	Mon.	Travel, arrival in Hanoi Courtesy call on Japanese embassy, JICA office
3	10/31	Tue.	Explanation of Draft Final Report to SPC, MOT and PMU-18
4	11/1	Wed.	Explanation and discussion of Draft Final Report with PMU-18
5	11/2	Thu.	Field survey of bridge No. 1
6	11/3	Fri.	Discussion of Minutes, Signing of Minutes Report to Japanese embassy, JICA
7	11/4	Sat.	Departure of team leader Mr. Kawahara and Mr. Moritani
8	11/5	Sun.	Gathering of related materials
9	11/6	Mon.	Return to Japan

3. List of Party Concerned in the Recipient Country

Date	Place Visited	Persons in Charge	Positions
	MINISTRY OF TRANSPORTS	Dr. LA NGOC KHUE	VICE MINISTER
		Mr. LE NGOC HOAN	VICE MINISTER
		Dr. TRAN DOAN THO	DEPUTY DIRECTOR OF PLANNING & INVESTMENT DEPT.
		Dr. HA KHAC HAO	SENIOR EXPERT OF PLANNING & INVESTMENT DEPT.
	STATE PLANNING COMMITTEE	Mr. NGUYEN NGOC NHAT	GENERAL DIRECTOR OF INFRASTRUCTURE DEPT.
		Mr. DUONG DUC UNG	GENERAL DIRECTOR OF FOREIGN ECONOMIC RELATIONS DEPT.
		Dr. NGUYEN TIEN THUAN	VICE GENERAL DIRECTOR OF FOREIGN ECONOMIC RELATIONS DEPT.
	NO.18 PROJECTS MANAGEMENT UNIT (PMU 18)	Mr. NGUYEN VIET TIEN	GENERAL DIRECTOR
		Mr. NGUYEN KIM QUY	DIRECTOR OF TECHNICAL DEPT.
		Mr. LE TOAN THINH	ASSISTANT GENERAL DIRECTOR
		Mr. LE HUU CHIEN	DEPUTY DIRECTOR OF ENGINEERING DEPT.
		Mr. DOAN VAN CHIEM	DEPUTY DIRECTOR OF PLANNING DEPT.
		Mr. NAUYEN NGOC LONG	DEPUTY DERECTOR OF ADMINISTRATION DEPT.
	M.O.T HA TAY	Mr. NGUYEN VAN CHE	DIRECTOR
		Mr. TAO	CHIEF OF TECHNICAL DEPT.
	NATIONAL ROAD No.2 ADMINISTRATION OFFICE	Mr. PHUNG VAN LAM	DIRECTOR

3. List of Party Concerned in the Recipient Country

Date	Place Visited	Persons in Charge	Positions
	M.O.T HA BAC	Mr. NGUYEN THANH THUY	EXPERT OF PLANNING DEPT.
	M.O.T HAI HUNG	Mr. NGUYEN VAN HUONG	DIRECTOR
		Mr. LE KHAC KIEN	CHIEF OF PLANNING DEPT.
	M.O.T. HOA BINH	Mr. TOAN	ROAD ADMINISTRATION DEPT.
		Mr. NGUYEN NGOC VIET	EXPERT
	M.O.T BAC THAI	Mr. DAM DUC OANH	DIRECTOR
		Mr. NGUYEN DUC THANH	CHIEF OF TECHNICAL DEPT.
	M.O.T VINH PHU	Mr. NGUYEN CAO NGHIEP	DEPUTY DIRECTOR
		Mr. DO DINH DAI	CHIEF OF PLANNING DEPT.
	M.O.T NINH BINH	Mr. NAUYEN XUAN HUE	DERECTOR
		Mr. DO KIM DINH	CHIEF OF MANAGEMENT ADMINISTRATION DEPT.
	M.O.T THAI BINH	Mr. DANG CHAN	DIRECTOR
		Mr. PHAM VAN DICH	CHIEF OF PLANNING DEPT.
	M.O.T LANG SON	Mr. NGUYEN ANH NHUONG	DEPUTY DIRECTOR
		Mr. LUONG VIET KIEM	CHIEF OF TECHNICAL DEPT.
		Mr. DINH TRONG TU	ENGINEER OF TECHNICAL DEPT.
	M.O.T TUYEN QUANG	Mr. DANG NGOC TAM	DEPUTY DIRECTOR
		Mr. PHAM HUNG TRUONG	DEPUTY DIRECTOR
		Mr. NGUYEN VAN SANG	EXPERT

3. List of Party Concerned in the Recipient Country

Date	Place Visited	Persons in Charge	Positions
	M.O.T YEN BAI	Mr. TRAN VO HOA	DEPUTY DIRECTOR
		Mr. NGUYEN QUOC CHIEN	CHIEF OF PLANNING DEPT.
		Mr. VU NGOC KHUYA	CHIEF OF ROAD ADMINISTRATION DEPT.
		Ms. NGUYEN THI THI	VICE CHIEF OF TECHCNICAL DEPT.
	M.O.T CAO BANG	Mr. DAN DUONG	DIRECTOR
		Mr. TRAN THANH BINH	CHIEF OF TECHNICAL & PLANNING DEPT.
	M.O.T SON LA	Mr. LO VAN LONG	DIRECTOR
		Mr. NGUYEN NANG THE	DEPUTY DIRECTOR
		Mr. TRINH XUAN HUNG	CHIEF OF PLANNING DEPT.
	M.O.T HA GIANG	Mr. TUAN	DIRECTOR
		Mr. THU	CHIEF OF TECHNICAL DEPT.
	M.O.T LAO CAI	Mr. NGUYEN KIM CUONG	DIRECTOR
		Mr. NGUYEN NGOC DUNG	DEPUTY DIRECTOR
	M.O.T LAI CHAU	Mr. DAO XUAN HUNG	DIRECTOR
		Mr. PHAM QUANG LAN	ASSISTANT DIRECTOR
		Mr. TO NHU SON	CHIEF OF PLANNING & TECHNICAL DEPT.
		Mr. PHAM HUYEN	VICE CHIEF OF PLANNING & TECHNICAL DEPT.

3. List of Party Concerned in the Recipient Country

Date	Place Visited	Persons in Charge	Positions
	PEOPLE'S COMMITTE OF HOA BINH PROVINCE	Mr. VUONG XUAN SON	CHAIRMAN
	PEOPLE'S COMMITTEE OF DABAC DISTRICT (HOA BINH)	Mr. DINH QUANG PHONG	VICE OHAIRMAN
		Mr. HOANG THE HUNG	CHIEF OF ROAD ADMINISTRATION DEPT.
	PEOPLE'S COMMITTEE OF MAICHAU DISTRICT (HOA BINH)	Mr. HA HIEN NHIEN	CHIEF OF ADMINISTRATION DEPT.
	PEOPLE'S COMMITTEE OF VU BAN DISTRICT (HOA BINH)	Mr. DINH VAN CAO	VICE CHAIRMAN
	PEOPLE'S COMMITTEE OF TULOC DISTRICT (HAI HUNG)	Mr. DUONG VAN THUC	CHAIRMAN
	PEOPLE'S COMMITTEE OF NINH THANH DISTRICT (HAI HUNG)	Mr. NGUYEN HUU PHAM	VICE CHAIRMAN
	PEOPLE'S COMMITTEE OF KIMSON DISTRICT (NINH BINH)	Mr. NGUYEN NGOC ANH	CHAIRMAN
		Mr. TRAN DANG CAN	CHIEF OF TRANSPORT DEPT.
	PEOPLE'S COMMITTEE OF YENMO DISTRICT (NINH BINH)	Mr. TRAN THUC	CHAIRMAN
	PEOPLE'S COMMITTEE OF HUULUNG DISTRICT (LANG SON)	Mr. LIEU	VICE CHAIRMAN
		Mr. BO	CHIEF OF ROAD ADMINISTRATION DEPT.
	PEOPLE'S COMMITTEE OF CHIEMHOA DISTRICT (TUYEN OUANG)	Mr. TRIEU VAN MUI	VICE CHAIRMAN
		Mr. MA VAN GIANG	CHIEF OF ADMINISTRATION DEPT.
	PEOPLE'S COMMITTEE OF NAHANG DISTRICT (TUYEN OUANG)	Ms. LE THI QUANG	CHAIRMAN
		Mr. MA VAN DUC	VICE CHAIRMAN
	PEOPLE'S COMMITTEE OF SONLA DISTRICT (SON LA)	Mr. NGUYEN VAN THO	CHIEF OF FOREIGN AFFAIRS DEPT.
	PEOPLE'S COMMITTE OF TRALINH DISTRICT (CAO BANG)	Mr. HUYNH KHOA	CHAIRMAN

3. List of Party Concerned in the Recipient Country

Date	Place Visited	Persons in Charge	Positions
	RAILWAY SURVEY & DESIGN ENTERPRISE (RSDE) - A MEMBER ENTERPRISE OF TRANSPORT ENGINEERING DESIGN INC. (TEDI)	Mr. TRINH PHUC LOI	RSDE DIRECTOR
		Mr. TANG VAN THIN	RSDE VICE DIRECTOR
		Mr. BUI DOAN TOAN	RSDE VICE DIRECTOR, PROJECT MANAGER
		Mr. LE HONG	MANAGER OF PLANNING DIVISION
		Mr. LE XUAN DOC	MANAGER OF GEOLOGICAL DIVISION
		Mr. NGUYEN XUAN TIEP	MANAGER OF TOPOSURVEY DIVISION, CREW No.3 LEADER
		Mr. DAO QUANG HUY	ENGINEER, CREW No.1 LEADER
		Mr. HOANG TIEN DICH	CREW No.2 LEADER
		Mr. DANG PHAM TY	ENGINEER, CREW No.4 LEADER
		Mr. TRAN VAN DOANH	CREW No.5 LEADER
		Mr. LE CHCI	ENGINEER, CREW No.6 LEADER
		Mr. HOANG NGOC ANH	ENGINEER, CREW No.7 LEADER
		Mr. PHAM VAN THANG	CREW No.8 LEADER
		Mr. LE XUAN CUC	CREW No.9 LEADER
		Mr. TRAN DINH RY	CREW No.10 LEADER
		Mr. TRAN BAY	CREW No.11 LEADER
	TEDI	Mr. LAM	DIRECTOR

3. List of Party Concerned in the Recipient Country

Date	Place Visited	Persons in Charge	Positions
	SCIENTIFIC AND TECHNOLOGICAL	Dr. NGUYEN XUAN DAO	DIRECTOR GENERAL
	INSTITUTE FOR COMMUNICATION	Mr. NGUYEN THUC	HEAD OF MATERIAL DEPT.
	AND TRANSPORTATION	Dr. DOAN MINH TAM	HEAD OF THE ROAD AND AERODROME DEPT.
	VIETNAM - JAPAN INTERNATIONAL	Mr. YOSHIRO SAWAMURA	VICE CHAIRMAN MANAGING DIRECTOR
	TRANSPORT CO., LTD	Mr. TOSHIHARU IKEDA	DEPUTY GENEREAL DIRECTOR
	CIVIL ENGINEERING CORPORATION	Mr. LE DINH XUAN	DIRECTOR
	No.1, No.14 BRIDGE COMPANY	Mr. PHAM QUANG DUONG	VICE DIRECTOR
		Mr. NGUYEN PHAN HUNG	VICE DIRECTOR
	UNIBRICO	Mr. DINH CAO THANG	VICE DIRECTOR OF PLANNING & INVESTMENT DEPT.
	THANGLONG COMPANY BRIDGE 7	Mr. HOANG HOA	DIRECTOR
		Mr. DING CONG THINH	DEPUTY DIRECTOR
	MECHANICAL TRANSPORT FACTORY 1	Mr. TRAN DUC NINH	DIRECTOR
		Mr. PHAM QUANG LOI	VICE DIRECTOR
	VIETNAM ROADWAY DEPARTMENT	Mr. PHAM MANH DAI	VICE DIRECTOR
	VEHICLE TRANSPORTATION COMPANY 2	Mr. NGUYEN TA NGUYEN	VICE DIRECTOR

3. List of Party Concerned in the Recipient Country

Date	Place Visited	Persons in Charge	Positions
	JAPANESE EMBASSY	Mr. MASAAKI MIYASHITA	Minister
		Mr. SHIRO SADOSHIMA	Councilor
		Mr. MASAO MIYAZAKI	Second Secretary
		Mr. NAOTA IKEDA	Second Secretary
	JICA VIETNAM OFFICE	Mr. MASARU TODOROKI	Chief
		Mr. HIROSHI TSUJINO	

4. Minuets of Discussion (1)

Minutes of Discussions
on
the Basic Design Study
on
the Project for Reconstruction of Bridges in the Northern District
in
the Socialist Republic of Viet Nam

(First Field Study)

In response to a request from the Government of the Socialist Republic of Viet Nam, the Government of Japan has decided to conduct a Basic Design Study on the Project for Reconstruction of Bridges in the Northern District (hereinafter referred to as "the Project"), and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to the Socialist Republic of Viet Nam a Basic Study Team headed by Mr. Shigeki KOBAYASHI, Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs, which is scheduled to stay in the country from June 26 to July 17, 1995.

The team held a series of discussions with the concerned officials of the Government of the Socialist Republic of Viet Nam, and conducted a field survey at the study area.

As a result of discussions and field survey, both sides agreed to recommend the main items described in the attached sheets to the respective governments, and to make effort to realize the smooth implementation of the Project for both countries' prosperous future.

The Team will proceed to further works and prepare the Interim Report.

Hanoi, July 1, 1995

Mr. Shigeki KOBAYASHI
Leader
Basic Design Study Team
JICA

Mr.Nguyen Ngoc NHAT
General Director
Infrastructure Department
State Planning Committee

Mr.Tran Doan THO
Deputy Director General
Planning & Investment Department
Ministry of Transports

Mr. Nguyen Viet TIEN
General Director
PMU 18
Ministry of Transports

ATTACHMENT

1. OBJECTIVE

The objective of the Project is to reconstruct damaged bridges which appear as a bottleneck of rural development in the Project area to help in balancing and upbringing the living standard and welfare condition of thepeople by ensuring smooth transportation, hence to contribute to socio-economic development of the Project area.

2. PROJECT IMPLEMENTING AGENCY

Project Management Unit. Ministry of Transports

3. PROJECT SITE

The proposed sites of the Project are located in the northern district which are shown in Annex-1.

4. MAJOR ITEMS REQUESTED BY THE VIET NAM SIDE

As a result of the series of discussions. the following items are requested by the Viet Nam side.

1) Construction of the bridges.

2) Provision of the steel girders necessary for construction of the bridges.

However. the final component of the Project will be decided after further studies.

5. JAPAN'S GRANT AID PROGRAMME

The Viet Nam side has understood the system of Japan's Grant Aid Programme explained in Annex-2.

6. NECESSARY MEASURES TO BE TAKEN BY THE VIET NAM SIDE

The Viet Nam side will take necessary measures described in Annex-3 for smooth implementation of the Project on condition that the Grant Aid by the Government of Japan is extended to the Project.

7. NECESSARY INTERNAL APPROVAL AND NOTIFICATION OF THE ACCEPTANCE

Upon presentation and explanation of the Draft Basic Design by the Japanese side in the end of October 1995. both sides will finalize the Project contents agreed through the discussions. The Viet Nam side will take necessary measures to obtain approval from the Government of Viet Nam for the Project and notify the Japanese side of acceptance of the Draft Basic Design until November 30, 1995 to facilitate the implementation of the Project. In case the notification would be delayed beyond

the deadline agreed upon, implementation of the Project will be delayed and the Project contents may have to be reduced since the Japan's Diet Approval on the Project should be obtained in the December Session for the implementation in the fiscal year (FY) 1996/97.

8. FURTHER SCHEDULE OF THE STUDY

1) The team will proceed to further studies in the Socialist Republic of Viet Nam until July 17, 1995.

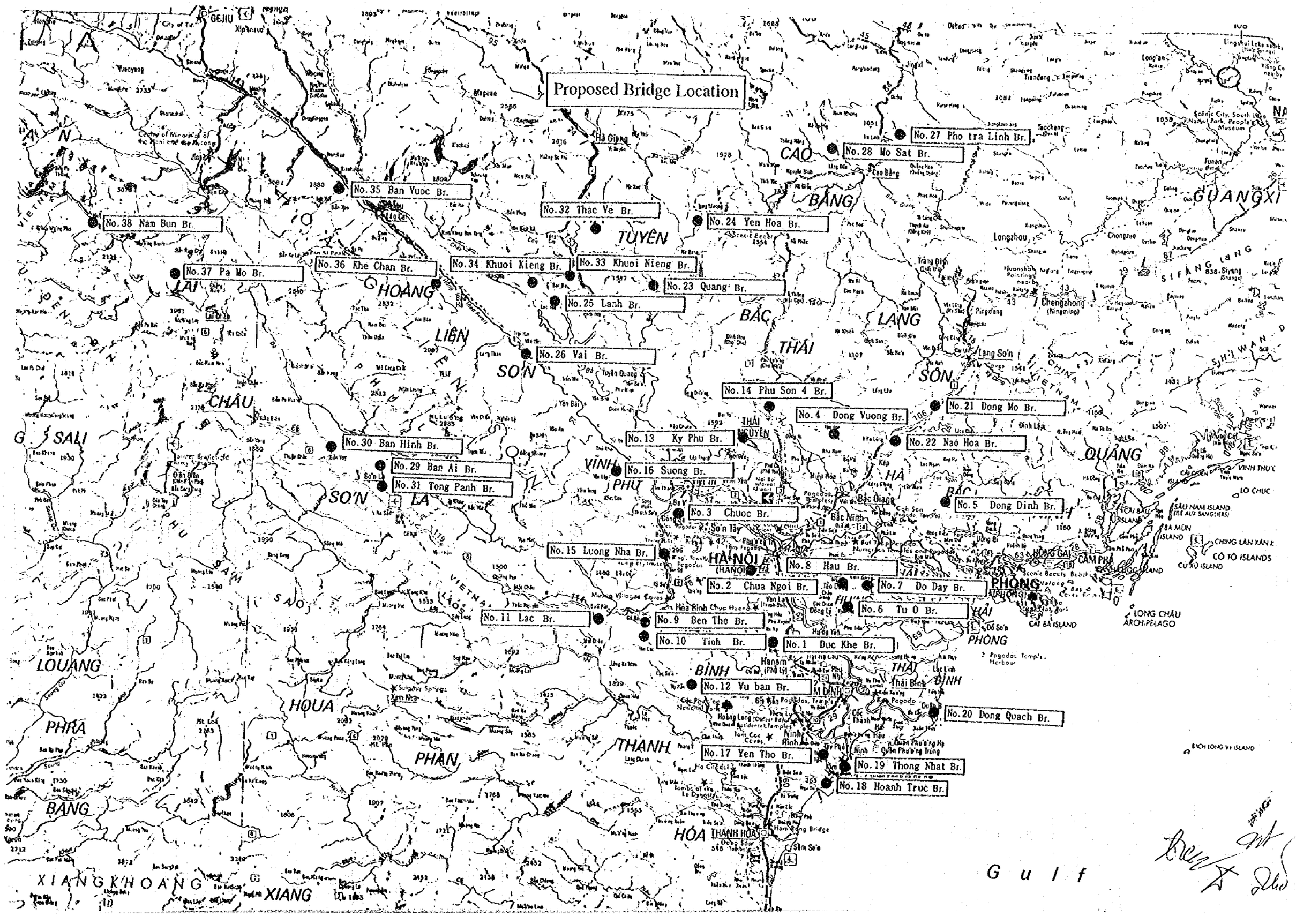
2) Based on the results, JICA will prepare an Interim Report and dispatch a team in the beginning of August 1995 in order to explain and confirm the contents,then proceed the second field study.

3) Based on the results of the second field study, JICA will prepare a Draft Basic Design and dispatch a team in the end of October 1995 in order to explain and confirm the contents.

4) Upon acceptance of the Draft Basic Design by the Viet Nam side, JICA will complete the Basic Design Report and forward it to the Viet Nam side by January 1996.

Annex-1 PROPOSED SITES OF THE PROJECT

Province	N	Name of Bridge	Length (m)	District	Route
Ha Tay	1	Duc Khe Bridge	71.2	My Duc	Province Rd
	2	Chua Ngoi Bridge	32.0	Ha Dong	Province Rd
	3	Chuoc Bridge	50.0	Ba Vi	Province Rd
Ha Bac	4	Dong Vuong Bridge	46.0	Yen The	Province Rd
	5	Dong Dinh Bridge	60.0	Luc Nam	District Rd
Hai Hung	6	Tu O Bridge	40.0	Ninh Thanh	District Rd
	7	Do Day Bridge	78.0	Tu Loc	District Rd
	8	Hau Bridge	60.0	Van Giang	District Rd
Hoa Binh	9	Ben The Bridge	42.0	Tan Lac	District Rd
	10	Tinh Bridge	24.0	Da Bac	District Rd
	11	Lac Bridge	23.5	Mai Chau	District Rd
	12	Vu Ban Bridge	96.0	Lac Son	Province Rd
Bac Thai	13	Ky Phu Bridge	26.4	Dai Tu	District Rd
	14	Phu Son 4 Bridge	52.4	Dong Hy	Province Rd
Vinh Phu	15	Luong Nha Bridge	41.5	Thanh Son	District Rd
	16	Suong Bridge	42.5	Song Thao	District Rd
Ninh Binh	17	Yen Tho Bridge	24.4	Tam Diep	Province Rd
	18	Hoanh Truc Bridge	27.7	Kim Son	District Rd
	19	Thong Nhat Bridge	26.1	Kim Son	District Rd
Thai Binh	20	Dong Quach Bridge	70.4	Tien Hai	District Rd
Lang Son	21	Dong Mo Bridge	64.3	Chi Lang	District Rd
	22	Nao Hoa Bridge	80.0	Huu Lung	District Rd
Tuyen Quang	23	Quang Bridge	74.0	Chiem Hoa	Province Rd
	24	Yen Hoa Bridge	30.0	Na Hang	District Rd
Yen Bai	25	Lanh Bridge	24.5	Luc Yen	District Rd
	26	Vai Bridge	22.0	Van Yen	Province Rd
Cao Bang	27	Pho Tra Linh Bridge	29.7	Tra Linh	Province Rd
	28	Mo Sat Bridge	80.0	Thong Nong	Province Rd
Son La	29	Ban Ai Bridge	11.0	Son La	District Rd
	30	Ban Hinh Bridge	12.8	Thuan Chau	District Rd
	31	Tong Panh Bridge	40.5	Son La	District Rd
Ha Giang	32	Thac Ve Bridge	55.0	Bac Quang	Province Rd
	33	Khuoi Nieng Bridge	40.0	Vinh Tuy	District Rd
	34	Khuoi Kieng Bridge	36.0	Vinh Tuy	District Rd
Lao Cai	35	Ban Vuoc Bridge	41.3	Bat Sat	Province Rd
	36	Khe Chan Bridge	95.0	Van Ban	Province Rd
Lai Chau	37	Pa Mo Bridge	42.0	Muong Te	Province Rd
	38	Nam Bun Bridge	60.0	Muong Te	Province Rd
Total		38 Bridges	1,772.2		


Proposed Bridge Location
No. 35 Ban Vuoc Br.
No. 38 Nam Bun Br.
No. 37 Pa Mo Br.
No. 36 Khe Chan Br.
No. 34 Khuoi Kieng Br.
No. 33 Khuoi Nieng Br.
No. 32 Thac Ve Br.
No. 25 Lanh Br.
No. 23 Quang Br.
No. 24 Yen Hoa Br.
No. 27 Pho tra Linh Br.
No. 28 Mo Sat Br.
No. 26 Vai Br.
No. 30 Ban Hinh Br.
No. 29 Ban Ai Br.
No. 31 Tong Panh Br.
No. 14 Phu Son 4 Br.
No. 4 Dong Vuong Br.
No. 21 Dong Mo Br.
No. 13 Ky Phu Br.
No. 22 Nao Hoa Br.
No. 16 Suong Br.
No. 5 Dong Dinh Br.
No. 3 Chuoc Br.
No. 15 Luong Nha Br.
No. 8 Hau Br.
No. 2 Chua Ngoi Br.
No. 7 Do Day Br.
No. 6 Tu O Br.
No. 11 Lac Br.
No. 9 Ben The Br.
No. 10 Tinh Br.
No. 1 Duc Khe Br.
No. 12 Vu ban Br.
No. 20 Dong Quach Br.
No. 17 Yen Tho Br.
No. 19 Thong Nhat Br.
No. 18 Hoanh Truc Br.
Gulf

Annex-2 JAPAN'S GRANT AID PROGRAMME

1. Japan's Grant Aid System

(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 the third country.

However the prime contractors namely consulting, constructing and procurement firms, are limited to "Japanese nationals". (the team "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 designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

(6) 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.

2. 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 Programme, 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.

Annex-3 NECESSARY MEASURES TO BE TAKEN BY THE VIET NAM SIDE

Following necessary measures should be taken by the Viet Nam side on condition that the Grant Aid by the Government of Japan is extended to the Project:

1. To provide data and information necessary for the Project.
2. To secure the land necessary for the excursion of the Project, such as the land for bridges, temporary offices, working areas, storage yards and others.
3. To clear the sites prior to the commencement of the construction.
4. To make passable all roads and bridges leading to the Project sites before the commencement of inland transportation of materials and equipment.
5. To demolish existing bridges according to the construction schedule which will be provided in the later stage.
6. To bear commissions to the Japanese foreign exchange bank for its banking services based upon the Banking Arrangement, namely the advising commission of the "Authorization to Pay" and payment commission.
7. To ensure prompt unloading, tax exemption, customs clearance at the port of disembarkation in the Socialist Republic of Viet Nam and prompt internal transportation therein of the materials and equipment for the Project purchased under the Grant Aid.
8. To exempt Japanese juridical and physical nationals engaged in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in the Socialist Republic of Viet Nam with respect to the supply of the products and services under the verified contracts.
9. To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the Socialist Republic of Viet Nam and stay therein for the performance of their work.
10. To provide necessary permissions, licenses and other authorizations for implementing the Project, if necessary.
11. To maintain and use properly and effectively the facilities constructed under the Project.
12. To coordinate and solve any issues related to the project which may be raised from third parties or inhabitants in the Project area during implementation of the Project.

4. Minutes of Discussion (2)

Minutes of Discussions
on
the Basic Design Study
on
the Project for Reconstruction of Bridges in the Northern District
in
the Socialist Republic of Viet Nam
(Second Field Study)

In June 1995, Japan International Cooperation Agency (JICA) dispatched the Basic Design Study Team (First Field Study) on the Project for Reconstruction of Bridges in the Northern District (hereinafter referred to as "the Project") to the Socialist Republic of Viet Nam,response to a request from the Government of the Socialist Republic of Viet Nam. As a result of the series of discussions, field survey in Viet Nam and technical assessment conducted in Japan, JICA has prepared the Interim Report on the study.

In order to discuss and consult with the Viet Nam side on the components of the study based on the interim Report, and to conduct further field survey, JICA sent to the Socialist Republic of Viet Nam the Basic Study Team (Second Field Study) headed by Mr.Kazuchika SATO, Development Specialist, JICA, which is scheduled to stay in the country from August 7 to September 15, 1995.

The team held a series of discussions with the concerned officials of the Government of the Socialist Republic of Viet Nam, and conducted a field survey at the study area.

As a result of discussions and the field survey, both sides agreed to recommend the main items described in the attached sheets to the respective governments.

The Team will proceed to further works and prepare the Basic Design Study Report.

Hanoi, August 25 , 1995

Mr. Kazuchika SATO
Leader
Basic Design Study Team
JICA

Mr.Nguyen Ngoc NHAT
General Director
Infrastructure Department
State Planning Committee

Mr.Tran Doan THO
Deputy Director General
Planning & Investment Department
Ministry of Transports

Mr. Nguyen Viet TIEN
General Director
PMU 18
Ministry of Transports

ATTACHMENT

1. COMPONENT OF THE INTERIM REPORT

The Viet Nam side has understood and accepted in principle the components of the Interim Report proposed by the Team.

2. ALTERATION TO THE CONTENTS OF APPLICATION

The Basic Study Team has conducted a field survey in LAI CHAU province in association with PMU and MOT province staff. However, after repeated attempts, it proved impossible to access the two bridge sites from Lai Chau city, since the road was blocked by flood and landslides caused by the heaviest recorded rainfall since 1971. The People's Committee of Lai Chau Province requested Minister of MOT to adopt the secondary listing of candidate bridges in place of the original bridge listing. MOT therefore asked JICA to approve the substitution of Bridges No.37 and 38. After a discussion and confirmation that alternative bridge locations are accessible, JICA agreed to conduct a field survey of the sites. However the final decision regarding selection of proposed alternative bridges will be concluded after further studies.

3. SUBJECTS OF THE BASIC DESIGN

After a series of discussion, the following sites are agreed to be the subject of the second field study on condition that the sites are accessible by the Team for site survey.

1) The bridge sites for bridge construction are listed in Annex-1(Priority-1&Priority-2)

2) The bridge sites for provision of steel girders are listed in Annex-2 (Priority-1&Priority-2)

Namely the Priority-1 and the Priority-2 are the possibility that the Priority-1 shall highly likely be considered as the components of the Project, and the Priority-2 are less likely considered as the components of the Project. However, the final component of the Project will be concluded after further studies.

4. SUBJECT OF THE VIET NAM SIDE'S F/S

The Viet Nam side will take necessary measure to obtain approval from the Gvernment of Viet Nam for the Project and notify the Japanese side of acceptance of the Draft Basic Design by the November 30, 1995 to facilitate the implemetation of the Project.

The bridges sites subject to the Viet Nam side's F/S are listed in Annex-3.

5. JAPAN'S GRANT AID PROGRAMME

The Viet Nam side has understood the system of Japanese Grant Aid Programme explained in Annex-4.

6. NECESSARY MEASURES TO BE TAKEN BY THE VIET NAM SIDE

The Viet Nam side will take necessary measures described in Annex-5 for smooth implementation of the Project on condition that the Grant Aid by the Government of Japan is extended to the Project.

7. FURTHER SCHEDULE OF THE STUDY

1) The team will proceed to further studies in Viet Nam until September 15, 1995.

2) Based on the results of the second field survey, JICA will prepare a Draft Basic Design and dispatch a team in the end of October 1995 in order to explain and confirm the contents.

3) Upon acceptance of the Draft Basic Design by the Viet Nam side, JICA will complete the Basic Design Report and forward it to the Socialist Republicof Viet Nam side by January 1996.

4) The schedule of both sides are summarized in Annex-6.

Annex-1

The bridge sites for bridge construction

	Bridge No.	Province	Name of Bridge	Road Classification	Design Length * 1)	Design Width * 1)	Area (SQ.M)	Priority-1	Priority-2	Priority-1 (SQ.M)	Priority-2 (SQ.M)
1	1	Ha Tay	Duc Khe	Provincial	70	7	490	Bridge		490	
2	3		Chuoc	District	50	5.5	275	Bridge		300	
3	5	Ha Bac	Dong Dinh	Community	60	5.5	330	Bridge		330	
4	6	Hai Hung	Tu O	District	60	5.5	330	Bridge		330	
5	8		Hau	District	60	5.5	330	Bridge		330	
6	9	Hoa Binh	Ben	District	35	4.5	157.5	Bridge		157.5	
7	11		Lac	District	25	4.5	112.5	Bridge		100	
8	12		Vu Ban	Provincial	100	7	700	Bridge		700	
9	13	Bac Thai	Ky Phu	District	25	4.5	112.5	Bridge		112.5	
10	15	Vinh Phu	Luong Nha	District	45	4.5	202.5	Bridge		202.5	
11	16		Suong	Provincial	70	5.5	385	Bridge		385	
12	17	Ninh Binh	Yen Tho	Community	35	4.5	157.5	Bridge		140	
13	18		Hoanh Truc	District	45	4.5	202.5	Bridge		202.5	
14	20	Thai Binh	Dong Quach	District	75	7	525	Bridge		525	
15	22	Lang Son	Nao Hoa	District	80	7	560	Bridge		480	
16	23	Tuyen Quang	Quang	Provincial	75	5.5	412.5	Bridge		412.5	
17	24		Yen Hoa	District	35	4.5	157.5	Bridge		140	
18	27	Cao Bang	Pho Tra Linh	District	30	7	210	Bridge		210	
19	31	Son La	Tong Panh	District	30	4.5	135	Bridge		135	
20	33	Ha Giang	Khuoi Nieng	District	40	4.5	180	Bridge		180	
21	34		Khuoi Kieng	District	35	4.5	157.5	Bridge		157.5	
				Total	1080		6122.5			6020	0

* 1) Preliminary estimated length and width of bridges by JICA Study Team

Annex-2

The bridge sites for provision of steel girder

	Bridge No.	Province	Name of Bridge	Road Classification	Design Length * 1)	Design Width	Area (SQ.M)	Priority-1	Priority-2	Priority-1 (SQ.M)	Priority-2 (SQ.M)
1	4	Ha Bac	Dong Vuong	District	50	5.5	275	S. Girder		275	
2	7	Hai Hung	Do Day	District	120	5.5	660		S. Girder		660
3	10	Hoa Binh	Tinh	District	25	4.5	112.5	S. Girder		100	
4	19	Ninh Binh	Thong Nhat	District	30	7	210				210
5	21	Lang Son	Dong Mo	District	60	5.5	330	S. Girder		330	
6	25	Yen Bai	Lanh	District	25	4.5	112.5	S. Girder		100	
7	26		Vai	Provincial	25	5.5	137.5	S. Girder		137.5	
8	28	Cao Bang	Mo Sat	Provincial	80	5.5	440		S. Girder		440
9	29	Son La	Ban Ai	Provincial	15	5.5	82.5	S. Girder		82.5	
10	30		Ban Hinh	Provincial	15	5.5	82.5	S. Girder		82.5	
11	35	Lao Cai	Ban Vuoc	District	45	5.5	247.5	S. Girder		247.5	
12	36		Khe chan	District	120	5.5	660		S. Girder		660
				Total	610		3350			1355	1970

* 1) Preliminary estimated length and width of bridges by JICA Study Team

Deleted bridge sites of the Project

	Bridge No.	Province	Name of Bridge	Road Classification	Design Length * 1)	Design Width	Area (SQ.M)
1	2	Ha Tay	Chua Ngoi	District	36	10.5	378
2	14	Bac Thai	Phu Son 4	District	40	4	160
3	32	Ha Giang	Thac Ve	District	55	6	330
4	37	Lai Chau	Pa Mo	Provincal	80	9	720
5	38		Nam Bun	Provincal	70	9	630

* 1) Proposed length and width of bridges

Annex-3 List of bridge site to be conducted F/S by the Viet Nam Government

	Bridge No.	Province	Name of Bridge	Road Classification	* 1) Pro. Length	Pro. Width	Area (SQ.M)	* 2) Design Length	Design Width	Area	Preliminary Evaluation	2nd Survey Evaluation	Bridge	S. Girder	Pending (SQ.M)
1	1	Ha Tay	Duc Khe	Provincial	60	6.5	390	70	7	490	Bridge	Bridge	490		
2	3		Chuoc	District	50	6.5	325	50	5.5	275	Bridge	Bridge	275		
3	4	Ha Bac	Dong Vuong	District	56	5.5	308	50	5.5	275	S. Girder	S. Girder		275	
4	5		Dong Dinh	Community	50	4	200	60	5.5	330	Bridge	Bridge	330		
5	6	Hai Hung	Tu O	District	40	5	200	60	5.5	330	Bridge	Bridge	330		
6	7		Do Day	District	120	8	960	120	5.5	660	Pending ?	S. Girder		660	
7	8		Hau	District	80	5	400	60	5.5	330	Bridge	Bridge	330		
8	9	Hoa Binh	Ben	District	48	4.5	216	35	4.5	157.5	Bridge	Bridge	157.5		
9	10		Tinh	District	24	4.5	108	25	4.5	112.5	S. Girder	S. Girder		112.5	
10	11		Lac	District	24	4.5	108	25	4.5	112.5	Bridge	Bridge	112.5		
11	12		Vu Ban	Provincial	120	7	840	100	7	700	Bridge	Bridge	700		
12	13	Bac Thai	Ky Phu	District	21	5	105	25	4.5	112.5	Bridge	Bridge	112.5		
13	15	Vinh Phu	Luong Nha	District	70	6	420	45	4.5	202.5	Bridge	Bridge	202.5		
14	16		Suong	Provincial	73	6	438	70	5.5	385	Bridge	Bridge	385		
15	17	Ninh Binh	Yen Tho	Community	34	8.5	289	35	4.5	157.5	Bridge	Bridge	157.5		
16	18		Hoanh Truc	District	36	9	324	45	4.5	202.5	Bridge	Bridge	202.5		
17	19		Thong Nhat	District	30	9	270	30	7	210	Deleted	S. Girder		210	
18	20	Thai Binh	Dong Quach	District	80	9	720	75	7	525	Bridge	Bridge	525		
19	21	Lang Son	Dong Mo	District	60	9	540	60	5.5	330	S. Girder	S. Girder		330	
20	22		Nao Hoa	District	120	10	1200	80	7	560	Bridge	Bridge	560		
21	23	Tuyen Quang	Quang	Provincial	81	6	486	75	5.5	412.5	Bridge	Bridge	412.5		
22	24		Yen Hoa	District	35	4	140	35	4.5	157.5	Bridge	Bridge	157.5		
23	25	Yen Bai	Lanh	District	15	4	60	25	4.5	112.5	S. Girder	S. Girder		112.5	
24	26		Vai	Provincial	20	4	80	25	5.5	137.5	S. Girder	S. Girder		137.5	
25	27	Cao Bang	Pho Tra Linh	District	24	8	192	30	7	210	Bridge	Bridge	210		
26	28		Mo Sat	Provincial	60	6	360	80	5.5	440	Pending ?	S. Girder		440	
27	29	Son La	Ban Ai	Provincial	33	10	330	15	5.5	82.5	S. Girder	S. Girder		82.5	
28	30		Ban Hinh	Provincial	33	10	330	15	5.5	82.5	S. Girder	S. Girder		82.5	
29	31		Tong Panh	District	36	6	216	30	4.5	135	Bridge	Bridge	135		
30	33	Ha Giang	Khuoi Nieng	District	40	6	240	40	4.5	180	Bridge	Bridge	180		
31	34		Khuoi Kieng	District	36	6	216	35	4.5	157.5	Bridge	Bridge	157.5		
32	35	Lao Cai	Ban Vuoc	District	52	9	468	45	5.5	247.5	S. Girder	S. Girder		247.5	
33	36		Khe chan	District	110	9	990	120	5.5	660	Pending ?	S. Girder		660	
				Total	1771		12469	1690		9472.5			6122.5	3350	0

* 1) Proposed length and width of bridges by MOT

* 2) Preliminary estimated length and width of bridges by JICA Study Team

Annex-4 JAPAN'S GRANT AID PROGRAMME

1. Japan's Grant Aid System

(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 the third country.

However the prime contractors namely consulting, constructing and procurement firms, are limited to "Japanese nationals". (the team "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 designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

(6) Undertakings required of the Government of the Recipient Country

In the implementation of the Grant Aid project, the recipient countryis 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 usethe 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.

2. 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 Programme,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.

Annex-5 NECESSARY MEASURES TO BE TAKEN BY THE VIET NAM SIDE

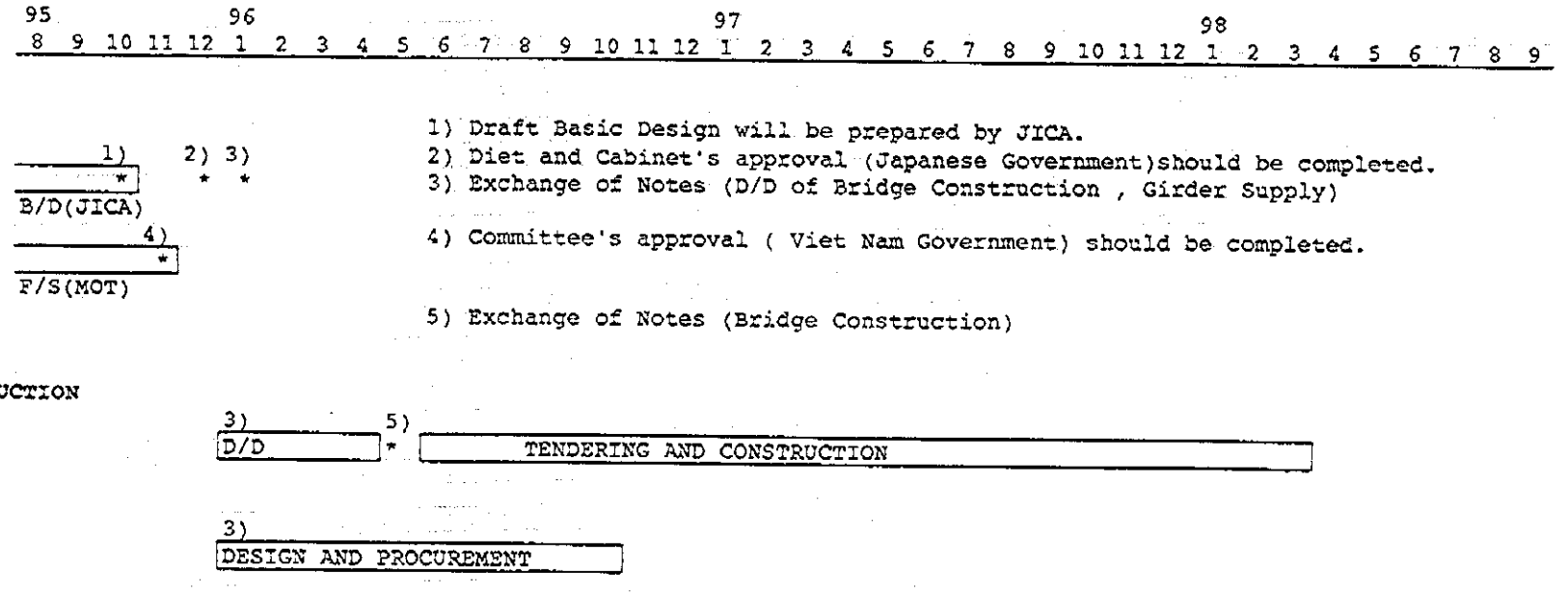
Following necessary measures should be taken by the Viet Nam side on condition that the Grant Aid by the Government of Japan is extended to the Project:

1. To provide data and information necessary for the Project.
2. To secure the land necessary for the excursion of the Project, such as the land for bridges, temporary offices, working areas, storage yards and others.
3. To clear the sites prior to the commencement of the construction.
4. To make passable all roads and bridges leading to the Project sites before the commencement of inland transportation of materials and equipment.
5. To demolish existing bridges according to the construction schedule which will be provided in the later stage.
6. To bear commissions to the Japanese foreign exchange bank for its banking services based upon the Banking Arrangement, namely the advising commission of the "Authorization to Pay" and payment commission.
7. To ensure prompt unloading, tax exemption, customs clearance at the port of disembarkation in the Socialist Republic of Viet Nam and prompt internal transportation therein of the materials and equipment for the Project purchased under the Grant Aid.
8. To exempt Japanese juridical and physical nationals engaged in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in the Socialist Republic of Viet Nam with respect to the supply of the products and services under the verified contracts.
9. To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the Socialist Republic of Viet Nam and stay therein for the performance of their work.
10. To provide necessary permissions, licenses and other authorizations for implementing the Project, if necessary.
11. To maintain and use properly and effectively the facilities constructed under the Project.
12. To coordinate and solve any issues related to the project which may be raised from third parties or inhabitants in the Project area during implementation of the Project.

Annex-6

The Basic Design Study on the Project for
Reconstruction of Bridges in the Northern District

Implementation Schedule



1) Draft Basic Design will be prepared by JICA.
2) Diet and Cabinet's approval (Japanese Government)should be completed.
3) Exchange of Notes (D/D of Bridge Construction , Girder Supply)
4) Committee's approval (Viet Nam Government) should be completed.
5) Exchange of Notes (Bridge Construction)