Appendix 5

DETAILED DESIGN

5.1 The Replies to the Comments on the Minutes of Meeting on 7 August 2000 in Hanoi, 6 September 2000

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Total 44 pages

Your ref. FCOKO-3 Our ref. Date 6th September, 2000

Subject: THE REPLYS TO THE COMMENTS ON THE MINUTES OF MEETING ON 7 AUGUST 2000 IN HANOI

Dear Sir,

As informed on 25 August, the JICA Study Team submits the rest of the replies to the comments on the Minutes of Meeting on 7 August 2000 in Hanoi.

Best Regards,

中井浩二

Koji Nakai

Co Team Leader

JICA Study Team

D/D of the Can Tho Bridge

c.c. - Mr. Takao Kaibara, JICA Tokyo
- Mr. Yuichi Sugano, JICA Vietnam Office
- Mr. Tsuyoshi Matsumoto, JICA Quality Control Committee
- Mr. Hideo Ezaki, JBIC Tokyo
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THE REPLYS TO THE COMMENTS ON THE MINUTES OF MEETING ON 7 AUGUST 2000 IN HANOI

4th September, 2000

Referring to the comments on the Minutes of Meeting on 7 August 2000 in Hanoi, the JICA Study Team prepared the replies as shown in the following.

1. Design of Road Surface Pavement (Item Number 2.1 of Minutes)

The comments described on the Minutes of Meetings for this item are as shown in the following;

- To adopt the AASHTO's design method for the road surface pavement design based on CBR-Value was agreed. However, the JICA Study Team shall examine the design results by Elastic Modulus Method, and provide the result of examination.

To estimate the Elastic Modulus that is the strength properties of the subgrade, the data derived from the following experimentation is required.

- CBR-Test (California Bearing Test)
- California Resistance Test
- Triaxial Compression Test
- Deflection Measurement Test (Benkelman beam Deflection Measurement, etc)
- Plate Bearing Test
- Resilient Test (defined in AASHTO Standard)

In the detailed design stage of this project, only the "CBR-Test" was conducted.

In case that the Multi-Layer Elastic Modulus method is examined, the Elastic Modulus must be converted from the data of CBR-Value in this stage. It means that the Elastic Modulus Method will be based on the same basis with the AASHTO's design method examined by the Study Team.

Moreover, the Mechanistic-Empirical Design Method defined on "AASHTO Guide for Design of Pavement Structures" applied for this project is one of the empirical method, and the Multi-Layer Elastic Modulus method is the accurate method based on the data derived from the experimentation. However, the Multi-Layer Elastic Modulus method is internationally applied for pavement under the specific conditions like airfield of the airport, or roads where the heavy specific vehicles pass, and it is not applied for the common roads.

With considering the above design conditions, the Study Team suggests that the AASHTO's design method examined by the Study Team also covers the Elastic Modulus Method, for this project.

2. Standard for the Design of the Weak Soil (Item Number 2.2 of Minutes)

The Study Team is still translating the Vietnamese Standards provided by Dost. Because of the volume and technical contents of these standards, the translation takes some more weeks. After the translation is finished, immediately the examination with these standards will be conducted, and the results will be reported to JICA and MOT.

3. Design Standard (Design Live Load) for the Large Span Bridge (Item Number 2.2 of Minutes)

The applied Design Live Load for the Project was B-type Live Load defined on "Standard Specification of Highway Bridge (Japan Road Association)".

The Study Team collected the data of Live Loads for the longer span bridges (more than 150m) in the world, as shown on the following figure:

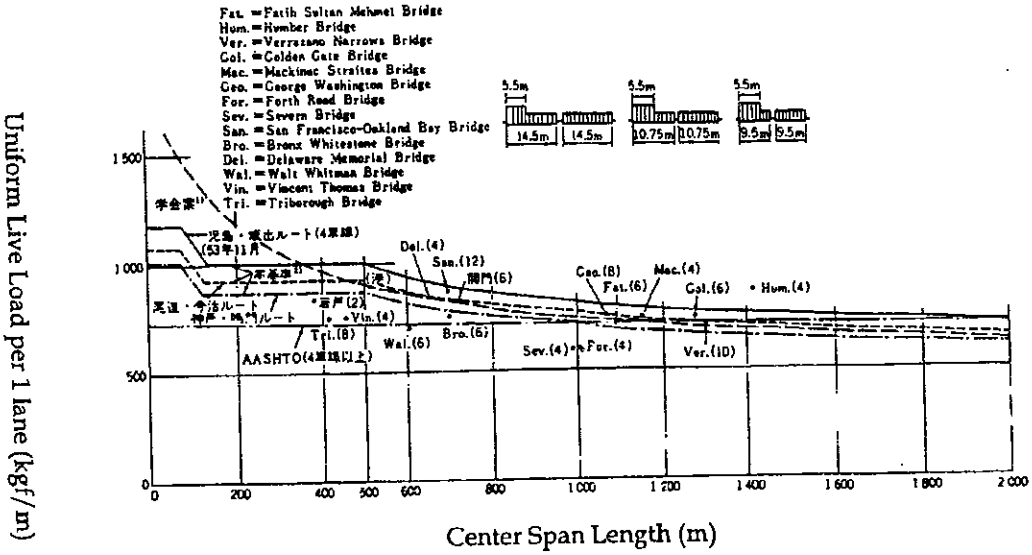


Figure 1. Comparison of the Design Live Load

The loads shown with "Line" on Figure 1 are mainly the Design Live Loads applied for the longer bridges of "Honshu - Shikoku Bridge Authority, Japan", and the Japanese B-type Live Load is also included in them.

Moreover, the loads shown with "Point" are mainly the Design Live Loads applied for the individual international longer bridge.

As shown on Figure 1, there are not so much difference between the "Line" Loads and the "Point" Loads. Based on this condition, the Japanese B-type Live Load can be suitable and reasonable.

4. International Standards related to the Design (Item Number 2.4 of Minutes)

The following International Standards are applied or referred to the Design of this project.

(1) Highway Design

Standard	Application	Remarks
- Highway - Specification for Design, TCVN 4054-1998 (Ministry of Transport, Vietnam)	- Geometric Design of Throughway	
- Freeway - Requirement for Design, TCVN5729-1997 (Ministry of Transport, Vietnam)	- Geometric Design of Rampway	
- Design of Standard Drainage Outside System and Works, 20TCN-51-1984	- Drainage of Service Area	
- A Policy on Geometric Design of Highways and Streets, 1994 (American Association of State Highway and Transportation Officials, USA)	- Geometric Design	
- Description and Application for Road Structure Ordinance (Japan Road Association)	- Highway Design general - Design of Service Area	- Japanese Edition, only
- Design of Standard Soft Ground Countermeasure (Japan Road Association)	- Soft Ground Treatment	- Japanese Edition, only

(2) Structure Design

Standard	Application	Remarks
- Highway Design Standards TCVN 4054-1998 (Ministry of Transport, Vietnam)	- Design of Minor Structures of Package-1&3	
- Specification for Bridge Structures 2057/QD-KT4-1979 (Ministry of Transport, Vietnam)	- ditto	
- Design Specification for Highway Bridge and Culvert, 22TCN18-79 (Ministry of Transport, Vietnam)	- ditto	
- Standard Specification of Highway Bridge (Japan Road Association)	- Structural Design, general	- Japanese Edition, only
- AASHTO LRFD BRIDGE DESIGN SPECIFICATION, SI Units Second Edition 1998 (American Association of State Highway and Transportation Officials)	- Structural Design	
- Wind-proof Design Standards 1976 (Japan Road Association)	- Design of Cable Stayed Bridge	- Japanese Edition, only

(3) Cost Estimation

Standard	Application	Remarks
- Decree 25/CP and 26/CP dated May 23rd 1993 of Government concerning the new wage policy.	- Local Labor Cost	
- Labor law of the Socialist Republic of Vietnam dated June 23rd 1994.	ditto	
- Decree 197/CP dated December 31st 1994 of Government concerning the wage for the Vietnamese labor working for Enterprise finance by foreign funding.	ditto	
- Guideline to tabulate "General cost estimate" No 08/1999/TT-BXD dated November 16th 1999.	ditto	
- Circular 07/LDTBXH-TT dated April 11th 1995 Guide to implementation the Articles Labor Law's dated June 23rd 1994 and Decree 195/CP December 31st 1994 of Government about Working time and Rest time.	ditto	
- Circular 11/LDTBXH -TT on May 3rd 1995 of Ministry Labor & War Invalid Social Affairs to guide the implementation of the Decree 197/CP of Government.	ditto	
- Circular 39TC/TCT on June 26th 1997 of Finance Ministry guide to implement the Decree05/CP dated January 1st 1995 and Decree 30/CP dated April 5th 1997 of the Government about Income Tax.	ditto	
- Decree 708/LDTBXH- QD dated June 15th 1999 of the Ministry labor &War Invalid Social Affairs about the minimum wage level for the Vietnamese Labor working for Enterprise finance by foreign funding.	ditto	
- Circular 19/LDTBXH-TT dated June 2nd 1993 Guide to implemented the regulation subsidy mobile allowance.	ditto	
- 1260/1998/QN-BXD	- Local Equipment Cost	
- Estimate Standard for Civil Work of Ministry of Construction, Japan 1999	- Method of Cost Estimate	- Japanese Edition, only
- Calculation Table for Depression of Civil Work Equipment in Japan 1999	- Method of Estimate of Equipment Operation	- Japanese Edition, only
- Price List for Construction in Japan July 1999	- Price of Imported Material	- Japanese Edition, only

5. Wind Load (Item Number 2.5 of Minutes)

The static wind data based on the collected wind records for Can Tho Bridge and My Thuan Bridge were shown in the following;

Return Period: 50 years

Static Method: Gringorten Method for Can Tho Bridge

Static Velocity	V10 (m/sec)			Vg(m/sec)		
Z (m)	10.0	40.0	100.0	10.0	40.0	100.0
Can Tho Bridge	31.3	38.8	44.8	43.8	49.7	52.8
My Thuan Bridge	26.0	32.0	38.0	41.0	48.0	53.0

* Note: V10: Average wind velocity per 10 minutes Vg: Wind velocity considering the Gust

Z : Height from ground level

- Wind records utilized for the static analysis of the Can Tho Bridge were procured from Can Tho Station.
- Static Data of My Thuan Bridge were quoted from the Design Report of My Thuan Bridge Project

As shown in the above table, the static wind velocities of Can Tho Bridge and My Thuan Bridge are almost similar.

The design wind velocity applied for these bridges is as follows:

Can Tho Bridge: 44.4m/sec (= 100mile/sec, at 10m height from ground level)

In conclusion, there are no difference between the two bridges about the static wind velocities and design wind load.

6. **Earthquake Effect (Item Number 2.6 of Minutes)**

The Institute of Geophysics suggested that the earthquake effect (ground acceleration) should be between 0.07g and 0.12g. The design seismic coefficient should be based on the further study on the seismic intensity of 1,000 year (0.07g for the Project Area) and the consideration on geotechnical condition and the importance of the structure.

Following the above suggestions, the JICA Study Team calculated the elastic seismic response coefficient with the above ground acceleration in accordance with AASHTO Specifications with a soil magnification factor. The calculated design seismic coefficient in accordance with AASHTO Specifications was shown in the following:

Reference: AASHTO LRFD BRIDGE DESIGN SPECIFICATION, SI Units Second Edition 1998 (hereinafter, AASHTO LRFD), Section 3 - Loads and Load Factors, 3.10 EARTHQUAKE EFFECTS: EQ

(1) Categorization

The bridge structures of this project were categorized into the following 3 categories to study the seismic coefficient based on AASHTO LRFD;

Structure and Package		Type of Structure
1) Main Bridge	Package-2	Hybrid Cable Stayed Bridge
2) Approach Span Bridges	Package-2	PC I beam & PC Box Girder
3) Minor Bridges	Package-1&3	PC I beam, PC Box Girder, PRC Hollow Slab

(2) Formula (AASHTO LRFD, Section 3.10.6)

Period of Vibration (sec)	Formula
$T_m > 4.0$	$C_{sm}=3AS / T_m^{4/3}$
$0.3 < T_m < 4.0$	$C_{sm}=1.2AS / T_m^{2/3} \leqq 2.5A$
$T_m < 0.3$	$C_{sm}=A(0.8+4.0 T_m)$

* Notes: C_{sm}: Elastic Seismic Response Coefficient
T_m: Period of Vibration of the m^{th} mode (sec)
A: Acceleration Coefficient
S: Site Coefficient

(3) Acceleration Coefficient, A (AASHTO LRFD, Section 3.10.2)

On AASHTO LRFD, the acceleration coefficient was defined on the contour map, only for United States of America. In this project, with considering this contour map, this coefficient was defined with considering the return-period of earthquake and the importance of structures as follows:

Structure and Package		A	Evaluation
1) Main Bridge	Package-2	0.12	Importance: Very High Return Period: 1000 years
2) Approach Span Bridges	Package-2	0.06	Importance: High Return Period: 1000years
3) Minor Bridges	Package-1&3	0.05	Importance: Medium Return Period: 500 years

(4) Site Effects, S (AASHTO LRFD, Section 3.10.5)

In AASHTO LRFD, the soil property of site was considered in the "Elastic Seismic Response Coefficient" as the "Site Effects", as follows;

Site Coefficient	Soil Profile Type			
	I	II	III	IV
S	1.0	1.2	1.5	2.0

- Soil Property Type I: Rock of any description, either shale-like or crystalline in nature or
  Stiff soils where the soil depth is less than 60,000mm, and the soil types overlying the rock are stable deposits of sands, gravels, or still clays.

- Soil Property Type II: A profile with stiff cohesive or deep cohesionless soils where the soil depth exceeds 60,000mm and the soil types overlying the rock are stable deposits of sands, gravels, or stiff clays

- Soil Property Type III: A profile with soft to medium-stiff clays and sands, characterized by 9,000mm or more of soft to medium-stiff clays with or without intervening layers of sand or other cohesionless soils

- Soil Property Type IV: A profile with soft clays or silts greater than 12,000mm in depth

In this project, whole of structures are categorized into "Soil Property Type IV", and the Site Effect, S was decided as "2.0".

(5) Period of Vibration, T_m

The period of vibrations of the three categories are summarized as follows:

Structure and Package		T_m (sec)
1) Main Bridge (Hybrid Cable Stayed Bridge) * Refer to Appendix-1	Package-2	1st Mode: 6.78 2nd Mode: 5.47 3rd Mode: 4.00
2) Approach Span Bridges (PC I beam & PC Box Girder)	Package-2	0.5 sec ~ 1.5 sec, approximately
3) Minor Bridges (PC I beam, PC Box Girder, & PRC Hollow Slab)	Package-1&3	1.0 sec, approximately for whole bridges

For 1) Main Bridge, the 3rd Mode was regarded as the critical mode for the structure analysis. The summary of dynamic analysis was shown on Appendix - 1.

(6) Elastic Seismic Response Coefficient, C_{sm} (AASHTO LRFD, Section 3.10.6)

Based on the above conditions, the Elastic Seismic Response Coefficients were calculated as follows:

Structure	T_m (sec)	Formula	A	S	C_{sm}
1) Main Bridge	4.0	$C_{sm}=3AS / T_m^{4/3}$	0.12	2.0	0.113
2) Approach Bridges	0.5	$C_{sm}=1.2AS / T_m^{2/3} \leqq 2.5A$	0.06	2.0	0.150
	1.0	$C_{sm}=1.2AS / T_m^{2/3} \leqq 2.5A$	0.06	2.0	0.144
	1.5	$C_{sm}=1.2AS / T_m^{2/3} \leqq 2.5A$	0.06	2.0	0.110
3) Minor Bridges	1.0	$C_{sm}=1.2AS / T_m^{2/3} \leqq 2.5A$	0.05	2.0	0.120

(7) Elastic Seismic Response Coefficient applied for Design

With considering the calculated C_{sm} and the suggestion of the institute of Geophysics, the following conclusion was derived for the design:

1) Main Bridge

The estimated C_{sm} based on AASHTO LRFD was 0.113.

In the application of seismic forces defined in AASHTO LRFD, Section 3.10.8, the combination of seismic force effects is to be examined, for the longitudinal and transverse directions. It means that the 100% of longitudinal seismic force and 30% of transverse seismic force should be examined in the design analysis at the same time.

In this project, to simplify the design analysis, the seismic forces in longitudinal and transverse directions are separately examined, with applying the Japanese Standards.

With considering the above situations, 0.12 was selected for the design of the Main Bridge.

2) Approach and Minor Bridges

The estimated C_{sm} based on AASHTO LRFD was 0.110 to 0.150.

Same as the Main Bridge, the seismic forces in longitudinal and transverse directions are separately examined. Moreover, the maximum value of seismic coefficient suggested by the Institute of Geophysics was 0.12.

With considering the above situations, 0.12 was selected for the design of these bridges.

7. Shipping Collision Force (Item Number 2.7 of Minutes)

Because of the absence of actual accident data as explained in the Meeting, the Study Team defined the design vessel collision force with utilizing the actual arrival ship record to the Can Tho Port.

8. Temperature Effect (Item Number 2.8 of Minutes)

The Study Team analyzed the collected data to define the design temperature with 30 or 40 years return periods.

The results are shown in the following, and the details of static analysis of temperatures are summarized in "Appendix-2".

Static Method: Iwai Method (Japanese)

< Records or Analyzed Temperatures >

	Design Criteria	For 30 years return period	For 40 years return period	For 100 years return period
- Maximum	36.7 °C	37.3 °C	37.4 °C	37.8 °C
- Minimum	17.7 °C	17.0 °C	16.9 °C	16.6 °C
- Range	19.0 °C	20.3 °C	20.5 °C	21.2 °C
- Average	26.7 °C	26.7 °C	26.7 °C	26.7 °C
Design Thermal Effect	+ 10 °C ~ - 10 °C	+ 10.6 °C ~ - 9.7 °C	+ 10.7 °C ~ - 9.8 °C	+ 11.1 °C ~~ - 10.1 °C

* Note: ● Temperature Data utilized for the static analysis were procured from Can Tho Station

As the feature of the climate of tropical regions, there is not much difference in the yearly range of the temperature. Moreover, the average monthly temperatures are also not different much.

Considering the above results, the design conditions of the structures are not to be changed, namely, the design thermal effect is decided as "+ 10 °C ~ - 10 °C".

9. Riverbed Scouring (Item Number 2.9 of Minutes)

The design conditions of riverbed scouring are summarized in "Item 13. Design of Tower Foundation of the Main Bridge", with considering the other effects for design. Please refer to Item 13.

10. Submission of the Final Structural Data (Item Number 3.1 of Minutes)

The Study Team already prepared and sent the required Final Structural Data of Cable Stayed Bridge, separately from the items explained on this reply letter.

Referring to the letter from My Thuan PMU to JICA Study Team (No. 1172/PBCT on 9th August 2000), and the letter from Proof Checking Consultant to My Thuan PMU (No. 1004/VPDA on 8th August 2000), the JICA Study Team was required again to submit the additional calculation data to My Thuan PMU.

On 24/08/2000, the first part of data was submitted to TCQM and My Thuan PMU of MOT. The contents of the data were as shown below:

1. Summary of Sectional Forces of Girder & Tensile Force of Stay Cable
2. Summary of Sectional Analysis of PC Girder
3. Summary of Sectional Analysis of Pylon

Moreover, the Summary of Stability and Sectional Analysis of Piles for Pylons is submitted to TCQM and My Thuan PMU, this time. The "Appendix-3" is the corresponding document.

These submitted data will be taken into a part of the Final Design Report of Package-2, Main and Approach Span Bridges.

11. Span Length Arrangement and Foundation Pile for the Bridges (Item Number 3.2 of Minutes)

11.1 Summary of Revision

The following table shows the summary of modifications for the bridges in the approach roads (Package-1 & 3). Moreover, the General Views of the revised bridges are shown on the Appendix-4:

(1) Package-1 (Approach Road on Vinh Long side)

Bridge	Modification		
- Large Tra Va	- Span Length Arrangement		
	(Original)	PC I beam:	4@31 = 124m
		PC Box Girder:	56+80+56 = 192m
		Total Length:	316m
	(Modified)	PC I beam:	4@35+4@35 = 280m
- Tra On	- Span Length Arrangement		
	(Original)	PC I beam:	1@31 = 31m
		PC Box Girder:	56+80+56= 192m
		PC I beam:	1@31 = 31m
		Total Length:	254m
	(Modified)	PC I beam:	2@36=72m
		PC Box Girder:	36.5+57.0+36.5=130m
		PC I beam:	2@29=58m
		Total Length:	260m

(2) Package-3 (Approach Road on Can Tho side)

Bridge	Modification
- Ba Mang	- Pile Foundation The types of piles are changed from bore-hole pile to driven pile, and the penetration depths were shortened with considering the geotechnical conditions. - Type of Superstructure * The connection between spans were removed, and changed to the simple spans.
- Cai Nai	- Pile Foundation The types of piles are changed from bore-hole pile to driven pile, and the penetration depths were shortened with considering the geotechnical conditions. - Type of Superstructure * The connection between spans were removed, and changed to the simple spans.
- Ap My	- Pile Foundation The types of piles are changed from bore-hole pile to driven pile, and the penetration depths were shortened with considering the geotechnical conditions. - Type of Superstructure * The connection between spans were removed, and changed to the simple spans.
- Cai Rang	- Pile Foundation The types of piles of the substructures supporting PC I beams (A1, A2, P5) are changed from bore-hole pile to driven pile, and the penetration depth were shortened with considering the geotechnical conditions. - Type of Superstructure * The connection between spans were removed, and changed to the simple spans.
- NH No.91B Interchange Ramp Way Bridge	- Pile Foundation The types of piles are changed from bore-hole pile to driven pile, and the penetration depths were shortened with considering the geotechnical conditions. - Type of Superstructure * The connection between spans were removed, and changed to the simple spans.

11.2 Policy of Revision

(1) Span Length Arrangement for the Approach Roads

The navigational clearances were reviewed, and the span lengths for two bridges were reduced with considering the requirement. The comparison tables for these bridges are summarized in "Appendix-5".

(2) Foundation Pile for the Approach Span and Approach Road Bridges

The geotechnical conditions were reviewed. The summary of soil properties is shown in the "Appendix-6".

In the Draft Final Report, the Layer and the Layers, "St/C1" or "S1" were regarded as the bearing stratum, and in the revision, the Clay Layer "C2" was regarded as the bearing stratum for some types of Minor Bridges at some locations.

The types of pile foundations were selected with considering the following items:

- Location & Soil Properties of C2 Layer

  At the each location of minor bridge, the depth and soil properties of C2 Layer were reviewed. With considering the available construction depth of driven piles (approximately, 40m), the bridges with the following conditions were reviewed;

  - The depth of the C2 Layer is less than 35m from the existing ground level.
  - The design N value of C2 Layer is more than "20". (Based on the Standard Specification of Highway Bridge, Japan Road Association)

- Type of Superstructure

  The driven piles were only applied for the substructures supporting the simple span portions of PC I beam.

  In case that the C2 Layer is regarded as the bearing stratum, the differential settlements of substructures will be happened. To prevent the effects caused by these settlements for the superstructures, the continuous spans of superstructures will not be adopted.

  The PC I beam can be the simple span, however the PC Box Girder and PRC Hollow Slab can not be the simple span because of their design and construction features.

Moreover, in the Final Report that will be submitted on October 2000, the all revised results will be referred to the cost estimation and other related fields.

12. Safety Factors to Structural Design (Item, Number 3.3 of Minutes)

The Load Modifier, defined in AASHTO LRFD, section 1.3.2 was studied as follows:

$\Sigma\eta_i\gamma_i Q_i \quad \varphi R_n = R_r$ (1.3.2.1-1 of AASHTO LRFD)

for which:

For loads for which a maximum value of γ_i is appropriate:

$\eta_i=\eta_D\eta_R\eta_I \quad 0.95$ (1.3.2.1-2 of AASHTO LRFD)

For loads for which a minimum value of γ_i is appropriate:

$\eta_i = 1/(\eta_D \eta_R \eta_I) \geq 1.0$ (1.3.2.1-3 of AASHTO LRFD)

where:

γ_i = Load factor: a statistically based multiplier applied to force effects

φ = Resistance factor: a statistically based multiplier applied to nominal resistance

η_i = Load modifier: a factor relating to ductility, redundancy, and operational importance

η_D = a factor relating to ductility

η_R = a factor relating to redundancy

η_I = a factor relating to operational importance

(1) Ductility, η_D (AASHTO LRFD, Section 1.3.3)

The structure system of the Main Bridge was planned and designed to avoid the concentration of the load effects into the limited portion, and as indicated in AASHTO LRFD, the Energy-dissipating devices (elastic bearings, etc.) were also planned and designed. These measures enhance the ductility of the structure system. With this reason, 1.00 was applied for this factor.

(2) Redundancy, η_R (AASHTO LRFD, Section 1.3.4)

In AASHTO LRFD, the boundaries of the above categories are not clearly described. Moreover, in the design of this project, the past records of the same types of bridges were reviewed and studied enough. The structure system is not conventional, but the design procedures and results are confidential for the redundancy. 1.00 was applied for this factor.

(3) Operational Importance, η_I (AASHSTO LRFD, Section 1.3.5)

The importance of Main Bridge was already considered in the other design conditions with referring to the Japanese Standards. Moreover, commonly 1.00 is applied for the similar factor defined in Japanese Standards even for the large span bridges. With considering the above reasons, 1.00 was applied for this factor.

As the conclusion, the Load modifier "η_i" was estimated as 1.00.

13. Design of Tower Foundation of the Main Bridge (Item Number 3.4 of Minutes)

With considering the suggestion from Vietnamese side, the simultaneous combination of earthquake effect, general and local riverbed scouring are under examination for the whole structural system.

The explanation of the above examination will be sent until the middle of September

14. **Flood Flow Direction and Skew of Tributaries for the Bridge Design (Item Number 3.5 of Minutes)**

As explained in the Meeting, the JICA Study Team's opinions were that the direction of the bridge including the substructures should be along with the direction of the flood water (parallel with the flow direction of the Hau River), and keeping right angle for the bridge to the centerline alignment of the Project from the following reasons:

- Flood water flow in parallel with the direction of the Hau River.
- The bridge structures with skew angle will disturb the water flow under the bridges.
- Rotation of the bridge abutments will occur due to imbalance of soil pressure from the road embankment on the weak soil.
- Cost will be increased due to the structural reinforcement for the characteristic of skewed structures.
- Complicated structures will be required due to the sharp skew angle.

However, the further survey in the field to examine the flow directions for the study on the skew angle of the bridge should be conducted in the initial stage of the implementation, and reconsider the skew angle of the bridge, if necessary.

15. **Review the Control of Road Profile (Item Number 3.6 of Minutes)**

As explained in the Meeting, the Study Team suggested the thickness of cover on the culverts was indispensable to reduce the cracks which might be occurred by the impact force of vehicle's wheels due to the uneven hardness at the culvert edge and to maintain more smooth vehicle traffic. Therefore, the profile design in the Draft Final Report is regarded as suitable.

16. **Discussion on the Cost (Item Number 4 of Minutes)**

The Study Team already submitted the required latest cost estimate to TCQM on 18th August 2000.

The further discussion and the data - transfer for Cost Estimate is being proceeded separately from the items explained in this letter because of the importance.

17. Submission of Final Report

After receiving of the final official comments on technical and cost estimate from Government of Viet Nam on the Draft Final Report and Draft Tender Documents by 15th September 2000, the Study Team will finalize the Final Report.

The Final Report will be submitted punctually in accordance with the Minutes of Meeting signed on 7th August 2000.

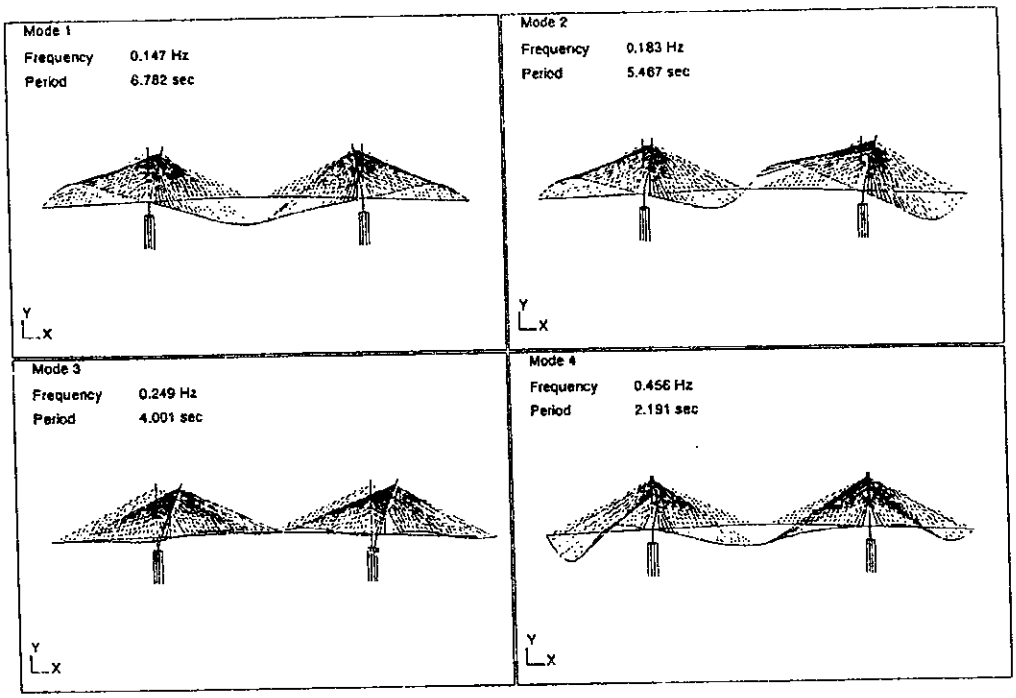
18. Appendix

Appendix-1:	Summary of Dynamic Analysis of Main Bridge for the estimation of the Period of Vibration	A4, 1 sheets
Appendix-2:	Static Analysis of Temperatures	A4, 5 sheets
Appendix-3:	Summary of Stability and Sectional Analysis of Piles for Pylons	A4, 12 sheets
Appendix-4:	General View of the Revised Bridges of Approach Roads (Package-1 & 3)	A4, 6 sheets
Appendix-5:	Comparison of the Span Arrangements	A4, 2 sheets
Appendix-6:	Compositions and Properties of Soil Layers for Design	A4, 2 sheets

Appendix - 1

Summary of Dynamic Analysis of Main Bridge for the estimation of the Period of Vibration

1. Figures of Vibration Modes



2. Period of Vibration

MODE	CIRC. FRQ (RAD/SEC)	FREQUENCY (1/SEC)	PERIOD (SEC)		X	Y
1	0.9264	0.1475	6.7821	P.F	11.87000	30.50900
				PF*S	-0.10871	-0.27939
				E.M	140.91000	930.78000
				EMR	0.00100	0.00400
2	1.1493	0.1829	5.4668	P.F	13.59300	-6.73650
				PF*S	-0.10748	0.05327
				E.M	184.77000	45.38000
				EMR	0.00100	0.00000
3	1.5137	0.2499	4.0009	P.F	283.92000	-1.82550
				PF*S	1.53010	-0.00984
				E.M	80610.00000	3.33240
				EMR	0.31700	0.00000
4	2.8673	0.4563	2.1914	P.F	5.40850	-131.70000
				PF*S	-0.06475	1.57660
				E.M	29.25200	17344.00000
				EMR	0.00000	0.06800

Appendix-2 Static Analysis of Temperatures

Study of Maximum Temperature

Forecast by IWAI Method

Propability calculation

Ranking n	Temperature : ti (deg)	Fn(%) 1-n/(N+1)	$Log_{10}vi$	ti+b	Yi Log(ti+b)	Yi^2
(1)	(36.7)	-	-	-	-	-
1	36.2	94.12	1.55870	29.8	1.47420	2.17327
2	36.1	88.24	1.55750	29.7	1.47280	2.16914
3	35.9	82.35	1.55510	29.5	1.46980	2.16031
4	35.6	76.47	1.55140	29.2	1.46540	2.14740
5	35.5	70.59	1.55020	29.1	1.46390	2.14300
6	35.4	64.71	1.54900	29.0	1.46240	2.13861
7	35.4	58.82	1.54900	29.0	1.46240	2.13861
8	35.3	52.94	1.54780	28.9	1.46090	2.13423
9	35.1	47.06	1.54530	28.7	1.45790	2.12547
10	35.1	41.18	1.54530	28.7	1.45790	2.12547
11	35.1	35.29	1.54530	28.7	1.45790	2.12547
12	35.0	29.41	1.54410	28.6	1.45640	2.12110
13	34.9	23.53	1.54280	28.5	1.45480	2.11644
14	34.8	17.65	1.54160	28.4	1.45330	2.11208
15	34.8	11.77	1.54160	28.4	1.45330	2.11208
16	34.7	5.88	1.54030	28.3	1.45180	2.10772
Total	564.9		24.7650		23.37510	34.15042
Average	35.3		1.54800		1.46090	2.13400

Calculation of Parameter b

	tt	ts	tt*ts	$tt*ts-to^2$	ts+tt	2ts-(ts+tt)	bs
1	36.2	34.7	1256.1	8.8	70.9	-1.5	-5.9
2	36.1	34.8	1256.3	8.9	70.9	-1.3	-6.8
						b=	-6.4

Standard Deviation according to Iwai method ; Sx

$Sx = (\Sigma Yi^2/N - (\Sigma Yi/N)^2)^{1/2}$

$= 0.0151$

Estimation of Parameter 1/a

$1/a = (2N/(N-1))^{1/2} \times Sx$

$= 0.0221$

Estimation of Maximum Temperature

Return Period (year)	ε	ε /a	Yi+ ε /a	t+b	t (deg)
100	1.645	0.0364	1.4973	31.43	37.8
40	1.386	0.0306	1.4915	31.01	37.4
30	1.297	0.0287	1.4896	30.87	37.3

$\varepsilon = c \log [(x+b)/(x_0+b)]$

Appendix-2 Static Analysis of Temperatures

Study of Minimum Temperature

Forecast by IWAI Method

Propability calculation

Ranking n	Temperature : ti (deg)	Fn(%) 1−n/(N+1)	$Log_{10}vi$	ti+b	Yi Log(ti+b)	Yi^2
1	17.7	94.44	1.24800	13.3	1.12390	1.26315
2	17.8	88.89	1.25040	13.4	1.12710	1.27035
3	18.0	83.33	1.25530	13.6	1.13350	1.28482
4	18.1	77.78	1.25770	13.7	1.13670	1.29209
5	18.1	72.22	1.25770	13.7	1.13670	1.29209
6	18.1	66.67	1.25770	13.7	1.13670	1.29209
7	18.4	61.11	1.26480	14.0	1.14610	1.31355
8	18.6	55.56	1.26950	14.2	1.15230	1.32780
9	18.6	50.00	1.26950	14.2	1.15230	1.32780
10	19.0	44.44	1.27880	14.6	1.16440	1.35583
11	19.1	38.89	1.28100	14.7	1.16730	1.36259
12	19.1	33.33	1.28100	14.7	1.16730	1.36259
13	19.1	27.78	1.28100	14.7	1.16730	1.36259
14	19.2	22.22	1.28330	14.8	1.17030	1.36960
15	20.1	16.67	1.30320	15.7	1.19590	1.43018
16	20.5	11.11	1.31180	16.1	1.20680	1.45637
17	20.9	5.56	1.32010	16.5	1.21750	1.48231
Total	320.4		21.6708		19.70210	22.84577
Average	18.8		1.27480		1.15890	1.34400

Calculation of Parameter b

	tt	ts	tt*ts	$tt*ts-to^2$	ts+tt	2ts-(ts+tt)	bs
1	20.9	17.7	369.9	15.4	38.6	-3.2	-4.8
2	20.5	17.8	364.9	10.4	38.3	-2.7	-3.9
						b=	-4.4

Standard Deviation according to Iwai method ; Sx

$Sx = (\Sigma Yi^2/N - (\Sigma Yi/N)^2)^{1/2}$

$= 0.0308$

Estimation of Parameter 1/a

$1/a = (2N-(N-1))^{1/2} \times Sx$

$= -0.0449$

Estimation of Minimum Temperature

Return Period (year)	ε	ε /a	Yi+ ε /a	t+b	t (deg)
100	1.645	-0.0739	1.0850	12.16	16.6
40	1.386	-0.0622	1.0967	12.49	16.9
30	1.297	-0.0582	1.1007	12.61	17.0

$\varepsilon = c \log [(x+b)/(x_0+b)]$

Appendix-2 Static Analysis of Temperature

Manthly Mean Temperature

	1	2	3	4	5	6	7	8	9	10	11	12	Average
1977	25.3	25.0	25.7	27.7	28.4	27.8	27.0	26.7	27.2	27.9	26.5	25.9	26.8
1978	25.8	26.0	27.5	28.1	27.9	27.0	27.0	26.4	26.3	26.4	25.6	25.4	26.6
1979	25.3	26.1	27.4	27.7	27.9	27.1	26.2	26.4	26.8	26.6	26.3	24.8	26.6
1980	25.1	26.0	27.3	28.3	27.1	26.8	26.9	26.2	26.8	26.7	26.5	25.2	26.6
1981	24.2	25.7	26.8	28.4	27.8	26.8	27.0	26.5	26.8	26.9	25.8	24.2	26.4
1982	24.3	25.5	26.7	28.0	27.9	26.8	26.1	26.2	26.6	26.8	27.1	25.0	26.4
1983	25.3	25.9	27.2	28.3	28.4	27.4	27.1	26.7	26.6	26.3	25.6	25.0	26.7
1984	24.6	25.6	26.8	27.9	27.4	26.2	26.8	26.4	26.3	26.5	26.6	25.7	26.4
1985	25.2	26.4	27.3	27.4	27.1	27.4	26.5	26.4	26.2	26.4	26.9	25.3	26.5
1986	24.3	25.3	26.4	28.2	27.1	27.3	26.9	26.5	26.1	27.0	26.0	25.4	26.4
1987	25.2	25.2	27.3	28.6	28.5	27.0	27.2	27.1	26.6	27.2	26.9	24.6	26.8
1988	26.1	26.7	27.5	28.7	27.7	27.2	26.8	27.2	26.8	26.0	25.6	24.3	26.7
1989	25.8	25.0	26.7	27.8	27.3	27.2	26.6	26.7	26.6	26.4	26.6	24.9	26.5
1990	25.5	26.1	27.4	28.8	28.2	27.2	27.0	26.6	26.8	27.0	26.6	25.7	26.9
1991	26.0	26.0	26.8	28.2	28.4	27.3	26.4	26.5	26.6	26.3	26.3	25.9	26.7
1992	24.7	26.1	27.3	28.8	28.8	27.4	26.9	26.2	26.9	26.3	25.8	25.8	26.8
1993	25.1	24.9	26.8	28.0	28.4	27.3	27.0	26.5	26.2	26.7	26.9	25.2	26.6

Ranking of Yearly Average Temperature
(1977 - 1993 , 17years)

Ranking	Temperature (degree)	Year
1	26.9	1990
2	26.8	1987
3	26.8	1977
4	26.8	1992
5	26.7	1991
6	26.7	1988
7	26.7	1983
8	26.6	1978
9	26.6	1993
10	26.6	1980
11	26.6	1979
12	26.5	1985
13	26.5	1989
14	26.4	1982
15	26.4	1981
16	26.4	1984
17	26.4	1986

Appendix-2 Static Analysis of Temperature

Manthly Maximum Temperature

	1	2	3	4	5	6	7	8	9	10	11	12	Maximum
1977	32.1	32.2	32.6	34.8	35.0	35.6	33.2	32.2	32.4	32.5	31.9	31.6	35.6
1978	32.1	32.8	34.7	36.2	35.5	33.8	33.1	31.7	33.1	31.3	29.5	30.7	36.2
1979	32.0	34.7	34.2	34.5	34.7	33.5	32.0	32.7	32.9	32.8	31.9	31.1	34.7
1980	32.7	32.2	34.5	35.1		34.4	33.6	32.4	33.2	32.1	31.5	31.2	35.1
1981	30.8	33.1	34.8	35.1	34.7	32.9	32.9	32.3	32.8	32.6	32.1	31.1	35.1
1982	30.5	32.8	34.7	35.2	35.5	33.1	31.5	32.0	32.1	32.1	32.5	31.4	35.5
1983	32.0	33.6	36.0	36.6	36.7	35.2	33.3	32.4	32.8	31.8	31.2	30.3	36.7
1984	31.3	31.7	33.9	34.8	33.6	32.5	32.9	32.3	32.3	31.9	31.7	31.6	34.8
1985	31.3	32.5	33.6	35.0	34.3	33.7	32.9	32.0	31.5	32.0	31.7	31.7	35.0
1986	30.4	33.7	33.8	34.8	33.7	33.4	32.8	31.7	32.1	32.6	31.7	31.6	34.8
1987	31.4	32.0	34.9	35.3	35.3	33.6	33.1	33.7	32.7	32.2	32.2	31.4	35.3
1988	32.3	32.3	35.6	36.1	34.6	33.7	33.7	33.2	33.2	31.3	31.3	30.5	36.1
1989	31.7	31.9	33.3	35.0	35.4	33.2	32.8	32.8	33.1	32.2	31.9	30.8	35.4
1990	31.5	33.3	34.0	35.9	35.4	34.0	33.1	32.7	33.3	32.9	32.4	31.5	35.9
1991	31.5	32.9	33.4	34.0	35.1	33.6	33.0	32.6	32.0	31.6	31.6	31.6	35.1
1992	31.2	32.7	34.0	35.4	35.0	34.4	33.0	32.9	32.6	31.5	31.3	31.3	35.4
1993	31.0	32.4	34.3	34.8	34.9	34.5	32.8	32.4	32.0	32.7	32.7	31.3	34.9

Ranking of Yearly Maximum Temperature
(1977 - 1993 , 17years)

Ranking	Temperature (degree)	Year
1	36.7	1983
2	36.2	1978
3	36.1	1988
4	35.9	1990
5	35.6	1977
6	35.5	1982
7	35.4	1989
8	35.4	1992
9	35.3	1987
10	35.1	1980
11	35.1	1981
12	35.1	1991
13	35.0	1985
14	34.9	1993
15	34.8	1984
16	34.8	1986
17	34.7	1979

Appendix-2 Static Analysis of Temperature

Manthly Maximum Temperature

	1	2	3	4	5	6	7	8	9	10	11	12	Minimum
1977	19.5	19.1	20.0	21.7	23.2	23.0	23.0	21.8	22.0	21.6	22.0	21.4	19.1
1978	20.1	20.8	20.3	21.1	23.1	21.4	22.4	22.3	22.3	21.7	21.9	20.2	20.1
1979	20.5	21.1	21.9	22.4	22.9	21.6	22.4	21.1	23.2	22.2	21.0	18.1	18.1
1980	18.6	21.4	20.6	23.1		23.0	23.1	23.0	22.6	22.2	22.3	20.5	18.6
1981	17.8	21.1	21.0	23.1	23.7	22.7	23.2	21.6	22.9	23.1	19.7	18.4	17.8
1982	18.8	20.7	20.4		23.3	22.5	22.0	22.2	23.0	21.8	23.2	18.6	18.6
1983	18.1	20.4	21.6	21.8	23.5	22.0	23.4	23.0	22.7	22.9	19.3	21.0	18.1
1984	18.0	21.1	21.1	22.9	23.5	22.0	22.8	22.3	22.2	23.0	21.8	21.4	18.0
1985	21.0	21.3	22.7	23.0	23.0	22.6	22.8	22.1	22.2	23.6	22.5	19.1	19.1
1986	18.4	20.3	17.7	22.6	22.9	22.7	23.6	22.0	22.4	22.8	21.6	19.9	17.7
1987	19.7	19.5	20.5	22.3	23.6	23.1	22.4	23.3	22.5	22.5	22.8	19.1	19.1
1988	20.7	21.0	22.2	23.6	24.0	22.6	22.9	23.1	23.4	22.1	19.7	19.0	19.0
1989	21.5	18.4	22.0	23.2	23.4	23.0	22.2	23.0	22.4	22.8	21.3	19.6	18.4
1990	20.5	20.5	22.1	22.4	23.4	22.3	22.2	21.9	22.8	22.5	22.6	20.8	20.5
1991	20.9	21.1	21.4	23.0	23.0	22.3	22.5	22.5	22.5	22.5	21.5	21.7	20.9
1992	19.2	20.8	21.5	23.3	23.8	22.5	22.0	22.5	23.0	22.5	20.5	20.5	19.2
1993	18.1	19.8	20.5	22.5	23.7	22.0	21.9	22.4	22.5	22.9	21.3	23.1	18.1

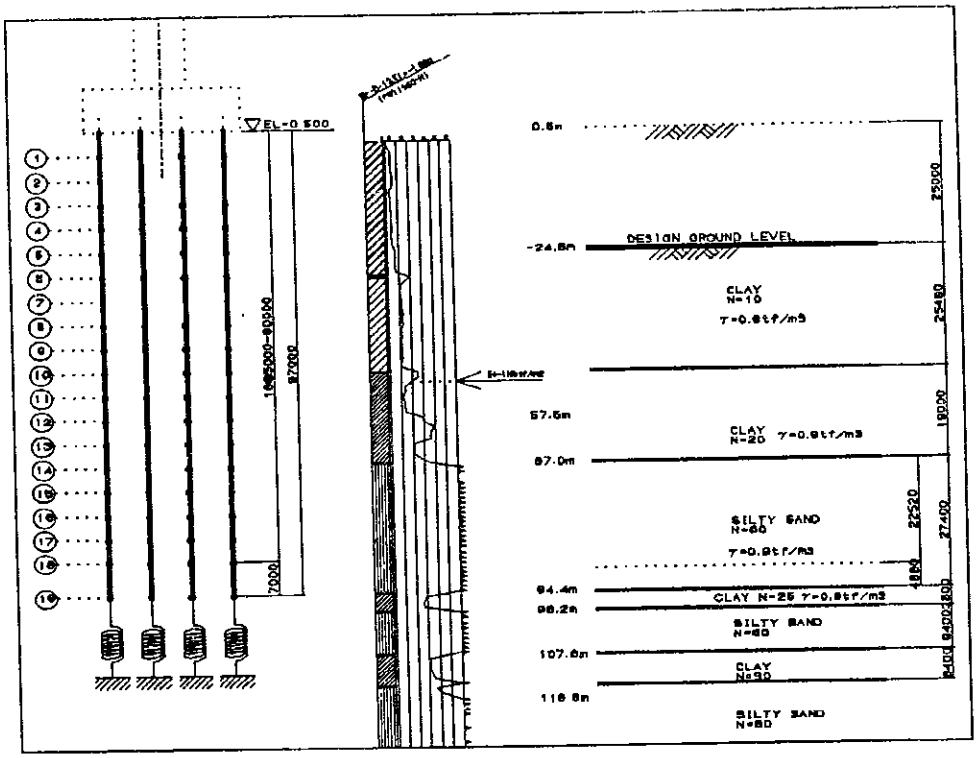
Ranking of Yearly Minimum Temperature
(1977 - 1993 , 17years)

Ranking	Temperature (degree)	Year
1	20.9	1991
2	20.5	1990
3	20.1	1978
4	19.2	1992
5	19.1	1977
6	19.1	1985
7	19.1	1987
8	19.0	1988
9	18.6	1980
10	18.6	1982
11	18.4	1989
12	18.1	1979
13	18.1	1983
14	18.1	1993
15	18.0	1984
16	17.8	1981
17	17.7	1986

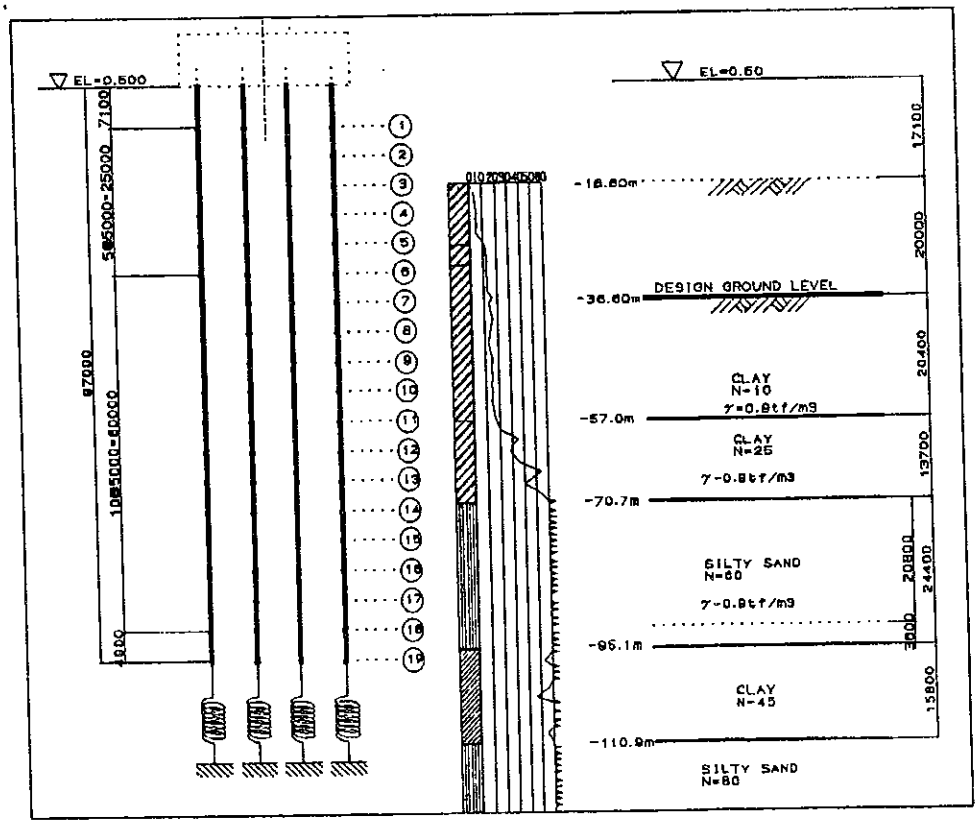
Appendix-3 Summary of Stability and Sectional Analysis of Piles for Pylons

3.7 Design of Pile for Pylon

3.7.1 Soil Condition of Pile



Southern Pylon



3.7.2 PILE CAPACITY CALCULATION

NAME: *Northern Pylon*

PILE TYPE Hybrid Pile (Cast-in-situ-pile with Parmanent Casing)

Dia :	Upper Pile	3.200	m	(t=30mm)
	Lower Pile	3.000	m	
Pile Length	Upper Pile	50.000	m	
	Lower Pile	47.000	m	
Stick out length of pile :		25.000	m	

Ulimate Soil End Bearing Capacity 300 tf/m2 2942 kN/m2

Skin Friction Capacity :

Layer Number	Depath:d (m)	Soil Type	N Value	fs (tf/m2)	Qs (tf)	Qs (kN)	Remarks
1	25.00	clay	10	5.0	1256.6	12323.4	Dia:3.2m
1	0.48	clay	10	10.0	45.2	443.6	Dia:3.0m
2	19.00	clay	20	15.0	2686.1	26341.3	〃
3	27.40	sand	60	20.0	5164.8	50649.3	〃
4	0.12	clay	25	15.0	17.0	166.4	〃
Total	72.00	-	-	-	9169.7	89924.1	

End Bearing Capacity : Qu 2120.6 (tf) 20795.8 (kN)

Replaced Effective Weight of Soil(Ws): 480.0 (tf) 4706.78 (kN)

Buoyant Weight of Pile(W): 1181.4 (tf) 11586 (kN)

Allowable Bearing Capacity(Qa):

Service Limit State	(FS=3)	2902.0 (tf)	28458.5 (kN)
Strength Limit State	(FS=2)	4703.7 (tf)	46127.3 (kN)
Extreme Event Limit Stat	(FS=2)	4703.7 (tf)	46127.3 (kN)

NAME: *Southern Pylon*

Pile Type Hybrid Pile (Cast-in-situ-pile with Parmanent Casing)

Dia :	Upper Pile	3.200	m	(t=30mm)
	Lower Pile	3.000	m	
Pile Length	Upper Pile	50.000	m	
	Lower Pile	47.000	m	
Stick out length of pile :		37.100	m	

Ulimate Soil End Bearing Capacity 300 tf/m2 2942 kN/m2

Skin Friction Capacity :

Layer Number	Depath:d (m)	Soil Type	N Value	fs (tf/m2)	Qs (tf)	Qs (kN)	Remarks
1	12.90	clay	10	10.0	1296.9	12717.8	Dia:3.2m
1	7.50	clay	10	10.0	706.9	6931.9	Dia:3.0m
2	13.70	clay	25	15.0	1936.8	18993.5	〃
3	24.40	sand	60	20.0	4599.3	45103.7	〃
4	1.40	clay	45	15.0	197.9	1940.9	〃
Total	59.90	-	-	-	8737.7	85687.9	

End Bearing Capacity : Qu 2120.6 (tf) 20795.8 (kN)

Replaced Effective Weight of Soil(Ws): 392.4 (tf) 3847.89 (kN)

Buoyant Weight of Pile(W): 0.0 (tf) 0 (kN)

Allowable Bearing Capacity(Qa):

Service Limit State	(FS=3)	2902.0 (tf)	28458.5 (kN)
Strength Limit State	(FS=2)	4703.7 (tf)	46127.3 (kN)
Extreme Event Limit Stat	(FS=2)	4703.7 (tf)	46127.3 (kN)

3.7.3 Calculation of Horizontal Spring-constant of Pile

NORTHERN PYLON

Layer Number	N-Value	kho: αE0(kgf/m3)		β	Bh=(D/β)^0.5(cm)	KH (kgf/cm3)	
		Ordinary	Earthquake			Ordinary	Earthquake
①	10	9.333	18.667	0.00094	218.8	2.103	4.206
②	20	18.667	37.333	0.00114	198.7	4.522	9.043
③	60	56.000	112.000	0.00154	170.9	15.184	30.369
④	25	23.333	46.667	0.00121	192.8	5.780	11.559
⑤	60	56.000	112.000	0.00154	170.9	15.184	30.369
⑥	30	28.000	56.000	0.00127	188.2	7.063	14.125
⑦	80	74.667	149.333	0.00167	164.2	20.870	41.741

SOUTHERN PYLON

Layer Number	N-Value	kho: αE0(kgf/m3)		β	Bh=(D/β)^0.5(cm)	KH (kgf/cm3)	
		Ordinary	Earthquake			Ordinary	Earthquake
①	10	9.333	18.667	0.00094	218.8	2.103	4.206
②	25	23.333	46.667	0.00121	192.8	5.780	11.559
③	60	56.000	112.000	0.00154	170.9	15.184	30.369
④	45	42.000	84.000	0.00142	178.0	11.047	22.094
⑤	80	74.667	149.333	0.00167	164.2	20.870	41.741

3.7.4 Vertical Spring Constant of Pile

Southern Pylon

Total length of pile = 97.0 m

stick out length of pile = 37.1 m

$$kv = \frac{1}{\frac{1}{kv1} + \frac{1}{kv2}}$$

kv: Equivalent Vertical Spring Constant

kv1: Kv of the part that stuck out in the water (Ap*Ec/h)

kv2: Kv of the part in the ground

$$Kv2 = \alpha \frac{Ap*Ep}{L}$$

α = 0.031 (L / D) - 0.15

kv1= 1/4*π*3.2*^2*4*E6/37.1

= 867,115 tf/m

α = 0.031*(59.9/3)-0.15

= 0.468967

kv2= 0.469*1/4*π*3.0^2*2.63*e6/59.9

= 145,547 tf/m

$$kv = \frac{1}{\frac{1}{kv1} + \frac{1}{kv2}}$$

$$= \frac{1}{\frac{1}{867,115} + \frac{1}{145,547}}$$

= 124,628 tf/m =1,222,185 kN/m

Northern Pylon

Total length of pile = 97.0 m

stick out length of pile = 25.0 m

$$\frac{1}{\frac{1}{kv1} + \frac{1}{kv2}}$$

kv: Equivalent Vertical Spring Constant

kv1: Kv of the part that stuck out in the water (Ap*Ec/h)

kv2: Kv of the part in the ground

$$Kv2 = \alpha \frac{Ap*Ep}{L}$$

α = 0.031 (l / D) - 0.15

kv1= 1/4*π*3.2*^2*4.0*E6/25
= 1,130,976 tf/m

α= 0.031*(72.0/3)-0.15
0.5940

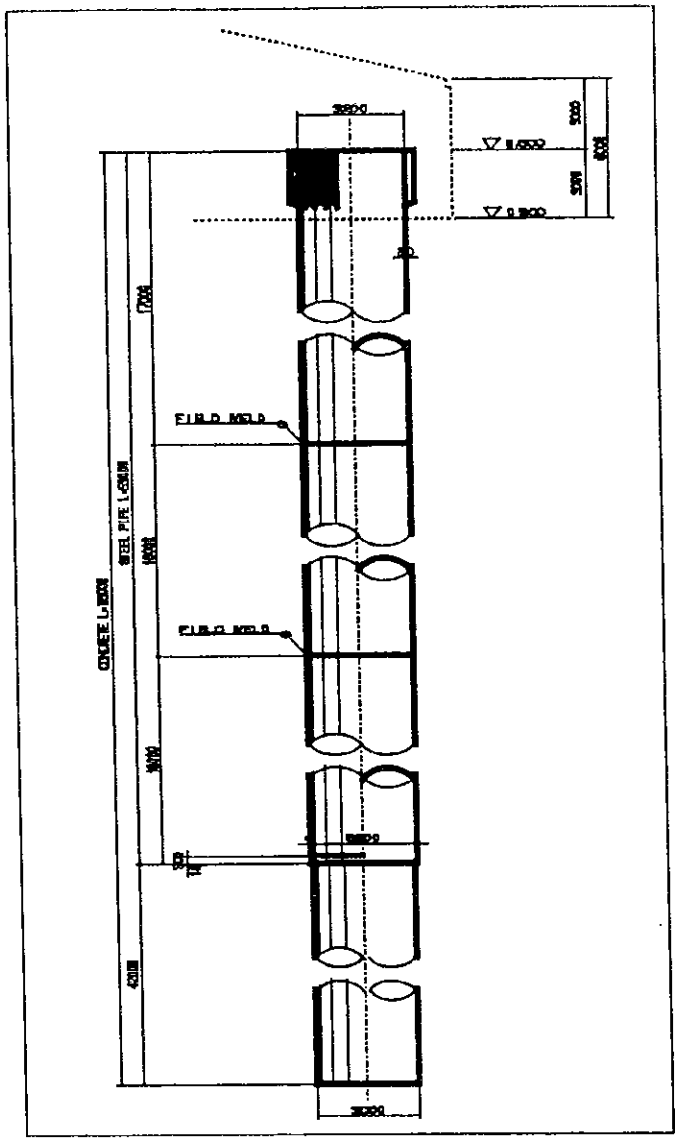
kv2= 0.5940*1/4*π*3.0^2*2.63*E6/72.0
= 153,371 tf/m

$$kv = \frac{1}{\frac{1}{kv1} + \frac{1}{kv2}}$$

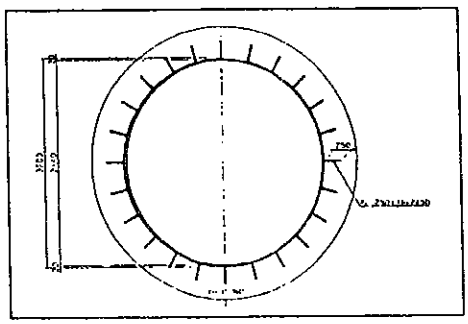
$$= \frac{1}{\frac{1}{1,130,976} + \frac{1}{153,371}}$$

= 135,056 tf/m =1,324,448 KN/m

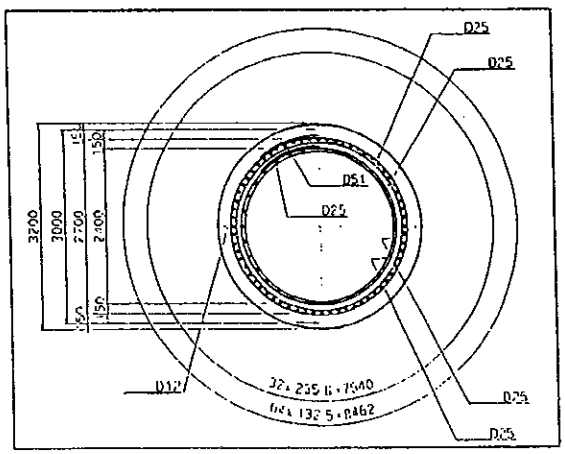
3.7.5 Genaral View of Pile



Steel Casing

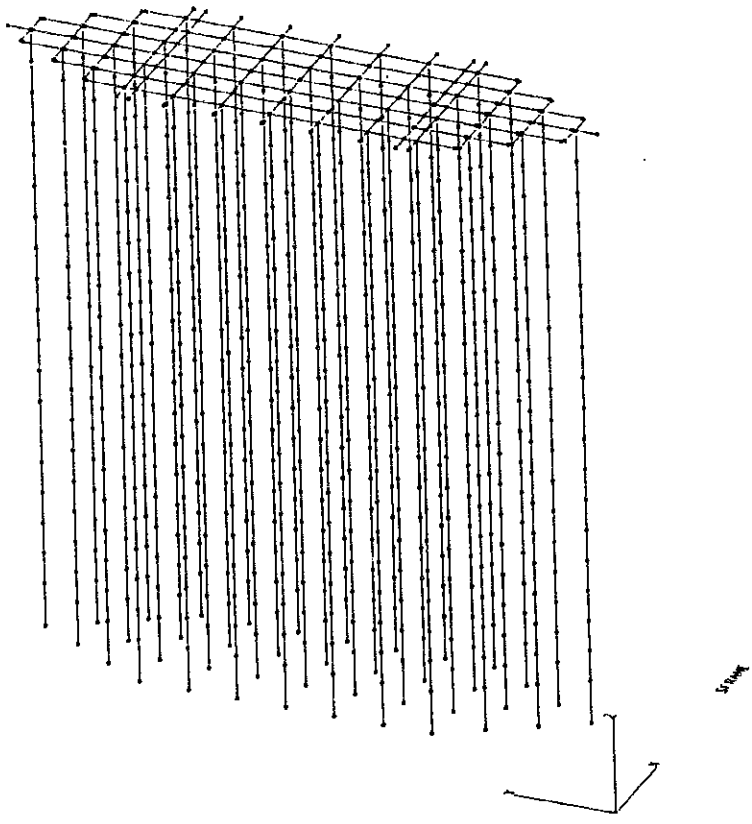


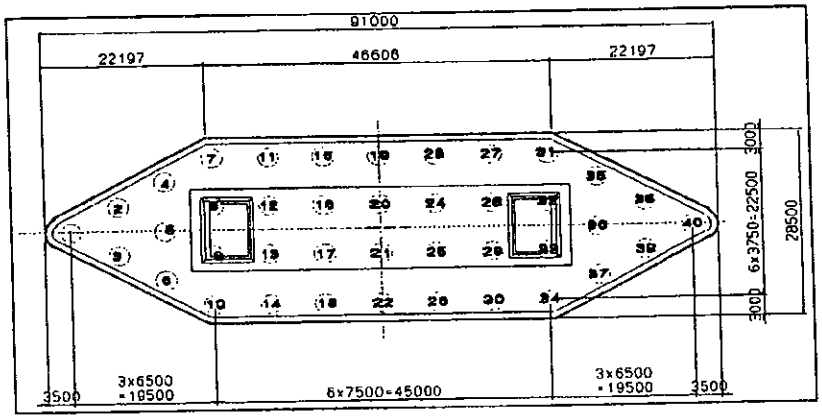
RC-Pile



3.7.6 Calculation of Pile Reaction

1) Load Combination





3.7.7 Calculation of Pile Reaction

1) Calculation Model

List of Load Cases

Case No	Load Name
Case-1	Pilecap
Case-2	Pile
Case-3	Girder + Surfacing
Case-4	Live Load M-Max
Case-5	Temperature Gradient
Case-6	Uniform Temperature (+10 deg)
Case-7	Uniform Temperature (-10 deg)
Case-8	Uniform Temperature at Pylon (+10 deg)
Case-9	Uniform Temperature at Pylon (-10 deg)
Case-10	Shrinkage at Pylon
Case-11	Wind Load for Longitudinal Direction (L->R)
Case-12	Wind Load for Longitudinal Direction (R->L)
Case-13	Wind Load for Transverse Direction (L->R)
Case-14	Wind Load for Transverse Direction (R->L)
Case-15	Wind Load on Live Load
Case-16	Water Load (Stream Pressure)
Case-17	Earthquake for Longitudinal Direction (L->R)
Case-18	Earthquake for Longitudinal Direction (R->L)
Case-19	Earthquake for Transverse Direction (L->R)
Case-20	Earthquake for Transverse Direction (R->L)
Case-21	EQ;Pilecap for Longitudinal Direction (L->R)
Case-22	EQ;Pilecap for Longitudinal Direction (R->L)
Case-23	EQ;Pilecap for Transverse Direction (L->R)
Case-24	EQ;Pilecap for Transverse Direction (R->L)
Case-25	EQ;Pile for Longitudinal Direction (L->R)
Case-26	EQ;Pile for Longitudinal Direction (R->L)
Case-27	EQ;Pile for Transverse Direction (L->R)
Case-28	EQ;Pile for Transverse Direction (R->L)
Case-29	Vessel Collision for Longitudinal Direction
Case-30	Vessel Collision for Transverse Direction

Summary for Load Combination

Combination Name		Contents	Remark
Combination1-1	Strength- I	1+2+3+4+6+8+10+16	Uniform Temperature
Combination1-2		1+2+3+4+7+9+10+16	
Combination2-1	Strength-V	1+2+3+4+6+8+10+11+15+16	Wind Load:Longitudinal Direction
Combination2-2		1+2+3+4+6+8+10+12+15+16	
Combination2-3		1+2+3+4+6+8+10+11+15+16	
Combination2-4		1+2+3+4+6+8+10+12+15+16	
Combination2-5	Strength-V	1+2+3+4+6+8+10+13+15+16	Wind Load:Transeverse Direction
Combination2-6		1+2+3+4+6+8+10+14+15+16	
Combination2-7		1+2+3+4+6+8+10+13+15+16	
Combination2-8		1+2+3+4+6+8+10+14+15+16	
Combination3-1	ExtremeEvent- I	1+2+3+4+16+17+21+25	Earthquake:Longitudinal Direction
Combination3-2		1+2+3+4+16+18+22+26	
Combination3-3	ExtremeEvent- I	1+2+3+4+16+19+23+27	Earthquake:Transeverse Direction
Combination3-4		1+2+3+4+16+20+24+28	
Combination4-1	ExtremeEvent- II	1+2+3+4+16+29	Vessel Collision:Longitudinal Directio
Combination4-2		1+2+3+4+16+30	Vessel Collision:Transeverse Direction
Combination5-1	Service- I	1+2+3+4+5+6+8+10+11+15+16	Wind Load:Longitudinal Direction
Combination5-2		1+2+3+4+5+6+8+10+12+15+16	
Combination5-3		1+2+3+4+5+6+8+10+11+15+16	
Combination5-4		1+2+3+4+5+6+8+10+12+15+16	
Combination5-5	Service- I	1+2+3+4+5+6+8+10+13+15+16	Wind Load:Transeverse Direction
Combination5-6		1+2+3+4+5+6+8+10+14+15+16	
Combination5-7		1+2+3+4+5+6+8+10+13+15+16	
Combination5-8		1+2+3+4+5+6+8+10+14+15+16	

3.7.8 Calculation Result of Pile Reaction

Reaction of Pile (at pile top)
NORTHERN PYLON

Pile	Load Combination	Axial Force(Kn)		Shear-Force(kn)		Morment(knm)		Remarks
		max	min	Y	Z	Y	Z	
Pile NO.7	Strength- I	-23,329	-22,850	-76	-426	6,170	1,096	
	Strength- II	-	-	-	-	-	-	
	Strength-III	-	-	-	-	-	-	
	Strength-IV	-	-	-	-	-	-	
	Strength- V	-27,001	-19,412	-41	-789	10,530	356	<Ra=52200KN
	Extreme Event- I	-41,036	-5,373	-41	-2,648	37,937	288	<Ra=52200KN
	Extreme Event- II	-25,494	-22,371	-88	-1,132	16,751	1,381	
	Service- I	-26,438	-19,888	-101	-466	6,145	1,350	<,Ra=32500KN
	Service- II	-	-	-	-	-	-	
	Service-III	-	-	-	-	-	-	
Pile NO.10	Strength- I	-22,827	-22,428	-90	424	-6,559	1,442	
	Strength- II	-	-	-	-	-	-	
	Strength-III	-	-	-	-	-	-	
	Strength-IV	-	-	-	-	-	-	
	Strength- V	-26,078	-18,142	-61	729	-10,744	827	
	Extreme Event- I	-38,622	-3,416	-55	2,524	-38,635	526	
	Extreme Event- II	-20,185	-18,730	1,285	337	-6,469	-23,377	
	Service- I	-25,147	-18,656	-79	652	-9,956	1,154	
	Service- II	-	-	-	-	-	-	
	Service-III	-	-	-	-	-	-	
Pile NO.1	Strength- I	-13,329	-13,174	-1,487	-8	-169	22,593	
	Strength- II	-	-	-	-	-	-	
	Strength-III	-	-	-	-	-	-	
	Strength-IV	-	-	-	-	-	-	
	Strength- V	-13,841	-12,175	-1,329	-298	4,244	20,506	
	Extreme Event- I	-16,580	-11,433	-3,038	963	-16,317	52,620	
	Extreme Event- II	-12,840	-9,565	-1,419	-671	9,325	21,553	
	Service- I	-13,609	-12,205	-1,341	-245	3,062	20,619	
	Service- II	-	-	-	-	-	-	
	Service-III	-	-	-	-	-	-	
Pile NO.40	Strength- I	-13,326	-13,174	1,554	-14	-103	-22,667	
	Strength- II	-	-	-	-	-	-	
	Strength-III	-	-	-	-	-	-	
	Strength-IV	-	-	-	-	-	-	
	Strength- V	-14,199	-13,016	1,841	256	-4,881	-28,458	
	Extreme Event- I	-14,251	-9,082	2,822	-767	10,424	-46,607	
	Extreme Event- II	-16,111	-12,836	2,739	-36	-742	-43,300	
	Service- I	-15,446	-12,607	1,610	-13	-770	-23,531	
	Service- II	-	-	-	-	-	-	
	Service-III	-	-	-	-	-	-	

SOUTHERN PYLON

Pile	Load Combination	Axial Force(Kn)		Shear-Force(kn)		Morment(knm)		Remarks
		max	min	Y	Z	Y	Z	
Pile NO.7	Strength- I	-20,359	-19,856	-42	-148	4,839	1,127	
	Strength- II	-	-	-	-	-	-	
	Strength-III	-	-	-	-	-	-	
	Strength-IV	-	-	-	-	-	-	
	Strength- V	-23,481	-17,103	-25	-395	8,901	699	
	Extreme Event- I	-39,368	-1,897	-19	-2,265	46,381	481	
	Extreme Event- II	-19,591	-17,826	1,337	-175	5,345	-28,539	
	Service- I	-23,586	-17,291	-46	-160	5,026	1,353	
	Service- II	-	-	-	-	-	-	
	Service-III	-	-	-	-	-	-	
Pile NO.10	Strength- I	-23,843	-23,421	-44	114	-2,552	1,193	
	Strength- II	-	-	-	-	-	-	
	Strength-III	-	-	-	-	-	-	
	Strength-IV	-	-	-	-	-	-	
	Strength- V	-26,494	-20,985	-2	353	-6,554	216	<Ra=43500KN
	Extreme Event- I	-41,627	-4,535	-14	2,145	-42,717	325	<Ra=43500KN
	Extreme Event- II	-25,887	-22,126	-44	750	-15,451	1,189	
	Service- I	-26,195	-21,165	-30	74	-2,046	946	<,Ra=26400KN
	Service- II	-	-	-	-	-	-	
	Service-III	-	-	-	-	-	-	
Pile NO.1	Strength- I	-12,415	-12,261	-496	-41	1,635	14,677	
	Strength- II	-	-	-	-	-	-	
	Strength-III	-	-	-	-	-	-	
	Strength-IV	-	-	-	-	-	-	
	Strength- V	-12,910	-11,262	-354	162	-2,523	12,211	
	Extreme Event- I	-16,680	-9,772	-2,065	608	-8,941	52,672	
	Extreme Event- II	-12,228	-8,324	-496	585	-10,527	14,669	
	Service- I	-12,790	-11,513	-386	106	-1,438	12,770	
	Service- II	-	-	-	-	-	-	
	Service-III	-	-	-	-	-	-	
Pile NO.40	Strength- I	-12,379	-12,225	553	-41	1,635	-14,553	
	Strength- II	-	-	-	-	-	-	
	Strength-III	-	-	-	-	-	-	
	Strength-IV	-	-	-	-	-	-	
	Strength- V	-13,478	-11,651	827	-267	6,102	-20,958	
	Extreme Event- I	-14,646	-9,361	1,942	-794	15,860	-47,721	
	Extreme Event- II	-16,096	-12,192	1,821	-57	1,850	-40,914	
	Service- I	-14,646	-11,790	595	-71	2,128	-15,686	
	Service- II	-	-	-	-	-	-	
	Service-III	-	-	-	-	-	-	

Calculation of Hibride Pile
Evaluate stiffness of hybrid pile as the member that composed concrete and steel pipe.

Axial force: distribute it by the ratio of the cross-section area of concrete and steel tube.
Bending morment: distribute it by the ratio of concrete and steel tube and geometrical moment of inertia.

section srea : A = Ac + nAs

geometrical moment of inertia.: I = Ic + nIs

$$n = Es / Ec = 2.0*10^{7} / 2.63*10^{6} = 7.605$$

$Es = 2.00*10^{7}$ (steel pipe)
$Ec = 2.63*10^{6}$ (RC)

Steel Pipe
ϕ3200 t=30mm Thickness of the corrosion of the steel pipe in the future=2mm

$As = 0.27867249\ m^2$
$Is = 0.34962975\ m^4$

Reinforced Concrete

$Ac = 7.74372984\ m^2$
$Ic = 11.8292116\ m^4$

Distribution of Axial Force and Bending Moment
Axial Fore
steel pipe Ns= 0.215
RC pile Nc= 0.785

Bending Moment
steel pipe Ms= 0.184
RC pile Mc= 0.816

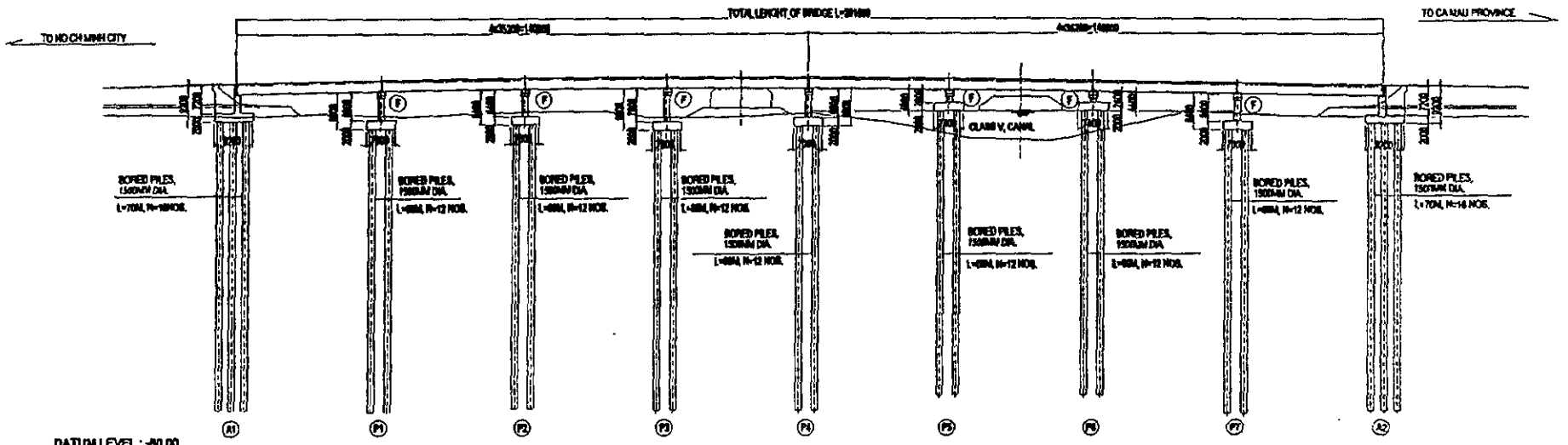
Calculation Result of Stress
Sectinal Force :

Pylon	Pile	Axial Force:max (KN)		Axial Force:min (KN)		Shear-Force(KN)		Morment(KNm)	
		Steel Pile	RC-pile	Steel Pile	RC-pile	Steel Pile	RC-pile	Steel Pile	RC-pile
North	No.7	8,817	32,219	1,233	4,219	569	2,079	6,962	30,976
South	No.10	8,867	32,400	974	3,561	461	1,684	7,839	34,879

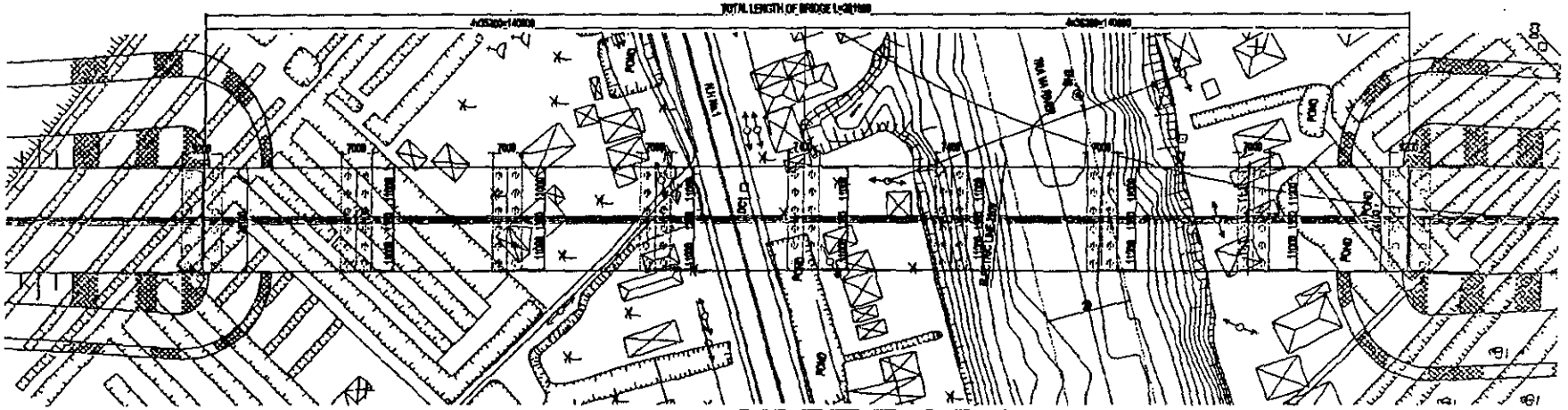
Stress

Pylon	Pile	Steel Pipe(N/mm2)		RC-Pile(N/mm2)		Allowable sterss (N/mm2)		
		Tension	Compressio	Concrete	Re.-Bar	Steel Pipe	Concrete	Re-Bar
North	No.7	-27.40	63.46	13.74	177.89	182.50	16.00	220.00
South	No.10	-32.33	67.65	15.46	207.16			

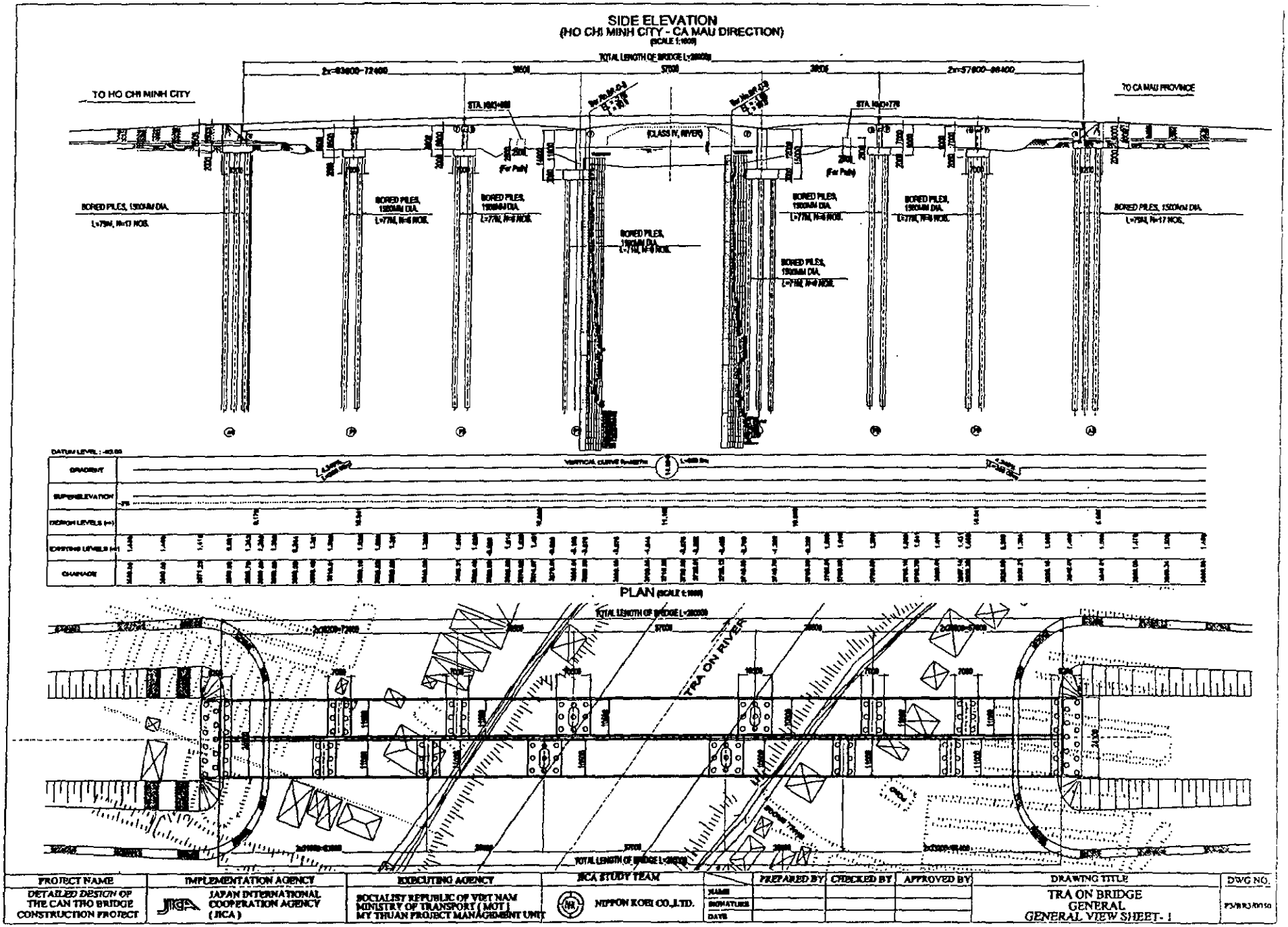
SIDE ELEVATION
(HO CHI MINH CITY - CA MAU DIRECTION)
(SCALE 1:1000)

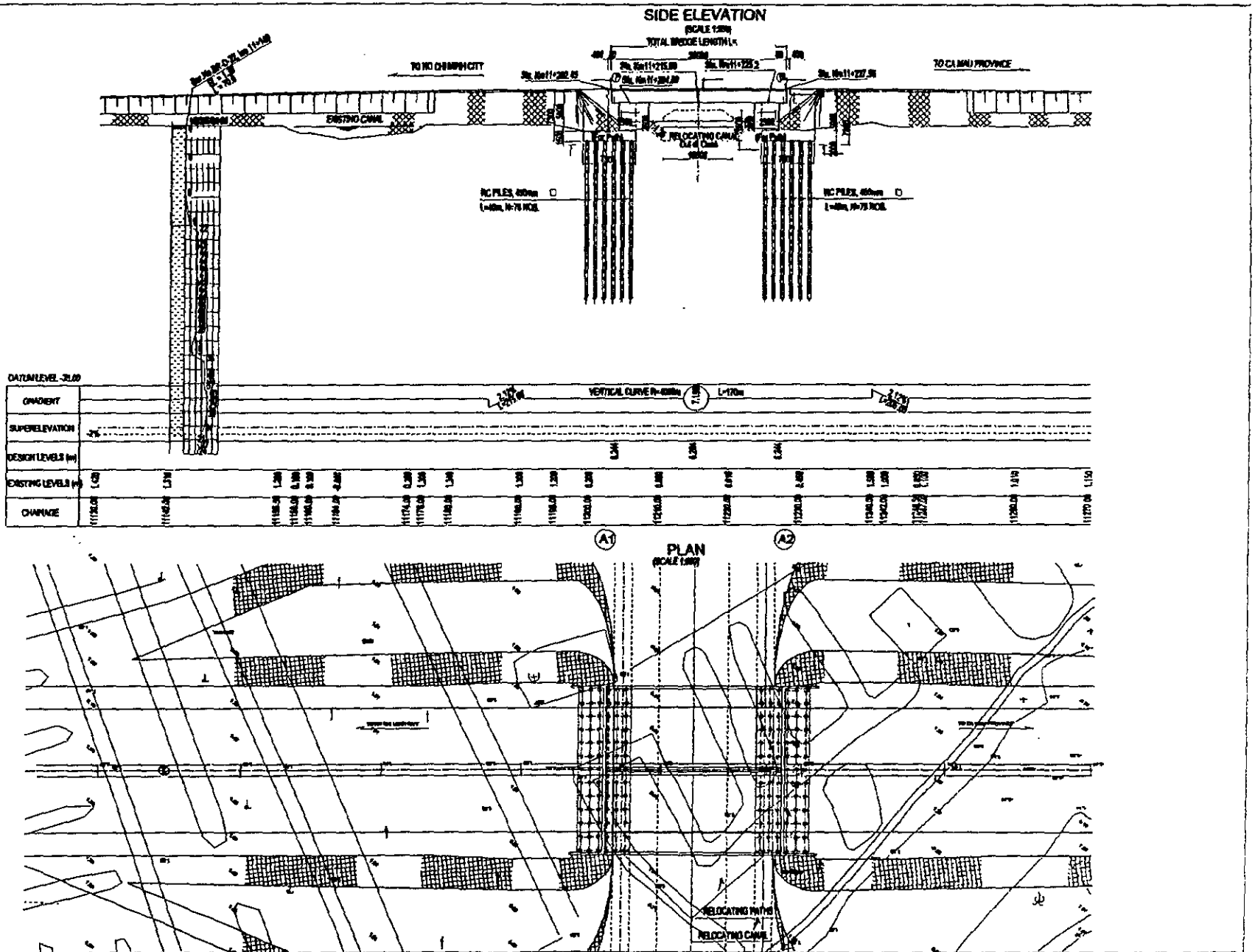


PLAN (SCALE 1:1000)



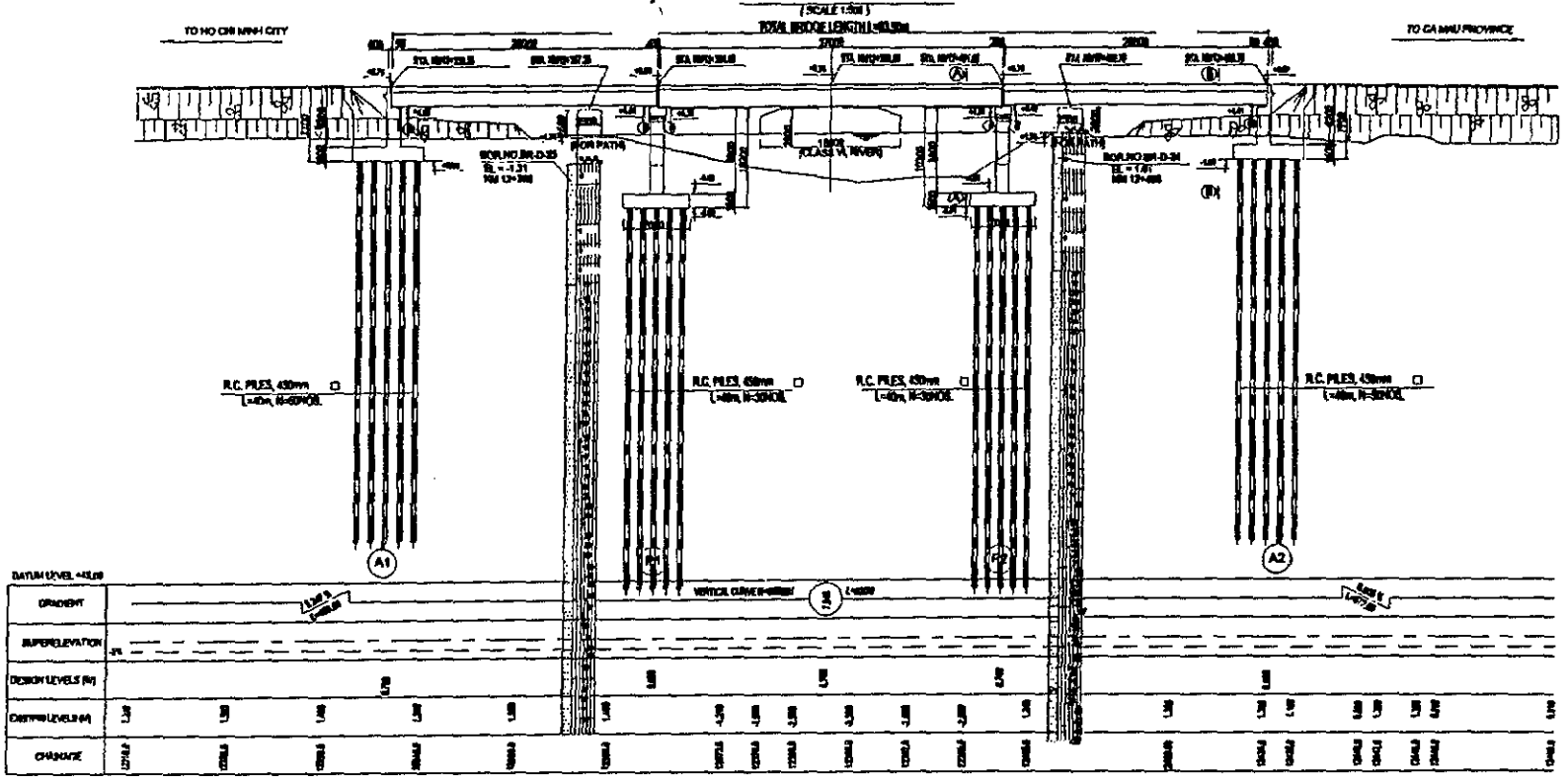
PROJECT NAME	IMPLEMENTATION AGENCY	EXECUTING AGENCY	JICA STUDY TEAM		PREPARED BY	CHECKED BY	APPROVED BY	DRAWING TITLE	DWG NO.
DETAILED DESIGN OF THE CAN THO BRIDGE CONSTRUCTION PROJECT	JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	SOCIALIST REPUBLIC OF VIET NAM MINISTRY OF TRANSPORT (MOT) MY THUAN PROJECT MANAGEMENT UNIT	NIPPON KOEI CO.,LTD.	NAME SIGNATURE DATE				LARGE TRA VA BRIDGE GENERAL GENERAL VIEW SHEET - 1	


SIDE ELEVATION
(HO CHI MINH CITY - CA MAU DIRECTION)
TO HO CHI MINH CITY
TO CA MAU PROVINCE
(CLASS IV, RIVER)
BORED PILES, 1500MM DIA.
L=75M, N=17 NOS.
BORED PILES, 1500MM DIA.
L=77M, N=6 NOS.
PLAN
TRA ON RIVER
PROJECT NAME
DETAILED DESIGN OF THE CAN THO BRIDGE CONSTRUCTION PROJECT
IMPLEMENTATION AGENCY
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
EXECUTING AGENCY
SOCIALIST REPUBLIC OF VIET NAM MINISTRY OF TRANSPORT (MOT) MY THUAN PROJECT MANAGEMENT UNIT
JICA STUDY TEAM
NIPPON KOEI CO.,LTD.
PREPARED BY
CHECKED BY
APPROVED BY
DRAWING TITLE
TRA ON BRIDGE
GENERAL
GENERAL VIEW SHEET - 1
DWG NO.



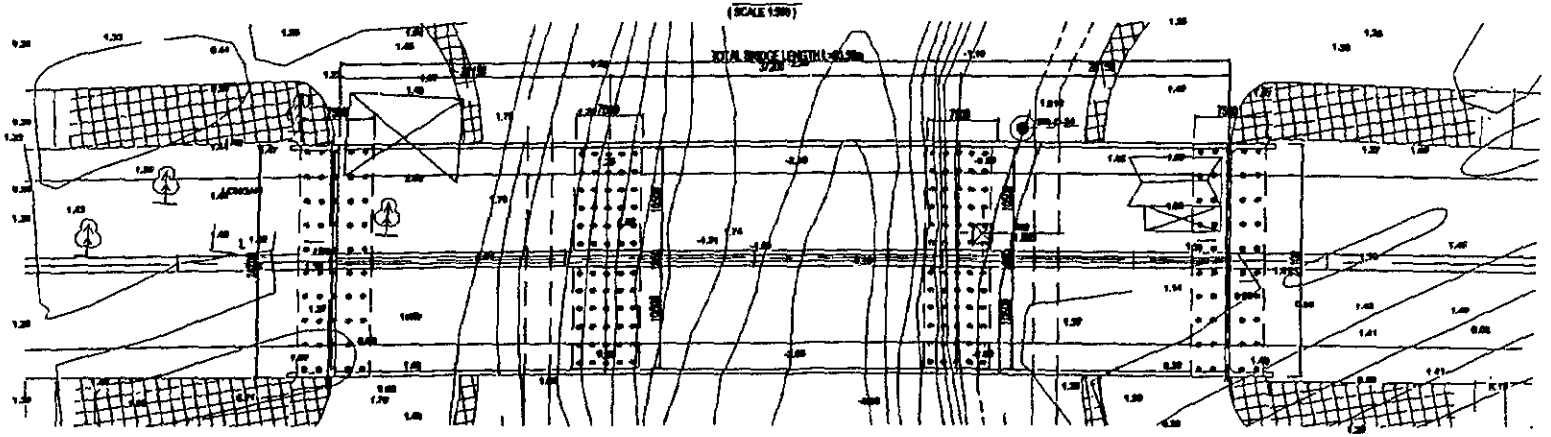
PROJECT NAME	IMPLEMENTATION AGENCY	EXECUTING AGENCY	JICA STUDY TEAM		PREPARED BY	CHECKED BY	APPROVED BY	DRAWING TITLE	D'WG NO.
DETAILED DESIGN OF THE CAN THO BRIDGE CONSTRUCTION PROJECT	JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	SOCIALIST REPUBLIC OF VIET NAM MINISTRY OF TRANSPORT (MOT) MY THUAN PROJECT MANAGEMENT UNIT	NIPPON KOEI CO.,LTD.	NAME SIGNATURE DATE				BA MANG BRIDGE GENERAL GENERAL VIEW SHEET -1	P3/BR/A0000

SIDE ELEVATION



PLAN

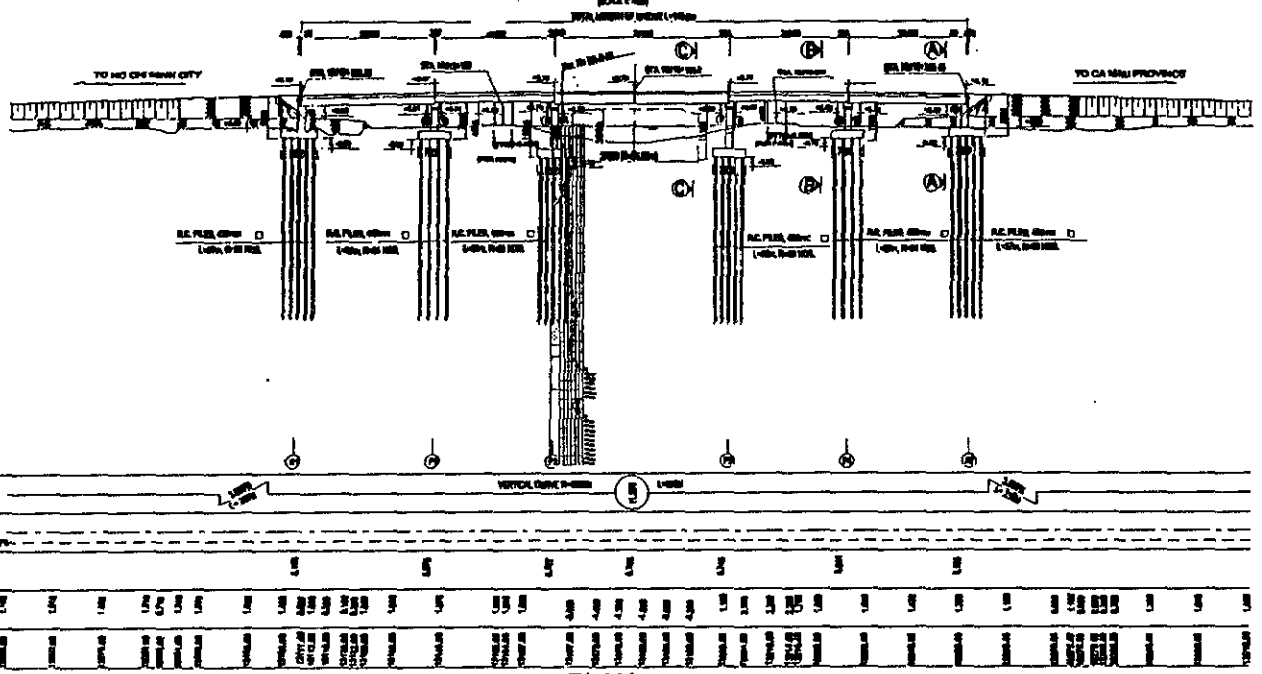
(SCALE 1:500)



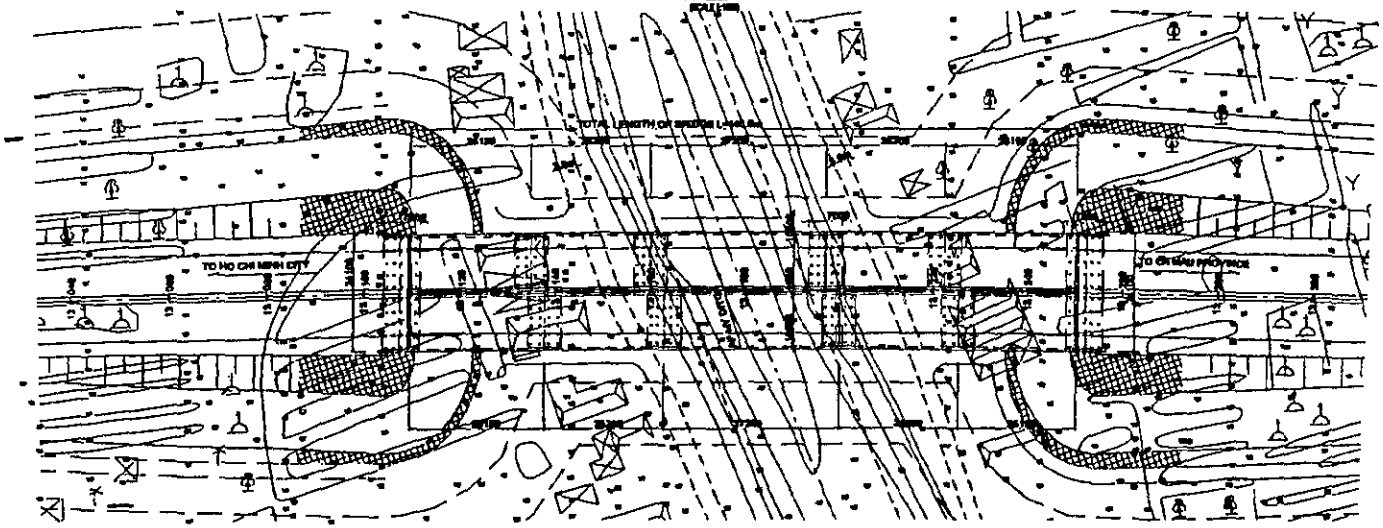
PROJECT NAME	IMPLEMENTATION AGENCY	EXECUTING AGENCY	JICA STUDY TEAM		PREPARED BY	CHECKED BY	APPROVED BY	DRAWING TITLE	DWG NO.
DETAILED DESIGN OF THE CAN THO BRIDGE CONSTRUCTION PROJECT	JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	SOCIALIST REPUBLIC OF VIET NAM MINISTRY OF TRANSPORT (MOT) MY THUAN PROJECT MANAGEMENT UNIT	NIPPON KOEI CO.,LTD.	NAME SIGNATURE DATE				CA NAI BRIDGE GENERAL GENERAL VIEW - SHEET 1	P3/BRS/0060

SIDE ELEVATION

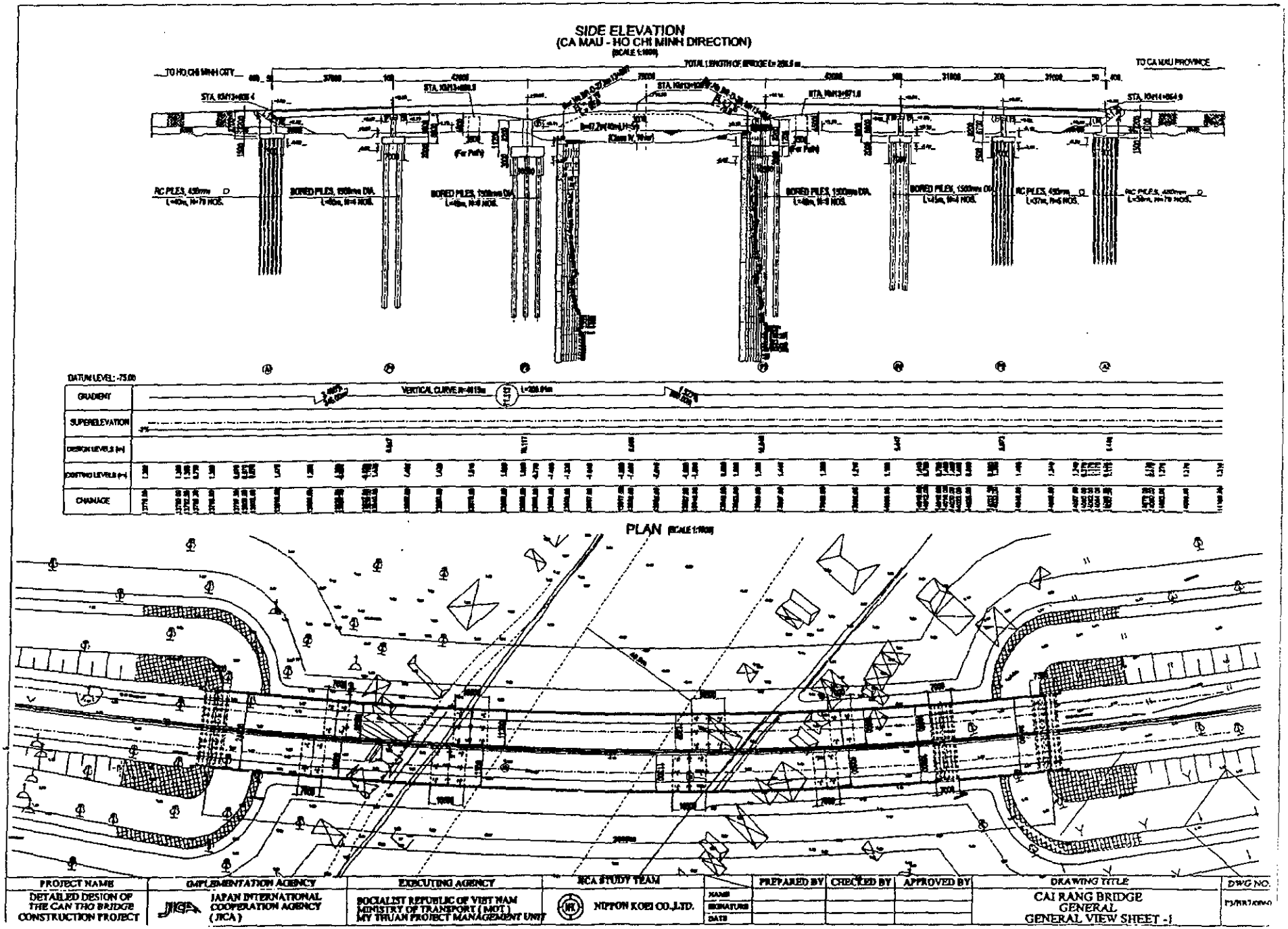
(HO CHI MINH CITY - CA MAU DIRECTION)



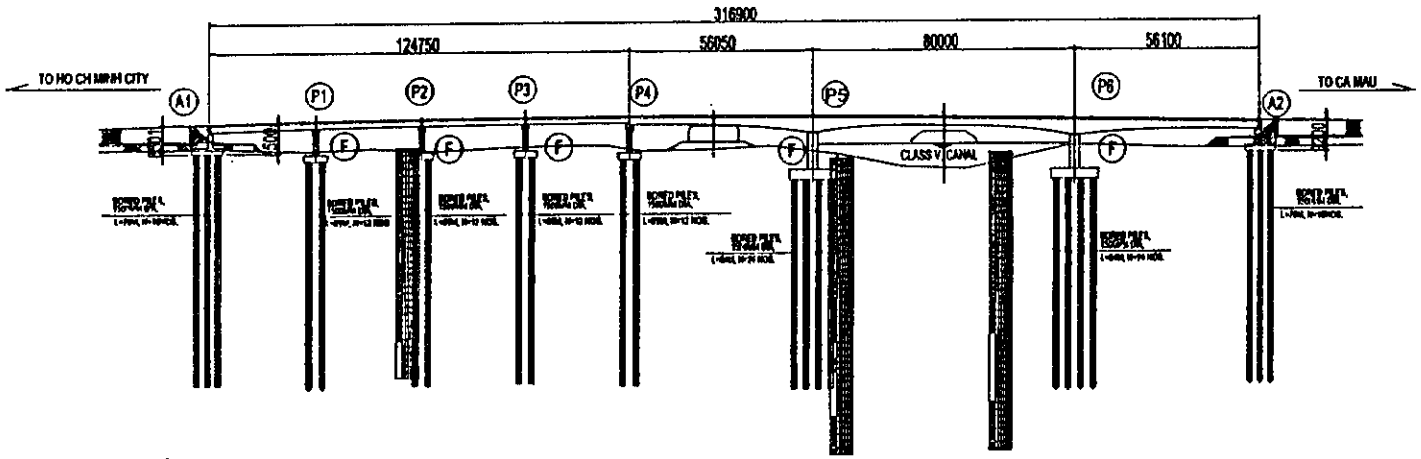
PLAN

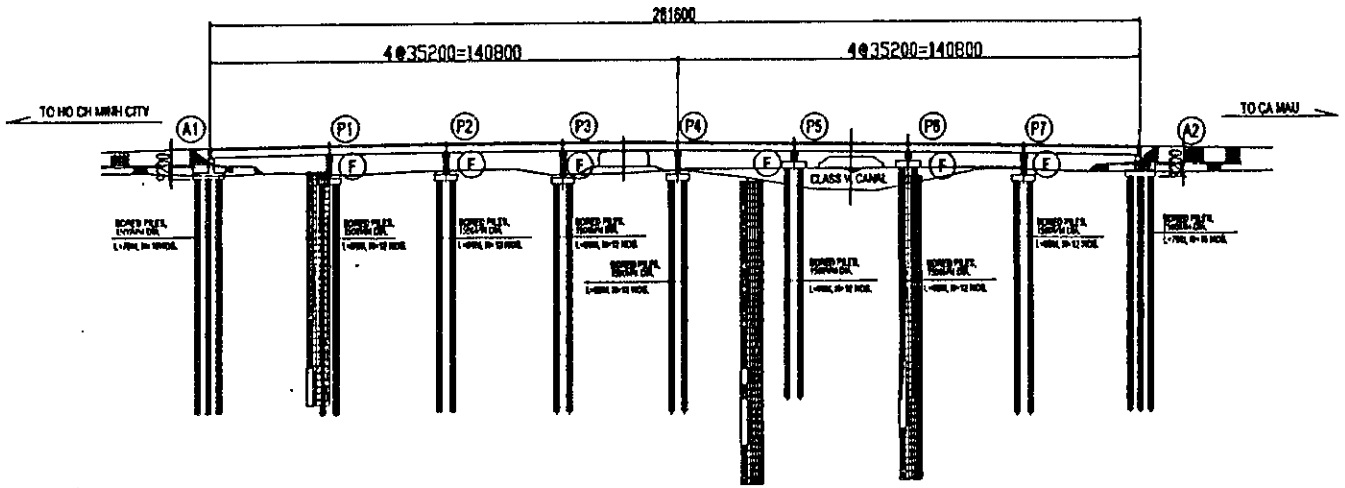


PROJECT NAME	IMPLEMENTATION AGENCY	EXECUTING AGENCY	JICA STUDY TEAM		PREPARED BY	CHECKED BY	APPROVED BY	DRAWING TITLE	DWG NO.
DETAILED DESIGN OF THE CAN THO BRIDGE CONSTRUCTION PROJECT	JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	SOCIALIST REPUBLIC OF VIET NAM MINISTRY OF TRANSPORT (MOT) MY THUAN PROJECT MANAGEMENT UNIT	NIPPON KOEI CO.,LTD.	NAME SIGNATURE DATE				AP MY BRIDGE GENERAL GENERAL VIEW - SHEET 1	F3/BR6/0000

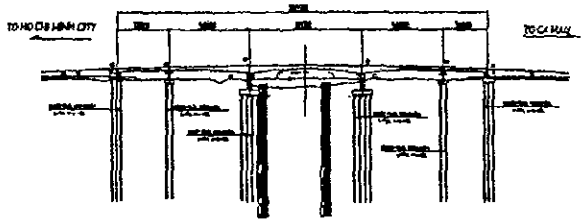
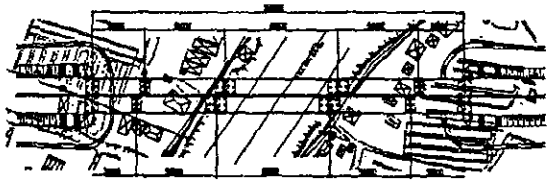
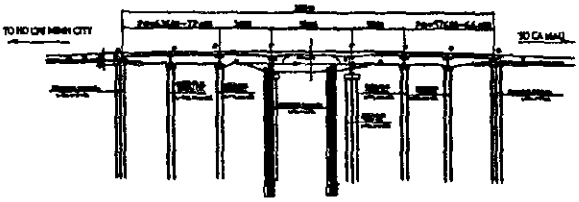
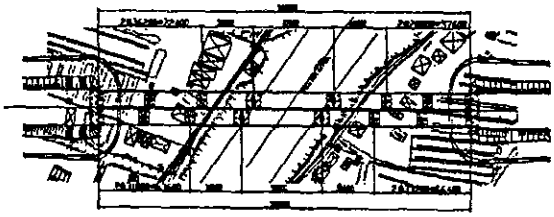
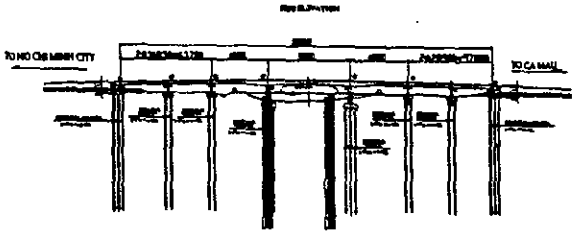
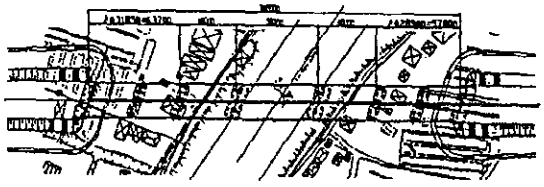

SIDE ELEVATION
(CA MAU - HO CHI MINH DIRECTION)
(SCALE 1:1000)
TO HO CHI MINH CITY
TOTAL LENGTH OF BRIDGE L= 2265 m
TO CA MAU PROVINCE
STA. KM13+608.4
STA. KM13+888.9
STA. KM13+971.8
STA. KM14+864.9
RC PILES, 450mm D
L=40m, N=79 NOS.
BORED PILES, 1500mm DIA.
L=40m, N=8 NOS.
BORED PILES, 1500mm DIA.
L=40m, N=8 NOS.
BORED PILES, 1500mm DIA.
L=40m, N=8 NOS.
BORED PILES, 1500mm DIA.
L=45m, N=4 NOS.
RC PILES, 450mm D
L=37m, N=5 NOS.
RC PILES, 450mm D
L=30m, N=79 NOS.
DATUM LEVEL: -75.00
GRADIENT
VERTICAL CURVE R=8150m
L=200.0m
SUPERELEVATION
DESIGN LEVELS (m)
EXISTING LEVELS (m)
CHAINAGE
PLAN (SCALE 1:1000)
PROJECT NAME
DETAILED DESIGN OF THE CAN THO BRIDGE CONSTRUCTION PROJECT
IMPLEMENTATION AGENCY
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
EXECUTING AGENCY
SOCIALIST REPUBLIC OF VIET NAM MINISTRY OF TRANSPORT (MOT) MY THUAN PROJECT MANAGEMENT UNIT
JICA STUDY TEAM
NIPPON KOEI CO.,LTD.
NAME
SIGNATURE
DATE
PREPARED BY
CHECKED BY
APPROVED BY
DRAWING TITLE
CAI RANG BRIDGE
GENERAL
GENERAL VIEW SHEET -1
DWG NO.

Appendix-5 Comparison of the Span Arrangement

LARGE TRA VA BRIDGE- Alternative 1	CONST.-COST
	SUPERSTRUCTURE 1.000 SUB-STRUCTURE 1.000 FOUNDATION 1.000 TOTAL 1.000

LARGE TRA VA BRIDGE- Alternative 2	CONST.-COST
	SUPERSTRUCTURE 0.703 SUB-STRUCTURE 1.045 FOUNDATION 1.045 TOTAL 0.850

Appendix-5 Comparison of the Span Arrangements

	GENERAL VIEW	STRUCTURAL FEATURE		
Tra On Bridge ALTERNATIVE-1	SIDE ELEVATION  PLAN 	TECHNICAL	TOTAL BRIDGE LENGTH L=260m NUMBER OF TOTAL SPAN : 5 SPANS 3-SPANS CONTINUOUS BOX GIRDER (56m+80m+56m) + COMPOSITE I-GIRDER(37m+31m) SKEW ANGLE OF BRIDGE =90 MIDDLE SPAN LENGTH =80m	
		CONSTRUCTION COST	ITEM	COST RATIO
			SUPERSTRUCTURE	1.000
			SUB STRUCTURE	1.000
			FOUNDATION	1.000
			TOTAL	1.000
Tra On Bridge ALTERNATIVE-2	SIDE ELEVATION  PLAN 	TECHNICAL	TOTAL BRIDGE LENGTH L=260m NUMBER OF TOTAL SPAN :7 SPANS 3-SPANS CONTINUOUS BOX GIRDER (56.5m+27.0m+36.5m) + COMPOSITE I-GIRDER (2@=63.8m 72.4m+2@=57.8m 68.4m)	
		CONSTRUCTION COST	ITEM	COST RATIO
			SUPERSTRUCTURE	0.867
			SUB STRUCTURE	1.098
			FOUNDATION	2.150
			TOTAL	0.968
Tra On Bridge ALTERNATIVE-3	 PLAN 	TECHNICAL	TOTAL BRIDGE LENGTH L=260 m NUMBER OF TOTAL SPAN : 7 SPANS 3-SPANS CONTINUOUS BOX GIRDER(40m+58.5m+40m) +COMPOSITE I-GIRDER (2@=63.7m+2@=57.8m) SKEW ANGLE OF BRIDGE =70 MIDDLE SPAN LENGTH =58.5m	
		CONSTRUCTION COST	ITEM	COST RATIO
			SUPERSTRUCTURE	0.873
			SUB STRUCTURE	1.098
			FOUNDATION	1.209
			TOTAL	0.982

APPENDIX-6

COMPOSITIONS AND PROPERTIES OF SOIL LAYERS

STA		B.P. ~ 4+500 (Package-1)	4+500 ~ 7+600	7+600 ~ 11+000 (Package-3)	11+000 ~ E.P (Package-3)
Bridge		- Large Tra Va - Small Tra Va - Tra On - Interchange No.54 Over bridge	-	- Cai Tac 1 - Cai Tac 2 - Cai Da - Interchange No.91B Over bridge - Rampway Bridge of Interchange No.91B	- Ba Mang - Cai Nai - Ap My - Cai Rang
No. of Bowling Point		D-1 ~ D-9	-	D-18 ~ D-21	D-22 ~ D-28
Layer C1	Depth	-	-	-	-
	N	1	1	1	1
	ϕ	5	5	4	4
	γ	16	16	16	16
	γ'	7	7	7	7
	C	10	10	10	10
	E0	2000	2000	2000	2000
	qu	30	30	35	20
Layer C2	Depth	-26 ~ -35	-	-27 ~ -20	-12 ~ -20
	N	8	12	18	20
	ϕ	14	14	14	14
	γ	19	19	19	19
	γ'	10	10	10	10
	C	20	20	50	50
	E0	5000	8000	12000	3500
	qu	60	150	220	150

* Notes:
- Depth: from Existing Ground Surface to the Surface of each Layer
- N: N value (Blows/300mm)
- ϕ: Friction Angle of Soil (Degree)
- γ: Unit Weight of Soil (kN/m3)
- γ': Dry Unit Weight of Soil (kN/m3)
- C: Cohesion (kN/m2)
- E0: Modulus of Deformation (kN/m2)
- qu: Unconfined Compression Strength (kN/m2)

* Friction of C1 Layer was ignored.

STA		B.P. ~ 4+500 (Package-1)	4+500 ~ 7+600 (Package-?)	7+600 ~ 11+000 (Package-3)	11+000 ~ E.P (Package-3)
Bridge		- Large Tra Va - Small Tra Va - Tra On - Interchange No.54 Over bridge	-	- Cai Tac 1 - Cai Tac 2 - Cai Da - Interchange No.91B Over bridge - Rampway Bridge of Interchange No.91B	- Ba Mang - Cai Nai - Ap My - Cai Rang
No. of Bowling Point		D-1 ~ D-9	-	D-18 ~ D-21	D-22 ~ D-28
		-	-	-	-
Layer S/St	N	-	20	-	-
	ϕ	-	10	-	-
	γ	-	18	-	-
	γ'	-	9	-	-
	C	-	10	-	-
	E0	-	13000	-	-
	qu	-	300	-	-
		-47 ~ -53	-	-41 ~ -43	-49 ~ -29
Layer St/C1	N	28	25	29	28
	ϕ	15	15	15	15
	γ	19.5	19.5	19.5	19.5
	γ'	10	10	10	10
	C	170	170	170	170
	E0	19000	17500	20000	19000
	qu	450	450	450	450
		-55 ~ -82	-	-70 ~ -55	-71 ~ -54
Layer S1	N	60	60	60	60
	ϕ	40	40	40	40
	γ	21	21	21	21
	γ'	12	12	12	12
	C	50	50	50	50
	E0	27000	27000	27000	27000
	qu	1000	1000	1000	1000

* Notes: Depth: from Existing Ground Surface to the Surface of each Layer
N: N value (Blows/300mm)
ϕ: Friction Angle of Soil (Degree)
γ: Unit Weight of Soil (kN/m3)
γ': Dry Unit Weight of Soil (kN/m3)
C: Cohesion (kN/m2)
E0: Modulus of Deformation (kN/m2)
qu: Unconfined Compression Strength (kN/m2)

* Friction of C1 Layer was ignored.

5.2 The Supplement for the Replies to the Comments on the Minutes of Meeting on 7 August 2000 in Hanoi, 26 September 2000

NIPPON KOEI CO.,LTD. *Consulting Engineers*

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To: Mr. Nguyen Viet Tien

Vice Minister, Ministry of Transport

Copy to: Mr. Do Huu Tri

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Telephone : 81-3 (5276) 3867
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Your ref. Our ref. Date 26th September, 2000

Subject: THE SUPPLEMENT FOR THE REPLYS TO THE COMMENTS ON THE MINUTES OF MEETING ON 7 AUGUST 2000 IN HANOI

Dear Sir,

This letter is the supplement for the official letter "FCOKO-3" sent on 6th September 2000, about the following 2 items that have not been replied by the JICA Study Team.

Item	Item Number of Minutes of Meeting	Item Number of FCOKO-3
- Standard for the Design of the Weak Soil	Item Number 2.2	Item Number 2
- Design of Tower Foundation of the Main Bridge	Item Number 3.4	Item Number 13

Best Regards,

Koji Nakai

Co Team Leader

JICA Study Team

D/D of the Can Tho Bridge

c.c.
- Mr. Vu Van Tri, Vice Chairman of TCQM of MOT
- Mr. Nguyen Xuan Hiep, My Thuan PMU of MOT
- Mr. Takao Kaibara, JICA Tokyo
- Mr. Yuichi Sugano, JICA Vietnam Office
- Mr. Tsuyoshi Matsumoto, JICA Quality Control Committee
- Mr. Hideo Ezaki, JBIC Tokyo
- Mr. Takayuki Sato, JBIC Vietnam Office
- Mr. Naoki Ariga, Nippon Koei Hanoi Office
- File

THE SUPPLEMENTS FOR THE REPLYS TO THE COMMENTS

ON THE MINUTES OF MEETING ON 7 AUGUST 2000 IN HANOI

25th September, 2000

As the supplements for the reply letter sent by the JICA Study Team on 6th September, the JICA Study Team prepared the replies as shown in the following. This letter also referred to the comments on the Minutes of Meeting on 7 August 2000 in Hanoi.

1. Standard for the Design of the Weak Soil (Item Number 2.2 of Minutes)

The Study Team translated the Vietnamese Standards provided by Dost at the end of September.

The comparison of the "Design Criteria applied for Can Tho Bridge Project" and the "Vietnamese Standards supplied by Dost" (22 TCVN244-98, 22TCN248-98, and 22TCN262-2000) was studied about the following items:

<1> Design Conditions at the Detail Design Stage
1. Stability Analysis
   - 1.1 Method of Analysis of the Stability, and Minimum Stability Coefficient K_{min}
   - 1.2 Effects of Seismic Force
2. Calculation of Consolidation Settlement
   - 2.1 Method of Calculation
   - 2.2 Immediate Settlement (Shear Settlement)
   - 2.3 Consolidation Settlement in the Long Term
   - 2.4 Depth of Soft Soil Layer utilized for the Calculation of Settlement
   - 2.5 Method of Calculation of Vertical Stress caused by the Loads of Embankment
   - 2.6 Method of Estimating the Degree of Consolidation

<2> Technical Specifications & Requirements at the Construction Supervision Stage
1. Requirements and Specifications for the Observation of Settlement
2. Residual Settlement
3. Over-Raise and Expansion of Road Shoulder
4. Requirement of Material of the Sand Blanket
   - 4.1 Material of Sand Blanket
   - 4.2 Thickness of Sand Blanket
5. Installation of Prefabricated Vertical Drain
6. Period of the Pre-Loading

Consequently, there are not so much differences for both of the results of design calculation and the technical requirements & specifications for construction supervision.

Moreover, the method of the adjustment of the settlement at site is defined in the Technical Specification with inspecting the actual condition. Accordingly, the results of the design works in this stage can be concluded as adequate and rational.

The detail of the comparison is summarized in the "Appendix-1".

2. **Design of Tower Foundation of the Main Bridge (Item Number 3.4 of Minutes)**

With considering the comments from Vietnamese side, the Study Team reviewed the design conditions of Tower Foundations of Main Bridges.

As reported by the reply letter sent on 6th September, the following design loads were already reviewed and clarified:

- Seismic Force (Earthquake Effect): 0.12
- Vessel Collision Force: Impact of 10,000 DWT vessel

Moreover, the scouring depth of individual foundation of tower was reviewed. The design condition of the scouring depth is as shown in the following:

Tower	Riverbed Fluctuation or Riverbank Erosion	Local Scouring	Total Scouring Depth	Remarks
North Tower (Vinh Long side)	15m	10m	25m	The vessel collision force was not studied because of the location of the tower. (On the ground)
South Tower (Can Tho side)	5m	15m	20m	

The riverbed fluctuation and riverbank erosion at towers were defined with considering the results of the hydrological analysis and the records of the long-term changes of the riverbed & the riverbank.

The tendency of the riverbank erosion on the Vinh Long side was identified more severe than that on the Can Tho side.

Moreover, because of the extension of the center span length from 500m to 550m, the location of the South Tower was replaced away from the area where the effect of the riverbed fluctuation was relatively large. Accordingly, the riverbed fluctuation at South Tower was defined smaller.

Total depths of the removed soils from the existing ground level are 25m for North Tower, and 20m for South Tower, respectively. The seismic force was studied under these conditions.

As an alternative, the seismic force was studied with the following scouring condition:

Tower	Riverbed Fluctuation or Riverbank Erosion	Local Scouring	Total Scouring Depth	Remarks
North Tower (Vinh Long side)	-	-	0m	The vessel collision force was not studied because of the location of the tower. (On the ground)
South Tower (Can Tho side)	5m	15m	20m	

In this alternative, the riverbank erosion predicted on the Vinh Long side was not considered. This is because of the low possibility of the occurrence of the huge earthquake and flood in a short period. Moreover, the riverbank protection works (masonry) was planned around the pilecap of North Tower.

As a result of the study, the composition of bore hole piles (Dia. = 3.0m, 40 piles for each tower) was not changed.

This is because of the following reasons:

- The soil layer located near the ground surface on the Vinh Long side is soft, namely, design N value is at most 5 and the depth is about 20m from the existing ground level. Its contribution for the vertical and the horizontal stability of the foundation is extremely low.

- For the overall balance and stability of the cable stayed bridge, the composition of piles of the North Tower contributes to the stability of the South Tower which design condition of foundation is severer than that of the North Tower.

Consequently, the JICA Study Team states that the composition of borehole piles of the original design is appropriate.

3. Appendix

Appendix-1:	The Detail of Comparison of the Standards for the Design of the Weak Soil	A4, 5 sheets

Concluded

<1> Design Conditions at the Detail Design Stage

1. Stability Analysis

1.1 Method of Analysis of the Stability, and Minimum Stability Coefficient K_{min}

<Design Criteria applied for the Project>	<Vietnamese Standard supplied by Dost>

- The following conditions were applied:
  - Method of slices with circular failure surface
  - K_{min} = 1.10
	- The following two cases are proposed:
	  (Case-1)
	  - Method of slices with circular failure surface
	  - K_{min} = 1.10
	  (Case-2)
	  - Bishop Method
	  - K_{min} = 1.40

1.2 Effects of Seismic Force

<Design Criteria applied for the Project>	<Vietnamese Standard supplied by Dost>
- Effects of seismic force were not considered, because the area around the project location is classified in Earthquake Level 6. * The estimation of seismic forces for the structures were separately defined based on both of the comments of the Institute of Geophysics and the definitions of AASHTO Specifications. This item was already replied with the official reply letter sent by the Study Team on 6th September.	- For the areas classified in Earthquake Level 7 or higher levels, the effects of seismic force should be studied.

2. Calculation of Consolidation Settlement

2.1 Method of Calculation

<Design Criteria applied for the Project>	<Vietnamese Standard supplied by Dost>
- Δe method was applied for the calculation of consolidation settlement. * Both of Δe method and Cc method are included in the standard calculation methods of the Japanese Standards. The difference of the calculated settlements between Δe method and Cc method is less than 10%.	- Cc method is to be applied for the calculation of consolidation settlement.

2.2 Immediate Settlement (Shear Settlement)	
<Design Criteria applied for the Project>	<Vietnamese Standard supplied by Dost>
- Immediate settlement was ignored because of the absence of the sand layers, with referring to the Japanese Standard.	- 10 ~ 40% of the consolidation settlement should be regarded as the immediate settlement.

2.3 Consolidation Settlement in the Long Term	
<Design Criteria applied for the Project>	<Vietnamese Standard supplied by Dost>
- 20cm was uniformly applied for the road embankments as the consolidation settlement in the long term. At the construction stage, this value (20cm) is reviewed and adjusted based on the field observation.	- No description and definition about this item.

2.4 Depth of Soft Soil Layer utilized for the Calculation of Settlement	
<Design Criteria applied for the Project>	<Vietnamese Standard supplied by Dost>
- The depth of all soft soil Layers was utilized for the calculation of settlement. * In some locations of road embankment, the result based on the Design Criteria of Can Tho Bridge Project was about 20cm more than the result based on the Vietnamese Standards.	- The depth from surface to the depth where the 15% of effective overburden pressure is effective was utilized for the calculation.

2.5 Method of Calculation of Vertical Stress caused by the Loads of Embankment	
<Design Criteria applied for the Project>	<Vietnamese Standard supplied by Dost>
- Bussinesq Equation was applied.	- The Graphic Chart of Osterberg should be applied. * The Graphic Chart of Osterberg is defined with utilizing the Bussinesq Equation, namely the theories of both methods are adjusted.

2.6 Method of Estimating the Degree of Consolidation	
<Design Criteria applied for the Project>	<Vietnamese Standard supplied by Dost>
- Terzaghi's Model of consolidation was applied. * The methods of both of the criteria and the standard are completely same.	- Terzaghi's Model of consolidation was applied.

<2> Technical Specifications & Requirements at the Construction Supervision Stage

1. Requirements and Specifications for the Observation of Settlement

<Design Criteria applied for the Project>	<Vietnamese Standard supplied by Dost>
- Three methods were explained in the Design Report, and the following limit was defined in one of these methods: - Maximum limit of settlement rate at the bottom of embankment of the center of roads: 15mm per day * With utilizing the other two methods, overall observation and adjustment can be accomplished based on the observed vertical and horizontal displacements.	- The following limits are defined: - Maximum limit of settlement rate at the bottom of embankment of the center of roads: 10mm per day - Maximum limit of movement rate in the horizontal direction at the both side of embankment: 5mm per day

2. Residual Settlement

<Design Criteria applied for the Project>	<Vietnamese Standard supplied by Dost>
- The following requirements were defined: 1) Degree of consolidation must be equal or more than 90%, or equal or less than 10cm. 2) The yearly settlement should be equal or less than 2cm after the construction is completed. * The requirement 2) was procured from the Vietnamese Standard.	- The ranges of residual settlement are defined from 10cm to 40cm in accordance with the locations of the roads.

3. Over-Raise and Expansion of Road Shoulder

<Design Criteria applied for the Project>	<Vietnamese Standard supplied by Dost>
- As the countermeasures against the residual settlement, the over-raise and expansion of Road Shoulder was proposed in the Technical Specification of the Tender Documents. * The thickness of over-raise and the width of expansion will be decided at the construction stage with inspecting the actual conditions of settlements.	- The expansion width of road shoulder is defined as follows: - Expansion width = Settlement/Ratio of Slope

4. Requirement of Material of the Sand Blanket

4.1 Material of Sand Blanket

<Design Criteria applied for the Project>	<Vietnamese Standard supplied by Dost>
- The technical requirement of material was based on ASTM (AASHTO) as mentioned in the Technical Specification of the Tender Documents. - The indexes of requirement are, "Grain Size Distribution" and "Ratio of Fine-Grained Soil". * These indexes are adjusted with the indexes defined in the Vietnamese Standards.	- The following indexes are defined: - Uniformity Coefficient: equal or more than 6 - Coefficient of Curvature: equal or more than 1

4.2 Thickness of Sand Blanket

<Design Criteria applied for the Project>	<Vietnamese Standard supplied by Dost>
- The Thickness of sand blanket was defined as 70cm with considering the travelling of the construction equipment. * The objectives of the installation of the sand blanket are as shown in the following: - To enhance the "Consolidated Drainage" - To keep the travelling of the construction equipment The target of "Consolidated Drainage" is releasing the excess pore water pressure caused by the loads of embankment. Accordingly, when the connections as shown below are ensured, the consolidated drainage will be successful. The thickness of sand blanket is not necessary to be equal or more than the settlement. - between the PVD and Sand Blanket - Sand Blanket and the open air	- The thickness of sand blanket must be equal or more than the settlement.

5. Installation of Prefabricated Vertical Drain

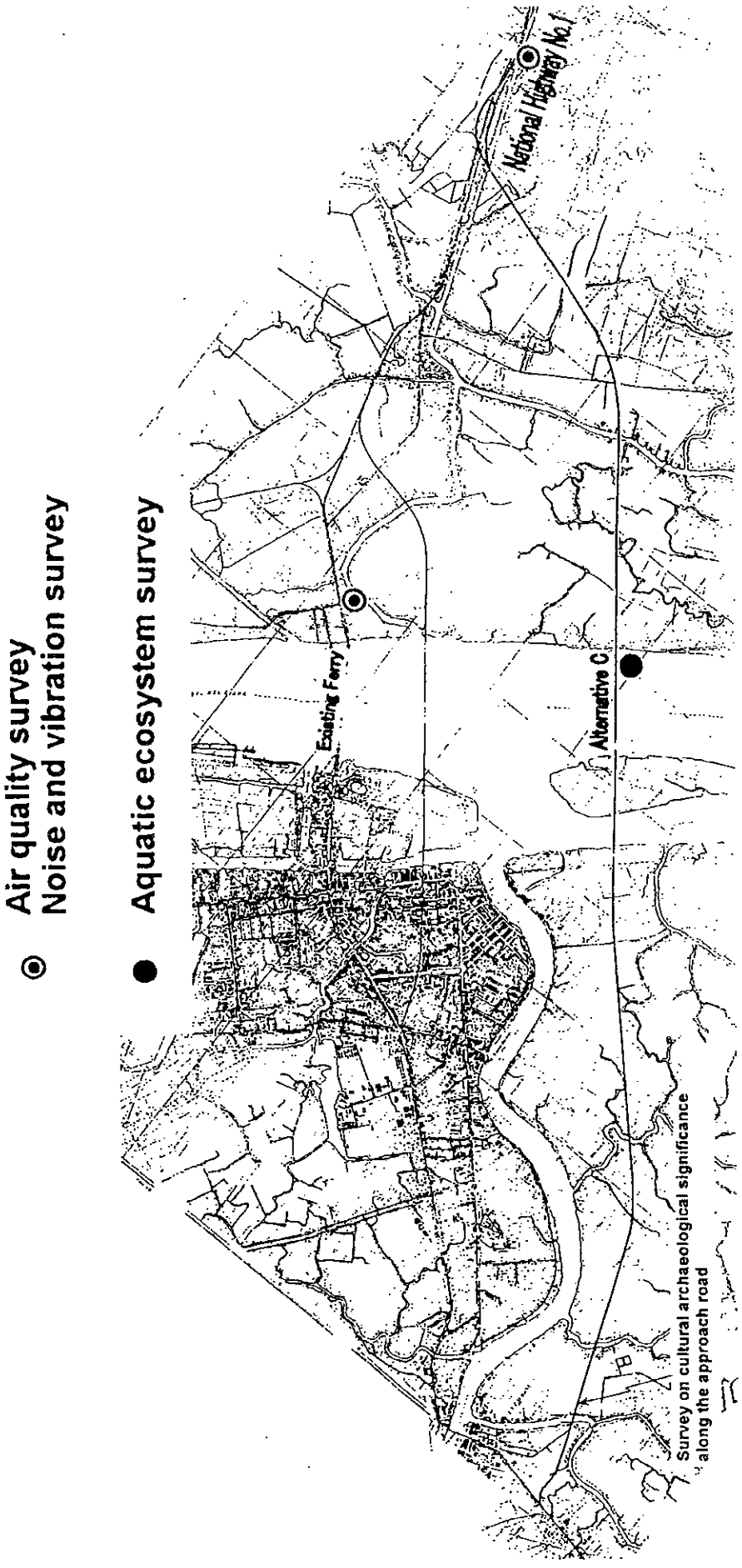
<Design Criteria applied for the Project>	<Vietnamese Standard supplied by Dost>
- The intervals are not less than 1.0m and not more than 2.0m. * The defined minimum interval is slightly smaller than that in Vietnamese Standard, however, it is possible to construct with utilizing the latest equipment.	- The intervals are not less than 1.3m and not more than 2.2m.

6. Period of the Pre-Loading

<Design Criteria applied for the Project>	<Vietnamese Standard supplied by Dost>
- The period of pre-loading was defined more than 6 months, as shown in the Drawings and the Technical Specification of the Tender Documents.	- The minimum period of pre-loading is defined as 6 months in case applying the paper vertical drain.

Appendix 6

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)



Location of the survey on natural environment carried out during the stage of Detailed Design

Aquatic ecosystem of Mekong River at the project area

I. Species identification

In June 1999 the EPC's EIA Study Team have carried out a survey on aquatic organisms at the project area. Samples have been taken at the bridge cross section in both high and low tidal levels. The study results show that in the study area 73 species of phytoplanktons, 37 species of zooplanktons and 33 species of benthic animals have been identified. The specie numbers of identified phylum of plankton and zoobenthos are listed in Tables 1,2,3

Table 1: Phytoplankton at the study area

Phylum	Identified species		High tidal situation		Low tidal situation	
	Number	%	Number	%	Number	%
Cyanophyta	13	17,8	4	10,0	12	22,2
Bacillariophyta	37	50,7	32	64,0	27	50,0
Chlorophyta	16	21,9	9	18,0	11	20,4
Euglenophyta	5	6,8	4	8,0	3	5,5
Dinophyta	1	1,4	none	none	1	1,8
Total	73	100	50	100	54	100

Table 2: Zooplankton at the study area

Phylum	Identified species		High tidal situation		Low tidal situation	
	Number	%	Number	%	Number	%
Rotatoria	11	29,7	5	21,7	10	28,6
Crustacea						
Cladocera	8	21,6	5	21,7	8	22,8
Copepoda	8	21,6	4	17,4	8	22,8
Ostracoda	1	2,7	1	4,3	1	2,8
Protozoa	2	5,4	2	8,6	1	2,8
Larva	7	18,9	6	26,1	7	20.0
Total	37	100	23	100	35	100

Table 3: Zoobenthos at the study area

Phylum	*Number of species*	*Percentage (%)*
Polychaeta	2	18,2
Oligochaeta	1	9,1
Crustacea	3	27,2
Mollusca:		
Gastropoda	3	27.2
Bivalvia	2	18.2
Total	11	100

The results shows that the number of plankton in high tidal flow is higher than that in low tidal level. The component of aquatic species clearly indicates the known specific characters of the Can Tho stage of the Mekong River. The area around the bridge cross section is strongly inffluenced by tide even in rainy season with high upstream discharge. Many sea-born species being representatives of Mekong Delta water bodies are observed at the study area, namely:

- Phytoplankton: *Coscinodiscus radiatus, Coscinodiscus subtilis, Biddulphia alternans, Synedra ulna, Nitzschia lorenziana.*

- Zooplankton: *Schmackeria bulbosa, Pseudodiaptomus beieri.*

- Zoobenthos: *Nephthys polybranchia, Pseudopolydora kempi* (Polychaeta), *Melita vietnamica, Grandidierella lignorum* (Crustacea), *Corbicula leviuscula, Corbicula castanea* (Mollusca - Bivalvia).

The survey was in early period of rainy season so far the river water has been slightly contaminated by acid water run off from acid sulfate soils. Several plankton species indicating weak-acid environment are also identified. These species are listed below:

- Phytoplankton: *Actinella guianensis, Epithemia turgida, Scenedesmus javaensis, Gonatozygon kinahani, Closterium moniliferum, ...*

- Zooplankton: *Lecane (Monostyla) bulla, Ilyocryptus halyi, Disparalona rostrata, Leydigia acanthocercoides, Biapertura intermedia, Tropodiaptomus vicinus, ...*

It is found that In Mekong river at Cantho area the representatives indicating nutrient richness and organic contamination are always occur. Those are also identified in this study including phytoplankton species: *Microcystis aeruginosa, Oscillatoria geitleriana, Oscillatoria acuta, Oscillatoria tenuis, Lyngbya limnetica, Synedra ulna, Melosira granulata, Fragilaria capucina, Euglena acus, Phacus longicauda;* zooplankton species: *Philodina roseola, Polyarthra vulgaris, Moina dubia, Mesocyclops leuckarti, Zoothamium arbuscula, Arcella vulgaris* ; and zoobenthos: *Nephthys polybranchia, Limnodrilus hoffmeisteri.*

II. Quantitative identification

- Phytoplankton

Population densities of phytoplankton in Mekong river in the study area vary from 303,300 to 425,000 cells/m^3. The dominant species are *Synedra ulna, Melosira granulata.* These species indicate high concentration of nutrient and organic contamination. The number of phytoplankton cells are relatively low due to the fact that river water with high discharge in the rainy season has high concentration of suspended solid, high turbidity that limits the growth of phytoplankton. The population density in high tide level is also higher than that in low tide.

- Zooplankton

Popilation density of zooplankton is also relatively low which varies from 527 to 2,312 individuals/m^3. *Nauplius copepoda* larva are dominant in low-tide time while *Bivalvia* larva are dominant in high-tide condition. The numbers of zooplankton in high tide is much more than that in low tide

- Zoobenthos:

The numbers of zoobenthos vary in a range of 360 - 1.110 individuals/m^2. Dominants species are *Assiminea brevicula* (Gastropoda), *Corbicula castanea* (Bivalvia) and *Limnodrilus hoffmeisteri* (Oligochaeta - Tubificidae). The population of *Nephthys polychaeta* (Polychaeta) is also high, that shows the inland migration of sea-born ognasims in Mekong delta is widely from estuarine. All identified zoobenthos are adaptable to fine mud being rich in organic humus

III. Fish caviar and juvenile fish

Fish investigation has carried out by special nets having sizes of D=50cm, L= 250cm, net screen = 150μm. Collection time for a sample is 15 minute.

Results are reviewed as below:

- High tidal situation

Water volume passing through the net 35m^3.

	Quantity (individuals)	*Size (mm)*	*Population (individuals/m^3)*
Zoe larva	74	1-2	2,1
Juvenile fish of Cypriniformes	28	3-5	0,8

- Low tidal level

Water volume passing through the net: 70,6m^3.

	Quantity (individuals)	*Size (mm)*	*Population (individuals/m^3)*
Zoe larva	51	1-2	0.7
Mysis larva	5	2-3	0,07
Juvenile fish of *Cypriniformes*	52	3-5	0,7

It shows that at high tidal condition shrimp larva migrate from estuarine upstream much than at low tidal condition, while the densities of juvenile fish in both situations are nearly equal

In both samples fish caviar has not been found. It may be explained that the survey time do not belong to spawning season in the downstream area of the Mekong Delta

Table 4
Phytoplankton species in the study area

Nº	Specie name	Collection condition	
		High tide	Low tide
	CYANOPHYTA		
1.	Microcystis aeruginosa		+
2.	Raphidiopsis mediterranea		+
3.	Gomphosphaeria lacustris		+
4.	Anabaenopsis elenkinii		+
5.	Oscillatoria acuta	+	+
6.	O. geitleriana	+	+
7.	O. limosa	+	+
8.	O. subbrevis		+
9.	O. tenuis		+
10.	Arthrospira jenneri	+	+
11.	Lyngbya hieronymusii	+	
12.	L. limnetica		+
13.	L. sp.		+
	BACILLARIOPHYTA		
14.	Melosira granulata	+	+
15.	M. varians	+	+
16.	Cyclotella comta	+	+
17.	Coscinodiscus radiatus	+	
18.	C. subtilis	+	+
19.	Biddulphia alternans	+	+
20.	Fragilaria capucina	+	+
21.	F. crotonensis	+	+
22.	Synedra ulna	+	+

23.	Actinella guianensis	+	
24.	Achnanthes brevipes	+	+
25.	Navicula ancilla	+	+
26.	N. arenaria	+	
27.	N. clementis	+	+
28.	N. inflexa	+	
29.	Pinnularia divergens	+	
30.	P. major	+	
31.	P. viridis	+	+
32.	Diploneis elliptica	+	
33.	Gyrosigma attenuatum		+
34.	G. littorale	+	+
35.	G. wansbeckii		+
36.	Amphora hyalina	+	
37.	Cymbella parva	+	+
38.	C. turgidula	+	+
39.	C. ventricosa		+
40.	Epithemia turgida v. granulata		+
41.	Nitzschia filiformis	+	
42.	N. lorenziana	+	+
43.	N. navicularis	+	+
44.	N. plana	+	
45.	Surirella elegans	+	+
46.	S. ovata		+
47.	S. robusta	+	+
48.	S. smithii	+	+
49.	S. striatula		+
50.	S. tenera	+	+
51.	Campylodiscus fastuosus	+	
	CHLOROPHYTA		
52.	Pediastrum duplex	+	+
53.	P. simplex	+	+
54.	P. simplex v. duodenarium	+	
55.	Scenedesmus acuminatus	+	
56.	S. javanensis		+
57.	S. quadricauda	+	+
58.	Gonatozygon kinahani		+
59.	Closterium acerosum		+
60.	C. acutum	+	
61.	C. kuetzingii		+
62.	C. macilentum	+	
63.	C. moniliferum		+
64.	C. venus	+	
65.	Euastrum ansatum		+
66.	Staurastrum natator		+
67.	Pithophora oedogonia	+	+
	EUGLENOPHYTA		
68.	Euglena acus	+	
69.	Phacus acuminatus	+	+

70.	P. longicauda	+	
71.	P. tortus		+
72.	Strombomonas longicauda	+	+
	DINOPHYTA		
73.	Peridinium gatunense		+
	Total number of species	50	54
	Population (cells/m^3)	425.000	303.300
	Dominant species	Melosira granulata	Synedra ulna
	Population of dominant species (cells/m^3)	128.800	107.500

Table 5
Zooplankton at the study area

Nº	Specie name	Collection condition	
		High tide	Low tide
	I. ROTATORIA		
	Philodinidae		
1.	Philodina roseola (Ehrenberg)		+
	Synchaetidae		
2.	Polyarthra vulgaris Carlin	+	+
	Asplanchnidae		
3.	Asplanchna sieboldi (Leydig)	+	+
	Lecanidae		
4.	Lecane (Monostyla) bulla (Gosse)		+
	Colurellidae		
5.	Lepadella patella (Muller)		+
	Brachionidae		
6.	Platyias quadricornis Ehrenberg		+
7.	Platyias patulus (Muller)	+	
8.	Keratella tropica (Apstein)		+
	Filiniidae		
9.	Filinia longiseta (Ehrenberg)	+	+
10.	Filinia brachiata (Rousselet)	+	+
11.	Tetramastix opoliensis Zacharias		+
	II. CLADOCERA		
	Macrothricidae		
12.	Ilyocryptus halyi Brady		+
	Daphniidae		
13.	Moina dubia de Guerne et Richard		+
14.	Ceriodaphnia rigaudi Richard	+	+
15.	Ceriodaphnia laticaudata O. F. Muller	+	+
	Chydoridae		
16.	Chydorus sphaericus (O. F. Muller)	+	+
17.	Disparalona rostrata (Koch)	+	+
18.	Leydigia acanthocercoides (Fischer)	+	+
19.	Biapertura intermedia (Sars)		+

	III. COPEPODA		
	Pseudodiaptomidae		
20.	Pseudodiaptomus beieri Brehm		+
21.	Schmackeria bulbosa Shen et Tai		+
	Diaptomidae		
22.	Tropodiaptomus vicinus Brehm		+
23.	Neodiaptomus visnu (Brehm)	+	+
	Cyclopidae		
24.	Microcyclops varicans (Sars)	+	+
25.	Mesocyclops leuckarti (Claus)		+
26.	Thermocyclops hyalinus (Rehberg)	+	+
	Chappuisiidae		
27.	Chappuisius singeri Chappuis	+	+
	IV. OSTRACODA		
	Cypridae		
28.	Heterocypris anomala Klie	+	+
	V. PROTOZOA		
	Vorticellidae		
29.	Zoothamium arbuscula Ehrenberg	+	+
	Arcellidae		
30.	Arcella vulgaris Ehrenberg	+	
	VI. LARVA		
31.	Nauplius copepoda	+	+
32.	Zoe	+	+
33.	Mysis	+	+
34.	Gastropoda	+	+
35.	Bivalvia	+	+
36.	Polychaeta larva	+	+
37.	Chironomidae		+
	Total number of species	23	35
	Population (individuals/m^3)	527	2.312
	Dominant species	Nauplius copepoda	Bivalvia larva
	Population of dominant species (individuals/m^3)	170	833

Table 6
Species and population of zoobenthos in the study area

Nº	Specie name	Sample collection site		
		CT1-1	CT1-2	CT1-3
	A. POLYCHAETA			
	I_ Errantia			
	Nephthydidae			
01	Nephthys polybranchia (Southern)	10	8	5
	II_ Sedentaria			
	Spionidae			
02	Pseudopolydora kempi (Southern)	2		1
	B. OLIGOCHAETA			
	Tubificidae			
03	Limnodrilus hoffmeisteri Clapareøde	15	15	26
	C. CRUSTACEA			
	I_ Amphipoda			
	Gammaridae			
04	Melita vietnamica Dang			1
05	Grandidierella lignorum Barnard			2
	II_ Decapoda			
06	Cua non	1	1	
	D. MOLLUSCA			
	I_ Gastropoda			
	Thiaridae			
07	Melanoides tuberculatus (Muller)	C	C	C
	Assimineidae			
08	Assiminea brevicula Pfeiffer	28	53	
	Lymnaeidae			
09	Lymnaea viridis Qouy et Gaimard	2	1	
	II_ Bivalvia			
	Corbiculidae			
10	Corbicula leviuscula Prime			1
11	Corbicula castanea Morelet	11	23	C
	Number of species	8	7	8
	Nuber of individuals	69	101	36
	Density (individuals/m^3	690	1.110	360

Results of the Surveys on Air Quality and Noise

The results of the survey on air quality and noise at the project area carried out by the EPC team in July 1999 are shown as followings.

Table 1 Results of noise level and car density

No	Time	Noise (dab) LE A					Car density (Unit / hour)			
		Average	L-50	L-Min	L-Max	L-Peak	> 10 ton	12 persons-<10 ton	4 - < 12 persons	Motor bicycle
1	K_1 (Km 2061 **National road N1**, 01/7/1999- 02/7/1999)									
	00 - 06h	66,3	46,7	36,9	90,4	103,3	45	24	11	23
	06h - 12h	71,4	67,4	51,4	99,2	123,1	4	60	52	250
	12h - 18h	75,1	66,8	41,6	107,5	123,1	10	37	63	216
	18h - 24h	85,9	62,3	41,6	112,3	123,4	24	37	40	96
	K_2 (Km 2070 **National road N1**, 03/7/1999- 04/7/1999)									
2	00 - 06h	65,3	51,3	41,6	90,6	109,9	24	63	5	68
	06h - 12h	69,6	66,1	54,3	95,2	113,9	23	57	21	633
	12h - 18h	70,5	64,6	49,3	96,2	123,1	26	81	24	453
	18h - 24h	68,4	63,0	51,6	99,8	122,9	28	81	25	336

Note: K1: 3km North to the Cantho Ferry (at Binhminh District)
K2: At Tran Phu street on the Southern Bank of Cantho ferry (Cantho City).

Table 2 Air Quality at K1

No	At Km 2061 National road N1 (K_1)	Concentration of pollutants (mg/m^3)		
		Dust	NO_2	Pb
Date 01/7/1999 (Thursday)				
1	00h - 03h	0.29	0.036	$4,2 \times 10^{-4}$
2	03h - 06h	0.31	0.039	$5,3 \times 10^{-4}$
3	06h - 09h	0.33	0.056	$6,4 \times 10^{-4}$
4	9h - 12h	0.35	0.046	$7,3 \times 10^{-4}$
5	12h - 15h	0.38	0.051	$5,4 \times 10^{-4}$
6	15h - 18h	0.30	0.053	$5,5 \times 10^{-4}$
7	18h - 21h	0.30	0.047	$6,4 \times 10^{-4}$
8	21h - 24h	0.28	0.048	$4,2 \times 10^{-4}$
Date 4/7/1999 (Sunday)				
9	00h - 03h	0.27	0.036	$4,1 \times 10^{-4}$
10	03h - 06h	0.31	0.040	$4,5 \times 10^{-4}$
11	06h - 09h	0.37	0.060	$6,3 \times 10^{-4}$
12	9h - 12h	0.35	0.063	$7,2 \times 10^{-4}$
13	12h - 15h	0.32	0.042	$5,0 \times 10^{-4}$
14	15h - 18h	0.33	0.061	$6,4 \times 10^{-4}$
15	18h - 21h	0.38	0.062	$7,2 \times 10^{-4}$
16	21h - 24h	0.27	0.035	$5,1 \times 10^{-4}$

Table 2 Air Quality at K1 (continueing)

No	At Km 2061 National road N1 (K_1)	Concentration of pollutants (mg/m^3)		
		Dust	NO_2	Pb
Date 6/7/1999 (Tuesday)				
17	00^h - 03^h	0.26	0.035	$4,2 \times 10^{-4}$
18	03^h - 06^h	0.28	0.038	$3,1 \times 10^{-4}$
19	06^h - 09^h	0.35	0.046	$5,5 \times 10^{-4}$
20	9^h - 12^h	0.33	0.056	$7,2 \times 10^{-4}$
21	12^h - 15^h	0.34	0.050	$6,3 \times 10^{-4}$
22	15^h - 18^h	0.34	0.052	$5,7 \times 10^{-4}$
23	18^h - 21^h	0.45	0.067	$6,4 \times 10^{-4}$
24	21^h - 24^h	0.28	0.053	$6,2 \times 10^{-4}$

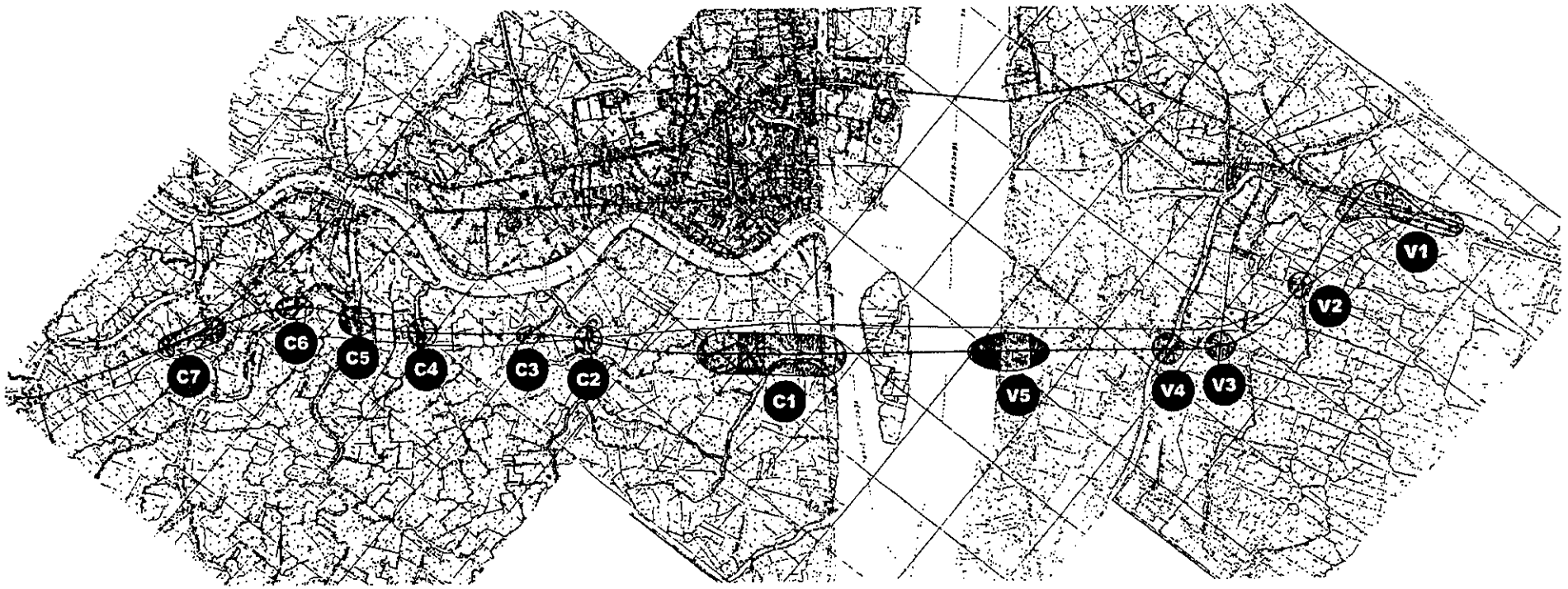
Table 3 Air quality at K2

	At Km 2070 National road N1 (K_2)	Concentration of pollutants (mg/m^3)		
		Dust	NO_2	Pb
Date 01/7/1999 (Thursday)				
1	00^h - 03^h	0,28	0.040	$4,7 \times 10^{-4}$
2	03^h - 6^h	0,29	0.058	$7,2 \times 10^{-4}$
3	6^h - 09^h	0,35	0.087	$8,4 \times 10^{-4}$
4	9^h - 12^h	0,39	0.074	$8,4 \times 10^{-4}$
5	12^h - 15^h	0,40	0.068	$48,1 \times 10^{-4}$
6	15^h - 18^h	0,38	0.083	$7,8 \times 10^{-4}$
7	18^h - 21^h	0,42	0.061	$6,5 \times 10^{-4}$
8	21^h - 24^h	0,30	0.048	$4,7 \times 10^{-4}$
Date 04/7/1999 (Sunday)				
9	00^h - 03^h	0,28	0.040	$5,1 \times 10^{-4}$
10	03^h - 06^h	0,28	0.051	$4,3 \times 10^{-4}$
11	06^h - 09^h	0,41	0.080	$7,6 \times 10^{-4}$
12	09^h - 12^h	0,38	0.066	$8,4 \times 10^{-4}$
13	12^h - 15^h	0,36	0.056	$9,3 \times 10^{-4}$
14	15^h - 18^h	0,33	0.086	$6,6 \times 10^{-4}$
15	18^h - 21^h	0,53	0.077	$8,7 \times 10^{-4}$
16	21^h - 24^h	0,31	0.049	$9,3 \times 10^{-4}$
Date 6/7/1999 (Tuesday)				
17	00^h - 03^h	0,28	0.049	$4,1 \times 10^{-4}$
18	03^h - 06^h	0,30	0.079	$6,3 \times 10^{-4}$
19	06^h - 09^h	0.38	0.086	$7,5 \times 10^{-4}$
20	9^h - 12^h	0.35	0.063	$9,8 \times 10^{-4}$
21	12^h - 15^h	0,33	0.059	$5,4 \times 10^{-4}$
22	15^h - 18^h	0,51	0.057	$8,5 \times 10^{-4}$
23	18^h - 21^h	0,39	0.063	$9,3 \times 10^{-4}$
24	21^h - 24^h	0,33	0.051	$4,8 \times 10^{-4}$

Table 10 Detail data on monitoring on transport density

Monitoring sites: Cantho Ferry
Monitoring time: 29/6/1999 - 6/7/1999

Time	Unit /hour											
	Car > 10 ton			**12 persons-<10 ton**			**4 - < 12 persons**			**Motor bicycle**		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
K_1 (Km 2061 **National road N1**, 01/7/1999- 02/7/1999)												
00 - 06^h	45	63(5^h)	31(2^h)	24	32(2^h)	13(1^h-2^h)	11	26(5^h)	0(1^{h}2^h)	23	103(5^h)	0(1^h-2^h)
06^h - 12^h	4	9(9^h-10^h)	0(6^h)	60	93(9^h)	18(8^h)	52	60(8^h)	24(10^h)	250	315(6^h)	150(8^h)
12^h - 18^h	10	21(13^{h}17^h)	3(16^h)	37	123(12^h)	15(14^h)	63	108(15^h)	33(13^h)	216	369(17^h)	111(13^h)
18^h - 24^h	24	65(22^h)	3(19^h)	37	69(19^h)	15(22^h)	40	84(18^h)	6(22^h)	96	210(18^h)	27(23^h)
K_2 (Km 2070 **National road N1**, 03/7/1999- 04/7/1999)												
00 - 06^h	24	33(4^h)	5(2^h)	63	93(1^h)	15(00^h)	5	15(4^h)	3(00^h)	68	129(4^h)	30(3^h)
06^h - 12^h	23	42(7^h)	5(10^h)	57	105(8^h)	10(10^h)	21	27(6^h)	3(23^h)	633	621(10^h)	534(6^h)
12^h - 18^h	26	45(16^h)	6(12^h)	81	126(14^h)	32(16^h)	24	51(12^h)	15(14^h)	453	750(15^h)	459(14^h)
18^h - 24^h	28	60(22^h)	5(19^h)	81	105(19^h)	27(21^h)	25	30(19^h)	15(21^h)	336	600(18^h)	122(23^h)



Location of the survey on socio-economic environment carried out during the stage of Detailed Design

PHIẾU ĐIỀU TRA KINH TẾ - XÃ HỘI
DỰ ÁN CẦU CẦN THƠ

A. THÔNG TIN VỀ NGƯỜI ĐƯỢC PHỎNG VẤN

1. Họ và tên: ..... 2. Giới tính: Nam/Nữ 3. Tuổi. .....

2. Dân tộc ☐ Kinh ☐ Hoa ☐ Khmer ☐ Khác

3. Ông/Bà có phải chủ hộ không? ☐ Có ☐ Không
Nếu không phải thì mối quan hệ với chủ hộ như thế nào?
☐ vợ/chồng ☐ anh/chị/em ☐ con ☐ bố/mẹ ☐ quan hệ khác (.....)

B. THÀNH PHẦN GIA ĐÌNH

1 Gia đình ông/bà có bao nhiêu người? ..... người
(gồm: ..... vợ/chồng ..... anh/chị/em ..... con .... cha/mẹ ..... khác)

2. Có bao nhiêu trẻ em trong tuổi đi học ? ..... người

3. Có bao nhiêu người trên 18 tuổi? ..... người

4. Có bao nhiêu người già yếu? ..... người

C. THU NHẬP CỦA HỘ GIA ĐÌNH

1.Tổng thu nhập hàng năm của hộ gia đình là bao nhiêu?
☐ < 3.000.000 đ ☐ 3.000.000 - 5.000.000 đ ☐ 5.000.000 - 7.000.000 đ
☐ 7.000.000 - 9.000.000 đ ☐ 9.000.000 đ - 15.000.000 đ ☐ > 15.000.000 đ

2. Nguồn thu nhập chính của gia đình Ông/Bà là gì?
☐ tiền lương/tiền công ☐ làm vườn/trồng lúa ☐ đánh cá/chăn nuôi
☐ kinh doanh ☐ nguồn khác

3. Những ai là người đóng góp nguồn thu nhập chính này?
☐ người được phỏng vấn
☐ người khác (quan hệ với chủ hộ: ☐ vợ/chồng ☐ anh/chị/em ☐ con
☐ cha/mẹ ☐ quan hệ khác)

4. Các nguồn thu nhập phụ của gia đình Ông/Bà là gì ?
(Đề nghị cho biết tỷ lệ của chúng so với tổng thu nhập)
☐ tiền lương/tiền công (..... %) ☐ làm vườn/trồng lúa (..... %)
☐ đánh cá/chăn nuôi (..... %) ☐ kinh doanh (..... %)
☐ nguồn khác (..... %)

5. Những ai là người đóng góp chính trong các khoản thu nhập phụ này?
☐ người được phỏng vấn ☐ vợ/chồng ☐ anh/chị/em
☐ con ☐ cha/mẹ ☐ người khác

6. Có ai trong gia đình Ông/Bà đã qua khóa đào tạo nào về nghề nghiệp chưa?
☐ không ☐ có - Khóa đào tạo gì ?.....
- Thời gian đào tạo? ..... tháng

D TÌNH TRẠNG NHÀ Ở VÀ ĐẤT Ở

1. Gia đình Ông/Bà đã cư ngụ ở đây bao lâu? ..... năm

2. Ông/Bà có ngôi nhà là do?
☐ tự xây ☐ thừa kế ☐ mua ☐ được Nhà nước cấp
☐ thuê của người khác ☐ thuê của Nhà nước ☐ lý do khác

3. Ngôi nhà này xây dựng từ khi nào? năm 19 .... (bao nhiêu năm .....)

4. Nhà của Ông/Bà thuộc loại cấp nào (Phân loại theo Thông tư 05/BXD/TT)
☐ nhà cấp 1 (nhà lầu kiên cố) ☐ nhà cấp 2 (gạch, mái bằng) ☐ nhà cấp 3 (gạch, mái ngói) ☐ nhà cấp 4 (nhà tạm)

5. Diện tích mảnh đất Ông/Bà đang ở (gồm cả vườn, ao) ..... m^2.

6. Đất ở hiện nay Ông/bà có giấy chứng nhận quyền SDĐ không? ☐ có ☐ không
Nếu có giấy chứng nhận SDĐ thì giấy ghi diện tích các loại đất là bao nhiêu:
Diện tích đất ở (thổ cư) ..... m^2; diện tích đất vườn (cây ăn quả) ..... m^2;
Diện tích đất trồng lúa, chăn nuôi..... m^2; đất khác ..... m^2

7. Ông/Bà bắt đầu sử dụng mảnh đất này từ khi nào? năm 19 .....

8. Ông/Bà có mảnh đất này là do đâu?
☐ tự khai phá đất hoang ☐ thừa kế ☐ mua ☐ thuê của người khác
☐ người khác cho ở nhờ ☐ được Nhà nước cấp ☐ Nhà nước tạm cấp

E. NHÀ Ở VÀ CÁC ĐẤT KHÁC CỦA GIA ĐÌNH

1. Ngoài ngôi nhà này Ông/Bà có ngôi nhà nào ở nơi khác không? ☐ có ☐ không
Nếu có thì ở đâu? .....
Phường (xã) ..... Quận (huyện) ..... Tỉnh (TP) .....
Diện tích mảnh đất đó? ..... m^2. Diện tích ngôi nhà..... m^2

2. Ngoài mảnh đất này Ông/Bà có mảnh đất nào khác nữa sử dụng cho trồng trọt hoặc kinh doanh không? ☐ có ☐ không
Nếu có thì tổng diện tích các mảnh đất đó là bao nhiêu..... m^2

3. Các mảnh đất đó ở đâu? ☐ ở trong cùng huyện ☐ ở huyện khác
Nếu ở cùng huyện thì cách nhà của Ông/Bà bao xa? Cách nhà khoảng ..... mét.

4. Mảnh đất đó dùng làm gì:
☐ ruộng lúa ☐ kinh doanh ☐ đất trồng cây (loại cây.....)
☐ trang trại gia đình ☐ bỏ hoang ☐ mục đích khác (.....)

5. Ông/bà có giấy chứng nhận quyền sử dụng đất này không? ☐ có ☐ không

F. TRẺ EM ĐI HỌC, CHĂM SÓC SỨC KHỎE, MUA BÁN, GIẢI TRÍ ...

1. Nếu trong gia đình Ông/Bà có trẻ em đi học, thì các em học ở đâu?
trường tiểu học, cách nhà ở ..... m
(có phải sử dụng phà Cần Thơ ☐ có ☐ không)
trung học, cách nhà ..... m
(có phải sử dụng phà Cần Thơ ☐ có ☐ không)

2. Nếu gia đình Ông/Bà có người bệnh thì bệnh viện hoặc trạm y tế gần nhất có thể đến khám bệnh là ở đâu?

y tế huyện, cách nhà ..... m
(có phải sử dụng phà Cần Thơ ☐ có ☐ không)
bệnh viện, cách nhà ..... m
(có phải sử dụng phà Cần Thơ ☐ có ☐ không)

3. Có người nào trong gia đình Ông/Bà bị mắc bệnh về hô hấp mà được thừa nhận do đường giao thông gần nhà gây ra không? ☐ có ☐ không

4. Gia đình Ông/Bà có thường xuyên đi sang bên kia sông Hậu để mua sắm không?
☐ hàng ngày ☐ hàng tuần ☐ hàng tháng ☐ vài lần trong năm

5. Gia đình Ông/Bà có thường xuyên đi sang bên kia sông Hậu để giải trí không?
☐ hàng ngày ☐ hàng tuần ☐ hàng tháng ☐ vài lần trong năm

G THÔNG TIN VỀ DỰ ÁN XÂY DỰNG CẦU

1. Ông/bà có biết thông tin về dự án xây dựng cầu Cần Thơ qua sông Hậu không?
☐ không
☐ có (từ nguồn thông tin nào: ☐ báo chí ☐ đài/TV ☐ tin đồn ☐ nguồn khác
Nghe vào thời gian nào? ..... tuần trước. ..... tháng trước. ..... năm trước)

2. Ông/bà nghĩ gì về dự án xây dựng cầu Cần Thơ qua sông Hậu?
☐ tán thành dự án ☐ phản đối dự án ☐ không có ý kiến

3. Phà Cần Thơ hiện nay có quan trọng đối với ông/bà không? ☐ không ☐ có
(Nếu có thì vì lý do nào? ☐ phương tiện kinh doanh
☐ phương tiện qua sông để đi học, mua sắm, giải trí ...
☐ lý do khác

4. Những vấn đề gì liên quan đến Ông/Bà nhiều nhất nếu như cầu được xây dựng (đề nghị chọn ít nhất là 3 câu trả lời trong danh mục câu trả lời phía dưới đây)
☐ nơi cư ngụ và đất nông nghiệp
☐ di chuyển mồ mả ông bà
☐ gián đoạn học của trẻ em
☐ giảm thu nhập
☐ sự đền bù không công bằng do mất đất và chỗ ở
☐ suy thoái môi trường tự nhiên
☐ ô nhiễm do số lượng phương tiện giao thông tăng lên
☐ tăng tai nạn, lan truyền bệnh tật
☐ đền bù không đủ để xây dựng cuộc sống mới
☐ khó khăn trong thiết lập mối quan hệ hàng xóm mới
☐ lý do khác (.....)

5. Nếu cầu được xây dựng thì ông/bà có hy vọng rằng người của gia đình có thể làm việc như là công nhân xây dựng không?
☐ không ☐ có (bao nhiêu người có thể làm thợ xây dựng: ..... người)

6. Gia đình Ông/bà dự định sẽ làm gì khi cầu được xây dựng xong?
☐ trồng trọt nhiều hơn nữa để tăng thu nhập ☐ kinh doanh các mặt hàng khác
☐ không ý kiến
☐ dự định khác (.....)

H VẤN ĐỀ ĐỀN BÙ CHO ĐẤT VÀ CHỖ Ở

1.Nếu đất của Ông/Bà bị thu hồi để thực hiện dự án xây cầu thì gia đình Ông/Bà dự định sẽ làm gì?

Đề nghị trả lời bằng cách chọn một trong số các câu hỏi dưới đây:

☐ nhận các khoản đền bù, hỗ trợ bằng tiền mặt và tự lo chỗ ở, cuộc sống mới tại:
☐ trong huyện ☐ ngoài huyện

☐ nhận các khoản đền bù, hỗ trợ bằng tiền mặt để tự tìm chỗ ở mới trong địa phương hiện tại và đề nghị chính quyền địa phương cấp đất để canh tác làm ăn.

☐ không nhận tiền đền bù, hỗ trợ nhưng muốn chính quyền địa phương cấp đất ở chỗ khác để làm nhà và canh tác.

Trong trường hợp này, Ông/Bà muốn nhà ở và đất canh tác mới ở đâu?

☐ đến khu tái định cư quy hoạch bởi chính quyền và khu có cơ sở hạ tầng như điện, nước, điện thoại, thuận tiện đi lại và gần trường học bệnh viện
☐ đến nơi nào đó gần chỗ ở và chỗ canh tác cũ, dọc theo tuyến đường mới
☐ ở gần xã/thành phố nơi mà họ hàng Ông/Bà đang sinh sống
☐ đến chỗ khác (.....)

2. Ông/Bà có muốn được chính quyền tổ chức cho Ông/Bà thăm quan một khu định cư mới của nhân dân bị ảnh hưởng bởi dự án cầu Mỹ Thuận không? ☐ có ☐ không

3. Nếu như Ông/Bà có những ý kiến nào khác về vấn đề đền bù, xin vui lòng cho biết một cách ngắn gọn ở dưới:

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I Ý KIẾN CỦA ÔNG/BÀ VỀ NHỮNG VẤN ĐỀ KHÁC

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Bản phỏng vấn số...../..... Mã số.....

☐ phía Vĩnh Long
☐ phía Cần Thơ

Địa chỉ hộ gia đình: .....
Thời gian phỏng vấn.....
Người phỏng vấn.....

CUỘC KHẢO SÁT BỔ SUNG - LẦN 1
THU THẬP Ý KIẾN CÁC HỘ DÂN BỊ ẢNH HƯỞNG BỞI DỰ ÁN XÂY DỰNG CẦU CẦN THƠ VỀ VẤN ĐỀ TÁI ĐỊNH CƯ

Ngày .... tháng 11 năm 1999

(A) Về người được phỏng vấn

1. Họ và tên: ..... 2. Giới tính: Nam/Nữ 3. Tuổi: .....
4. Địa chỉ: .....
5. Đã có tham gia vào cuộc phỏng vấn thăm dò ý kiến do Trung Tâm Bảo Vệ Môi Trường tổ chức vào khoảng Tháng 7/1999, hay không ?
   ☐ có tham gia ☐ không tham gia

Bản phỏng vấn
Số: .....
☐ Phía Vĩnh Long
☐ Phía Cần Thơ

(B) Thu nhập của hộ gia đình

1. Tổng thu nhập hàng năm của hộ Ông/Bà?
   ☐ < 3.000.000VND ☐ 3.000.000 ≈ 5.000.000 VND ☐ 5.000.000 ≈ 7.000.000VND
   ☐ 7.000.000 ≈ 9.000.000 VND ☐ > 9.000.000 VND
2. Nguồn thu nhập chính của gia đình Ông/Bà là gì?
   ☐ tiền lương/ tiền công, ☐ làm vườn/trồng lúa, ☐ đánh cá/ chăn nuôi,
   ☐ kinh doanh, ☐ nguồn khác

(C) Tình trạng nhà ở, và đất ở

1. Gia đình Ông/Bà đã ở ngôi nhà này được bao lâu? .....năm
2. Ông/Bà có ngôi nhà là do?
   ☐ tự xây dựng ☐ thừa kế ☐ mua ☐ được nhà nước cấp
   ☐ thuê của người khác ☐ thuê của nhà nước ☐ lý do khác
3. Nhà của Ông/Bà đã xây được bao lâu? năm 19..... (bao nhiêu năm .....)
4. Nhà của Ông/Bà thuộc loại cấp nào? (Phân loại theo Thông tư 05/ BXD/TT)
   ☐ Nhà cấp 1 (nhà lầu kiên cố) ☐ Nhà cấp 2 (gạch, mái bằng) ☐ Nhà cấp 3 (gạch, mái ngói) ☐ Nhà cấp 4 (nhà tạm)
5. Diện tích mảnh đất Ông/Bà đang ở (gồm cả vườn và ao) là bao nhiêu mét vuông?
   - .....m^2
6. Ông/Bà có Giấy chứng nhận Quyền Sử Dụng Đất cho khu đất này không?
   ☐ có ☐ không
   - Nếu có Giấy CNQSDĐ thì giấy này ghi diện tích các loại đất là bao nhiêu:
     a) Diện tích đất ở (thổ cư) ..... m^2
     b) Diện tích đất vườn (đất quả) ..... m^2
     c) Diện tích đất trồng lúa, chăn nuôi ..... m^2
     d) Diện tích các đất khác ..... m^2
7. Ông/Bà bắt đầu sử dụng mảnh đất này từ khi nào? năm 19.....
8. Ông/Bà có mảnh đất này là do đâu?
   ☐ tự khai phá đất hoang ☐ thừa kế ☐ mua ☐ thuê của người khác
   ☐ người khác cho ở nhờ ☐ được nhà nước cấp ☐ nhà nước tạm cấp

(D) Nhà ở và các đất khác của gia đình

1. Ngoài ngôi nhà này Ông/Bà có ngôi nhà nào ở nơi khác không? ☐ có ☐ không
   Nếu có thì ngôi nhà này ở đâu?: - Phường (xã) .....
   Quận (Huyện) ..... Tỉnh (TP) .....
   Diện tích mảnh đất đó? ..... m^2 Diện tích ngôi nhà ..... m^2

2. Ngoài mảnh đất này Ông/Bà có mảnh đất nào khác nữa để sử dụng cho việc canh tác hoặc kinh doanh không?: ☐ có ☐ không
   Nếu có thì tổng diện tích các mảnh đất đó là bao nhiêu: .....m^2
3. Các mảnh đất đó ở đâu? ☐ ở cùng trong huyện ☐ ở huyện khác
   Nếu ở cùng trong huyện thì cách nhà của Ông/Bà bao xa?
   Cách nhà khoảng .....m
4. Mảnh đất đó đang được sử dụng vào việc gì?
   ☐ trồng lúa ☐ kinh doanh ☐ trồng cây (loại cây:.....)
   ☐ bỏ hoang ☐ ấp trại của gia đình ☐ mục đích khác (.....)
5. Ông/Bà có giấy chứng nhận quyền sử dụng các khu đất này không? ☐ có ☐ không

(E) Về vấn đề đền bù cho đất và di dời chỗ ở

1. Nếu đất của Ông/Bà bị thu hồi để trưng dụng vào dự án xây cầu, thì gia đình Ông/Bà dự định sẽ làm gì? (Xin trả lời bằng cách chọn một trong số các câu hỏi dưới đây:)
   ☐ Tái định cư tại chỗ (nhận các khoản đền bù, và tự xây nhà ở trong khu đất hiện tại còn lại không bị ảnh hưởng bởi dự án, hoặc tại phần đất khác, có sẵn hay sẽ mua, gần nhà ở hiện tại.)
   ☐ Tự tìm nơi tái định cư (nhận các khoản đền bù, và tự tìm đất mới để xây nhà tại một nơi nào đó không thuộc khu đất đang ở hiện tại).
   ☐ Nhận đất xây nhà trong khu tái định cư tập trung được quy hoạch bởi dự án (xin tham khảo tài liệu giới thiệu đính kèm)
2. Nếu Ông/Bà có ý định vào ở trong một khu tái định cư tập trung, thì Ông/Bà mong muốn có được một lô đất ở đó với diện tích là bao nhiêu mét vuông:
   ☐ khoảng 40 m^2, ☐ từ 41 đến 60 m^2, ☐ từ 61 đến 80 m^2,
   ☐ từ 81 đến 100 m^2, ☐ từ 101 đến 120 m^2, ☐ từ 121 đến 140 m^2,
   ☐ từ 141 đến 160 m^2, ☐ từ 161 đến 180 m^2, ☐ trên 181m^2
3. Nếu Ông/Bà có những ý kiến nào khác về vấn đề đền bù, xin vui lòng cho biết một cách ngắn gọn ở dưới:

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